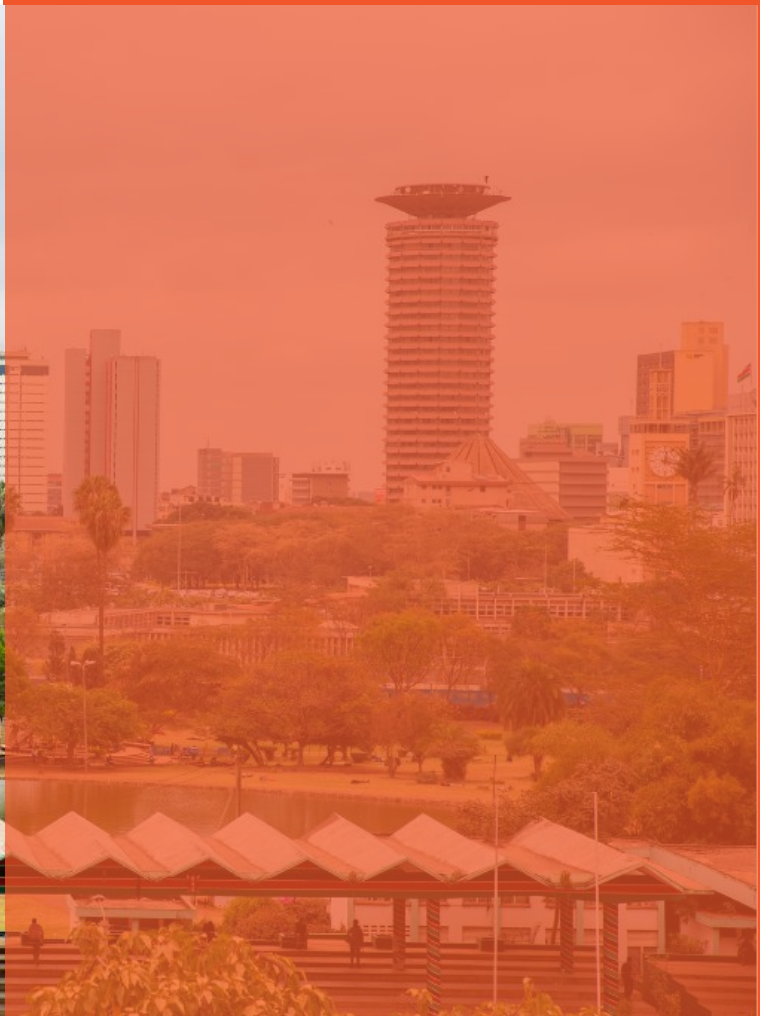




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Scaling insurance for climate resilience in Africa

Insights from Kenya



Commissioned by:





About Krutham

Krutham, is a leading research and consulting firm that specialises in the financial sectors of emerging markets. Its analysis is used by companies, investors, stockbrokers, regulators, policy makers and companies in South Africa and around the world. It has offices in Johannesburg, London and Boston.

This report was commissioned by the African Climate Foundation (ACF). It was produced independently by Krutham and the contents represent the views of Krutham and its analysts.

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List of abbreviations

ACRE	Agriculture and Climate Risk Enterprise	KMD	Kenya Meteorological Department
ADIS	Australian Drought Insurance Scheme	KNBS	Kenya National Bureau of Statistics
AKI	Association of Kenya Insurers	KRA	Kenya Revenue Authority
API	Application Programming Interface	MNAIS	Modified National Agricultural Insurance Scheme
ARC	African Risk Capacity	MRV	Measurement, Reporting and Verification
ASAL	Arid and Semi-Arid Lands	NAP	National Adaptation Plan
AWS	Automated Weather Station	NDC	Nationally Determined Contribution
CBK	Central Bank of Kenya	NDEF	National Drought Emergency Fund
CERF	Central Emergency Response Fund	NDMA	National Drought Management Authority
CPI	Climate Policy Initiative	NDMA	National Disaster Management Authority
DREF	Disaster Relief Emergency Fund	NDVI	Normalised Difference Vegetation Index
DRIVE	De-risking, Inclusion and Value Enhancement	NEMA	National Environment Management Authority
DRM	Disaster Risk Management	NGOs	Non-Governmental Organizations
EU	European Union	OECD	Organisation for Economic Co-operation and Development
GDP	Gross Domestic Product	PAAF	Planning Africa's Adaptation Finance
GIS	Geographic Information System	PMFBY	Pradhan Mantri Fasal Bima Yojana
HSNP	Hunger Safety Net Programme	PPP	Public-Private Partnership
IAIS	International Association of Insurance Supervisors	RCRF	Regional Climate Risk Fund
IBLI	Index-Based Livestock Insurance	REPAIR	Regional Emergency Preparedness & Access to Inclusive Recovery
IDB	Inter-American Development Bank	SFERA	Special Fund for Emergency and Rehabilitation Activities
IMF	International Monetary Fund	UNDP	United Nations Development Programme
IRA	Insurance Regulatory Authority	USAID	United States Agency for International Development
KAIP	Kenya Agriculture Insurance Programme	WFP	World Food Programme
KLIP	Kenya Livestock Insurance Program		
KLIP	Kenya Livestock Insurance Programme		

Executive summary

Kenya, East Africa's largest economy, faces significant climate-related risks that threaten its economic growth, livelihoods, infrastructure, and public health. This report examines the role of climate risk insurance as climate risk management tool in Kenya, assessing its potential to mitigate climate-related risks and strengthen the country's adaptation and resilience.

Climate change impact

Kenyan economy, society and environment

- Despite achieving 4.8% average GDP growth (2015-2019), Kenya faces significant climate change vulnerabilities that threaten its economic development.
- Over 70% of natural disasters in Kenya are climate-related, with severe flooding affecting 40 out of 47 counties in 2024, causing more than 230 deaths and displacing 40,000 households.
- The 2008-2011 Horn of Africa drought slowed Kenya's economy by 2.8% and caused \$12.1 billion in damages and losses.
- Poverty remains a critical issue, with significant regional disparities (77.7% poverty rate in Turkana vs 16.5% in Nairobi).
- Limited financial inclusion compounds vulnerability, with only 44.1% of Kenyans accessing banking services.

Climate change and the insurance sector

- The sector faces both physical risks (extreme weather events) and transition risks (shift to low-carbon economy)
- Insurance companies face the following challenges:
 - Accurate risk modelling and pricing for extreme weather events
 - Rising claims and loss ratios (13.3% increase in insurance claims in 2023)
 - Poor profitability (287% combined ratio in 2023), indicating that claims and

operating expenses far exceeded premium income

- Mounting pressure on balance sheets through higher capital requirements
- Risk of assets becoming uninsurable in climate-exposed regions

Climate and disaster risk financing

- Kenya has a comprehensive risk layering strategy to finance climate and disaster risks. It incorporates social protection, contingent credit and access to external aid.
- Kenya faces a substantial funding gap for climate adaptation, requiring approximately KES853bn (\$6.6bn) annually, with 71% needed for climate resilience. Current funding predominantly focuses on mitigation rather than adaptation.¹
- It has several instruments to absorb financial impact, such as the National Drought Emergency Fund, Contingencies Fund and county-level emergency funds.
- However, due to gaps in tracking disaster expenditures, these mechanisms are often underfunded. This renders the government reliant on budgetary mechanisms.
- Kenya also has access to external aid, but this largely undermines long-term climate resilience as the payment and distribution of disaster relief funds tend to misalign with local needs.
- Insurance can address disaster risk financing gaps through rapid payouts, incentivising DRR and providing financial protection against high-impact climate events.

Kenya's insurance landscape

- **Market growth:** The general insurance market reached KES88bn (\$686m) in gross written premiums with projected 9% annual growth.
- The reinsurance market in Kenya is growing, particularly for high-risk and complex industrial exposures.
- Low retention ratios for fire industrial risks and increasing reliance on reinsurance for

¹ * Conversion rate: KES 1 = \$0.0078, converted 30 August 2024

miscellaneous classes signal an industry trend towards risk diversification

damage in 2024, highlighting an urgent need for diversified disaster financing.

Strengths that facilitate the use of insurance for climate risk management

- **Proactive government engagement:** Kenya has implemented comprehensive climate laws and policies, mobilised adaptation funding, and strengthened livelihood resilience through various insurance mechanisms.
- **Innovative insurance solutions:** The country has pioneered programmes like the Kenya Livestock Insurance Programme (KLIP) and the Kenya Agriculture Insurance Programme (KAIP), providing subsidised coverage to vulnerable pastoralists and smallholder farmers.
- **Supportive regulatory environment:** The Insurance Regulatory Authority (IRA) has implemented risk-based supervision and introduced regulations to support microinsurance and index-based insurance products.
- **Growing digital infrastructure:** High mobile phone penetration and increasing internet access provide opportunities for innovative insurance distribution channels.

Barriers and challenges

- **Inadequate weather data infrastructure:** Limited weather stations in rural areas force reliance on satellite data, which may not accurately reflect local conditions. This hinders effective insurance design and increases basis risk.
- **Digital connectivity challenges:** Rural areas face inconsistent internet access and low smartphone penetration, limiting farmers' ability to engage with insurance platforms, submit claims, or receive timely payouts.
- **Limited IT systems:** Many insurers lack advanced systems to process large volumes of data, leading to delays in claim processing and payouts.
- **Low insurance penetration:** With only 2.4% penetration in 2023, demand for climate insurance products remains low, driven by mistrust, limited awareness, and high costs.
- **Limited non-drought coverage:** Most insurance products focus on drought, neglecting other significant risks like floods. For instance, urban flooding caused severe

Insurance sector participation in climate resilience

- Limited industry engagement in climate resilience efforts. However, the following initiatives demonstrate the industry's growing recognition of its potential role in climate resilience:
 - **Nairobi Declaration on Sustainable Insurance:** A regional commitment by insurers to align operations with climate goals, though targets remain voluntary.
 - **Africa Climate Risk Insurance Facility for Adaptation (Acrifa):** Aims to de-risk investments in climate-sensitive sectors like agriculture, mobilising significant capital, such as the
- Kenya stands out for its enabling environment, with:
 - National Adaptation Plan (NAP) and the Climate Change Act, promoting private sector (ie insurance industry) engagement in the country's climate commitments.
 - Financial incentives such as the Green Bonds Programme to encourage adaptation-aligned investments.
 - Reformed PPP Act (2021) to facilitate private-sector engagement in climate adaptation.

Recommendations

Enhance data infrastructure and sharing

- Modernise weather monitoring through automated weather stations, satellite data integration, and user-friendly data portals.
- Establish a centralised agricultural database to improve crop, livestock, and pest data accuracy, and foster cross-institutional collaboration for robust risk assessments.

Multilevel risk transfer mechanisms

- Expand insurance coverage across micro (farmers), meso (cooperatives and financial institutions), and macro (government) levels, integrating tools like catastrophe bonds and early warning systems for comprehensive risk management.

- Implement a parametric insurance mechanism to provide timely payouts to county governments, using hybrid triggers and innovative financing methods.
- Mitigate basis risk with innovative mechanisms
 - Develop a basis risk fund capitalised by insurers, government, and donors to compensate farmers for non-triggered but verified losses.
 - Explore hybrid insurance products combining index-based and indemnity features for commercial policyholders and refine index designs through pilot programmes.

Incentivising adaptation investment

- **Kenya's Climate Envoy Office**, with key stakeholders, could establish a country platform to coordinate adaptation, disaster risk reduction (DRR) and resource mobilisation. The platform could focus on innovative financing to unlock public and private funding, build capacity to engage international donors, and form partnerships with financial institutions. By gathering data on adaptation projects and showcasing avoided losses, it could strengthen monitoring systems and demonstrate returns. The platform would also enhance coordination to integrate insurance into national adaptation and resilience plans.

Introduction

Climate change in Kenya: impact and vulnerabilities

Kenya's vulnerability to climate change presents a significant threat to its economic development, despite achieving average GDP growth of 4.8% from 2015 to 2019. The country's diverse topography, stretching from arid plains to fertile highlands, creates varying temperature patterns and exposes it to multiple climate-related hazards, with more than 70% of natural disasters being climate-related (World Bank Group, 2023).

Kenya suffered floods almost every year between 2010 and 2020, affecting, per event, between 11,000 to nearly one million people. In 2024, severe floods in 40 out of 47 counties resulted in more than 230 deaths, displaced about 40,000 households and caused extensive damage to infrastructure and agriculture (Clemens et al., 2024; Njeru, 2024).

Droughts, driven by atmospheric variability and land degradation, have an equally devastating impact, especially in the country's arid zones. For instance, the major drought from 2008-2011 in the Horn of Africa slowed Kenya's economy by an average of 2.8% and resulted in \$12.1bn in damages and losses (Detelinova et al., 2023).

Climate change inflicts significant damage on Kenya's key economic sectors, particularly agriculture and water resources, with effects varying by region. The coastal areas face unique challenges, with potential damage to port infrastructure threatening both trade and tourism sectors (Detelinova et al., 2023).

Several socio-economic challenges exacerbate Kenya's climate vulnerability. Although monetary poverty has decreased from 47% to 38.6% between 2005/06 and 2021, significant regional disparities persist. Rural and arid areas in the north and northeast experience substantially higher poverty rates than urban centres. For example, Turkana, the northernmost county, reported a poverty rate of 77.7%, compared with 16.5% in Nairobi City (Kenya National Bureau of Statistics, 2023).

Low-income households, especially in rural areas, have limited resources to cope with climate-

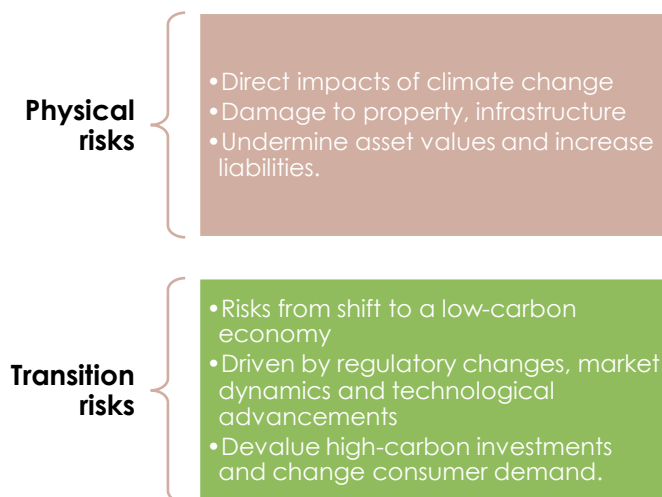
related shocks and stresses. They often face challenges accessing financial services and employment opportunities, crucial for escaping poverty. Although financial inclusion has improved, access to banking services, insurance and social security remains limited, with only 44.1% of Kenyans using banking services and products (Central Bank of Kenya, 2021; Heyer & Pensa, 2023). Consequently, households often rely on savings and asset sales to cope with livelihood shocks, perpetuating the cycle of poverty, particularly among income-poor, rural and female-headed households (Central Bank of Kenya, 2021; Philip, 2020).

Climate change and Kenya's insurance industry

Climate change poses significant challenges to Kenya's insurance industry through physical and transition risks. The **physical risks** stem from direct climate change impacts like extreme weather events damaging property and infrastructure, while **transition risks** emerge from the global shift towards a low-carbon economy (IAIS, 2021).

Compared with South Africa, Kenyan insurers'

Figure 1: Physical and transition risks for the insurance industry



exposure to transition risks is limited. While the financial sector's regulatory landscape has evolved with new climate-related financial risk disclosure requirements for listed companies, their exposure through their investment portfolios is contained (Deloitte, 2024). This is largely

attributable to the country's lower insurance penetration rate and proactive investment in renewable energy and low carbon emissions.

However, as mentioned, growing intensity of natural disasters in Kenya translate to significant exposure to physical risks. The widespread nature of these events, often affecting multiple counties simultaneously, increases the likelihood of correlated risks and large aggregate losses for insurers.

This shift in the risk landscape has exposed vulnerabilities in traditional insurance models and risk assessment strategies. A major challenge insurers face is accurately modelling and pricing risks associated with extreme weather events as well as the slow-onset effects on agriculture and water security in the longer term (Clark, 2024). Traditional catastrophe models, which rely on historical loss data, are becoming less reliable in predicting future climate-related risks.

Kenyan insurers are grappling with increased claims and loss ratios, as evidenced by the 13.3% rise in insurance claims and a 22.2% increase in the loss ratio for long-term insurance business in 2023 (Cytonn, 2024). Moreover, the industry's **combined ratio** of 287% in the same year indicates that the core insurance business is currently unprofitable (Cytonn, 2024; Shah, n.d., 2024).

Kenya's evolving climate risk landscape highlights the urgency of mobilising financing for climate

Explanation: combined ratio

The combined ratio is a metric used to measure the profitability of an insurance company's core underwriting operations. It is the sum of the loss ratio (claims paid out as a percentage of premiums earned) and the expense ratio (operating and administrative expenses as a percentage of premiums earned).

A combined ratio above 100% indicates that the insurance company is paying out more in claims and operating expenses than it earns from premiums, meaning the underwriting operations are unprofitable.

In this case above, the combined ratio of 287% suggests that for every KES1 of premium income, the industry incurred KES2.87 in claims and expenses, highlighting significant challenges in managing profitability in the sector.

resilience. As a significant risk aggregator, with expertise in risk assessment and management, the insurance industry is uniquely positioned to contribute to resilience solutions. Yet, insurance is only one piece of this puzzle. First, insurers and reinsurers are vital to the soundness of contemporary financial systems and therefore cannot be expected to shoulder disproportionate climate risks. The systemic and escalating nature of these risks have grave financial implications:

- Insurers face mounting pressures on their balance sheets through higher capital requirements for reinsurance.
- The rapid repricing of climate-exposed assets undermines insurers' investment portfolios and market valuations.
- This creates a challenging dynamic where some historically stable premium and profit pools may shrink in climate-exposed regions, while certain assets are at risk of being uninsurable (Grimaldi et al., 2020).

Second, for the insurance industry to contribute to climate resilience, a system-wide, collaborative approach is required involving public-private partnerships (PPPs), government agencies, non-profit organisations and community organisations.

This report examines the current role of insurance in Kenya, assessing what products and mechanisms are available and how they contribute to climate resilience financing. It evaluates insurance integration at the macro level, supporting government and systemic responses, as well as at the meso and micro levels, where households and businesses face direct impacts of climate-related risks. By identifying gaps and opportunities, this analysis aims to enhance the role of insurance in Kenya's broader climate resilience framework.

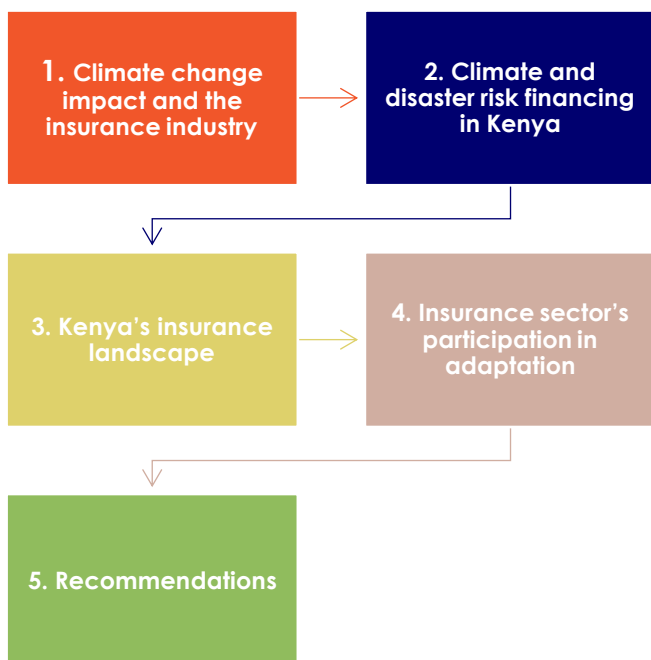
In addition, the report maps out the regulatory landscape and seeks out how it can be leveraged to strengthen the role of insurance. This includes examining insurance regulations, adaptation strategies and disaster risk management policies. It also explores innovations and trends in the insurance sector to determine whether they can be harnessed to improve the commercial viability of insurance products and support their integration into social protection programmes.

Methodology

The research took place over a period of eight months (April-November 2024) and relied on the following methods:

- Extensive desktop research examining existing literature, policy documents and market data.
- Stakeholder engagements with insurance companies, regulators, industry associations as well as NGOs working on climate resilience.
- Peer reviews by independent experts to ensure the robustness of our findings.
- The report also benefited from valuable feedback and insights gathered during a panel discussion hosted by the ACF at the South Africa pavilion during COP29 in Baku, Azerbaijan. The research team presented the main findings that informed a structured discussion between expert panellists in the insurance industry.

Figure 2: Report structure



Report structure

The report is structured as follows:

The first section looks at Kenya's broader climate and disaster risk financing strategies, identifying strengths and weaknesses. This section looks at how the integration of insurance into climate resilience financing can bridge funding gaps, incentivise disaster risk reduction and support adaptation efforts (see *Climate and disaster risk financing in Kenya*).

The second section explores the country's insurance industry focusing in particular on the capacity of non-life primary insurers and reinsurers to underwrite climate risk. It also maps existing insurance products that provide cover against climate-related disasters, identifying key strengths, including innovative products (see **Kenya's insurance landscape**).

The third section looks at how insurance companies are contributing to climate resilience through their investment portfolios and ESG/CSI initiatives and how these actions align with the country's climate resilience policy agendas. It identifies the main barriers that need to be addressed to strengthen participation among not only the insurance industry but the private sector as a whole (see **Insurance sector's participation in adaptation**).

The report concludes with actionable and strategic recommendations that aim to offer a framework for integrating insurance into climate resilience. These recommendations balance immediate priorities, like addressing funding gaps, with long-term goals, such as fostering innovation and resilience-building (see **Recommendations**).

Climate and disaster risk financing in Kenya

The insurance sector traditionally plays a vital role in disaster risk management. Given Kenya's increasing vulnerability to climate-related disasters, understanding how insurance mechanisms can be integrated with other risk management strategies is crucial. This section contextualises its potential role within the significant challenges that Kenya faces in managing and financing its climate-related disaster risk management (DRM) efforts.

In particular, this section assesses the feasibility and potential impact of the following climate and disaster resilience financing strategies:

- **Risk reduction:** Current approaches and financing towards strengthening resilience through DRR and adaptation measures.
- **Risk retention:** How are risks that remain after DRR and adaptation measures have been implemented, managed and financed?
- **Reliance on external assistance:** What are the implications of relying on external assistance and aid for disaster response for Kenya's long-term climate resilience?
- **Risk transfer:** What are the opportunities and limitations of incorporating insurance to climate and disaster risk management?

A comprehensive approach to financing climate resilience typically depends on a combination of these strategies. The discussion of these strategies focuses on the practicality and effectiveness of each within the Kenyan context, recognising strengths and limitations. The goal is to identify the most viable and sustainable approaches for enhancing Kenya's resilience to climate-related risks and disasters, with a particular focus on how insurance can complement and strengthen other risk management efforts.

Risk reduction: scaling adaptation

Investing in adaptation measures is crucial to building resilience within communities and infrastructure to better withstand climate-related hazards, thereby reducing the overall need for disaster response funding.

Adaptation projects in Kenya span several key sectors:

- **Climate information services:** Investment opportunities in Kenya's Climate Information Services (CIS) span multiple areas, from technical infrastructure development to innovative research initiatives. Key investment areas include enhancing observation networks and monitoring systems, developing user-friendly climate information products, implementing mobile-based technologies and providing critical capacity building through training programmes (KMD, 2023)
- **Water management:** Improving systems to cope with both droughts and floods (World Bank Group, 2021, 2023).
- **Agriculture:** The agricultural sector, a cornerstone of Kenya's economy, is being adapted through the introduction of drought-resistant crop varieties and sustainable land management techniques (Government of Kenya, 2021a; Perryman, 2023; ReliefWeb, 2024; Wahome, 2020).
- **Coastal protection:** Given Kenya's extensive coastline, planned adaptation projects focus on strengthening defences against sea-level rise through measures such as building seawalls, restoring mangroves and implementing coastal zone management plans (Wandia, 2023).
- **Urban resilience:** Upgrading infrastructure in cities like Mombasa and Nairobi to withstand extreme weather events, including improvements to drainage systems and creation of green spaces (AECOM & World Bank Group, 2023).

The benefits of investing in adaptation are significant. According to the Planning Africa's Adaptation Finance (PAAF) standard reference estimate, the benefit-cost ratio for investing in climate adaptation measures is 4.1, with some estimates being even higher at 10:1 (GCA & WRI, 2019; Nicolson et al., 2023). This means that for every dollar spent on adaptation, returns would be four times higher. Additionally, the PAAF estimates that adaptation can save approximately one-third of estimated damages in priority sectors. Climate adaptation results in savings from both direct costs (stemming from the impact of climate change-related events) and indirect ones, including lower insurance premiums. Thus, investing in adaptation could substantially decrease Kenya's exposure to climate-related

risks, resulting in lower long-term financial costs for reactive DRM measures (Invesco, 2024).

However, scaling adaptation investments in Kenya faces considerable barriers, including:

Substantial funding gap: Kenya's updated Nationally Determined Contributions indicate a need for approximately KES853bn (\$6.5bn) annually, with 71% of this amount required for climate resilience (CPI, 2021). A UNDP report estimates Kenya's adaptation needs at 6.0% of GDP, or about KES837bn (\$6.4bn) (Nicolson et al., 2023). Current funding falls significantly short of these requirements.

The majority of climate finance in Kenya goes towards mitigation, which represented 79% of total funding tracked in 2018 and only 11.7% directed to adaptation (Mazza et al., 2021).

Renewable energy generation is the largest mitigation sub-sector and recipient of climate finance at KES161bn (\$1.3bn) (Mazza et al., 2021). In the adaptation space, most financing was allocated to the water and wastewater sub-sector in 2018, which received KES13bn (\$105m). This amount represents only 8% of the financing for renewable energy and is only a fraction of the KES100.7bn (\$785m) of Kenya's NDC for the water and blue economy sector (Mazza et al., 2021).

Furthermore, the NDC needs for disaster risk management is KES17.4bn (\$136m), while only KES2bn (\$15.6m) was allocated to this sub-sector in 2018 (Mazza et al., 2021).

Limited domestic resource mobilisation: Kenya's ability to mobilise domestic resources for adaptation is constrained by competing priorities and limited fiscal space. The country's GDP relies heavily on climate-sensitive sectors, yet critical areas such as agriculture, forestry and water remain underfunded (ReliefWeb, 2024). High government debt levels further limit capacity for disaster preparedness and response, with 49% of the 2023/24 budget allocated to debt repayment, servicing and pensions (IMF, 2024).

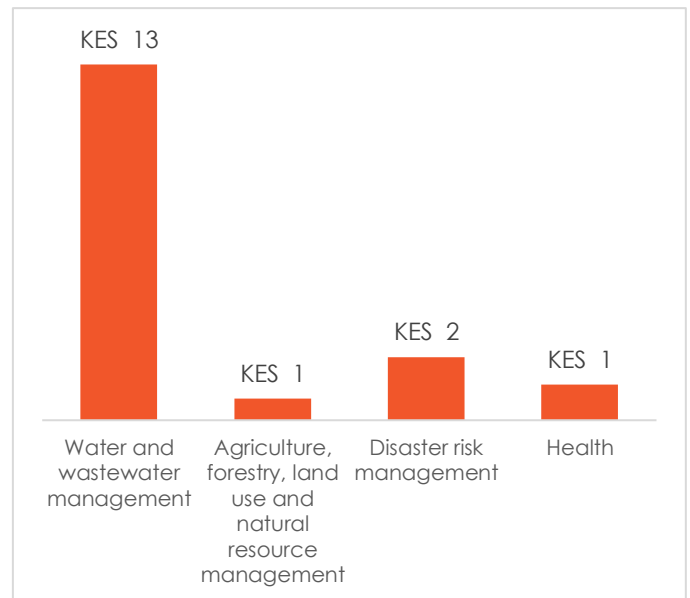
Challenges in accessing international climate finance: Like many countries in the global South, Kenya faces challenges in accessing international

climate finance due to complex application procedures, while stringent reporting requirements present additional challenges. Many international

funds have rigorous application processes and stringent reporting requirements, which can create barriers for developing countries like Kenya (Detelinova et al., 2023).

The technical expertise required to navigate these

Figure 3: Investments in adaptation sub-sectors in KES billion



processes, coupled with limited institutional capacity, can lead to delays in project implementation and inefficiencies in fund use (De Marez et al., 2022; OECD, 2023). The absence of clear Measurement, Reporting and Verification systems for climate projects and finance, along with limited institutional capacity, further undermines access to international climate finance (Detelinova et al., 2023).

It will be important for Kenya to work on addressing these barriers to unlock funding for adaptation and climate-resilient growth. In the meantime, integrating adaptation investments with more immediate DRM measures could help balance long-term resilience building with short-term disaster preparedness needs.

Improving risk absorption capacity

This strategy focuses on strengthening the ability of various domestic stakeholders to manage and absorb the financial impacts of climate-related disasters. Risk absorption, also referred to as risk retention, involves accepting and budgeting for certain levels of risk, acknowledging that not all risks can be entirely mitigated or avoided. These

unavoidable risks are financed through contingency funds, disaster relief budgets or self-insurance mechanisms.

Kenya has established several instruments to absorb the financial impacts of climate-related disasters:

- **National Drought Emergency Fund (NDEF):** Supports drought preparedness and response
- **Contingencies Fund:** Provides immediate financial support for urgent expenses
- **County-level emergency funds:** Offer localised support
- **Hunger Safety Net Programme (HSNP):** Provides cash transfers to vulnerable households in northern Kenya.

These mechanisms play an important role in strengthening the disaster resilience of the country's vulnerable populations (Calcutt et al., 2022; NDMA, n.d.; UNDP, 2020). The key advantages of strengthening risk retention capabilities include reducing the economic impact of climate risks that cannot be addressed through adaptation and retaining sovereignty in managing climate risks, especially in the face of increasing global climate impacts.

However, despite their strategic importance, implementation of these risk absorption mechanisms faces significant challenges that limit their practical effectiveness:

Insufficient funding: Due to limited fiscal space, allocating adequate resources to these mechanisms is challenging, undermining domestic actors' capacity to plan for and respond effectively to climate-related disasters. This is reflected in the country's heavy reliance on ex-post budgetary mechanisms and borrowing to fund disaster responses (Ochieng & Jattani, 2023). For example, a World Bank analysis of four ministries with disaster risk management (DRM) mandates found frequent and substantial budget reallocations following disasters, with adjustments of up to 68% of original budgets (Calcutt et al., 2022). In the 2019/20 fiscal year, approximately KES50bn (\$390m) was reallocated for disaster responses across three supplementary budgets. This reactive approach depletes fiscal resources over time and jeopardises long-term DRM strategies.

Delayed response: Funding constraints exacerbate operational challenges, particularly delays in mobilising and disbursing funds. This slows emergency relief efforts and heightens the social and economic impacts of disasters. The delays also hinder post-disaster recovery efforts, reducing opportunities to "build back better" and undermining long-term resilience.

Lack of expenditure tracking: Compounding these operational issues, poor expenditure monitoring undermines the government's ability to plan and budget for DRM effectively (Calcutt et al., 2022). Climate-related disasters create an economic burden of approximately 2-2.8% of Kenya's annual GDP (ReliefWeb, 2024).

Opportunity costs: Expanding risk retention instruments diverts budgetary resources from other sustainable development sectors and programmes, creating opportunity costs. This limits development progress and hampers Kenya's capacity to adapt and transform its economy to address climate-related risks effectively.

Gaps in public asset management: In addition to these challenges, Kenya's public asset management policies exacerbate vulnerabilities to climate impacts. These policies fail to adequately address climate-related risks, leaving critical infrastructure and public assets highly exposed. For example, they lack provisions for robust insurance or funding mechanisms aimed at rebuilding or reinforcing assets to better withstand future climate events. This approach limits recovery efforts to restoring assets to their pre-disaster state, perpetuating vulnerabilities in the face of increasing climate-related risks (Calcutt et al., 2022; IMF, 2024).

Strengthening Kenya's risk absorption capacity would help create a more resilient financial framework for managing climate and disaster risks. However, this approach must be balanced with investments in long-term risk reduction and prevention measures to avoid perpetuating a cycle of reactive disaster response.

Reliance on external support

Given these limitations in domestic risk absorption capacity, Kenya relies on external support to complement its existing disaster risk financing strategy. The country receives substantial financial assistance from international organisations and donors, including €250m in humanitarian funding since 2012 from the EU and over \$436m in emergency assistance from USAID (EU, 2024). In 2023, international humanitarian partners launched the Kenya Drought Response Plan 2023, which raised \$361.5m (80% of the targeted amount) to address drought impacts (ARC, 2024b).

Kenya also has access to international disaster risk financing mechanisms, such as the Special Fund for Emergency and Rehabilitation Activities (SFERA), the Central Emergency Response Fund (CERF) and the Disaster Relief Emergency Fund (DREF). These facilities provide flexible funding for disaster response and preparedness.

Kenya's DRM efforts involve collaboration with international agencies and NGOs, including the UN World Food Programme (WFP), Catholic Relief Services and Mercy Corps. These organisations contribute to humanitarian aid, food security and capacity-building initiatives (USAID, 2023; WFP, 2023). For example, Oxfam has been working to strengthen local humanitarian networks to increase the visibility and influence of local organisations in disaster response efforts (Stevens & Cousins, 2024).

International emergency assistance offers several benefits:

- Immediate access to funds that might otherwise be unavailable.
- Access to specialised expertise in climate and disaster financing.
- Technological and logistical support for disaster response.

However, overreliance on external assistance poses significant challenges:

Unpredictability of aid: The uncertainty of external funding complicates long-term planning and budgeting for disaster preparedness and response, as evidenced by Kenya's past experiences with aid freezes (Njeru, 2003). Donor dissatisfaction with Kenyan government policy

resulted in two major aid freezes in 1992 and 1997 which led to an immediate reduction in public spending. The government's response was to borrow from local markets and implement fiscal control strategies. While this is a long time ago, it illustrates how reliance on external assistance can complicate long-term planning and budgeting for disaster preparedness and response.

Misalignment with local priorities: Donors often prioritise their agendas, leading to funding allocations that may overlook local needs. For instance, humanitarian funding for disasters tends to focus significantly on emergency response and overlook funding needs for disaster prevention, preparedness, reconstruction and rehabilitation (Weingärtner & Spencer, 2019). This discrepancy can lead to well-intentioned efforts that fail to address the most pressing concerns of affected communities.

Coordination challenges: The influx of multiple international actors can lead to inefficiencies, duplication of efforts and gaps in service delivery. Bureaucratic barriers associated with international assistance can slow down response times and impede aid delivery efficiency (Stevens & Cousins, 2024).

Dependency and resilience: Perhaps most critically, the reliance on external support may create dependency, potentially undermining Kenya's efforts to develop robust, self-reliant disaster management capabilities and undermining long-term resilience to climate-related disasters.

Overall, while access to external aid is beneficial and likely to remain necessary for the foreseeable future, overreliance on it can have very significant drawbacks. The following section considers if and how the use of insurance can bridge some of the gaps in Kenya's current climate and disaster resilience management efforts.

Risk transfer and sharing through insurance and reinsurance

Insurance, along with catastrophe and resilience bonds, can address the current limitations in Kenya's climate resilience financing strategies. These risk transfer instruments provide timely financial resources after disasters, reducing dependence on reactive budget reallocations

and external aid while encouraging risk reduction measures.

By providing rapid, pre-arranged funding based on predefined parameters, these mechanisms enable stakeholders to reduce their exposure to climate-related disasters. This approach ensures more effective disaster response compared with relying on external donor support or post-disaster budget adjustments.

Moreover, the insurance sector's potential as a significant institutional investor positions it to support climate change adaptation through strategic investments in resilient infrastructure, climate risk data sharing, risk assessment and resilience planning.

Sovereign disaster insurance addresses several gaps in current climate and disaster risk management strategies. It bridges the funding gap by providing immediate financial protection during the implementation of long-term adaptation measures. By transferring risk to the private sector, it reduces Kenya's dependence on unpredictable external donor assistance, promoting greater financial autonomy. Insurance also complements existing risk reduction and absorption mechanisms, offering additional protection for high-impact, low-frequency events that would be too costly to adapt to. Furthermore, pre-arranged coverage helps stabilise government budgets by minimising the need for sudden, large-scale reallocations after disasters.

These benefits, however, largely depend on the speed and efficiency of payouts. Delays in insurance payouts can significantly diminish the welfare and resilience benefits of these programmes at micro, meso and macro levels.

Research on the implementation of African Risk Capacity's (ARC) first five years of operation highlights how delayed payments can undermine the intended benefits of sovereign disaster insurance (Kramer et al., 2020). For instance, a cost-benefit analysis of ARC showed that when payouts were delayed, every \$1 invested in the programme resulted in just \$0.40 in welfare benefits. In contrast, if payments had been disbursed rapidly through pre-arranged delivery channels, the same investment could have generated up to \$1.90 in benefits for affected households. This significant difference – a

potential welfare gain of \$1.50 per dollar invested – was lost primarily because countries used conventional food aid distribution systems rather than pre-arranged delivery mechanisms such as state-contingent welfare schemes that could have provided greater speed, cost and targeting advantages (Kramer et al., 2020; Ward et al., 2022).

The remainder of this report explores how Kenya can strengthen its insurance sector to contribute meaningfully to climate and disaster risk management as part of a broader, integrated approach. While insurance has a vital role in transferring risk and providing timely financial relief following disasters, it is not a standalone solution to the multifaceted challenges of climate adaptation. This report will critically examine the current state of the insurance market in Kenya, including its innovative products, delivery mechanisms and regulatory framework, while identifying the technical, financial, demand and supply-side constraints that limit its effectiveness.

Kenya's insurance landscape

The Kenyan government alongside financial sector regulators and development partners have been at the forefront of leveraging insurance as a climate risk management tool. This has entailed proactive engagement with the insurance industry, ensuring a supportive regulatory environment for innovative products, providing premium subsidies, integrating insurance into social protection programmes and collaborating with international partners such as the World Bank to roll out insurance schemes for small-scale farmers (Allen et al., 2022; Calcutt et al., 2022; Fava et al., 2021; Kramer, 2023).

These efforts have encouraged insurers to adopt advanced technology, such as satellite-based data for weather and index insurance and to use innovative distribution channels like mobile platforms. While this has established a strong foundation for market growth and innovation, it also introduces novel challenges. The emphasis on developing climate-related products has required insurers to invest in advanced risk modelling, data collection and innovative solutions, increasing operational complexity and costs. However, this has also opened new revenue streams and fostered partnerships with technology providers and government entities.

Sector growth and composition

Market growth

Kenya's insurance sector has demonstrated steady growth in recent years, paralleling the country's broader economic expansion. (Thornurn & Hernandez, 2019). The general insurance market's gross written premium (GWP) reached KES88bn (\$686m) in 2023, with a projected compound annual growth rate exceeding 9% from 2024 to 2028 (GlobalData, 2024). This growth is noteworthy, considering Kenya's low insurance penetration rate of 2.4% (Cytonn, 2024).

The industry encompasses both general and life insurance segments, with increasing attention to microinsurance products. As of 2024, there were 64 licensed insurance providers in Kenya, including five reinsurance companies, 35 general

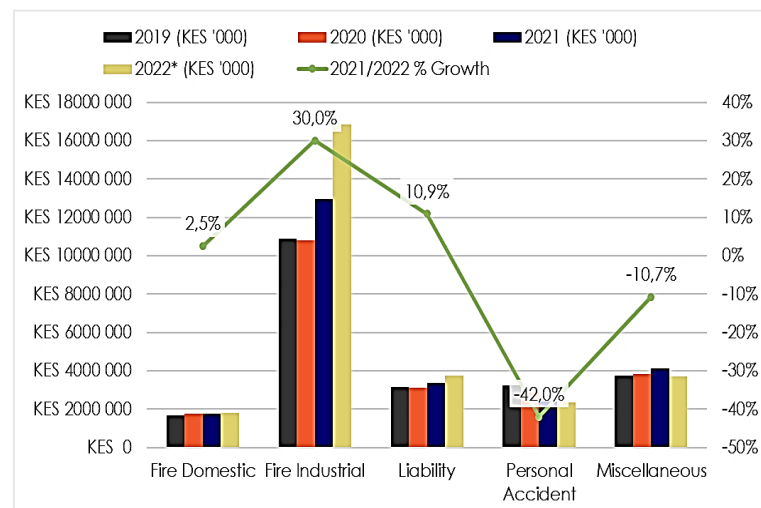
insurers and 24 long-term life insurers (IRA, 2024). Additionally, it features a mix of local and international players, including major regional companies such as Jubilee Insurance, ICEA Lion, Britam and CIC Insurance Group. International firms often utilise their global expertise to introduce innovative products and distribution channels, such as mobile insurance solutions, artificial intelligence-driven customer services and partnerships with InsurTech firms (APA insurance, 2022; Association for Kenya Insurers, 2022; Mateli, 2023).

Financial performance: general insurance and reinsurance

The general insurance market recorded a 12.9% rise in GWP premium growth between 2021 and 2022 (IRA, 2022, 2023). This market has several offerings that provide cover against climate-related risks, including fire, medical, micro and miscellaneous insurance as outlined in Table 1 (IRA, 2022).

Industrial fires recorded the highest growth, while **miscellaneous** insurance, which typically includes agricultural insurance, saw the biggest decline, of -10.7% (IRA, 2023). The miscellaneous insurance class also had some of the highest underwriting losses of KES144m (\$1.1m) as depicted in Figure 4.

Figure 4: Gross direct premium income, 2019 – 2022



Source: IRA (2023)

Reinsurance

Kenya's reinsurance market plays a pivotal role in the East African region, anchored by Kenya Reinsurance Corporation (Kenya Re), the oldest and most prominent reinsurer in the area. Kenya Re operates alongside four other licensed reinsurance companies and two regional reinsurers, ZEP-RE and Africa Re, which benefit from mandatory cessions of 10% and 5% respectively. Kenya Re itself receives a 20% mandatory cession of treaty insurance business arrangements (IRA, 2023).

share, with premiums of KES14.23bn (\$111m). Conversely, fire domestic insurance and miscellaneous classes experienced a decline in outward premiums as outlined in Figure 5.

The growth in fire industrial reinsurance premiums coincides with declining risk retention ratios for this class, dropping from 26% in 2018 to 19.8% in 2022 (IRA, 2023). This is well below the 2022 industry average of 71%, as well as the retention ratios for fire domestic and miscellaneous insurance, which stood at 67% and 54% respectively.

Table 1: Definition of insurance classes (covering climate risks) by IRA

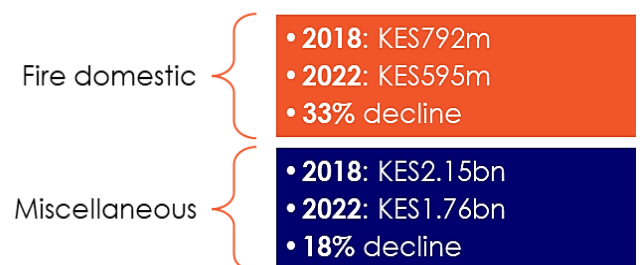
Insurance class	Definition
Fire and allied perils	Covers contracts that protect against property loss or damage caused by fire, explosions, storms and floods.
Fire industrial	For industrial and commercial risks.
Fire domestic	Risks that are of private or personal use.
Medical insurance	Business of providing coverage for medical expenses, which may also include protection for disability, long-term nursing care or custodial care needs.
Miscellaneous	Contracts that do not fall within any other defined classes of insurance. Includes, but is not limited to, bond insurance, livestock insurance and crop insurance.
Micro-insurance	Regulated insurance designed to offer affordable protection to low-income populations.

The reinsurance industry has grown in recent years, especially in terms of the quantum of premiums it receives from primary insurers. Two key indicators highlight this growth:

- **Outward reinsurance premiums:** The premiums paid by primary insurers (cedants) to reinsurers to transfer a portion of their risks.
- **Risk retention ratio:** The percentage of premiums retained by an insurer after ceding part of its risks. Higher retention indicates greater risk retention, while lower ratios suggest more reliance on reinsurance.

For general reinsurance, total outward reinsurance premiums increased substantially, from **KES36.89bn** (\$287.7m) in **2018 to KES 49.06bn** (\$383m) in **2022**, which represents a 33% increase. Fire industrial insurance accounted for the largest

Figure 5: Outward reinsurance premiums for fire domestic and miscellaneous, 2018 vs 2022



Notably, while insurers are increasingly ceding risks for miscellaneous policies, the risk retention for fire domestic insurance rose markedly between 2018 and 2022, from 50.6% to 67%. This high retention ratio correlates with the smaller premium base of KES595m (\$4.6m), representing only 4% of fire industrial premiums. The low uptake of fire

domestic insurance, corroborated by a claim ratio of just 17% (far below the global benchmark of 50–70%), suggests limited market penetration (IRA, 2023).

The increased cession of fire industrial risks may reflect the growing complexity and scale of industrial exposures, which demand substantial reinsurance support. This aligns with a global trend of primary insurers ceding high-severity risks to reinsurers. Conversely, the increased retention of fire domestic risks, likely driven by low premium volumes, makes ceding such smaller-scale risks less financially viable.

Additionally, the growing reliance on reinsurance for miscellaneous classes, despite their smaller premium base, highlights the varied nature of risks covered under this category. This class often includes risks that are harder to predict or quantify, such as for crop or livestock insurance, necessitating greater reinsurance support.

Regulatory environment

The Insurance Regulatory Authority (IRA) has taken steps to strengthen climate risk management, recognising the growing physical risks posed by climate change. As a member of the International Association of Insurance Supervisors (IAIS), the IRA focuses on improving disclosure, governance and risk assessment, including through stress-testing. However, specific climate risk guidance is yet to be issued.

In line with international standards, recent regulatory reforms have focused on adopting risk-based supervision, aligning Kenya's insurance sector with IAIS guidelines (IAIS, 2024b). This framework requires insurers to maintain capital proportional to their risk exposure across underwriting and investment portfolios, encompassing insurance, market, credit and operational risks (Insurance Act Chapter 487, 2022).

Building on this foundation, the risk-based framework enables a proportionate approach to managing climate risk exposures while creating incentives for the insurance industry to enhance its climate resilience and develop more sophisticated risk modelling capabilities.

Regulatory measures that could be leveraged to use insurance for climate risk management

To facilitate broader access to insurance products and enhance climate risk management, the IRA has implemented several key regulatory measures:

Tiered licensing requirements: The IRA introduced tiered licensing, including a microinsurance licence category, with differentiated capital requirements for microinsurers versus long-term or general insurers. This reduces barriers for smaller insurers and specialised providers, potentially expanding the range of climate risk insurance products (Hougaard et al., 2022)

Microinsurance and index-based insurance definitions: In 2019, the IRA added definitions for microinsurance and index-based insurance to its regulations (A2ii, 2019). This provides a clear framework for developing products that address climate risks for vulnerable populations. It also supports technology use and innovative distribution channels, encouraging public sector involvement (A2ii, 2017; Carpenter, 2022; Simões, 2021).

Streamlined product approval: To complement tiered licensing, the IRA streamlined the product approval process, addressing previously lengthy procedures (Hougaard et al., 2022). This enables quicker introduction of climate risk insurance products tailored to emerging risks.

Promoting innovation: Kenya currently hosts the second-largest number of InsurTechs in Africa as of 2019 (Allen et al., 2022). These companies are leveraging AI to analyse data, improve risk pricing and offer tailored insurance solutions. Many Insurtechs partner with traditional insurers for underwriting and pricing due to their financial strength and extensive data.

The IRA actively fosters market innovation through initiatives like BimaLab. This programme, developed in collaboration with insurers and partners, supports start-ups in refining their value propositions, assessing commercial viability and scaling solutions through partnerships (Hougaard et al., 2022). Sandbox initiatives like BimaLab offer controlled environments for testing new climate risk insurance products and distribution methods. This is particularly important to leverage the

growing digitalisation of insurance through InsurTech innovations and partnerships (Kizito, 2024; Kramer et al., 2024; Mateli, 2023).

Emerging regulatory guidance

As the global insurance industry evolves, international standards continue to shape Kenya's regulatory landscape. The IAIS's development of global guidance on climate risk for insurers and supervisors, including proposed updates to its Insurance Core Principles in 2023–2024 (IAIS, 2024a), provides a crucial framework for Kenya's regulatory development. This evolving international regulatory landscape is highly relevant for Kenya as it seeks to strengthen its insurance regulatory framework, particularly around climate and disaster risks.

While the IRA has made significant strides, particularly in index insurance regulations, opportunities exist for further alignment with international best practices. Notably, the Central Bank of Kenya's (CBK's) 2021 guidance note on climate-related risk management opens possibilities for enhanced regulatory cooperation (CBK, 2021). This cross-institutional collaboration could encompass cooperation on climate-related risk management, specifically in terms of sharing approaches on risk identification and measurement, metrics and key risk indicators, set up joint working groups on climate risks and discuss best practices and areas of concern.

The IRA could consider introducing climate scenario exercises for insurers to better understand potential risk exposures and transmission channels. This could inform both microprudential supervision and macroprudential policy. Kenya's existing risk-based capital framework provides a foundation that could be leveraged to incorporate climate risk considerations.

Regulatory challenges

Despite these regulatory advances, several significant challenges persist in Kenya's insurance sector:

High transaction costs: While the IRA has a tiered licence framework that differentiates the capital requirements of different insurance providers, the starting capital requirements are nevertheless prohibitively high, specifically for microinsurers

(Allen et al., 2022; Association for Kenya Insurers, 2023).

InsurTech partnerships: Despite their potential, several constraints undermine the growth of

Digital innovation and insurance uptake

Recent research reveals that digital innovation increases insurance take-up in areas that are typically underserved by insurance. Kramer et al (2024) evaluate Picture-Based Insurance as a tool to increase insurance uptake and fertiliser use among Kenyan smallholder farmers. Conducted across 191 villages in seven counties, it aimed to overcome barriers to agricultural insurance and support sustainable farming in climate-vulnerable areas.

Picture-Based Insurance (PBI) is an innovative insurance model that leverages photographic evidence to assess and verify losses in agricultural settings. This approach enables farmers to use mobile devices to capture and submit regular images of their crops, creating a visual record of their farming activities over time. These images are analysed to monitor the condition of crops and assess potential damage due to adverse weather events or other risks. Unlike traditional indemnity or weather index-based insurance, which relies on field visits or complex weather data to process claims, PBI simplifies the claims process by providing direct and verifiable visual evidence.

The study found that PBI significantly increased insurance uptake, particularly in arid and semi-arid lands, where uptake reached 30% for men and 40% for women. Women, often with lower financial literacy, favoured PBI's straightforward claims process. While both PBI and weather-based insurance (WBI) boosted fertiliser use, WBI had a stronger impact, potentially due to PBI's indemnity nature, which may reduce incentives for risk-reducing practices.

PBI demonstrated scalability through its use of local champion farmers equipped with smartphones and trained to take images of crops. Its participatory design shows promise for addressing agricultural insurance challenges and building resilience in vulnerable communities.

InsurTechs and ultimately, their ability to increase insurance uptake. Because most of these companies are start-ups who want to enter new markets and develop new products, they come with significant risks. This complicates partnerships with incumbent insurers and mobile network

companies, who do not always have the required risk appetite to partner with Insurtechs. Furthermore, partnerships with mobile network operators are not easy to navigate, for both incumbent insurers and Insurtechs. While this is the most obvious distribution partnership to achieve scale, mobile network operators with significant market share such as Safaricom are approached with caution due to unequal power dynamics that can put start-ups at risk and dictate the rules of the innovation game (Allen et al., 2022).

Capacity within the regulatory bodies: As discussed, regulatory initiatives, such as climate scenario analysis or supervising against climate-related financial risks, are important to improve the insurance sector's understanding of the risks it faces, as well as help prepare it to facilitate more climate risk transfer from households and the economy. However, these regulatory tools require significant expertise and capacity. The absence of such measures could result in insurance companies either hesitating to expand their coverage of climate change-related risks or taking up too much, with potential implications for their prudential soundness.

As the next section discusses, it is also important to further consider how this role can strategically compliment the national-level adaptation and resilience planning.

Climate and disaster risk insurance

The landscape of climate risk insurance in Kenya encompasses various mechanisms tailored to different stakeholders' needs, with most insurance products focusing on the agricultural sector and primarily addressing drought risks. At the micro level, products like index-based weather insurance and bundled insurance solutions serve individual farmers and pastoralists (Kramer, 2023). Meso-level insurance operates through cooperatives and farmer organisations, while macro-level programmes like the Kenya Livestock Insurance Programme (KLIP) and Kenya Agriculture Insurance Programme (KAIP) provide government-subsidised coverage to vulnerable populations (Calcutt et al., 2022; Fava et al., 2021).

The ecosystem of stakeholders driving these initiatives is diverse:

- The government plays a central role through regulatory oversight and premium subsidisation.
- Private insurers underwrite insurance products.
- Insurance brokers such as Agriculture and Climate Risk Enterprise (ACRE) Africa and Pula are crucial stakeholders, as they possess the technical expertise to design innovative insurance solutions that traditional insurers typically do not develop in-house.
- Technology companies and mobile network operators facilitate digital distribution.
- Agricultural cooperatives and savings and credit cooperatives (SACCOs) serve as crucial intermediaries, leveraging their extensive networks to reach underserved communities.

Kenya has been a testing ground for climate risk insurance innovations, with programmes ranging from mobile-enabled micro-insurance to sophisticated regional risk-pooling schemes. Given the prioritisation of agriculture insurance as a risk management tool for Kenya's significant farming population, it is necessary to clarify what types of farmers different schemes target, based on the climate risks they face. Additionally, it helps to identify how different farmers manage climate risks and how insurance can be integrated in an optimal way to strengthen resilience.

Government programmes

Government-led insurance programmes in Kenya align with the country's prioritisation of strengthening the resilience of households engaged in the agriculture sector. To this end, the government provides premium subsidies for livestock insurance and crop insurance products. These schemes typically involve a consortium of local insurance companies, alongside technical support partners such as the World Bank and International Livestock Research Institute.

Furthermore, the programmes covered below operate across multiple risk layers and farming household groups, with a core focus on protecting vulnerable pastoralists and subsistence farmers (groups 1, 2 and 3) from moderate and catastrophic risks that can increase agricultural losses (see [cover note](#)).

Kenya Livestock Insurance Programme (KLIP)

KLIP provides index-based insurance to pastoralists, protecting them against drought-related livestock losses (Nackoney, 2024). Introduced in 2015, the programme uses a satellite-based, normalised difference vegetation index (NDVI) to monitor drought conditions. KLIP targets some of the most vulnerable pastoralists in Kenya's ASAL regions (Pelvin & Jones, 2023). These areas face significant challenges during the two annual dry seasons, where droughts lead to poor forage quality and an increased risk of livestock mortality. The satellite data derived from NDVI monitors forage conditions and when forage scarcity falls below a predetermined threshold for a specific insured area (unit area insured, UAI), registered pastoralists receive claim payments (Fava et al., 2021; Pelvin & Jones, 2023).

The use of NDVI in agricultural insurance

The NDVI is a remote sensing tool used to assess vegetation health by measuring differences between near-infrared and visible red light reflected by plants. Higher NDVI values indicate healthier vegetation. It uses data from satellites with a coarse spatial resolution, which are beneficial for capturing long-term data, ensuring frequent cloud-free observations and establishing a proven correlation between NDVI values and rangeland biomass in arid areas.

In the context of livestock insurance, NDVI data are used to generate a seasonal index reflecting the relative availability of forage across designated insurance unit areas (UAs). These areas are strategically defined, incorporating inputs from local pastoral communities, agro-ecological data and administrative boundaries.

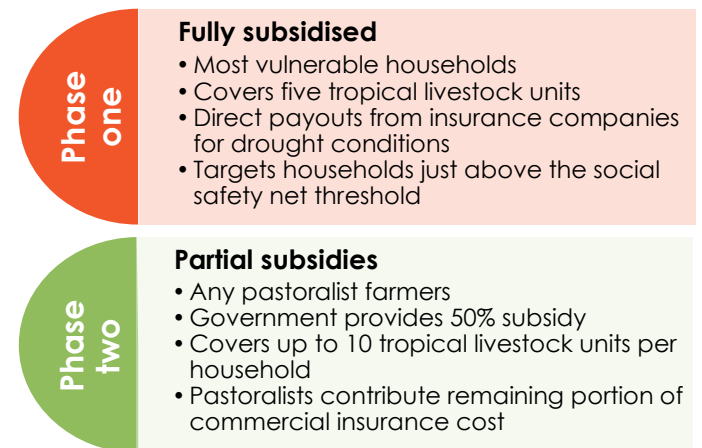
Insurance payouts are triggered when NDVI-based indices fall below set thresholds, signalling early drought conditions that could potentially lead to significant livestock losses and consequent food insecurity. This application of NDVI ensures that pastoralists can receive timely assistance, mitigating the impacts of environmental stress on their livelihoods.

Programme funding and implementation

KLIP operates through a coordinated network of public and private stakeholders. The Ministry of Agriculture, Livestock and Fisheries leads the programme, while APA insurance leads a consortium of seven Kenyan insurers, including UAP, CIC, Jubilee, Heritage, Amaco and Kenya Orient, while Swiss Re provides reinsurance backing (Mude, 2017). The Kenyan government pays annual premiums to domestic insurance companies to provide drought-related financial protection for vulnerable households. Since 2019, KLIP has insured 18,012 pastoralist households, covering 90,060 tropical livestock units annually (Lung et al., 2021).

The primary farming household KLIP targets is group 1, supported by full premium subsidies (see cover note) (Pelvin & Jones, 2023). The secondary target falls in groups 2 and 3, that is, more commercially oriented pastoralists that could qualify for 50% coverage or arrange additional coverage directly with insurers (see Figure 6).

Figure 6: Subsidy structure, KLIP



Distribution channels

KLIP uses multiple payment methods, depending on geographical factors and financial services access. These include:

- Cheque payments
- Bank transfers
- Mobile money systems
- Physical bank account

The most widely used disbursement is mobile money, specifically the Mpesa payment system (Plevin & Jones, 2023).

Impact on resilience

At the micro level, KLIP has improved pastoralist livelihoods by mitigating income loss during droughts and reducing adverse coping strategies. Beneficiaries use payouts for essential needs like food, fodder, water and veterinary services, contributing to community resilience and food security (Fava et al., 2021; Lung et al., 2021).

At the macrolevel, by transferring risk to the private sector, KLIP has reduced the government's financial burden to finance drought response and since its inception in 2015 to 2021, triggered \$10m in payouts by the private sector (Fava et al., 2021).

Additionally, KLIP's expansion has strengthened Kenya's insurance sector in three key ways:

- It generated significant premium volume, creating a robust market base.
- It enhanced the sector's technical and operational capabilities in delivering

agricultural insurance products. For instance, several companies now offer index-based weather and agriculture insurance to smallholder farmers in Kenya (IRA, 2022). Recently, Britam Holdings PLC, in collaboration with Oxfam in Kenya and Swiss Re, launched an index-based flood insurance solution in Kenya. This product aims to protect small-scale farmers along the Tana River in Tana River County from catastrophic flood impacts (Britam, 2023; Kizito, 2024).

- It fostered business growth by expanding agent networks into pastoral regions and creating new partnerships with telecom companies for digital financial services (Fava et al., 2021).

Payout patterns

Seasonal KLIP payouts occur with a probability of 20%, meaning that a household has roughly a 40% chance of receiving a payout in any given year (equivalent to once every 2.5 years) (Plevin & Jones, 2023). Between 2015 and 2019, KLIP demonstrated the following key payout patterns:

- The probability of receiving a payout was approximately 40% per season, meaning households had roughly a one in 2.5 chance of receiving a claim annually.
- 96% of beneficiaries received at least one payout during the seven seasons from 2015-2019.
- The average cumulative payout per beneficiary was KES11,600 (approximately \$104) over this period (Plevin & Jones, 2023).

While payout frequency remained relatively consistent across regions, impact evaluations of KLIP show notable variations in both timing and amount between different counties (Calcutt et al., 2022, 2022; Fava et al., 2021). Despite the product being designed to disburse payouts immediately after the rainy season, delays of more than three months after results were declared have been reported. The main challenge appears to be administrative delays in beneficiary payouts, rather than index calculation problems. As mentioned previously, (see **Risk transfer and sharing through insurance and reinsurance**), timely payouts can significantly enhance the welfare benefits of insurance and strengthen a household's climate resilience. Conversely, delays in payment increases the likelihood of vulnerable households adopting harmful coping mechanisms such as selling assets

and taking children out of school, which increases the financial and human costs of disasters (Hill et al., 2019).

Scaling KLIP: The de-risking, inclusion and value enhancement (DRIVE)

The World Bank's DRIVE programme scaled KLIP to three other Horn of Africa countries: Djibouti, Ethiopia and Somalia (World Bank, 2022). This pools the agricultural risks across the region, creating a market platform that enables participating countries to achieve economies of scale and reduce operational costs. It also enables national insurers to access reinsurance capacity at a lower price point, enhancing the overall financial sustainability of the insurance solution (World Bank, 2022).

DRIVE has two main components:

- A bundled package of financial services, including savings for resilience, drought index insurance, digital accounts and financial education. The insurance component uses satellite data to monitor pasture growth, triggering payouts when moisture levels fall below a certain threshold.
- Integration of beneficiaries into commercial activities and livestock value chains through infrastructure upgrades, off-taker agreements and private investment mobilisation (World Bank, 2022).

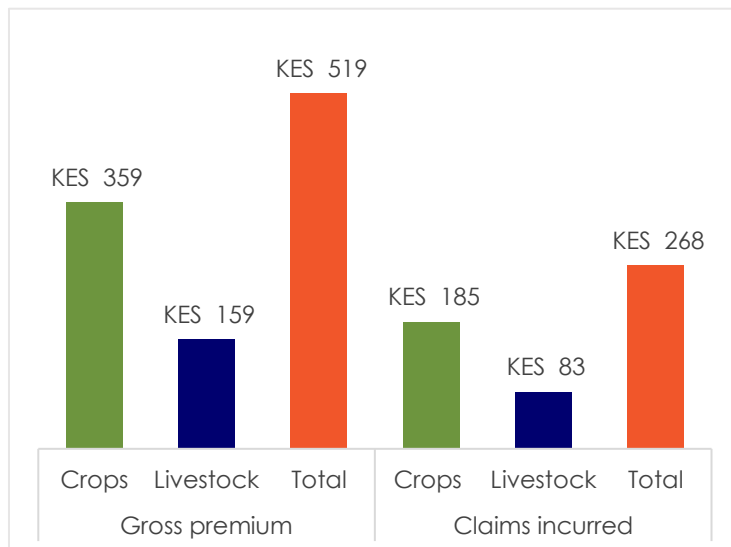
DRIVE's premium structure is different to KLIP, as the government subsidises 80% with 20% contribution from pastoralists (Mutua, 2024). As such, it targets subsistence and smallholder farmers that are either already integrated into formal value chains or show potential for more market-oriented agriculture.

As of March 2024, the programme has sold a total of 291,002 insurance policies of which 57% of policy holders are women. In Kenya, 103,480 have been sold, representing 662,272 pastoralists and their dependents (Robakowski & Roberts, 2024). With total funding of \$327.5m from the World Bank, DRIVE transforms KLIP's scope from a purely insurance-focused programme to a comprehensive pastoral development initiative that addresses drought resilience, market access and value chain enhancement.

Kenya agricultural insurance programme (KAIP)

The Kenya agricultural insurance programme is the country's subsidised crop insurance scheme. It is an area yield index insurance product, which covers crop losses when average yields in defined spatial units fall 20% or more below their 10-year averages (Biese et al., 2021). Contrary to KLIP, this scheme targets farmers from group 2 (non-poor, subsistence-oriented farms) and group 3 (commercially oriented small farms) rather than vulnerable pastoralists (Kramer et al., 2022).

Figure 7: Crop and livestock insurance gross premiums and claims incurred in KES millions



Source: AKI (2022)

The programme operates as a PPP, with the government providing a premium subsidy of up to 50%, while the programme is implemented through a consortium of seven insurance companies led by APA Insurance. By 2020, it also had five reinsurers and worked with aggregators such as the One Acre Fund (which combines the crop insurance with asset-based loans for other tools and instruments aimed at agricultural productivity and resilience, as well as with the Kenya Seed Company and Apollo Agriculture as distribution channels (Biese et al., 2021).

KAIP covers risks such as drought, excessive rainfall, flooding, pests, diseases, hailstorms and wind for crops like maize, sorghum, green grams and beans (APA insurance, 2022).

KAIP has grown at around 50% year on year since 2018. In 2020, significantly, approximately 750,000 farmers were insured under KAIP, which is about 20% of the estimated 3.5-million small-scale crop farmers in Kenya.

Financial performance of crop and livestock insurance

Between 2016 and 2020, the combined ratio of KLIP was at 115%, which means that the programme has paid out more than what was collected (Fava et al., 2021). KAIP showed significant variance in combined ratios during the same period (2016, 2018 and 2020 were good years, while 2017 and 2019 had higher claims ratios due to adverse weather events), averaging between 57% and 76% (Biese et al., 2021).

This is corroborated by the results collected by the Association of Kenyan Insurers (AKI) that show that between 2021 and 2022, gross premiums for crop insurance are nearly double the amount of livestock insurance, with the exception of ICEA Lion (Association for Kenya Insurers, 2022). However, these results may mask important nuances about the relative viability of these products. Stakeholder engagements revealed that the challenge behind livestock insurance is that policies cover only a limited number of farmers, which undermines developing economies of scale and risk diversification.

Furthermore, given that livestock insurance policyholders are typically pastoralists, monitoring and verification of livestock losses becomes complicated and increases the risk of moral hazard. ACRE has developed picture-based technologies that employ AI to identify unique features of a farmer's livestock, such as a cow's muzzle to address this issue (see also box on page 20) (Kramer et al., 2022).

Yet, other engagements with the industry

suggested the opposite is true: from a technical perspective, insuring livestock assets and monitoring drought conditions through satellite imagery is more straightforward than assessing crop losses, particularly given the complexity of smallholder farming systems with intercropped plots. This technical advantage is reflected in implementation success – index-based livestock insurance schemes have achieved greater scale across developing countries, with successful examples in Mongolia, Kenya (IBLI/KLIP) and Ethiopia (Schäfer & Waters, 2016).

In contrast, crop insurance programmes have achieved significant scale only in countries like India and China, where they are heavily subsidised and bundled with agricultural loans or

inputs, as seen in India's automatic insurance offerings with agricultural loans, as well as with Zambia's integration with fertilizer subsidies (Gulati et al., 2018).

Research also shows limited awareness and uptake of crop insurance through KAIP, with most insured farmers accessing coverage through specific projects like ACRE Africa rather than private insurance channels (Kramer, 2023). The lower crop insurance claims may therefore reflect implementation challenges such as lack of awareness among policyholders rather than lower risk or better product viability.

The section below on distribution channels looks at different approaches that have been used to scale agriculture insurance.

Microinsurance distribution channels

Bundled insurance programmes

Several approaches have been used to scale climate risk insurance, specifically for Kenyan farmers. The most significant development has been bundled insurance approaches, which integrate insurance products with complementary services or products. While these bundles are often intended to mitigate climate risks, they do not always directly address risk management. For instance, Kilimo Salama and replanting guarantees (described below) have provided hybrid maize seed, which may not necessarily be drought-tolerant or include seeds of more resilient crops. Such cases highlight the importance of aligning bundled services with broader climate adaptation objectives to maximise their effectiveness (InsuResilience Global Partnership & Munich Climate Insurance Initiative, 2021; Kramer, 2023; Schäfer & Waters, 2016). The sections below discuss some examples.

The Kilimo Salama programme and replanting guarantees

ACRE Africa pioneered bundled insurance in 2009 with its Kilimo Salama programme, which evolved into various products including the Replanting Guarantee Cover (RPG). The initial Kilimo Salama programme combined insurance with certified maize seeds, allowing farmers to activate

coverage at planting time using scratch cards included in seed packages. The programme provided mobile money payouts for adverse weather events like drought or excessive rainfall (Kramer et al., 2019).

Implementation and impact

Starting as a pilot in 2009, ACRE Africa's programmes reached 1.2-million clients by 2016 across Kenya, Tanzania and Rwanda. Evidence reflects significant benefits (Adegoke, et al., 2017):

- Insured farmers invested 19% more and earned 16% more than uninsured farmers.
- Increased spending on complementary inputs like fertilizers and hired labour.
- Expanded cultivated land area.
- Increased farmers' willingness to pay for future insurance by 7% to 8%.

Product evolution

The RPG built upon Kilimo Salama's foundation, offering crop insurance through seed bags. Farmers register via SMS to initiate coverage. If drought causes germination failure, they receive a payout or replacement seed for immediate replanting. Payouts are based on comparing actual rainfall to a pre-set "trigger" level using historical data (Adegoke, et al., 2017).

Weather index insurance, such as the RPG, is exposed to basis risk, as it does not cover losses from pests or diseases. To address this, ACRE Africa introduced a hybrid index and multi-peril crop insurance cover, combining weather index triggers with field assessments for comprehensive coverage (Adegoke, et al., 2017). While this offers more complete protection, the inclusion of field visits increases the costs. Long-term solutions may involve technological innovations such as picture-based insurance, to address basis risk cost-effectively.

To distribute the product, ACRE Africa partnered with Safaricom in Kenya, which facilitated farmer registration and farm location through its M-PESA mobile payment system, ensuring smooth premium collections and payouts. The main insurance partner in Kenya was UAP, alongside several other financial and global reinsurance companies such as Swiss Re and Africa Re.

Despite initial success, several challenges have undermined the scaling of these programmes:

- Lack of farmer awareness (see **above** discussion on crop insurance).
- Transparency issues regarding the link between rainfall and payouts.
- Declining participation of seed companies due to subsidy removal and cost-competitiveness concerns.

Despite these challenges, bundling insurance with agricultural services and products such as credit, seeds, modern input or a better market outlet enhances the value-adding proposition of insurance (Kramer et al., 2019). For instance, Bulte et al. (2020) demonstrated that subsidised crop insurance, conditional on purchasing certified seeds:

- Increased spending on complementary inputs (fertilisers and hired labour).
- Expanded cultivated land area.
- Increased farmers' willingness to pay for future insurance by 7% to 8%.

These findings suggest that short-term subsidies could foster longer-term demand for agricultural insurance. However, the willingness to pay remained below the threshold necessary for market sustainability without subsidies, indicating the need for continued support during the transition to a self-sustaining market (Bulte et al., 2020).

Risk contingent credit

Another innovative approach that has been piloted in Kenya is risk contingent credit (RCC). In 2017, IFPRI and a consortium of partners, including universities and insurance companies, piloted the "promoting resilience and food security through risk contingent credit" programme in Machakos County, eastern Kenya (You & Shee, 2022). Agricultural risks caused by rain failures significantly affect crop yields and discourage investment in production inputs. While new technologies can boost productivity amid climate change, many farmers cannot afford them due to lack of credit access. RCC aims to address this by embedding insurance within a credit structure, mitigating financial risks associated with droughts and heat stress. This mechanism not only provides crop insurance but also reduces collateral requirements for loans, making credit more accessible to farmers. The programme has since

expanded to Embu County in Kenya and five woredas in Ethiopia.

Contract farming and pay-at-harvest insurance

Embedding insurance in the agriculture value chain through contract farming has demonstrated potential in strengthening farmers' financial security and insurance uptake.

Contract farming involves agreements where buyers specify quality standards and prices while farmers commit to delivering agreed quantities at a future date. Often, companies enhance this partnership by providing additional support such as agricultural inputs, land preparation and production advice.

Building on this model, pay-at-harvest insurance has emerged as a promising innovation agricultural risk management. Unlike traditional insurance, which requires upfront premium payments, pay-at-harvest insurance allows farmers to defer payment until harvest time. The premiums are then deducted directly from the farmers' crop revenues, making insurance more accessible and reducing financial strain during the growing season. This integration of insurance into contract farming strengthens risk management and ensures farmers' financial security.

A randomised controlled trial found that bundling insurance with contract farming increased insurance demand (Casaburi & Willis, 2016). This approach leverages existing relationships between farmers and crop buyers. Furthermore, Casaburi and Wallis (2016) found that the pay-at-harvest model significantly increased take-up rates: 5% of farmers chose standard pay-upfront insurance and 72% opted for the pay-at-harvest option. This difference was particularly pronounced among poorer farmers, suggesting potential benefits for vulnerable populations.

The success of this model can be attributed to several factors. First, it addresses liquidity constraints that often prevent farmers from purchasing insurance at the beginning of the growing season. Second, it mitigates issues related to "present bias", where farmers might undervalue future benefits against immediate costs. Finally, it reduces counterparty risk concerns, as farmers

don't have to pay premiums until they receive crop revenues.

Meso-insurance and cooperatives

In Kenya, cooperatives play a crucial role as a distribution channel for insurers, particularly in reaching underserved and low-income populations. Kenya boasts the highest cooperative movement in Africa in terms of deposit, assets and membership (Ndirangu, 2024). In 2019, there were 22,883 registered cooperative societies, with 6,774 in agriculture and 16,109 in non-agricultural sectors, including 13,088 savings and credit cooperatives (SACCOs) (Otieno, 2019).

Cooperatives in Kenya have strong infrastructure to support insurance distribution, including a robust capital base, effective governance structures and up-to-date ICT systems (Kuloba et al., 2020; Otieno, 2019). The cooperative business model possesses several key attributes that make it effective in driving economic and social development, such as the capacity to develop economies of scale, which reduces production costs and strengthens efficiency.

Insurance companies are leveraging cooperatives, specifically SACCOs, to reach a larger customer base through an aggregator model. The Cooperative Insurance Company (CIC), one of the largest insurance companies in Kenya, is a major cooperative insurer that works with SACCOs to distribute their insurance products, including agriculture (mainly livestock) insurance. In 2024, CIC launched the Co-op Care Micro Health product, tailored to SACCOs with a minimum of 10 principal members. The product is designed to be affordable and reliable, targeting households that earn between KES15,000 (\$117) and KES349 (\$2.7) per month (ICMIF Foundation, 2024).

SACCOs distribute insurance through various models, including:

- Partner-agent model, collaborating with insurers to provide tailored microinsurance for members.
- Bundling insurance with loans, savings, or microcredit to expand agricultural insurance (Mombo Sacco, 2023).
- Digital platforms offering mobile-based insurance management (eg, Solution SACCO

with Jubilee Health Insurance and M-TIBA) (Solution SACCO, 2022).

Beyond Kenya, other African countries have implemented notable meso-level climate insurance programmes. For instance, the R4 Rural Resilience Initiative, operating in countries such as Ethiopia, Senegal and Zambia, provides weather index insurance to groups of smallholder farmers. This programme works through local organisations and farmer cooperatives, effectively serving as intermediaries between global reinsurers and individual farmers.

In India, the Weather-Based Crop Insurance Scheme (WBCIS) operates on a meso-level by insuring groups of farmers within defined geographical areas. This approach allows for more efficient risk pooling and reduces the administrative burden of individual policies, making insurance more accessible to smallholder farmers.

By bridging the gap between large insurers and individual farmers or pastoralists, these approaches address many of the challenges that have historically limited insurance penetration in developing countries. As climate risks continue to intensify, such innovative distribution models will likely play an increasingly crucial role in building resilience among vulnerable communities.

Regional risk-pooling schemes

One of the major barriers to agricultural insurance in sub-Saharan Africa is the limited pool of potential policyholders, driven by low insurance penetration. This is further compounded by income poverty, the inherent risks in agricultural insurance and the challenge of sustaining donor-funded premiums in development partner programmes. These constraints limit the scale of agricultural insurance schemes, reducing their attractiveness to insurers due to inadequate risk diversification and high administrative costs, which make microinsurance products unsustainable.

Regional risk pools could be a solution to this, specifically in agriculture. By allowing multiple countries to collectively manage and transfer climate-related risks, these schemes create economies of scale and improve risk diversification.

The African Risk Capacity (ARC), an African Union agency, is a prime example of such a pool. It helps governments improve their capacity to plan, prepare and respond to extreme weather events and natural disasters (ARC, 2024a). During 2014-16, Kenya engaged in ARC's drought insurance, aiming for coverage up to \$30m annually. However, due to broad coverage parameters that didn't align well with localised drought impacts, expected payouts were not triggered, which received much criticism. Subsequently, Kenya moved away from broad risk transfer instruments towards more direct, post-disaster actions. Recently, Kenya has reconsidered risk-transfer mechanisms, focusing on tailored products that cater to local needs (Calcutt et al., 2022; UNDP, 2020).

Following the controversial payouts in the 2015-2016 season, the ARC has since taken steps to address the model limitations that contributed to the problem. Reviews of the model parameters and a shift from national to subnational risk aggregation resulted in a 2022 payout of \$14.2m triggered for drought, aiding 6.4-million people, with high accuracy in anticipating crop failure in critical regions. The payout process was notably efficient, achieving 97% of cash assistance targets and a low cost-to-transfer ratio, indicating significant progress in ARC's approach (ARC, 2022, 2024a; Sivel, 2023).

The World Food Programme (WFP) also provides sovereign insurance products through its ARC replica programme, which mirrors the policies bought by African governments through ARC. Sovereign insurance products are financial instruments designed to protect governments against specific risks, in this case, climate-related disasters. These products allow countries to transfer some of their financial risks to the insurance market, providing a safety net for national budgets in times of crisis. ARC Replica therefore doubles the insurance coverage available for climate-related disasters in participating countries (WFP, 2021).

Regional Emergency Preparedness & Access to Inclusive Recovery (REPAIR), a World Bank scheme in the early stages of development, aims to strengthen the financial and operational preparedness of participating countries in Eastern and Southern Africa to respond quickly to climate and other shocks (World Bank, 2024). It entails

establishing a regional climate risk fund with pre-arranged financial instruments (World Bank, 2024).

These regional risk pools offer several advantages for Kenya including:

- Increased capacity to handle large-scale, systemic risks.
- Economies of scale, potentially reducing insurance costs.
- Enhanced risk diversification across different geographic areas and agricultural systems.

While regional risk-pooling schemes offer promising solutions for Kenya's insurance sector, more targeted initiatives are also being implemented to address specific vulnerabilities.

As Kenya faces increasing climate-related risks, the combination of regional risk pools and programmes that integrate climate risk reduction measures represents a promising pathway towards more robust and inclusive climate and disaster risk management. These approaches, when effectively implemented and coordinated with other national efforts, can significantly contribute to Kenya's long-term resilience and economic stability in the face of climate change.

Barriers to growth

While Kenya's insurance industry is undertaking significant efforts to increase the uptake of insurance among vulnerable populations and areas, several barriers persist. This section focuses on key infrastructure and market limitations.

Infrastructure barriers

The infrastructure required for **collecting and transmitting localised weather data**, crucial for climate insurance, is inadequate in many parts of Kenya. The scarcity of weather stations and other data collection points in remote areas leads to reliance on satellite data which, while useful, may not always accurately reflect ground-level conditions.

There is also a lack of data on historical loss and damages that would be useful to design climate insurance (Kramer, 2023; Schäfer & Waters, 2016). High-quality index insurance products require access to reliable historical data on both the proposed index and agricultural losses, to minimise basis risk. The absence of such data makes it difficult for insurers to determine expected payouts, which is one of the key reasons why agricultural insurance often faces basis risk, even when high-resolution satellite imagery is used to limit spatial basis risk.

Inconsistent and unreliable internet connectivity: Although Kenya has seen a substantial increase in internet penetration over the years, the quality and speed of connections vary greatly. In remote regions, where many agricultural and pastoral communities reside, internet access can be sporadic or entirely absent. This hampers the real-time data collection and processing necessary for index-based insurance products, which rely on timely and accurate information to trigger payouts (Allen et al., 2022).

The digital divide between urban and rural areas extends beyond mere connectivity issues.

Many potential insurance beneficiaries in remote locations lack access to smartphones or other digital devices capable of running sophisticated insurance applications. To bridge this gap, insurers often work through local intermediaries, such as champion farmers, who help facilitate access and understanding of insurance products in their communities. Despite these local solutions,

technological limitations still restrict many beneficiaries' ability to engage with digital insurance platforms, submit claims or receive timely information about their policies. These challenges extend to the back-end systems of insurance providers.

For instance, many insurers in Kenya are still in the process of **digitising their operations** and may lack the sophisticated IT infrastructure required to process and analyse large volumes of data efficiently. This limitation can lead to delays in claim processing and payout disbursements, undermining the effectiveness of insurance as a risk management tool.

Market barriers

Insurance penetration remains low, at 2.4% as of 2023. Despite the significant innovations in climate risk insurance, specifically in the agricultural sector, there is low demand for new insurance products among farmers and other value chain actors. A contributing factor to low demand and uptake of insurance schemes, particularly in the case of crop insurance schemes, is infrastructural obstacles in reaching pastoralist households. Additionally, establishing understanding and trust in insurance among pastoral farmers are often challenging (Schäfer & Waters, 2016). While public awareness campaigns are ongoing, they are expensive and require committed public resources to build salience in the product and a critical mass of understanding.

Basis risk represents a significant challenge for index-based crop insurance, which occurs when insurance payouts do not align with farmers' actual losses. This misalignment happens because index insurance relies on external measurements such as weather conditions and area yield rather than individual farm assessments. Studies indicate that the chance of farmers suffering losses without receiving compensation typically ranges from 16% to 36%, a substantial concern for risk management (Lichtenberg & Martínez, 2022). Two fundamental sources contribute to basis risk: zonal risk, stemming from intrinsic heterogeneity within an insurance zone; and design risk, arising from the index's lack of predictive accuracy. Microclimates and uneven topography can significantly affect yields in ways that aren't accurately captured in product design (Ntukamazina et al., 2017). While several measures

have been developed to reduce basis risk, such as increasing the density of weather stations and developing hybrid products that combine satellite-rainfall estimates with vegetation indices, it remains a major barrier to scaling agriculture insurance to vulnerable farming populations.

Market uncertainty and risk exposure

Market uncertainty poses a significant barrier to effective climate and disaster risk management through insurance in Kenya. This uncertainty stems from the growing incidence of systemic catastrophic risks, which are often too costly to insure through micro or meso insurance schemes. Here, the narrow and microlevel scope of many climate risk insurance schemes covering only a small number of policyholders raises concerns about scale and risk diversification, making these schemes less attractive to insurers. It also increases their risk exposure and transaction costs, due to the difficulty in monitoring and verifying losses in pastoralist and smallholder farming communities, which further compounds this issue, increasing the risk of moral hazard.

The increasing frequency and intensity of extreme weather events due to climate change

, including locust outbreaks and widespread droughts, challenge traditional risk assessment models and threaten the financial stability of insurers. Traditional catastrophe models, which rely on historical loss data, are becoming less reliable for assessing secondary perils due to the changing frequency and intensity of these events. This presents a significant challenge for insurers, who need to develop innovative tools and approaches to accurately assess climate change risks.

Another challenge for insurance markets, also outlined in the Malawi section, is that the growing incidence of systemic catastrophic risks are too costly to insure through micro or meso insurance.

Individual farmers typically cannot afford micro insurance against events like locust outbreaks or widespread droughts that lead to national food insecurity. Such large-scale scenarios, impacting millions of farmers simultaneously, are better suited for macro insurance schemes, such as the ARC and the Alliance to Feed the Earth and Disasters (ALLFED) initiative, which insures response operations for locust outbreaks (Kramer, 2023).

Another issue is the limited coverage for non-drought risks. Existing climate and disaster financing instruments predominantly focus on drought, which accounts for more than 92% of disaster financing in Kenya (Taylor & Mwangi, 2023). There is therefore an alarming gap in funding instruments that cover floods. Where they do exist, such as the new Index-Based Flood Insurance product described earlier, they mainly cover river basin flooding, overlooking events such as urban flooding. This can cause severe damage on urban public infrastructure systems, such as roads and buildings. Some climate models predict increased rainfall and flood risk in Kenya, yet national climate policies do not sufficiently capture this (Detelinova et al., 2023) The 2024 floods destroyed 68 roads and affected 151 schools, 1,373 businesses, 45 health facilities and 2,458 water sources (Kenya Red Cross, 2024).

Insurance sector's participation in adaptation

This report has so far explored the use of insurance as a DRM tool that helps transfer climate risk exposures from individuals, businesses and the public sector to the insurance and reinsurance industry. This section discusses what the insurance sector's broader role can be in managing the consequences of climate change.

The insurance and reinsurance industry have a unique position as both risk managers and institutional investors. Beyond their core function of providing insurance coverage, these firms contribute to adaptation efforts and could further increase their role in several key ways (CISL, 2016).

Investing in adaptation and resilience

First, as institutional investors, insurers can consider resilience within their investment portfolios while adhering to regulatory requirements and risk management frameworks. This entails investment guidelines on exposure to high-risk assets provided be the IRA that often direct investments towards government securities, fixed deposits and other stable instruments. Within these regulatory frameworks, insurers can still promote climate resilience by investing in approved green bonds, infrastructure projects with strong climate adaptation components and other regulated investment vehicles that align with both prudential requirements and climate objectives (Bice et al., n.d.; Camargo, 2019; CISL, 2016). This approach allows insurers to support climate resilience while maintaining their role as long-term investors focused on protecting policyholder interests. For instance, insurers can participate in government-backed green infrastructure projects or purchase climate-aligned sovereign bonds that meet regulatory requirements for capital adequacy and risk management.

As further discussed below, new financial vehicles or products may also need to be developed or facilitated to incentivise insurers to play a bigger role in funding adaptation and resilience and to enable investment in a manner consistent with their risk mandates and appetite.

Promoting resilience and adaptation indirectly across broader financial markets

Second, insurers can promote resilience indirectly across the broader financial markets. As major institutional investors, insurers have significant influence over the companies and projects in which they invest. By engaging with investee companies on climate risk management and resilience strategies, insurers can encourage the adoption of best practices and drive market-wide improvements in climate resilience (Camargo, 2019; CISL, 2016; Fantini et al., 2023).

As described in the previous section, insurance products can also be bundled with other measures that reduce climate vulnerabilities or create incentives for instituting adaptation measures. This can have a knock-on effect of improving climate risk management in other sectors.

Promoting societal awareness for the need to adapt to climate risks

Finally, insurers can support societal resilience to climate risks more broadly. As risk management experts, insurers have a deep understanding of the potential impacts of climate change on communities and economies. They can leverage this expertise to raise awareness about the importance of adaptation and resilience-building measures and to support the development of effective public policies and initiatives. For instance, insurers can work with governments and other stakeholders to develop risk-sharing mechanisms, such as public-private partnerships, that can help finance adaptation efforts and protect vulnerable communities (Insight Investment, 2023; Massingham & Malia, 2021; Wagener, 2024). Fostering societal resilience offers long-term benefits for insurers by maintaining insurability of assets, expanding insurance penetration and addressing the climate risk protection gap, even if immediate financial incentives aren't always apparent (CISL, 2016).

Here, regulatory conditions are also important, particularly those covering PPPs as well as countries' adaptation plans and climate policies. These regulations create a conducive environment for private investment in climate

resilience by providing clear mandates, incentives and opportunities for engagement.

Kenya's climate adaptation regulatory and investment landscape

Kenya has established a comprehensive framework that enables and encourages private sector participation in climate change adaptation efforts:

- The National Adaptation Plan (NAP) 2015-2030 recognises the importance of private investment and promotes "climate-proofing" of investments (Government of Kenya, 2016b).
- The Climate Change Act of 2016 allows for imposing climate change obligations on private entities, while providing incentives for their contributions to low-carbon development (Government of Kenya, 2016a).
- The National Policy on Climate Finance (2016) encourages private sector involvement by creating business opportunities and facilitating investments in low-carbon technologies (Government of Kenya, 2016c).
- The Disaster Risk Management Bill of 2023 promotes PPPs for disaster risk management and advocates integrating disaster risk approaches into business models (Government of Kenya, 2023).
- Kenya's updated Nationally Determined Contributions (NDCs) in 2021 prioritise private sector adaptation, encouraging the mobilisation of financial resources from capital markets and other financial instruments to support green investments (Government of Kenya, 2021a).
- Kenya's Green Bonds Programme promotes financial sector innovation by developing a domestic green bond market and is brought together by the Kenya Bankers Association (KBA), Nairobi Securities Exchange (NSE), Climate Bonds Initiative, Financial Sector Deepening (FSD) Africa and FMO-Dutch Development Bank (Green Bonds Kenya, n.d).

Integrating climate resilience in investment portfolios

The insurance sector in Kenya and across Africa is increasingly recognising the importance of climate resilience for their financial and operational sustainability. While domestic private sector investment in adaptation is low, representing only 14% of climate finance investments, there are signs that insurers are considering resilience within their own investment activities. For example, Britam has already started integrating ESG criteria into its investment decisions.

The Nairobi Declaration on Sustainable Insurance (NDSI), a commitment by African insurance leaders to support the UN Sustainable Development Goals (SDGs), includes several climate-related action points. These include assessing, managing and disclosing climate change-related risks and opportunities in investment portfolios and advancing disclosures on environmental, sustainable and governance (ESG) metrics. More than 20 Kenyan insurance companies, including major players like Sanlam Kenya Plc and Minet Kenya, are signatories to the NDSI. While voluntary and lacking specific targets, the NDSI represents a step towards aligning the insurance industry with climate resilience goals. Its effectiveness could be enhanced through more specific targets, stronger accountability mechanisms and broader industry adoption.

Outside of Kenya, another example of insurers prioritising resilience investment in their portfolios is Sanlam Investments' partnership with Climate Fund Managers, with target investments in renewable energy infrastructure, water and sanitation projects. The company has developed Climate Investor Two, a financing facility mandated to invest in water, sanitation and ocean infrastructure projects (Sanlam, 2021).

De-risking adaptation investments

The Africa Climate Risk Insurance Facility for Adaptation (Acrida), unveiled at the Africa Climate Summit in September 2023, aims to de-risk investments in climate change adaptation through insurance (AfDB, 2023). Acrida leverages the insurance sector's capabilities to de-risk investment across climate-sensitive agri-food value chains. It aims to raise an initial \$1bn to

mobilise concessionary high-risk capital and grants, catalysing the development and uptake of targeted climate insurance solutions.

This facility provides direct insurance coverage and stimulates investment in climate-resilient infrastructure and businesses across Africa, including Kenya.

Strengthening societal resilience

Insurers play a vital role in enhancing societal resilience to climate risks, extending far beyond their traditional function of providing financial protection through risk transfer. As experts in risk management, they possess valuable insights into the potential impacts of climate change on communities, economies and infrastructure. This expertise positions insurers as critical partners in building resilience, offering a range of services that support adaptation and risk reduction efforts.

One significant contribution insurers can make is by providing data and analytics for resilience planning. Their underwriting and claims records contain detailed information about historical losses and risk patterns, which can inform vulnerability assessments and predictive modelling. By sharing this data with governments, urban planners and other stakeholders, insurers enable the design of more robust policies and infrastructure to withstand climate risks.

A notable example comes from South Africa, where Santam's Partnership for Risk Resilience (P4RR) programme provides fire and flood risk management training to municipal staff and community volunteers, while also installing early warning systems such as smoke detectors in fire hotspots (Santam, 2023). The insurer has developed sophisticated data mapping capabilities in municipalities and helps identify fire hotspots, enabling more targeted interventions (Surminski et al., 2022).

The programme's success lies in its collaborative approach to risk management. Rather than working in isolation, Santam engages with multiple stakeholders, including government bodies, state-owned entities, research institutions and community organisations to co-create resilience initiatives

Participation in climate adaptation through PPPs

Kenya's climate policies actively encourage private sector participation in climate adaptation through PPPs. The NAP, Climate Change Act, National Policy on Climate Finance and updated NDCs collectively create a conducive environment for PPPs by providing clear mandates, incentives and opportunities for private sector engagement in climate adaptation initiatives.

The Public Private Partnerships Act of 2021, which replaced the 2013 Act, aims to streamline and expedite the PPP process, addressing previous inefficiencies and bottlenecks that undermined project implementation (Government of Kenya, 2021b).

It also establishes the PPP Directorate as the central coordinating body for PPP projects in Kenya. This centralisation is intended to provide clearer guidance and more efficient processes for private sector engagement (Tharani & Baru, 2022). The act empowers the directorate to issue binding guidelines on various aspects of the PPP process, allowing for greater flexibility and responsiveness to market realities than the previous system of regulations.

The legislation also introduces a separate, less onerous process for PPP procurement by county governments, recognising the potential for local-level climate projects and facilitating private sector involvement at the sub-national level. Safeguards remain in place to ensure proper oversight, including mandatory approval from the PPP Committee for all projects and additional scrutiny for those requiring government support measures or exceeding a county's fiscal capacity (Tharani & Baru, 2022).

Furthermore, the regulatory framework now explicitly recognises the need for environmental and social impact assessments in PPP projects (Government of Kenya, 2021b). This requirement aligns with Kenya's climate commitments and ensures that private sector participation contributes to, rather than detracts from, the country's climate goals.

Barriers undermining participation in adaptation investment

While Kenya is a continental leader in terms of its regulatory provisions, significant challenges undermine the insurance industry's participation in adaptation.

Lack of climate-related project appraisal in PPPs

A recent IMF (2024) report on Kenya's Public Investment Management (PIM) highlighted the absence of standardised methodologies for assessing climate impacts. While the project feasibility study template includes an environmental and social assessment module, neither the PIM Regulations nor the economic appraisal manual specifically require a climate change analysis. Some sectors, such as roads and transport, are developing their own methodologies to integrate adaptation and mitigation measures, but these are used only when requested by development partners and are not part of a centralised appraisal process (IMF, 2024).

The report emphasises that project concept notes and feasibility study templates, used for initial appraisal and pre-screening, do not include climate-sensitive elements. Updating these templates to assess potential impacts of projects on greenhouse gas emissions and exposure to climate-related disasters would ensure that climate change impacts are identified and projects are designed to be resilient before further design work is initiated (IMF, 2024).

Absent and inconsistent policy incentives

Absent and inconsistent policy incentives serve as another barrier to insurance sector participation in climate change adaptation and mitigation efforts in Kenya. The government has introduced various incentives to encourage investment in mitigation, such as VAT exemptions for cleaner cooking solutions and renewable energy products. However, these incentives have been subject to frequent changes and reversals, creating an unpredictable policy environment that undermines investor confidence (Mulwa & Gravesen, 2023).

For instance, in 2020, the standard VAT was reintroduced on cleaner cooking solutions that were previously VAT-exempt (Clean Cooking Alliance, 2020). Meanwhile, kerosene, despite

being highly polluting, maintains a reduced VAT rate of 8% compared to the standard 16%. In 2021, VAT exemptions were reinstated on renewable energy products, including solar and wind generation equipment (Benke, 2021). These fluctuations in tax policies have dampened investor confidence in green and renewable sectors, as the unpredictability of policy changes discourages long-term commitments to climate-related investments. Businesses may favour shorter-term, less risky ventures instead.

Capacity constraints to access climate finance

Many private enterprises, including the insurance sector and private businesses in general, struggle to access finance due to high interest rates and limited capacity to develop viable funding proposals (KEPSA, 2022). The high cost of borrowing restricts the ability to finance green growth and climate action, reducing the availability of public finance for blending with private investments.

This challenge is exacerbated by a lack of capacity within both the private and public sectors to write bankable proposals to raise funding (Detelinova et al., 2023; KEPSA, 2022). Adaptation is often embedded in broader development projects, leading to difficulties in distinguishing between adaptation and development activities. For example, a project aimed at improving agricultural yields may include adaptive measures like enhanced irrigation, drought-resistant crops and farmer training, all of which increase resilience to climate changes such as varying rainfall and rising temperatures. However, separating and identifying the additional costs specifically for adaptation, which is often required for international adaptation funding, can be complex (OECD, 2023).

In the context of climate adaptation PPPs, this complicates the development of an adaptation project pipeline, which requires expertise to conduct climate vulnerability assessments, identify appropriate adaptation activities and integrate them into broader development plans. This also undermines the potential of the insurance sector to financially contribute to climate adaptation projects. From a funder's perspective, the lack of project pipelines or clear strategies with tangible

results is arguably the most significant barrier to allocating adaptation funding (IMF, 2024; OECD, 2023).

Another significant challenge for investors in allocating funding to adaptation projects is the lack of clear, practical and investor-relevant impact measurement frameworks for climate resilience. While several frameworks are in place, such as the Adaptation and Resilience Impact Measurement Framework developed by the Adaptation and Resilience Investors Collaborative (ARIC), adaptation projects are inherently local, which means that vulnerability and resilience will look different across contexts, sectors and geographies (Dinshaw & McGinn, 2019).

Furthermore, measuring adaptation and resilience relies on local-level data, which can be patchy, inconsistent or unavailable. This is complicated by the fact that the benefits of adaptation may not be quantifiable. Societal benefits are rarely documented or quantified and this undervalues adaptation investments, as only financial benefits are considered and co-benefits such as reduced vulnerability or improved public health are mostly ignored (OECD, 2023).

Lack of public asset climate resilience

The impact of these challenges is specifically evident in the lack of standards and engagement with Kenyan insurers to "build back better" after disasters. Kenya's public asset management policies currently do not address climate-related vulnerabilities and lack sufficient insurance to "build back better" after disasters. While climate-related risks are integrated into spatial and urban planning, they are not required in building regulations (IMF, 2024). Likewise, the National Disaster Risk Management Bill identifies the increased risk of natural disasters associated with climate change but ignores the impact on public infrastructure.

Implications for adaptation and resilience

The insurance industry has substantial potential to contribute to climate resilience, as evidenced by initiatives like the Nairobi Declaration on Sustainable Insurance and the Africa Climate Risk Insurance Facility for Adaptation. These efforts

demonstrate the sector's capacity to integrate climate considerations into investment portfolios, de-risk adaptation investments and strengthen societal resilience. However, the effectiveness of these initiatives is limited by the broader challenges facing private sector engagement in climate adaptation.

The challenges to increasing insurance sectors' participation in adaptation, outlined above, collectively point to the need for a more coordinated approach between the government and the insurance sector. Insurers possess unique capabilities in risk assessment, pricing and management that could be invaluable in addressing climate adaptation challenges. However, to fully leverage these capabilities, there needs to be greater alignment between public policy, climate risk assessment methodologies and insurance industry practices.

Looking forward, the insurance sector could take a more proactive role in shaping climate adaptation policies and practices in Kenya. This could involve collaborating with the government to develop standardised climate risk assessment methodologies for public investments, contributing expertise to the design of climate-resilient infrastructure standards and working with policymakers to create more stable and predictable incentive structures for climate-related investments.

Furthermore, the sector could lead in developing innovative financial products that bridge the gap between traditional insurance and climate adaptation financing. This might include parametric insurance products linked to specific climate indicators, resilience bonds that finance adaptation projects, or blended finance solutions that combine insurance with other forms of climate finance.

Recommendations

Climate risk insurance in Kenya requires significant institutional collaboration and strategic improvements across multiple sectors to enhance its viability and effectiveness. A comprehensive approach focusing on data infrastructure, risk management and policy alignment is essential for building a robust climate resilience framework

that serves both the agricultural sector and the insurance industry. The following sections outline key recommendations for strengthening Kenya's climate risk insurance system, addressing critical areas such as data collection, basis risk management and market uncertainties.

Strengthen data collection and sharing capabilities

A robust data ecosystem supporting both agriculture and insurance in Kenya requires collaboration between key institutions. This proposal outlines specific actions for the Kenya Meteorological Department (KMD), Ministry of Agriculture and the IRA to strengthen the country's data infrastructure.

Kenya Meteorological Department (KMD)

The KMD could focus on modernising its weather monitoring network through:

- Expanding the network of automated weather stations (AWS), particularly in underserved arid and semi-arid regions. This expansion could involve installing new AWSs in strategic locations to capture microclimatic variations and upgrading existing manual stations to automated systems.
- Implementing satellite-based monitoring to complement ground data. Remote sensing technologies can provide valuable data on vegetation indices, soil moisture levels and precipitation estimates.
- Developing algorithms to merge satellite and ground-based data for more comprehensive and accurate climate information.
- Ensuring rigorous quality control and calibration procedures for all weather stations to ensure data reliability.
- Creating a user-friendly data portal that provides real-time and historical weather data, along with APIs for seamless integration with insurance companies' systems.

Strategic partnerships with county governments would help identify optimal locations for new stations. The KMD can learn from India's successful AWS network expansion and satellite data integration, supporting the country's Pradhan Mantri Fasal Bima Yojana crop insurance scheme.

Ministry of Agriculture

The Ministry of Agriculture could establish a centralised agricultural database and improve data collection methodologies. Key actions include:

- Digitising historical crop yield data across all counties.
- Standardising the recording of livestock mortality rates.
- Implementing pest and disease outbreak tracking.
- Training extension officers in modern data collection techniques.
- Using remote sensing and geographical information services (GIS) for crop estimation.

To ensure data quality and accessibility, the KMD could develop data validation protocols, create a secure cloud-based platform for data storage and sharing, and integrate data visualisation tools for easy interpretation and analysis. This approach is adopted in Australia. The Australian government collaborates with meteorological agencies and insurers to develop robust data-sharing protocols. Programmes like the Australian Drought Insurance Scheme (ADIS) benefit from extensive climate data integration, enhancing resilience against droughts.

Insurance Regulatory Authority

The IRA's role is crucial in promoting data sharing, standardisation and innovation across the insurance sector. The authority could focus on:

Data sharing and standardisation

- Implementing mandatory data-sharing regulations with robust privacy protocols.
- Creating incentive schemes for high-quality data contribution.
- Establishing uniform standards for agricultural and weather data collection.
- Developing guidelines for integrating satellite, ground-based and farmer-reported data.
- Fostering public-private partnerships for improved collaboration.

Capacity building

- Delivering advanced data analytics training for insurance professionals.
- Supporting index design research to minimise basis risk.
- Facilitating stakeholder knowledge-sharing forums.

While this would require investments in research and development as well as infrastructure, Kenyan authorities can leverage existing technological capabilities and support data collection and sharing. These actions will enable more accurate risk assessments, improve product offerings and ultimately reducing the cost impact of future climate-induced disasters.

Addressing basis risk

The IRA, alongside the National Treasury and insurance companies, should explore options to establish a dedicated basis risk fund to address the mismatch between index payouts and actual losses experienced by farmers. This fund would serve as a safety net to compensate farmers when index triggers fail to capture localised losses. Key aspects of implementing this fund could include:

- Capitalising the fund through contributions from insurers offering index products, government allocations and potentially donor support.
- A portion of index insurance premiums (eg, 5%-10%) could be set aside to build up the fund over time.
- Establishing clear criteria for when farmers can access the fund, such as verified crop losses

exceeding a certain threshold when no index payout is triggered.

- Creating an independent body with representatives from government, insurers and farmer groups to oversee fund management and claims assessment.
- Initially piloting the fund in two to three counties with high index insurance uptake before scaling nationwide.
- Capping payouts from the fund at a certain percentage of sum insured, to maintain incentives for accurate index design. Additionally, the IRA could set a minimum standard for insurance product quality, such as a maximum level of basis risk that is acceptable (based on expected utility metrics).
- Analysing data on fund usage to continually improve index design and reduce basis risk over time.

The IRA would need to develop regulations on insurer contributions, fund governance and integration with existing index insurance products.

The design of this funding mechanism needs careful consideration. While contributions from insurers and government are sensible, relying too heavily on premium surcharges could make products unaffordable for smallholder farmers. A blended financing approach, incorporating donor support and innovative mechanisms like catastrophe bonds, could help build a sustainable fund without overly burdening policyholders.

By providing an additional layer of protection, such a fund could increase farmer confidence in index insurance while incentivising ongoing product improvements. The IRA could convene a working group of insurers, agricultural experts and farmer representatives to further develop the structure and implementation plan for the basis risk fund.

Alternatively, for commercial policyholders, basis risk could be addressed by exploring hybrid insurance products that combine index-based and indemnity components. This approach can help address basis risk by providing a safety net for farmers when index triggers fail to capture localised losses. The IRA should also set standards for transparency in index insurance products, requiring insurers to clearly communicate potential basis risk to policyholders. To implement this, the IRA could establish a working group with

representatives from major agricultural insurers, agricultural research institutions and farmer associations to design and test these hybrid products in selected counties before scaling up nationwide. One example of this is India's Pradhan Mantri Fasal Bima Yojana (PMFBY), which combines area-yield index with localised assessment capabilities to provide comprehensive coverage from pre-sowing to post-harvest losses (Nirmal & Babu, 2021).

The scheme operates at the Village/Village Panchayat level for major crops and incorporates both widespread damage assessment and individual farm-level evaluation for localised calamities like inundation, hailstorms and landslides. PMFBY leverages digital technologies, including remote sensing, smartphones and drones for monitoring, while offering innovative features such as post-harvest loss coverage and mid-season adversity payments (Government of India, 2016). The integration of picture-based insurance could further enhance monitoring capabilities through smartphone-based crop loss detection and real-time assessment.

Risk-transfer mechanisms in climate and disaster risk financing

To strengthen Kenya's resilience to climate risks and address limitations in climate and disaster risk resilience financing, the targeted use of insurance instruments to transfer financial risk could play an important role. This includes tailored insurance mechanisms and a robust catastrophe risk pool to safeguard vulnerable populations, enhance financial stability and promote sustainable adaptation strategies.

At the micro level, this would involve expanding KLIP's focus to include cover against perils beyond drought. Furthermore, there is an urgent need to expand climate risk insurance products' existing agriculture focus to include vulnerable households in urban areas that are highly exposed to floods and, subsequently, property damage, unemployment and food insecurity.

At the meso level, the focus could be on providing coverage to agricultural cooperatives, aggregators and financial institutions that serve farmers. This could include portfolio-level protection for banks and microfinance institutions

against weather-related loan defaults, enabling them to expand agricultural lending.

The macro level would involve sovereign risk transfer solutions, similar to those offered by ARC, to provide the Kenyan government with rapid liquidity in the event of large-scale disasters affecting multiple regions. This layer could potentially use innovative financial instruments such as catastrophe bonds to access global capital markets and diversify risk beyond traditional reinsurance.

To implement these multi-level risk transfer mechanisms, the Ministry of Interior and Coordination of National Government, together with the State Department for Special Programmes, the IRA and the Treasury could establish a working group focused on micro-, meso- and macro-level insurance solutions. It would need to design the specifics of each layer and ensure they complement rather than duplicate each other. It should also develop clear triggers and payout mechanisms.

The working group could also focus on creating linkages between insurance and other risk management strategies, such as improved early warning systems and climate-smart agricultural practices. This integrated approach would not only transfer risk but also incentivise risk reduction, potentially lowering premiums over time.

Catastrophe risk pool for climate and disaster financing

To strengthen county-level financial resilience against climate disasters, a county-focused catastrophe risk pool is required – a shared insurance mechanism that would provide quick, predictable payouts to county governments when specific climate triggers are met. This pool, overseen by the National Treasury and NDMA with support from the Council of Governors, would enable counties to respond more effectively to climate disasters while spreading the risk across participants.

The first step here would be to review and update county-level risk assessments, focusing on exposure to drought, floods and pest outbreaks, among others.

Trigger mechanisms

In developing parametric triggers for payouts, a hybrid approach could be considered, combining objective, measurable indices with rapid ground-level verification through local community organisation mechanisms. For drought, this could involve satellite-based vegetation indices and rainfall measurements, complemented by reports from local community organisations. For floods, river gauge data and flood extent mapping could be used alongside real-time reports from affected areas, potentially leveraging mobile technology for quick verification.

Financial structure

The capitalisation of the pool would have to take into account both expected annual losses and potential extreme events. Here, the National Treasury could explore innovative financing mechanisms, including catastrophe and resilience bonds or outcome-based instruments.

Governance and implementation

The successful implementation of the catastrophe risk pool requires collaboration and capacity building across various levels of government and stakeholders.

- The Council of Governors could coordinate county-level risk assessments and develop standard operating procedures for accessing payouts.
- It could also advocate for capacity building at the county level. This would ensure local governments have the necessary skills and understanding to effectively participate in and benefit from the risk pool.
- The IRAs would be tasked with developing a regulatory framework and guidelines for market interaction.
- The NDMA would develop a comprehensive DRR strategy that complements the risk transfer mechanism of the pool. This would ensure a more holistic approach to disaster risk management, integrating early warning systems, contingency fund mechanisms and proactive response coordination.

To operationalise the pool, a dedicated committee could be established under the joint oversight of the National Treasury and the IRA. This committee should have sufficient autonomy to make rapid decisions during crises, with clear

protocols for interaction with other government agencies in such situations.

The independent oversight board should include representatives from potential international donors or reinsurers, in addition to civil society, academia and the private sector. This would help build international credibility for the pool and potentially facilitate access to global reinsurance markets.

While the catastrophe risk pool is a crucial component of Kenya's climate resilience strategy, it should be integrated into a broader framework of risk management and adaptation.

Incentivising adaptation investment

Climate risk appraisal methodology for PPPs

The National Treasury and Kenya's PPP directorate, in collaboration with the Ministry of Environment and Forestry, could establish standardised methodologies for assessing climate impacts in PPPs.

This includes integrating climate-sensitive elements into project concept notes and feasibility templates. A centralised appraisal process, harmonised across sector-specific ministries, should ensure consistency in evaluating climate risks. Lessons from other regions should guide this effort:

- Kenya could adapt the Inter-American Development Bank's (IDB) toolkit, which combines screening-level risk assessments and detailed vulnerability analysis for PPPs (Frisari et al., 2020).
- Jamaica's approach with short-, medium- and long-term objectives to ensure climate resilience mainstreaming in policy and project planning is useful. Kenya could emulate this approach by creating a phased implementation plan for integrating climate considerations into PPP processes. This could involve initially focusing on high-risk sectors or regions before expanding to a comprehensive, nationwide approach (World Bank, n.d.).
- The World Bank's Climate Toolkits for Infrastructure PPPs provide sector-specific guidance that Kenya could leverage. For instance, the Water Production and Treatment

Toolkit incorporates climate considerations in project selection, identifies risks and evaluates climate effects on project economics.

- Resources such as the Global Centre on Adaptation's Climate Resilient Infrastructure Officer Handbook can guide the inclusion of climate resilience into project templates.
- To integrate sector-specific methodologies into a centralised appraisal process, Kenya could look to the example of the European Union's Climate-ADAPT platform. This platform serves as a centralised repository of climate adaptation information and case studies from across Europe (European Environment Agency., 2018).

Incentivising private sector participation in adaptation

Tax incentives

The Kenyan Revenue Authority, guided by the National Treasury, could implement a tiered tax incentive system for adaptation investments. This system would offer progressively higher tax deductions based on the scale and impact of adaptation projects. For example:

- Investments in drought-resistant agricultural technologies could receive a 150% tax deduction.
- Larger infrastructure projects enhancing community-wide resilience could qualify for up to 200% deduction.

This targeted approach would provide tailored incentives, especially for domestic companies. Additionally, tax benefits could be extended to insurers that are contributing toward the national adaptation objectives. These benefits might include reduced corporate tax rates or preferential treatment for climate-aligned products, providing strong financial motivation for insurers to support Kenya's climate goals

Climate data portal

Kenya's National Bureau of Statistics could collaborate with private and public agencies that are involved in data management could create a centralised Climate Risk and Finance Data Portal. The portal would aggregate climate risk data, adaptation project outcomes and financial flows. Regular reporting from public and private entities should be mandated to bridge current data gaps. This could be supported by mandates from

private and public sector entities reporting on their adaptation and resilience building efforts.

The Kenya National Bureau of Statistics could provide technical support in data collection and analysis. This would address the data gap undermining accurate assessment of climate finance flows and risks.

Country investment platforms

Kenya's Climate Envoy Office, alongside key government departments and external stakeholders, could develop a dedicated country platform that focuses on coordinating adaptation and DRR efforts and resource mobilisation. This could support implementing some of the proposed recommendations.

The platform's resource mobilisation could focus on developing innovative financing instruments to unlock private and public sector funding. This would require developing capacity to engage with international donors and investors, establishing partnerships with international financial intuitions and gathering data on adaptation projects. The data could showcase the necessary monitoring and measurement systems required for these projects as well as the yield returns based on avoided losses. The platform can also support coordination to integrate insurance better into national adaptation and resilience planning.

Linking insurance activities with NAP and NDC objectives

The IRA could lead the development of guidelines that align insurers' products and investments with Kenya's national adaptation plan and nationally determined contributions. These guidelines should not only provide recommendations but also set clear, measurable targets for the insurance sector's contribution to national climate goals.

To ensure alignment with wider government priorities, the IRA can collaborate with the National Treasury and the Ministry of Environment and Forestry. The guidelines should require insurers to:

- Conduct climate risk assessments of their portfolios.
- Develop strategies to redirect investments towards climate-resilient and low-carbon projects.

- Report annually on progress towards NAP and NDC goals, using standardised metrics for accountability.

A dedicated unit or taskforce, perhaps led by the IRA and National Climate Change Council, could support the strategic integration of the insurance sector in NAP and NDC policies and processes. This taskforce's responsibility could be to develop a roadmap for the sector's involvement in climate adaptation and mitigation. This roadmap would:

- Identify areas where insurance products can directly support NAP and NDC goals, such as parametric insurance for smallholder farmers or incentives for climate-resilient construction through property insurance.
- Explore innovative financing mechanisms, like resilience bonds, to fund adaptation projects outlined in the NAP.

The Kenya Association of Insurers could support industry-wide collaboration and knowledge sharing by organising forums to exchange best practices as well as capacity building workshops on how to align operations with national climate strategies.

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