NIGERIA

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FINANCING OPTIONS FOR SECTORAL ADAPTATION PROGRAMMES

CONTEXT

Development mandate. To support the integration of climate risks into long-term economic and adaptation planning as well as evidence-based policymaking for adaptation to climate change in Nigeria, the German Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (BMUV) has commissioned the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) with the project Climate Resilient Economic Development (CRED) and Policy Dialogue and Knowledge Management on Climate Protection Strategies (DIAPOL-CE). Together the projects support the Government of Nigeria with modelling the macroeconomic effects of selected adaptation strategies.

Nigeria is Africa's most populous nation and has one of the continent's largest economies, with agriculture playing a central role in livelihoods, food security and employment. The Agriculture, Forestry and Fishing sector contributes about 22% of national GDP and employs about 36% of the labour force. Despite this importance, Nigerian agriculture remains highly vulnerable to climate change, with over 90% of farmland rain-fed and highly exposed to droughts, floods, erratic rainfall and land degradation. These climate-related risks have a significant impact on food production and rural livelihoods, exacerbating poverty and food insecurity, particularly in the most climate-sensitive regions of the country.

CONTENTS

To support strategic planning for adaptation finance, the GIZ projects, conducted a comprehensive assessment of international climate finance flows to Nigeria from 2017 to 2022 and developed a Project Idea Note (PIN) to guide the design of bankable adaptation investments in priority sectors. The assessment found that Nigeria will receive approximately USD 6.7 billion in international public climate finance over this period, with 54% of this being allocated to adaptation.

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Agriculture was identified as the leading recipient sector, particularly for interventions related to climate-smart agriculture and sustainable water management. Building on these findings, the Project Idea Note (PIN), Adapting Nigeria's Agriculture Sector: Building Resilience through Irrigation and Watershed Management was developed as a blueprint for scalable adaptation investments. Table 1 depicts the selected adaptation programmes in more detail.

The purpose of this country report is to summarise the key findings and lessons learned from the implementation of the GIZ projects in Nigeria. Drawing on insights from the assessment of climate finance flows, consultations with national stakeholders, and the development of a PIN aimed at designing bankable adaptation projects, the report presents consolidated analyses and conclusions that can inform future planning and investment strategies. The work resulted in the design of a PIN focused on climate-smart irrigation and watershed management as a scalable and finance-ready adaptation solution.

ADAPTATION MEASURE	BRIEF DESCRIPTION OF RELEVANCE AND SCOPE
CLIMATE-SMART IRRIGATION SYSTEMS	Climate-smart irrigation systems, such as solar-powered drip and sprinkler technologies, are important adaptation programmes to strengthen water use efficiency in Nigeria's agricultural sector. Given the country's reliance on rain-fed agriculture and exposure to droughts and erratic rainfall, these systems increase crop productivity, reduce water stress and allow for multiple cropping seasons.
USE OF WETLANDS	Improving watershed management is crucial for enhancing climate resilience in flood-prone and ecologically vulnerable areas of Nigeria. Within the broader framework of watershed management, restoring degraded wetlands will improve water retention, regulate flood risks and support agricultural livelihoods. Healthy wetlands enhance ecosystem services and contribute to carbon sequestration, providing both adaptation and mitigation benefits.

1. ADAPTATION PRIORITIES AND FINANCING NEEDS

1.1. Adaptation priorities identified

Policy scenario and priority setting. The GIZ projects in Nigeria applied dynamic computable general equilibrium (CGE) modelling to identify priority adaptation strategies in agriculture under different fiscal and climate policy scenarios. These were grounded in national planning frameworks including the Nationally Determined Contributions (NDC) – 2021 Update, the Long-Term Low-Emission Development Strategy (LT-LEDS) – 2060, Nigeria Agenda 2050, the National Development Plan (2021–2025), and the National Agricultural Technology and Innovation Policy (2022–2027), among others. The analysis focused on identifying cost-effective adaptation actions with strong economic multipliers. While the modelling exercise and cost benefit analysis has not been finalised, as of now, the intermediary outputs helped articulate and prioritise viable policy options and informed the development of proposals for adaptation-focused investment in water resource management and climate-smart farming practices.

Climate vulnerability and production stress. Modelling outcomes confirm Nigeria's high exposure to climate shocks such as flooding, prolonged droughts, desertification, and erratic rainfall. More than 38.6% of the population faces food insecurity, while the consensus of models points to significantly lower yield predictions as a consequence of climate change. Yields in key staples like rice, maize, and cassava could decline by up to 30% by mid-century without adequate adaptation programmes. Agriculture remains largely rain-fed (>90%), making it highly sensitive to changing precipitation patterns. Land degradation, pest outbreaks, and heatwaves further threaten agricultural productivity and rural livelihoods.

Key measures in crop and livestock systems into measures that can be easily implemented by farmers and measures that require substantial investments, infrastructure and policy support. While "soft" measures deliver strong economic returns and can be rapidly scaled among smallholder farmers, "hard" interventions play a crucial long-term role in building

systemic resilience and supporting climate-smart agricultural transformation. The "soft" measures, include the widespread adoption of climate-resilient crop varieties, mulching and mixed farming, and the scaling up of small-scale irrigation (e.g., dry-season farming). Agroforestry was identified as a high-impact measure to restore degraded soils and enhance carbon sequestration. These soft interventions, many with benefit-cost ratios (BCRs) between 2.4 and 3.2, offer immediate resilience benefits at the farm level.

Irrigation infrastructure (BCR ~1.1) and wetland use (BCR ~ 1.5) were recommended to support building long-term systemic resilience and supporting climate-smart agricultural transformation. These priority measures are particularly relevant given the country's dual exposure to seasonal flooding and water scarcity and require substantial (external) support.

Macroeconomic modelling. The GIZ_CoPS CGE model is designed to assess the economy-wide impacts of scaling up climate-smart agriculture (CSA) in Nigeria. It captures how agricultural adaptation policies affect value added across agro-industrial linkages, employment, trade balances and household welfare. The model shows how the adoption of CSA, particularly investments in irrigation, watershed management and improved inputs, increases productivity and import substitution. Between 2016 and 2019, Nigeria's cumulative agricultural imports reached ₦3.35 trillion, significantly higher than exports of ₦803 billion. By 2021, annual food imports will reach $2.71 billion. The model highlights that reducing this import dependence through adaptation investments, such as expanding irrigated agriculture and resilient crop production, would directly improve the trade balance. In addition, agriculture, forestry and agro-processing contribute more than 22.7% to Nigeria's GDP, and the agricultural sector in particular (mainly at the subsistence level) employs more than 36% of the labour force, of which 50-60% are women. This reinforces the relevance of the intervention proposed in the PIN, which strategically aims to expand irrigation, rehabilitate wetlands and provide financial support to smallholder farmers to stabilise macroeconomic indicators and reduce Nigeria's dependence on food imports.

1.2. Adaptation funding needs

Relevance of agriculture in adaptation finance. The climate finance flow assessment for Nigeria confirms that the agriculture sector is a key priority for adaptation finance because of its foundational role in supporting food security, employment, and poverty alleviation. Without interventions, climate-related hazards such as drought, flooding, erratic rainfall, and land degradation have serious implications for productivity and rural livelihoods. As a result, agriculture is identified as a core area for adaptation in national policy frameworks including Nigeria's Nationally Determined Contributions, Long-Term Low-Emission Development Strategy, and the Project Idea Note focused on irrigation and watershed management (such as wetland restoration).

Volume and allocation of adaptation finance. From 2017 to 2022, Nigeria received an estimated 6.7 billion US dollars in international public climate finance. Out of this total, 3.6 billion US dollars, representing 54%, was allocated for adaptation. Agriculture, forestry, and fishing received the largest share of adaptation finance, amounting to 1.3 billion US dollars. This reflects the high priority placed on agriculture by international development partners and its relevance in building resilience.

Funding distribution within the agriculture sector. Within the agriculture sector, 87% of adaptation finance was delivered through debt instruments, mostly from multilateral development banks. Livestock-related activities received 263 million US dollars, which is about 20% of the total finance for agriculture. In contrast, only 60 million US dollars was allocated for agricultural water resources such as irrigation systems, reservoirs, and groundwater development. This amount was entirely provided through grants from the Food and Agriculture Organization.

Estimated adaptation investment needs. According to Nigeria's NDC Implementation Framework (2023–2030), the country will require an estimated 189 billion US dollars in total climate investment, with 114.63 billion US dollars (or approximately 6%) dedicated to adaptation-related measures. The water sector represents the largest adaptation investment need at 105.68 billion US

dollars, followed by the Forest and Land Use sector (28.92 billion US dollars) and agriculture (6.75 billion US dollars).

Pipeline and readiness of adaptation projects. Nigeria's climate finance pipeline includes several projects aligned with adaptation priorities in the agriculture and water sectors. In particular, the World Bank's proposed Rural Access and Agricultural Marketing Project (USD 550 million in total) and the Sustainable Power and Irrigation for Nigeria Project (USD 700 million in total) represent large-scale investments with direct relevance to climate-resilient infrastructure and water access. In agriculture, projects such as the GEF-supported Transformation of Food Systems (USD 68.33 million) and the Great Green Wall Initiative's Dryland Ecosystem Restoration (USD 1.4 billion in co-financing) reflect efforts to regenerate degraded landscapes and promote sustainable practices. The Acumen Resilient Agriculture Fund II (GCF) and circular economy initiatives targeting plastic pollution and sustainable land use further enrich the adaptation finance landscape.

2. IDENTIFYING FINANCING OPTIONS FOR SELECTED ADAPTION MEASURES

2.1. Overcoming key barriers for adaptation programmes in selected priority sectors

Barriers to climate adaptation in agriculture and water. Nigeria's vulnerabilities are compounded by weak regulatory enforcement and insufficient access to climate finance. Based on findings from the Climate Finance Flow Assessment and insights from stakeholder consultations under the GIZ CRED and DIAPOL-CE projects, several core barriers were identified that hinder the implementation of effective adaptation programmes in Nigeria's agriculture and water sectors. These barriers fall into institutional, technological, regulatory, financial, and economic categories, and informed the design of tailored responses proposed in the PIN.

Institutional and policy-level challenges. Despite the presence of several national strategies promoting climate-smart agriculture and sustainable land and water management, implementation, enforcement and monitoring is weak. Mandates are often overlapping or unclear between the Federal Ministry of Agriculture, the Ministry of Environment, and the Ministry of Water Resources and across federal, state, and local levels. Additionally, limited capacity within public institutions further limit progress, especially at subnational levels. To overcome these barriers, the PIN proposes strengthening inter-agency coordination and establishing multi-stakeholder platforms that bring together public, private, and civil society actors. The project also supports the development of an implementation plan for climate-resilient agricultural strategies and improvements to the land tenure framework, which is currently a key obstacle for investment in sustainable infrastructure.

Technological barriers and proposed solutions. On the technology front, smallholder farmers face major constraints in accessing climate-smart irrigation systems and sustainable water management tools. The penetration of technologies such as solar-powered pumps, drip and sprinkler irrigation, and water harvesting systems remain extremely limited, particularly in the northern states. Poor extension networks and lack of technical skills further limit adoption. To address these challenges, the project will invest in the deployment of appropriate irrigation and water retention technologies, coupled with training programs for farmers. Capacity building will focus on the operation and maintenance of new systems, as well as broader climate-smart practices such as mulching, soil health management, and use of resilient crop varieties. The project also promotes access to climate and weather information systems to improve decision-making and enable better risk management.

Financial and economic barriers and proposed solutions. Nigeria's smallholder farmers, face high upfront costs for adaptation investments and limited access to affordable credit. Most loans available come with high interest rates and short tenors that are not suited for agricultural investments. Moreover, many farmers are unaware of available financial products or lack the documentation required to qualify for loans. Insurance coverage is quite limited, despite the growing frequency of climate-induced shocks. To address these constraints, the project proposes the establishment of an Agriculture Support Facility (ASF)

to provide concessional loans, performance-based grants, and technical assistance tailored to smallholder needs. In parallel, partnerships with local financial institutions will be developed to roll out tailored credit and insurance products, such as weather-index and yield-index insurance schemes. By de-risking lending and improving farmers' financial literacy, the project aims to create a sustainable financing ecosystem for climate-smart agriculture in Nigeria.

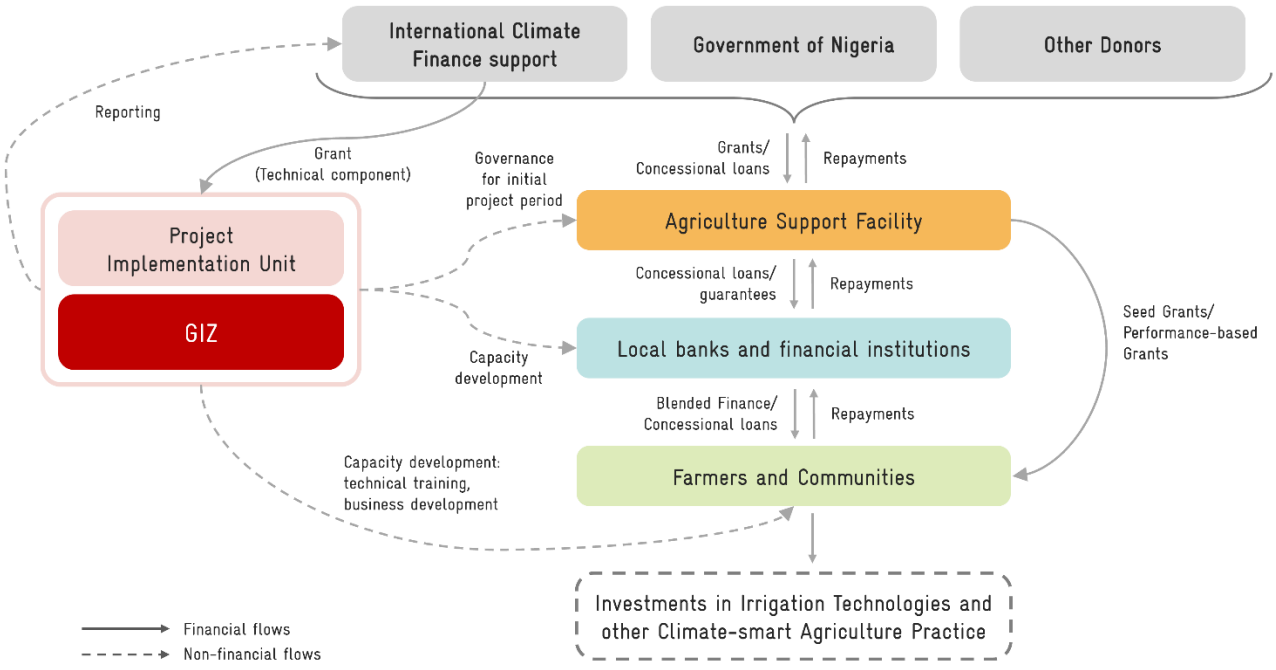
Outputs. The project aims to enhance the climate resilience of Nigeria's agricultural sector by expanding access to modern irrigation infrastructure and restoring critical watershed ecosystems. These efforts are expected to reduce climate vulnerability among smallholder farmers, improve water productivity, and support food security. The core of the intervention is the establishment of an ASF which will provide concessional loans and performance-based grants to de-risk and stimulate private investment in climate-smart agriculture, particularly irrigation and wetland restoration.

Key technical interventions include the deployment of solar-powered drip and sprinkler irrigation systems, construction of small-scale water retention structures, and restoration of degraded wetlands. Complementary actions will improve land management, strengthen farmer training programs, and facilitate access to climate advisory services. Capacity-building measures will target smallholder farmers, extension officers, and financial institutions, with a strong focus on gender equality and inclusion.

The project will also support the integration of climate adaptation considerations into national policies and planning models. It will assist with policy implementation, develop updated guidelines for sustainable agriculture, and promote land tenure security. Knowledge-sharing platforms and digital tools will be introduced to disseminate best practices and improve data-driven decision-making.

Financing structure. The estimated project budget includes a technical component of USD 1.7 million and a financial component of USD 70 million over an envisage period of five years. The financial structure follows a multi-instrument model that blends grants, concessional lending, and performance incentives to address affordability barriers and attract private sector participation.

Figure 1 - Financing structure for the PIN



Key elements of the financing model include:

- Concessional loans provided through the ASF to support investments in CSA technologies, particularly for irrigation systems through an on-lending approach and the collaboration with local financial institutions.
- Performance-based grants to incentivise farmers to adopt climate-resilient practices and or facilitate investments into public infrastructure and address the barrier of high capital costs.
- Technical assistance funding to build institutional capacity, develop tailored financial products, and train farmers and local stakeholders.

Figure 1 illustrates the flow of funds, where the initial capital for the ASF will be sourced from international climate finance donors and development partners, complemented by government contributions. Local financial institutions will act as intermediaries, channelling ASF resources to farmers through simplified procedures and tailored loan products.

To ensure long-term sustainability, the ASF will operate as a revolving fund, reinvesting loan repayments into future projects. Complementary financing instruments, such as insurance schemes (e.g., weather and yield-index products), guarantees, and co-financing mechanisms with private banks, will be explored. The structure aims to deliver both climate and economic returns, while catalysing large-scale investment in climate-smart agriculture across Nigeria's most vulnerable states.

2.2. Opportunities of climate finance for adaptation programmes

Strategic groundwork for adaptation planning and finance. Nigeria has made substantial progress in defining climate adaptation priorities, particularly in agriculture, forestry, land use, and water resources. The country's updated Nationally Determined Contribution (NDC) Implementation Framework estimates a total investment need of USD 189 billion from 2023 to 2030, with over USD 114 billion required for adaptation-related activities (including adaptation co-benefits). Agriculture, water management, and sustainable land use stand out as priority sectors, underlining the central role of climate-smart irrigation, watershed restoration, and ecosystem management in building resilience. The Climate Finance Flow Assessment (2024) further identified that between 2017 and 2022, Nigeria mobilised approximately USD 6.7 billion in international public climate finance, of which 54% was allocated to adaptation, with agriculture receiving USD 1.3 billion. However, this funding remains insufficient relative to the sector's exposure to climate shocks and its foundational role in livelihoods and food security.

Key investment barriers. Consultations with national stakeholders and analysis from the PIN reveal systemic barriers across institutional, technical, and financial dimensions that hinder the implementation and scaling of adaptation investments. Regulatory challenges include inconsistent policy enforcement, unclear land tenure, and fragmented mandates among institutions responsible for agriculture, water, and environment. Technically, there is limited adoption of modern irrigation systems, poor infrastructure maintenance, and weak extension networks. Financially, smallholder farmers face high upfront costs, limited access to affordable credit, and low penetration of agricultural insurance products. Perceived investment risks are amplified by climate-related uncertainties and underdeveloped climate data systems, discouraging both public and private actors. The Climate Finance Flow Assessment also underscored that 83% of adaptation funding is delivered through debt instruments, even for vulnerable sectors, revealing a misalignment between financial instrument design and sector needs.

Scaling up adaptation. The PIN offers a pathway to overcome these barriers through an integrated, climate finance-ready approach. It proposes a blended finance structure combining concessional loans, results-based grants, and technical assistance to support investments in efficient irrigation systems and wetland restoration. The project foresees the establishment of a dedicated ASF to provide tailored financial products to smallholder farmers, while enhancing the role of local financial institutions as intermediaries. Financial reforms and newly developed business models tailored specifically for smallholder farmers will enable substantial investments in climate-smart agriculture at

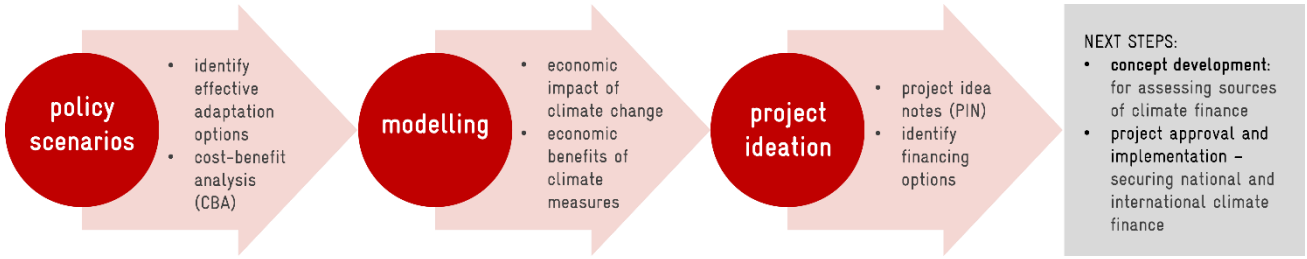
scale, continuing independently beyond the direct support of the project. International funds such as the Green Climate Fund, Global Environment Facility, and World Bank can support by providing seed capital and concessional financing, while the Nigerian government can contribute through co-financing and policy harmonisation. A total pipeline of nearly USD 3 billion in agriculture and water-related climate investments, identified through the 2024 pipeline analysis, further reinforces the readiness for scaling.

Adaptation unlocks opportunity. Investing in adaptation in Nigeria is not only critical for reducing climate vulnerability, but also for catalysing economic resilience, rural transformation, and food security. The PIN demonstrates that well-targeted investments can also advance mitigation goals, for example through solar-powered irrigation and wetland carbon sinks, aligning with Nigeria's broader transition to low-emission development. With agriculture accounting for up to 30% of Nigeria's greenhouse gas emissions, adaptation and mitigation co-benefits offer further incentives for climate funders.

2.2.1. Next steps and opportunities of climate finance for selected adaptation programmes in Nigeria:

The developed PIN demonstrates how access to climate finance sources can be enhanced through the formulation of project concepts that fit national priorities and the needs of the Nigerian population, while also resonating with investment criteria of international funds. Figure 2 shows the development process for the PIN.

Figure 2 - Process of developing the PINs



Source: GIZ-CRED programme

Next steps and opportunities of climate finance for selected adaptation programmes in Nigeria:

- To unlock international adaptation finance, Nigeria should prioritise translating the PIN and future ideas into full, bankable proposals aligned with the requirements of key climate funds, such as the Green Climate Fund, Global Environment Facility, and Adaptation Fund. This process requires detailed financial structuring, clarification of executing roles, and alignment with national planning frameworks such as the NDC Implementation Framework and LT-LEDS. Emphasis should be placed on identifying scalable demonstration sites and conducting feasibility assessments to underpin funding requests with robust data and implementation plans.
- The current PIN currently regards watershed management as a whole, with the key embedded measures of irrigation infrastructure and wetland restoration across six distinct states. For instance, the GCF offers a simplified approval process for projects of up to 25 million USD. During the further development process of the PIN, it is worth evaluating if the focus can be narrowed to stay within that limit, while increasing the pace of project approval.
- Establishing a dedicated, flexible financial mechanism, such as the ASF, is important for channelling concessional capital to smallholder

farmers and de-risking adaptation investments. To ensure long-term sustainability and scale, the ASF should be embedded in national structures like the National Agricultural Development Fund (NADF) and designed to facilitate blended finance models.

› To strengthen Nigeria's climate finance architecture, proactive coordination with development partners is essential. This includes structured engagement with the World Bank, AfDB, GCF, and bilateral partners to identify co-investment opportunities along clearly defined sectoral pipelines. The 2024 project pipeline already outlines several planned investments across agriculture and water, including large-scale irrigation projects and ecosystem-based adaptation initiatives. These pipelines should be further aligned with donor modalities and investment criteria through joint planning workshops and co-financing dialogues. Importantly, integrating adaptation considerations into macro-planning and public finance systems will enhance transparency, donor confidence, and predictability of funding flows.

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