



Climate Change and Socio-Economic Development in Nigeria

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LIST OF ACRONYMS/ABBREVIATIONS

AFOLU	Agriculture, Forestry and Other Land Use
ASLR	Accelerated Sea-Level Rise
BEVs	Battery Electric Vehicles
BNRCC	Building Nigeria's Response to Climate Change
BRT	Bus Rapid Transit
CIDA	Canadian International Development Agency
CO₂	Carbon Dioxide
CRI	Climate Risk Index
CSA	Climate-Smart Agriculture
OCHA	(United Nations') Office for the Coordination of Humanitarian Affairs
DCC	Department of Climate Change
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit
DG	Director-General
ECN	Energy Commission of Nigeria
ESN	Eastern Security Network
ETP	Energy Transition Plan
FAO	Food and Agriculture Organisation
FCT	Federal Capital Territory
FMARD	Federal Ministry of Agriculture and Rural Development
FGoN	Federal Government of Nigeria
GRADE	The Global Rapid (Post Disaster) Damage Estimation
GCF	Green Climate Finance
GDP	Gross Domestic Product
GHGs	Greenhouse Gases
GW	Gigawatts
IPOB	Independent People of Biafra
ICCC	Inter-Ministerial Committee on Climate Change
IPCC	Intergovernmental Panel on Climate Change
IRENA	International Renewable Energy Agency
ISWAP	Islamic State in West Africa Province
KP	Kyoto Protocol
LT-LEDs	Long Term Low GHG Emission Development Strategies
CH₄	Methane
MDAs	Ministries, Departments, and Agencies
MRV	Monitoring, Reporting, and Verification
NAF	National Adaptation Framework
NAP	National Adaptation Process
NARF	National Agricultural Resilience Framework
NASPA-CCN	National Adaptation Strategy and Plan of Action
NATIP	National Agricultural Technology and Innovation Plan

NBC	National Broadcasting Commission
NCCP	National Climate Change Programme
NCCC	National Council on Climate Change
NDCs	Nationally Determined Contributions
NITDA	National Information Technology Development Agency
NOA	National Orientation Agency
NPCC	National Policy on Climate Change
NBS	Nature-Based Solutions
NETP	Nigeria Energy Transition Plan
N₂O	Nitrous Oxide
NGOs	Non-Government Organisations
PA	Paris Agreement
REEEP	Renewable Energy and Energy Efficiency Project
UNFCCC	United Nations Framework Convention on Climate Change
US-EXIM Bank	US Export-Import Bank
VAT	Value Added Tax
VEOs	Violent Extremist Organisations

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EXECUTIVE SUMMARY

Climate change is increasing hunger, poverty, disease-burden, migration, conflict and insecurity in Nigeria. It is damaging infrastructure, changing Nigeria's coastlines, fuelling desertification, producing water scarcity, facilitating erosion and resulting in the loss of revenue for states and the national government. The total economic cost of climate change to Nigeria is estimated to be about USD100 billion cumulatively. Climate change may also cause Nigeria to lose trillions of dollars in stranded assets. With these far-reaching negative effects on the country's human and natural systems, climate change has the potential to jeopardise the country's economic development and alter its geographical, social, and political trajectory for decades or centuries. Some of the repercussions of climate change on the nation may be irreversible. Therefore, it should be evident that climate change is not a marginal or peripheral issue that the government and the people of Nigeria can take lightly.



The total economic cost of climate change to Nigeria is estimated to be about USD100 billion cumulatively

Even though climate change poses significant threats to Nigeria's economic development, it also presents an opportunity to diversify the economy, expand the country's energy portfolio, address energy security concerns, and increase global economic competitiveness. To transform climate change from a significant threat into an opportunity requires deliberate planning supported by immediate, bold and courageous action.

There is evidence that successive Nigerian governments recognise the enormous threat of climate change and the necessity for action, as indicated by a plethora of policy declarations, documents, and a new National Climate Change law. However, actual action is still behind schedule. The government has not yet established a clear roadmap for the effective and comprehensive implementation of key policies and commitments, and there are no clear budgetary provisions for their implementation.

Transitioning to a green economy is a complex endeavour that requires meticulous planning, stakeholder participation, and a dedication to sustainable development. Leveraging climate action to pursue economic development in Nigeria is not only a viable but essential strategy. Incorporating climate considerations into economic development strategies can result in inclusive and sustainable growth. Such a move can provide Nigeria with excellent opportunities to construct a climate-resilient economy that not only promotes growth and reduces poverty, but also creates good green jobs and contributes to the reduction of greenhouse gas emissions and environmental sustainability. By proactively addressing the issue of stranded assets, Nigeria will be able to position itself for a more resilient and prosperous future.

The emphasis should be on finding methods to industrialise and transition without substantially increasing the country's emissions profile. To accomplish this, Nigeria will need to implement mitigation and adaptation strategies that considerably enhance its macroeconomic stability, economic transformation, and job creation, while minimising

the negative impacts of climate change on development.

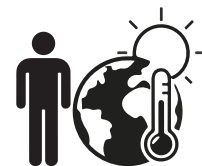
The global transition from a high-carbon economy to a low-carbon economy is already well underway through a multitude of international and national initiatives many of which are led by high-polluting industrialised nations that are keen to transform their economies and position their countries as net beneficiaries of the new global green economy. These strategies and investments will inevitably alter the global political, economic and geopolitical landscape, producing winners and losers across the world. Whether Nigeria will swim or sink in the face of climate change and the global green growth transition will depend on its willingness to take urgent action now and re-align its national development strategies towards a low-carbon economic future.

HIGHLIGHTS

There is a scientific consensus that human activities have resulted in the rapid and widespread warming of the planet with catastrophic consequences.

The industrial revolution ushered much of the developed world to an era of unprecedented mechanisation and economic prosperity based on the burning of fossil fuel. But it is now evident that decades of dumping of Greenhouse Gases (GHGs) in the atmosphere have altered the very climatic system upon which development has depended and now pose a significant threat to the survival of humankind.

The evidence and scientific consensus on climate change have compelled much of the global community to a search for ways to adapt to the impact of climate change and to transition economies to low-carbon paths. The human-induced rapid changes in the global average surface temperature and long-term weather patterns across the world and consequent negative impacts on human and natural systems have resulted in increased rethinking of key economic ideas, practices, and political institutions that have been the bedrock of human civilisation for decades. The significance of this is that how Nigeria fares with regards to climate change will be shaped not just by what Nigeria chooses to do but also by the actions and activities of actors beyond Nigeria's borders.



Scientific evidence indicates that Nigeria is experiencing rapid climate change with figures suggesting the situation will get worse with time. Since the 1980s, the temperature over Nigeria has risen significantly, and climate projections show a significant increase in temperature across all ecological zones in the next few decades. Based on the results of various climate model scenarios published in Nigeria's Third National Communication and Nigeria's Climate Risk Profile, temperatures across Nigeria are expected to increase by 2.9°C to as much as 5.7°C by end of the century. Nighttime temperatures, currently between 20°C and 27°C, are expected to increase by as much as 4.7°C. The impacts of climate change manifest in rising temperatures, variable rainfall, increases in the frequency or intensity of some extreme weather events, such as floods and droughts, and rising sea levels.

Climate change is compounding poverty challenges in Nigeria and impeding the attainment of Sustainable Development Goals (SDGs) in the country. Climate impacts are complex, interrelated and they affect several aspects of our lives and

well-being. It is evident that climate change is compromising Nigeria's economic development through multiple and compound negative impacts. Nigeria is very vulnerable to the impacts of climate change as much of its agricultural sector, which contributes about 24% to its GDP, is rain-fed and climate-sensitive. Other sectors of the economy such as health, transportation, energy, and water resources are also vulnerable to the impacts of climate change.



Agriculture is one of the sectors most sensitive to global warming in Nigeria and a major source of climate-induced economic loss in the country. Agriculture is a crucial sector in Nigeria, employing a significant portion of the population and contributing to food security and economic growth. Climate change could result in the decline of agricultural productivity between 10 to 25 percent by 2080¹. For some areas in the northern part of the country, the decline in yield in rainfed agriculture could be as much as 50 percent. Increased warming trends will also make the storage of root crops and vegetables challenging for farmers without access to refrigerators, thereby increasing the already high level of post-harvest loss. In 2021, the Global Hunger Index ranked Nigeria as 103rd out of 116 countries.² Climate change could contribute towards further worsening these realities. Given that Nigeria has 35 million children under the age of five, of which 12 million are stunted, with 23.5 million being anaemic owing to poor nutrition³, the threat posed by climate change has the potential to further worsen the situation.

Climate change will worsen water-scarcity challenges in the country. The World Bank predicts that climate change would lead to a drop of 25% in the amount of water that is available in Nigeria by the year 2050. This will significantly affect water supply for agriculture, industry, and home consumption. Reduced water availability will also pose severe threats to irrigation agriculture, industrial activities, and domestic water supply, threatening the livelihoods of farmers/labourers (employment) and GDP.



Climate change will alter Nigeria's coastlines, result in displacement of hundreds of thousands of people and possibly the submergence and disappearance of Nigerian communities. Calculations show that the potential increase in sea levels due to global warming, known as accelerated sea-level rise (ASLR), for Nigeria ranges from 0.5 to 1 metre. This would result in the radical alteration of Nigeria's coast line. A shoreline retreat of 100 metres is expected by the year 2060, with worst-case scenarios predicting erosion rate of up to 600 metres by the year 2060. With ASLR of about 1.0 m (in no development and no mitigation/adaptation measures scenario), about 75% of the delta could be lost. Capital values at risk could be as high as US\$17.5 billion.



1 Cervigni, R., Riccardo, V., and Monia, S, eds. 2013. *Toward Climate-Resilient Development in Nigeria*. Directions in Development. Washington, DC: World Bank

2 Mohammed Hadiza and Badi'a Hassan Ramatu, "Mitigating the Effects of Climate Change to Achieve Food Security in Nigeria", *BusinessDay*. <https://businessday.ng/opinion/article/mitigating-the-effects-of-climate-change-to-achieve-food-security-in-nigeria/>

3 Ihejirika Iviw Patience, "How Climate Change, Insecurity Is Exacerbating Nigeria's Malnutrition Burden", *Leadership*. <https://leadership.ng/how-climate-change-insecurity-is-exacerbating-nigerias-malnutrition-burden/>

Flooding represents one of the most widespread and recurring impact of climate change in Nigeria.

The Global Rapid (Post Disaster) Damage Estimation (GRADE)⁴ Assessment report presented by the Minister of Humanitarian Affairs, Disaster Management and Social Development on the 2022 flooding indicated that all 36 states and the Federal Capital Territory were affected by the floods, with varying degrees of damages. According to the report of the United Nations Office for the Coordination of Humanitarian Affairs (OCHA)⁵, over 3.2 million people spread over 34 of the 36 States in the country were affected by the flood, with over 600 deaths and 1.4 million people displaced. In addition, more than 569,000 hectares of farmland were damaged by floods, at the height of harvest seasons, which may further aggravate the already precarious food insecurity in the country. Nigeria reportedly lost an estimated \$6.68 billion.

Climate change will increase the case of malaria burden in Nigeria. Malaria is a major public health concern in Nigeria, with an estimated 68 million cases and 194 000 deaths due to the disease in 2021. Nigeria has the highest burden of malaria globally, accounting for nearly 27% of the global malaria burden. A recent study finds that climate change could result in an additional 4.7 million cases of malaria in Nigeria per year by 2050.⁶ The economic impacts of these diseases include increased healthcare costs, loss of workdays, and decreased productivity. One study suggests that the economic burden of malaria in Nigeria is estimated to be around \$1.1 billion annually.⁷



It is hard to accurately calculate the economic cost of climate change in Nigeria but available estimates suggest a cumulative of up to \$100 billion by 2020 and \$460 billion by 2050. In 2006, the World Bank assumed that between 2-10% of Nigeria's Gross Domestic Investment and about 40% of official development assistance would be sensitive to climate change.⁸ A more recent estimate indicates that without climate-proofing Nigeria's economy and society through concrete adaptation action, it is estimated that climate change will cost the country between 6% and 30% of its GDP by 2050, equivalent to a cumulative loss of \$100-460 billion.⁹ In addition, estimates for losses in the country's priority sectors (agriculture, water resources, health and transport), without adequate mitigating measures are at \$3.06 billion annually from 2020 which is expected to rise to about \$5.50 billion in 2050.¹⁰ Without climate-



4 GRADE is developed by the World Bank's Disaster-Resilience Analytics and Solutions (D-RAS) Team

5 Nigeria Flood Response: Flash Update 2 OCHA - <https://reliefweb.int/report/nigeria/nigeria-floods-response-flash-update-2-last-updated-1-november-2022>

6 Ogonnaya, U., Ajayi, C. A., Uzochukwu, B. S. C., & Nduka, I. I. (2021). Malaria burden in Nigeria: A systematic review and meta-analysis. PLOS ONE, 16(1),

7 Sonaiya et al. (2017),

8 World Bank, 2006. Investment framework for clean energy and development. World Bank, Washington, DC., USA.

9 Federal Ministry of Environment (2021). *National Climate Change Policy for Nigeria*. Abuja: Federal Ministry of Environment, p. 9.

10 Federal Ministry of Environment (2021). *Nigeria's Adaptation Communication to the United Nations Framework Convention on Climate Change*. Abuja: Federal Ministry of Environment,

proofing, an expected project life of 30 years could be truncated to 20 years.

Nigeria can lose billions and up to trillions in stranded assets due to climate change and global climate policy action.

Asset stranding is the process of collapsing expectations of future profits from invested capital (the asset) as a result of disruptive policy and/or technological change.¹¹ As the world attempts to achieve net-zero carbon emissions and penalise climate-unfriendly investments and activities, vast quantities of recoverable fossil fuels will have to remain underground in order to stabilise the global climate and energy-intensive equipment will have to be retired at a quicker pace in favour of less carbon-intensive ones.¹² With this transition, therefore, many assets will become stranded.



Climate change offers opportunities for economic competitiveness, energy security, and sustainable development.

Even though climate change poses significant threats to Nigeria's economic development, it also presents an opportunity to diversify the economy, expand the energy portfolio, address energy security concerns, and increase global economic competitiveness. Climate change also offers opportunities to strengthened integrated agriculture, forest, and water management by promoting climate-smart agriculture (CSA) and integrated water and coastal management, reducing deforestation. Far-reaching opportunities also exist in the areas of better natural gas management, green transportation and low carbon housing.



The Government of Nigeria recognises the challenge that the climate crisis poses to its development, and that there is a need to address the challenge for national sustainable development, however, action has not kept pace with pronouncements and pledges.

The government has put in place several policies in response to climate change. These include an ambitious Nationally Determined Contributions (NDC), the Energy Transition Plan (ETP), National Climate Policy (NCP), a Long-term Vision (LTV) and an innovative National Climate Change Act. A few green projects have also been financed across the country in a variety of sectors of the economy. Nevertheless, the scale of action has not matched the statements of ambition and the need for bold action is imperative. The government is yet to put in place a clear roadmap for the effective and holistic implementation of the NPCC for impact and the initiatives identified in the NCCP so far have no clear-cut budgetary provisions for their implementation.

The global transition from a high-carbon economy to a low-carbon economy is well underway and will likely make Nigeria poorer unless the country acts

p. xviii.

11 Van der Ploeg, F. & Rezai, A. (2020). Stranded assets in the transition to a carbon-free economy. *Annual Review of Resource Economics*, 12: 281–298; Aldecott, B. (2017). Introduction to special issue: stranded assets and the environment. *Journal of Sustainable Financial Investment*, 7: 1–13

12 Baron, Richard and Fischer, David (2015). Divestment and Stranded Assets in the Low-carbon Transition. Background paper for the 32nd Round Table on Sustainable Development 28 October 2015 OECD Headquarters, Paris. Paris: OECD.

strategically. Nigeria needs to understand is that the ground has shifted and that things are no longer business as usual. The energy transition from fossil fuels and even gas into greener energy is already happening. Major players in the oil and gas sector are already re-aligning their business strategies towards a low-carbon economy framework. This will have broad implications for the energy landscape of Nigeria, a country that is currently heavily-dependent on its vast oil and gas reserves to drive its national development. By addressing the challenge of stranded assets proactively, Nigeria can position itself for a more resilient and prosperous future.

Transitioning to a green economy in the presence of abundant fossil fuels and gas is a complex endeavour that requires careful planning, stakeholder engagement, and a commitment to sustainable development. The goal is to minimise climate change threats to development and maximise the opportunities the challenge provides by promoting growth and social development through a low-emission development path, without compromising development goals of poverty reduction and inclusive development. A major step is to strengthen institutional capacity for climate action and the legal framework. This may include anchoring in law NDC climate policy priorities and the establishment of a legal framework for participation in global carbon markets. It is also imperative to standardise monitoring, reporting, and verification (MRV) procedures and mainstream climate change in public financial management, public investment management, green public procurement, and government-owned enterprises



Leveraging climate action to pursue economic development in Nigeria is not only a viable strategy but also an essential one. Integrating climate considerations into economic development plans can lead to sustainable and inclusive growth, and provides good opportunities for Nigeria to build a climate-resilient economy that will not only promote growth and reduce poverty as well create good green jobs, but will also contribute to GHG emission reductions and environmental sustainability. The emphasis is to find ways to industrialise and transition without significantly increasing the emissions profile of the country. To do this effectively, Nigeria will need to pursue mitigation and adaptation strategies that will significantly improve its macroeconomic stability, economic transformation and job creation, while reducing the negative impacts of climate change on development.

Policy Recommendations:

- **Strengthen national climate policy frameworks:** Nigeria needs to synergise and align its various policies and declarations on climate change with its national needs. Emphasis should be to focus the country's macro and micro-level efforts on solid mitigation and adaptation policies, with strong governance structure and a reliable and expanding energy mix to ensure an investor-friendly environment.
- **Deepen institutional capacity for climate action and the legal framework:** This may include anchoring in law NDC climate policy priorities and the establishment of a legal framework for participation in global carbon markets. It is also imperative to standardise monitoring, reporting, and verification (MRV) procedures and mainstream climate change in public financial



management, public investment management, green public procurement, and government-owned enterprises.

- **Ensure adequate climate funding:** To meet the high cost of mitigation and adaptation, the government should consider the use of other financing instruments, such as *Green and Sustainable Bonds*, for financing climate-smart projects in line with Nigeria's NDC, ETP and other national development medium-term strategies to encourage private investment on climate change initiatives and projects. Other carbon pricing instruments such as Carbon Tax, Emission Trading System, Crediting mechanism and Results-Based Climate Finance may also be considered to attract private sector investment in national climate change response.
- **Ensuring a just and fair energy transition:** Nigeria will need to properly manage her need to be part of the global transition to a cleaner energy future and a cleaner means of production, especially the move away from oil, coal and other fossil fuels, so as to not be at a competitive disadvantage, which may stall her economic growth and development. An unjust and unfair global transition to a diversified green economy may be risky for the country and disrupt her economy. This could have serious socio-economic consequences, such as increasing poverty and inequality, threatening social stability and organisations' social licence to operate¹³. In this regard, Nigeria must explore all opportunities available at the global level to ensure that the implementation of her ETP ensures a just and fair transition in her pursuit of low-carbon climate resilient development.

- **Increase the level of public awareness for climate change:** Most Nigerians are unaware of climate change. Surveys conducted by Afrobarometer suggest that only 30% of Nigerians are aware of both climate change and its anthropogenic cause, compared to an African average of 39%.¹⁴ This is geographically uneven, as climate literacy ranges from 5% in Kano to 71% in Kwara.¹⁵ A more informed and engaged public would be able to better plan and limit exposure to climate risks. By increasing individuals' internalisation of costs of climate adaptation for themselves, this would help reduce the costs incurred by the government in responding to climate shocks.



Improving public awareness of climate change, therefore, is very critical to any national effort to respond to the challenge of climate change in Nigeria. This requires initiatives, resources and projects dedicated to educating public servants, farmers, civil society and other groups, and upskilling relevant national institutions such as the National Orientation Agency (NOA), national television and radio stations such as the Nigerian Television Authority (NTA) and the Federal Radio Corporation of Nigeria (FRCN) as well as the News

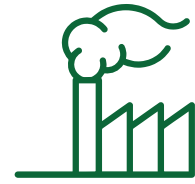
13 Deloitte, "Did COP26 lay the groundwork for a just transition to net zero?", 2022

14 Simpson, N.P., Andrews, T.M., Krönke, M. et al. (2021). Climate Change Literacy in Africa. *Nature Climate Change*, 11: 937–944.

15 Ibid.

Agency of Nigeria (NAN). Working with the NCCC, these institutions can reorient Nigerian citizens on climate change, its mitigation and the need for adaptation.

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- **Pursue a collaborative approach to low-carbon development future:** Nigeria needs to strengthen its partnerships with various national and international climate change actors to accelerate transformational and collaborative climate action to respond to the urgency of climate change in Nigeria.



Other sectoral policy interventions may include:

- **Strengthening integrated agriculture, forest, and water management** by promoting climate-smart agriculture (CSA) and integrated water and coastal management, reducing deforestation, strengthening tree tenure and rights of landholders, and enhancing integrated landscape management. There is need to immediately deploy landscape management plans at the local government level, scale-up community-level natural resource management, reform land and tree tenure, and strengthen charcoal regulation.
- **Creating the conditions for resilient cities and infrastructure** by integrating risk data into land use and city-wide infrastructure plans, reduce urban sprawl, introduce zoning in flood risk areas, and implement climate-informed design criteria for urban and new residential infrastructure.
- **Enhancing national capacity for climate-induced disaster risk management** by developing early warning systems in priority areas, strengthen emergency response capacity, and pilot options for disaster risk financing.
- **Setting the foundations for low-carbon development in the transport sector** by improving vehicle regulations and fuel standards, and improving traffic management that will include making available walkways and bus/bike-only lanes. Immediate action on mitigation in transport will create conditions to leverage opportunities from technology, innovation and financing.
- **Boosting climate resilience in the housing and construction sector** by adopting green building standards into the National Building Code and providing demand-side and supply-side subsidies to incentivize investments in green buildings and catalyse Nigeria's green building subsector.

-
- **Promoting climate-resilient infrastructure development** by revising the Nigeria Integrated Infrastructure Master Plan to incorporate climate resilience as a major component of the government's infrastructure plans.



1

The Global and the National Contexts of the Climate Crisis

1.1 Introduction

Climate change refers to long-term shifts in temperatures and weather patterns. It is different from changes in weather, which refers to short-term variation in the state of the atmosphere at a particular place and time. Climate change measures average weather changes in decadal or longer-time scales, and it is one of the most complex challenges facing humankind today.

For several decades, humanity has taken a relatively stable climate as a given or as a constant in their social interactions, economic calculations, and geo-political relations. But this is no longer the case. The human-induced rapid changes in the global average surface temperature and long-term weather patterns across the world and consequent negative impacts on human and natural systems have resulted in increased rethinking of key economic ideas, practices, and political institutions that have been the bedrock of human civilisation for decades.


The industrial revolution ushered much of the developed world to an era of unprecedented mechanisation and economic prosperity based on the burning of fossil fuel. But it is now evident that decades of dumping of Greenhouse Gases (GHGs) in the atmosphere have altered the very climatic system upon which development has depended and now pose a significant threat to the survival of humankind. This realisation has compelled much of the global community to a search for ways to adapt to the impact of climate change and to transition economies to low-carbon paths.

Due to the complexity of interacting factors causing climate change and the intricate relationship between a wide range of economic activity and the emission of GHGs that are responsible for global warming and climate change, designing and implementing effective action to address climate change in order to achieve sustainable development is an enormous challenge for all countries. But while climate change represents a policy challenge to all countries, the challenge is more acute for many developing countries such as Nigeria that have limited financial, economic, and technical abilities to manage the climate crisis.

Worthy of note, however, is that climate change also presents far-reaching



Decades of dumping of Greenhouse Gases (GHGs) in the atmosphere have altered the very climatic system upon which development has depended and now pose a significant threat to the survival of humankind



Human activities, primarily due to the burning of fossil fuels (e. g. coal, oil and gas), produce heat-trapping gases, known as greenhouse gases (GHGs) that have resulted in the rapid and widespread warming of the planet with catastrophic consequences. The most prominent among these gases are carbon dioxide (CO₂), nitrous oxide (N₂O), methane (CH₄), halocarbons, and water vapour

opportunities for economic restructuring, increasing energy access and sovereignty, and addressing inequalities within and between nations. It is evident that how Nigeria chooses to respond or not to climate change can determine its geographical, social, political, and economic future in the coming decades. What is clear is that the impacts of climate change could affect Nigeria's future and threaten the sustainable and balanced development of the country.

Climate change is already disrupting long-existing economic and political ideas and institutions around the world and a diverse array of actors such as countries, businesses and international organisations are already reorganising their national laws, investments, energy systems, education, infrastructure, and innovation system in response.

In view of the complex global nature of climate change, we begin the report by providing a summary of the science and global impact of climate change. This serves to situate the context within which Nigeria must respond to climate change. Following this, we present the national context of climate change as part of the introduction of the report. Section two covers a summary of the impacts of climate change on development in Nigeria while Section 3 describes how the country is currently responding to the challenge. Section 4 explores the opportunities to advance the sustainable socio-economic development of the country under increasing climate risk. This section also features policy recommendations and highlights major barriers to action. The major conclusions of the report are enumerated in the last section of the report.

1.2 Global Context

1.2.1. The Scientific Context

The causes and impacts of climate change are global in scope and unprecedented in scale. Hence, the relationship between human activities and climate change, involving both causes as well as impacts, has become a major issue of concern and interest all over the world. It is now a subject of international concern that is subjected to both scientific and diplomatic debate.

There is a scientific consensus that human activities, primarily due to the burning of fossil fuels (e. g. coal, oil and gas), produce heat-trapping gases, known as greenhouse gases (GHGs) that have resulted in the rapid and widespread warming of the planet with catastrophic consequences. The most prominent among these gases are carbon dioxide (CO₂), nitrous oxide (N₂O), methane (CH₄), halocarbons, and water vapour.¹⁶ The Intergovernmental Panel on Climate Change (IPCC), which comprises majority of the world's top atmospheric scientists, has concluded that human activities have likely caused a 1.07-degree Celsius increase in the average global surface temperature since 1850 (just before the start of the industrial revolution).¹⁷



Human activities have likely caused a 1.07-degree Celsius increase in the average global surface temperature since 1850 (just before the start of the industrial revolution)

¹⁶ <https://www.epa.gov/climatechange-science/basics-climate-change>

¹⁷ IPCC (Wg 1), 2006.



There is a scientific consensus that human activities, primarily due to the burning of fossil fuels (e. g. coal, oil and gas), produce heat-trapping gases, known as greenhouse gases (GHGs) that have resulted in the rapid and widespread warming of the planet with catastrophic consequences.

The panel concluded that if the global temperature continues to increase at the current rate, global warming is likely to reach 1.5°C above the pre-industrial revolution era between 2030 and 2052 (Figure 1).

Cumulative emissions of CO₂ and future non-CO₂ radiative forcing determine the probability of limiting warming to 1.5°C

a) Observed global temperature change and modeled responses to stylized anthropogenic emission and forcing pathways

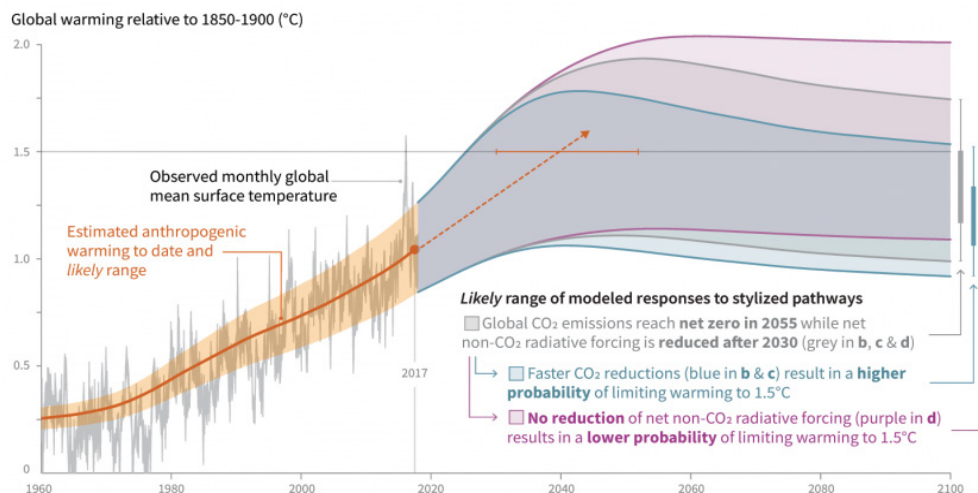


Figure 1: Human induced activities have resulted in about 1.0 climate change since 1850 (Source: IPCC, 1.5 Special Report).

It is important to note that these numbers refer to global average and that warming greater than the global annual average is already being experienced in many land regions and seasons, including in Africa. The IPCC Sixth Assessment Report reported that the average annual global GHG emissions from 2010 to 2019 were at the highest levels in human history. While the rate of increase of GHG emissions has decreased compared to the past decades, the absolute number of GHG emissions is still increasing across all sectors.

The IPCC finds that since 2011, the concentrations of GHG have continued to increase in the atmosphere, reaching annual averages of 410 parts per million (ppm) for CO₂, 1866 parts per billion (ppb) for CH₄, and 332 ppb for N₂O in 2019 with the records showing that each of the last four decades has been successively warmer than any decade that preceded it since 1850.¹⁸ Despite global efforts to minimise GHG emissions into the atmosphere, recent measurements indicate that it has not abated. Monthly mean CO₂ measurements taken at the world’s premier atmospheric research facility at Mauna Loa, Hawaii show marked and steady increase in its atmospheric concentration since 1960 (Figure 2). This increase is also observable in a more recent monthly mean CO₂ at the same Mauna Loa Observatory which indicates very high figures for 2023 (Figures 3).

The science is clear. The globe is warming at a rapid rate and the diverse impacts



he IPCC Sixth Assessment Report reported that the average annual global GHG emissions from 2010 to 2019 were at the highest levels in human history.

¹⁸ Ibid. p3

of climate change ranging from glacial melts, sea-level rise, droughts, cyclones, wildfires, and other weather extremes are posing significant challenges to global livelihoods, and human and natural systems.

1.2.2 The International Policy Landscape

The evidence and the scientific consensus on climate change have compelled much of the global community to a search for ways to adapt to the impact of climate change and to transition economies to low-carbon paths. The United Nations Framework Convention on Climate Change (UNFCCC), agreed in 1992, has a near universal membership with 198 parties/countries ratifying the document. The UNFCCC acknowledges that “the global nature of climate change calls for the widest possible cooperation by all countries and their participation in an effective and appropriate international response, in accordance with their common but differentiated responsibilities and respective capabilities and their social and economic conditions”. Parties agreed in the Convention to pursue the objective of stabilising greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system.



The global nature of climate change calls for the widest possible cooperation by all countries and their participation in an effective and appropriate international response, in accordance with their common but differentiated responsibilities and respective capabilities and their social and economic conditions

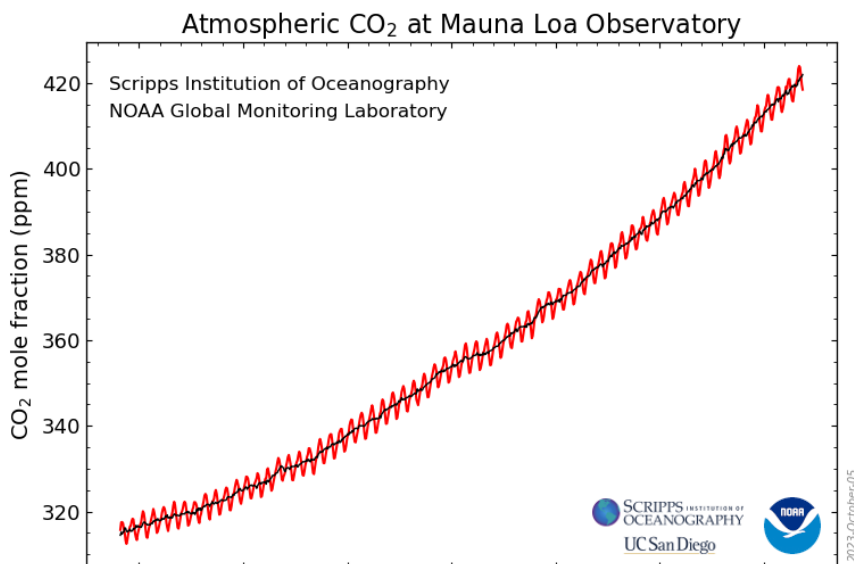


Figure 2: Monthly mean carbon dioxide measured at Mauna Loa Observatory, Hawaii.

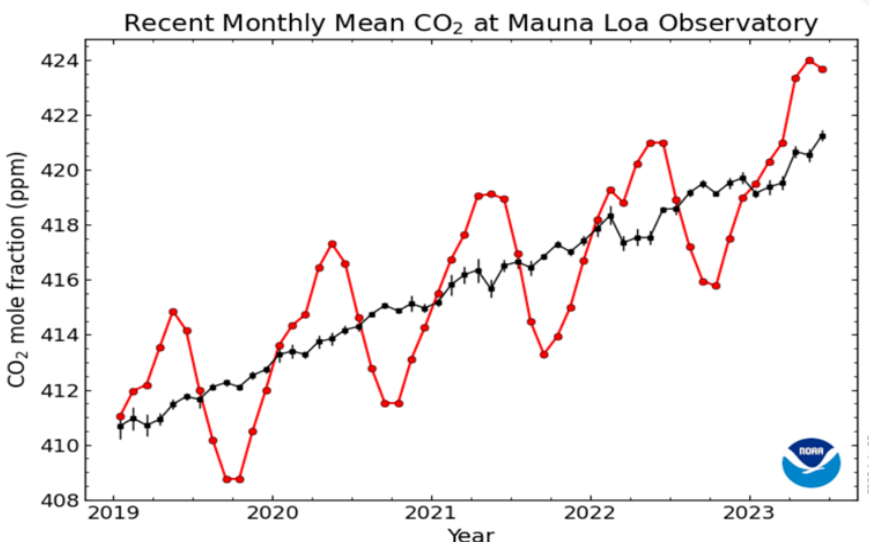


Figure 3: Recent monthly mean CO₂ at the Mauna Loa Observatory

The Paris Agreement, signed in 2015, builds on the UNFCCC. A key milestone after three decades of multilateral diplomacy, the Paris Agreement commits parties/countries to implement policies and strategies to hold the increase in the global average temperature to well below 2°C above pre-industrial levels and to pursue efforts to limit the temperature increase to 1.5°C above pre-industrial levels. Parties also agree in the Paris Accord to increase efforts to adapt to the adverse impacts of climate, foster climate resilience and make finance flows consistent with a pathway towards low greenhouse gas emissions and climate-resilient development.

Given the increased consensus on the scientific understanding of climate change as presented in the Intergovernmental Panel on Climate Change (IPCC) AR6 reports the escalating evidence of deteriorating climate impacts globally, and the extensive activism by youth across the globe, governments worldwide, including those in Africa, have faced mounting pressure to commit to achieving net-zero carbon emissions by the mid-century and to develop comprehensive long-term strategies for low-emission development. In response, a substantial number of countries have undertaken the task of formulating their Nationally Determined Contributions (NDCs) and a range of other national and international climate policies including net -zero pledges.



The global climate change policy landscape is also rapidly expanding into several realms encompassing trade, investment, and geopolitics

Crucially, the global climate change policy landscape is also rapidly expanding into several realms encompassing trade, investment, and geopolitics. Several notable instances can be observed, such as the initiatives undertaken by the World Trade Organisation (WTO) to utilise the multilateral trading system in order to bolster climate action. Furthermore, there has been a heightened focus on incorporating climate considerations in infrastructure and Foreign Direct Investment. Lastly, negotiations have taken place to establish multi-billion Just Energy Transition Partnerships (JETPS), aimed at expediting the cessation of fossil fuel usage in specific developing nations, including those in Africa; and many countries are also calling for debt restructuring as a part of climate change policy package.

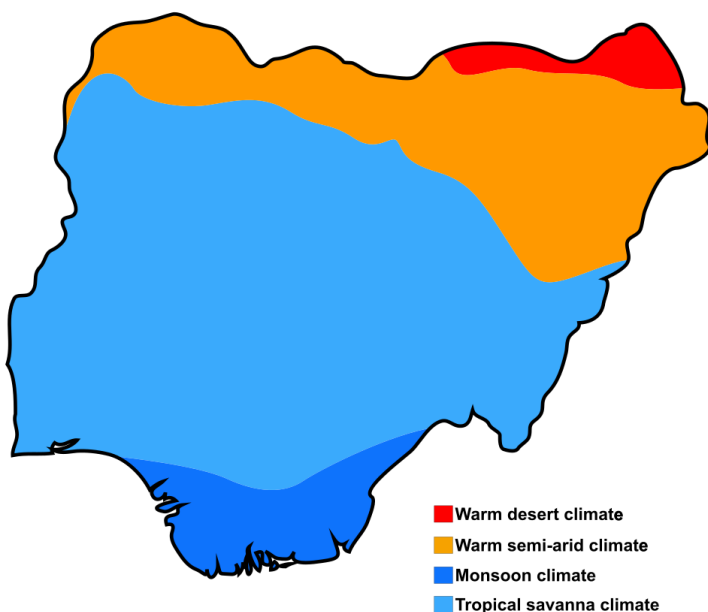
1.3 National Context

1.3.1 Geography and Climate Vulnerability

Nigeria is characterized by three distinct climate zones: a tropical monsoon climate in the south, a tropical savannah climate for most of the central regions, and a Sahelian hot and semi-arid climate in the north of the country. This leads to a gradient of declining precipitation amounts from south to north. The southern regions experience strong rainfall during the rainy season from March to October with annual rainfall amounts usually above 2,000 mm, and can reach 4,000 mm and more in the Niger Delta.

The central regions are governed by a well-defined single rainy season (April to September) and dry season (December to March). The dry season is influenced by the harmattan wind from the Sahara. Coastal areas experience a short, drier season with most rain occurring over March to October. Annual rainfall can reach up to about 1200 mm. In the north, rain only falls from June to September in the range of 500 mm to 750 mm. The rest of the year is hot and dry. Northern areas have a high degree of annual variation in its rainfall regime, which results in flooding and droughts.

Nigeria is characterized by three distinct climate zones: a tropical monsoon climate in the south, a tropical savannah climate for most of the central regions, and a Sahelian hot and semi-arid climate in the north of the country.



The most significant temperature difference in Nigeria is between the coastal areas and its interior as well as between the plateau and the lowlands. On the plateau, the mean annual temperature varies between 21°C and 27°C whereas in the interior lowlands, temperatures are generally over 27°C. The coastal fringes have lower means than the interior lowlands. Seasonal mean temperatures are consistently over 20°C throughout the country and diurnal variations are more pronounced than seasonal ones. Highest temperatures occur during the dry season, and vary little from the coast to inland areas. Like rainfall, the relative humidity in Nigeria decreases from the south to the north, with an annual mean of 88% around Lagos. Mean annual temperature for Nigeria is 26.9°C, with average monthly temperatures ranging between 24°C (December, January) and 30°C (April). Mean annual precipitation is 1,165.0 mm. Rainfall is experienced throughout the year in Nigeria, with most significant rainfall occurring from April to October and with minimal rainfall occurring November to March.



Scientific evidence indicates that since the 1980s, the temperature over Nigeria has risen significantly, and climate projections show a significant increase in temperature across all ecological zones in the next few decades

Scientific evidence indicates that since the 1980s, the temperature over Nigeria has risen significantly, and climate projections show a significant increase in temperature across all ecological zones in the next few decades. Based on the results of various climate model scenarios published in Nigeria's Third National Communication and Nigeria's Climate Risk Profile, temperatures across Nigeria are expected to increase by 2.9°C to as much as 5.7°C by end of the century. Night time temperatures, currently between 20°C and 27°C, are expected to increase by as much as 4.7°C with a significant increase in the duration of heat waves by a range of an additional eight to 55 days by the end of the century. While temperature increases are expected to be lower in the southern areas of the country, they are highly likely to increase much more rapidly in the interior and northern areas of the country¹⁹.

Rainfall variability is expected to increase further, with precipitation amount increasing in southern areas. Despite its unpredictability, heavy rainfall is projected to intensify, with precipitation and extreme rainfall more likely to result in flooding. Already, the country has witnessed a significant increase in the frequency and intensity of flooding events since 2012. Changes in precipitation patterns impact rivers and surface water runoff, further exacerbating flooding and submergence of coastal lands. On the other hand, droughts are expected to become a regular occurrence, particularly in Northern Nigeria due to decreased precipitation and increased temperature.

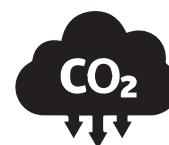
Overall, climate change will in the long-run continue to compound the development challenges of Nigeria, making attainment of the Sustainable Development Goals, particularly in the short-term, difficult for the country. This is because the country's largely fragile economy is strongly vulnerable to the impacts of climate change as much of it, particularly the agriculture sector, which contributes about 24% to its GDP, is climate-sensitive. Other sectors of the economy, including transportation, water resources, health and energy, are also vulnerable to the impacts of climate change. Fighting poverty and insecurity and tackling climate change remain three critical development challenges for Nigeria, as they all impact the utilisation of Nigeria's

¹⁹ Climate Risk Profile: Nigeria (2021): The World Bank Group.

human and natural resources for meaningful and sustainable development. Meeting these challenges, particularly tackling the climate change challenge, requires fresh ideas and a radical new way of thinking, once the impacts on national development are well known.

1.3.2 Emission profile

After South Africa, Nigeria is the second highest emitter of GHG in Africa. Nigeria’s First Biennial Update Report (BUR1)²⁰ to the UNFCCC, which covers emissions for the period 2000-2015, shows that, in 2015, total net national emissions, including removals, amounted to 712,6 Mt CO₂-eq. Emissions from Agriculture Forestry and Other Land Use (AFOLU) headed the sectors with 477MtCO₂-eq (66.9%) of total aggregated emissions followed by Energy with 28.2%, Waste, 3.0% and the remaining 1.9% from IPPU. Regarding the direct greenhouse gases, CO₂ was responsible for 82.3% of the emissions, CH₄ for 12.4% and N₂O for 5.3%.



After South Africa, Nigeria is the second highest emitter of GHG in Africa

Nigeria’s revised Nationally Determined Contribution submitted in 2015 updated the base year for GHG assessment from 2012 to 2018 and estimated that the total GHG emission in 2018 was about 347 million tonnes of CO₂-equivalent (MtCO₂e). The report estimates that the energy sector was the highest source of GHG emission with 209 MtCO₂e followed by the AFOLU sector with about 125 MtCO₂e. Of the energy sector emissions, fugitive emissions from the oil and gas sector are the largest, contributing about 36% to the total emissions from the energy sector. The full distribution of the emission profile of the key sectors is provide in Figure 4 below.

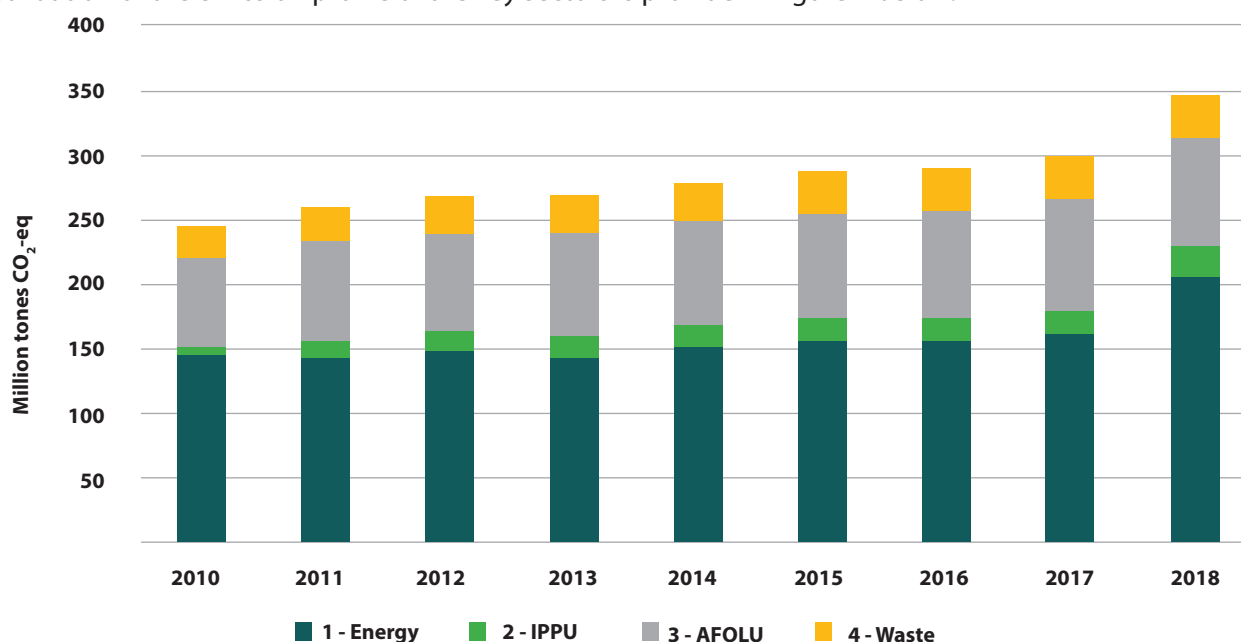


Figure 4: Total GHG emissions from 2010 to 2018 (Revised NDC)

Recent analysis from the Nigeria Deep Decarbonisation project suggests that Nigeria’s total emission by 2018 was about 424.30 MtCO₂eq. (see Figure 5 below). The estimated emission in 2018 is higher than the value (347 mtCO₂e) estimated

²⁰ https://unfccc.int/sites/default/files/resource/Nigeria%20BUR1_Final%20%282%29.pdf

in the NDC by about 22%, which could be attributed to the expansive and detailed consideration of emissions data in the AFOLU and transport sectors. The analysis indicates that the energy sector emissions (i.e., from oil and gas extraction, power, building and residential, and transport subsectors) account for 54.3% (229.4 mtCO₂e) of the total emissions. However, at the subsector levels, AFOLU sector dictates the emission at 125.70 mtCO₂e, which is equivalent to 29.6% of the total emissions in 2018.

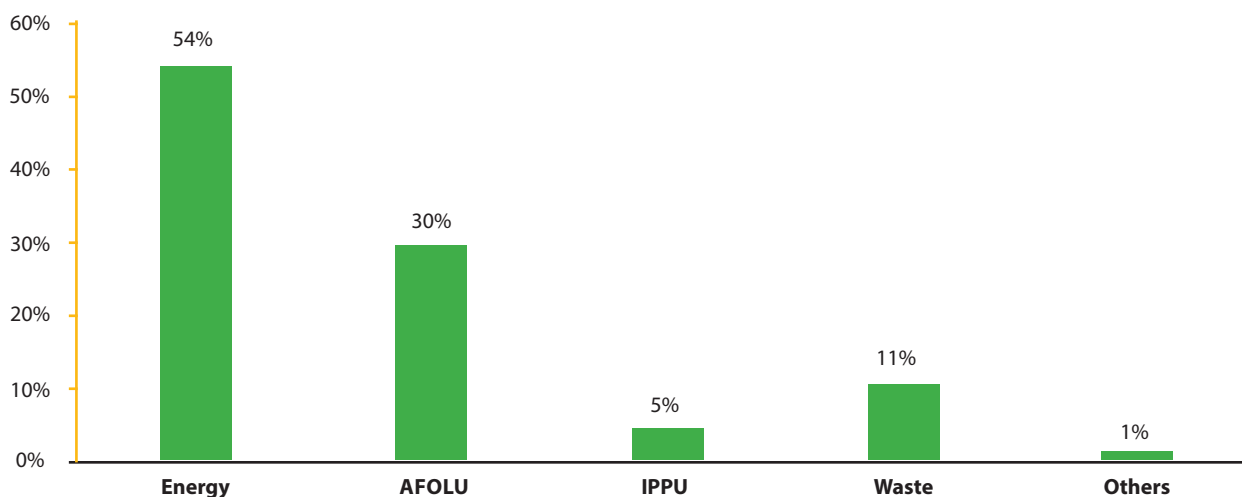


Figure 5: Total GHG Emission in Nigeria by 2018 (Source Nigeria Deep Decarbonisation Project, 2023).

The Nationally Determined Contribution (NDC) of Nigeria considers emission reductions by 2030 compared to a business as usual (BAU) scenario in which the economic growth is at 5% and population growing at about 2.5% per year, all Nigerians to have access to electricity (both on-grid and off-grid) and demand is met, industry triples its size by 2030. Under this scenario, emissions are projected to grow 114% by 2030. The unconditional NDC considers notably improving energy efficiency by 20%, providing 13 GW of renewable electricity to rural communities that are currently not connected to the electric power grid, and ending the flaring of gas. This would lead to a 20% reduction compared to BAU, corresponding to a roughly 70% increase between 2015 and 2030. Higher emission reduction is considered in the conditional NDC, in which international support would notably allow increasing energy efficiency and significant reduction in the use of generators. This would lead to a 45% reduction of GHG emissions in 2030 compared to BAU, or 18% increase from 2015 levels.

1.3.3 Economic Context

A major feature of the Nigerian economy regarding energy is its huge reliance on oil as the main source of government revenue. Nigeria has the second largest crude reserve in Africa and exported almost 774,000,000 barrels in 2014. This has important consequences for domestic GHG emissions since, insufficient oil field infrastructure lead to a very large portion of gas associated with oil production being flared into the atmosphere and, despite progress over the past decade, Nigeria remains the world's fifth-largest gas flaring country. This huge dependence on oil and gas – about 90% of exports – also has important consequences for the vulnerability of the Nigerian economy to international oil markets, which are volatile in the short-term and very



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uncertain in the medium to long term especially in a context of international climate policies, where the demand of oil demand is reduced.

A key challenge therefore lies in the capacity to imagine a Nigerian economy that would feature a significantly different structure by 2050. Economic diversification is highlighted in the Nigerian NDC as a key priority for the government of Nigeria, notably to alleviate high unemployment especially for youth in rural areas (see discussion in section 2.2). But it is also highlighted that growing manufacturing and industrial sectors may imply increasing emissions if not managed properly and that the future of industry is in turn closely connected to energy futures, notably reliable access to electricity.

Another key feature of the Nigerian economy in relation to climate change is that Nigeria lacks adequate energy to meet its socioeconomic and technological needs. The country's annual energy consumption per capita is estimated at about 7.9 MWh as against 82.75 MWh and 38.26 MWh for North America and the European Union, respectively, with the corresponding GDP per capita of \$1700, \$48,960 and \$36,410. Nigeria has one of the largest electricity access gaps in the world, with approximately 85 million people being underserved. Less than half of Nigeria's population have access to grid-connected electricity. Electric power supply is inefficient and has limited industrial development. The 2015 power supply averaged 3.1 gigawatts (GW) per capita, an amount estimated to be a third of demand. The lack of adequate modern energy supply in the country has pushed a majority of Nigerians into the use of biomass (fuelwoods and agro-wastes) as the major source of primary energy. From a back of the envelope calculation, the continuous trend of the current energy consumption in Nigeria may likely increase the country's greenhouse gases emission potentials more than ten folds by the Paris Agreement baseline year, 2050. Hence, one key question is how to support the needed increase of energy access without triggering a strong rise of associated GHG emissions.

As of 2022, Nigeria was the largest economy in Sub-Saharan Africa with a real gross domestic product (GDP) of \$535 billion. Yet Nigeria is still categorised as a lower-middle-income country, with gross national income (GNI) per capita of \$2,300²¹. However, stagnant productivity and falling growth have revealed the limits of the fossil fuel-dependent model. Despite rapid expansion of the economy, diversification remains limited, with growth fuelled by natural resource rents and domestic consumption. Productivity growth collapsed following the global financial crisis in 2008–09 and has failed to recover fully since. This situation has contributed to steadily declining GDP growth; the growth rate has fallen from 8% in 2010 to 2% in 2019, averaging 3.6% growth rate per year. Unemployment is high and population is increasing with a youth bulge.

Unfortunately, despite huge potential for power generation, the Nigerian energy sector is not close to its potential. Nigeria's energy use per capita (including electricity, but also other areas of consumption including transport, heating, and cooking)



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²¹ The World Bank, 2022

of 2,548kWh is much lower than the Africa average of 4,027kWh in 2021.²² The country's average rate of electrification is about 55%. The energy sector thus remains underdeveloped, with concomitant negative repercussions for the development of the economic and industrial structure.

The environment and socio-economic condition outlined above sets the stage for an understanding of Nigeria's vulnerability to climate change.

²² Hannah Ritchie et al., 2022.

Impacts of Changing Climate on Nigeria's Development

The impacts of climate change on Nigeria's development are widespread and significant. They range from mere shifts in weather patterns that threaten food production to large-scale sea level rises that increase the risk of catastrophic flooding.

The physical and socio-economic manifestations of climate change are increasingly visible across Nigeria. Climate impacts have affected not only the ecology of the systems impacted but also the livelihoods and survival of millions of people. The 2019 Climate Risk Index (CRI)²³—which indicates a level of exposure and vulnerability to extreme events that countries should understand as warnings to be prepared for more frequent and/or more severe events in the future—ranks Nigeria 73 out of 180 countries surveyed. Meanwhile, the 2014 climate vulnerability index report, classified Nigeria as one of the 10 most vulnerable countries in the world²⁴. Extreme weather events (both in terms of rapid onset changes like flash flooding, storm surge, increased temperatures and slow onset changes like drought, erosion, coastal flooding, sea level rise and heatwaves) are adversely affecting food system, energy, transport, tourism, industrial sectors, etc., and constraining the country's socio-economic development.

2.1 Physical Impacts of Climate Change

The physical impacts of climate change traverse many aspects of Nigeria's environment. These impacts are complex, interrelated and also affect several aspects of our lives and well-being. These impacts manifest in rising temperatures, variable rainfall, increases in the frequency or intensity of some extreme weather events, such as floods and droughts, and rising sea levels. They also threaten our health by affecting the food we eat, the water we drink, the air we breathe, and the weather we experience.

23 Developed by German watch analyses quantified impacts of extreme weather events¹⁰ – both in terms of the fatalities as well as the economic losses that occurred - <https://www.germanwatch.org/en/cri>.

24 <https://www.climatecorecard.org/2018/11/nigeria-listed-as-one-of-the-10-most-climate-vulnerable-countries/>



Physical impacts of climate change are complex, interrelated and also affect several aspects of our lives and well-being. These impacts manifest in rising temperatures, variable rainfall, increases in the frequency or intensity of some extreme weather events, such as floods and droughts, and rising sea levels.

In general, things that we depend upon and value, such as agriculture, ecological ecosystems, energy, human health, transportation, wildlife and water are already experiencing the effects of a changing climate. The impacts will vary in extent, severity and intensity, but the exact degree still remains uncertain. There are a few detailed specific quantitative studies on the physical impacts of climate change in Nigeria, but in general, the country's increasing vulnerability to climate change and its physical impacts is reflected in the different dimensions listed below.²⁵:

2.1.1 Ecosystems and Biodiversity

Climate change is already transforming the country's ecological systems and could further adversely affect the forest ecology and the ecosystems that are already under significant human pressure. Climate Change is fuelling drought and desertification which significantly affects biological diversity. Persistent flooding and waterlogging due to accelerating sea-level rise or extreme weather events and which also affects biodiversity and potentially renders forest regeneration more difficult. In general, the net primary productivity, biomass and carbon stock in various pools of forests are also affected by these extremities in climate across the different Nigerian zones. The savannah biome of northern Nigeria would be very vulnerable to any climate-change-related dramatic reduction in rainfall in the region. In particular, fire outbreaks in vegetation of the sub-region due to high temperature could result in land exposure to extreme winds, erosion and nutrient loss. Warming and acidification oceans amplify the impact of other pressures from overfishing, habitat destruction and pollution.

The increased acidity of the ocean reduces the ability of coral reefs to re-establish themselves ("bounce back") from disturbances such as bleaching, cyclones and crown-of-thorns starfish outbreaks. If current rates of temperature rise continue, the ocean will become too warm for coral reefs by 2050. This would mean a major disruption to at least 25 percent of the biodiversity in the ocean, as well as the loss of productive fisheries and significant impacts on industries such as tourism. The loss of reefs as a barrier would increase the exposure of coastal areas to waves and storm systems. Coastal systems and low-lying areas are also increasingly experiencing adverse impacts from sea level rise – submergence, coastal flooding, and coastal erosion. The loss of coastal ecosystems such as mangroves and seagrass beds increase vulnerability of coastlines and people to the impacts of climate change.

2.1.2 Soil Erosion

Climate change-related heavier and steadier than normal rainfall that is expected in the southern part of the country will worsen soil erosion that is already of catastrophic dimension. The recent increase in the number of reported severe landslides in south-eastern states of the country is an attestation to the possible climate change-induced



The recent increase in the number of reported severe landslides in south-eastern states of the country is an attestation to the possible climate change-induced changes in erosion intensity

25 Summarised from (a) Cervigni, R., Riccardo, V., and Monia, S, eds. 2013. *Toward Climate-Resilient Development in Nigeria*. Directions in Development. Washington, DC: World Bank; (b) Haider, H. (2019). *Climate change in Nigeria: Impacts and responses*. K4D Helpdesk Report 675. Brighton, UK: Institute of Development Studies; (c) Olagunju, T.E., Adewoye, S.O., Adewoye, A.O. and Opasola, O.A. (2021). *Climate Change Impacts on Environment: Human Displacement and Social Conflicts in Nigeria*. 4th International Conference on Science and Sustainable Development (ICSSD 2020). IOP Conf. Series: Earth and Environmental Science 655 (2021) 012072

changes in erosion intensity. Landslides associated with gully formation also presents a big threat to lives, property and economic activities.

2.1.3 Water Resources

Climate change impacts water availability, quality, and accessibility, posing significant challenges to Nigeria's water resources. The changing rainfall patterns induced by global warming has consequences for water supply and increased water scarcity, which will strongly and negatively impact on other economic sectors such as agriculture, industry, and energy. According to the Food and Agriculture Organisation (FAO), two-thirds of the world's population could face water shortages by 2050 in part due to climate change.²⁶ The World Bank projects that climate change could lead to a 25 percent reduction in water availability in Nigeria by 2050, significantly affecting water supply for agriculture, industry, and domestic use.²⁷ This reduced water availability poses significant risks to agricultural irrigation, industrial processes, and domestic water supply. This is in addition to threatening the livelihoods of farmers/labourers.

In general, climate change as an additional stress to water security in Nigeria would result in increased variability in rainfall, predictably resulting in floods in some humid areas to the south of the country and a decrease in precipitation in the savannah north. This may result in droughts and a decrease in surface water resources in the north. The case of rapidly shrinking Lake Chad from about 45,000 km² in 1960 to less than 3,000 km² in 2007 is attributed mainly to changes in the climatic conditions over the region towards increasing aridity. As of 2020, about 13 million people in the Lake Chad Basin required humanitarian assistance, as the lake receded by more than 90 percent of its original size. Freshwater shortage in the Lake Chad Basin has had severe economic impacts on the fisheries, flood recession agriculture, livestock rearing and other wetland industries in the north-eastern part of Nigeria. For example, it led to the failure of the overly ambitious South Chad Irrigation Project aimed at irrigating 67,000 hectares for the production of rice, wheat and cotton. Over \$400 million worth of agricultural investments were lost, and by 1984 the project disintegrated, leaving about 60,000 people with no secured means of livelihood²⁸.



Lake Chad shrank from about 45,000 km² in 1960 to less than 3,000 km² in 2007 is attributed mainly to changes in the climatic conditions over the region towards increasing aridity

2.1.4 Sea Level Rise

Global warming-induced accelerated sea-level rise (ASLR) of 0.5 - 1 metre that is anticipated for Nigeria could worsen the environmental condition of the country's coastline. Under business-as-usual conditions, a shoreline retreat of 100 metres is expected by the year 2060, with worst-case erosion rates predicted to be up to 600 metres by the year 2060. With ASLR of about 1.0 m about 75 percent of the delta could

26 Ameh Ochojila. "Two-Third of World's Population May Face Water Crisis by 2050." The Guardian Nigeria News - Nigeria and World News, March 23, 2023. <https://guardian.ng/news/two-third-of-worlds-population-may-face-water-crisis-by-2050/>.

27 World Bank Group. Nigeria - World Bank, 2021. https://climateknowledgeportal.worldbank.org/sites/default/files/2021-07/15918-WB_Nigeria%20Country%20Profile-WEB.pdf.

28 Oladipo, E. O., 1993: A Comprehensive Approach to Addressing Drought and Desertification in Northern Nigeria: *Natural Hazards* 8, 235 - 261.

be lost; Capital values at risk could be as high as \$17.5 billion (no development and no mitigation/adaptation measures scenario)²⁹.

2.1.5 Floods and Droughts

As earlier stated, climate change would result in increased variability in rainfall, predictably resulting in floods in many parts of the country, particularly the humid areas, with devastating consequences. The increasing frequency of floods in the north-eastern region and many parts of the country demonstrates the vicissitudes of climate-changed extreme events in Nigeria. In 2022, Nigeria battled its worst floods in a decade. The Global Rapid (Post Disaster) Damage Estimation (GRADE)³⁰ assessment report presented by the then Minister of Humanitarian Affairs, Disaster Management and Social Development on the 2022 floods indicated that all 36 states and the Federal Capital Territory were affected by the floods, with varying degrees of damages. According to the 2nd November 2022 report of the United Nations Office for the Coordination of Humanitarian Affairs (OCHA)³¹, over 3.2 million people spread over 34 of the 36 States in the country were affected by the flood, with over 600 deaths and 1.4 million people displaced. In addition, more than 569,000 hectares of farmland were damaged by floods, more or less at the height of harvest seasons, which might have further aggravated the already precarious food insecurity in the country. Nigeria reportedly lost an estimated \$6.68 billion to the 2022 floods. The impacts included damages to croplands, infrastructure, and residential and non-residential buildings, among others³². On the other hand, increased severe and recurrent droughts that are the expected principal weather-related hazards for the northern part of the country will further worsen the precarious Lake Chad hydrology.



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2.2 Impacts of Climate Change on Social and Economic Development

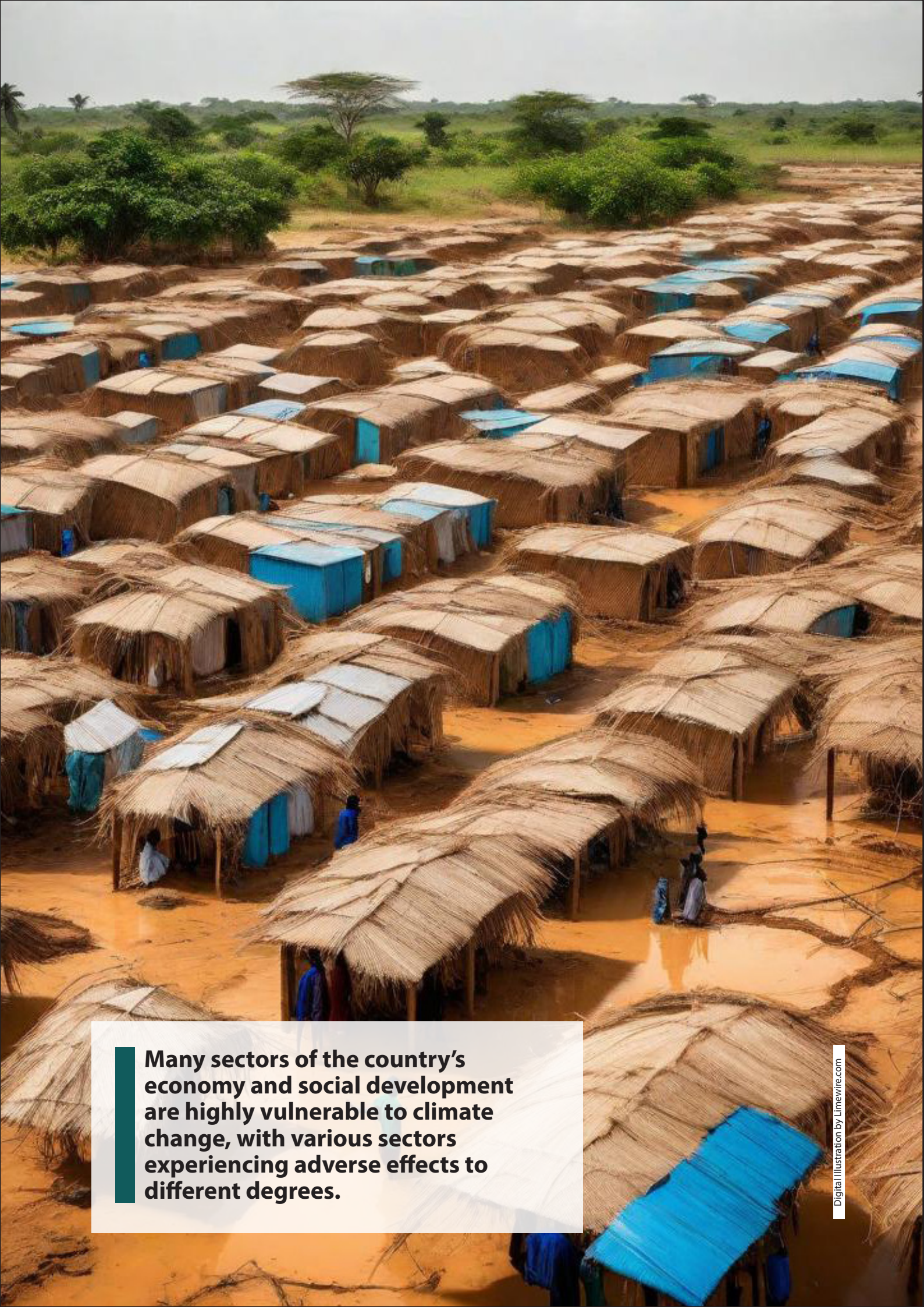
In this section, we will explore the relationship between climate change and the Nigerian economy, as well as the impacts of climate change on the social development of the people. We show that many sectors of the country's economy and social development are highly vulnerable to climate change, with various sectors experiencing adverse effects to different degrees. Notably, the agricultural sector, which is crucial for Nigeria's economy, faces significant challenges due to changing rainfall patterns and increased occurrence of extreme weather events. Additionally, climate change poses risks to energy security, infrastructure, human health, and coastal regions.

²⁹ DFID (2009) - ibid

³⁰ GRADE is developed by the World Bank's Disaster-Resilience Analytics and Solutions (D-RAS) Team

³¹ Nigeria Flood Response: Flash Update 2 OCHA - <https://reliefweb.int/report/nigeria/nigeria-floods-response-flash-update-2-last-updated-1-november-2022>

³² Nigeria lost \$6.68 billion to flooding in 2022: Minister available at <https://gazzetngr.com/nigeria-lost-6-68-billion-to-flooding-in-2022-minister/>



Many sectors of the country's economy and social development are highly vulnerable to climate change, with various sectors experiencing adverse effects to different degrees.

2.2.1 Agriculture and Food Security

Agriculture is a crucial sector in Nigeria, employing a significant portion of the population and contributing to food security and economic growth. But agriculture is one of the sectors most sensitive to global warming in Nigeria. Under a “business as usual scenario”, agricultural productivity in general could decline between 10 to 25 percent by 2080³³. For some areas in the northern part of the country, the decline in yield in rainfed agriculture could be as much as 50 percent. Increased warming trends will also make the storage of root crops and vegetables challenging for farmers without access to refrigerators, thereby increasing the already high level of post-harvest loss. On the other hand, global warming-induced flooding will also have devastating impact on agricultural productivity in the affected regions. For example, in 2022, devastating floods in Nigeria were responsible the loss of several farmlands which contributed to reduced availability of food in the country.

Climate change-induced prolonged dry spells are more than likely to affect livestock production. In particular, persistent and frequent drought will make it more difficult for livestock farmers to find water and green pastures due to reductions in surface water resources and available pastureland. Higher than normal temperatures would lead to poor livestock health which reduces the market value of affected livestock thereby reducing farmers' income. Flooding leads to loss of livestock, destruction of livestock enclosures and outbreak of diseases. Climate change impacts on the nature and characteristics of freshwater resources will affect fisheries, a key source of livelihoods and protein for riverine and coastal rural communities. Tajudeen et al³⁴ also note that uncertainty around weather can impact decisions around crop production (date of planting, seed purchasing, date of harvest). This, in turn, could lead to food shortages and crop production suppression. All these will further worsen the precarious state of food insecurity in the country.

Given that Nigeria has 35 million children under the age of five, of which 12 million are stunted, with 23.5 million being anaemic owing to poor nutrition³⁵, the threat posed by climate change has the potential to further worsen the situation. The United Nations Food and Agriculture Organisation (FAO) puts the number of Nigerians who are in danger of acute food insecurity at approximately 25.3 million.³⁶ Similarly, the 2022 Global Food Security Index ranked Nigeria 107 out of 113 countries.³⁷



*For some areas in the northern part of the country, the **decline in yield in rainfed agriculture could be as much as 50%***

33 Cervigni, R., Riccardo, V., and Monia, S, eds. 2013. *Toward Climate-Resilient Development in Nigeria*. Directions in Development. Washington, DC: World Bank

34 Tajudeen, Tawakalitu Titilayo et al. “The Effect of Climate Change on Food Crop Production in Lagos State.” *Foods* (Basel, Switzerland) vol. 11,24 3987. 9 Dec. 2022, doi:10.3390/foods11243987

35 Ihejirika Iviw Patience, “How Climate Change, Insecurity Is Exacerbating Nigeria’s Malnutrition Burden”, *Leadership*. <https://leadership.ng/how-climate-change-insecurity-is-exacerbating-nigerias-malnutrition-burden/>

36 Ekwe Michael, “A Deadly Duo: Climate Change and Conflict Are Fuelling Nigeria’s Food Insecurity Crisis”, *The Conversation*. <https://theconversation.com/a-deadly-duo-climate-change-and-conflict-are-fuelling-nigerias-food-insecurity-crisis-206042>

37 Ibid

2.2.2 Energy



*Nigeria has the highest energy poverty in the world with **90 million Nigerians not connected to the grid***

Climate change will have significant effects on the energy sector in Nigeria. In particular, rising temperatures would result in increased demand for air conditioning, refrigeration, and other household appliances, at a time the country is unable to meet people's basic demand for energy. Currently, Nigeria has the highest energy poverty in the world with 90 million Nigerians not connected to the grid³⁸. This will be very critical in this era of poor energy access and energy efficiency in the country. Furthermore, increases in temperature and droughts may limit the availability of water for hydropower generation. For example, according to the Nigerian Electricity Regulatory Commission (NERC), Nigeria's hydroelectric power generation declined by 20% in 2019 due to reduced water levels in major dams caused by climate change impacts. Higher than normal temperatures may also limit the availability of cooling water for thermal power generation. In addition, greater magnitude and frequency of extreme weather events will constitute threats to physical energy infrastructure, such as overhead transmission and distribution, as well as substations or transformers. Additionally, extreme weather events have disrupted oil and gas operations, leading to production losses and revenue decline.

2.2.3 Public Health



*A study by Ogonnaya et al. (2021) found that climate change could increase the burden of malaria in Nigeria, resulting in an additional **4.7 million cases per year by 2050***

Climate change impacts public health through various means such as heatwaves, increased incidence of vector-borne diseases, and disruption of healthcare systems. A number of studies have highlighted the vulnerability of Nigerians to climate-related health risks, including malnutrition, waterborne diseases, and the spread of malaria and other vector-borne illnesses. For instance, a study by Ogonnaya et al. (2021) found that climate change could increase the burden of malaria in Nigeria, resulting in an additional 4.7 million cases per year by 2050.³⁹ The economic impacts of these diseases include increased healthcare costs, loss of workdays, and decreased productivity. According to a study by Sonaiya et al. (2017), the economic burden of malaria in Nigeria is estimated to be around \$1.1 billion annually.⁴⁰ Considering this, the link between climate change and the economy is interlinked – an ill population/workforce would mean that Nigeria will generate less revenue and lower productivity

2.2.4 Tourism

Tourism, one of Nigeria's fastest-growing sectors, could be negatively affected as many tourist attractions are located along the coastal zone of the country. Also, those tourist-attracting traditional festivals (e.g., Argungu Festival on River Argungu in Kebbi State) may decline to the extent that climate change induces shrinkage of such

38 <https://www.worldbank.org/en/news/press-release/2023/06/09/the-world-bank-approves-additional-financing-to-consolidate-the-gains-of-nigeria-s-power-sector-recovery-program#:~:text=Nigeria%20has%20the%20world's%20largest,people%20not%20connected%20to%20electricity>.

39 Ogonnaya, U., Ajayi, C. A., Uzochukwu, B. S. C., & Nduka, I. I. (2021). Malaria burden in Nigeria: A systematic review and meta-analysis. PLOS ONE, 16(1),

40 Sonaiya, E. B., Ekpenyong, C. E., Ogban, G. I., Ikpeme, B. M., Etukumana, E. A., & Okon, O. O. (2017). Economic burden of malaria on households and productivity loss in southeast Nigeria. Acta Parasitologica Globalis, 8(1), 26-32.

rivers. One study⁴¹ conducted on the effects of climate change in Jos, Plateau State, found that climate change has the potential to disrupt ecosystems, decrease tourism activities, alter tourism destinations, lead to the loss and migration of wildlife species, and result in the flooding of ecotourism sites. These impacts can render tourism schedules ineffective by negatively affecting wildlife sightings and fixed dates for cultural events.

2.3 Climate Change and Transitional Risks in Nigeria

In the section, we will pay attention to many investments, infrastructures and assets that will be locked into conventional systems and structures that are not easily or entirely modifiable for climate mitigation or adaptation. This is referred to as transition risks – the potential costs to society of evolving to a low-carbon economy to mitigate climate change.⁴² These costs can arise from innovation, changes in public sector policies, in the affordability of new technologies and in consumer or investor sentiment in favour of a greener environment which require divestment of assets.

Sectors with the largest volume and value of physical assets face the biggest transition risks, including the infrastructure sector, buildings and construction, and oil and gas sector. Climate change can negatively affect their contributions to the national economy, if concrete national actions are not taken to address the challenge.

2.3.1. Infrastructure

Climate change will cause an increased frequency over time of extreme weather events. These climate shocks require the Nigerian government to improve the resilience of the country's energy and other infrastructure. Yet, not only is the country's infrastructure currently inadequate – with a physical infrastructure gap of about \$3 trillion over the next 30 years,⁴³ – the existing and annually constructed infrastructure has weak climate adaptability capacity.⁴⁴ As a result, many parts of the country are prone to flooding and droughts, such as the Niger-Benue basin, covering 630 km² of land and 357,000 people in Lagos State exposed to flooding.⁴⁵ About 3.2 million people could be at risk by 2070,⁴⁶ which would also cause significant economic damage. For instance, the physical and durable assets damaged by the 2012 floods



Many parts of the country are prone to flooding and droughts, such as the Niger-Benue basin, covering 630 km of land. About 3.2 million people could be at risk by 2070

41 Ijeomah, H. M., & Aiyeloja, A. A. (2009). Impact of climate change on sustainable tourism management in plateau state, Nigeria. *Journal of Sustainable Development in Africa*, 11(1), 23-34.


42 National Association of Insurance Commissioners (2023). "Transition Risk". <https://content.naic.org/cipr-topics/transition-risk>.

43 Federal Ministry of Finance, Budget and National Planning (2020). *Reviewed National Integrated Infrastructure Master Plan*. Abuja: Federal Ministry of Finance, Budget and National Planning.

44 Marco Hernandez, Emilija Timmis, Miguel Saldarriaga, Samer Matta, Nyda Mukhtar, Gloria Joseph-Raji, Joseph Ogebe, and Masami Kojima (2022). *Nigeria Public Finance Review: Fiscal Adjustment for Better and Sustainable Results*. Washington, DC: World Bank, p. 14.

45 *Ibid.*, p. 14.

46 *Ibid.*, p. 14.



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have been valued at about \$9.5 billion, or about 2% of GDP.⁴⁷

In fact, the International Renewable Energy Agency (IRENA) estimates that the sector that experiences the largest amount of asset stranding on a global scale is buildings, with approximately \$10.8 trillion stranded if policy action is delayed.

2.3.2. Housing and construction

A large part of infrastructural demand in Nigeria is for housing. With a population of over 200 million people and a high population growth rate, there is a continuous demand and pressure on the construction sector. The country has a housing deficit of 20 million units, which requires about N21 trillion to finance.⁴⁸

Yet the National Building Code does not mention climate change or climate resilience. Also, there are no national programmes promoting climate-proofed or green buildings as they are promoting solar energy adoption. This is of great concern since IRENA estimates that the building sector will experience the largest amount of asset stranding, with double the value of stranded assets if action is delayed compared to the value if accelerated action is taken.⁴⁹ This is primarily because the low stock turnover rate of buildings means that stranded assets – in this case, buildings with an inefficient building envelope, equipment, among others – cannot be avoided, even if all new buildings were to be constructed with the highest energy efficiency and renewable energy system integration standards.

The Nigerian government will need to launch a programme promoting the construction of green buildings and novel ways of building that are both climate-friendly and climate-proof. Green building refers to “the practice of creating structures and using processes that are environmentally responsible and resource-efficient throughout a building’s life-cycle from siting to design, construction, operation, maintenance, renovation and deconstruction.”⁵⁰

Green buildings have the additional advantage of using between 20-40% less energy and water than traditional buildings on average, and users can save 15-20 percent on their utility bills.⁵¹ Green buildings are therefore an untapped market, with an investment opportunity of \$509.6 billion for the residential sector and \$258.4 billion for the



The country has a housing deficit of 20 million units, which requires about N21 trillion to finance... yet there are no national programmes promoting climate-proofed or green buildings as they are promoting solar energy adoption.

⁴⁷ Ibid., p. 14.

⁴⁸ Emmanuel Abolo Moore (2019). Addressing Housing Deficit in Nigeria: Issues, Challenges and Prospects. *Economic and Financial Review*, 57(4): 201-222.

⁴⁹ IRENA (2017). *Stranded Assets and Renewables*. Abu Dhabi: International Renewable Energy Agency (IRENA), p. 6.

⁵⁰ Environmental Protection Agency (2016). “Green Building”. <https://archive.epa.gov/greenbuilding/web/html/about.html>.

⁵¹ Aditya Divyadarshi, Pranjali Tiwari, Basab Sharma, George Washington, and Kshyana P. Samal. (2018). Energy Consumption and Efficiency in Green Buildings. *International Journal for Scientific Research & Development*, 5(11): 78-81; John Donnelly (2 December 2019). “Building Green—the Business Case”. International Financial Corporation. <https://www.ifc.org/en/stories/2010/gb-business-case>.

commercial sector (mainly education, office and healthcare) in sub-Saharan Africa.⁵²

Green buildings are also affordable for low-income earners, although building costs vary across locations, driven by climatic conditions, cost, and availability of building materials as well as energy- and water-efficient equipment, and availability of technical expertise in green construction, among other factors.⁵³

The National Building Code needs to incorporate climate change concerns in order to reduce emissions from the building and construction industry and to make buildings more resilient to climate shocks such as flooding and temperature changes which alter heating and cooling demands. These codes should also allow for the integration of more renewable energy technologies into building designs, for lighting, heating, cooling and other functions. Without greening at the point of building design, non-green buildings may in the future have to pay for costly retrofits as these technologies become more affordable and demand for them grows.⁵⁴

Fiscal incentives, such as property tax incentives, VAT exclusion, tax deductions, technical assistance, grant provisions, loan programmes and expedited permitting processes and reduced permitting requirements for green buildings should also be considered to encourage developers to build green.⁵⁵

2.3.3 Stranded assets

Asset stranding is the process of collapsing expectations of future profits from invested capital (the asset) as a result of disruptive policy and/or technological change.⁵⁶ As the world attempts to achieve net-zero carbon emissions and penalise climate-unfriendly investments and activities, vast quantities of recoverable fossil fuels will have to remain underground in order to stabilise the global climate and energy-intensive equipment will have to be retired at a quicker pace in favour of less carbon-intensive ones.⁵⁷ With this transition, therefore, many assets will become stranded.

Companies extracting oil, gas, and coal are likely to be affected by stranded assets as a result of the low-carbon transition. This should be a major concern for a major oil-producing country like Nigeria. It is estimated that at least \$1 trillion in fossil fuel



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52 International Financial Corporation (2019). *Green Buildings: A Finance and Policy Blueprint for Emerging Markets*. Washington, DC: International Financial Corporation (IFC), p. viii.

53 *Ibid.*, p. 19.

54 *Ibid.*, p. 20.

55 *Ibid.*, p. 51.

56 Van der Ploeg, F. & Rezai, A. (2020). Stranded assets in the transition to a carbon-free economy. *Annual Review of Resource Economics*, 12: 281–298; Aldecott, B. (2017). Introduction to special issue: stranded assets and the environment. *Journal of Sustainable Financial Investment*, 7: 1–13

57 Baron, Richard and Fischer, David (2015). *Divestment and Stranded Assets in the Low-carbon Transition*. Background paper for the 32nd Round Table on Sustainable Development 28 October 2015 OECD Headquarters, Paris. Paris: OECD.

assets will potentially become stranded globally.⁵⁸ Other carbon-intensive sectors and sectors that make use of fossil fuels as inputs for production could also be impacted.

Nigeria needs to exploit technologies and build an energy infrastructure that factors in the risk of stranded assets. The International Renewable Energy Agency demonstrates that with delayed policy action, the chance of having stranded assets will increase and total investment costs will rise.⁵⁹ This calls for accelerating natural gas as a transition fuel which will both create opportunities to develop new gas fields for a just energy transition plan and allow for the management of stranded assets and associated transition risks without denying the country the right to development.⁶⁰

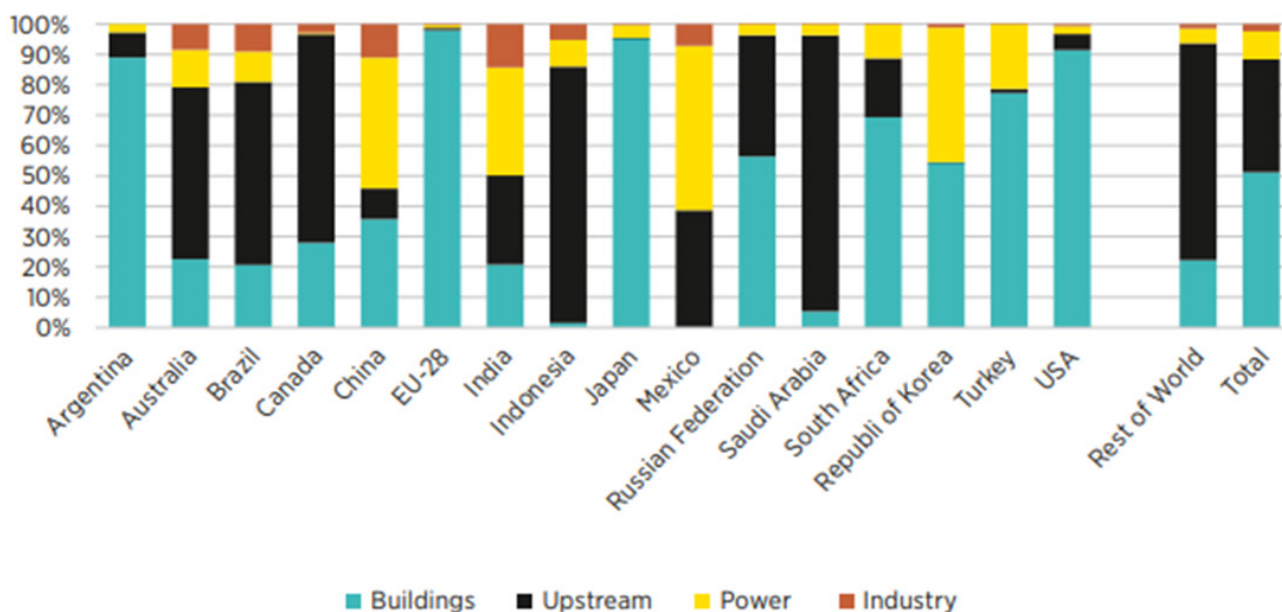


Figure 6: Stranded assets by sector and country.

Although there are no estimates for the value of potentially stranded assets specifically for Nigeria, globally the buildings sector is at the most risk, followed by the upstream energy sector and finally the power sector. Fortunately for Nigeria, coal does not feature significantly in the country's power sector, and gas-fired plants benefit from some leeway for natural gas being a transition fuel. The risk of stranded assets is therefore much less for Nigeria in its power sector than for South Africa, for example, where 85% of its electricity is generated from coal-fired power stations. At the same time transitioning to the green economy will have serious implications for Nigeria as an oil-producing country. It will have implication for government revenue and foreign exchange earnings since more than 80 percent of the country's exports and forex come from the oil and gas sector.

58 Semieniuk, Gregor, Holden, Philip B., Mercure, Jean-Francois, Salas, Pablo, Pollitt, Hector, Jobson, Katharine, Vercoulen, Unnada et al. (2022). Stranded fossil-fuel assets translate to major losses for investors in advanced economies. *Nature Climate Change*, 12: 532–538.

59 IRENA, Stranded Assets and Renewables, p. 5.

60 AfDB (2022). Country Focus Report 2022 Nigeria. Supporting Climate Resilience and a Just Energy Transition. Addis Ababa: African Development Bank (AfDB), p. 11.

2.4 Security-Climate Change Nexus and Potentials for Conflicts



The current situation in the Lake Chad region of the north-eastern part of the country provides good empirical evidence of apparent linkage between climate change, migration, conflicts, and insecurity; albeit in a rather non-linear and complex manner.

Nigeria has been confronted with multiple security challenges. Some of these include the threat posed by the nefarious activities of violent extremist groups such as Boko Haram and its splinter group the Islamic State in West Africa Province (ISWAP), in the Northeast region; the activities of Ansaru, which is Boko Haram's first breakaway faction and armed banditry, in the Northwest region, and the persistent farmer-herder clashes in the Northcentral region. Others include the activities of organised criminal gangs in the Southwest; militancy and piracy in the Niger Delta region and the separatist agitations by the Independent People of Biafra (IPOB) and its paramilitary wing, the Eastern Security Network (ESN) operating in the Southeast region. There are also concerns over an ever-increasing population, youth unemployment, rising poverty, inequality, high levels of illiteracy, endemic corruption, weak institutions and poor governance amongst others. Added to these is the threat posed by climate change and how it contributes to insecurity in Nigeria.

Extreme climatic occurrences such as drought/flood cycles and sea-level rise would have a huge and lasting effect on many highly populated regions of Nigeria. The current situation in the Lake Chad region of the north-eastern part of the country provides good empirical evidence of apparent linkage between climate change, migration, conflicts, and insecurity; albeit in a rather non-linear and complex manner. While there is some disagreement in the literature, some studies link climate change to the changes in Lake Chad and with associated severe economic impacts on the fisheries, flood recession agriculture, livestock rearing, and other wetland industries in the north-eastern part of Nigeria. Consequently, there has been significant migration from the north of the Basin as "environmental refugees" have fled drought, increasing the pressure on natural resources and fuelling social tensions, which is snowballing into severe national insecurity in the region.

Conflict in and around Lake Chad takes three principal forms: first, the competition between communities for access to natural resources, like farming, herding, and fishing livelihoods overlap in an ever-changing environment; second, international disputes over borders between the riparian nations; and third, violence related to militant and illicit activities, including the attacks of Boko Haram⁶¹.

⁶² The consequences of these challenges have led to the forced displacement of people within and across the region, in search of economic survival, as over 7.5 million people across the region are food insecure.⁶³ An estimated 3.8 million people

61 Olagunju, T.E., Adewoye, S.O., Adewoye, A.O. and Opasola, O.A. (2021). Climate Change Impacts on Environment: Human Displacement and Social Conflicts in Nigeria. 4th International Conference on Science and Sustainable Development (ICSSD 2020). IOP Conf. Series: Earth and Environmental Science 655 (2021) 012072

62 "Nigeria -Complex Emergency"; United States International Development Agency, accessed on 12 July 2023, https://www.usaid.gov/sites/default/files/documents/2022-01-20_USG_Nigeria_Complex_Emergency_Fact_Sheet_1.pdf

63 "Lake Chad Crisis", Plan International, accessed on 12 July 2023, <https://plan-international.org/emergencies/lake-chad-crisis>



Nigeria has been confronted with multiple security challenges. Some of these include Boko Haram and its splinter group, the ISWAP, in the Northeast; armed banditry in the Southwest; persistent farmer-herder clashes in the NorthCentral; piracy in the Niger Delta region; and separatist agitations by the IPOB in the Southeast region.

in Nigeria's Northeast region were estimated to face acute food insecurity during the June-to-August season in 2022.⁶⁴ This represents an 80% increase compared to the previous year.⁶⁵ In Nigeria's northeast region, approximately 350,000 displaced households were unable to participate in agricultural production owing to the activities of violent extremist organisations (VEOs) as of December 2021, which is further triggered by the complexities of climate change.⁶⁶

While the lines of causality are complex with multiple factors at play, several scholars have argued that there is a close relationship between climate change, migration and conflict.⁶⁷ Nonetheless, there is no doubt that the destruction and over-exploitation of natural resources and ecosystems under increasing climate risk can increase the risk of violent conflict. Competition over declining natural resources such as freshwater, fertile soils, fisheries or forests may affect livelihoods and increases the risk for conflict. Extreme weather conditions can increase competition for scarcer resources like grazing land, water etc, and trigger more conflicts.

Climate change may exacerbate existing challenges and has been addressed on international levels as a serious aggravating factor to violent conflicts. Generally, the risk of conflict is higher in fragile contexts than where governments or societies can cope with the challenges. Violent conflicts are increasing in number and intensity. Environmental degradation, exacerbated by climate change, may not automatically lead to conflict but can affect such drivers of conflict as low rural incomes or food insecurity. Where society, institutions, and governments cannot manage the challenges related to these drivers, the risk of conflict increases. Countries with a history of armed conflict have an increased risk of falling back into conflict. Where environmental factors are root causes or one of the main underlying reasons leading to the outbreak of an armed conflict, likewise, it is also plausible that the influence of conflict on outmigration is indirect. Conflict affects many factors that may, in turn, induce migration, such as income loss, the breakdown of social relations and institutional failure.

It is now obvious that unless drastic actions are taken to minimise the impact of climate change on the country's development, it is capable of further slowing the sustainable development of Nigeria. The Government of Nigeria recognises the challenge that the climate crisis poses to its development, and that there is a need to address the challenge for national sustainable development.



An estimated 2.4 million people were projected to experience crises levels of food insecurity between October and December 2021

64 "Nigeria -Complex Emergency", United States International Development Agency, accessed on 12 July 2023 https://www.usaid.gov/sites/default/files/documents/2022-01-20_USG_Nigeria_Complex_Emergency_Fact_Sheet_1.pdf

65 Ibid

66 "Nigeria -Complex Emergency", United States International Development Agency.

67 O'Loughlin, John, Frank DW Witmer, Andrew M. Linke, Arlene Laing, Andrew Gettelman, and Jimy Dudhia. "Climate variability and conflict risk in East Africa, 1990–2009." *Proceedings of the National Academy of Sciences* 109, no. 45 (2012): 18344–18349.

3

Responding to the Climate Change Challenge

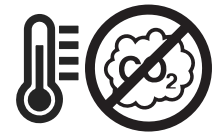
3.1 Global Initiatives

In response to the global climate crisis, the global community negotiated the United Nations Framework Convention on Climate Change (UNFCCC) in 1992 and its Kyoto Protocol (KP) in 1997 to provide a platform for international cooperation on climate action. More recently, parties concluded the landmark Paris Agreement (PA) on Climate Change in 2015 with an overarching goal of holding “the increase in the global average temperature to well below 2°C above pre-industrial levels” and pursuing efforts “to limit the temperature increase to 1.5°C above pre-industrial levels.” The three objectives of Paris Agreement are as follows:

- To reduce the impact of climate change by holding the increase in the global average temperature to well below 2°C above pre-industrial levels and pursue efforts to limit the temperature increase to 1.5°C above pre-industrial levels.
- To increase efforts at climate adaptation to the adverse impact of climate change and foster climate resilience and low greenhouse gas emissions development.
- To make finance flows consistent with a pathway towards low greenhouse gas emissions and climate-resilient development.

Scientists have determined that achieving the goal of the Paris Agreement implies a rapid reduction in GHG emission and indeed an accelerated reduction towards ‘net-zero’ emission by the middle of the century. It is for this reason that many countries, including Nigeria, have announced commitment to achieve net-zero emission by either 2050 or 2060.

A major outcome of the Paris Agreement is that it more or less removed the division between developed and developing countries which was a major feature of the Kyoto agreement by imposing emission reduction obligations on all countries through the Nationally Determined Contributions (NDCs) which is to be reviewed, updated and increased every five years. In addition to establishing the Nationally Determined Contributions (NDCs), the Paris Agreement also requested parties to elaborate and communicate Long Term Low GHG Emission Development Strategies (LT-LEDs) to indicate how they plan to reduce emissions up to the middle of the century consistent



To reduce the impact of climate change by holding the increase in the global average temperature to well below 2°C above pre-industrial levels and pursue efforts to limit the temperature increase to 1.5°C above pre-industrial levels.



More recently, parties concluded the landmark Paris Agreement (PA) on Climate Change in 2015 with an overarching goal of holding “the increase in the global average temperature to well below 2°C above pre-industrial levels” and pursuing efforts “to limit the temperature increase to 1.5°C above pre-industrial levels.”

with the long-term objectives of the Paris Agreement. The agreement also marked a perceived turn in global climate policy from a period of negotiation to an era of implementation.

Nigeria is a signatory to the UNFCCC and its Kyoto Protocol (KP), which she ratified on 29th August 1994 and 10th December 2004 respectively. It also ratified the Paris Agreement in March 2017. Under the UNFCCC and KP instruments, Nigeria as a Non-Annex 1 Party, was not obligated to reduce the emission of greenhouse gases. It was only required to periodically submit to the UNFCCC Secretariat various National Communications documents such as a progress report of national mitigation action and a National Adaptation Programme of Action. However, with the ratification of the Paris Agreement, Nigeria now has emissions reduction obligations which must be reported and strengthened periodically.

Beyond the mainstream formal international agreement of the United Nations, global climate change has become a subject of intense interest and domain of governance for a wide range of other subnational and international actors such as cities, NGOs, businesses, investors, and multilateral development banks. The activities of these multiplicity of actors are resulting in important shifts in the global economic and political landscape in ways that pose far-reaching consequences for Nigeria.

3.2 Nigeria's Climate Governance System

The Nigerian government has undertaken some initiatives to address the challenge of climate change in the context of its development efforts. They can be categorised as (i) policy, legal and institutional; (ii) mitigation initiative/plans; and (iii) adaptation plans⁶⁸.

3.2.1 Policy, Legal and Institutional Frameworks

The Federal Government of Nigeria (FGoN) promulgated a climate change law in 2021 and has put in place a functional institutional arrangement for climate change response. The Department of Climate Change (DCC) in the Federal Ministry of Environment acted as the focal point since 2011 but this mandate has recently been transferred to the National Council for Climate Change as of 2023. The government has also put in place some policies and financed a few green projects across the country in a variety of sectors as part of its effort to meet its Paris Agreement commitments. These are highlighted as follows:

3.2.1.1 National Policy on Climate Change (NPCC)⁶⁹

Developed by the DCC and approved by the Federal Executive Council in June 2021, the policy's vision is a low-carbon, climate-resilient Nigeria. Its main objective is to promote low-carbon development by, among others:

68 Taken mostly from various write ups and policy briefs written by Prof. Emmanuel Oladipo over the years and for various organisations and institutions, one of which is the Global Affairs Canada

69 Available at https://climatechange.gov.ng/wp-content/uploads/2021/08/NCCP_NIGERIA_RE-VISED_2-JUNE-2021.pdf



The Department of Climate Change (DCC) in the Federal Ministry of Environment acted as the focal point since 2011 but this mandate has recently been transferred to the National Council for Climate Change as of 2023.



The Nigerian government has undertaken some initiatives to address the challenge of climate change.

- i strengthening capacities and promoting synergies among federal, state and local governments and non-state climate actors, including civil society and the private sector, as well as development partners in the implementation of climate change response in the country;
- ii promoting climate-related scientific research, technology and innovation;
- iii developing and implementing appropriate strategies and actions to reduce the vulnerability of Nigerians to the impacts of climate change;
- iv mainstreaming gender, children and youth, and other vulnerable groups into all climate change interventions; and
- v promoting climate-resilient and sustainable land-use systems that enhance agricultural production, ensure food security and maintain ecosystem integrity.

In addition to enhancing the adaptive capacity of Nigerians, this policy targets (i) reducing greenhouse gas emissions and guiding the national path towards net-zero emission; and (ii) reducing the country's vulnerability in all sectors to climate change.

3.2.1.2 National Climate Change Programme (NCCP)

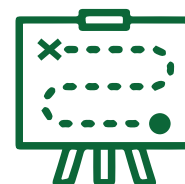
This ten-year (2021 – 2030) programme that accompanied the NPCC was also developed by the DCC and approved by the Federal Executive Council in June 2021. It contains a number of initiatives that can be implemented to promote low-carbon, high growth economic development path and build a climate resilient society in Nigeria. These initiatives include those identified in the country's nationally determined contribution (NDC).

The government is yet to put in place a clear roadmap for the effective and holistic implementation of the NPCC for impact and the initiatives identified in the NCCP so far have no clear-cut budgetary provisions for their implementation.

3.2.1.3 National Action Plan on Gender and Climate Change (NAPGCC)⁷⁰

The goal of this action plan is to ensure that gender considerations are mainstreamed into national climate change policies, programmes and initiatives. Among its many objectives are to:

- increase the understanding of climate change impact on women, youth and other vulnerable groups through evidence-based vulnerability analysis and dissemination;
- ensure the integration of gender concerns and gender-responsive innovative approaches in the implementation of the Paris Agreement and Nigeria's NDC;
- increase participation of vulnerable groups especially women, youth and persons with disability in climate change policies and negotiations at local,



The government is yet to put in place a clear roadmap for the effective and holistic implementation of the NPCC for impact and the initiatives identified in the NCCP so far have no clear-cut budgetary provisions for their implementation.

⁷⁰ Available at <https://climatechange.gov.ng/wp-content/uploads/2020/09/climate-change-and-gender-action-plan.pdf>

- state, national and international levels;
- promote the implementation of gender-responsive and sustainable adaptation and mitigation initiatives that will minimise risks associated with climate change while maximising opportunities for women, men, youth and other vulnerable groups; and
- establish a gender responsive monitoring and evaluation system for the collection and regular dissemination of gender disaggregated data on climate change issues.

There is yet to be a clear implementation framework for the NAPGCC.

3.2.1.4 Climate Change Law

Nigeria enacted the Climate Change Act in November 2021, after several years of political negotiation. The law applies across sectors of the economy and tiers of government with the overall intent of providing mechanisms to build resilience and low-carbon development. It seeks to establish important functions to ensure coherence and to mainstream climate change considerations into decision-making at all levels. The law makes provision for the following:

- provides incentives and obligations for private sector contributions to low-carbon development;
- prioritises civil society capacity-building and participation as well as gender equity; and
- promotes technology transfer, mobilisation and transparent management of climate finance.

To facilitate coherence and implementation, the law establishes a National Climate Change Council (NCCC), chaired by the President, with ministers from relevant ministries, as well as representation from civil society and the private sector as members. The council will perform the following functions, among others:

- Coordinate the implementation of sectoral targets and guidelines for the regulation of GHG emissions and other anthropogenic causes of climate change.
- Approve and oversee the implementation of the National Climate Change Action Plan.
- Administer the Climate Change Fund established under the law.
- Ensure the mainstreaming of climate change into the national development plans and programmes.
- Formulate policies and programmes on climate change to serve as the basis for climate change planning, research, monitoring, and development.
- Formulate guidelines for determining vulnerability to climate change impact and adaptation assessment, and facilitate the provision of technical assistance for their implementation and monitoring.
- Recommend legislative, policy, appropriation, and other measures for climate change adaptation, mitigation, and other related activities.
- Mobilise financial resources to support climate change actions.
- Develop a mechanism for carbon tax in Nigeria.



Nigeria enacted the Climate Change Act in November 2021, after several years of political negotiation

- Develop and implement a mechanism for carbon emission trading.
- Collaborate with the Nigerian Sovereign Green Bond in meeting Nigeria's Nationally Determined Contributions (NDC) targets.

With the appointment of the Director-General (DG) for the NCCC, the implementation of the climate change law has commenced. Its effective implementation will, however, depend on the existence of adequate capacity in the NCCC Secretariat.

3.2.2 Institutional Arrangements

Until the establishment of the NCCC in 2022, the Department of Climate Change (DCC) in the Federal Ministry of Environment was the National Focal Point for the coordination of activities for the implementation of the United Nations Framework Convention on Climate Change (UNFCCC), Kyoto Protocol, and Paris Agreement. It was also to provide a sustainable policy framework and enabling environment for climate change action in Nigeria and to regularly update information regarding national greenhouse gas emission, mitigation options, vulnerability assessment and adaptation measures to the impacts of climate change⁷¹. There is also the Inter-Ministerial Committee on Climate Change (IMCC) that provides policy oversight on the activities of DCC with respect to national response to climate change within both global and national frameworks.

With the establishment of the NCCC and the appointment of a director-general to head its secretariat for the coordination of all climate change activities in the country, there would be clear changes to the current institutional arrangement. First, the NCCC will replace the IMCC at a higher level of authority at the Presidency. While the relationship between the NCCC Secretariat and the DCC is yet to be clarified, it is clear from the itemised functions of the NCCC that most of the original coordinating role of the DCC in climate change governance in the country will now be performed by the NCCC Secretariat.

At the federal level, some ministries (e. g. Agriculture and Rural Development; Science and Technology; Finance, Budgets and Planning; Health; and Water Resources) have climate desks or climate change units to ensure the mainstreaming of climate change in their sectoral development activities. There is also an increasing level of encouragement and support for all other ministries to have designated desks/units on climate change.

At the sub-national level, each state has a climate change focal point in their ministry of environment. Some states (e. g. Ogun State) have the equivalent of IMCC in their states to create strong platforms to facilitate coordinated state response to climate change challenge in terms of mitigation and adaptation initiatives. Lagos State has organised annual summits on climate change since 2009 (except 2016 – 2020) and has a five-year climate change action plan. Besides having the focal points in all the states and a few state-level inter-ministerial committees and summits on climate change, the capacity of the states to address the challenge within the national policy



At the sub-national level, each state has a climate change focal point in their ministry of environment.

⁷¹ With the establishment of the National Council on Climate Change and the appointment of a Director-General for the Council, the role of DCC may change.

and programme framework is weak. All the states, except maybe Lagos, depend on capacity-building activities initiated at the federal level for adoption as their own programmes and initiatives. It is, therefore, not surprising that apart from Lagos State, there is no state-specific climate change action plan, as it obtains in other countries, such as India. In fact, the required capacity to drive climate change action at the local government level is totally absent. The net result is that there is an overall limited national effort to bring the climate change programmes and activities closer to the grassroots.

The current situation calls for an improved climate change governance landscape in Nigeria in which policies and initiatives will be properly and vertically integrated for implementation among the federal, state and local government actors with well-defined roles and responsibilities. An adequately capacitated and functional secretariat of the NCCC will be in position to drive the coordination of climate change response at the local, state and federal government levels more appropriately.

3.2.3 National Mitigation Plans/Initiatives

The key policy-related and mitigation-focused initiatives are the Nationally Determined Contribution (NDC) and the country's Energy Transition Plan (ETP). The ETP encompasses other related policies and plans such as the Nigeria Gas Master Plan, Nigeria Energy Emissions Calculator 2050 and National Renewable Energy and Energy Efficiency Policy.

3.2.3.1 Nationally Determined Contribution (NDC)

The first NDC for the country was developed in 2015, as required by the UNFCCC for the Paris Agreement. In its 2021 NDC update, Nigeria intends to reduce its greenhouse gas (GHG) emissions intensity of GDP by around 47% by 2030 relative to the emissions intensity of GDP in the base period 2010 to 2018, focusing on seven priority sectors identified as being critical for Nigeria to contribute to the goal of keeping the global temperature increase to well below 2°C. The sectors are (i) agriculture and land use; (ii) energy; (iii) industry; (iv) oil and gas; (v) transport; (vi) waste; and (vii) water.

The GHG emission reduction consists of 20% on an unconditional basis as well as a further 27% on a conditional basis consequent upon receiving climate finance, technology transfer and capacity building from development partners commensurate with these ambitions. The country also intends to achieve net-zero emission by 2060.

The current NDC also recognises the importance of nature-based solutions (Nbs) in addressing the country's climate change challenge. It concluded that if Nigeria is able to protect and sustainably manage or restore its ecosystems effectively (including mangrove restoration and management, agroforestry, improved forest management and forest restoration), it may be able to reduce its GHG emissions from its agriculture, forestry and other land use (AFOLU) sector by about 116 metric tonnes of carbon dioxide equivalent per year (116 Mt CO₂e/year). Implementing Nbs activities can also enable Nigeria to bolster water and security, as well as enhance national resilience to natural disaster risks such as floods and drought.



The key policy-related and mitigation-focused initiatives are the Nationally Determined Contribution (NDC) and the country's Energy Transition Plan (ETP)

Like other climate change-related policies, Nigeria is yet to develop a well-formulated NDC implementation roadmap that will translate mitigation and adaptation initiatives identified in the policy document into bankable and scalable projects and link them effectively with the NPCC, NCCP and other climate-related national policies and plans.

3.2.3.2 Nigeria Energy Transition Plan (NETP)⁷²

Formulated by the Office the Vice-President of Nigeria and launched on 24 August 2022, NETP presents a policy instrument for Nigeria to switch to gas and other more efficient fuels for her economic development in a just, inclusive and equitable energy transition manner. The expected wide adoption of net-zero technologies will enable partial decarbonisation of the economy by 2030 and propel the country towards achieving net-zero emissions by 2060. Its major objective is to enable the country to achieve sustainable economic growth to reduce poverty and provide energy access to all in a carbon-neutral manner. The plan is to cost about \$410 billion⁷³ (about \$10 billion per annum) to implement, and its main targets for delivery include:

- i. Generation of 7 GW of solar energy per annum till 2050 and 5 GW of solar energy per annum between 2050 and 2060.
- ii. Installed national capacity to produce 34 GW of hydrogen, 11 GW of hydro, 10 GW of (standby) gas and 15 GW of decentralized renewable energy.
- iii. Over 80% cooking done on zero emission cookstoves (biogas, electric) and back-up diesel generators completely replaced by centralised or decentralised grid.
- iv. More than 80% of passenger cars transit to electric vehicles.
- v. Decarbonisation of the oil and gas sector.
- vi. 100% adoption of zero emissions heating from the industrial sector, particularly with respect to cement and ammonia production.

As a just transition involves a move away from fossil fuels, which currently is the mainstay of Nigeria's economy, NETP needs to be strategically implemented for the benefits of all. A major challenge in this regard is the national perception that the process for the formulation of the plan was neither inclusive nor participatory. For example, the Energy Commission of Nigeria (ECN) that has the "*statutory mandate for the strategic planning and co-ordination of national policies in the field of Energy in all its ramifications*"⁷⁴ claimed not to be involved in its development. Nevertheless, the World Bank and the US Export-Import Bank (Exim Bank) have pledged a sum of \$3 billion to boost the implementation of the plan. In addition, the former Vice-President Professor

72 Key highlights of the Plan are available at <https://energytransition.gov.ng/>

73 Federal Government of Nigeria 2021: Nigeria Energy Transition Plan (yet to be published draft report)

74 By its 1979 Act ECN is the apex government organ empowered to carry out overall energy sector planning and policy implementation, promote the diversification of the energy resources through the development and optimal utilization of all, including the introduction of new and alternative Energy resources like Solar, Wind, Biomass and Nuclear Energy.

Yemi Osinbajo in 2022 undertook a resource-mobilisation trip to the US, including meeting with his American counterpart to seek support for the financing of the plan.

3.2.4 National Adaptation Plans/Initiatives

In addition to the NDC that has some generic adaptation measures for Nigeria, the key national policy-related and adaptation-focused initiatives are (i) National Adaptation Strategy and Plan of Action (NASPA-CCN); National Adaptation Framework (NAF); National Adaptation Process (NAP)⁷⁵; National Agricultural Resilience Framework (NARF) and National Agricultural Technology and Innovation Plan (NATIP). There is also the Nigeria Digital Agriculture Strategy. Of all these, the most comprehensive is NASPA-CCN, which was formulated in 2011 and is due for a review.



The key national policy-related and adaptation-focused initiatives are National Adaptation Strategy and Plan of Action (NASPA-CCN); National Adaptation Framework (NAF); National Adaptation Process (NAP); National Agricultural Resilience Framework (NARF) and National Agricultural Technology and Innovation Plan (NATIP).

3.2.4.1 National Adaptation Strategy and Plan of Action (NASPA-CCN)⁷⁶

This policy document was developed in 2011 with the support of the Canadian International Development Agency (CIDA), which is now Global Affairs Canada, as part of its support to the Building Nigeria's Response to Climate Change (BNRCC) Project. The NASPA-CCN remains the only solid national action plan for adaptation response in Nigeria. The main thrust of the NASPA-CCN is to "minimise risks, improve local and national adaptive capacity and resilience, leverage new opportunities, and facilitate collaboration with the global community, all with a view to reducing Nigeria's vulnerability to the negative impacts of climate change"⁷⁷.

The Plan of Action identified 13 priority sectors impacted by climate change in Nigeria. These sectors include agriculture (crops and livestock), freshwater resources, coastal water resources and fisheries, forests, biodiversity, health and sanitation, human settlements and housing, energy, transportation and communications, industry and commerce, disaster, migration and security, livelihoods, vulnerable groups, and education. The impacts of climate change on these sectors and the recommended adaptation strategies were drawn mainly from results of the pilot and research projects of the BNRCC.

To ensure an effective implementation of the plan, NASPA-CCN spelt out roles and responsibilities of different stakeholders including the Federal Government, state governments, local governments, civil society organisations, international development partners, communities and organised private sector. In particular, the Federal Government is expected to provide the overarching policy and legislative leadership, while the states and the local governments are to lead in the states and at the grassroots. On the other hand, the organised private sector is expected to explore business opportunities presented by climate change, while civil society organisations are to act as catalysts at the adaptation frontline.

⁷⁵ Currently under formulation

⁷⁶ Available at <https://csdevnet.org/wp-content/uploads/NATIONAL-ADAPTATION-STRATEGY-AND-PLAN-OF-ACTION.pdf>

⁷⁷ BNRCC and Federal Ministry of Environment 2011.

The relevance of NASPA-CCN to enhancing the country's adaptive capacity to the impact of climate change is limited by the uncoordinated implementation of the plan of action. The only available national report on adaptation activities in the country is Nigeria's 2021 Adaptation Communication to the UNFCCC. The report only indicated that adaptation issues in the country have been addressed using a sectoral approach focusing on agriculture, energy, water resources, forestry and wildlife, education, health, security, and transportation. Apart from lack of data on the achievements of the adaptation-related activities mentioned in the report, it is also very difficult to attribute such adaptation actions (e. g. Great Green Wall, coastal zone management, sand dune fixation, ecosystem restoration projects, land/gully reclamation, solid waste management, development of climate-smart crop varieties, capacity building on sustainable water management, to mention a few) to any strategic implementation of priority actions identified in NASPA-CCN or any national adaptation plan.

3.2.4.2 Nigeria's National Adaptation Framework (NAF)⁷⁸

In line with current global best practices, and as encouraged by the UNFCCC for developing economies, Nigeria is in the process of developing a National Adaptation Plan (NAP) starting with a national adaptation framework (NAF). The developed framework will be used to guide the country in developing, coordinating, and implementing the various policies, plans, strategies, and legislation that will enable it to address its adaptation needs. Specifically, the objectives of the NAP Framework are to: (i) clarify the country's approach to its National Adaptation Process (NAP); (ii) align the NAP process with existing policies (including NASPA); and (iii) focus on specific themes that are particularly relevant and/or unique to Nigeria's context.

3.2.4.3 National Adaptation Process (NAP)

DCC is executing a Green Climate Finance (GCF)-supported three-year (2021-2024) project for the development of its national adaptation plan (NAP). The United Nations Environment Programme (UNEP) is the implementing agency for the project. The formulation of NAP will be through an all-inclusive process that will involve multiple sectors and agencies as well as private sector organisations, working at the national, state, and local government levels. The process of developing the NAP will promote stronger collaboration among government's ministries, departments, and agencies, to enable experience sharing. It will also reduce overlaps and unnecessary duplications in the adaptation programmes and projects in the country. A major input into the NAP will be a comprehensive review of NASPA-CCN and other relevant policies, such as in agriculture, health and water, to harmonise existing adaptation-related policies and identify critical adaptation measures for implementation in the plan. In this respect, the NAP will facilitate the alignment of adaptation programmes and projects within the country's overall national development agenda.

It is expected that the implementation of NAP will include the development and effective financing of State Climate Change Adaptation Plans for all the 36 States and

⁷⁸ Available at <https://napglobalnetwork.org/wp-content/uploads/2021/06/napgn-en-2020-Nigeria-National-Adaptation-Plan-NAP-Framework.pdf>

the FCT.

3.2.4.4 National Agricultural Resilience Framework (NARF)⁷⁹

Facilitated by the Federal Ministry of Agriculture and Rural Development (FMARD) in 2014, the National Agricultural Resilience Framework (NARF) sets out robust (but not time-bound) approaches that will enhance productivity and boost food security while protecting the country's environmental resources base under a changing climate. Its overall goal is to strengthen the country's overall policy and institutional framework for improved resilience and adaptation to climate variability and change in the agriculture sector in Nigeria. NARF encompasses risk transfer and risk management, capacity enhancement for climate resilient and sustainable land and water management strategies, as well as evidence-based assessment and management for the sustainable development of the country's agriculture. The NARF report articulates policy options, opportunities and required interventions for achieving a number of the strategic objectives such as strengthening the overall policy/institutional framework for improved resilience and adaptation to climate variability and change, improving productivity, reinforcing existing social safety nets and revamping extension services in the agricultural sector.

It is not clear how much of NARF's activities elaborated in its 2017 manual has been implemented as there are no national reports on its status of implementation. Moreover, FMARD in 2021 developed another policy, the National Agricultural Technology and Innovation Policy (NATIP) that will chart a new roadmap to scale up the successes of NARF in overcoming climate change-related constraints to agriculture.

3.2.4.5 National Agricultural Technology and Innovation Policy (NATIP)⁸⁰

This policy (2022 -2027) was also facilitated by FMARD. It recognises that climate change is negatively affecting the Nigerian agricultural sector while the policy response and the needed interventions to mitigate the impact have remained largely ad hoc. This has resulted in food security being continually threatened by drought, floods and land degradation in many parts of the country, while the natural resource management system remains largely poor. To address the challenges, the policy intends to promote sustainable agricultural practices through the building of capacity of various stakeholders on sustainable agricultural production techniques and practices—such as organic farming-- improved land and water management, reduced methane gas emission as well as other conservation techniques to fight climate change. Capacity for responding to and adapting to changing climates is also to be promoted through climate-smart agriculture (CSA) practices in partnership among relevant ministries, departments and agencies.

⁷⁹ Adegoke J, Chidi I, Araba A (eds). 2014. National Agricultural Resilience Framework; a report by the advisory committee on agricultural resilience in Nigeria. Abuja, Nigeria: Federal Ministry of Agriculture and Rural Development

⁸⁰ Available at <https://fmard.gov.ng/natip-2022>

The policy is yet to have a clear and functional implementation framework. Moreover, it is not clear how FMARD will harmonise NARF into it. The situation demonstrates the challenge of multiplicity of overlapping policies and institutional mandates, not only for climate change governance, but for the general development landscape of Nigeria.

3.2.4.6 Nigeria Digital Agriculture Strategy (2020 – 2030)⁸¹

This strategic ten-year plan developed by the National Information Technology Development Agency (NITDA) outlines ways to adopt digital technologies in the agriculture sector. It acknowledges that climate change is negatively affecting the Nigerian agriculture sector and further notes that food security is threatened by both climate change-induced droughts and floods. It also recognises that the current water management technologies and innovations are not sufficient to address these concerns. Like NARF and NATIP, the policy approach and much needed interventions have remained largely ad hoc.

Overall, the country's climate change landscape is dominated by a plethora of policies and few practical programmes and initiatives. While developing the plans is important, what should be more important is a robust implementation of targeted mitigation and adaptation initiatives within a comprehensive and coherent national climate change programme for impact. Examples of such critical initiatives include clean cooking, climate-smart agriculture, distributed renewable energy, green transportation, and energy efficiency that have the potential to deliver climate objectives as well as wider sustainable development goals of green jobs, clean air, better health, food, and energy security. Such an approach will promote a climate-compatible sustainable development that will explore potentially positive and beneficial socio-economic and environmental opportunities inherent in developing and implementing a coherent national response to the development challenge of climate change.

81 Available at https://nitda.gov.ng/wp-content/uploads/2020/11/Digital-Agriculture-Strategy-NDAS-In-Review_Clean.pdf

4

Promoting Sustainable Socio-Economic Development in Nigeria Under Increasing Climate Change Threat

4.1 The Cost of Inaction or Doing Nothing

Deloitte research reveals that inaction on climate change could cost the world's economy US\$178 trillion by 2070⁸². Costing climate change adaptation accurately is challenging, and Nigeria is yet to fully undertake detailed assessment of cost estimates for national adaptation actions and programmes. In 2006, the World Bank, for example, assumed that 2-10% of Nigeria's Gross Domestic Investment (monetarily \$1.5 trillion at the time), 10% of foreign direct investment (\$160 billion) and 40% of official development assistance (\$100 billion) would be sensitive to climate change, and assumed a mark-up to climate-proof these investments of 10-20%.⁸³ A more recent estimate indicates that without climate-proofing Nigeria's economy and society through concrete adaptation action, it is estimated that climate change will cost the country between 6% and 30% of its GDP by 2050.⁸⁴ In addition, estimates for losses in the country's priority sectors (agriculture, water resources, health and transport), without mitigation adequate care was put at \$3.06 billion annually from 2020 and expected to rise to about \$5.50 billion in 2050.⁸⁵ Without climate-proofing, an expected project life of 30 years could be truncated to 20 years.

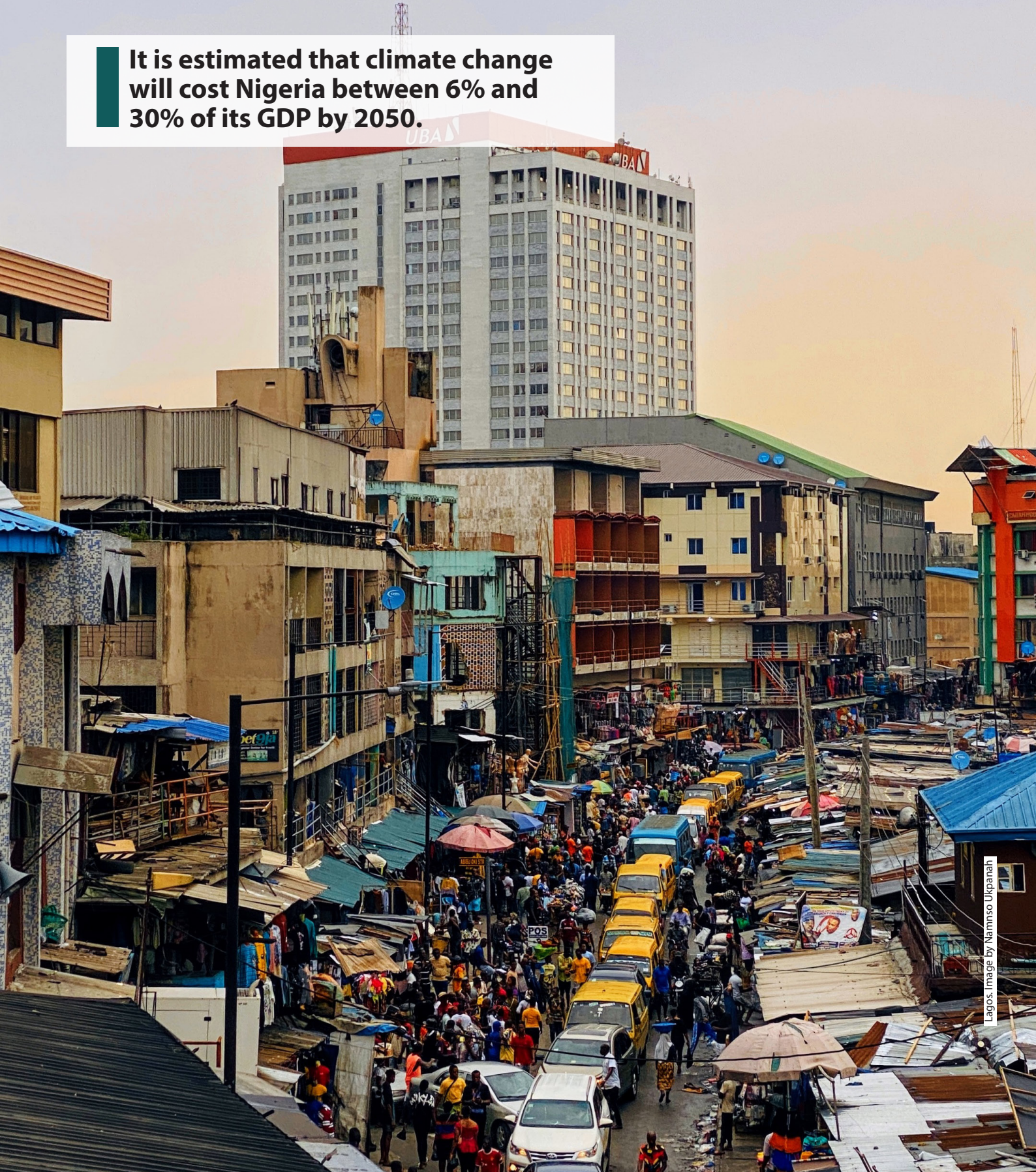
82 The Turning Point available at file:///C:/Users/OLADIPO/Downloads/gx-global-turning-point-report.pdf

83 World Bank, 2006. Investment framework for clean energy and development. World Bank, Washington, DC., USA.

84 Federal Ministry of Environment (2021). National Climate Change Policy for Nigeria. Abuja: Federal Ministry of Environment, p. 9.

85 Federal Ministry of Environment (2021). *Nigeria's Adaptation Communication to the United Nations Framework Convention on Climate Change*. Abuja: Federal Ministry of Environment, p. xviii.

It is estimated that climate change will cost Nigeria between 6% and 30% of its GDP by 2050.



The challenges of numerous climate-related risks (such as extreme weather events, rising temperatures, changing precipitation patterns and sea-level rise) can undermine economic growth, food security, and social stability of Nigeria. Unless immediate action is taken, Nigeria could be among the worst-affected countries in the world. Promoting sustainable socio-economic development of the country under the increasing threat of climate change is a critical and complex challenge. To address this issue effectively, a multi-faceted and inter-related approach that will include a number of targeted interventions is needed in the areas of climate adaptation and resilience, sustainable agriculture, renewable energy transition, rural development and sustainable water resources management in a gender-responsive and inclusive manner and with adequate policy and institutional governance.

Promoting sustainable socio-economic development in Nigeria under increasing climate change threat requires a concerted effort from government, civil society, the private sector, and the international community. It is essential to integrate climate considerations into all aspects of development planning and implementation to build a resilient and sustainable future for Nigeria.

4.2 Climate-Compatible Sustainable Development Imperative for Nigeria

Climate change impacts will continue to pose significant challenges to the resilience of livelihoods and ecosystems, and are likely to make development unsustainable in future Nigeria. Integrating climate change resilience into development efforts has now emerged as a major global policy agenda. The goal is to minimise climate change threats to development and maximise the opportunities the challenge provides by promoting growth and social development through a low emission development path, without compromising development goals of poverty reduction and inclusive development. This, in summary, defines the concept of *climate compatible development* (Figure 7). It is an approach that focuses on long-term resilience development, considering the future projections on climate change and thereby transforming development pathways to effectively face the problem of climate squarely. This approach promotes the longterm sustainability of development.

Unless significant strategies are put in place, the potential impacts of climate change on development in Nigeria could be complex and even derail the attainment of the Sustainable Development Goals (SDGs) in Nigeria. Inability to adapt and plan for the future will make climate change to continue threatening and undermining development gains made over the past few decades. The imperative for Nigeria is to focus on promoting climate resilient, low emission sustainable development.



Climate change impacts will continue to pose significant challenges to the resilience of livelihoods and ecosystems, and are likely to make development unsustainable in future Nigeria.



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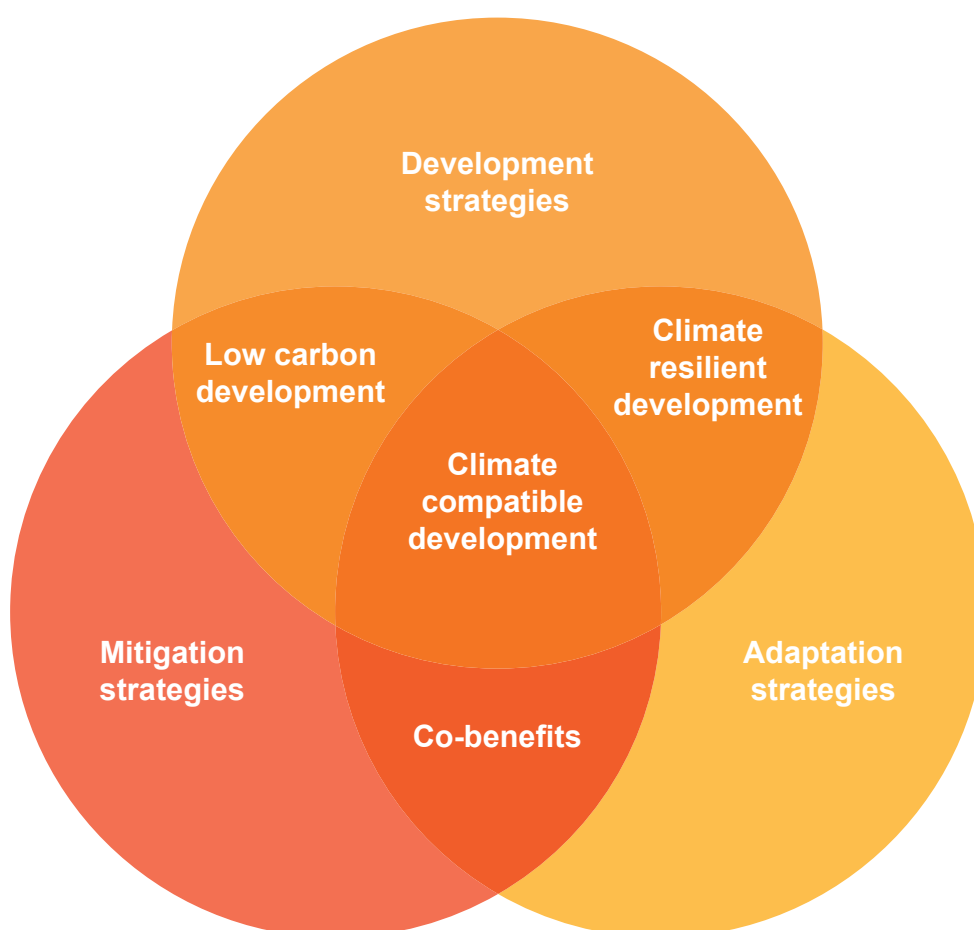


Figure 7: Components of Climate Compatible Development (CDKN,2010)

Source: CDKN Policy Brief

Climate-compatible sustainable development for Nigeria is essential to address the challenges of climate change while promoting economic growth, social equity, and environmental protection. Key strategies and considerations for achieving this goal will include embarking on low-carbon energy transition; decentralised rural electrification; afforestation and reforestation; sustainable agriculture and water resources management; resilience building; green transport and urban development; circular economy; and climate finance and investment with effective awareness creation and monitoring and reporting. Inclusiveness and gender responsiveness are critical enablers for synergising the strategies for the promotion of climate-compatible development in Nigeria.

Climate-compatible sustainable development in Nigeria requires a coordinated and holistic approach that addresses the unique challenges and opportunities of the country. It involves balancing environmental conservation with economic growth and social equity. It will also involve taking into account the specific vulnerabilities and needs of different regions and communities within Nigeria. In so doing, Nigeria will need to address a number of challenges, while also exploring many opportunities that climate-compatible development offers the country to advance her national development.



There are also four important gaps the Nigerian government needs to close to advance national sustainable climate-compatible development.

4.2.1 Challenges

In addition to the challenges of meeting the needs of the people and tackling the pervasive issue of poverty, there are also four important gaps the Nigerian government needs to close to advance national sustainable climate-compatible development. These are related to inadequate capacity, limited financial resources, poor technology development and use, and weak alignment of climate policy with national and regional adaptation needs, practices, and strategies. Another challenge is transitioning into green economy that may lay a number of national resources, particularly oil and gas, stranded. These challenges may seriously limit Nigeria's adaptive capacity to the global rapidly changing shift towards the use of greener energy for sustainable development. A critical challenge that Nigeria needs to properly analyse and address in the process of evolving her strategic response to the development challenge of climate change in view of her current heavy dependence on oil and gas for economic development is the issue of stranded assets.

4.2.1.2 Transitioning into a green economic development in the face of abundant fossil fuel and gas in Nigeria -the challenge of stranded assets

The world has been shifting gradually towards a new model of development since the signing of the UNFCCC in 1992. This shift has intensified in the last 10 years, and many are now asserting that green transition represents a new industrial era. This has led to the setting of targets for net-zero carbon emission by the middle of the century and the elaboration of long-term strategies for low emission development (LT-LEDS) by many countries all over the world. Nigeria has set a target of 2060 for reaching carbon neutrality or zero-emission development, and is about to finalise her LT-LEDS report. Transitioning into a green economic development model, in the face of abundant oil and gas in Nigeria, poses unique challenges, particularly with respect to the issue of stranded assets. The global transition from a high-carbon economy to a low-carbon economy is well underway. Although there remains some level of reluctance and concerns about greenwashing, there is evidence that some major players in the oil and gas sector are re-aligning their business strategies towards a low-carbon economy framework. For example, despite the COVID-19 pandemic that slowed down economic growth around the world, the growth rate in the world's renewable energy capacity jumped 45% in 2020, including an unprecedented boom in wind and solar energy. According to the 2021 report from the International Energy Agency (IEA), renewable power was the only energy source for which demand increased, while consumption of all other fuels declined.⁸⁶ This will have broad implications for the energy landscape of Nigeria, a country that is currently heavily dependent on its vast oil and gas reserves to drive its national development. There is a serious concern that Nigeria has the potential to become a stranded country with stranded resources, and with significant implications for national sustainable development aspirations, if the current global commitment to zero-carbon development continues. On current trends, renewable energy generating capacity will exceed that of fossil fuels and nuclear energy combined by 2026. New climate and energy policies in many countries around the world have driven the growth, with many governments setting out higher ambitions of cutting greenhouse gas emissions and reaching net zero emissions by 2050. At

⁸⁶ IEA, 2021: Global Energy Review 2021

least 14 countries have announced a ban on fossil fuel vehicles from 2035 onwards. These include Germany, Norway, France, the Netherlands, the United Kingdom, India, Israel among others. After a decade of rapid growth, the global electric car stock hit the 10 million mark in 2020, a 43% increase over 2019. Battery electric vehicles (BEVs) accounted for two-thirds of new electric car registrations and two-thirds of the stock in 2020. China, with 4.5 million electric cars, has the largest fleet, though in 2020 Europe had the largest annual increase to reach 3.2 million.

Furthermore, at least one fifth (21%) of the world's 2,000 largest public companies have committed to meet net-zero targets. According to a new report, these companies together represent sales of nearly \$14 trillion. They include not only Twitter (now X), Meta, and Amazon but also include five major oil giants namely BP, Shell, Total, Repsol and Equinor. For example, Equinor views renewables as a "significant growth area" and has set ambitions for profitable growth within clean energy. It expects a renewable production capacity of between 4GW and 6GW by 2026, with the hope of reaching between 12GW and 16GW by 2035⁸⁷. From an economic perspective, those cleaner energy options are consistently dropping in price, making them increasingly more attractive than fossil fuels (e.g., solar energy prices have fallen more than 80 percent over the past decade alone according to the International Renewable Energy Agency.⁸⁸

The last 10 years have seen a boom in investors' interest in sustainable and resilient assets, including renewables with many big global investors now seeking out investment position that will reduce their exposures to climate change vis-a-vis stranded assets. In one of the Wall Street Journal analyses conducted in the first three quarters of 2020, oil and gas companies in North America wrote down asset values of \$145billion, a rough equivalent of 10% of their market value. Denmark, in one of its global decisions, has cancelled all upcoming North Sea licensing rounds in anticipation of ending oil and gas production in the North Sea by 2050. Several oil giants like Shell have commenced divestment of their onshore oil stakes – and for political, economic and environmental reasons many of these divestment decisions are targeting Nigeria. The 2021 IEA report also indicated that no new oil and gas fields should be developed for the world to hit its climate goals. Thus, while these trends cannot be interpreted as the end of oil, especially given the recent invasion of Ukraine by Russia and in the impact on oil and gas prices, the UN Environment Programme found that plans to expand fossil fuel projects over the next decades are severely out of line with the ambition to cut greenhouse gas emissions and limit temperature rises to 1.5°C by 2050 in place⁸⁹. Also, the world's top banks pumped \$742 billion into fossil fuels in 2021 in loans, equity and debt capital market underwriting. And this includes 51 percent rise (to \$23 billion) in Canadian tar sands.

Yet it has been calculated that the value of assets stranded in the upstream fossil fuel sector would total US\$3.3 trillion by 2050. In its Renewable Energy and Jobs: Annual

87 Black, R., Cullen, K., Fay, B., Hale, T., Lang, J., Mahmood, S., Smith, S.M. (2021). Taking Stock: A global assessment of net zero targets, Energy & Climate Intelligence Unit and Oxford Net Zero

88 <https://www.irena.org/Energy-Transition/Technology#costs-trends>

89 UNEP (2022): Emissions Gap Report 2022 – available at <https://www.unep.org/resources/emissions-gap-report-2022>

Review 2021 report released recently, the International Renewable Energy Agency (IRENA) said delaying action could cause this value to rise to an alarming US\$6.5 trillion by 2050 — almost double.

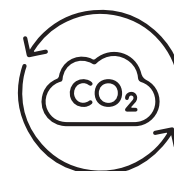
Transitioning to a green economy in the presence of abundant fossil fuels and gas is a complex endeavour that requires careful planning, stakeholder engagement, and a commitment to sustainable development. By addressing the challenge of stranded assets proactively, Nigeria can position itself for a more resilient and prosperous future.

What is vital for Nigeria is to understand is that the ground has shifted and that things are no longer business as usual. The transition from fossil fuels to greener energy is already happening. It is a train that cannot be stopped, and it is within this context that Nigeria must carve out her own response to climate change. The sustainability imperatives for Nigeria include accelerated economic diversification; transparency in internalisation of costs, as well as equity in the distribution of benefits among stakeholders in the country's oil and gas industry. Nigeria needs to explore and leverage from opportunities provided by the current trend towards greener energy in her pursuit of sustainable socio-economic and environmental development under increasing climate risk and threat.

4.2.2 Opportunities: Leveraging climate action for sustainable socio-economic and environmental development

While climate change cannot be solved completely, local actions can help manage physical and transition risks as well as bring large opportunities. Leveraging climate action to pursue economic development in Nigeria is not only a viable strategy but also an essential one. Integrating climate considerations into economic development plans can lead to sustainable and inclusive growth, and provides good opportunities for Nigeria to build a climate-resilient economy that will not only promote growth and reduce poverty as well as create good green jobs, but will also contribute to GHG emission reductions and environmental sustainability. A recent study by Deloitte⁹⁰ identified many opportunities that an African country like Nigeria can explore to build climate resilience for socio-economic development in a global net-zero future. The emphasis is to find ways to industrialise and transition without significantly increasing the emissions profile of the country. To do this effectively, Nigeria will need to pursue mitigation and adaptation strategies that will significantly improve its macroeconomic stability, economic transformation and job creation, while reducing the negative impacts of climate change on development.

Some of the critical opportunities identified by Deloitte⁹¹ that Nigeria can link to its own diversification and industrialisation needs in a global net-zero future include investing in a greener energy mix; supplying commodities that are vital for a clean



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⁹⁰ Deloitte (2022): Building climate resilience: Opportunities and considerations for Africa in a net-zero future available at <https://www2.deloitte.com/za/en/pages/deloitte-africa/articles/building-climate-resilience.htm>

⁹¹ Ibid:

energy future; investing in climate-resilient industry while leapfrogging to new technologies; and harnessing her natural capital to offset carbon emissions. Within the adaptation response landscape, opportunities for Nigeria may include city planning and infrastructure upgrades, adapting agricultural practices to better ensure food security, and advancing healthcare systems and early warning systems to ensure the health, safety and well-being of her citizens.

- **Investing in a greener energy mix:** With its high renewable potential, Nigeria has a good opportunity to tilt its energy mix towards a renewable target of more than 30% of its energy mix by 2030 as contained in its NDC. The Nigerian government, in collaboration with GIZ developed the renewable vision platform to enable investment in renewable energy, as well as energy efficiency, electrification, and implementation. The government has also signed an agreement for an electrification implementation roadmap, which will address existing power issues and expand power capacity for the country.⁹²

The country is also investing in hydropower, with the largest project being the Chinese-funded Mambila Power Station which will have the ability to generate 3,050MW when completed. There is also a focus on solar power: Nigeria is working with the World Bank to build 10,000 solar-powered mini-grids in rural areas by 2023⁹³.

The move to sustainable energy not only adheres to international norms and conversations regarding combating climate change and achieving net-zero carbon emissions, but will also be a beneficial opportunity for Nigeria to position herself in sub-Saharan Africa as a leader of such important change for the region. Undoubtedly, Nigeria's transition to renewable energy requires immediate attention and policy. Evidence collected from the International Renewable Energy Agency (IREA) shows that in recent years, Nigeria has made progress in renewable energy deployment.⁹⁴ For example, as of 2021, Nigeria had an installed solar photovoltaic capacity of 525 MW and a wind power capacity of 25.5 MW, showcasing the country's renewable energy potential.⁹⁵ Furthermore, a notable project completed in 2018 was the Renewable Energy and Energy Efficiency Project (REEEP), which provided more than 260,000 citizens with renewable energy access. The project was funded by the United States Agency for International Development (USAID) in collaboration with Power Africa. In 2020, the government launched the Solar Power Naija Project, which will provide five million solar-based connections to off-grid communities. The project is still ongoing and aims to target 25 million homes,



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92 Omvuyo Tena, "Nigeria recommit to its 2030 renewable energy target", ESI Africa, July 2022

93 Isabelle Gerretsen, "Oil-rich Nigeria turns to renewable energy as population booms", Reuters, May 3, 2018

94 International Renewable Energy Agency (IREA). "Renewable Capacity Statistics 2021." Retrieved from <https://www.irena.org/>

95 International Renewable Energy Agency (IREA). "Renewable Capacity Statistics 2021." Retrieved from <https://www.irena.org/>

while creating approximately 250,000 jobs.⁹⁶

Harnessing the high potential of renewable energy in the country will require that Nigeria addresses the change of stranded assets in terms of huge amount of coal, oil and gas that may have to be left in the ground untouched, despite their potential to rapidly develop the country's economy.

- **Prioritising green manufacturing and climate-resilient industry:** Another opportunity is green manufacturing and investing in industry that is climate-resilient. One example of green manufacturing is embedding circular economy principles into manufacturing investments from the onset, including in key sub-sectors such as food and beverages, petroleum, chemical products and plastics, wood products, paper and packaging, glass and non-metallic materials, textiles and clothing, iron, steel, and mineral products, and motor vehicles.

Circular economy includes (i) reducing, reusing, repairing, refurbishing, remanufacturing, and recycling to eliminate waste and lower material and resource consumption; (ii) improving the design of products to reduce resource inputs; and (iii) extracting maximum value from resources while in use through, for example, Industrial Symbiosis (IS): and ultimately reducing GHG emissions while curbing negative environmental impacts and regenerating natural systems.⁹⁷ In addition to energy and waste management, cleaner production also includes issues around water and chemicals use. To create circular climate-resilient industry that will compete globally, Nigeria will need to invest in smart factory technologies that are able to manage and optimise energy, waste and water consumption.

- **Adapting agricultural practices and ensuring food security:** As agriculture contributes significantly to the country's GDP, there are opportunities to innovate, change farming methods, and build a more climate-resilient food system that restores ecosystems, produces nutritious food, and creates job opportunities for youth and vulnerable groups (e.g., women farmers). To realise this opportunity, Nigeria, like other African countries, will have to make a concerted effort to add value to the agricultural sector, while simultaneously investing in the adaptation of related industries, such as food and agro-processing. The country must improve her ability and capacity to adapt and respond to unpredictable and extreme weather events and boost the resilience of both smallholder and commercial farmers by enhancing their adaptive capacities through the implementation of climate change adaptation strategies in the agriculture and agro-processing sector that will reduce GHG emissions, ensure efficient use of water resources, and strengthen the



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⁹⁶ Ini Iheonye, Isochukwu Nwosu, Israel Aye, "Spotlight: renewable energy project development in Nigeria", Lexology, August 2021

⁹⁷ Mathilda Englund and Karin André, "A circular economy: a tool to bridge climate mitigation and adaptation?", Stockholm Environment Institute (SEI), October 2021

resilience of rural livelihoods. Such strategies may include, but not limited to⁹⁸:

- ✓ Adopting regenerative agricultural practices such as promoting biodiversity, eliminating or decreasing tillage, reducing the use of artificial fertilisers, and using regenerative grazing management for livestock.
- ✓ Planting drought and heat-resistant varieties and species of crops.
- ✓ Employing water-efficient practices, technologies, and water-wise irrigation systems, such as mulching to improve water retention of the soil, modifying irrigation techniques (e.g., the drip irrigation system), and adopting technologies to “harvest” water, conserve soil moisture, and reduce siltation and saltwater intrusion.
- ✓ Adopting intercropping planting practices and integrating crop-livestock-forestry systems, thereby regenerating soils and increasing the ability to adapt to climate change by not focusing on one kind of production.
- ✓ Restoring and rehabilitating degraded lands by recovering degraded pastures by sustainably planting indigenous grasses and trees, thereby avoiding soil erosion, enhancing biodiversity, and strengthening two vital carbon sinks – soil and grasslands.
- ✓ Adopting agroforestry systems by integrating trees and crops into an intentionally designed system that allows farms to be productive, stores more carbon, and ensures income for farmers throughout the seasons.
- ✓ Upgrading and adapting storage technology, transportation infrastructure, and planning to minimise post-harvest and food losses.
- ✓ Embracing adaptation options in the fishery sector which could include improving fishing infrastructure and technologies, the introduction of new species, aquaculture, as well as better control of overfishing by introducing and enforcing fishing permits.

▪ **Harnessing Nigeria’s natural capital for adaptation and mitigation:**

Nigeria’s abundance of natural capital, in the form of forests and favourable growing conditions, offers a significant opportunity for the country to monetise bio-diversity assets to support the world’s growing demand for carbon offsets. It also presents an opportunity to contribute to socio-economic development in local communities, boost tourism, and help to fund countries’ energy transition.

One such opportunity is the preservation of carbon sinks. Given the amount of carbon they absorb, ecosystems like forests and wetlands are important carbon sinks. For example, the Congo Basin rainforest, which is the second-largest rainforest in the world, reportedly absorbs 4% of global carbon dioxide emissions every year, representing 1.1 billion tonnes of carbon dioxide⁹⁹. Also,



Nigeria’s abundance of natural capital, in the form of forests and favourable growing conditions, offers a significant opportunity for the country to monetise bio-diversity assets to support the world’s growing demand for carbon offsets

98 Ibnu Budiman, “Low-Carbon and Climate Resilient Industrial Development in Africa”, Academia, March 2017,

99 Susana Edjang, “Congo Basin: Earth’s African ‘lung’ is it most resilient”, Mail & Guardian, October 16, 2021,

with particular reference to Nigeria, the Finima Nature Park in Bonny Island Rivers State, Nigeria, with an area of about 1000 hectares reportedly had a total carbon stock of 247,158.78 mg t CO₂eq.¹⁰⁰

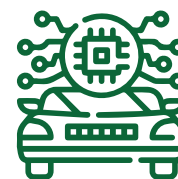
Reforestation and restoration of degraded lands also provides a good opportunity to create new carbon sinks. In this regard, the implementation of Nigeria's Great Green Wall initiative which is targeted at natural resources conservation and development, as well as climate change mitigation and adaptation, in the arid and semi-arid areas of the country remains critical as a response approach to the development challenge of climate change in the country.

Carbon offsets¹⁰¹ provide a means to channel much-needed finance to nature conservation and sustainable development, while reducing climate emissions. Nigeria is already forging ahead with a framework for a carbon offset programme in the implementation of the National Climate Change Act. It will also support the country in meeting its international climate commitments through mitigation, if properly standardised, managed and transparently verified.

- **Mitigating climate change with effective city planning and infrastructure upgrades:** In addition to mitigation strategies like retrofitting buildings to make them more energy efficient, adopting renewable energy sources, and introducing more sustainable transport systems, such as bus rapid transit (BRT), cities in Nigeria will also need to adapt infrastructure and city planning to a warming climate and more volatile weather events.

Also, adapting roads to deal with the effects of climate change stressors during road maintenance and expansion can decrease climate event damages at a relatively low cost. For example, roads can be constructed using asphalt mix and permeable road surfaces, as these are better suited to tolerating high temperatures and heavy rainfall¹⁰².

Improving Nigeria's water infrastructure and the management of water resources will reduce the climate vulnerability of people across the country. Taking advantage of opportunities in green and grey water infrastructure and using nature-based solutions, such as restoring wetlands, removing invasive species, and introducing buffer zones and retention ponds, not only has the benefit of reducing operating and construction costs, but also results in



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100 NCF 2015 Carbon Stock and Ecosystem Service Assessment of Finima Nature Park II. Available at https://finimanaturepark.com/wp-content/uploads/2021/11/FNP-Carbon-Stock-Assessment-II_Sep-tember-2019.pdf

101 Carbon offsets are tradable "rights" or certificates linked to activities that lower the amount of carbon dioxide (CO₂) in the atmosphere. By buying these certificates, a person or group can fund projects that fight climate change, instead of taking actions to lower their own carbon emissions.

102 Florent Baarsch and Michiel Schaeffer, "Climate Change Impacts on Africa's Economic Growth", AfDB, 2019,

improved quality and security of water, and enhanced climate resilience and flood protection¹⁰³

- **Enhancing climate resilience:** Strengthening climate resilience requires the integration of climate change considerations into infrastructure development, urban planning, and disaster risk reduction strategies. Thus, the importance of early warning systems, improved infrastructure resilience, and ecosystem-based approaches to adaptation, as responses to climate change cannot be over-emphasised. For example, a mere 24-hour warning of an impending storm or heatwave can reduce damages by up to 30%¹⁰⁴. Unfortunately, the rate of implementation of Multi-Hazard Early Warning Systems remains low in Nigeria. In this regard, investment is needed in the collection of climate and meteorological data, biophysical monitoring, and early warning, preparedness, and response mechanisms. These strategies will support and prepare populations for the inevitable impacts of climate change events, save lives and livelihoods, and create more resilient economy¹⁰⁵.
- **Improving adaptation strategies for health and safety:** The increasing frequency and severity of acute weather events continue to impact the health and safety of Nigerians, including leading to unacceptable loss of life, disruption to public services and operations, as well as imposing large financial burdens in rebuilding infrastructure. One opportunity to adapt the health sector to the impacts of climate change is by reinforcing public health systems and providing more healthcare facilities (fixed and mobile) to address the needs of communities severely impacted by climate change. To do this effectively will require Nigeria investing in adaptation strategies and programmes related to health and safety, including protecting physical health infrastructure from the impact of extreme weather events, considering the health implications of climate change on patients, and embracing proactive innovations (such as digital tools) to advance healthcare equity for the people.¹⁰⁶



Strengthening climate resilience requires the integration of climate change considerations into infrastructure development, urban planning, and disaster risk reduction strategies

4.3 Policy Recommendations

Responding to the development challenge of climate change by transiting towards a lower carbon future is complex for Nigeria, a country that still depends heavily on fossil fuels for its social and economic development in the face of abject poverty, unemployment and insecurity. Yet the concern about the negative consequences of

¹⁰³ The World Bank, "Putting Nature to Work: Integrating Green and Gray Infrastructure for Water Security and Climate Resilience", March 2019

¹⁰⁴ United Nations Office for Disaster Risk Reduction (UNDRR), "Learn - International Day for Disaster Risk Reduction", 2022

¹⁰⁵ IOL, "Temperatures, drought, extreme weather among 13 climate-related findings in State of Climate in Africa 2021 report", September 2022; Presidential Climate Commission, "A Framework for a Just Transition in South Africa", 2021,

¹⁰⁶ Neal Batra, Dr Elizabeth Baca, Michael Joseph Johnson, Jay Sekhon, "Why climate resilience is key to building the health care organization of the future", Deloitte Insights

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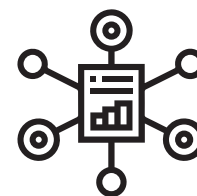


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global-warming intensified climate change makes transition towards a lower-carbon future inevitable. But there are many climate-led opportunities that Nigeria can explore to enable rapid economic growth, create jobs for a rapidly growing youthful and urbanising population, and address high levels of abject poverty and inequality through a just transition.

This requires that the right policy frameworks are in place, funding mechanisms to support the country's energy transition opportunities are effectively mobilised, secured and deployed, the economic transition is just and fair, and needed collaboration and partnerships for implementation are established. Towards this end, the following broad policy recommendations are made with respect to how Nigeria can pursue its development objectives while considering the challenges of climate change and the opportunities from the transition:

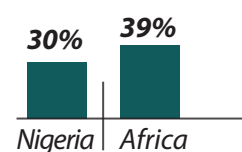
- **Strengthen national climate policy frameworks:** In response to global demands, Nigeria has some climate-related policy and regulatory actions in place, mostly on mitigation, such as the NDC. They need to be synergised and aligned more with national needs and commitments to ensure greater effectiveness. Emphasis should be to focus the country's macro and micro-level efforts on solid mitigation and adaptation policies, with strong governance structure and a reliable and expanding energy mix to ensure an investor-friendly environment.
- **Strengthen institutional capacity for climate action and the legal framework:** This may include anchoring in law NDC climate policy priorities and the establishment of a legal framework for participation in global carbon markets. It is also imperative to standardise monitoring, reporting, and verification (MRV) procedures and mainstream climate change in public financial management, public investment management, green public procurement, and government-owned enterprises.
- **Ensure adequate climate funding:** To meet the high cost of mitigation and adaptation, the government should consider the use of other financing instruments, such as *Green and Sustainable Bonds*, for financing climate-smart projects in line with Nigeria's NDC, ETP and other national development medium-term strategies to encourage private investment on climate change initiatives and projects. Other carbon pricing instruments such as Carbon Tax, Emission Trading System, Crediting mechanism and Results-Based Climate Finance may also be considered to attract private sector investment in national climate change response. Nigeria must also consider boosting climate resilience through sectoral interventions, deepening financial and preparedness mechanisms to shocks, and setting the foundation for a low-carbon transition in energy and transport. The country must begin to unlock private climate finance by improving the business environment for private investment in green technologies and supporting the preparation of bankable projects for international finance.
- **Ensuring a just and fair energy transition:** Nigeria will need to properly



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manage her need to be part of the global transition to a cleaner energy future and a cleaner means of production, especially the move away from coal and other fossil fuels, so as to not be at a competitive disadvantage, which may stall her economic growth and development. An unjust and unfair global transition to a diversified green economy may be risky for the country and disrupt her economy. This could have serious socio-economic consequences, such as increasing poverty and inequality, threatening social stability and organisations’ social licence to operate¹⁰⁷. In this regard, Nigeria must explore all opportunities available at the global level to ensure that the implementation of her Energy Transition Plan ensures a just and fair transition in her pursuit of low-carbon climate resilient development. The transition to clean and green energy must scale-up solar PV, achieve universal access to electricity and realise the large hydropower potential for the country. It must also promote nation-wide adoption of clean cooking with LPG.

- **Increase the level of public awareness for climate change:** Most Nigerians are unaware of climate change. Surveys conducted by Afrobarometer suggest that only 30% of Nigerians are aware of both climate change and its anthropogenic cause, compared to an African average of 39%.¹⁰⁸ This is geographically uneven, as climate literacy ranges from 5% in Kano to 71% in Kwara.¹⁰⁹



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A more informed and engaged public would be able to better plan and limit exposure to climate risks. By increasing individuals’ internalisation of costs of climate adaptation for themselves, this would help reduce the costs incurred by the government in responding to climate shocks. For example, public expenditure on relief materials for smallholder farmers suffering from famine could reduce if farmers make use of weather index insurance; and disaster management costs of managing flood victims and property damage could reduce if more people reduce plastic usage and improper waste disposal that blocks drainage systems.

Improving public awareness of climate change, therefore, is very critical to any national effort to respond to the challenge of climate change in Nigeria. This requires initiatives, resources and projects dedicated to educating public servants, farmers, civil society organisations and other groups, and upskilling relevant national institutions such as the National Orientation Agency (NOA), national television and radio stations such as the Nigerian Television Authority (NTA) and the Federal Radio Corporation of Nigeria (FRCN) as well as the News Agency of Nigeria (NAN). Working with the NCCC, these institutions can reorient Nigerians on climate change, its mitigation and the need for adaptation.

¹⁰⁷ Deloitte, “Did COP26 lay the groundwork for a just transition to net zero?”, 2022

¹⁰⁸ Simpson, N.P., Andrews, T.M., Krönke, M. et al. (2021). Climate Change Literacy in Africa. *Nature Climate Change*, 11: 937–944.

¹⁰⁹ Ibid.

- **Pursue a collaborative approach to low-carbon development future:** The global consensus is that tackling the challenges of climate change and advancing towards a green and resilient transition will require inclusive collective will and partnerships, as well as extraordinary levels of collaboration and coordination across emerging systems and between governments, private sector, civil society, philanthropic organisations, research centres, and communities alike¹¹⁰. In this regard, Nigeria needs to strengthen its partnerships with various national and international climate change actors to accelerate transformational and collaborative climate action to respond to the urgency of climate change in the country.

Other recommended sectoral policy interventions include:

- **Strengthening integrated agriculture, forest, and water management** by promoting climate-smart agriculture (CSA) and integrated water and coastal management, reducing deforestation, strengthening tree tenure and rights of landholders, and enhancing integrated landscape management. There is need to immediately deploy landscape management plans at the local government level, scale-up community-level natural resource management, reform land and tree tenure, and strengthen charcoal regulation.
- **Creating the conditions for resilient cities and infrastructure** by integrating risk data into land use and city-wide infrastructure plans, reduce urban sprawl, introduce zoning in flood risk areas, and implement climate-informed design criteria for urban and new residential infrastructure.
- **Enhancing national capacity for climate-induced disaster risk management** by developing early warning systems in priority areas, strengthening emergency response capacity, and piloting options for disaster risk financing.
- **Setting the foundations for low-carbon development in the transport sector** by improving vehicle regulations and fuel standards, and improving traffic management that will include making available walkways and bus/bike-only lanes. Immediate action on mitigation in transport will create conditions to leverage opportunities from technology, innovation and financing.
- **Boosting climate resilience in the housing and construction sector** by adopting green building standards into the National Building Code and providing demand-side and supply-side subsidies to incentivise investments in green buildings and catalyse Nigeria's green building subsector.
- **Promoting climate-resilient infrastructure development** by revising the Nigeria Integrated Infrastructure Master Plan to incorporate climate resilience as a major component of the government's infrastructure plans.



Promoting climate-smart agriculture (CSA) and integrated water and coastal management, reducing deforestation, strengthening tree tenure and rights of landholders, and enhancing integrated landscape management

Above all, the immediate overarching policy imperative is the integration of climate

¹¹⁰ Deloitte (2022): Building climate resilience: Opportunities and considerations for Africa in a net-zero future available at <https://www2.deloitte.com/za/en/pages/deloitte-africa/articles/building-climate-resilience.htm>

considerations into the country's development plans to address issues of (i) just energy transition ; (ii) renewable energy Investment; (iii) energy efficiency; (iv) green Infrastructure; (v) sustainable agriculture; (vi) afforestation and reforestation; (vii) climate-resilient infrastructure; (viii) green jobs creation; (ix) international collaboration: and (x) community engagement and inclusivity, among others.

Leveraging climate action for economic development in Nigeria requires a coordinated effort across government, the private sector, civil society, and international partners. It involves aligning climate goals with broader economic development objectives to create a sustainable and resilient future for the country.

Conclusion

The development cost of inaction in the face of climate change is huge, and this calls for the need to urgently mainstream climate change into our development process. The inevitable transition to a low-carbon and climate-resilient future requires that Nigeria makes the right choices now to chart the pathway to decarbonisation of its economy and build a climate-resilient and competitive society. These decisions will determine the future for generations to come in the face of large uncertainties about the time and space of extreme weather events that are currently disrupting the economy of the country.

The global consensus is that if correct action is taken now, we could all be better off in the decades to come. Undoubtedly, the transition promises to be complex, with many moving parts. All stakeholders will have to collaborate to build the right foundational frameworks, policies, and momentum that will drive change.

For the survival of our development in a sustainable manner, funding and investments that prioritise low-emissions and climate-resilient industries must be deployed and mobilised. Also, the adaptive capacity of people in different ecological zones of Nigeria must be strengthened with good training and knowledge development for them to be able to take appropriate responsive actions to tackle climate change and minimise its impacts. Commitment to this transition will create economies and societies that create jobs, and are greener and grow more quickly than their carbon-intensive alternatives.

As frequently mentioned in climate change discourse, Nigeria must balance the adaptation and mitigation strategies for a low-carbon future with urgent development priorities for a just transition that will be critical to address challenges such as food insecurity, unemployment, poverty, inequality, and social stability, while diversifying and structurally transforming its socio-economic development.

The country's immense natural and human wealth should be fully utilised for economic transformation and industrialisation that will ensure a cleaner energy future. As properly and succinctly put by Delimit, such a transformation presents Nigeria, like other African countries, "with an unmissable opportunity: to use its natural resources, including metals and minerals such as hydrogen as a clean fuel to power industries and lithium to power electric mobility batteries. Such assets including agricultural resources, renewable resources, and bio-diversity assets as a springboard to benefit, grow, and diversify, while upskilling a growing workforce, increasing electrification, attracting new technologies and investments, and setting the foundation for climate-resilient



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industrialisation"¹¹¹.

To move forward, it is imperative for Nigeria that critical policy and investment decisions are made immediately to properly shape the future of the country's economy in the face of increasing climate risk and threat and the likelihood that global demand for the country's oil and gas may reduce drastically as the world continues to increasingly imbibe the use of renewable energy to power economic development. A well-developed and properly implemented national response to climate change will not only enable Nigeria to identify costly development risks of inaction but also enable her to explore immense opportunities to leapfrog to more green, inclusive, globally competitive, and resilient pathways for rapid and sustainable national development.



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An effective, coherent and coordinated national response to climate change, through a well-formulated climate change action plan, provides Nigeria a window of immense opportunities to help transform and transition the economy in an environmentally and socially sustainable manner. Time is of essence. Thus, the immediate development of the National Climate Change Action Plan, as mandated by the 2021 Climate Change Act, provides a good opportunity to kickstart the long and overdue process of a well-coordinated national response to the socio-economic and environmental impacts of climate change in Nigeria.

The most effective option for Nigeria to tackle the climate crisis is to grow sustainably and reduce poverty, and climate actions can support these dual goals. What is required is sound macroeconomic management, a conducive business environment, and broad and nimble safety nets for building resilience and laying foundations for the low-carbon transition. Reports on climate change and development by the World Bank for many developing countries in West Africa (e.g. Burkina Faso, Chad, Ghana, Mali) have demonstrated that climate action is not only compatible with development goals, but highly complementary and beneficial to keep countries on track to meet their ambitions for growth and build resilience, while flagging risks of costly lock-ins into obsolete and high-risk development directions, and highlighting opportunities to leapfrog to more green, inclusive, and resilient pathways¹¹². Nigeria cannot be an exception.

¹¹¹ Deloitte (2022): Building climate resilience: Opportunities and considerations for Africa in a net-zero future available at <https://www2.deloitte.com/za/en/pages/deloitte-africa/articles/building-climate-resilience.htm>

¹¹² World Bank Country Climate and Development Reports available at <https://www.worldbank.org/en/publication/country-climate-development-reports>

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About Agora Policy

Agora Policy is a Nigerian think tank and non-profit committed to finding practical solutions to urgent national challenges. We conduct policy research, facilitate frank and purposeful dialogues, and build capacity for governance, policy and advocacy.

About the IIAPP Project

The Informed, Inclusive and Accountable Public Policies (IIAPP) project is designed to achieve three things: one, to maximise the opportunity provided by the electioneering and transition periods and beyond to sustain attention on and further mainstream transparency, accountability, gender equity and social inclusion into policy and governance discourse in Nigeria; two, to generate original and credible evidence before, during and after the 2023 elections to focus the attention of the country on key policy areas and, ultimately, the adoption of sensible, inclusive and effective policies on key national challenges; and three, to deepen the capacity of state and non-state actors to undertake evidence-driven policy analysis, design, implementation and advocacy. The IIAPP is supported by the MacArthur Foundation.



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