



CLIMATE-RESILIENT AGRICULTURE IN NIGERIA: EVALUATING THE LEGAL AND INSTITUTIONAL FRAMEWORK FOR SUSTAINABLE AGRICULTURAL ADAPTATION

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ABSTRACT

Climate change poses a significant threat to agricultural productivity and food security in Nigeria by increasing the frequency and intensity of droughts, floods, desertification and other extreme weather occurrences. These challenges necessitate climate-resilient agricultural practices capable of enhancing adaptive capacity, reducing vulnerability and ensuring sustainable food production. Against this backdrop, this paper examines climate-resilient agriculture in Nigeria from a legal perspective, with particular emphasis on the adequacy of the existing legal, policy and institutional frameworks supporting agricultural adaptation. Employing the doctrinal legal research methodology, the paper analyses relevant international climate change instruments and Nigeria's domestic legal and policy frameworks governing climate-resilient agriculture. It further evaluates the progress made in promoting climate-smart agricultural practices while identifying key challenges hindering their effective implementation. These challenges include weak enforcement of relevant laws and policies, inadequate funding, limited technical and institutional capacity, poor coordination among implementing agencies, low farmer awareness, and insecurity. The paper finds that although Nigeria has made appreciable progress through policy development and adaptation initiatives, significant implementation and enforcement gaps continue to undermine the effectiveness of these measures. It concludes that strengthening institutional coordination, enhancing enforcement mechanisms, increasing investment in climate-resilient agriculture, improving farmer education and extension services, and addressing insecurity are essential to building a sustainable and resilient agricultural sector capable of ensuring long-term food security and climate adaptation in Nigeria.

KEYWORDS: *Adaptation, Climate Change, Climate-Resilient Agriculture and Food Security*

1. INTRODUCTION

Nigeria is a country located in the Western region of the African continent.¹ With a population of over 200 million people, it is the most populous country in Africa and the 6th most populous nation in the world.² It has a total land area of 923,768 km² (356,669 sq mi), making it the 31st largest

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¹ A H M Kirk-Greene and Others, 'Nigeria' *Britannica* (3rd June 2026). <<https://www.britannica.com/place/Nigeria>> accessed 25 May 2026.

² Z Dierks, 'Population in Africa, by selected Country' *Statista* (26th January 2026). <<https://www.statista.com/statistics/1121246/population-in-africa-by-country/>> Accessed 25th May 2026. Worldometer, 'Countries in the world by population (2026)'. <<https://www.worldometers.info/world-population/population-by-country/>> accessed 25 June 2026.

country in the world.³ This means that it has the amount of land needed to support a booming agricultural sector. Nigeria has up to 34 million hectares of arable land and 70.8 million hectares of total agricultural land area.⁴ The sector centres on staple crops such as cassava, rice, maize, millet, sorghum and yams, and cash crops such as cocoa, oil palm, cotton, groundnut and rubber.⁵ Livestock and fish farming are also abundant in Nigeria, with animals such as cattle, sheep, goats, poultry, fish, and other seafoods.⁶ With crops maintaining a majority share, agriculture contributes up to 20% of Nigeria's gross domestic product (GDP) and is the country's largest non-oil sector.⁷ It also provides Nigeria's largest non-oil exports. Indicatively, agriculture remains a cornerstone of Nigeria's economy, employing a third of the nation's population and contributing to national food security.⁸ However, among other challenges the sector faces, including high production costs, low mechanisation levels, and insecurity,⁹ The sector is increasingly threatened by climate change.¹⁰

Africa is one of the places that is highly vulnerable to the effects of climate change despite its low greenhouse gas (GHG) emissions,¹¹ and this is particularly visible in agriculture.¹² Within Africa, Nigeria experiences this agricultural vulnerability. The nation faces significant climate challenges due to its exposure to climate-related risks, which include rising temperatures, unpredictable rainfall patterns, and frequent extreme weather events.¹³ These conditions threaten agricultural productivity and food security,¹⁴ making climate resilience a critical concern for the country. Furthermore, environmental degradation resulting from petroleum activities has exacerbated these issues, impacting soil quality, water resources, and local ecosystems.¹⁵

³ AFRI-RES, 'Nigeria'. <<https://afri-res.uneca.org/country-profile/ng/nigeria>> Accessed 25th May 2026.

⁴ U V Okoli and C B Onugha, 'Impact of the Agricultural Sector on Job Creation in Nigeria' [2025] (X) (II) *International Journal of Research Innovation in Applied Science* 225.

⁵ *ibid*; United Nations FAO, 'Nigeria at a Glance'. <<https://www.fao.org/nigeria/fao-in-nigeria/nigeria-at-a-glance/en>> Accessed 25th June 2026; S Dukeh, 'What Crops Does Nigeria Grow?' *The Guardian* (30th May 2026). <<https://guardian.ng/nigerian/what-crops-does-nigeria-grow/>> Accessed 25 May 2026.

⁶ *ibid*.

⁷ C N Obidi, 'Analysis of the contribution of agriculture to Nigeria's economic growth (1981-2024)' [2026] (18) (2) *International Journal of Science and Research Archive* 211-225.

⁸ R O Enessi, 'Food and Agriculture Organisation and the Agricultural Sector in Nigeria, 2014-2024' [2025] (3) (3) *Journal of Political Discourse* 166-179.

⁹ FAO (n 5).

¹⁰ G O Omokaro, 'Multi-Impacts of Climate Change and Mitigation Strategies in Nigeria: Agricultural Production and Food Security' [2025] (4) *Science in One Health* 100113.

¹¹ African Development Bank Group, 'Climate Change in Africa'. <<https://www.afdb.org/en/cop25/climate-change-africa>> Accessed 25th May 2026; Etheldred E Woha and B Oyaleke, 'Optimising Inclusive Participation for Climate Action and Sustainability in the Niger Delta: Lessons from Norway and New Zealand' *Obafemi Awolowo University Law Journal* (OAU LJ) [2026] 7(2) 111.

¹² *ibid*.

¹³ A Adeleye, 'Climate Change in Nigeria: Causes, Effects, and Mitigation Efforts' *The Nation* (16th October 2025). <<https://thenationonline.ng/climate-change-in-nigeria-causes-effects-and-mitigation-efforts/>> Accessed 25th May 2026.

¹⁴ H Turrall, J Burke and Hean-Marc Faures, 'Climate Change, Water and Food Security' *UNFAO* 2011. <<https://www.fao.org/4/i2096e/i2096e.pdf>> Accessed 25th May 2026; A I Prince and Others, 'Analysing the Critical Impact of Climate Change on Agriculture and Food Security in Nigeria' [2023] (9) (4) *International Journal of Agriculture and Earth Science* 1-27.

¹⁵ K G Amos and E O Okoro, 'Assessing the Dual Threats of Oil Spills and Climate Change on Sustainable Development in Ogbia, Bayelsa State Nigeria' [2025] (24) (1) *Scientia Africana* 125-136.



The combination of climate change and environmental impacts underscores the urgent need for effective legal, policy, and institutional frameworks to support a climate-resilient agriculture, which will also protect Nigeria's natural resources. Ironically, agriculture also contributes significantly to Nigeria's share of GHG emissions.¹⁶ Climate resilient agriculture, therefore, represents a holistic approach that integrates adaptation, mitigation and sustainability into agricultural practices to enhance productivity, protect the environment and reduce vulnerability to climate shocks.¹⁷ It involves farming practices that are designed to withstand and adapt to the impacts of climate change.¹⁸ It is promoted by international climate agreements such as the United Nations Framework Convention on Climate Change (UNFCCC) 1992,¹⁹ Paris Climate Change Agreement 2015,²⁰ UN Convention to Combat Desertification (UNCCD) 1994,²¹ UN Convention on Biological Diversity (UNCBD) 1992²² and the Cartagena Protocol on Biosafety 2003.

Given Nigeria's vulnerability to climate change, the role of law in promoting, regulating and enforcing climate resilient agriculture has become indispensable. This paper, therefore, provides an insight into what climate resilient agriculture in Nigeria entails, the legal and institutional framework promoting its adoption, the strides made thereof, the challenges affecting the expansion of climate resilient agriculture in Nigeria and what can be done to solve them.

2. CONCEPTUAL CLARIFICATION

2.1 Climate Change

Climate change is defined as long-term shifts in temperatures and weather patterns across the globe and is driven by human activities.²³ It has led to extreme weather, rising sea levels, ocean acidification and severe risks to human health.²⁴ It further threatens food and water security, accelerates biodiversity loss, and disproportionately affects communities globally.²⁵

2.2 Climate Resilient Agriculture

Climate Resilient Agriculture refers to agricultural systems that anticipate, prepare for and adapt to climate-related shocks while maintaining productivity and sustainability.²⁶ It emphasises the use of practices such as crop diversification, improved water management and climate-smart

¹⁶ D I Okorie and B Lin, 'Emissions in Agricultural-based Developing Economies: A Case of Nigeria' [2022] (3)(37) *Journal of Cleaner Production* 130570.

¹⁷ R K Jat and Others, 'Climate Resilient Agriculture Strategies to address the Challenges of Agri-food Security and Climate Change' [2026] (3)(40) *Field Crops Research* 110370.

¹⁸ H H Sarma and Others, 'Innovative Approaches for Climate Resilient Farming: Strategies against Environmental Shifts and Climate Change' [2024] (14) (9) *International Journal of Environment and Climate Change* 217-241.

¹⁹ UNFCCC 1992, art 4 (1) (c) and (e).

²⁰ Paris Climate Change Agreement 2015, art. 2 (1) (b).

²¹ UNCCD 1994, art 10 (4), 19 (1) (e).

²² UNCBD 1992, Preamble.

²³ United Nations, 'What is Climate Change?' <<https://www.un.org/en/climatechange/what-is-climate-change>> Accessed 25 May 2026.

²⁴ Ibid.

²⁵ ibid; S S Abdul-Nabi, 'Climate Change and its Environmental and Health Effects from 2015 to 2022: A Scoping Review' *Heylion* [2025] (11) (3) 1-17; D Florence-Renteria, 'Climate Change and Food Security: Global Challenges and Opportunities' *IISD* (4th June 2025). <<https://sdg.iisd.org/commentary/guest-articles/climate-change-and-food-security-global-challenges-and-opportunities/>> Accessed 25 May 2026.

²⁶ Jat and Others (n 17).

technologies.²⁷ Relative to Nigeria, since the nation faces severe climate vulnerabilities such as droughts, desertification and floods, climate resilient agriculture provides a conceptual basis for policy and legal interventions aimed at safeguarding food security against climate variability.²⁸ These interventions are considered in this paper.

3. LEGAL, POLICY AND INSTITUTIONAL FRAMEWORK FOR CLIMATE RESILIENT AGRICULTURE IN NIGERIA

Nigeria has developed legal, policy and institutional frameworks for environmental protection and climate action.²⁹ Much of their development stemmed from international commitments, visible in international treaties ratified by Nigeria. Internationally, the fight against climate change and the promotion of sustainable development is championed by the United Nations and its treaty system. International conventions and treaties such as the UNFCCC 1992, Paris Climate Agreement 2015, UNCCD 1994, UNCBD 1992 and the Cartagena Protocol on Biosafety 2000 were adopted to awaken awareness on the challenges posed by climate change, rally global support to tackle climate change through mitigation and adaptation efforts, protect the Earth's biological diversity, promote sustainable land use and management, tackle food insecurity and ultimately achieve sustainable development for all. Since agriculture depends on the climate and weather conditions, these conventions are of utmost importance in providing the basis and governance to ensure that agriculture is not threatened by climate change.

The UNFCCC 1992, ratified by Nigeria in 2017,³⁰ in this vein, urges State parties to promote and cooperate in developing and applying technologies, practices and processes that control emissions in sectors such as agriculture.³¹ The Convention encourages State parties to cooperate in developing and applying plans for adaptation regarding water resources and agriculture and for the protection and rehabilitation of areas affected by droughts, desertification and floods.³² The Paris Agreement 2015 recognises the need to safeguard food security and end hunger.³³ It urges State parties to strengthen the global response to climate change by increasing adaptability, fostering climate resilience and low GHG emissions development in a manner that does not threaten food production.³⁴

The UNCCD 1994, ratified by Nigeria in 1997,³⁵ urges State parties to adopt sustainable land management and agricultural practices to prevent and reverse land degradation affecting farming

²⁷ *ibid.*

²⁸ Prince and Others (n 17).

²⁹ V A Tari and E C Diah, 'Challenges and Prospects of the Legal Frameworks for Combatting Climate Change in Nigeria' *AKSU Journal of Administration and Corporate Governance* [2024] (4) (1) 111.

³⁰ UNCC, 'Parties to the UNFCCC: Nigeria'. <<https://unfccc.int/node/61130>> Accessed 27th May 2026.

³¹ UNFCCC 1992 (n 22).

³² *ibid.*

³³ Paris Agreement 2015 (n 20).

³⁴ *ibid.*

³⁵ UNCCD Parties. <https://treaties.un.org/pages/ViewDetails.aspx?src=IND&mtdsg_no=XXVII10&chapter=27&clang=_en> Accessed 27 May 2026.



systems.³⁶ Accordingly, it recognises that farmers need support to improve resilience to drought and declining soil fertility through policies, funding, technology transfer and capacity building.³⁷ Finally, the Convention encourages States to ensure the restoration of degraded agricultural land and integrate agriculture into food security and sustainable development strategies.³⁸

The CBD, ratified by Nigeria in 1994,³⁹ is another convention essential to agriculture because its preamble states that biodiversity conservation is important to food,⁴⁰ and thus the need to conserve biodiversity, ensure its sustainable land use, even relative to sectors such as agriculture. It further promotes the fair use of biological and genetic resources and technology,⁴¹ which are essential to promoting climate-resilient agriculture. Finally, the accompanying Cartagena Protocol, ratified by Nigeria in 2003,⁴² is essential as it requires States to ensure that living modified organisms (LMOs) or genetically modified organisms (GMOs) are safe for use in agriculture so that they do not harm biodiversity or human health.⁴³ Assessments must be conducted before GMO seeds are introduced,⁴⁴ and States must encourage information sharing, prior consent and proper labelling to regulate their transfer and use.⁴⁵ Together, they are in place to help States provide the direction needed to implement climate action, ensuring that environments are preserved, food security is not threatened, and livelihoods are not diminished due to climate change.

Nigeria's national frameworks are considered thus. Nigeria's 1999 Constitution (as amended) provides principally that the State shall protect the environment.⁴⁶ This provision provides the basis for all action surrounding environmental protection, climate action, biodiversity conservation and sustainable development in Nigeria. Nevertheless, going further, the Constitution makes provisions concerning food security. By virtue of the Fifth Alteration Act of 2023, the Constitution provides that the government shall direct its policy towards ensuring that every Nigerian has the right to food and food security.⁴⁷ It goes ahead to provide that the State shall ensure that food security is guaranteed, the means of production, conservation and distribution of food are upgraded or improved continuously, measures are put in place to ensure that food security is not compromised and is instead enhanced.⁴⁸ This is indeed an amazing provision, but by virtue of Section 6 (6) (c) is not justiciable and thus may not be adequately enforced.

³⁶ UNCCD 1992 (n 21).

³⁷ *ibid.*

³⁸ *ibid.*

³⁹ CBD, 'List of Parties'. <<https://www.cbd.int/information/parties.shtml>> Accessed 27th May 2026.

⁴⁰ UNCCD 1992 (n. 25).

⁴¹ *Ibid*, art 1 and 16.

⁴² CBD, 'Parties to the Cartagena Protocol and its Supplementary Protocol on Liability and Redress'. <<https://bch.cbd.int/protocol/parties>> Accessed 27 May 2026.

⁴³ Cartagena Protocol in Biosafety 2000, art. 1.

⁴⁴ *ibid*, art 11 (6), 15.

⁴⁵ *ibid*, art 20.

⁴⁶ CFRN 1999 (as amended), s 20.

⁴⁷ *Ibid*, s 16 (2) (d).

⁴⁸ CFRN 1999 (as amended), s 16 (a).

Going forward, the National Environmental Standards and Regulations Enforcement Agency Act 2007 (as amended in 2018) is Nigeria's principal environmental protection law and establishes the Agency to enforce environmental protection.⁴⁹ The Agency is empowered to issue Regulations for that purpose,⁵⁰ and one of these Regulations is the Desertification Control and Drought Mitigation Regulations 2011. Relative to agriculture, the Regulation requires states and relevant authorities to promote sustainable land utilisation for protection, especially in desertification-prone areas.⁵¹ This includes adopting environmentally sound agricultural and land management practices.⁵² The Regulations further obligate state governments to encourage afforestation, reforestation and agro-forestry, ensuring that farmers implement measures such as tree planting to prevent land degradation.⁵³ It encourages States to take action to identify vulnerable areas and enforce mechanisms to sustain agricultural productivity and environmental (or climate) resilience.⁵⁴

Another, more recent, fundamental law Nigeria has enacted is the Climate Change Act 2021. The Act establishes a comprehensive framework which requires the government and sectors to integrate climate change into national development.⁵⁵ It emphasises the development of a National Climate Change Action Plan and carbon budgets, which should include measures to strengthen adaptation and resilience in all sectors, including agriculture and food production.⁵⁶ Through the National Council on Climate Change and dedicated funding, the Act encourages the adoption of policies and strategies to support climate resilient practices, promote sustainable land use and enhance food security in the wake of climate impacts.⁵⁷

In addition to Nigeria's legal framework promoting climate-resilient agriculture, Nigeria has developed policies and plans to guide government action. These promote climate resilient agriculture by integrating sustainability, innovation and adaptation into agriculture. The first is the National Environmental Policy (Revised 2016), which emphasises the need for sustainable natural resource management, environmental protection and the integration of environmental concerns into development decisions.⁵⁸ It promotes resilient agriculture through conservation, protection of ecosystems and impact assessments.⁵⁹

Going forward is the Climate Change Policy 2021-2030. The National Climate Change Policy 2021-2030 was developed as part of Nigeria's conscious step in responding to climate change at a

⁴⁹ NESREA Act 2007 (as amended in 2018), s 1-2, Pt II.

⁵⁰ *ibid*, s 34.

⁵¹ Desertification Control and Drought Mitigation Regulations 2011, Pt II, III and IV

⁵² *ibid*, reg 2.

⁵³ *ibid*, reg 3-5.

⁵⁴ *ibid*, reg 18.

⁵⁵ Climate Change Act 2021.

⁵⁶ *ibid*, s. 19-20.

⁵⁷ *ibid*, s 19-20.

⁵⁸ National Environmental Policy (Revised 2016) 7, 8, 15, 19, 36, 39 and 40. <<https://nesrea.gov.ng/wp-content/uploads/2025/05/nig176320.pdf>> Accessed 27th May 2026.

⁵⁹ *ibid*.



governmental level. The Policy calls for the reduction of vulnerability to climate impacts.⁶⁰ It encourages the mainstreaming of climate considerations into sectoral policies such as agriculture.⁶¹ Regarding agriculture, it promotes the adoption of sustainable land-use systems that enhance agricultural productivity, food security and ecosystem integrity.⁶² It further emphasises the use of climate resilient farming practices, improved resource management, capacity building and innovation to strengthen the agricultural sector and rural livelihoods.⁶³

The sectoral policy concerning agriculture is the National Agricultural Technology and Innovation Policy 2022-2027. The Policy recognises the need for rapid development in Nigeria's agricultural sector, having recognised the current challenges it faces.⁶⁴ This policy advances climate resilience in the agricultural sector by promoting the use of climate-smart agriculture, sustainable land and water use, improved inputs, irrigation and innovation in farming.⁶⁵ This enhances agricultural productivity and food security while strengthening resilience to climate shocks.

Finally, it is an important national plan for the nation's development that includes the growth of various sectors, one of which is agriculture. The National Development Plan 2021-2025 was adopted to deepen the government's commitment to national development for all sectors. The agricultural sector is one of them. The Plan recognises Nigeria's agricultural potential and strides.⁶⁶ However, it notes the challenges the sector faces, including reliance on rain, low mechanisation, high importation, farmer/herder conflicts and importantly, climate change.⁶⁷ Climate change factors are specifically mentioned to include drought, desert encroachment, pests and disease.⁶⁸ Recognising these, the Plan sets the goal of achieving agricultural development through, among others, targeted investments in production systems and technology in line with sustainable practices that promote resilience in the sector.⁶⁹

Having considered these laws and policies, it is also important to consider essential governmental institutions responsible for coordinating and implementing their provisions. In Nigeria, the institutional framework for implementing climate-resilient agriculture is primarily driven by the Federal Ministry of Agriculture and Food Security, the Federal Ministry of Environment and the National Climate Change Council. Nigeria's Federal Ministry of Agriculture and Food Security

⁶⁰ National Climate Change Policy 2021-2030, 18 and 26. <<https://faolex.fao.org/docs/pdf/NIG209876.pdf>> Accessed 27 May 2026.

⁶¹ *ibid.*

⁶² *ibid.*

⁶³ *ibid.*

⁶⁴ National Agricultural Technology and Innovation Policy 2022-2027.

<<https://agriculture.gov.ng/wpcontent/uploads/2024/06/National-Agricultural-Technology-and-Innovation-Policy-NATIP-2022-2027.pdf>> Accessed 27th May 2026.

⁶⁵ NATIP 2022-2027 (n 56).

⁶⁶ National Development Plan 2021-2025, 46-49. <<https://faolex.fao.org/docs/pdf/nig216946.pdf>> Accessed 27 May 2026.

⁶⁷ *ibid.*

⁶⁸ *ibid.*

⁶⁹ National Development Plan 2021-2025, 46-49. <<https://faolex.fao.org/docs/pdf/nig216946.pdf>> Accessed 27 May 2026.

was established to ensure food security and promote agricultural sustainability in Nigeria.⁷⁰ It is also responsible for formulating the nation's agricultural policy and, among others, promoting sustainable practices to cultivate a resilient and prosperous agricultural sector.⁷¹

Going further, the Federal Ministry of Environment provides the nation's environmental regulatory and policy oversight.⁷² It promotes the adoption of climate change mitigation and adaptation strategies, sustainable land management and ecosystem protection that are necessary for resilient agriculture in Nigeria.⁷³ Finally, the National Council for Climate Change, established under the Climate Change Act 2021, serves as the central body that coordinates, develops, and implements Nigeria's climate laws and policies.⁷⁴ It also oversees the implementation of adaptation and mitigation strategies for all of Nigeria's sectors, including agriculture.⁷⁵ These institutions play complementary roles, ensuring that Nigeria is not left behind in global climate action and the move towards achieving sustainable development.

a. Strides made by Nigeria in promoting Climate Resilient Agriculture

The preceding section provided an insight into the laws, policies and institutions in place promoting climate-resilient agriculture in Nigeria. This shows growing awareness of climate change and the need for climate resilience in the nation and is indeed a significant stride. Accordingly, it is important to consider other strides Nigeria has made in deepening and expanding climate-resilient agriculture. The government launched a platform to provide agricultural information through digital means. Also, as recently as 2025, Nigeria's Meteorological Agency launched initiatives to bridge climate information gaps and improve access to usable climate data.⁷⁶ This is good for farmers to be abreast of climate information in real time.

Practically, Nigeria has supported the adoption of climate-resilient farming practices, including the use of drought-tolerant and early maturing crop varieties, intercropping and crop diversification, which is helping farmers to cope with unpredictable rainfall and climate variability.⁷⁷ Nigeria has also embarked on improving water management through irrigation projects. Projects such as the Transforming Irrigation Management in Nigeria (TRIMING) Initiative, in conjunction with the World Bank, have expanded irrigated farmland and water efficiency.⁷⁸ This has helped to increase

⁷⁰ Federal Ministry of Agriculture and Food Security <<https://agriculture.gov.ng/about-us/>> Accessed 27th May 2026.

⁷¹ *ibid.*

⁷² Federal Ministry of Environment <<https://environment.gov.ng/mandate/>> Accessed 27th May 2026.

⁷³ FME (n 64).

⁷⁴ Climate Change Act 2021, s 3-4.

⁷⁵ *ibid.*

⁷⁶ P Etuk, 'NiMet unveils Initiative to boost Climate Services, Disaster Resilience' *Punch Newspapers* (19th August 2025). <<https://punchng.com/nimet-unveils-initiative-to-boost-climate-services-disaster-resilience/>> Accessed 28th May 2026.

⁷⁷ M Amare and B Mulubrhan, 'Climate Change, Income Sources, Crop Mix, and Input Use Decisions: Evidence from Nigeria' [2023] (2) (11) *Ecological Economics* 107892.

⁷⁸ World Bank Group, 'How smarter irrigation is changing Nigerian farming'. <<https://www.worldbank.org/en/news/feature/2025/10/15/how-smarter-irrigation-is-changing-nigerian-farming>> Accessed 28th May 2026. Transforming Irrigation Management in Nigeria (Triming) Project: Final Terms of Reference for the Preparation of an Environmental and Social Management Plan (ESMP) for Intervention to support Livelihood Options for the



agricultural productivity in several regions of the country, including Kano, Zamfara, Jigawa, Sokoto and Gombe States, helping to reduce overdependence on erratic rainfall.⁷⁹ Nigeria has also advanced agroforestry practices and is ramping up efforts to include climate-smart technologies and renewable energy for agro-processing.⁸⁰ Through public-private partnerships (PPP), farmers are being trained and supported with funding and technologies to improve yields.⁸¹

Another World Bank-supported project, the Agro-Climatic Resilience in Semi-Arid Landscapes (ACReSAL) project targets extreme land degradation and vulnerable lands, helping the extreme poor to manage resources and promoting resilience in agriculture in Nigeria's northern regions.⁸² The government has also increased the provision of fertilisers to farmers, and has embarked on the distribution of improved and climate-resilient seed varieties of maize, rice and vegetables to farmers.⁸³ It has also supported the cultivation of several hectares of land under climate-resilient practices, and is establishing soil testing and assessment facilities, improving research in climate resilience for agriculture.⁸⁴

Additionally, the government, through the Bank of Agriculture and other financial schemes, has been expanding financial grants and loans to farmers to support agricultural productivity and investments therein.⁸⁵ The provision of tractors and other machinery to increase agricultural mechanisation is also progressing.⁸⁶ These have indeed helped to boost agricultural productivity. Overall, these strides have demonstrated that there is a commitment to expanding climate-resilient agriculture in Nigeria. This is being done through research, policy reforms, technological innovation, and the adoption of adaptation strategies. As a result, the sector has seen stabilised yields and a boost in productivity. The impacts of climate-resilient agriculture are considered further in the next section.

Maradun Community affected during the Bakolori Dam Construction. <https://www.triming.org/wp-content/uploads/2019/10/Final_ToR_Jankarawa_ESMP_Cleared1-17_12_2020-13239.pdf> Accessed 28th May 2026.

⁷⁹ *ibid*.

⁸⁰ S Precious, 'Agroforestry and Climate Resilience: Case Studies from Nigeria' *Agritech Diest* (12th November 2025). <<https://agritechdigest.com/agroforestry-and-climate-resilience-case-studies-from-nigeria/>> Accessed 28th May 2026.

N C Olisah, B Anabaraonye and C C Odo, 'The Role of Renewable Energy in Enhancing Climate Smart Agriculture in Nigeria' *Journal of Environmental Science and Agricultural Research* [2025] 3(1): 1-5.

⁸¹ K Nanyah, 'A United Call to Secure Nigeria's Food Future' *Businessday* (24th May 2025).

<<https://businessday.ng/opinion/article/a-united-call-to-secure-nigerias-food-future/>> Accessed 28th May 2026.

⁸² Agro-Climatic Resilience in Semi-Arid Landscapes (ACReSAL). <<https://acresal.gov.ng>> Accessed 28th May 2026.

⁸³ T I Tahir, 'Improving food security through higher crop outputs' *Blueprint* (1st June 2026). <<https://blueprint.ng/improving-food-security-through-higher-crop-outputs>> Accessed 1st June 2026.

Y M Imonikhe, 'How Climate-Smart Agriculture is Reshaping Farming in Northern Nigeria' *Agritech Digest* (14th August 2025). <<https://agritechdigest.com/how-climate-smart-agriculture-is-reshaping-farming-in-northern-nigeria/>> Accessed 28th May 2026.

⁸⁴ *ibid*.

⁸⁵ P Dada, 'FG targets 1.2m farmers with 2,000 tractors to boost food production' *Punch Newspapers* (2nd June 2026). <<https://punchng.com/fg-targets-1-2m-farmers-with-2000-tractors-to-boost-food-production/>> Accessed 3rd June 2026.

⁸⁶ P Dada, 'FG targets 1.2m farmers with 2,000 tractors to boost food production' *Punch Newspapers* (2nd June 2026).

<<https://punchng.com/fg-targets-1-2m-farmers-with-2000-tractors-to-boost-food-production/>> Accessed 3rd June 2026.

b. Impacts of Climate Resilient Agriculture

Having displayed the strides Nigeria has made in adopting and promoting climate-resilient agriculture, it is necessary to consider the impacts thereof. Climate resilient agriculture leaves impacts both environmentally and socio-economically. These impacts are discussed hereunder.

i. Environmental Impacts

Climate-resilient agriculture plays a critical role in restoring and protecting Nigeria's natural ecosystems. One of its most important impacts is that it improves soil health. Practices, such as conservation agriculture, crop rotation, and agroforestry, play a crucial role in supporting environmental sustainability.⁸⁷ These methods help to reduce soil erosion, which is essential for maintaining land productivity.⁸⁸ In addition, they contribute to enhancing soil fertility and improving soil structure.⁸⁹ By implementing these practices, agricultural systems become more resilient to climate variability and emissions therein are reduced.⁹⁰ These practices also promote carbon sequestration.⁹¹ This is where carbon dioxide is captured and stored in soils and vegetation, helping to mitigate GHG emissions, thereby combatting climate change.⁹²

In addition, climate-resilient agriculture contributes to better water resource management by improving water retention in soils and promoting efficient irrigation techniques.⁹³ This reduces vulnerability to drought, desertification and water scarcity.⁹⁴ Furthermore, it enhances biodiversity protection and ecosystem stability. This is done through agroforestry and diversified cropping mechanisms, which create habitats for various plant and animal species, while also restoring degraded land.⁹⁵

ii. Socio-Economic Impacts

Beyond the environmental gains, climate-resilient agriculture leaves significant socio-economic impacts and benefits, both nationally, for farmers and for rural communities. One of the primary impacts is that it increases agricultural productivity. The use of climate-smart practices and improved seeds adds to crop yields, reducing input costs and enhancing efficiency in resource use.⁹⁶ This is essential for agro-allied industries and exports, which leaves a positive impact on the

⁸⁷ A Sithole and O D Olorunfemi, 'Sustainable Agricultural Practices in Sub-Saharan Africa: A Review of Adoption Trends, Impacts, and Challenges among Smallholder Farmers' *Sustainability* [2024] (16) (22) 9766.

⁸⁸ Bikramaditya, K. Singh and S K Singh, 'Role of Conservation Agriculture in Soil Health and Crop Sustainability' *Journal of Science Innovations and Nature of Earth* [2025] (5) (1) 109-111.

⁸⁹ *ibid*; D V, S S Yadav and S C Gupta, 'Climate Resilient Agriculture: Linking Soil Fertility, Water holding Capacity, and Stress Tolerance: A Systematic Review' *International Journal of Advanced Biochemistry Research* [2026] (10) (5) 394-398.

⁹⁰ World Bank Group, 'Climate Smart Agriculture'. <<https://www.worldbank.org/en/topic/climate-smart-agriculture>> Accessed 28th May 2026.

⁹¹ M Savari, M Yazdanpanah and D Rouzaneh, 'Applying Conservation Agriculture Practices as a Strategy to Control Soil Erosion and Carbon Sequestration' *Results in Engineering* [2025] (26) 1-15.

⁹² *ibid*.

⁹³ S Bhatnagar and Others, 'Exploring the Dynamics of Climate-smart Agricultural Practices for Sustainable Resilience in a Changing Climate' *Environmental and Sustainability Indicators* [2024] (24) 1-21.

⁹⁴ *ibid*.

⁹⁵ M R Rashmi, 'Resilient Soils for a Changing Climate: Navigating the Future of Sustainable Agriculture' [2024] (11) *Plant Science Today* 01-12.

⁹⁶ P Andati and Others, 'Effect of Climate-Smart Agriculture Technologies on Crop Yields: Evidence from Potato Production in Kenya' [2023] (41) *Climate Risk Management* 1-11.



economy. As yields increase, farmers can sell more, resulting in higher income and reduced poverty, which helps sustain their livelihood. Furthermore, climate-resilient agriculture strengthens food security in Nigeria.⁹⁷ It can therefore be maintained that by ensuring more stable and reliable crop production despite climate risks, there will be a drastic reduction in food and hunger shortages. Overall, climate-resilient agriculture improves Nigeria's socio-economic imperatives by ensuring an increase in food and economic growth.

Challenges lie, however, as there is more that needs to be done. They are considered hereunder.

c. Challenges to Climate-Resilient Agriculture in Nigeria

Despite the international and national legal, policy and institutional framework in place and the strides made to promote climate-resilient agriculture in Nigeria, several challenges persist which hinder widespread and optimal adoption of climate resilience in Nigeria. These challenges are discussed as follows:

i. Sub-optimal enforcement of environmental and agricultural legal, policy and institutional frameworks

Earlier, this paper provided a significant insight into Nigeria's legal, policy and institutional framework promoting the adoption of climate-resilient agriculture. From these, it was seen that Nigeria maintained some level of commitment to sustainable agriculture, and this has indeed yielded good results for the nation's agricultural sector. However, a significant challenge remains. Nigeria is a huge country. This means that there must be dedicated and widespread implementation of these laws across the nation's varying regions. When this is compared to the level of effort carried out, it indicates that the strides made are not enough.

Scholars and stakeholders have noted that there is a lingering weakness in sector-wide implementation of the legal and institutional framework, especially as it relates to climate action.⁹⁸ Nigeria's commitments to the international climate treaties it has ratified are not being implemented sufficiently.⁹⁹ APRI further noted specifically that climate action in Nigeria is hindered by the limited integration of climate considerations into agricultural planning,¹⁰⁰ meaning that these laws and policies are not being strictly followed. It further noted that there is an institutional disconnect between governmental institutions such as the agricultural ministry, forestry and climate

⁹⁷ L Lipper and Others, 'Climate-Smart Agriculture for Food Security' *Nature Climate Change* [2014] (4) 1068–1072. A Kolapo and S Sieber, 'From Vulnerability to Viability: Climate-Smart Agriculture as Drivers of Productivity and Food Security in Nigerian Maize-based Farming Households' [2025] (20) *Environmental Challenges* 1-29.

⁹⁸ O Olubajo, 'Stakeholders stress need for Implementation Mechanisms to make NDC 3.0 Investible' *Peoples' Gazette* (4th June 2026). <<https://gazettengr.com/stakeholders-stress-need-for-implementation-mechanisms-to-make-ndc-3-0-investible/>> Accessed 5th June 2026.

⁹⁹ C Amaram and C Onuoha, 'Climate Change and International Cooperation: A Critique of Nigeria's Commitments, 1972-2024' [2024] (5) (2) *NJIRA* 123-130.

¹⁰⁰ D I Ofoegbu, 'Mainstreaming Climate Action into Agriculture and Food Security in Nigeria' *African Policy Research Institute* (3rd November 2025). <<https://afripoli.org/mainstreaming-climate-action-into-agriculture-and-food-security-in-nigeria>> Accessed 29th May 2026.

coordination structures.¹⁰¹ The limited coordination among these institutions is a major obstacle to attracting and deploying much-needed climate finance in areas of technology, seed systems, and awareness, among others. This affects the effective enforcement of climate policies and laws in the agricultural sector.

ii. Inadequate funding and technical capacity

Another major challenge hindering the widespread adoption of climate-resilient agriculture in Nigeria is insufficient funding and technical capacity. Finance is crucial for advancing sustainability in any sector,¹⁰² and Nigeria, as a developing country, requires as much funding as necessary to effectively implement existing policies and laws promoting climate-resilient agriculture.¹⁰³ Although progress has been made in agriculture, it remains insufficient to meet the country's desired output. Reports indicate that Nigeria needs up to US\$25 billion in climate finance but has only secured about 10% of that,¹⁰⁴ falling significantly short of the estimated requirements. While Nigeria has received approximately US\$4 billion over the years for various climate-related projects, this is still far below the US\$177 billion needed annually to fulfil its climate commitments.¹⁰⁵ Additionally, Nigeria has relied on loans in recent years to finance projects, leading to a surge in national debt.¹⁰⁶ This leaves a huge financial deficit, hindering Nigeria from fully investing in climate-smart agriculture and the technology needed.

Accordingly, the technical or technological deficits are high. Nigeria still faces food insecurity and vulnerability due to weak agricultural infrastructure.¹⁰⁷ This typically includes limited mechanisation, inadequate irrigation, limited storage and limited use of smart technologies to support agriculture.¹⁰⁸ Climate-resilient agriculture relies on smart practices, such as irrigation, renewable energy-based processing and storage and improved seeds.¹⁰⁹ But slowness in adopting these technologies is due to the lingering finance gaps and the integration of financing into on-the-ground support. Corruption and mismanagement of funds at the national level also mean that some

¹⁰¹ B A Ayiri and E E Etah, 'Agro Forestry Practices and Green Economy for Environmental Sustainability in Nigeria (A Case Study of Obudu and Obanliku Local Government Areas of Cross River State Nigeria)' [2025] (11) (8) *International Journal of Agriculture and Earth Science* 19.

¹⁰² A Y Mamun and V László, 'Advancing Sustainability through Financial Inclusion and Sustainable Finance: A Systematic Literature Review' [2025] (7) *Digital Finance* 853–870.

¹⁰³ S Stout and Others, 'Landscape of Climate Finance in Nigeria 2025' *Climate Policy Initiative* (7th May 2025). <<https://www.climatepolicyinitiative.org/publication/landscape-of-climate-finance-in-nigeria-2025/>> Accessed 29th May 2026.

¹⁰⁴ Stout and Others (n 94).

¹⁰⁵ *ibid.*

¹⁰⁶ G Iyatse, C Olayinka and I Chibuike, 'Fresh concerns over funding risks as Nigeria's public debt hits N159.28tr' *The Guardian* (16th April 2026). <<https://guardian.ng/featured/fresh-concerns-over-funding-risks-as-nigerias-public-debt-hits-n159-28tr/>> Accessed 28th May 2026.

¹⁰⁷ M M Okonkwo and Others, 'Agricultural Infrastructure Deficit and Production of Export Commodity Crops as the Epicenter of Food Insecurity in Africa, Nigeria' [2025] (13) (12) *Open Journal of Social Sciences* 375-398.

¹⁰⁸ *ibid.*

¹⁰⁹ S Sahoo and Others, 'Review of Climate-resilient Agriculture for ensuring Food Security: Sustainability Opportunities and Challenges of India' [2025] (25) *Environmental and Sustainability Indicators* 1-19.



much-needed funding may not get to the sector.¹¹⁰ As a result, Nigeria is unable to invest fully in building resilience in its agricultural sector.

iii. Limited awareness and access to climate information among smallholder farmers

The third challenge facing the promotion and adoption of climate-resilient agriculture in Nigeria is the limited awareness and access to climate information among farmers. It is indeed commendable that the government has embarked on training and education of farmers through the FG and NiMet platforms and Initiatives, as noted earlier. However, many more farmers, including smallholder farmers who are the backbone of Nigeria's food production, lack timely and reliable climate information.¹¹¹ Since many are smallholder farmers, many are from the rural extraction and therefore may not have enough knowledge, literacy or education concerning these matters.¹¹² This information includes information about weather conditions, rainfall timelines and patterns, adaptation measures, conservation methods and available government support.¹¹³

The lack of awareness contributes to why climate-smart practices are not yet widely adopted in Nigeria. This affects overall production output as farmers are still being faced with challenges that could have been solved if they had the right information. Top-down delivery has been fragmented, and since the government institutions or agencies are not equipped enough financially or technically, providing adequate information to farmers nationwide is slow.¹¹⁴ It is therefore necessary to fast-track the government's efforts to respond to low farmer extension by expanding farmers' access to information in real time.

iv. Insecurity

Finally, and perhaps the most destabilising challenge to not just climate resilient agriculture but growth and sustainable development in Nigeria generally is insecurity.¹¹⁵ To define, insecurity is a state where a country and its citizens are vulnerable to threats, danger and harm.¹¹⁶ whether internal and external. Nigeria has now become synonymous with insecurity. Since the beginning of the 21st century to date, the nation has been destabilised by terrorism from Boko Haram, banditry, kidnappings, armed robberies, farmer and herdsman clashes and ritual killings.¹¹⁷ The

¹¹⁰ U O Efanga and Others, 'Government Funding and Agricultural Sector Output in Nigeria: The Moderating Effect of Corruption' [2024] (5) (2) *Journal of Development Economics and Finance* 321-340.

¹¹¹ A M Mohammed and Others, 'Sources of Information on Climate Change among Maize Farmers in Northeastern Nigeria' [2024] (4) (4b) *Nigerian Journal of Agriculture and Agricultural Technology* 91-101.

¹¹² A Adedugbe, 'Smallholder Farmers and the Need for Climate Smart Agriculture in Nigeria' [2023] (7) (67) *Fara Research Report* 854-857.

¹¹³ T Mabhaudhi and Others, 'Linking Weather and Climate Information Services (WCIS) to Climate-Smart Agriculture (CSA) Practices' [2025] (37) *Climate Services* 1-15.

¹¹⁴ D O Awolala and Others, 'Profiling User Needs for Weather and Climate Information in Fostering Drought Risk Preparedness in Central-Southern Nigeria' [2022] (4) *Frontiers in Climate* 4.

¹¹⁵ Adedugbe (n 105).

¹¹⁶ S U Ali and J I Mukhtar, 'Insecurity and Its Implications for Development in Nigeria: An Assessment' [2025] (9) (6) *Journal of Arts and Sociological Research* 59-60.

¹¹⁷ A Tanko, 'Nigeria's Security Crises - Five different threats' *BBC News* (19th July 2021). <<https://www.bbc.com/news/world-africa-57860993>> Accessed 28 May 2026.

farmer/herder clashes have been particularly notable because of their relationship with agriculture. For a long time, terrorism, banditry and kidnappings have become the order of the day.¹¹⁸ These have led to numerous losses of lives and widespread displacements, especially in Nigeria's northern and central regions.¹¹⁹

Relative to agriculture, insecurity in many parts of Nigeria has significantly stifled farming. Farmers can no longer safely access farmlands or engage in agriculture because of the threats insecurity poses.¹²⁰ Insecurity has also led to the destruction of farmland. Current humanitarian reporting shows that conflict, violence and displacement have directly undermined food production, livelihoods and resilience efforts in Nigeria.¹²¹ This has led to serious consequences for food security. Food prices continue to soar as productivity is threatened, resulting in millions of people facing acute malnutrition and severe hunger.¹²² The insecurity crises show that the government is not pragmatic enough about ensuring its primary duty of providing safety, peace and security for the masses and for their livelihoods to thrive. The violence has undermined climate-resilient agriculture¹²³ because its processes and strategies, such as improved water use, land management and agroforestry, cannot be carried out when there are no peace and stability. These challenges undermine the effectiveness of climate resilient agricultural initiatives and highlight the need for stronger legal, institutional, financial and technical backing as well as a grounded commitment to peace, security and stability at national and sub-national levels for resilient agriculture to thrive.

4. SUMMARY OF FINDINGS

Having considered the climate risks and vulnerabilities Nigeria faces in its agricultural sector, coupled with the legal, policy and institutional framework promoting the adoption of climate resilient agriculture in Nigeria, as well as the strides made by the government and the challenges that undermine climate resilience in the sector, this paper makes the following findings:

- i. This revealed that Nigeria has an extensive legal, policy and institutional framework promoting climate resilience in agriculture, but faces enforcement and institutional coordination challenges.

¹¹⁸ *ibid*.

¹¹⁹ P A Essoh and O S Asangausung 'The Causes and Consequences of Insecurity in Northern Nigeria (2014-2024)' [2024] (14) (3) *International Journal of Social Sciences and Humanities Reviews* 230–247. T Akinmoyeje, 'REPORT: More Than 140,000 Nigerians Displaced by Insecurity in the North-West in 5 Months' *Foundation for Investigative Journalism* (4th June 2026), <<https://fij.ng/article/report-more-than-140000-nigerians-displaced-by-insecurity-in-the-north-west-in-5-months/>> Accessed 5th June 2026.

¹²⁰ E Udoh, 'How Insecurity in Nigeria is disrupting Agriculture, Impoverishing the People and Crippling the Economy' *The Revealr* (24th November 2025). <<https://therevealr.ng.com/how-insecurity-in-nigeria-is-disrupting-agriculture-impoverishing-the-people-and-crippling-the-economy/>> Accessed 29th May 2026.

¹²¹ N B Oruchkwu, 'Humanitarian Crises and Armed Conflicts in Nigeria: Implications for Sustainable Development and Policy Responses' [2025] (3) (3) *Journal of Political Discourse* 327-335.

¹²² A Abba, M M. Turaki and A U Mavakumba, 'The Impact of Farmer-Heder Relationships on Insecurity and Food Production in Nigeria' [2024] (2) (4) *Journal of Political Discourse* 121-132.

¹²³ Ofoegbu (n 93).



- ii. It was further revealed that while improvements to farmer education are being made, widespread farmer education, especially in rural communities, is limited. Furthermore, access to climate data and awareness, though progressing, is still significantly low.
- iii. Nigeria has seen stability and a slight increase in agricultural productivity, yet nowhere near the desired results or projections. This paper revealed that this is partly and significantly due to huge funding gaps, limited widespread technology and innovation adoption to deepen the utilisation of climate-smart practices in the agricultural sector.
- iv. Finally, this paper revealed that insecurity is one of the biggest hindrances to promoting sustainable agriculture in Nigeria. Insecurity ends farmers' lives, causes displacements, destroys farmlands, and exacerbates climate vulnerabilities in Nigeria, effectively weakening the prospect of climate-resilient agriculture and the sector's overall productivity. Whatever strides the government has made in promoting climate-resilient agriculture stands to be of no effect if the insecurity challenges continue to linger.

5. CONCLUSION

This paper has provided an overview of climate-resilient agriculture in Nigeria from a legal perspective. The legal, policy and institutional framework promoting climate-resilient agriculture is quite extensive. Nigeria's government has also made important strides in actualising climate-resilient agriculture on the ground. However, challenges hinder the translation of the frameworks into effective, widespread and optimal realisation. The limited enforcement of the legal, policy and institutional framework, supported by inadequate financing and infrastructure, as well as limited awareness and the rising insecurity, undermines efforts in the sector. Addressing these challenges, therefore, requires sustained efforts recommended hereafter. Ultimately, it is important to underscore that without achieving climate resilience in agriculture at a national scale, Nigeria cannot hope to ensure food security, environmental sustainability and long-term economic prosperity.

6. RECOMMENDATIONS

Having considered the challenges to climate resilient agriculture and revealed the findings made in this paper concerning climate resilient agriculture in Nigeria, it is important to provide adequate recommendations to solve the challenges, increase the strides made and accordingly, strengthen climate resilient agriculture in Nigeria. This paper recommends as follows:

1. Strengthen enforcement mechanisms and institutional coordination at national and sub-national levels to ensure that the legal, policy, and institutional frameworks promoting climate-resilient agriculture are effectively implemented.



2. Enhance farmer education, particularly in rural communities, and improve access to climate data and legal awareness to support informed decision-making and increase awareness of climate-smart practices. This can be done through multiple awareness programmes, workshops and conferences at state and local levels in partnership with universities, stakeholders and departments of government ministries and agencies.
3. Promote public-private partnerships with national and international companies and governments to secure funding and stimulate technology adoption and innovation, thus expanding advancements in climate-resilient agriculture across the country. Technological adoption includes expanding mechanised farming, renewable energy systems, and vertical farming, among others.
4. Demonstrate stronger political will and commitment to peace and security through improving national and state security infrastructures, as these are critical to sustaining agricultural productivity and resilience.