



European Investment Bank (EIB)

Greening Financial Systems Technical Assistance Programme

Central Bank of Kenya

Identification of the characteristics of the Kenyan economy that are most affected by climate risks, disaggregated into physical and transition climate risks

APRIL 2025

Table of Contents

Executive Summary	2
1. Introduction	3
Objectives of the Climate Risk Diagnostic	3
2. Physical Climate Risks	4
Defining Physical Risks for Financial Institutions	8
The Geography of Kenya	9
Regional Interaction of Physical Risks in Kenya	10
Understanding the Impacts	12
3. Transition Risks	15
Regulatory and Legal Risks	15
Technological Risks	15
Market Risks	16
Reputational Risks	16
Climate Transitional Risks in Kenya	16
4. Regulatory Response to Climate-Related Risks in the Kenya's Banking Sector ...	18
5. Bibliography	20

List of Figures

Figure 1: Temperature Risk in Kenya:	5
Figure 2: Temperature Risk in Kenya:	5
Figure 3 Drought Risk (yearly probability of SPEI3 inferior to < -1) in Kenya	6
Figure 5: Extreme Precipitation Risk in Kenya:.....	6
Figure 6: Flooding Risk in Kenya:.....	7
Figure 7: UNITAR flood map. Red indicates flooded area detected via remote sensing from April to June 2024.	11

List of Tables

Table 1: Priority physical climate risks for Kenya	8
Table 2: Prioritisation of chronic climate physical risks for Kenya	9
Table 3: Sectors vulnerable to climate physical risks and their assessment	10
Table 4: Regions and their potential impacts	10
Table 5: Physical climate risk assessment for vulnerable sectors in Kenya	13
Table 6: Transition risk drivers	17

Executive Summary

Physical climate risks in Kenya are of great concern, with acute (event-driven) and chronic (long-term climate shifts) risks presenting direct and indirect financial implications for organisations. These risks include droughts, rising sea levels, temperature increases, flooding, and storms, each carrying significant consequences for various economic sectors. Identifying these risks requires a multifaceted process, incorporating climate projections, historical climate data, and regional vulnerabilities.

The geographical diversity of Kenya leads to a spectrum of climate physical risks impacting different regions and sectors in distinct ways. Coastal areas, for example, face challenges such as rising sea levels and increased storm frequency, while inland regions grapple with droughts and changing agricultural conditions. Understanding these regional and sectoral susceptibilities is crucial for banks to formulate informed strategies to enhance resilience and mitigate adverse environmental effects. Moreover, banks play a pivotal role in fostering climate resilience by incorporating climate risk assessments into their lending practices, evaluating the vulnerability of potential borrowers, and considering their exposure to climate-sensitive industries.

Transition risks are another critical factor for Kenyan banks. These risks encompass policy and legal changes, technological advancements, market dynamics, and reputational consequences resulting from the global shift towards a lower-carbon economy. Kenya's commitment to the Paris Agreement and its updated Nationally Determined Contributions (NDCs)¹ highlights its dedication to reducing greenhouse gas emissions and transitioning to a sustainable, low-carbon economy. Recognising and managing these climate transition risks is essential for businesses to adapt effectively to the changing economic and regulatory landscape.

Acknowledgements

This project is implemented by a Consortium led by Development Alternatives Incorporated (DAI), in partnership with Application Européenne de Technologies et de Services (AETS) and Belgian Bankers Academy (BBA). The technical assistance operation is financed under the International Climate Initiative Fund (the "IKI Fund"), established with funding from the German Federal Ministry of Economic Affairs, Kenya Meteorological Department and Climate Action ("BMWK"). The IKI Fund is a Fund established between the EIB and the BMWK to catalyze investments dedicated towards mitigating greenhouse gas emissions and adapting to the effects of climate change in developing countries and emerging economies.

Disclaimer: The authors take full responsibility for the content of this report. The opinions expressed do not necessarily reflect the view of the BMWK and of the EIB.

Authors: This document was produced and coordinated with significant contributions from the project team at CBK and authors Marjan Stojiljkovic and Enrique Rebolledo, with substantial inputs provided by Patrick Nganga, Hussein Anooshah, and Chloe Prodhomme.

¹ In its [NDC 2020 – 2030 Update](#), Kenya reaffirms its commitment to reduce greenhouse gas emissions by 32% below Business As Usual by 2030.

1. Introduction

In the ever-changing realm of climate change, financial institutions are encountering a blend of challenges and opportunities emanating from physical and transitional risks. As global efforts shift towards a lower carbon economy, financial portfolios are increasingly prone to disruptions and transformative influences. This scenario demands a thorough grasp of the possible effects on these portfolios. These impacts are diverse, reaching beyond simple financial metrics, including regulatory adherence, reputation management, and alignment with changing societal norms. In Kenya, financial institutions must skilfully traverse this complex environment, identifying vulnerabilities and exploring sustainable investment and strategic growth opportunities.

By analysing these impacts, stakeholders in the financial sector can gain insights into the resilience and adaptability of their portfolios. This knowledge is crucial for developing proactive strategies that protect portfolios from negative impacts and position financial institutions as contributors to a sustainable, low-carbon future. This exploration aims to equip Kenyan financial institutions with the knowledge to make informed decisions, embrace sustainable investment opportunities, and strengthen their portfolios against climate change-related challenges.

Kenya faces significant vulnerabilities to extreme weather events such as floods and droughts, which directly affect crucial sectors like infrastructure, agriculture, and ecosystems – all vital components of the Kenyan economy. The country's heavy reliance on agriculture makes it particularly sensitive to climate-related disruptions. Any climate-induced disturbance in this sector can ripple through, impacting food security and the livelihoods of many.

Kenya's coastline, too, is at risk, especially with the looming threat of rising sea levels. This vulnerability is both environmental and economic, as these coastal regions host significant infrastructure. Addressing the potential impacts of climate change in these areas is paramount to ensuring sustainable development. The broader societal implications of climate change are also evident in the health and social sectors. Temperature-related health risks can overburden healthcare systems, while biodiversity loss might disrupt resource availability, both critical to Kenya's social well-being.

Recognising the role of transitional risks, such as rapid technological changes and regulatory shifts, is also essential. Kenya's financial institutions must stay alert to how these factors affect asset valuation and influence carbon-intensive industries. The Kenyan economy's global interconnectedness is highlighted through its susceptibility to supply chain disruptions and changing investor sentiments. Consumer preferences and investor priorities, shifting in response to global market dynamics, can substantially influence local industries and financial portfolios.

These risks underscore the need for a robust Climate Risk Diagnostic to aid in identifying climate physical and transition risks and one that considers the unique vulnerabilities of Kenya and the critical sectors most affected by climate change.

Objectives of the Climate Risk Diagnostic

There is a growing recognition of the need to move beyond traditional risk models to address climate threats. This shift highlights the banking sector's understanding of the connection between climate resilience and financial stability over various time frames. As climate challenges grow, a transparent and standardised framework for identifying climate risks becomes crucial.

By establishing a foundational framework, this diagnostic tool initiates a collaborative effort to better tackle climate challenges proactively, enhance risk management, strengthen portfolios, and build a resilient financial sector. The diagnostic is a first attempt to provide a customised perspective on how climate change is impacting the performance of the banking sector in alignment with the climate risk disclosure framework led by the Central Bank of Kenya. By raising awareness and improving the understanding of climate risks in the banking sector, Kenya will be better prepared to build a more resilient financial and economic ecosystem.

This diagnostic is the first building block in a series of elements to enhance the Kenyan climate risk disclosure framework, the anticipated outcomes of which include a unified understanding of climate risks, enhanced resilience, and reporting. This diagnostic will help raise awareness in the banking sector and support efforts to identify the most pressing climate risks in the country. This diagnostic will be accompanied by guidance on disclosing climate risks in the banking sector and a dashboard for banking supervision. This initial framework is expected to be expanded over time, with additional tools to better identify and manage climate risks, paired with guidance and simplified approaches to improve reporting, particularly under the IFRS S2 standards.

With this, the Central Bank of Kenya is fostering the adoption of more sustainable banking practices. The diagnostic is structured under two main components aimed at identifying the most pressing climate hazards in Kenya, summarised as physical and transition risks.

2. Physical Climate Risks

Physical climate risks are risks posed to businesses from specific weather events and long-term shifts in climate patterns resulting from the impacts of a warming climate system and changes in environmental systems and resources. Physical climate risks have direct financial implications to organisations, such as damage to physical assets, and indirect implications, such as declining natural resources and loss of biodiversity. Physical climate risks are categorised as acute (event-driven) or chronic (long-term climate shifts).

Acute Physical Climate Risks

Acute climate physical risks are driven by specific weather events or hazards such as floods, wildfires, and storms. They are characterised by uncertainty in scope, timing and severity and their impact's changing magnitude and nonlinearity. Acute risks can be direct or indirect.

- **Direct Acute Physical Risks.** Direct acute risks are associated with property damage and loss of life due to increased severity and frequency of climate hazards - for example, an increase in reported deaths attributed to unusual heatwaves, prolonged drought or severe flooding.
- **Indirect Acute Physical Risks.** Indirect acute risks are associated with property devaluation and supply chain disruptions attributed to weather events. Examples include decreased property value in areas with increased flooding risks and delays in meeting customer orders due to a decreased supply of inputs due to drought.

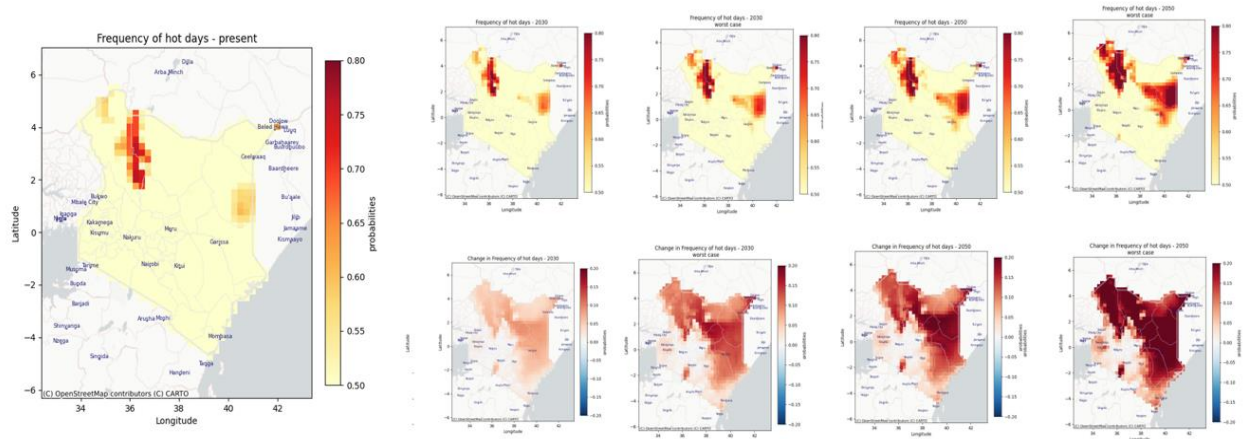
Chronic Physical Climate Risks

Chronic climate physical risks are related to long-term alterations in climate patterns, resulting in changes of extreme weather frequencies, such as droughts, heatwaves and heavy rainfall. They are characterised by their longer time horizons and changing magnitude and nonlinearity associated with tipping points and thresholds. Chronic risks can be direct or indirect.

- **Direct Chronic Physical Risks.** Direct chronic risks are associated with increased uninhabitable regions and resource depletion due to shifting climate patterns such as increased mean temperatures and chronic droughts.
- **Indirect Chronic Physical Risks.** The indirect chronic risks are related to increased financial costs attributed to changed climate patterns, such as revenue and expenditure impacts, high operating and capital costs, and increased insurance costs. For example, heating, ventilation and air-conditioning (HVAC) costs to cool buildings due to increased temperatures and expenses associated with infrastructure for higher sea levels defences.

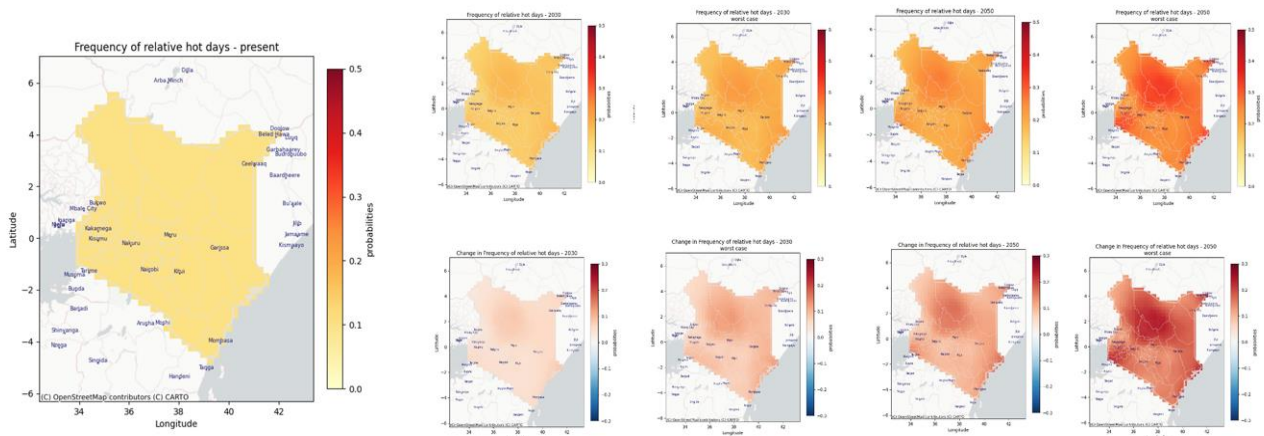
The figures below shed light on critical climate-related risks facing Kenya. Temperature risk, illustrated in Figure 1, demonstrates a significant upward trend, with instances of temperatures exceeding 35 degrees Celsius becoming increasingly prevalent, notably in the worst-case scenario projections for 2050. Figure 2 illustrates the shift in extreme temperature compared to the local climate highlighting important changes which will affect agriculture.

Figure 1: Temperature Risk in Kenya:



Notes: Probability of Exceeding 35°C. Present Scenario (Left), Top Row: 2030 Mean, 2030 Worst Case, 2050 Mean, and 2050 Worst Case. Bottom Row: Difference with present risk for 2030 Mean, 2030 Worst Case, 2050 Mean, and 2050 Worst Case.

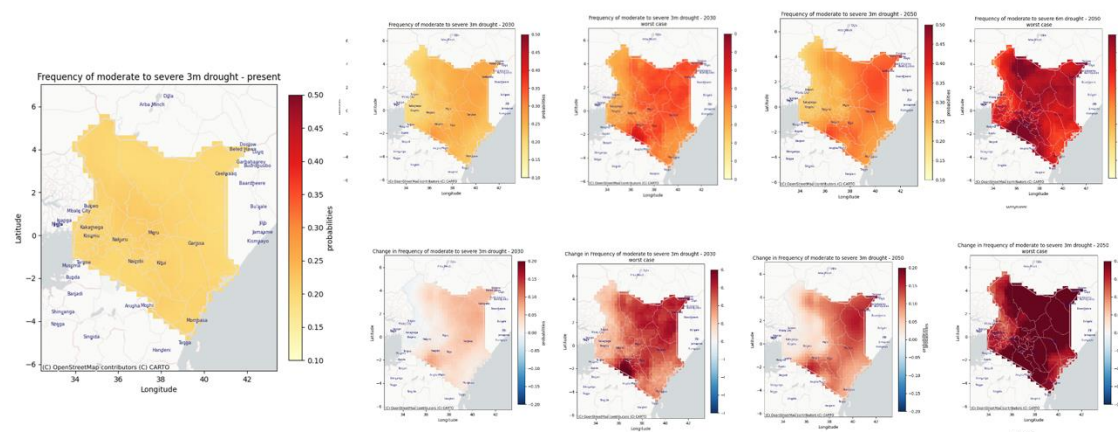
Figure 2: Temperature Risk in Kenya:



Notes: Probability of Exceeding the 90th percentile of temperature estimated over the present period. Present Scenario (Left), Top Row: 2030 Mean, 2030 Worst Case, 2050 Mean, and 2050 Worst Case. Bottom Row: Difference with present risk for 2030 Mean, 2030 Worst Case, 2050 Mean, and 2050 Worst Case.

Figure 3 highlights a concerning increase in drought risk, posing challenges for water resource management and agricultural sustainability.

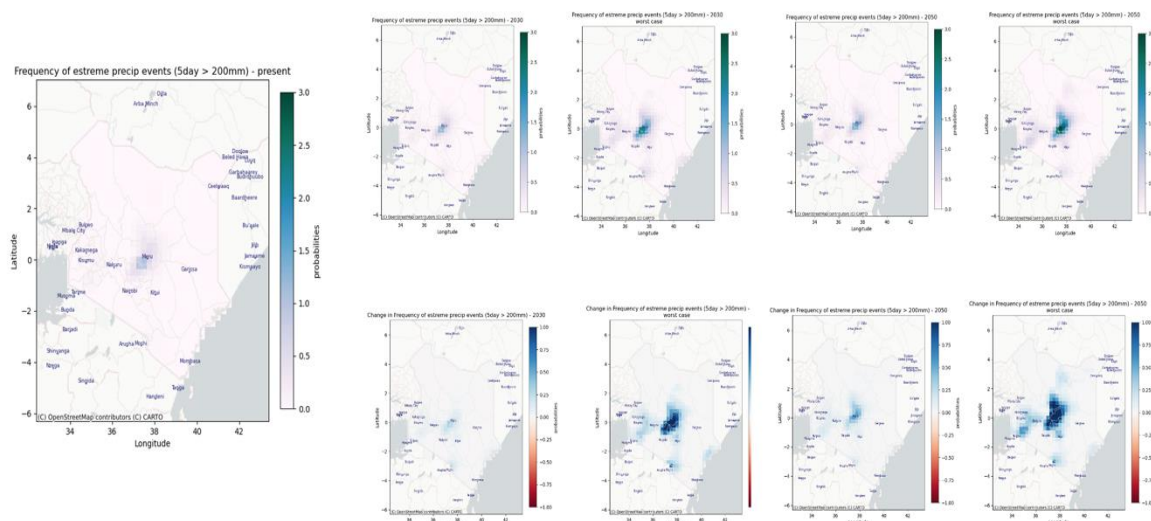
Figure 3 Drought Risk (yearly probability of SPEI3 inferior to < -1) in Kenya



Notes: Probability Assessment of Severe Drought Conditions. Present Scenario (Left), Top Row: 2030 Mean, 2030 Worst Case, 2050 Mean, and 2050 Worst Case. Bottom Row, difference with present risk for 2030 Mean, 2030 Worst Case, 2050 Mean, and 2050 Worst Case.

Figure 4 highlights the escalation of extreme precipitation events that underscore the heightened probability of pluvial flooding, a factor not conventionally addressed in flooding models, necessitating proactive risk management strategies.

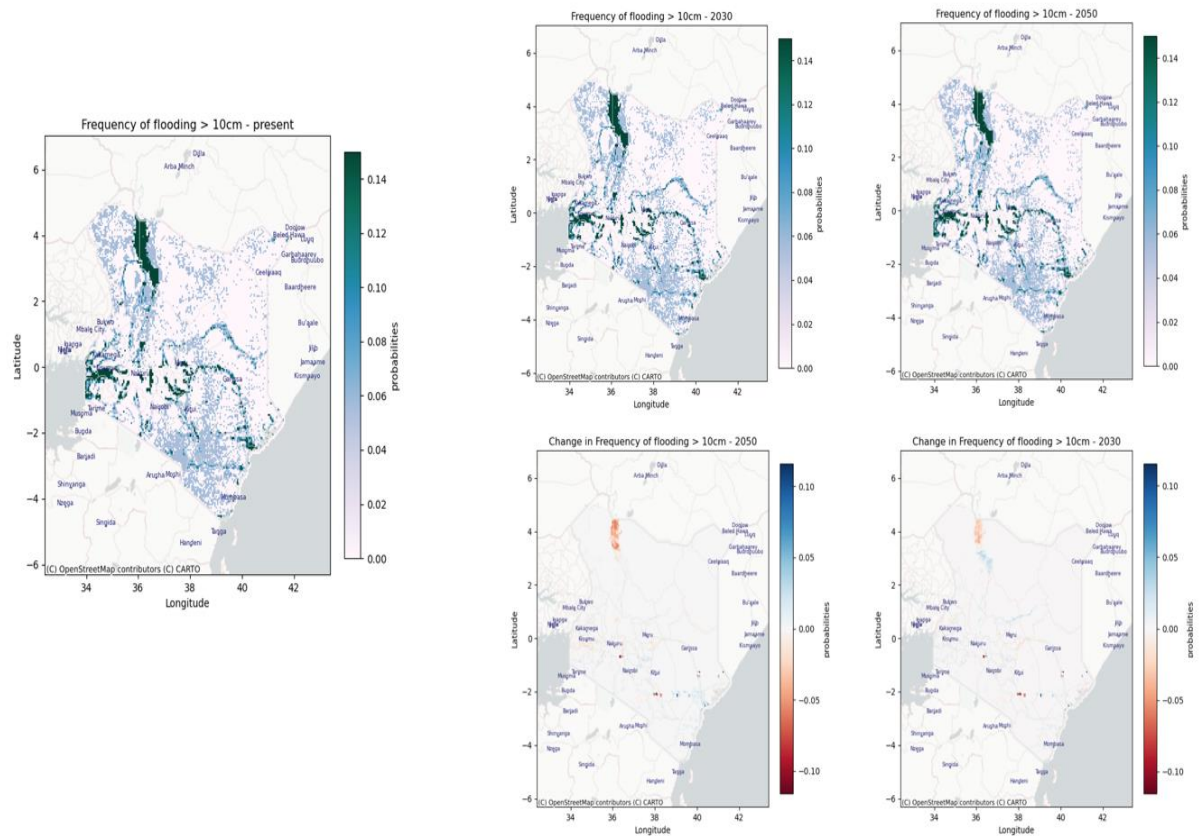
Figure 4: Extreme Precipitation Risk in Kenya:



Notes: Yearly Probability of 5-Day Precipitation Exceeding 200mm/Day. Present Scenario (Left), Top Row: 2030 Mean, 2030 Worst Case, 2050 Mean, and 2050 Worst Case. Bottom Row, difference with present risk for 2030 Mean, 2030 Worst Case, 2050 Mean, and 2050 Worst Case.

Despite flood risk maintaining its prominence across the nation, coastal regions experience a marginal elevation in vulnerability due to climate change impacts, as demonstrated in Figure 5 below.

Figure 5: Flooding Risk in Kenya:



Notes: Probabilities of Exceeding 10cm Flooding Events. Present Scenario (Left), Top Row: 2030 Mean, and 205. Bottom Row, the difference with present risk for 2030 and 2050.

Methodology used in Mapping

To estimate extreme precipitation and drought, we utilised data sourced from the NASA-NEX Global Daily Downscaled Climate Projections (GDDP) based on the Coupled Model Intercomparison Project Phase 6 (CMIP6). This dataset offers reliable and up-to-date climate information processed using robust scientific methodologies. Specifically, we employed bias-corrected daily data provided by NASA-NEX, ensuring accuracy and consistency in our analyses. The spatial resolution of 25 kilometres provided by this dataset allows for detailed assessments of extreme precipitation and drought patterns across Kenya. Access to this dataset was facilitated through the NASA Earth Exchange (NEX) platform, ensuring transparency and accessibility. (Reference: NASA Earth Exchange - NEX GDDP)

In estimating flooding risk, we adopted an integrated approach utilising multiple data sources and models. Satellite observations from the Cloud-to-Street platform provided essential insights into current flooding patterns and dynamics. Additionally, we employed the ISIMIP model from the Climada dataset, which offers advanced simulation capabilities for assessing future riverine flood risks. Furthermore, projections from the Deltares coastal flooding model were incorporated to account for future changes in coastal flooding risk due to climate change. By integrating these diverse datasets and models, we were able to comprehensively evaluate flooding risk across different regions of Kenya, considering both current and future scenarios.

Defining Physical Risks for Financial Institutions

In the context of banks operating in Kenya, climate physical risks refer to the potential adverse impacts of climate-related events and environmental changes. These risks can manifest due to extreme weather events, rising temperatures, changes in precipitation patterns, and other climate-related occurrences. Such events can potentially affect the physical assets and operations of businesses, posing potential and, in many cases, actual risks to the financial stability of borrowers and lenders. The table below describes the climate physical risks of climate change, their broad definition, and their significance.

Table 1: Priority physical climate risks for Kenya

Priority Physical Risks	Definition	Significance
Acute Risks		
1. Flooding	Overflow of water onto dry land, caused by heavy rainfall or river overflow.	Infrastructure, agriculture, and communities are threatened, particularly in regions prone to heavy rainfall.
2. Drought	Extended periods of deficient rainfall lead to water shortages and impact ecosystems and agriculture.	It affects water availability and agriculture, leading to food and water security challenges, especially in arid and semi-arid regions.
3. Temperature Extremes (Heatwaves and Cold Spells)	Prolonged periods of unusually high or low temperatures compared to historical averages.	Impacts agricultural productivity, water availability, and human health. Cold spells (desert / arid regions) can also affect crops and livestock.
4. Storms and Cyclones	Powerful wind systems are accompanied by heavy rainfall and storm surges.	Coastal areas are susceptible, posing risks to infrastructure and coastal communities and leading to widespread damage. Flash floods are associated with heavy rainfall.
5. Wildfires	Uncontrolled fires spreading rapidly across vegetation.	Increased temperatures and changing precipitation patterns contribute to the risk of impacting ecosystems, biodiversity, and property.

Priority Physical Risks	Definition	Significance
Chronic Risks		
6. Land Degradation	Deterioration of land quality due to factors like deforestation and poor agricultural practices.	Threatens soil fertility, reduces agricultural productivity, and contributes to desertification, impacting livelihoods and food security.
7. Vector-Borne Diseases (e.g., Malaria)	Climate factors influence diseases transmitted by vectors like mosquitoes.	Climate changes affect the prevalence and spread of diseases, impacting public health.
8. Sea-Level Rise	Increase in the average level of oceans due to melting glaciers and polar ice caps.	Coastal areas face risks of saltwater intrusion, erosion, and threats to infrastructure, agriculture, and communities.

Source: Adapted from World Bank. 2021. Climate Risk Country Profile Kenya.

Understanding and prioritising these climate physical risks is essential for developing effective climate resilience strategies. Based on the extreme weather events experienced in Kenya between 1900 and 2020, droughts and floods are the top climate-related impacts. Below is a table showing the prioritisation of critical physical climate risks and the rationale behind the priority level assigned.

Table 2: Prioritisation of chronic climate physical risks for Kenya

Physical Risks	Priority Level	Rationale
Drought	High	Recurrent droughts threaten agriculture, water supply, and energy production.
Sea-Level Rise	High	Coastal vulnerability to sea-level rise impacts infrastructure, agriculture, and communities in areas like Mombasa.
Temperature Increases	High	Long-term temperature increases affect agriculture, water availability, and the prevalence of vector-borne diseases.
Desertification	Moderate to High	Land degradation and desertification impact soil fertility and agricultural productivity, particularly in vulnerable areas.
Glacial Retreat	Moderate	Glacial retreat affects water availability in certain regions, impacting agriculture and water supply.

The Geography of Kenya

Kenya faces a spectrum of climate physical risks that have the potential to significantly impact various sectors of its economy. As the nation appreciates and develops experience in dealing with the challenges posed by climate change, it becomes imperative to assess and comprehend how different industries may be vulnerable to these physical climate risks and their potential or actual impacts.

Below is an overview of the key sectors within Kenya likely to be influenced by a range of climate-related climate physical risks, already detailed in Table 1 above. By recognising these sectoral susceptibilities, commercial banks can formulate informed strategies to enhance resilience and mitigate the adverse effects of these environmental challenges.

Table 3: Sectors vulnerable to climate physical risks and their assessment

Sector	Illustrative Impact
Agriculture	Agriculture is a cornerstone of Kenya's economy, contributing significantly to employment and Gross Domestic Product (GDP). Physical risks such as droughts, floods, and temperature extremes directly threaten crop yields, livestock, and food security.
Water and Sanitation	Changes in precipitation patterns and prolonged droughts affect water availability. This impacts water supply systems and sanitation infrastructure and challenges urban and rural communities to access clean and reliable water sources.
Energy	Kenya heavily relies on hydropower for energy generation. Droughts and changes in precipitation can lead to reduced water levels in reservoirs, affecting power generation capacity. This underscores the importance of diversifying the energy mix to enhance resilience.
Construction	Coastal areas face the risk of rising sea levels, leading to erosion and damage to critical infrastructure. Increased frequency and intensity of storms can also impact roads, bridges, and other vital facilities, affecting transportation networks.
Tourism	Kenya's tourism industry, centred around its unique ecosystems and wildlife, is susceptible to the impacts of climate change. These include disruptions to ecosystems and wildlife habitats and changes in visitor patterns due to extreme weather events.
Healthcare	Climate factors influence vector-borne diseases such as malaria. Temperature and precipitation patterns can alter the geographic distribution of disease vectors, impacting public health and straining healthcare systems.
Finance and Insurance	The financial sector faces risks associated with climate-induced events that can impact businesses and households, affecting loan portfolios, insurance claims, and overall economic stability. This includes risks associated with property damage and business interruptions.
Transportation	Extreme weather events like floods and storms can disrupt transportation networks, impacting road and air travel. Coastal regions may face challenges related to port infrastructure due to rising sea levels and storm surges.

Source: Adapted from World Bank. 2023. Country Climate and Development Report.

Regional Interaction of Physical Risks in Kenya

Kenya's geographical diversity leads to varied regional susceptibilities to climate physical risks. Coastal areas may face challenges related to rising sea levels and increased frequency of storms, while inland regions might experience impacts like droughts or changing agricultural conditions. Understanding these regional nuances is crucial for banks to tailor their risk assessments and lending strategies based on the specific vulnerabilities of the areas in which they operate. The illustrative table below broadly describes each region's likely challenges.

Table 4: Regions and their potential impacts

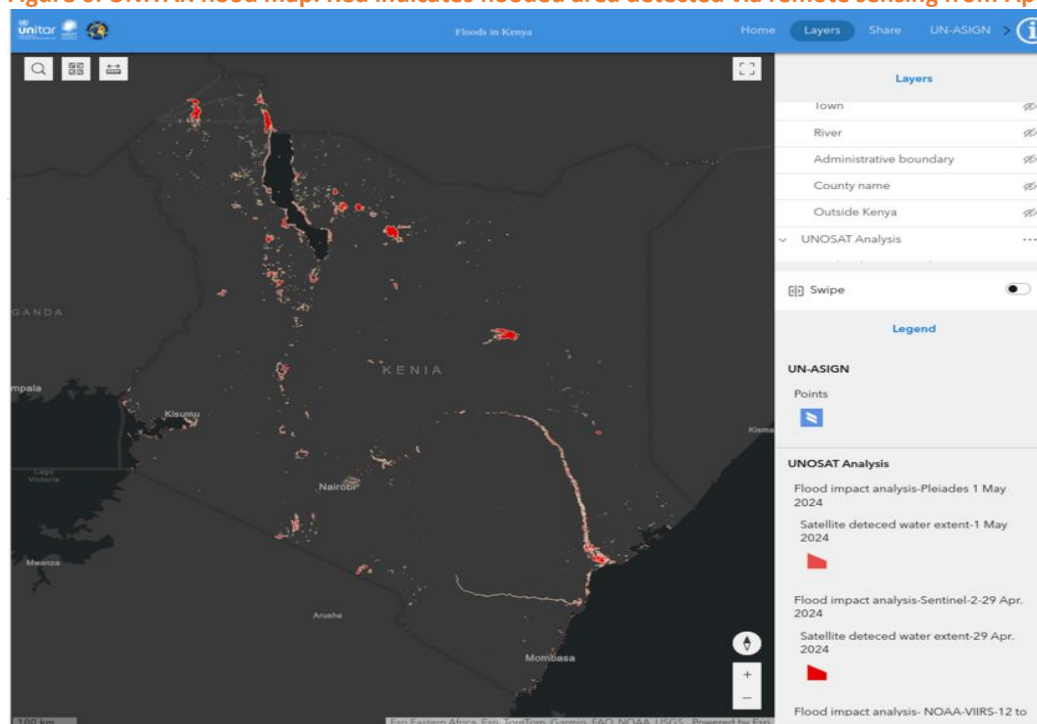
Region Impacts	Physical Climate Risks	Impacts on specific regions
Coastal Regions	- Sea-level rise and storm surges - Flooding - Property damage, infrastructure vulnerability - Coastal Erosion	Mombasa Lamu Malindi
Arid and Semi-Arid Regions	Increased frequency and intensity of droughts	Turkana Mandera

Region Impacts	Physical Climate Risks	Impacts on specific regions
	Agricultural productivity decline, water supply shortages	
Highland Regions	- Changes in precipitation patterns, extreme rainfall - Landslides, soil erosion, disruption to agriculture	Central Kenya
Rift Valley Region	- Increased temperature, changes in water availability - Shifts in agricultural suitability. - Potential / Actual crop failures - Landslides, soil erosion, disruption to agriculture	Agricultural crop production areas, in general
Urban and Semi-Urban Areas	- Urban heat island effect, extreme weather events, flooding - Infrastructure damage, increased demand for energy	Nairobi
Lake Victoria Basin	- Changes in lake water levels and temperature - Disruptions to fishing, changes in ecosystems - Flooding	Regions surrounding Lake Victoria
Forested Regions	- Changes in temperature and precipitation, increased wildfires - Loss of biodiversity, changes in ecosystem services	The Aberdare Mount Kenya

Specific Note on Flooding

In 2024, Kenya experienced extreme flooding conditions due to both climate change and a strong El Niño event. These conditions were exacerbated by the first recorded landfall of a tropical cyclone (in its tropical storm state) in Kenya. The combination of these extreme factors created a very rare event. Figure 6 shows the affected regions, which are consistent with those depicted in Figure 6.

Figure 6: UNITAR flood map. Red indicates flooded area detected via remote sensing from April to June 2024.



Flooding risk is widespread across Kenya's territory, particularly in regions surrounding large water bodies. However, the impact of flooding is expected to be more catastrophic in highly populated areas such as Nairobi, Mombasa, Kisumu, and Garissa.

Understanding the Impacts

The impacts of climate physical risks on banks can be diverse and financially damaging to all parties concerned. Disruptions to supply chains, collateral damage, and increased operational costs due to extreme weather events are common examples. Furthermore, businesses that rely on climate-sensitive sectors such as agriculture or tourism may face challenges that, in turn, affect their ability to meet financial obligations.

Table 5: Physical climate risk assessment for vulnerable sectors in Kenya

Sector	Hazards	Impacts	Science-Based Target Indicators	Location of data sources
Agriculture	- Irregular rainfall patterns - Increased temperatures - Extreme weather events	- Crop failure - Reduced yields - Water scarcity	- Annual crop yield data - Precipitation patterns over time - Temperature records and trends - Historical extreme weather event data - GHG-Scope 1-2-3 operational Co2 emissions data	Kenya Meteorological Department Ministry of Agriculture and Livestock Development Ministry of Water and Sanitation Water Resource Authority Ministry of Environment, Forestry and Climate Change Ministry of Devolution and ASALs
Water Resources	- Changing precipitation patterns - Prolonged droughts	- Dwindling water supply - Increased competition for resources	- Annual water supply levels - Historical precipitation patterns - Drought severity indices - GHG-Scope 1-2-3 operational Co2 emissions data	Ministry of Water and Sanitation Water Resource Authority Ministry of Environment, Forestry and Climate Change Kenya Meteorological Department Kenya National Bureau of Statistics (KNBS) Ministry of Devolution and ASALs
Energy	- Lower water levels affecting hydroelectric plants - Higher temperatures leading to increased energy demand	- Disruptions in hydropower generation - Increased demand for cooling	- Hydropower generation data - Water level records for hydroelectric plants - Energy consumption trends and forecasts - GHG-Scope 1-2-3 operational Co2 emissions data	Ministry of Energy Water Resource Authority Ministry of Water and Sanitation Ministry of Land and Physical Planning
Health	- Altered disease vectors due to climate changes. - Increased temperatures	- Spread of vector-borne diseases - Heat-related illnesses	- Incidence rates of vector-borne diseases - Temperature-related health impacts - Historical climate-related health data - GHG-Scope 1-2-3 operational Co2 emissions data	Ministry of Health Kenya Meteorological Department National Drought Management Authority National Environment Management Authority (NEMA)

Tourism	• Changes in weather patterns • Sea-level rise affecting coastal areas	• Shifts in tourist destinations. • Damage to coastal infrastructure	1. Tourist destination trends and preferences 2. Coastal infrastructure vulnerability assessments 3. Sea-level rise projections 4. GHG-Scope 1-2-3 operational Co2 emissions data	Ministry of Tourism and Wildlife Kenya Meteorological Department Ministry of Land and Physical Planning The National Treasury and Economic Planning Ministry of Transport, Infrastructure, Housing and Urban Development
Infrastructure	• Flooding, landslides, and storms affecting roads, bridges, and buildings	• Increased vulnerability to Extreme weather events	1. Infrastructure vulnerability assessments 2. Historical extreme weather event impact data 3. Climate resilience indices for infrastructure 4. GHG-Scope 1-2-3 operational Co2 emissions data	The National Treasury and Economic Planning Ministry of Transport, Infrastructure, Housing and Urban Development Ministry of Environment, Forestry and Climate Change Ministry of Land and Physical Planning National Environment Management Authority (NEMA)
Finance	• Climate-related damages affecting investments. • Stranded assets	• Increased insurance claims • Exposure to climate-sensitive assets	1. Insurance claims data related to climate events 2. Portfolio exposure to climate-sensitive assets 3. Stranded asset risk assessments 4. GHG-Scope 1-2-3 operational Co2 emissions data	The National Treasury and Economic Planning Ministry of Interior and Coordination of National Government Ministry of Transport, Infrastructure, Housing and Urban Development Ministry of Environment, Forestry and Climate Change Ministry of Land and Physical Planning
Manufacturing	• Disruptions in raw material supply due to climate events. • Increased energy costs	• Supply chain disruptions • Increased operating costs	1. Supply chain resilience assessments 2. Historical raw material supply disruptions 3. Energy consumption and cost trends	The National Treasury and Economic Planning Ministry of Interior and Coordination of National Government Ministry of Industrialization, Trade and Enterprise Development Ministry of Energy National Environment Management Authority (NEMA)

3. Transition Risks

Transition risks refer to the financial risks that result from the process of adjusting towards a lower-carbon economy. These risks emerge from the significant changes needed in policy, technology, and market structures to address climate change through mitigation and adaptation strategies. Kenya's National Determined Contribution (NDC) contains the fundamental target, policy direction and measures for reducing the national emissions and intertwines with transition risk by providing communication on the 5-year NDC strategy. Policy frameworks developed through mitigation and adaptation strategies must consider the legal consequences and the market effect. In addition, technological advancements such as the important growth of fintech should be regarded, as well as the reputational risks of inaction.

The Kenya banking sector is posed with the multi-faceted angles associated with transition risks. On the one hand, banks need to understand their exposure to climate change, ranging from domestic and international policies to changes in consumer preferences and technology. For this, the use of the GHG Emissions Exposure Index (EEI) can help in understanding the segments that are at risk in the portfolio of a financial institution. Similarly, banks need to understand how the climate action landscape is changing, particularly in alignment with national and international efforts. It is expected that the use of green taxonomies, such as the one being developed in Kenya, could support the coordination with investors and financial intermediaries in defining green investment in the sectors and the economic activities. For this purpose, the use of the Emissions Holding Index (EHi) could help in understanding how the strategic alignment of the bank with climate action could improve or deteriorate its access to financing.

Organisations face climate transition risks associated with how effectively and swiftly they adapt to these changes and shift towards reducing greenhouse gas emissions and embracing renewable energy. These risks vary in type and intensity. Key categories of climate transition risks are policy and legal, technology, market and reputation.

Regulatory and Legal Risks

This transition risk refers to the legal actions and complications that arise from the existing and emerging regulatory development addressing climate change. Existing and new environmental regulations require compliance that attracts legal risks in instances of non-compliance. These risks could include a lack of detail in climate disclosures, legal battles on behalf of an unsatisfied consumer, or the requirement to implement energy-efficient technologies rapidly. Similarly, new policies are being developed to mitigate and adapt to climate change, such as creating a carbon pricing mechanism that could financially impact a company.

Technological Risks

Technological improvements or innovations that support the transition to a lower-carbon, energy-efficient economic system can significantly impact organisations. To the extent that new technology displaces old systems and disrupts some parts of the existing financial system, winners and losers will emerge from this "creative destruction" process. However, technology development and deployment timing are critical in assessing technology risk. Risks arising from technology include additional costs and expenditures, technology marketability, return on investment, product/service effectiveness, and life cycle. In addition, more resources will be required for research and development and enhancing the capacity and capability of firms.

Market Risks

The transition to a low-carbon economy will involve changes in the supply and demand of goods, services and commodities and shifts in relative prices. Firms that adapt to this complex, nonlinear and dynamic context will navigate the transition more successfully than those that do not understand the nature of these changes. While how markets could be affected by climate change is varied and complex, one of the significant ways is through shifts in supply and demand for certain commodities, products, and services as climate-related risks and opportunities are increasingly considered. Market risks include the impact on market size, coverage and growth potential, product portfolio changes and consumer environmental consciousness that shifts their behaviours and preferences. One of the most prominent market transition risks is associated with the Carbon Border Adjustment Mechanism (CBAM), as a formal instrument to tax the real sector for products entering the European Union. In this context, Kenya has been identified as one of the countries more affected by the introduction of this market instrument that will affect exports in Kenya.

Reputational Risks

Climate change has been identified as a potential source of reputational risk tied to changing customer or community perceptions of an organisation's contribution to or detractor from the transition to a lower-carbon economy. Consumers are starting to seek more sustainable choices when shopping, meaning organisations that willingly choose not to embrace sustainability could suffer from serious accusations such as greenwashing and even risk losing loyal customers. This means organisations need to remain honest in their intentions and be able to back up their claims with factual evidence, or their entire business could be at stake. Reputation risks include decreasing brand value, shifting public sentiment on a company's role in climate action, stakeholder and investor shift in climate-related commitments and pledges, stigmatisation of high emissions sectors and changes in customer base.

Climate Transitional Risks in Kenya

As global climate patterns undergo unprecedented changes, Kenya finds itself at the forefront of both challenges and opportunities associated with transitioning to a more sustainable and climate-resilient future. Recognising that the Kenyan economy is inextricably linked to various sectors vulnerable to climate impacts, understanding and addressing transitional risks becomes paramount.

Identifying climate transitional risks is crucial in proactively managing the evolving landscape of economic activities, regulations, and societal expectations. As a signatory to international agreements like the 2015 Paris Agreement, Kenya acknowledges the need for a low-carbon, climate-resilient trajectory. This section explores climate transition in Kenya, focusing on the challenges and opportunities of moving towards a sustainable, low-carbon economy. .

As the global community intensifies efforts to address climate change, the financial landscape is evolving, driven by regulatory changes, market dynamics, and shifts in stakeholder expectations. Identifying and understanding transitional risks is crucial for Kenyan industries to navigate this changing terrain effectively.

Transitional risks stem from the adjustments required to align with environmental sustainability goals. These risks span regulatory, market, technological, and societal dimensions, impacting industries differently based on their practices and dependencies. In Kenya, where economic sectors vary widely, recognising and addressing these transitional risks becomes imperative for strategic planning and resilience.

The table below analyses transition risk drivers, practical examples and impacts of transitional risks on specific industry sectors in Kenya. It provides a more granular understanding of how different industries will likely be affected, allowing businesses to tailor their strategies accordingly.

Table 6: Transition risk drivers

Risk Drivers	Practical Examples	Impacts on Industries
Regulatory Changes	• Introduction of carbon pricing mechanisms affecting industries dependent on fossil fuels • Implementation of renewable energy targets impacting energy-intensive sectors.	• Energy: Transition away from fossil fuels • Agriculture: Fossil fuel transition and higher manufacturing costs and costs for renewable alternatives • Tourism Operators: Increased operational costs for transportation and accommodations, leading to potential price hikes for tourists. • Manufacturing: Higher compliance costs
Market Dynamics	• Shift in consumer preferences towards sustainable products, affecting industries not aligned with sustainable practices. • Emergence of sustainable finance trends influencing investment decisions.	• Retail: Consumer demand for eco-friendly products • Consumer Goods: Financing based on sustainability (ESG) performance indicators. • Tourism Products: Decreased demand for activities or services perceived as environmentally unfriendly.
Technological Advancements	• Adoption of clean and sustainable technologies in the energy sector, impacting traditional energy sources. • Advancements in agricultural technologies promoting climate-smart practices.	• Energy: Shift towards renewable energy sources, • Agriculture: Adoption of precision farming technologies • Sustainable Tourism Experiences: Integrating advanced technologies for eco-friendly tours and activities. • All Industries: Energy-Efficient Infrastructure: Implementing green technologies in hotels and transportation.
Supply Chain Analysis	• Dependence on carbon-intensive resources in manufacturing industries facing supply chain disruptions. • Impact of sustainable sourcing practices on the agricultural sector.	• Manufacturing: Supply chain disruptions • Agriculture: Shifting sourcing dynamics
Financial Market Considerations	• Integration of ESG criteria by investors affecting financing options for non-compliant businesses. • Development of green financial products influencing investment decisions.	• Banking: Financing aligned with sustainable practices • Banking: Development of green financial products influencing investment decisions • Real Estate: Demand for green building initiatives
Social Awareness and Reputation	• Consumer backlash against businesses perceived as environmentally irresponsible.	• All Industries: Reputational impacts, consumer-driven changes

Risk Drivers	Practical Examples	Impacts on Industries
	Positive market perception and customer loyalty for companies adopting sustainable practices.	
International Agreements	- Aligning Kenyan policies with international agreements like the Paris Agreement influences regulatory changes. - Participation in global sustainable development initiatives impacting local industries.	All Industries: Compliance with global standards, market access
Legal and Litigation Environment	- Introduction of legal frameworks mandating climate-related disclosures impacting non-compliant entities. - Potential litigation risks for businesses not adhering to emerging climate-related regulations.	All Industries: Legal compliance challenges, potential lawsuits
Stakeholder Engagement	- Industry consultations leading to collaborative efforts for sustainable practices. - Expectations from NGOs and civil society influencing businesses to adopt climate-friendly strategies.	All Industries: Collaborative approaches, adapting to stakeholder expectations
Capacity Building	- Training programs enhancing the capacity of businesses to adapt to sustainable practices. - Increased awareness and education leading to a proactive approach to climate risk management.	All Industries: Skill development, readiness for sustainable practices

4. Regulatory Response to Climate-Related Risks in the Kenya's Banking Sector

Kenya's legislative landscape reflects a multifaceted response to climate-related risks and opportunities. The Climate Change Act underscores the significance of the Task Force on Climate-Related Financial Disclosures (TCFD) recommendations (now incorporated into IFRS-ISSB-S2 reporting requirements), emphasising the need for financial institutions to disclose climate risks comprehensively. The Act further provides a comprehensive framework guiding climate governance, risk assessments, and adaptation planning at the national level. This legislation acknowledges the interconnectedness of climate-related risks across various sectors and articulates a strategic vision for climate resilience.

As part of its regulatory framework, CBK requires banks to employ suitable procedures and systems to ensure their capital adequacy, with increased emphasis on risk management. These procedures, collectively known as the Internal Capital Adequacy Assessment Process (ICAAP), are the formal process through which banks identify, measure, aggregate and monitor material risk to ultimately build a risk profile that becomes the basis for allocating capital. By adhering to these ICAAP requirements, banks in Kenya can maintain a comprehensive risk management framework, address all material risks – including climate-related risks, and sustain adequate capital buffers to safeguard their solvency and stability.

Recognising the pervasive nature of climate-related financial risks, CBK issued the Guidance on Climate-Related Risk Management in 2021. The guidance provides commercial banks with a roadmap for integrating climate-related risks into their decision-making and disclosure frameworks. It has been benchmarked against global best practices on climate risk management, including the TCFD, the Basel Committee on Banking Supervision, and the Network for Greening the Financial System, as well as guidance and guidelines on climate-related risk management by the Bank of England's Prudential Regulatory Authority.

Efforts by CBK have been supplemented by the Kenya Banker Association Sustainable Finance Guidelines, which are intended to support the banking sector in embedding sustainable finance practices. By encouraging banks to incorporate environmental and social risks into lending and investment decisions, the banking sector seeks to foster a financial ecosystem that manages environmental and social risks and identifies opportunities arising from sustainable practices.

CBK's engagement with the Network for Greening the Financial System (NGFS), which supports scenario analysis, showcases a commitment to informed decision-making. Whether adopting NGFS principles or developing bespoke scenario analysis frameworks, the Central Bank of Kenya aims to comprehensively support the assessment of physical and transition risks in the banking sector and reflects a commitment to ensuring the long-term viability of the sector in the face of a changing climate landscape.

5. Bibliography

Reports/Periodicals/Journals

1. Africa Climate Foundation. 2023. [Implications for Africa of a CBAM in the EU](#).
2. Central Bank of Kenya. (2021). *Guidance on Climate-related Risk Management*. [Guidance-on-Climate-Related-Risk-Management.pdf \(centralbank.go.ke\)](#)
3. European Banking Authority. (2021). *Mapping Climate Risk: Main findings from the EU-wide pilot exercise*. [Mapping climate risk: Main findings from the EU-wide pilot exercise \(europa.eu\)](#)
4. Africa Climate Foundation. 2023. [Implications for Africa of a CBAM in the EU](#).
5. Intergovernmental Panel on Climate (IPCC) (2014). Summary for policymakers. In: Climate Change 2014: Impacts, Adaptation, and Vulnerability. Part A: Global and Sectoral Aspects. Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change. [Summary for Policymakers \(ipcc.ch\)](#)
6. Kenya Banker Association (2015), Sustainable Finance Guidelines. <https://sfi.kba.co.ke/uploads/sfi-booklet.pdf>
7. Monasterolo, I., Battiston, S., Janetos, A.C. et al. Vulnerable yet relevant: the two dimensions of climate-related financial disclosure. *Climatic Change* 145, 495–507 (2017). <https://doi.org/10.1007/s10584-017-2095-9>.
8. Kenya Climate Change Act 2023 (Amended). [TheClimateChange Amendment Act No.9of2023.pdf \(kenyalaw.org\)](#)
9. Ministry of Environment and Forestry (NEMA). (2020). *Kenya Amended Nationally Determined Contributions (NDC's)*. The Government of Kenya. [KEN210108.pdf \(fao.org\)](#)
10. Mwangi, Kenneth and Mutua, Felix. (2015). Modelling Kenya's Vulnerability to Climate Change – A Multifactor Approach. *International Journal of Science and Research (IJSR)* 4 (6). [Modelling Kenya's Vulnerability to Climate Change – A Multifactor Approach \(ijsr.net\)](#)
11. National Environment Management Authority (NEMA). (2015). *Kenya Second National Communication to the United Nations Framework Convention on Climate Change*. The Government of Kenya. unfccc.int/resource/docs/natc/kennc2.pdf
12. The United Kingdom (UK) Government. (2009). *The Economics of Climate Change in Kenya: Final Report submitted in advance of COP15*. assets.publishing.service.gov.uk/media/57a08b3eed915d3cfd000c0a/60871-kenya-climatechange1.pdf
13. United Nations Framework Convention on Climate Change (UNFCCC). (2023). *Climate-Impacted Loss and Damage in Kenya*. [Climate-Impacted Loss and Damage in Kenya | UNFCCC](#)
14. United Nations Framework Convention on Climate Change (UNFCCC). (2015). *Kenya National Adaptation Plan 2015 – 2030*. unfccc.int/sites/default/files/resource/Kenya_NAP.pdf
15. World Bank. *Climate Risk Country Profile: Kenya*. (2021). The World Bank Group. [15724-WB_Kenya_Country_Profile-WEB.pdf \(worldbank.org\)](#)
16. World Bank. (2023). *Country Climate and Development Report*.
17. World Health Organization. (2014). Quantitative risk assessment of the effects of climate change on selected causes of death, 2030s and 2050s. [Quantitative risk assessment of the effects of climate change on selected causes of death, 2030s and 2050s \(who.int\)](#)

Websites

1. European Central Bank (ECB – SSM Stress test 2022). Available at: [Climate risk stress test - Methodology \(europa.eu\)](#)
2. International Sustainability Standards Board (ISSB). (2023) IFRS S2 Climate-related Disclosures. [IFRS - IFRS S2 Climate-related Disclosures](#)
3. Kenya Meteorology Department: Climate data. Available at: [Meteo Kenya Map Room](#)
4. Moody's Climate Capability "Heat Stress Impacts-Generic -2023". [Heat Alert: Assessing Heat Stress Risk Impacts with Moody's Climate on Demand Pro | Climate on Demand \(moody.com\)](#)
5. NASA's Earthdata platform data related to temperature, precipitation, and other climate factors. [War on Hunger | Earthdata \(nasa.gov\)](#)
6. Tzachor, A., Richards, C., Gudoshava, M., Nying'uro, P., Misiani, H., Ongoma, J., Yair, Y., Mulugetta, Y., Gaye, A. (2023, August 14). *How to reduce Africa's undue exposure to climate risks*. Nature. [How to reduce Africa's undue exposure to climate risks \(nature.com\)](#)
7. Regional Centre for Mapping of Resources for Development (RCMRD) [RCMRD Open Data Site](#)
8. SwissRe-Proprietary Geo-location and mapping tool data sets. (Sign in required by CBK). [CatNet® | Swiss Re](#)
9. The United Nations Office for Disaster Risk Reduction (UNDRR), Generic resource on climate impacts [Global Risk Analysis and Reporting | UNDRR](#)
10. United Nations Convention to Combat Desertification – Drought tool. Available at: [UNCCD Drought Toolbox](#)
11. USAID Kenya Climate Change Fact Sheet (US Government). [Kenya Climate Change Fact Sheet | Global Climate Change \(climatelinks.org\)](#)
12. World Bank: Climate Knowledge Portal – historical and projected climate data. Available at: [Kenya - Summary | Climate Change Knowledge Portal \(worldbank.org\)](#)
13. World Bank: World development indicators (GDP Contribution Table). [Contribution to GDP of Kenya for selected sectors \(%\) | Download Table \(researchgate.net\)](#)