CHAPTER 15:
BUILDING ON THE LINKS BETWEEN CLIMATE CHANGE ADAPTATION AND DISASTER RISK REDUCTION

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15.1. Introduction

Climate change adaptation (CCA) and disaster risk reduction (DRR) have similar aims and are very closely related. However, they tend to differ in their timeframes of focus, with CCA looking at the longer term (e.g. five to 40 years) and DRR more concerned with the more immediate term. Despite their similarities in aim, the two fields have arisen with a false degree of separation. The separation is perpetuated by them typically being addressed within different government departments, and guided by different international agreements. However, taking a holistic risk management approach offers the opportunity for greater complementarity. This chapter outlines the links between CCA and DRR and how they are variously guided by global commitments in terms of the UNFCCC, Sendai Framework and Sustainable Development Goals. It then highlights institutional challenges in addressing CCA and DRR in the SADC region.

Box 15.1: Definitions of DRR and CCA (according to the IPCC Fifth Assessment Report)

Disaster risk reduction "denotes both a policy goal or objective, and the strategic and instrumental measures employed for anticipating future disaster risk; reducing existing exposure, hazard, or vulnerability; and improving resilience". (IPCC, 2014: 1763)

Climate change adaptation is "the process of adjustment to actual or expected climate and its effects. In human systems, adaptation seeks to moderate harm or exploit beneficial opportunities. In natural systems, human intervention may facilitate adjustment to expected climate and its effects." (IPCC, 2014: 1758)

15.2. Links between CCA and DRR

CCA and DRR have similar aims – both are concerned with reducing the potential negative impacts of exposure to hazards by improving the ability to anticipate, resist, cope with and recover from such events (see Box 15.1). However, they have evolved from different circumstances and continue to have small differences.

DRR has evolved from disaster risk management and disaster response. Typically, response to disasters was reactive, and planning focused on capacity to respond. The SADC Disaster Preparedness Forum, for example, would look at potential disaster exposure on an annual basis in order to prepare for response, for example through stockpiling and contingency planning. DRR arose as an attempt to be more proactive in addressing the likelihood of disasters occurring, as opposed to being ready to react to them. DRR typically addresses a range of hazards, from tectonic (e.g. earthquakes and volcanoes) to man-made as well as hydrometeorological (extreme weather events such as droughts, floods and cyclones – on which we focus here). In the context of a changing climate, climate hazards make up the majority of disasters which occur (WMO, 2014).

Disasters have a long history and are not only related to climate events (such as droughts, floods and cyclones) – although in the context of a changing climate, these make up the majority of disasters which occur. The costs of disasters arising from extreme climate events are also increasing (see Chapter 3). It is important to remember that an increasing incidence of extreme events or climate hazards will not necessarily lead to more disasters – it is the combination of exposure with a vulnerable population that leads to increased disaster risk. Climate change will contribute to exposure, and it will also contribute to vulnerability through the changes in water and food availability, and on livelihoods.

The focus with DRR is on reducing disaster risk at the present time. Mechanisms focus on early-warning systems – providing information and establishing an institutional infrastructure for awareness raising and response preparedness, such that appropriate activities can be implemented in case of different alert levels.

CCA is very similar in its aims of reducing vulnerability to reduce the likelihood of harm. As well as changing the context of disasters, climate change will also manifest itself in incremental change in temperatures and rainfall, as well as through extreme events that may lead to disasters. Adaptation is thus necessary in addition to DRR. However, CCA takes a longer-term and more forward-looking perspective. In order to reduce vulnerability and build resilience, climate change adaptation requires a different approach to development (Schipper, 2007; Jones et al., 20165). In reality, all adaptation should also be development (particularly in an African context, where immediate development improvements are so pressing), but not all development is adaptation. In essence, development becomes adaptation when it has no or low regrets – i.e. its sustainability and robustness under a range of potential feasible climate futures have been taken into account. Adaptation-related activities can thus involve two main components (McGray et al., 2007). One of these is helping populations and institutions cope better with climate change, particularly where it involves the incremental intensification of currently familiar climate hazards. The other is interventions that are specifically designed to address particular aspects of climate change. These actions are typically "hard" and often involve climate proofing of existing or new planned infrastructure at a variety of scales. This marks another way in which CCA and DRR can be different: while both DRR and CCA involve soft knowledge-based interventions, typically only CCA involves the large-scale hard infrastructural interventions.

15.3. Global commitments to addressing CCA and DRR

15.3.1. United Nations Framework Convention on Climate Change

The United Nations Framework Convention on Climate Change (UNFCCC) acknowledges vulnerability to climate change and calls for efforts to reduce the consequences through adaptation. This is to be enabled through financial support, capacity building and technology transfer to developing countries. Commitment to adaptation has grown within the UNFCCC framework since its signing in 1992.

The first key activity came with the Least Developed Countries Programme, which was signed at the 7th Conference of the Parties (COP) in Marrakech in 2001. This provided a mechanism for least developed countries to outline their particular adaptation needs through creating National Adaptation Programmes of Action, which were to inform particular needs for financial, capacity building and technology transfer support.

The second wave of support for adaptation came in the form of the Nairobi Work Programme, which was the outcome of the 12th COP in Nairobi in 2006.

The most recent development with regards to adaptation within the UNFCCC is the Cancun Adaptation Framework, signed at the 16th COP in Cancun in 2010. Within the Cancun Adaptation Framework is a mechanism to enable Least Developed Country Parties to formulate and implement National Adaptation Plans, as well as consider how to determine loss and damage. The Cancun Adaptation Framework also mandated the establishment of a dedicated institution within the UNFCCC – the Adaptation Committee. This committee is tasked with providing technical support, enabling information sharing and knowledge management, and providing inputs to Parties and the COP on adaptation actions (e.g. UNFCCC Adaptation Committee, 2014).

As the first legal agreement under the UNFCCC – the Kyoto Protocol – comes to an end in 2020, it will be superseded by the Paris Agreement. The Paris Agreement was negotiated at the 21st COP of the UNFCCC, held in Paris in December 2015, and was opened for signature on 22 April 2016. Its main focus is mitigation, and attempting to keep global temperature increase well below 2 °C in the twenty first century, and pursue efforts to limit the increase to 1.5 °C. However, the text also outlines adaptation, as well as finance, capacity building and technology. The Paris Agreement will be reached through Nationally Determined Contributions (NDCs) from each Party, some of which contain adaptation commitments. National Adaptation Plans will support planning for adaptation.

15.3.2. Sendai Framework

The Sendai Framework for Disaster Risk Reduction 2015-2030 arose out of the UN World Conference on Disaster Risk Reduction in 2015. It builds on, and is a successor to, the Hyogo Framework for Action (HFA) 2005-2015: Building the Resilience of Nations and Communities to Disasters. During the lifetime of the HFA there was a discernible shift from disaster management to risk reduction, on which the Sendai Framework builds. In addition, it highlights the need for improved understanding of disaster risk in all its dimensions of exposure, vulnerability and hazard characteristics and the strengthening of disaster risk governance (priorities one and two). Sendai is implemented by the United Nations International Strategy for Disaster Reduction (UNISDR), with the support of a Global Platform for Disaster Risk Reduction and the regional platforms for disaster risk reduction as mechanisms for coherence across agendas, monitoring and periodic reviews in support of UN governance bodies.

15.3.3. Sustainable Development Goals

The Sustainable Development Goals (SDGs) were agreed in New York in 2015 and provide targets up to 2030 across a range of development spheres. The purpose of the SDGs is essentially to build on the Millennium Development Goals (MDGs) and complete what they did not achieve in attaining sustainable development. Unlike in the MDGs, climate change is expressly included in the SDGs, with goal 13 to "take urgent action to combat climate change and its impacts". International recognition of the need to bring together CCA and DRR is embedded in this goal, which has among its targets "Strengthen resilience and adaptive capacity to climate-related hazards and natural disasters in all countries" (13.1) and "Improve education, awareness-raising and human and institutional capacity on climate change mitigation, adaptation, impact reduction and early warning" (13.3).

15.4. Bringing together CCA through a risk management approach

Taking a risk management approach goes a long way to bridge the fields of climate change adaptation and disaster risk reduction. As described in Chapter 4, the IPCC AR5, in the Working Group on Vulnerability, Impacts and Adaptation, has taken this on board, and is highly concerned with risk identification and management (Figure 4.1). The Figure shows that climate risk, or the probability of an impact, is a function of hazards, exposure and vulnerability. This means that for climate risk to exist, there needs to be a combination of those three elements. Disaster risk can be seen as a subset of climate risk.

Taking this one step further, the IPCC AR5 highlighted a mechanism for defining tolerable risks. Figure 15.1 shows how tolerable risks exist in the space between adaptation limits and acceptable risks. Expanding the adaptation limits will lead to a greater range of tolerable risks and, ultimately, lowered risks of adverse impacts of climate change.

Recognising the normative nature of adaptation in the risk management approach opens up politicisation of adaptation decisions. For every objective, there may be multiple adaptation options, each of which is associated with a particular set of costs, benefits and externalities. Major challenges of adaptation are its incompatibility with political timeframes and its relative invisibility (i.e. if an adaptation has been successful there will be no negative impact in the face of hazard exposure; yet such "non-events" do not receive the media coverage and scrutiny of negative impacts). Relative to other immediate development priorities, adaptation can thus be deprioritised (Jones et al., 2015).

As well as the temporal scale, the spatial scale of analysis is also important in considering adaptation. While damming a river to enable irrigation of fields may reduce the vulnerability of one community to lower rainfall and drought, it does so at a cost to downstream settlements whose surface water supply will subsequently be reduced. In some southern African countries, genetically modified organisms (GMOs) have been embraced to address challenges of low productivity and related occurrences of food insecurity; but that adaptation to climate change may be seen as placing an increased risk on genetic diversity and terrestrial ecosystems. This is because it can "out-compete" other varieties locally, reducing species composition and thus the gene pool; but also because forces such as wind dispersal and erosion mean that containing the effects of GMOs in one area is difficult. The same challenges apply for DRR activities, except that they tend to be a subset of adaptation. In addition, DRR activities tend to cover a smaller scale and be more immediate in focus, relative to CCA (Birkmann & von Teichman, 2010).

Bearing in mind a risk-management framework, there are many examples of activities that are considered both CCA and DRR, for example:

- preparing risk assessments,
- protecting ecosystems,
- improving agricultural methods,
- managing water resources,
- building settlements in safe zones,
- developing early-warning systems,
- improving insurance coverage, and
- developing social safety nets.

For sustainability, integrating adaptation and disaster risk reduction into development planning is also key (UNISDR, 2008).

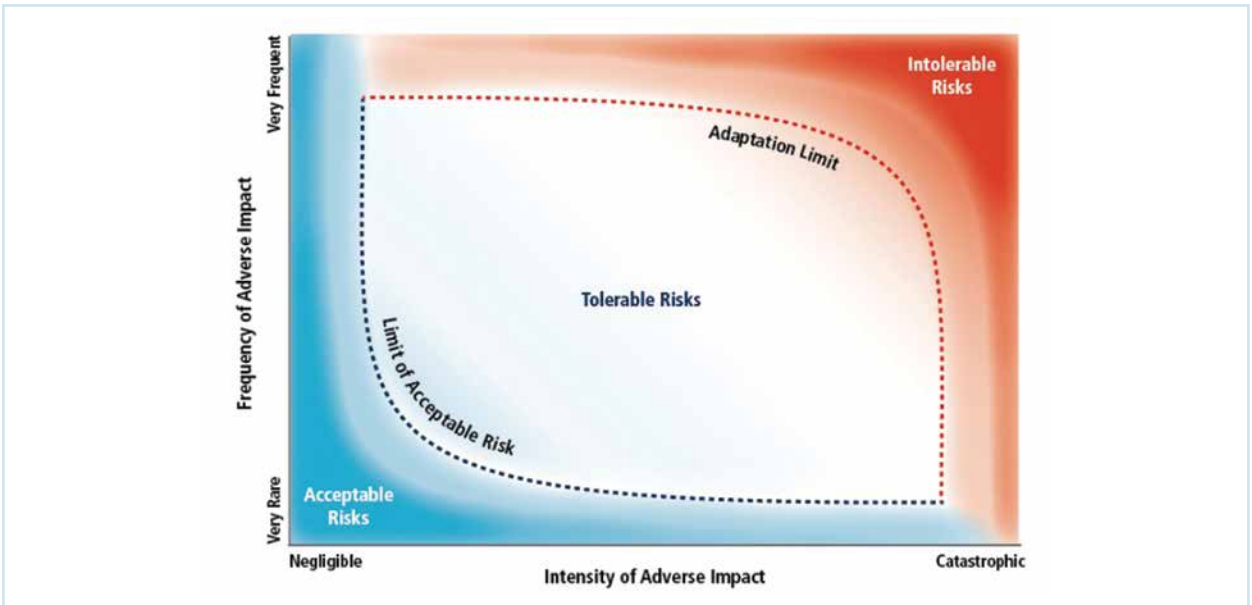

Figure 15.1: Conceptual model of the determinants of acceptable, tolerable, and intolerable risks and their implications for limits to adaptation (Dow et al., 2013)

15.5. Climate Smart Disaster Risk Management

Climate Smart Disaster Risk Management (CSDRM) has been born out of the need to integrate disaster risk reduction and climate change adaptation as discussed above under chapter 15.4. The magnitude of the challenge requires that new ways of addressing disaster be developed, which will include learning to adapt while addressing the drivers of vulnerability in an effective and articulate way. CSDRM is considered as the initial step to adapting to climate change and variability, providing policy-makers with practical measures to allocate resources to reduce current and future risks at all levels. This is an evidence-based approach to incorporating climate change into the current disaster reduction models (Mitchell et al., 2010). The twelve components of CSDRM are divided into three action-oriented pillars:

- Pillar 1 - Addressing changing disaster risks and uncertainties.
- Pillar 2 - Enhancing adaptive capacity.
- Pillar 3 - Tackling poverty and vulnerability and their structural causes.

Pillar 1 – Addressing changing disaster risks and uncertainties

This pillar is based on the Hyogo Framework for Action, indicating the importance of a multi-stakeholder approach as well as information from detailed risk assessments that are done using various sources of knowledge. Access to information through a myriad of forms such as education, early warning and the media can be used to understand and tackle the circumstances that are increasing risk as well as issues of vulnerability (Mitchell et al., 2010).

Pillar 2 – Enhancing adaptive capacity

Under this pillar, enhancing adaptive capacity and building resilience is the key focus. This needs to be done at institutional and network levels by allowing learning, knowledge and experience to be shared to create flexibility in devising solutions for problems faced (Berkes et al., 2003). The following are some the factors essential to increase the resilience:

- Ensuring community participation, promoting diversity and learning, making allowances for all perspectives, integrating uncertainty, and acknowledging the importance of social values and structures in striving for planning, preparedness and readiness.

Enhancing adaptive capacity enables affected communities and institutions to respond to the shocks and threats posed by unexpected events resulting from a changing climate. CSDRM integrates the above-mentioned factors of adaptive capacity and presents these in a practical way (Mitchell et al., 2010).

Pillar 3 – Tackling poverty and vulnerability and their structural causes

The third pillar is premised on the pressure and release models as well as research on the factors that extend from the cause of disasters to the failure of development (Wisner et al., 2004). The pressure and release model considers the root causes, dynamic pressures, unsafe conditions and hazards as all contributing to disaster risk. The contributing factors to vulnerability include population growth, urbanisation, and the lack of skills and institutional arrangements to manage with disaster risk. CSDRM does, however, acknowledge the interdependencies and complications encountered and advocates the integration of the three pillars. Figure 15.2 below highlights guiding questions and includes actions to be taken.

CSDRM needs to be context-specific and tailor-made to address local challenges (Mitchell et al., 2010). For CSDRM to be effective, there is a need for heavy investment in human capacity, institutional cooperation, technical solutions as well as technical innovation. Access to climate science information, and transparent and democratic decision-making will create the environment necessary for the success of CSDRM (Mitchell et al., 2010). Figure 15.2 highlights components of the three pillars that should be considered when promoting CSDRM.

1. Tackle changing disaster risks and uncertainties	2. Enhance adaptive capacity	3. Address poverty and vulnerability and their structural causes
1a **Strengthen collaboration and integration between diverse stakeholders working on disasters, climate and development** To what extent are climate change adaptation, disaster risk management and development integrated across sectors and scales? How are organisations working on disasters, climate change and development collaborating?	2a **Strengthen the ability of people, organisations and networks to experiment and innovate** How are the institutions, organisations and communities involved in tackling changing disaster risks and uncertainties creating and strengthening opportunities to innovate and experiment?	3a **Promote more socially just and equitable economic systems** How are interventions challenging injustice and exclusion and providing equitable access to sustainable livelihood opportunities? Have climate change impacts been considered and integrated into these interventions?
1b **Periodically assess the effects of climate change on current and future disaster risks and uncertainties** How is knowledge from meteorology, climatology, social science, and communities about hazards, vulnerabilities and uncertainties being collected, integrated and used at different scales?	2b **Promote regular learning and reflection to improve the implementation of policies and practices** Have disaster risk management policies and practices been changed as a result of reflection and learning-by-doing? Is there a process in place for information and learning to flow from communities to organisations and vice versa?	3b **Forge partnerships to ensure the rights and entitlements of people to access basic services, productive assets and common property resources** What networks and alliance are in place to advocate for the rights and entitlements of people to access basic services, productive assets and common property resources?
1c **Integrate knowledge of changing risks and uncertainties into planning, policy and programme design to reduce the vulnerability and exposure of people's lives and livelihoods** How is knowledge about changing disaster risks being incorporated into and acted upon within interventions? How are measures to tackle uncertainty being considered in these processes? How are these processes strengthening partnerships between communities, governments and other stakeholders?	2c **Ensure policies and practices to tackle changing disaster risk are flexible, integrated across sectors and scale and have regular feedback loops** What are the links between people and organisations working to reduce changing disaster risks and uncertainties at community, sub-national, national and international levels? How flexible, accountable and transparent are these people and organisations?	3c **Empower communities and local authorities to influence the decisions of national governments, NGOs, international and private sector organisations and to promote accountability and transparency** To what extent are decision-making structures de-centralised, participatory and inclusive? How do communities, including women, children and other marginalised groups, influence decisions? How do they hold government and other organisations to account?
1d **Increase access of all stakeholders to information and support services concerning changing disaster risks, uncertainties and broader climate impacts** How are varied educational approaches, early warning systems, media and community-led public awareness programmes supporting increased access to information and related support services?	2d **Use tools and methods to plan for uncertainty and unexpected events** What processes are in place to support governments, communities and other stakeholders to effectively manage the uncertainties related to climate change? How are findings from scenario planning exercises and climate-sensitive vulnerability assessments being integrated into existing strategies?	3d **Promote environmentally sensitive and climate smart development** How are environmental impact assessments including climate change? How are development interventions, including ecosystem-based approaches, protecting and restoring the environment and addressing poverty and vulnerability? To what extent are the mitigation of greenhouse gases and low emissions strategies being integrated within development plans?

Figure 15.2: The 12 factors of Climate Smart Disaster Reduction Management grouped into three pillars (Source: Mitchell et al., 2010).