



# Climate risk information for financial sector decision-makers in Africa: gaps and opportunities

**Including insights into financial sector policies of four African countries: Ethiopia, Ghana, Kenya and South Africa**

**By Malango Mughogho**



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## About this working paper and who it is for

This paper was developed as a resource for financial sector decision-makers in Africa. It aims to explore the extent to which financial sector decision-makers are considering climate risk information to support robust financial decisions that enhance effective responses to climate change.

Firstly, the paper identifies and categorises the types of information the sector requires to make sound, climate-informed investment decisions. Secondly, a framework is put forward for identifying gaps in climate risk information. Thirdly, results from a study are presented of how four African countries – Ethiopia, Ghana, Kenya and South Africa – are improving the integration of climate risk information in financial sector policies. This is followed by recommendations to financial sector decision-makers on how to address challenges in generating climate risk information in Africa.

The paper is also meant for those in the climate change field working outside the financial sector to support their understanding of what climate information the financial sector requires in order to evaluate climate risks and opportunities effectively.

## About the author

Malango Mughogho is the Managing Director of ZeniZeni Sustainable Finance Limited and has over 20 years' experience in banking and development finance.

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# Climate risk information for financial sector decision-makers in Africa: gaps and opportunities

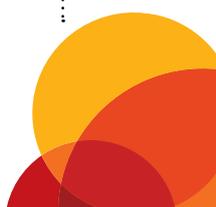
Including insights into financial sector policies of four African countries: Ethiopia, Ghana, Kenya and South Africa



Abandoned cars lie in the mud and water underneath a bridge after heavy rains brought severe flash floods to Durban, South Africa in April 2022. © Gareth\_Bargate via Shutterstock

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## Acronyms

<b>CAFI</b>	Climate Assessment for Financial Institutions
<b>CFRF</b>	Climate Financial Risk Forum, UK
<b>CPEIR</b>	Climate Public Expenditure and Institutional Review
<b>CRGE</b>	Climate-Resilient Green Economy
<b>DRM</b>	Disaster Risk Management
<b>FSB</b>	Financial Stability Board
<b>GCA</b>	Global Commission on Adaptation
<b>GCM</b>	Global Climate Models
<b>GHG</b>	Greenhouse Gas
<b>IPCC</b>	Intergovernmental Panel on Climate Change
<b>IFC</b>	International Finance Corporation
<b>IMF</b>	International Monetary Fund
<b>MoFEC</b>	Ministry of Finance and Economic Cooperation, Ethiopia
<b>NDC</b>	Nationally Determined Contribution
<b>NGFS</b>	Network for Greening the Financial System
<b>NMHS</b>	National Meteorological and Hydrological Services
<b>PACTA</b>	Paris Agreement Climate Transition Assessment
<b>PCAF</b>	Partnership for Carbon Accounting Financials
<b>RCM</b>	Regional Climate Models
<b>TCFD</b>	Task Force on Climate-Related Financial Disclosures
<b>UNEP</b>	United Nations Environment Programme
<b>UNFCCC</b>	United Nations Framework Convention on Climate Change
<b>WMO</b>	World Meteorological Organisation

## Summary

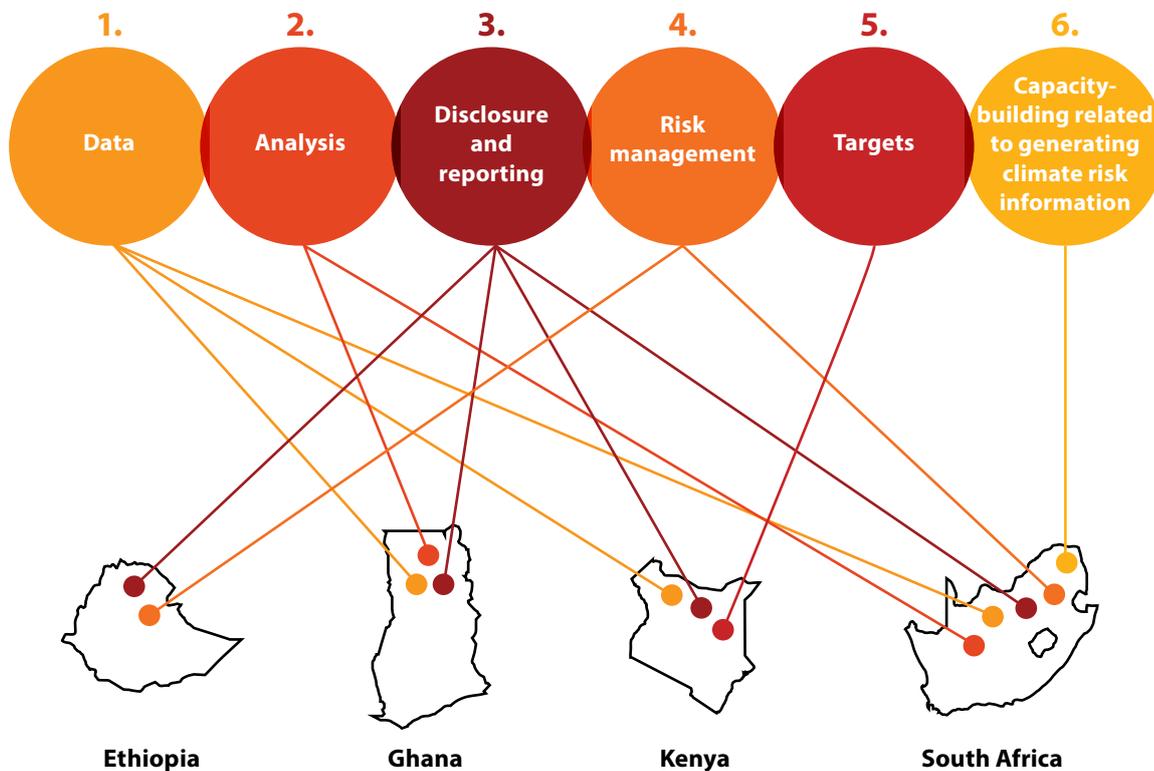
This working paper discusses the role of financial sector policy in relation to addressing gaps in climate risk information in the private finance sector, with a specific focus on Africa. Financial sector decision-makers are increasingly concerned with the impact of climate change on financial sector stability and individual financial institutions. At the same time, they are aware of the important role that the sector can play in achieving positive climate outcomes, particularly in Africa, where climate impacts are likely to be more significant than in other parts of the world.<sup>1</sup> Given that there is only a nascent understanding of how climate risk is transferred to the financial sector, ensuring that climate risk information is available, and fully and effectively incorporated into financial sector decisions, should be an important policy objective.

The paper uses three main information sources:

- A desktop review of financial sector policies to consider the extent to which climate risk is considered;
- Interviews with representatives from the Ministry of Finance in four African countries with differing financial sector depth and levels of, and potential to contribute to, addressing climate risk (Ethiopia, Ghana, Kenya and South Africa); and
- A workshop held on ‘Climate risk information for financial sector decision-makers in Africa’ held in October 2020.<sup>2</sup>

The paper divides climate risk information into six categories, as shown in Figure 1 below. The study shows that financial sector decision-makers in all four countries have developed initiatives or policies related to climate risk information across the six categories. All the countries have initiatives or policies related to disclosure and reporting, indicating that this is an important area of concern. South Africa has the widest range of initiatives or policies that cover five of the six categories (with the exception of targets).

**Figure 1. Policies and initiatives across six categories of climate risk information in Ethiopia, Ghana, Kenya and South Africa**



The paper finds that the financial sector experiences several challenges related to generating, analysing and applying climate risk information in the context of financial sector decision-making in the African context. There are gaps in the availability of climate risk information that the financial sector requires for effective and efficient decision-making, leading to the possibility that climate-related financial risks are not fully reflected in decisions related to asset valuations, capital allocations and financial product design, among other areas. This may lead to financial stability risk and also increased sovereign risk (i.e., the risk of a country defaulting on its debt by not paying back interest or principal payments).

The paper recommends financial sector decision-makers take the following steps to close the gaps in climate risk information:

1. **Financial sector decision-makers need to think beyond their traditional sphere of influence** to ensure that the financial sector has the necessary climate-related information to manage climate risks and take advantage of the opportunities that addressing climate change brings. This can be done through further analysis on the extent to which the mandate and focal areas of financial sector decision-makers prevent them from addressing gaps in climate risk information.
2. **Countries should consider including the need to adapt and transform their financial sectors in their updated United Nations (UN) Nationally Determined Contributions (NDCs).** In addition to highlighting the imperative to focus on this area, addressing the financial sector in NDCs should allow financial sector decision-makers to understand their role in supporting the shifts required in the financial sector to better support their country's overall climate change mitigation and adaptation goals.
3. **Further analysis is required to identify and categorise the type of climate risk information needed by financial sector decision-makers.** This will allow clearer lines of responsibility in terms of the parties creating and curating the information. It will also allow for the identification of relevant open data platforms, or the development of these platforms where they do not exist, to ensure that such information is easily and widely available.
4. **Detailed analysis is needed on the 'gaps' in climate risk information.** This should ideally be done on a regional basis, given the diverse nature of regional climate change impacts. The Financial Stability Board (FSB) is carrying out this exercise at an international level.
5. **A mapping of climate risk information for public companies and public financial institutions,** such as sovereign wealth funds, and public insurance and savings schemes, would extend the information provided by budget-related initiatives such as Climate Public Expenditure and Institutional Reviews (CPEIRs). In several countries, these organisations play a significant role in the economy but, unlike private listed companies, they are typically not required to assess and disclose climate-risk information.



A decommissioned coal-fired power station in Cape Town, South Africa. © Danie van der Merwe via Flickr

## 1. How climate risks and opportunities result in financial impact

### 1.1 What the science says

Science tells us that average global temperatures should be limited to 1.5°C (and should not exceed 2°C) above pre-industrial levels (1850–1900) to avoid catastrophic climate change impacts.<sup>3</sup> These impacts include more frequent and intense storms and droughts, rising sea levels and ecosystem destruction, and associated consequences for societies and economies. The latest report from the Intergovernmental Panel on Climate Change (IPCC)<sup>4</sup> (2022) confirms that achieving these limits will require immediate and rapid reductions in greenhouse gas (GHG) emissions, which, in turn, requires a dramatic shift in how we live and produce what is needed in modern economies, and the way we interact with the environment.<sup>5</sup> These shifts form part of the so-called 'low-carbon transition', coupled with building resilience to climate change impacts.

Estimates of the investment required to support this transition are significant. The IPCC estimates that cumulative investment in renewable energy needs to reach US\$ 27 trillion, or US\$ 770 billion per year, in the 2016–2050 period, to limit temperature rise to well below 2°C.<sup>6</sup> Adaptation at the scale required could amount to US\$ 300 billion annually by 2030, according to the latest Adaptation Gap Report from the United Nations Environment Programme (UNEP).<sup>7</sup>

The Global Commission on Adaptation (GCA) estimates that investing US\$ 1.8 trillion globally in five areas from 2020 to 2030 could generate US\$ 7.1 trillion in total net benefits. These areas are early warning systems, climate-resilient infrastructure, improved dryland agriculture crop production, global mangrove protection, and investments in making water resources more resilient.<sup>8</sup>

Financial sector institutions, both public and private, therefore have an important role to play in driving this transition, since they are the source of the financing needed for adaptation and mitigation, while the regulators will play a key role in maintaining financial stability.

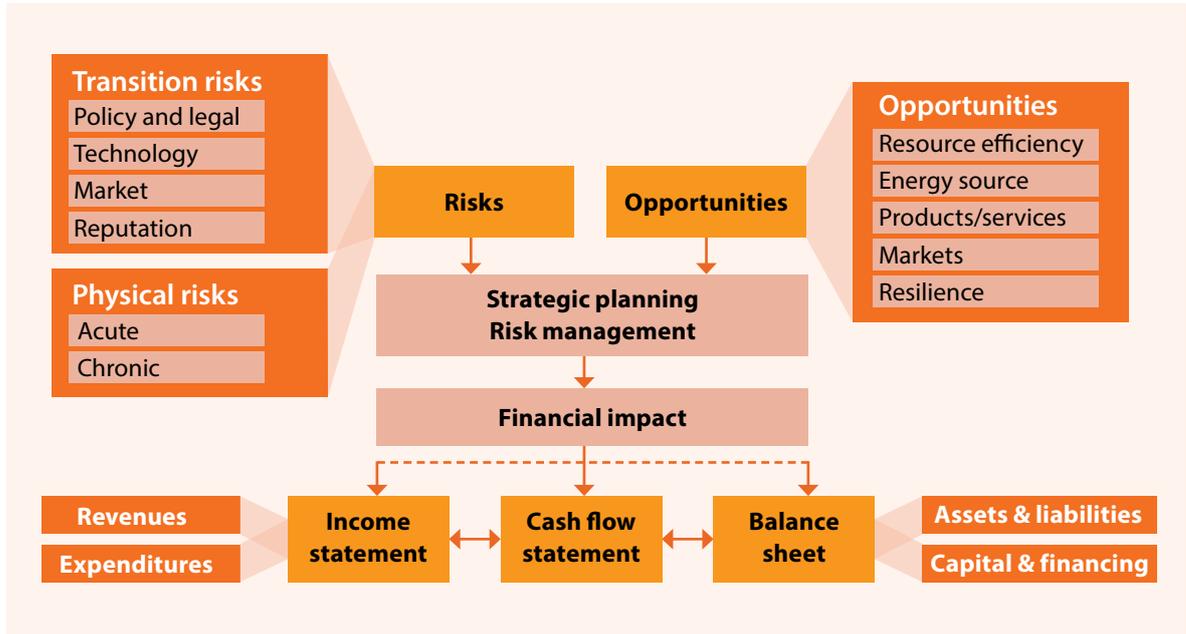
### 1.2 Climate change and the financial sector

The factors that influence a financial sector institution taking a particular financing decision, such as extending a line of credit, making an equity investment or underwriting insurance cover for a particular risk, vary from situation to situation. However, nearly all financial sector decision-makers include a risk-based approach in their decision-making. In the context of climate change, this would require, among other things, understanding the climate risks in relation to a financial decision, which, in turn, are assessed based on the climate information available to the decision-maker. Currently there is no requirement for climate risk to be taken into account by the regulators; this is likely to change if the Task Force on Climate-Related Financial Disclosures (TCFD) disclosures are made mandatory.

In 2015, the G20 Finance Ministers wanted to understand how the financial sector could consider the risks climate change poses to the financial system and requested the FSB to lead this work through the TCFD. In 2018, the TCFD produced recommendations to achieve "more effective climate-related disclosures that could promote more informed investment, credit and insurance underwriting decisions and, in turn, enable stakeholders to better understand the concentrations of carbon-related assets in the financial sector and the financial system's exposures to climate-related risks".<sup>9</sup> Importantly, in addition to climate-related risks, the TCFD recommendations highlighted climate-related opportunities, since both climate risks and opportunities can result in financial impacts on financial institutions themselves, as shown in Figure 2.

**The Global Commission on Adaptation (GCA) estimates that investing US\$ 1.8 trillion globally in five areas from 2020 to 2030 could generate US\$ 7.1 trillion in total net benefits.**

**Figure 2. Climate change related risks, opportunities and (firm-level) financial impact**



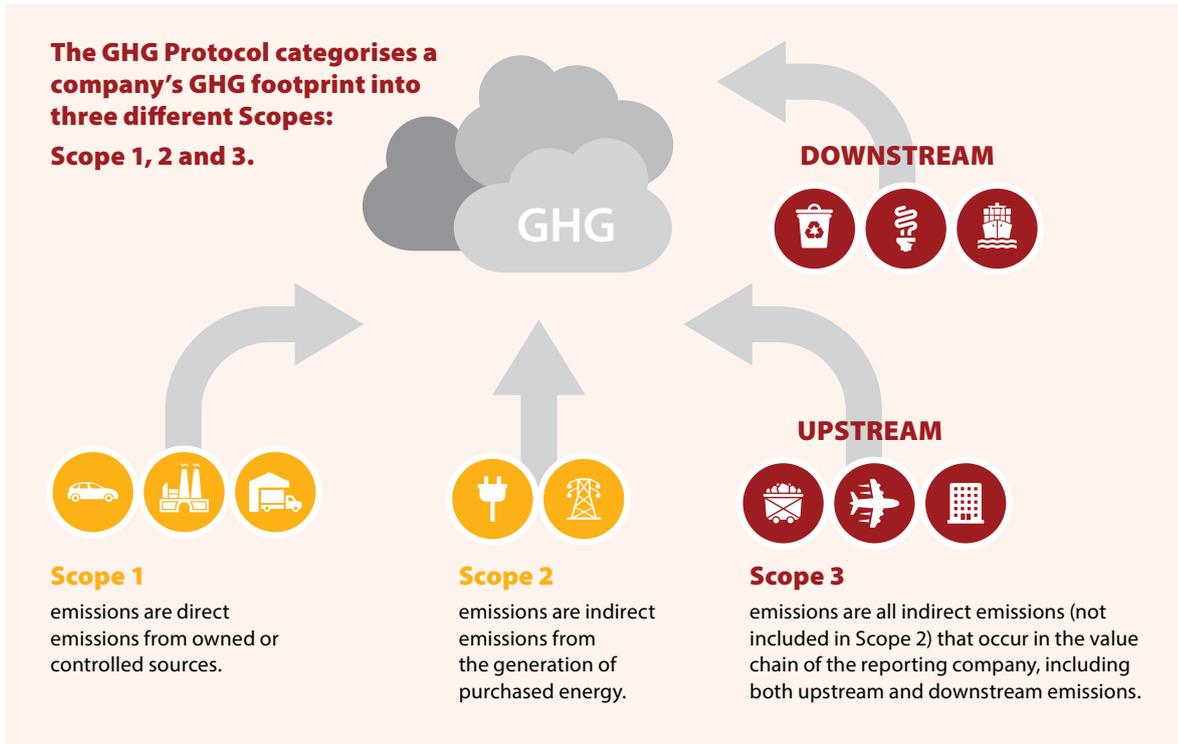
Source: Recommendations of the TCFD<sup>10</sup>

As a service sector, the financial sector mainly generates indirect, Scope 3 GHG emissions (Figure 3).<sup>11, 12</sup> According to the GHG Protocol, these are defined as indirect emissions (but excluding indirect emissions from the generation of energy) that occur in the value chain of the reporting company, including both upstream and downstream emissions.<sup>13</sup> The different categorisation of the GHG footprint of companies according to the GHG Protocol is shown in Figure 3.

This means that the financial sector’s climate-related response is heavily reliant on activities and policy developments in the non-financial sector (which is sometimes referred to as the ‘real’ sector) being climate-resilient and low-carbon. For example, at 14.7% of the global total, activities in the agriculture, forestry and land-use sectors are one of the largest contributors to global GHG emissions. This is due to GHG emissions being released through activities such as clearing forested land for planting crops, cutting down trees for commercial timber production, and feeding livestock that produce methane as excrement, as shown in Figure 4.

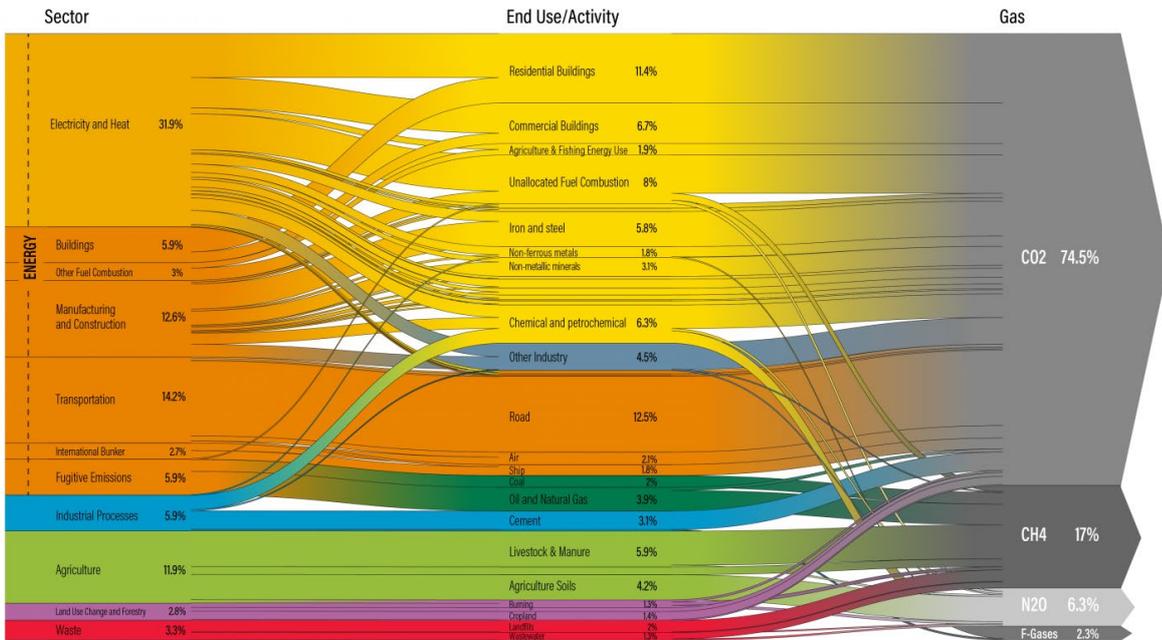
Strategies to reduce GHG emissions in these sectors have to target these emissions-intensive activities. While a financial institution may provide a loan or an insurance product to a company in one of these sectors, the financial institution does not directly carry out or control the company’s activities and, therefore, has no direct control over the emitting of GHGs. Nor would they typically be consulted by a country’s ministry of forestry or ministry of agriculture when they discuss government policies targeted at activities in those sectors. The loan provided by the financial institution, therefore, has only an indirect link to GHG emissions from the company. Similarly, any risks related to the loan, such as repayment risks, are only indirectly related to the climate risks the company faces.

**Figure 3. Categorising a company's GHG footprint according to the GHG Protocol**



Source: BSR<sup>14</sup>

**Figure 4. World GHG emissions in 2018 (by sector, end use and gas): Total 48.9 GtCO<sub>2</sub>e**



Source: World Resources Institute<sup>15</sup>

### 1.3 Types of climate risks relevant for the financial sector

Climate change affects two areas of critical importance to financial sector decision-makers and regulators who have a mandate to establish macroeconomic and financial system stability: sovereign risk and financial stability risk.<sup>16, 17, 18</sup> In the context of the financial sector, climate risks can be classified into two broad categories:

1. **Physical risks:** Financial risks from actual changes to climatic conditions, such as temperature and precipitation changes, and extreme events, such as floods and droughts.
2. **Transition risks:** Financial risks arising in society and the economy from the transition to a climate-resilient, low-carbon economy, such as those related to policy and regulatory changes, technology development and shifts in consumer preferences.

Physical climate risks can affect financial stability in several ways. For example, if there is an extreme weather event that significantly affects the economy and population of an area, this may lead to assets – typically loans – of the country’s financial institutions becoming at risk of default. This then affects the viability and performance of the financial institutions that own those assets. In this instance, physical climate risks can be viewed as having been transmitted through the economy and causing financial sector risks.

Transition risks can similarly affect financial stability in several ways. The advent of renewable energy technologies and distributed energy systems in the electricity generation sector, for example, has meant that the unit cost of electricity of a new renewable energy generation plant is less than the unit cost of a new coal-fired plant. This has led to coal-powered electricity plants being less financially viable in certain countries and at risk of becoming so-called ‘stranded assets’.<sup>19</sup> Financial institutions with loans or underwriting exposure to, or equity in, these companies are, therefore, faced with non-performing assets. Consequently, if those financial institutions have a large exposure to this risk, it presents a risk to the overall stability of the financial system.

An example of the industry’s attempt to better understand these risks is the UK’s Climate Financial Risk Forum (CFRF), which is jointly convened by the country’s two financial sector regulators: the Prudential Authority and the Financial Conduct Authority. The CFRF builds capacity and shares best practices across financial regulators and industry to advance the sector’s response to the financial risks from climate change. According to the CFRF, while the UK’s financial institutions generally accept the classification of climate risks into these two broad categories, the overall understanding of these risks is relatively immature.<sup>20</sup> An example of a similar initiative in Africa is South Africa’s Climate Risk Forum, which is chaired by the National Treasury and has members from the financial sector regulator, the Department of Forestry, Fisheries and Environment, the securities exchange and industry organisations.<sup>21</sup>



Flooding in Accra, Ghana. © Stig Nygaard via Flickr

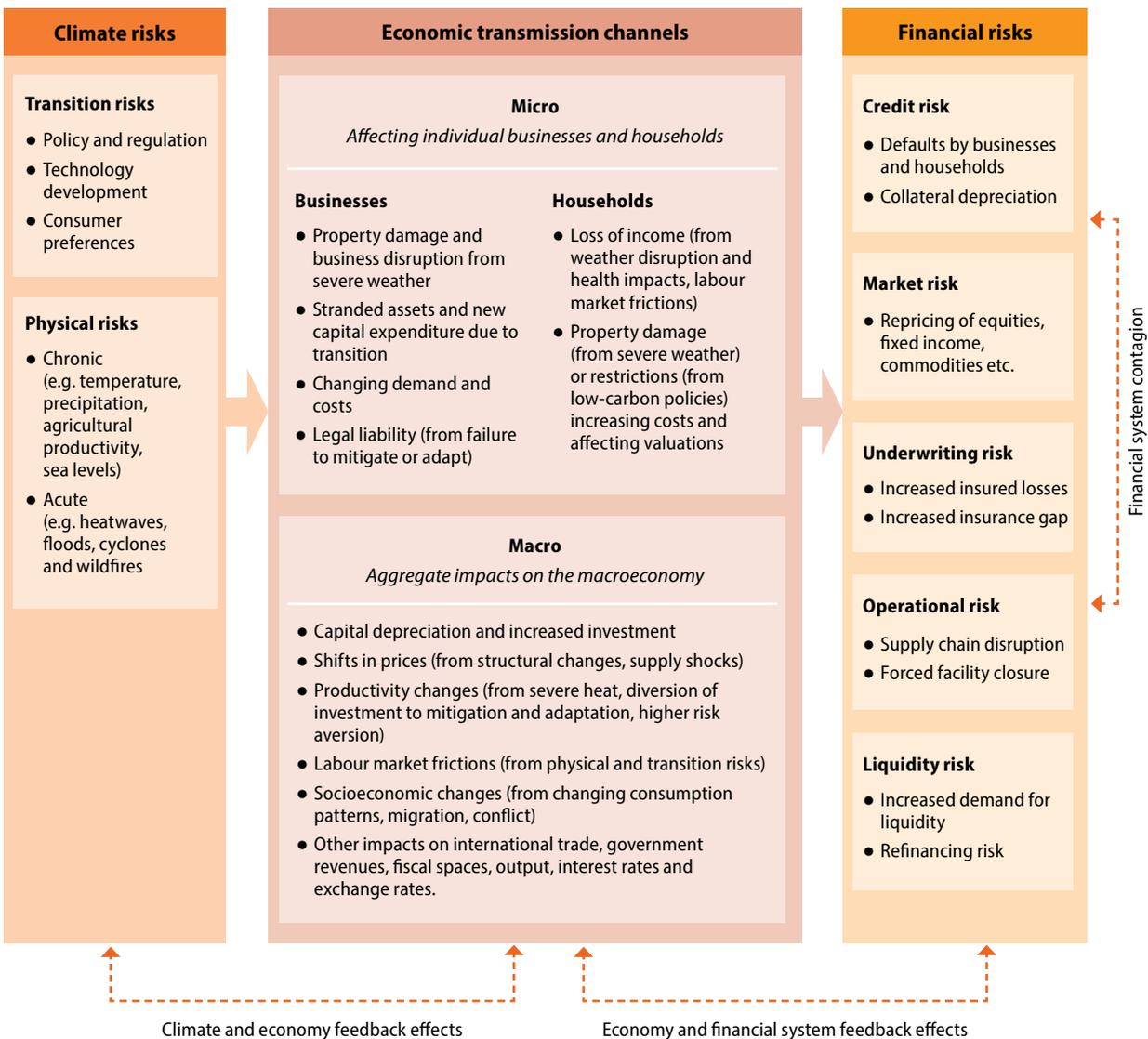
1.3.1 How climate risks trigger financial risks

Figure 5, developed by the Network for Greening the Financial System (NGFS), shows how climate risks (both physical and transition) caused by the activities of actors in the non-financial sector are transmitted into financial risks, via specific economic transmission mechanisms. In 2021, transmission channels were developed specifically for ministries of finance (see Figure 6).<sup>22</sup>

An example of the transmission of climate risk to financial risk is when households lose income following an extreme weather event, such as a catastrophic flood. The loss in income negatively affects the ability of the households to repay any loans from a bank, increasing the risk they will default on the loan. This, in turn, results in an increase in credit risk at the bank, where credit risk exposure is an important indicator of the financial well-being of the bank.

The individual actions of financial institutions can also play an important role in terms of redirecting financing towards climate-related opportunities. It is now widely understood that financial sector policy and regulation are essential to create the enabling environment for this transition to happen effectively.

Figure 5. Transmission channels: Climate risks to financial risks



Source: NGFS climate scenarios for central banks and supervisors<sup>23</sup>

#### 1.4 The importance of climate risk disclosure and information to address financial risks

In a speech that preceded the official formation of the TCFD, Mark Carney (the then chair of the FSB) remarked that static disclosure, as represented by the TCFD, could be improved by countries exploring different scenarios for possible prices of carbon and then stress-testing the performance of regulated financial institutions in those countries under those different scenarios.<sup>24</sup> Stress-testing is a way for regulators to assess the performance of financial institutions that they regulate under different economic scenarios, to see what could potentially happen to key indicators, such as the level of non-performing loans for a bank, or the ratio of assets to liabilities for a pension fund. As a result, following the TCFD publication, financial sector decision-makers across the world have begun to institute policies related to disclosure. For example:

- The UK's Financial Conduct Authority announced in 2020 that TCFD reporting would be mandatory by 2025.
- The European Central Bank published its guide on *Climate related and environmental risks* that incorporates the TCFD recommendations in 2020.<sup>25</sup>
- The US promulgated the Climate Risk Disclosure Act in 2019,<sup>26</sup> which requires publicly-listed companies to annually disclose climate risks posed to the issuer, including an issuer's strategies and actions to mitigate these risks. The US President also issued an Executive Order on Climate-Related Financial Risk in May 2021 that encourages financial regulators to assess climate-related financial risk, among other requirements.<sup>27</sup>
- In November 2021, the Technical Readiness Working group, chaired by International Financial Report Standards Foundation, provided recommendations for a Climate-related Disclosure Prototype by companies for the International Sustainability Standards Board to consider. The prototype – along with other initiatives – will “lay the technical groundwork for a global sustainability disclosure standard-setter for the financial markets”.<sup>28</sup>

While these are important developments, the disclosure of risks requires that there is robust climate information available. In addition, analysis must be conducted across all the transmission pathways of climate risk that arise at an economy- and firm-level, as shown in Figure 5. It is critical to obtain the necessary data to understand the pathways of these risks and their resultant impacts on areas of concern to financial decision-makers.



A district Meteorological Officer shows the process of gathering and monitoring data at a meteorological weather station in Kisumu, Kenya. © Thomas Omondi, DfID and IDRC

For example, a working group of 16 banks piloting TCFD found that one of the challenges in assessing climate-related transition risk is the “limited information available to assess how a climate scenario might impact the creditworthiness”, resulting in one of the recommendations to “develop data and analytics for borrower-level climate-risk analysis”.<sup>29</sup> The combination of information and analysis based on that information is known as a climate service, which is “a decision aide derived from climate information that assists individuals and organisations in society to make improved ex-ante decision-making”.<sup>30</sup>

This concern was mirrored by G20 Finance Ministers and Central Bank Governors who stated in their communique in July 2021 that “quality data and comparable frameworks of disclosure are crucial for addressing climate-related financial risks and mobilising sustainable finance”.<sup>31</sup> And a recent analysis of sustainable finance roadmaps in 30 countries recommended that financial sector decision-makers should “consider addressing data gaps through available digital tools, to increase data quality and enable market participants to incorporate sustainability more effectively into their decisions”. Enhanced reporting and disclosure requirements were included in 93% of the roadmaps examined.<sup>32</sup>

Financial sector decision-makers are faced with two challenges related to climate change risk information in trying to address the impacts of climate risks on the financial sector:

1. **Data:** Financial firms are beginning to take action to reduce and manage exposure to climate-related risks, which is a positive development. However, there is often a lack of appropriate and consistent data to assess these risks, thus limiting the ability of financial firms to take the necessary actions.<sup>33</sup> Examples of appropriate data include information on the impact of a climate-induced weather event on a bank’s client and their creditworthiness, or the impact of planned climate change legislation on the insurability of a client’s supply chain risks over the short- and long-term.
2. **Incorrect asset valuations:** There is a strong risk that climate-related financial risks are not fully reflected in asset valuations, leading to financial stability risk, and increased sovereign risk,<sup>34, 35</sup> a phenomenon which is described in more detail in Section 4.

### Box 1: A lack of data hampers the ability of financial institutions to reduce or manage climate-related risks

This excerpt from a 2020 Financial Stability Board report demonstrates how a lack of data is impeding the ability of the financial sector to adequately respond to climate risks and opportunities.

“ There are various actions that financial institutions can take – and are taking – to reduce or manage their exposure to climate-related risks. However, the efficacy of actions financial firms take may also be hampered by a lack of data to assess clients’ exposures to climate-related risks, or the magnitude of climate-related effects. Robust risk management might be supported by initiatives to enhance information to assess climate-related risk.

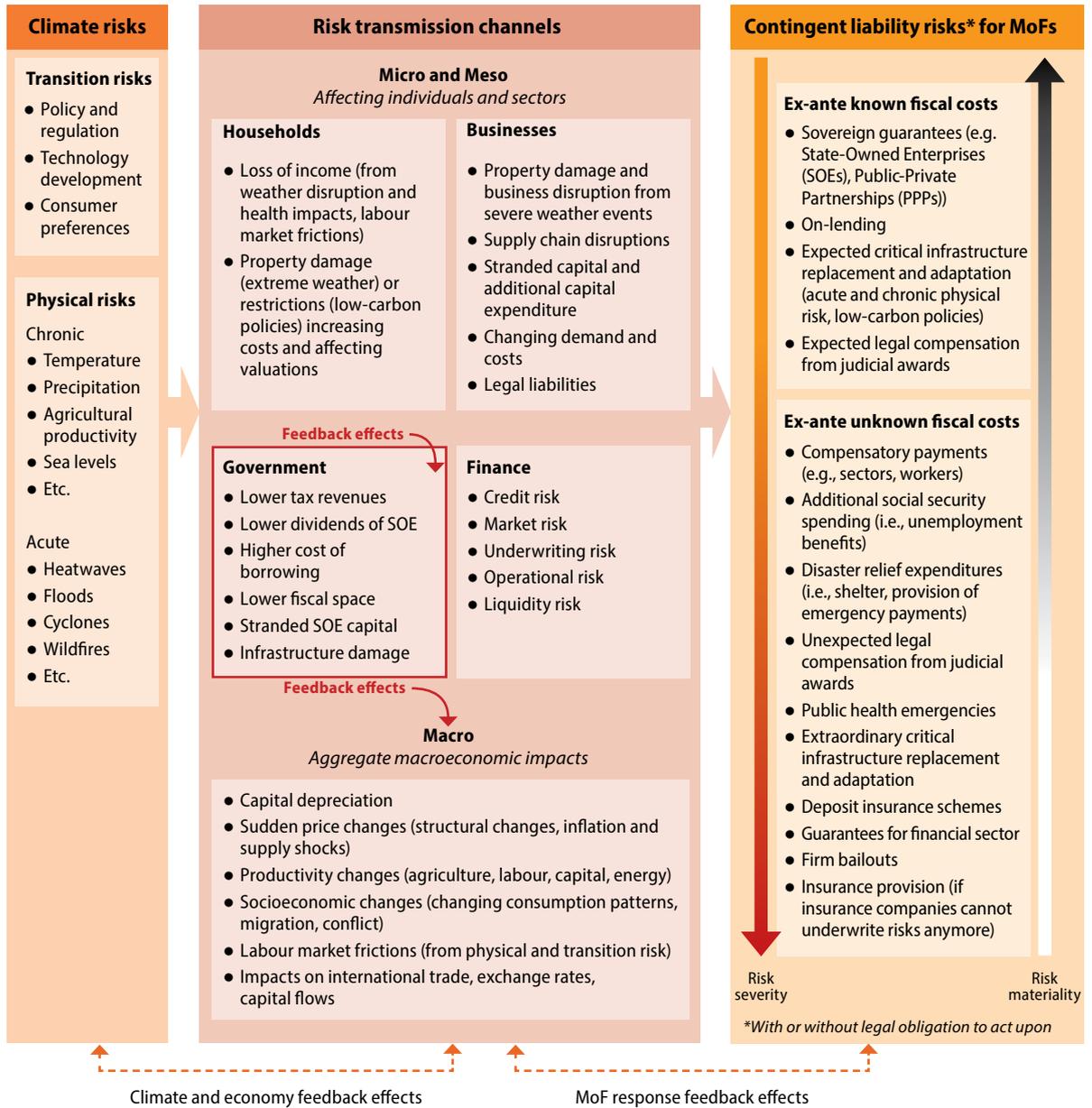
The Financial Stability Board will conduct further work to assess the availability of data through which climate-related risks to financial stability could be monitored, as well as any data gaps.<sup>36</sup>



## 1.5 How climate risk impacts ministries of finance

Further analysis of the risk transmission channels of climate risks by the Coalition of Finance Ministers for Climate – a grouping of fiscal and economic decision-makers from over 65 countries – found several impacts of climate change that directly impact the operations of ministries of finance through the creation of contingent liability risks, as shown in Figure 6 below. These risks include risks that could result in fiscal costs related to the financial sector, including guarantees for the sector, deposit insurance schemes and insurance provisions.<sup>37</sup>

**Figure 6. Climate-related risk transmission channels and ministries of finance (MoFs)**



Source: Coalition of Finance Ministers for Climate Action<sup>38</sup>

The same research found that these impacts could be significant, given that the average fiscal cost of contingent liabilities realisations of 80 advanced and emerging market economies from 1990 to 2014 was 6.1% of GDP. Among other conclusions, the report finds that “a better understanding of climate-related risks can enable ministries of finance to build the body of information they need to pursue policy planning, regulation, and budgeting that is aligned with sustainable development”.

Given the importance to the financial sector and ministries of finance of addressing the climate risk information gap, this paper discusses current and planned financial sector policies in four African countries (section 3) that aim to improve the integration of climate risk information into financial sector decision-making.

## 1.6 Why Africa's financial sector requires climate risk information

Ensuring that relevant and timely climate risk information is available to the financial sector is particularly relevant in Africa, where many countries have high climate vulnerability and low readiness to respond to that vulnerability,<sup>39</sup> coupled with having shallow financial markets<sup>40</sup> and a high risk protection gap (where there is a substantial difference between the resources available and the resources needed in the case of a climate risk event).<sup>41</sup> This means that when climate impacts occur, governments have to pay for the resultant health, property and ecosystem impacts for a significant portion of vulnerable citizens and businesses. Consequently, certain governments can be described as 'insurers of first resort', obliged to cover the costs for most of the repair and recovery of climate impacts.

Climate impacts worsen for vulnerable communities when governments are not able to play the role of 'insurers of first resort', resulting in increased human suffering and ecological decline.<sup>42</sup> This contrasts with countries with deep financial markets where citizens have greater access to, and are better able to afford, financial products, such as insurance designed to support recovery from climate impacts.

Similarly, climate change presents many opportunities for investment in resilience efforts, such as ecosystem-based adaptation and green technology for the financial sector (also known as green fintech) and, in mitigation efforts, such as renewable energy programmes and low-carbon transport projects. However, with shallow financial markets, many African countries have to rely on government funding to realise these opportunities. As a result, governments become 'investors of first resort' as well as 'insurers of first resort'. In many instances, however, governments have insufficient funding to meet these needs, meaning that climate impacts are not fully addressed,<sup>43</sup> nor investment opportunities realised.

These needs can be partly met by the financial sector through using supportive financial sector policy that addresses both the need to protect the sector from climate change impacts, and stimulate climate-resilient and low-carbon investment.

## 2. A framework for the financial sector to identify and address climate risk information gaps

### 2.1 Types of climate risk information for financial sector decision-making

Based on Figure 5, information is needed at three levels to provide financial sector decision-makers with a comprehensive overview of the transmission of climate risk to the financial sector: (1) the physical or transition risk level, (2) the economy level, and (3) the financial-system level. While the sources of information at each level vary according to the country and business sector, a wide range of entities and institutions need to regularly provide information on several climate-related issues. These include National Meteorological and Hydrological Services (NMHS) providing information collected through observation stations (atmosphere and water) and satellites; academic institutions that employ climate scientists who develop climate models; governments providing signals through policies, laws and regulations; and research firms publishing information on certain technological developments, to name but a few.

This paper proposes that the type of climate risk information required for each of the three risk-transmission levels above can be separated into six categories:

- 1. Data** is any information that provides a scientific understanding of climate risks. Examples include climate projections from global climate models (GCMs) and regional climate models (RCMs). Results on the global and regional scale from these models are reviewed and published by the IPCC. At the national level, countries also produce National Communications to the UNFCCC, which contain data on climate risks specific to the country. Other examples include environmental and social data produced by the World Bank,<sup>i</sup> as well as weather (seasonal and short-term) observation data produced by the World Meteorological Organisation (WMO) and different NMHS – both of which are used to issue forecasts and are also incorporated into GCMs and RCMs.

i. Social and broader environmental risks may be useful for understanding how climate risks may cause knock-on effects through transmission channels.

2. **Analysis** refers to the assessment of climate risk data. The type of analysis varies and depends on the target audience. Examples of analyses include equity analyst company reports, where analysis is carried out on the impact of climate risks on a company's equity valuation. Other analyses include assessments of a country's vulnerability to climate change impacts,<sup>44</sup> or climate analysis produced by meteorological organisations, such as the WMO. Furthermore, climate data does not simply become information without significant interpretation. In a climate risk context, this results in a need for climate hazard models that are forward-looking, which are challenging to develop.
3. **Disclosure frameworks** are reporting and transparency mechanisms related to climate risk. In the context of financial sector decision-makers, examples of disclosure frameworks are the TCFD and the Partnership for Carbon Accounting Financials (PCAF). Sustainable finance taxonomies that include climate-related categories are also important frameworks in determining what activity is considered to have a positive impact on climate change mitigation or adaptation. These frameworks provide guidance on the disclosure of climate risk information related to the disclosing entity. The TCFD also provides recommendations and guidance in several other areas important for incorporating climate risk into financial sector decisions, such as governance and strategy processes within the disclosing entity, and the use of scenario analysis. TCFD disclosure frameworks are still voluntary; however, as already highlighted, several jurisdictions are making climate-related disclosure for companies – including financial institutions – mandatory.
4. **Targets** refer to goals that organisations, investors or countries adopt for climate change mitigation and adaptation. The most notable example of targets are country emission reductions targets disclosed in NDC submissions to the United Nations Framework Convention on Climate Change (UNFCCC). Targets are an important source of climate change risk information in terms of carbon budgets. For example, a country that has an emissions target that includes fossil fuels use for the next 50 years results in a different carbon budget, compared to a carbon budget where fossil fuels will only be used for another 15 years. If an emissions target results in a country having a carbon budget not aligned with science, this increases the risk that there will need to be a faster and less just transition to a low-carbon global economy when compared to a carbon budget aligned with science. This risk is highly likely to affect the financial sector. The Science-Based Targets Initiative has provided guidance to companies on setting climate mitigation targets<sup>45</sup> and UNEP FI has provided guidance to banks on target setting.<sup>46</sup> Investors grouped under the UN-convened Net-Zero Asset Owner Alliance (launched at the UN Secretary Generals' Climate Action Summit in September 2019) have also issued their own interim 2025 targets to reduce GHGs in their investment portfolios. The Alliance has pledged to reduce their combined portfolios to net zero by 2050.<sup>47</sup> In this publication, focus is placed on targets in the context of the financial sector as opposed to targets that relate to government revenues for climate change – fiscal policies – or country-level mitigation and adaptation targets typically outlined in NDCs.
5. **Risk management** is the process of identifying and managing identified climate risks. There are several climate risk management tools emerging in the financial sector, including the Paris Agreement Capital Transition Assessment (PACTA/Climate Analysis Scenario programme),<sup>48</sup> which uses scenario analysis to understand the risks to an organisation under different climate change scenarios.
6. **Capacity-building to generate climate risk information** is not strictly a type of climate risk information, but is listed here because of the importance of enhancing the skills to generate the five types of climate risk information outlined above, tailored to the needs of the financial sector. Programmes such as the 'Climate Capacity-Building: Risk Anticipation and Minimisation programme' run by the Potsdam Institute for Climate Impact Research<sup>49</sup> are important in this regard.

Table 1 demonstrates the complex range of climate risk information required and where it is being produced. It confirms that financial sector decision-makers need to think beyond their traditional sphere of influence to ensure that the sector has the necessary climate-related information to manage climate risks and take advantage of the opportunities that addressing climate change brings.

**Table 1. Climate risk information by type and source**

Type of climate risk information	Illustrative examples of climate risk information sources
1. Data	<ul style="list-style-type: none"> <li>• <a href="#">International Panel on Climate Change (IPCC) Assessment Reports</a><sup>50</sup></li> <li>• <a href="#">National Communications to the UNFCCC</a><sup>51</sup></li> <li>• <a href="#">National Adaptation Plans</a><sup>52</sup> and <a href="#">NDCs</a><sup>53</sup></li> <li>• <a href="#">Network for Greening the Financial System (NGFS) Climate scenarios for central banks and supervisors</a><sup>54</sup></li> <li>• <a href="#">The World Bank's Sovereign environmental, social and governance data</a><sup>55</sup></li> <li>• <a href="#">World Bank's Climate Change Knowledge Portal</a><sup>56</sup></li> <li>• <a href="#">ClimDev-Africa's Climate Information Services</a><sup>57</sup></li> <li>• <a href="#">Climate Systems Analysis Group (CSAG) Climate Information Portal</a><sup>58</sup></li> <li>• <a href="#">KNMI Climate Data Explorer</a><sup>59</sup></li> </ul>
2. Analysis	<ul style="list-style-type: none"> <li>• <a href="#">Climate Policy Initiative, State of Cities Climate Finance reports</a><sup>60</sup></li> <li>• <a href="#">AMWA and the Water Utility Climate Alliance: It's hot and getting hotter: Implications of extreme heat on water utility staff and infrastructure and ideas for adapting</a><sup>61</sup></li> <li>• <a href="#">Trucost: Understanding climate risk at the asset level: The interplay of transition and physical risks</a><sup>62</sup></li> </ul>
3. Disclosure and reporting	<ul style="list-style-type: none"> <li>• <a href="#">Climate Public Expenditure and Institutional Review (CPEIR)</a><sup>63</sup></li> <li>• <a href="#">Task Force on Climate-Related Financial Disclosure (TCFD)</a><sup>64</sup></li> <li>• <a href="#">Partnership for Carbon Accounting Financials (PCAF)</a><sup>65</sup></li> <li>• <a href="#">International Finance Corporation (IFC)'s Climate Assessment for Financial Institutions (CAFI)</a><sup>66</sup></li> </ul>
4. Targets	<ul style="list-style-type: none"> <li>• <a href="#">Mitigation and adaptation targets in NDCs</a></li> <li>• <a href="#">Science-Based Targets Initiative (SBTi)</a><sup>67</sup></li> <li>• <a href="#">Net-Zero Asset Owner Alliance's Inaugural 2025 target setting protocol</a><sup>68</sup></li> </ul>
5. Risk management	<ul style="list-style-type: none"> <li>• <a href="#">Paris Agreement Capital Transition Assessment (PACTA)</a><sup>69</sup></li> <li>• <a href="#">ECB's Guide on climate-related and environmental risk</a><sup>70</sup></li> </ul>
6. Capacity building	<ul style="list-style-type: none"> <li>• <a href="#">ClimDev-Africa's Policy support</a><sup>71</sup></li> <li>• <a href="#">The Climate Capacity Building: Risk Anticipation and Minimisation programme, Potsdam Institute for Climate Impact Research</a><sup>72</sup></li> <li>• <a href="#">UNEP FI training programme: Climate Change and the TCFD: Risks and Opportunities for the Banking Industry</a><sup>73</sup></li> </ul>

Author's analysis, Network for Greening the Financial System,<sup>74</sup> Coalition of Finance Ministers for Climate Action<sup>75</sup>



Community-based rain-fed watershed management in Ethiopia. © ICARDA – Science for resilient livelihoods in dry areas via Flickr

### 3. How are African financial sector decision-makers integrating climate risk information?

This section describes initiatives and policies on climate risk information put in place or being considered by financial sector decision-makers in four African countries: Ethiopia, Ghana, Kenya and South Africa.

#### 3.1 Ethiopia

Ethiopia's Ministry of Finance and Economic Cooperation (MoFEC) regards climate risk information as important. The Ministry recognises, for example, that if insurers do not use accurate information, this could result in basis risk for farmers, where their insurance does not adequately cover the expected risk. The country's challenges related to climate risk information include a lack of capacity and financial literacy to make sure people understand the benefits and drawbacks of the products they are purchasing. Another challenge is the lack of data on the ground due to issues such as insufficient rain gauging stations to measure precipitation levels that may signal a flood or a drought, resulting in insurance companies having to rely on satellite information, which is less accurate.

From a policy perspective, the Government of Ethiopia has been taking necessary measures to improve fiscal risk management to ensure sound fiscal public finances and macroeconomic stability. "Maintaining a prudent fiscal policy stance" was reaffirmed in the government's Homegrown Reform Agenda launched in October 2019 and, hence, the MoFEC addresses fiscal financial policies related to climate change impacts, while the Central Bank uses monetary policy as a policy tool.

From a policy perspective, the Government of Ethiopia has been taking necessary measures to improve fiscal risk management to ensure sound fiscal public finances and macroeconomic stability.

The country's Disaster Risk Management (DRM) Policy<sup>76</sup> plays a central role in terms of addressing climate change impacts, and is well mainstreamed into national development, allowing for a climate- and risk-informed budget. The DRM Policy is complemented by the Climate-Resilient Green Economy (CRGE) Strategy<sup>77</sup> that was launched in 2012 and is incorporated into the country's 10-year National Development Plan.<sup>78</sup> The CRGE Vision outlines a road map that will enable Ethiopia to attain middle-income status by 2025, while building climate resilience and achieving growth with a zero-net increase in carbon emissions from 2010 levels. In the CRGE Vision (2011), establishing a national climate fund was identified as one of the main components for CRGE implementation. This fund, the CRGE Facility, began operating in December 2013 and is a dedicated entity to attract and channel climate finance from international, public and private sources to implement initiatives towards establishing a climate-resilient, green economy. The CRGE Facility is jointly managed by MoFEC and the Environment, Forest and Climate Change Commission.

The DRM and CRGE are part of a comprehensive national plan and are not standalone initiatives. In this regard, substantial public investments are being made to support CRGE and DRM interventions. Additionally, the CRGE Facility is undertaking climate finance tracking, which are all strategies that contribute to climate risk information about government expenditures.

In 2019, MoFEC developed its Fiscal Risk Register and Fiscal Risk Statement as part of a larger effort to overhaul the management of public finances. The Fiscal Risk Register is a tabular presentation of fiscal risks that gives a more detailed account of the risks identified in the Register. At present, this risk register does not cover climate risks.

Ethiopia is also a member of the V20 Group of Ministers of Finance that was formed in 2015 as a dedicated cooperation initiative of economies systematically vulnerable to climate change.<sup>79</sup> Among other things, this membership allows the country to build capacity to address climate change adaptation through initiatives such as the V20-led Sustainable Insurance Facility, which is a project pipeline development facility for solutions to build resilient micro-, small- and medium-sized enterprises in V20 economies.<sup>80</sup>

### 3.2 Ghana

Ghana's Ministry of Finance has instituted several strategies and policies that support financial sector decision-makers with climate risk information. Considerable focus has been placed on understanding the government's climate-informed expenditure, with a climate-related expenditure analysis included in the country's Biennial Update Report to the UNFCCC in 2015.<sup>81</sup> Climate-related expenditure analyses allow financial sector decision-makers to analyse the climate transmission mechanism of government's climate expenditure, such as how government expenditure is allocated to adaptation or mitigation activities.

The Ministry of Finance is also exploring the introduction of a carbon tax. This tax provides increased climate risk information to the financial sector by requiring companies to disclose their GHG emissions, thereby providing information on transition risk.

In terms of sector-specific information, agriculture is an important sector in Ghana, contributing 19.7% to GDP in 2019.<sup>82</sup> Agriculture is identified as one of the sectors most vulnerable to climate change.<sup>83</sup> It is, therefore, important to understand how climate impacts to the agricultural sector are transmitted through to the financial sector. Ghana's Ministry of Finance supported work to develop a roadmap for integrated climate-risk management.<sup>84</sup> This work resulted in enhanced understanding of the transmission mechanism of climate risk through the agriculture sector. However, the challenge of addressing the risks remains, since the Ministry of Finance has not been able to develop an insurance product that can be financed within the government's existing budget.

*In Ghana, considerable focus has been placed on understanding the government's climate-informed expenditure, with a climate-related expenditure analysis included in the country's Biennial Update Report to the UNFCCC in 2015.*



A woman cleaning maize in Gwenua, Kassena Nankana District, Ghana. © Axel Fassio, CIFOR via Flickr



Public water level gauge in Itare River, Kenya. © Sande Murunga, CIFOR

### 3.3 Kenya

There are several initiatives that the Kenyan National Treasury is undertaking that support climate risk information for financial sector decision-makers.

The country's green bond programme was initiated in 2017, which the Ministry of Finance supported. The programme helps identify investments that address either climate change mitigation or adaptation (where climate investments are sub-categories of so-called 'green' investments).<sup>85</sup> The Ministry has plans to issue a sovereign green bond – a green bond issued by a sovereign country rather than by a company or a project – which will provide further guidance in this regard.

Kenya's National Treasury is also developing a policy on green fiscal incentives that will allow Kenya to exploit the opportunities of accelerating the transition to a low-emissions development pathway, while enhancing climate resilience and ensuring environmentally-sustainable development.

The Government of Kenya, led by the National Treasury, is also developing a policy on green fiscal incentives that will allow Kenya to exploit the opportunities of accelerating the transition to a low-emissions development pathway, while enhancing climate resilience and ensuring environmentally sustainable development.



Climate-smart vegetable farming in western Kenya. © Cecilia Schubert via Flickr

In addition, Kenya instituted a Climate Change Act in 2016<sup>86</sup> that requires, among other things, the development of a National Climate Change Action Plan.<sup>87</sup> The current plan runs from 2018 to 2022 and provides for tracking and reporting of climate-relevant expenditure. Climate finance tracking processes provide climate risk information in terms of data on government expenditure.

### 3.4 South Africa

South Africa instituted a carbon tax in the 2020 fiscal year that should improve climate risk information for the financial sector, even though the main objective of the tax relates to environmental rather than fiscal considerations. In addition, South Africa's National Treasury published a technical paper on *Financing a Sustainable Economy* in 2020, which was subsequently updated in 2021.<sup>88</sup> The paper includes a strategy to develop a benchmark climate scenario to stress-test regulated financial institutions, thereby improving their ability to address climate risk issues at a financial-system level.

South Africa instituted a carbon tax in the 2020 fiscal year that should improve climate risk information for the financial sector, even though the main objective of the tax relates to environmental rather than fiscal considerations.

Several initiatives related to climate risk information have subsequently emerged. These include the development of a green taxonomy,<sup>89</sup> plans to develop a transition taxonomy, and work related to the TCFD. These initiatives can be categorised as 'disclosure and reporting' in terms of climate risk information.

A working group comprising representatives from the financial sector and relevant bodies, such as the South African Association of Chartered Accountants, is also focusing on building capacity in the financial sector to address climate risk and climate finance issues. Finally, another working group is focused on developing a handbook on sustainable finance instruments, including instruments that support positive climate outcomes.

From a disclosure and reporting perspective, National Treasury is also in the process of 'climate tagging', as part of overall budget transparency. Climate tagging refers to the monitoring and tracking of climate-related expenditures within the national budget system. In general, however, non-financial reporting is not the South African National Treasury's core mandate; that mandate sits with the Department of Monitoring and Evaluation. Reporting does enter the National Treasury's mandate in relation to linking the national budget with outcomes. Yet, reporting in and of itself does not guarantee climate outcomes will be achieved. An opportunity, therefore, exists to produce and disseminate climate risk information through the National Treasury's existing areas of focus, such as the fiscal imbalance, non-performing loans in the banking sector, the financial state of state-owned enterprises, and the funding of disasters such as the Covid-19 pandemic.

### 3.5 Comparing the country-level findings

Financial sector decision-makers in all four of the study countries are either working on or already have policies in place that seek to improve the enabling environment for providing finance-relevant climate risk information. Some of these initiatives or policies explicitly set out to address climate risk information gaps, such as the South African National Treasury's research into TCFD, or the climate public expenditure and budget review and climate tagging carried out in Ghana and South Africa, respectively. Others, such as a carbon tax currently in place in South Africa and being considered in Ghana and Kenya, only indirectly improve climate risk information, but result in positive outcomes nonetheless.

These country-specific initiatives are summarised in Table 2 below and are separated into the six types of climate risk information that form part of the framework described earlier: data, analysis, targets, risk management, disclosure and reporting, and capacity building.

All four countries have initiatives that focus on disclosure and reporting, and three countries have initiatives related to data. The reporting and disclosure elements relate to government budget and expenditure reporting, rather than reporting by financial institutions. However, South Africa has developed a draft green finance taxonomy that has an initial focus on climate change<sup>90</sup> and has issued guidance on climate-related disclosure that is based on TCFD.<sup>91</sup> Both of these initiatives will impact how financial institutions report their climate-related financing, thereby generating additional climate risk information. Reporting frameworks, such as the CPEIR in Ghana and climate tagging, provide useful climate risk information. Extending the data

to include analysis of the expenditure and investments of state-owned entities and government funds would provide even greater insight into this important data set.

Of the other categories of climate risk information – analysis, risk management, targets and capacity building – there are only either one or two countries that have initiatives in these areas. This could indicate that the financial sector decision-makers have differing priorities with regards to climate risk information. But it could also reflect how the different mandates of the decision-makers in the four countries do not cover climate risk information in its broad sense, or that another government department entity is already providing the necessary information.

Reporting frameworks, such as the CPEIR in Ghana and climate tagging, provide useful climate risk information. Extending the data to include analysis of the expenditure and investments of state-owned entities and government funds would provide even greater insight.

South Africa is the only country with financial sector policy initiatives covering all but one of the categories of climate risk information (targets). Many of these initiatives resulted from the publication and processes around the development of the National Treasury's *Financing a Sustainable Economy*<sup>92</sup> technical paper mentioned above, which had an initial focus on climate change and was developed in partnership with regulators and financial sector industry associations. The impetus for this work is likely a result of South Africa's membership of the G20, where sustainable finance has been a priority for several years, and because South Africa has a carbon-intensive energy sector and contributes nearly 1% of the world's GHG emissions.<sup>93</sup> It is also likely a reflection of the importance of the financial sector in the South African economy (the finance and insurance, real estate and business services sector contributed 20.1% to GDP during quarter four of 2020)<sup>94</sup> and the depth of its capital markets.<sup>95</sup>

Targets are an interesting category of climate risk information, given that all four countries are members of the United Nations and signatories to the Paris Agreement, which requires, among other things, that countries submit NDCs in terms of climate change mitigation and adaptation.<sup>96</sup> These NDCs are non-binding targets that, in the case of developing countries such as Ghana, Ethiopia, Kenya and South Africa, can be made conditional, dependent on receiving the necessary financing or technology transfer. Targets in NDCs generally focus on country-level GHG emissions reduction or adaptation targets, with less focus placed on climate targets that relate to the actions of finance sector actors. However, the NDC Partnership, established to help countries enhance and revise their NDCs, noted that 8% of adaptation requests with committed support related to the banking and finance sector as of the end of December 2019,<sup>97</sup> indicating that certain countries have given thought to adaptation needs within the financial sector. In addition, there are increasing calls for financial institutions to set targets that align their operations with a 'net zero by 2050' target, with leadership in the industry being shown by initiatives such as the Net-Zero Asset Owner Alliance.<sup>98</sup>



Community-based rain-fed watershed management, Ethiopia. © ICARDA – Science for Resilient Livelihoods in Dry areas via Flickr

In the context of this paper, only Kenya has a financial sector policy related to targets (as a result of its green bond programme, which includes a target for the country to issue a green sovereign bond). This indicates an opportunity for financial sector decision-makers to include targets in their updated NDCs for the adaptation of the financial sector itself in response to climate change.

**Table 2. Climate risk information initiatives (and policies) by financial sector decision-makers in Ghana, Ethiopia, Kenya and South Africa**

Type of climate risk information (relevant to the financial sector)	Financial sector policy-led initiative (or policy) in place or under development			
	Ghana	Ethiopia	Kenya	South Africa
<b>Data</b>	Carbon tax	-	Carbon tax	Carbon tax  Sustainable Finance Handbook
<b>Analysis</b>	Roadmap for integrated climate risk management	-	-	Climate stress-testing of financial institutions
<b>Disclosure and reporting</b>	Climate Public Expenditure and Institutional Review (CPEIR)	Climate budget reporting and tagging	Tracking of climate relevant expenditures	Climate tagging of government expenditure  TCFD working group for financial institutions  Green and transition finance taxonomy
<b>Targets</b>	-	-	Green bond programme, including sovereign green bond	Benchmark climate scenario for financial institutions
<b>Risk management</b>	-	V20-led Sustainable Insurance Facility	-	-
<b>Capacity building</b>	-	-	-	Capacity- and competency-building working group for financial institutions and key service providers

Overall, these findings imply that climate reporting and disclosure is a priority for the four countries' financial sector decision-makers. This is logical since reporting is an important first step in allowing financial sector decision-makers to understand how climate risk information is gathered and used. However, with the exception of South Africa, the lack of initiatives covering other aspects of the climate risk information spectrum indicates the possibility that financial sector institutions in Ethiopia, Ghana and Kenya may face the danger the FSB highlights about a lack of appropriate data to assess these risks, thereby limiting the ability of financial firms to take the necessary actions.<sup>99</sup> This then leads to the observation by the International Monetary Fund (IMF) and NGFS that climate-related financial risks may not be fully reflected in asset valuations, and thus increase financial stability risk and sovereign risk.<sup>100, 101</sup>

#### 4. Addressing challenges in generating climate risk information in Africa

Five main challenges related to climate risk information in Africa were highlighted during the workshop discussions, some of which were echoed in the desktop review and interviews. These included low insurance penetration in African countries, a lack of reliable data, the still evolving methodologies to assess climate-related risks in the financial sector, the lack of clear policy signals, and anti-competitive issues preventing cooperation and information-sharing amongst financial institutions.

Table 3 below links these challenges to the different categories of climate risk information and outlines some considerations for financial sector decision-makers to address these obstacles, where relevant.



Darling Wind Farm, South Africa. © warrenski via Flickr

**Table 3. Financial sector policy interventions to address climate risk information challenges in Africa**

Challenge	Relevant climate risk information category	Financial sector policy intervention considerations
1. Risk management options are limited because of low insurance penetration in many African countries.	Risk management	Increasing insurance penetration typically falls within the mandate of financial sector decision-makers. However, risk management techniques do not have to be product related: financial sector decision-makers can support the adoption of risk management tools such as PACTA or IFC's CAFI.
2. Reliable data is not always available, particularly in relation to Scope 3 emissions; a challenge faced by commercial as well as non-profit organisations. While certain UN organisations provide useful, publicly-available data, additional support is needed for research and data collection, including the requirement that every company should disclose its climate risk.	Data	Financial sector decision-makers in certain jurisdictions are making disclosure and reporting mandatory in the non-financial and financial sectors. <sup>102</sup> This is based on initiatives such as TCFD and the Carbon Disclosure Project, among others.
3. Methodologies to assess climate-related risks in the financial sector are still evolving, a process made more complex because of the many variables that need to be considered.	Analysis	<p>The complexity of the risk analysis process is increased because climate-related risks will always be one of the many risks that financial institutions need to consider before entering into a financial transaction. Financial sector decision-makers, such as the Ghanaian Ministry of Finance, have supported research that analyses climate-related risks and transmission mechanisms in the agricultural sector. South Africa's National Treasury is in the process of developing a benchmark climate scenario against which financial institutions can perform analysis.</p> <p>Financial sector decision-makers can support this need by following similar approaches, including identifying priority sectors for which research into transmission mechanisms is needed and supporting the development of risk management methodologies, such as climate scenario analysis.</p>

<p>4. Clearer policy signals are needed because fossil fuels will continue to be a significant part of the energy mix in many countries, yet there is a need for the energy sector to be aligned with the Paris Agreement, which requires a rapid decrease in fossil fuel use.</p>	<p>Targets</p>	<p>Although target mitigation measures exist in the context of a country's NDCs, energy policy related to fossil fuels is typically not within the purview of financial sector decision-makers. However, given the potential financial stability risks and sovereign risks stemming from climate risks brought about by energy policies not aligned with the Paris Agreement, financial sector decision-makers need to highlight this risk to planners in government.</p>
<p>5. Anti-competitive issues sometimes prevent cooperation and sharing of information between financial institutions in relation to climate risk information.</p>	<p>Data</p>	<p>Financial institutions, particularly insurance companies, gather important climate risk data. Examples include physical and financial losses in the event of weather events exacerbated by climate change. Finding a way for this information to be used, without financial institutions losing the incentive to gather it, would be highly beneficial.</p>

## 5. Conclusion and recommendations

The initiatives and policies that financial sector decision-makers in Ghana, Ethiopia, Kenya and South Africa have implemented related to climate risk information are a positive trend. These developments are especially important since many African countries are vulnerable to climate change, and this vulnerability extends to the financial sector and contingent liabilities of ministries of finance related to climate change. There were also positive indications of momentum regarding climate risk management in Africa at the UNFCCC COP26 held in Glasgow in 2021. Some notable announcements included:

- The German Government provision of premium support of EUR 18 million to subsidise climate insurance premiums for African Risk Capacity (ARC) Member States.<sup>103</sup>
- The Financial Sector Development Department of the African Development Bank (ADB) development on the Africa Financial Sector Corporate Governance initiative to provide technical assistance focused on climate risk management for regulators and banks.<sup>104</sup>
- An investment of US\$ 143 million focused on climate adaptation and agricultural insurance by the Green Climate Fund (GCF) and International Fund for Agricultural Development (IFAD). The programme will be implemented in Burkina Faso, Chad, The Gambia, Mali, Mauritania, Niger and Senegal.<sup>105</sup>
- The African Financial Alliance on Climate Change (AFAC) announcing a focus on climate risk-mitigating financial instruments, climate risk disclosure and knowledge sharing for African financial sectors.<sup>106</sup>

It is also positive in that the FSB, which has a global influence on financial sector policies, acknowledges that a lack of data may hamper the ability of financial institutions to reduce or manage climate-related risks. The categorisation of climate risk information into six categories that this paper developed may provide a useful framework for financial sector decision-makers to understand where best to focus efforts to address these challenges.

This report found that financial sector decision-makers in all four of the countries have developed initiatives and policies related to the disclosure and reporting category, but not consistently across the other categories. This may be the result of several challenges regarding climate risk information. These include the lack of available climate risk data, the lack of capacity to generate and analyse the data, and insufficient tools to analyse and understand the transmission channels of climate risk to financial risks. It is also clear that there are areas of climate risk information not currently being addressed by financial sector initiatives or policies in the four countries studied, such as setting science-aligned targets. This indicates that the financial sector in these countries may not be reflecting climate-related financial risks in asset valuations, leading to financial stability risk and increased sovereign risk.

This points to several recommendations:

1. **Financial sector decision-makers need to think beyond their traditional sphere of influence** to ensure that the financial sector has the necessary climate-related information to manage climate risks and take advantage of the opportunities that addressing climate change brings. This can be done through further analysis on the extent to which the mandate and focal areas of financial sector decision-makers prevent them from addressing gaps in climate-risk information.
2. **Countries should consider including the need to adapt and transform their financial sectors in their updated NDCs.** In addition to highlighting the imperative to focus on this area, addressing the financial sector in NDCs should allow financial sector decision-makers to understand their role in supporting the shifts required in the financial sector so it can better support their country's overall climate change mitigation and adaptation goals.
3. **Further analysis is required to identify and categorise the type of climate risk information needed by financial sector decision-makers.** This will allow clearer lines of responsibility in terms of the parties creating and curating the information. It will also allow for the identification of relevant open data platforms, or the development of these platforms where they do not exist, to ensure that such information is easily and widely available.
4. **Detailed analysis is needed on the 'gaps' in climate risk information.** This should ideally be done on a regional basis, given the diverse nature of regional climate change impacts. The FSB is carrying out this exercise at an international level.
5. **A mapping of climate risk information for public companies and public financial institutions,** such as sovereign wealth funds, and public insurance and savings schemes, would extend the information provided by budget-related initiatives such as CPEIR. In several countries, these organisations play a significant role in the economy but, unlike private listed companies, they are typically not required to assess and disclose climate risk information.



Rainwater harvesting in Machakos county, Kenya. © Timothy Mburu via Flickr

## Glossary

<p><b>Basis risk</b></p>	<p>Basis risk in weather index insurance (see below) arises when insurance payouts depend on index measurements that do not match an individual’s actual losses. There are two major sources of basis risk in index insurance. One source stems from poorly-designed products, and the other from geographical elements.</p> <p>Product design basis risk is minimised through robust product design and backed by testing contract parameters. Geographical basis risk is a factor of the distance between the index measurement location and the production field. The greater the distance between the measurement instrument and the field, the greater the basis risk.</p> <p>For example, some households that experience loss may not receive compensation [or insurance pay outs], while others that experience no loss may receive payments. This basis risk is reduced when the area covered by the index is homogeneous, both in terms of weather and farming techniques. Therefore, as the density of weather stations and satellite pixels (which provide images used within measurement) is increased, basis risk is minimised.<sup>107</sup></p> <p>Basis risk is a barrier to widespread uptake of index insurance developed to help farmers manage weather-related disasters.</p>
<p><b>Climate risk information</b></p>	<p>Information about climate change that allows users to better understand the risks related to climate change at a global, regional, country, local, ecosystem, company or household level.</p>
<p><b>Climate service</b></p>	<p>A decision aide derived from climate information that assists individuals and organisations in society to make improved ex-ante decision-making. A climate service requires appropriate and iterative engagement to produce a timely advisory that end-users can comprehend and which can aid their decision-making and enable early action and preparedness. Climate services need to be provided to users in a seamless manner and, most of all, need to respond to user requirements.<sup>108</sup></p>
<p><b>Financial stability</b></p>	<p>According to the World Bank, there are numerous definitions of financial stability. Most of them have in common that financial stability is about the absence of system-wide episodes in which the financial system fails to function. It is also about the resilience of financial systems to stress.</p> <p>A stable financial system can efficiently allocate resources, assess and manage financial risks, maintain employment levels close to the economy’s natural rate, and eliminate relative price movements of real or financial assets that will affect monetary stability or employment levels. A financial system is in a range of stability when it dissipates financial imbalances that arise endogenously, or as a result of significant adverse and unforeseen events. In a stable phase, the system will absorb the shocks primarily via self-corrective mechanisms, preventing adverse events from having a disruptive effect on the real economy or other financial systems. Financial stability is paramount for economic growth, as most real-economy transactions are made through the financial system.</p> <p>The true value of financial stability is best illustrated in its absence, in periods of financial instability. During these periods, banks are reluctant to finance profitable projects, asset prices deviate excessively from their intrinsic values, and payments may not arrive on time. Major instability can lead to bank runs, hyperinflation, or a stock market crash. It can severely shake confidence in the financial and economic system.<sup>109</sup></p>
<p><b>Index insurance</b></p>	<p>A market-based instrument that provides insurance against weather-related disasters. Payouts in weather insurance are triggered on the basis of a pre-specified “index” that is calculated using weather parameters, such as rainfall or temperature.<sup>110</sup></p>

<b>Nationally Determined Contributions</b>	NDCs are the heart of the Paris Agreement and the achievement of these long-term climate goals. NDCs embody efforts by each country to reduce national GHG emissions and adapt to the impacts of climate change. The Paris Agreement (Article 4, paragraph 2) requires each Party to prepare, communicate and maintain successive NDCs that it intends to achieve. Parties were requested to submit the next round of NDCs (new NDCs or updated NDCs) by 2020 and every five years thereafter (e.g. by 2020, 2025, 2030), with the ambition of the NDC progressing over time and in each successive NDC. <sup>111</sup> This was updated in Glasgow with countries being requested to use common timeframes for their NDC commitments, and to strengthen 2030 targets by the end of 2022 to align with the Paris Agreement temperature goal. <sup>112, 113</sup>
<b>Sovereign risk</b>	The chance that a national government's treasury or central bank will default on their sovereign debt, or else implement foreign exchange rules or restrictions that will significantly reduce or negate the worth of its forex contracts. <sup>114</sup>
<b>Scope 1 emissions</b>	The GHG Protocol Corporate Standard classifies a company's GHG emissions into three types of scope. Scope 1 emissions are direct emissions from owned or controlled sources. <sup>115</sup>
<b>Scope 2 emissions</b>	The GHG Protocol Corporate Standard classifies a company's GHG emissions into three types of scope. Scope 2 emissions are indirect emissions from the generation of purchased energy. <sup>116</sup>
<b>Scope 3 emissions</b>	The GHG Protocol Corporate Standard classifies a company's GHG emissions into three types of Scope. Scope 3 emissions are all indirect emissions (not included in Scope 2) that occur in the reporting company's value chain, including both upstream and downstream emissions. <sup>117</sup>
<b>The Paris Agreement</b>	<p>The Paris Agreement is a legally-binding international treaty on climate change. It was adopted by 196 Parties at COP 21 in Paris on 12 December 2015 and entered into force on 4 November 2016. Its goal is to limit global warming to well below 2 degrees Celsius, and preferably to 1.5 degrees Celsius, compared to pre-industrial levels.</p> <p>To achieve this long-term temperature goal, countries aim to reach global peaking of GHG emissions as soon as possible to achieve a climate-neutral world by mid-century.</p> <p>The Paris Agreement is a landmark in the multilateral climate change process because, for the first time, a binding agreement brings all nations into a common cause to undertake ambitious efforts to combat climate change and adapt to its effects.<sup>118</sup></p>

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Rain gauge in operation in Itare, Kenya. © Sande Murunga, CIFOR via Flickr

## About CDKN

The Climate and Development Knowledge Network (CDKN) supports decision-makers in developing countries in designing and delivering climate-resilient development. We do this by combining knowledge sharing, research and advisory services in support of locally-owned and -managed climate-resilient action. CDKN works in partnership with decision-makers in the public, private and non-governmental sectors nationally, regionally and globally.

## About ZeniZeni

ZeniZeni aims to help solve the critical sustainability issues facing players in the finance and financing sectors in a wide range of development contexts.

The firm has a strong focus on policy research related to climate change, gender and finance. Current research includes policy strategies to integrate climate change into sovereign and private sector financing, policy options to improve the accuracy and availability of climate risk information for financial sector decision-makers, and approaches for sovereign financing of gender projects.

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