



Opportunities for Integrating Climate Change Adaptation and Disaster Risk Reduction in Development Planning and Decision-Making

Examples from Sub-Saharan Africa

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Global Assessment Report
on Disaster Risk Reduction



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Development Planning and Decision-Making

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Anne Olhoff

2011



ENERGY, CLIMATE
AND SUSTAINABLE
DEVELOPMENT

Opportunities for Integrating CCA and DRR in Development Planning and Decision-Making

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AND SUSTAINABLE
DEVELOPMENT

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Framing the issue

Climate change, climate variability and extreme events pose significant risks to development and poverty alleviation today – with compelling scientific evidence that these threats will accelerate in the coming decades. Over the past decades, there has already been a striking increase in the number of climate related disasters, the number of people affected and the economic losses caused by these disasters. Management of climate related risks, including improved understanding and alleviation of the vulnerabilities to extreme events, is imperative to minimise the adverse impacts on human health, society and the environment under current and future climates. It is also an area where climate change adaptation (CCA) and disaster risk reduction (DRR) overlap.

Attention to coordination and collaboration between CCA and DRR bodies in the broader context of development planning and decision-making is subsequently growing at national and international levels. As an example, a clear recommendation of UNISDR (2009, p. 176) is to pursue a functional linking of DRR and CCA within the context of poverty reduction and development. This recommendation is echoed in the literature on linkages between DRR and CCA, as well as in the literature and guidance materials on integration, or mainstreaming, of respectively CCA and DRR into development planning and decision-making frameworks¹. Another prominent example of the growing attention to the linkages between CCA and DRR is the forthcoming special report of the Intergovernmental Panel on Climate Change (IPCC) on ‘Managing the risks of extreme events and disasters to advance climate change adaptation’.

The increasing recognition of the inter-linkages and overlaps between CCA and DRR is similarly reflected in key frameworks, including the United Nations Framework Convention on Climate Change (UNFCCC) and the Hyogo Framework for Action. However, it has not yet translated into systematic integration, or functional linking, of DRR and CCA in activities and mainstreaming efforts on the ground. This is hardly surprising. Climate risk management, coordination of DRR and CCA activities and frameworks, and their mainstreaming in development planning and decision-making processes are relatively new areas of research and practical effort. Furthermore, experience from other areas, such as gender, has shown that mainstreaming is a multidimensional, continuous process that takes time.

Nonetheless, with the increasing funding flows for climate change adaptation and risk management and the significant international, national, and sub-national climate change programming and planning efforts undertaken and underway, this is a vital time to bring about closer coordination of disaster risk reduction and climate change adaptation efforts.

Much of the available literature on coordination of CCA and DRR focuses on identifying and analysing opportunities and barriers for coordination at the overall institutional or framework level (Sperling & Szekely, 2005; Birkmann & von Teichman, 2010; Schipper & Pelling, 2006; Mitchell & van Aalst, 2008).

¹ See for example Mitchell & van Aalst, 2008; Few, Osbahr, Bouwer, Viner, & Sperling, 2006; Commission on Climate Change and Development, 2009; OECD, 2009; Schipper & Pelling, 2006; UNPEI, 2009a; UNPEI, 2009b; Swiss Re, 2010b, and; Benson, Twigg, & Rossetto, 2007.

In this paper, we examine nine Sub-Saharan African climate change adaptation mainstreaming projects implemented as part of the joint UNEP-UNDP CC DARE programme². The objective is to identify preliminary lessons and potential ways forward for supporting systematic integration of CCA and DRR in the context of development based on climate risk management and mainstreaming implementation efforts on the ground.

The idea is that by examining climate risk management efforts on the ground, it is possible to identify areas where successful collaboration and coordination of CCA and DRR is taking place as well as where opportunities for collaboration and coordination may be further exploited. A pragmatic bottom-up approach facilitates consideration of activities at the local level, which is where the impacts of climate change, climate variability, and extreme events are witnessed and where risks ultimately need to be handled. Furthermore, it is in tune with the decentralisation processes occurring in many countries.

Demonstration of prospects for and benefits of an integrated approach to CCA and DRR in the context of development based on experiences on the ground may in turn facilitate concerted efforts at higher level, not only for functionally linking policy and governance frameworks for disaster risk reduction and climate change adaptation, but also for the broader integration, or mainstreaming, of DRR and CCA into development planning and poverty reduction.

The paper starts by examining the rationale for coordination and mainstreaming of CCA and DRR based on trends in climate variability and extreme events, disasters, and their economic implications and on overlaps and conceptual similarities between CCA and DRR. Next, a brief overview of common characteristics of CCA and DRR climate risk management and mainstreaming approaches is provided along with emerging experience from their application in the context of climate change adaptation. This is followed by an analysis of nine climate change adaptation mainstreaming projects in Sub-Saharan Africa focusing on whether collaboration and/or coordination of CCA and DRR is taking place and on identifying opportunities arising at various levels and from various implementation approaches for pursuing coordination and collaboration between CCA and DRR. The final section offers a discussion of potential ways forward for supporting systematic integration of CCA and DRR in the context of development.

The case for coordination and mainstreaming

Trends: Climate, disasters and economic implications

Examination of the trends in climate, disasters and associated economic implications provides a strong rationale for coordination between CCA and DRR and for their mainstreaming into development planning and decision-making.

² CC DARE: Climate Change and Development – Adapting by Reducing Vulnerability. More information on the programme is provided in the section on case examples.

Climate and disasters

There is increasing evidence that the burden of climate change, including variability and extreme events and associated disaster risk, falls disproportionately on the poorest of developing countries and the poorest and most vulnerable parts of the populations within developing countries³. As noted by for example Sperling & Szekely (2005) and IPCC (2007), the degree of vulnerability to climate related hazards is a function of the magnitude of physical exposure and prevalent environmental and socioeconomic conditions, which may lessen or exacerbate the risk for a negative impact associated with a hazard or climate change. With high exposure and limited adaptive capacity, Sub-Saharan Africa is among the most vulnerable regions in the world.

Climate change will be felt most directly through the impacts of increased climate variability and changes in frequency and intensity of extreme weather events. Climate variability and extreme events have immediate implications for wellbeing and livelihoods and are implicit in the projected longer-term changes in climatic averages. Even small increases in average temperature are projected to lead to a rise in the frequency and intensity of extreme weather events (UNFCCC, 2008) and increased climate variability with direct consequences for disaster risk – and climatic changes are already observed. One of the most prominent findings in the peer reviewed literature is that the frequency and intensity of heavy precipitation events has increased in most areas in recent years, even in land regions that have experienced a reduction in total precipitation. In addition, longer and more intense droughts have been observed especially in the tropics and subtropics since the 1970s (Trenberth, et al., 2007). Other observed changes include increases in the frequency and intensity of heat waves, increases in intense tropical cyclone activity in various regions, and increases in the number of incidences of extreme high sea level (Meehl, et al., 2007).

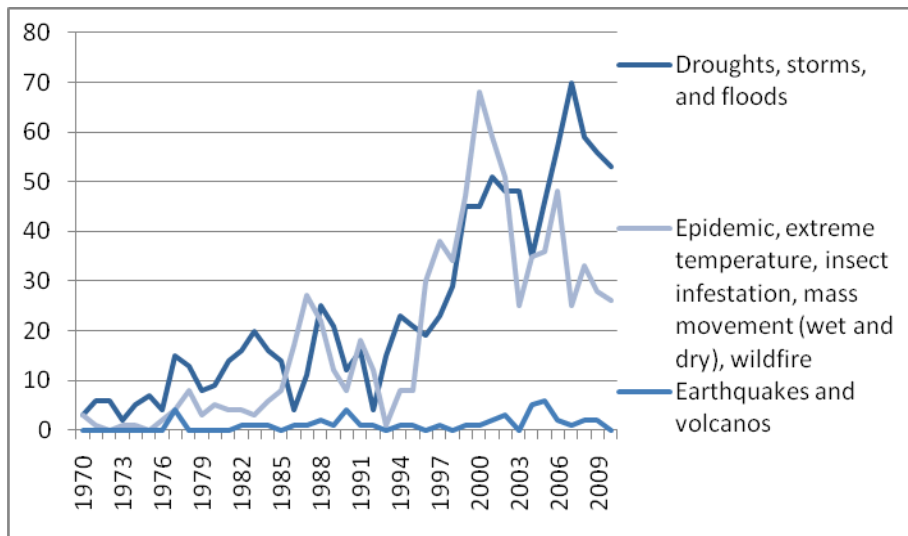
These observations correspond well to the increase in the number of natural disasters experienced in Sub-Saharan Africa (SSA) over the past 40 years. Figure 1 below illustrates the trend in the annual number of natural disasters from the 1970s until 2009. Natural disasters have been divided into three categories: droughts, storms, and floods that are key hydro-meteorological events considered in relation to climate change; epidemics, extreme temperature, insect infestation, mass movements (wet and dry), and wildfires that are climate influenced; and finally, earthquakes and volcanic eruptions that fall under geophysical hazards. As the figure shows, the increase in the annual number of natural disasters in SSA almost exclusively reflects an increase in the frequency of climate related hazards.

While the total number of lives lost due to natural disasters has declined over the same period of time, the increase in the number of natural disasters has led to a comparable increase in the number of people affected by natural disasters. From the 1970s to the 2000s, the number of people in SSA affected by natural disasters more than quadrupled⁴.

³ See e.g. (IPCC, 2007).

⁴ Based on computations of data from CRED, 2011.

Figure 1 Trends in annual number of natural disasters in SSA, 1970-2009⁵



Source: Created on Feb-8-2011 based on data from EM-DAT (CRED, 2011)⁶.

It is interesting to note that although Figure 1 illustrates a pronounced increase since the 1970s in the annual number of the second category of disasters (i.e. epidemics, extreme temperature, etc.), this increase has had very limited impact on the increase in the number of people affected annually by natural disasters. This is apparent in

Figure 2 shows how the increase in the number of people affected by natural disasters over the past 40 years almost entirely mirrors the increase in the number of people affected by the three types of hydro-meteorological events, i.e. droughts, storms and floods (CRED, 2011). The two curves in the figure exhibit an almost complete overlap apart from in 1994, where an epidemic had a noticeable impact on the total number of people affected by natural disasters.

Figure 2 that illustrates the trend in the total number of people affected annually in SSA from 1970 to 2010 by respectively all types of natural disasters and by droughts, storms, and floods.

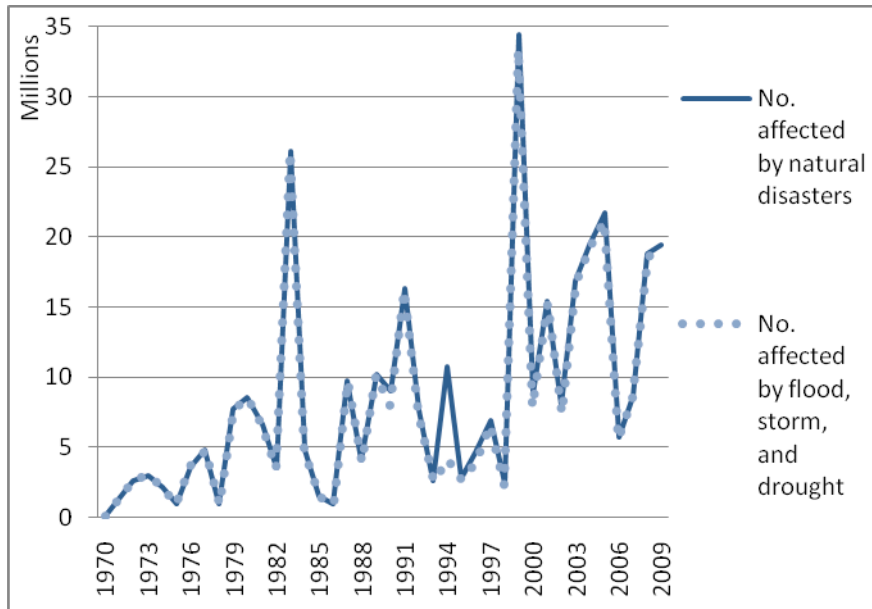
Figure 2 shows how the increase in the number of people affected by natural disasters over the past 40 years almost entirely mirrors the increase in the number of people affected by the three types of hydro-meteorological events, i.e. droughts, storms and floods (CRED, 2011). The two curves in the figure

⁵ In addition to floods, storms, droughts, earthquakes and volcanic activity, total number of natural disasters include epidemics, extreme temperature, mass movement (wet and dry), insect infestation and wildfires. All of these additional disasters are influenced by meteorological and hydrological events.

⁶ To be entered in the CRED EM-DAT database, a natural disaster must involve at least 10 people reported killed; 100 people reported affected; the declaration of a state of emergency; or a call for international assistance. Recorded deaths include persons confirmed as dead and persons missing and presumed dead. Total affected persons include people suffering from disaster-related physical injuries, trauma, or illness requiring medical treatment; people needing immediate assistance for shelter; or people requiring other forms of immediate assistance, including displaced or evacuated people.

exhibit an almost complete overlap apart from in 1994, where an epidemic had a noticeable impact on the total number of people affected by natural disasters.

Figure 2 Trends in total number of people affected annually by natural disasters in SSA, 1970-2009



Source: Created on Feb-8-2011 based on data from EM-DAT (CRED, 2011).

The close correlation between droughts, storms, and floods and total number of people affected by natural disasters implies that the risks associated with these three types of hydro-meteorological events should be a key priority for CCA and DRR in SSA.

Economic implications

The increase in climate related risks and disasters has direct economic consequences. Economic cost estimates from available studies underline that the burden of climate related risks on economic development is significant and rising. Swiss Re, a global reinsurer focussing on risk transfer, risk retention financing, and asset management, report that worldwide, insured annual losses from climate related disasters, that only cover a relatively small part of total losses, have increased by a factor of more than five, comparing the past two decades to the period between 1970 and 1989 (Swiss Re, 2010a). According to UNISDR (2009), the cost of natural disaster related damages rose from USD75.5 billion in the 1960s to roughly USD1 trillion in the 2000s. The World Bank (2004) finds that for the period 1990-2000, natural disasters resulted in damages constituting between 2 to 15 percent of an exposed country's annual GDP. These figures are comparable to the findings of the Economics of Climate Adaptation (ECA) Working Group, that the current climate related losses in developing countries are between 1 and 12 percent of annual gross domestic product and that this figure could increase significantly as soon as by 2030 under a scenario of high climate change (ECA, 2009).

There is broad consensus in available studies that the costs of adaptation and disaster risk reduction as a general rule are smaller than their benefits (Agrawala & Fankhauser, 2008). Examples on the cost effectiveness of risk management measures are reported e.g. by the World Bank (2004), and ECA (2009) further notes that between 40 and 68 percent of the loss expected to 2030 in their studies could be averted through adaptation measures whose economic benefits outweigh their costs.

Nonetheless, significant resources are required to manage the risks of climate change. Studies on aggregate costs of adaptation offer a wide range of estimates from USD4 billion to USD109 billion a year (Parry, et al., 2009). Parry et al. (2009) furthermore suggest that these figures may be substantial underestimates. While there is room for improving the coverage and scientific basis of cost estimates, available estimates are useful in underlining the order of magnitude of the international funding required for addressing adaptation and disaster risk challenges at a sufficient scale in developing countries. A recent study by the World Bank (2010a) estimates that the cost of developing countries to adapt to climate change between 2010 and 2050 is USD100 billion a year. This sum is of the same order of magnitude as the total foreign aid that developed countries now give developing countries each year. However, measured in terms of GDP, it is a very modest percentage, amounting to about 0.2 percent of the projected GDP of all developing countries in the current decade, although this figure is higher for SSA at approximately 0.6 percent.

Funding for climate risk management

Although current funding levels are nowhere near the estimated need as presented above, funding for climate related risk management is increasing considerably. The increase mainly stems from additional financing made available for climate change adaptation through international donors and agencies. However, DRR is generally supported in the key climate change adaptation financing mechanisms. Under the United Nations Framework Convention on Climate Change (UNFCCC), the two mechanisms managed by the Global Environment Facility (GEF): the Least Developed Countries Fund (LDCF) and the Special Climate Change Fund (SCCF), pay specific attention to DRR in their guidance. The Adaptation Fund, which is the financing mechanism for adaptation under the Kyoto Protocol, similarly supports activities 'aimed at addressing the adverse impacts of and risks posed by climate change', although no explicit reference is made to the term disaster risk reduction (Adaptation Fund, 2010).

The support reflects the growing attention in key international frameworks to functional linking of CCA and DRR⁷. The international framework for action on disaster risk reduction, the Hyogo Framework for Action, is explicit about the commitment to promote the integration of risk associated with climate variability and change into DRR and CCA strategies (UNISDR, 2005). Under the UNFCCC, the recently adopted Cancún Adaptation Framework (UNFCCC, 2011) calls for enhanced action on climate change related disaster risk reduction. The Bali Action Plan (UNFCCC, 2007b) also pays specific attention to the significance of disaster risk reduction as part of enhanced action on climate change adaptation, and the link to DRR is also reflected in the Nairobi Work Programme (UNFCCC, 2007a).

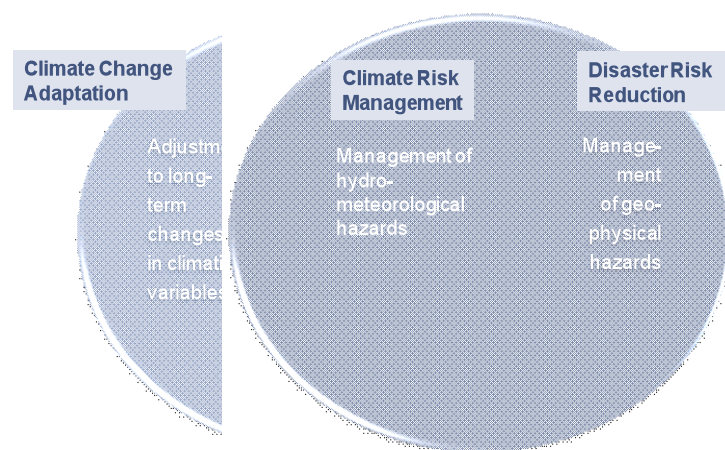
⁷ For a more detailed discussion of the convergence of CCA and DRR in frameworks and finance mechanisms, see for example Mitchell & van Aalst (2008).

The support of DRR in CCA financing mechanism is encouraging for the prospects of closer collaboration and coordination of adaptation and disaster risk reduction as part of comprehensive risk management strategies. It may also provide an additional opportunity for DRR to strengthen efforts aimed at building capacity to reduce future risk, which can be difficult through traditional funding channels, where disaster emergency response continues to divert resources away from prevention (Few, Osbahr, Bouwer, Viner, & Sperling, 2006).

Overlaps and conceptual similarities

Management of climate related risks presents an area where CCA and DRR overlap. This was indicated in the section above and is illustrated in Figure 3 below. Although there are notable differences between CCA and DRR, for example in terms of the types of hazards dealt with, but also regarding the impacts and typical timeframes considered (see Box 2), CCA and DRR share similar objectives and approaches to management of climate related risks (see Box 1).

Figure 3 Overlap between CCA and DRR



Box 1 Definitions of CCA and DRR

Climate change adaptation: “An adjustment in natural or human systems in response to actual or expected climate stimuli or their effects, which moderates harm or exploits benefit opportunities.” (Parry, Canziani, Palutikof, van der Linden, & Hanson, 2007: p.27).

Disaster risk reduction: “The conceptual framework of elements considered with the possibilities to minimize vulnerabilities and disaster risks throughout a society, to avoid (prevention) or to limit (mitigation and preparedness) the adverse impacts of hazards, within the broad context of sustainable development.” (UNISDR, 2004: p.17)

First of all, the overarching objective of CCA and DRR is effective development planning and decision-making. In this regard, coordination helps avoid duplication of efforts and reduces administrative inefficiencies (Mitchell & van Aalst, 2008). Furthermore, to realise the overarching objective, CCA and

DRR need to be integrated, or mainstreamed, into development planning and decision-making processes. Available studies generally conclude that simultaneous achievement of reduction of climate related disaster risk, successful adaptation to climate change and meeting poverty reduction and other development goals, requires that these objectives are pursued in an integrated manner. By integrating climate risk management in development planning and decision-making processes, synergies between development, adaptation and disaster risk reduction can furthermore be exploited.

Secondly, both aim to address underlying vulnerabilities (see [Box 1](#)). It is important to note that development activities that alleviate the root causes of vulnerability generally have positive implications for adaptation and disaster risk reduction – even in cases where climate change is not explicitly considered. It is, however, becoming increasingly apparent that development and disaster risk reduction and management activities that overlook or fail to adequately incorporate the impacts of a changing climate, may unintentionally increase the vulnerability to climate change (i.e. result in mal-adaptation). Coordination of CCA and DRR fosters sharing of information and experiences across institutions and professionals, which enables CCA efforts to build on existing DRR tools and methods, and reduces the risk of maladaptive outcomes of DRR efforts by ensuring that climate change induced changes in hazards are taken into account.

Box 2 Key differences between CCA and DRR

Hazards: DRR focuses on reducing the risks of all natural hazards, whereas the focus of CCA is on hydro-meteorological hazards.

Origin and culture: CCA originates from scientific theory and traditionally emphasises physical exposure, whereas DRR originates from humanitarian assistance and traditionally emphasises vulnerability reduction.

Impacts and time scale: CCA addresses impacts of climate variability, extreme events, and in addition to current and shorter term impacts also considers long-term changes in climatic averages, whereas DRR predominantly focuses on risks and impacts associated with extreme events and adopts shorter timeframes.

For details on differences between CCA and DRR and signs of convergence, see e.g. (Birkmann & von Teichman, 2010), (Few, Osbahr, Bouwer, Viner, & Sperling, 2006), (Mitchell & van Aalst, 2008), (Schipper & Pelling, 2006), (Sperling & Szekely, 2005), and (Venton & La Trobe, 2008).

Finally, a continuous process of evaluation of risks, vulnerabilities and remedial measures is inherent to both CCA and DRR approaches to climate risk management and to its integration into planning and decision-making processes.

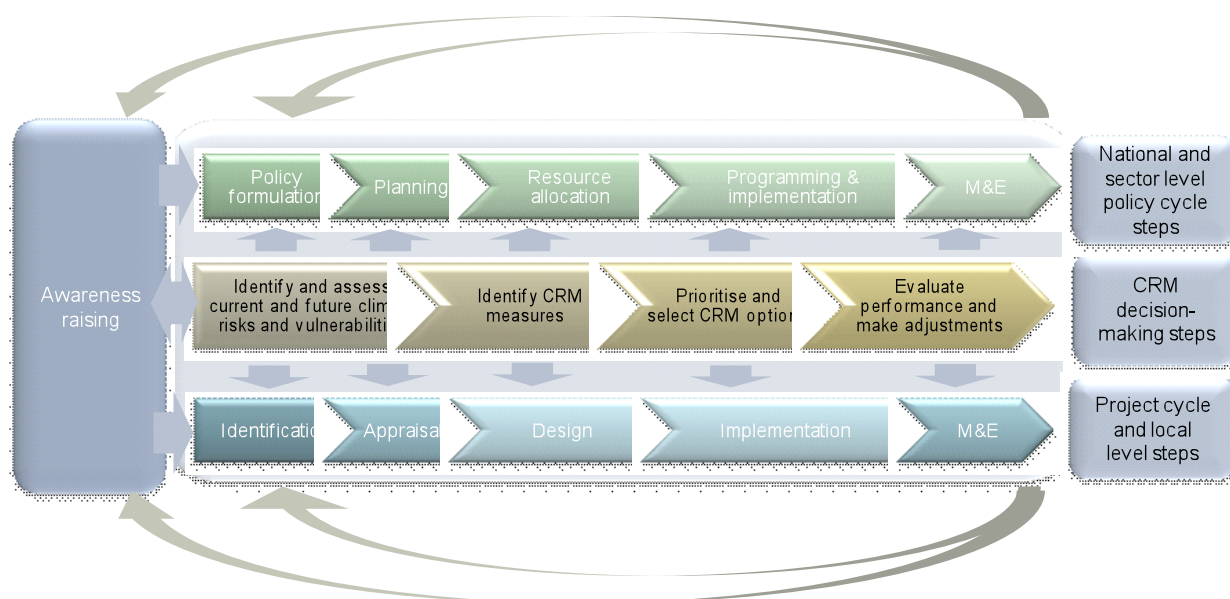
Climate risk management approaches and tools: Common characteristics and emerging experience

To assist the process of integrated climate risk management, a burgeoning number of climate change risk screening tools and mainstreaming guidance materials have been developed over the past five to ten years (La Trobe & Davis, 2005; Benson, Twigg, & Rossetto, 2007; UNDG, 2009; OECD, 2009; UNPEI, 2009a, Olhoff & Schaer, 2010). Although there is a general recognition in these tools and guidance

materials of the desirability of coordination of CCA and DRR, they have primarily been developed and tested separately for mainstreaming, or integration, of disaster risk reduction and climate change adaptation into projects, plans, and policies.

There is, however, a high degree of convergence in CCA and DRR approaches in terms of the climate risk management steps put forward and how they can be linked to and integrated in planning and decision-making processes. Based on analysis of available CCA and DRR approaches and tools, Figure 4 provides a cross-cutting synthesis of the main steps involved in climate risk management and how these can feed into or be integrated in the planning and decision-making steps at project, local, sectoral and national levels.

Figure 4 Integrating climate risk management (CRM) in planning and policy processes



As illustrated in Figure 4, climate risk management and its integration in projects, plans, and policies are perceived as continuous, cyclical processes with feedback loops. A variety of tools and techniques are available to support each of the climate risk management decision-making steps depicted in the figure.

To be effective in increasing the climate resiliency of development policies, plans and projects, climate risk management should be integrated into the relevant policy, project and local planning and decision-making steps. Climate risk management may, however, target existing as well as new projects, plans, and policies and, as indicated in the figure, it can also take place as a separate effort.

As mentioned above, climate risk management tools and approaches primarily have been developed and applied separately for CCA and DRR. Experience from climate change adaptation mainstreaming activities on the ground indicates that application of climate risk and vulnerability screening and assessment tools as a more generic or separate effort can be an appropriate and effective means of increasing the awareness and building capacity among key stakeholders and decision-makers on climate related risks and their potential implications for vulnerability and development (Trærup & Olhoff,

forthcoming). This is particularly the case in situations where the integration of climate risk management into development is in its early stages.

Indeed it seems that awareness raising has been the perhaps most important outcome of climate risk screening and mainstreaming efforts on the ground so far. In addition, identification and assessment of current and future climate risks and vulnerabilities, and identification of climate risk management measures (i.e. the two first steps in the climate risk management decision-making process depicted in Figure 4 and related decision-making steps at project, local, sectoral, and national levels) have been targeted in efforts to date. Prioritisation exercises have been conducted to a lesser extent, few of these have included cost assessments and there is generally limited technical capacity to carry out economic assessments of the costs and benefits of climate risk management measures (Trærup & Olhoff, forthcoming).

The similarities in CCA and DRR approaches to climate risk management and integration in planning and decision-making processes provide a good basis for joint CCA and DRR efforts in the context of development. In the following we take a closer look at recent climate change adaptation mainstreaming efforts in Sub-Saharan Africa to assess whether coordination and collaboration with DRR is taking place in practice and how it may be further supported.

Examples from Sub-Saharan Africa

In this section, we look at 9 projects in Sub-Saharan Africa targeting the creation of a catalytic environment for mainstreaming of climate change adaptation and climate risk

Box 3: CC DARE

The overall objective of the CC DARE programme is to improve the ability of countries in Sub-Saharan Africa to remove barriers and create opportunities to integrate CCA into national development planning and decision-making frameworks. This is achieved through the provision of targeted, flexible and rapid technical and financial assistance to country specific needs identified nationally.

CC DARE is designed to complement and strengthen ongoing and planned country driven CCA and risk management initiatives and builds capacity of national institutions to continue the mainstreaming processes beyond the project period. Using the national system and UN country teams as entry points in the countries, a wide range of stakeholders including national institutions, academia, NGOs, community groups, independent experts, and the private sector participate in the country inception workshops and are invited to submit proposals requesting support through CC DARE.

Technical support to the country projects is provided on a needs basis by national, regional and international consultants, including by UNEP Risoe Centre and UNEP DHI Centre, the two technical CC DARE partner institutions.

Emphasis is on:

- Small-scale, short-term activities developed and implemented by country partner institutions that can have catalytic effects on the enabling environment for climate risk management.
- Diversifying actors and actions: Expanding the number of stakeholders involved in CC and fostering linkages and exchange of information between them.
- Building capacity on a range of the multifaceted dimensions required to integrate CCA responses into projects and development planning and decision-making frameworks.

CC DARE works with 11 partner countries in SSA: Benin, Ethiopia, Ghana, Malawi, Mozambique, Rwanda, Senegal, Seychelles, Tanzania, Togo, and Uganda, and covers more than 35 projects.

For more information, please visit www.ccdare.org

management into development projects, plans and policies at national, sectoral and sub-national levels. We draw on information from country projects implemented as part of the joint UNEP-UNDP Climate Change and Development – Adapting by REducing vulnerability (CC DARE) programme, currently implemented in partnership with 11 countries in Sub-Saharan Africa (see Box 3).

Although climate risk management is specified as an objective, CC DARE is an adaptation programme that does not specifically prioritise or induce inclusion of DRR bodies, stakeholders and approaches. It is however an explicit goal of the programme to induce involvement in climate change adaptation activities by diverse stakeholders to foster cross-cutting linkages and initiatives that support mainstreaming. All projects implemented in the countries are selected based on proposals developed and submitted by a wide range of stakeholders in the countries.

In the case examples presented in the following, we are particularly interested in assessing whether collaboration and/or coordination of CCA and DRR has taken place and in identifying opportunities arising at various levels and from various implementation approaches for pursuing coordination and collaboration between CCA and DRR.

We do not claim that the selected projects are representative of climate change adaptation projects in general. Rather, they represent examples of nationally defined and driven climate change activities in SSA and in that capacity may provide insights on the extent to which CCA and DRR are regarded as interlinked by national stakeholders, in addition to shedding light on the implications that the activities may have for establishing functional links between CCA and DRR within a broader development context at the national and sub-national scales.

Table 1 provides an overview and summary of the projects considered, followed by a presentation of the individual cases.

Table 1 Overview of the cases from Sub-Saharan Africa and key pointers for coordination of CCA and DRR

Project	Key objectives and activities	Level	Linking to DRR?	Target groups	Key pointers for coordination of CCA and DRR
Sustainable development of the coastal zone of the Govuro district in Mozambique	Identification of climate related hazards and impacts; Mapping of climate risk zones and livelihood resources; Analyse current coping strategies and alternative adaptation strategies; Develop land use plan.	District/Community	Yes	District govt. officials; provincial delegates for natural disaster prevention; local technicians; community leaders; community based organisations incl. village disaster committees.	Institutional links strengthened. Participatory approaches at local level support coordination and collaboration between CCA and DRR. Potential for replication in other districts and implementation of demonstration projects. Learning possibilities through methods and tools for CCA and DRR.
Climate change database: Recovery of historical data in Mozambique	Recovery and digitisation of climate data. Training on climate data archiving. Training on climate change detection and monitoring and development of indices of climate extremes.	Institutional	Yes	Training and data recovery: INAM, but also INGC. Links to RIMES. Outreach and communication workshop: Broad range of national stakeholders and international donor agencies.	Capacity to incorporate effects of CC in DRR is built. Institutional collaboration between INAM and INGC and links to international institutions established. Foster and strengthen collaboration and information sharing between CC and DRR experts.
Adapting to Climate Change through Land and biodiversity conservation in Gishwati area in the Nyabihu District, Rwanda	Develop land suitability and land use plans; Establish practical guidelines on sustainable livelihood practices	District/Community	Unclear	Communities, Local Government Authorities, Government Ministries and Departments, and CSOs	Barrier to mainstreaming removed. Making the case for budget allocations and securing international funding for further CCA activities. Revision of existing risk maps to include climate change and climate risks.
Enhancing Capacity Building and Raising Awareness on Climate Change in Rwanda	Awareness and sensitisation; capacity building; Develop training, awareness, and 'Good Practice' materials.	Institutional	Unclear	CSOs, journalists and the public.	Sustainability of capacity building induced through training of trainers. Opportunities for similar activities targeting DRR stakeholders.
Integrating climate risk management into the District Development Planning System in Malawi	Awareness and sensitisation; Building capacity at district level to integrate climate change issues into development planning. Revising the Karonga District Contingency Plan.	District/Community	Yes	District assemblies, area development committees, village development committees, NGOs and CSOs, and communities	Practical example of integrated development, DRR, and CCA efforts at district level facilitated by a NGO. Scope for replication in other districts and countries. Learning: Revision of contingency plan to include CC implications.
Integrating CCA and DRR into annual	Strengthen technical capacity.	District/Community	Yes	Mayors, Local Councillors,	Practical example of integrated development,

Project	Key objectives and activities	Level	Linking to DRR?	Target groups	Key pointers for coordination of CCA and DRR
investment and development plans at the municipality level in Benin	Integrate CCA in the Annual Investment and Development Plans. Establish a system for climate risk and disaster management.			District Heads, Village chiefs, Opinion Leaders, Associations of Producers, Livestock breeders, Craftsmen, NGOs and CSOs	DRR and CCA efforts at municipality level facilitated by a NGO. Scope for replication to other districts and countries.
Integrating climate risk management in urban development plans in Senegal	Revise urban development plans to consider climate risks. Build capacity of local government to tackle climate risks in planning processes. Produce multi-date maps and modelling of the coastal zone.	Urban/District	Unclear	Local population, local government officials and, CSOs and fishermen associations	Ministerial and local govt. capacity on climate risks and adaptation strengthened. Induce specific inclusion of DRR bodies in the expanded project. Learning regarding CCA and DRR methods and tools.
Integrating climate risk management into national planning in Senegal	Determine CC impacts on national development strategy and planning systems; develop a strategy for integrating climate risks in the national planning systems and budget allocation processes (down to local level).	National	Unclear	National and sectoral development and expenditure planning units; parliamentary institutions; institutions at regional level	Practical example of activity targeting CRM at the highest national policy level. Scope for specific inclusion of DRR bodies.
Integrating climate change risks into agricultural planning frameworks in Uganda	Integrate CC in draft Development Strategy and Investment Plan: Build CCA capacity among key stakeholders; Produce CCA mainstreaming guideline.	Sector	No	Technical and ministerial staff at MAAIF; local government officials and line ministries.	Scope for increasing the attention and linking to DRR.

Sustainable development of the Govuro Coastal Zone in Mozambique

The climate related risks that Mozambique is exposed to are similar to the risks faced by other countries in the tropical region. Mozambique's vulnerability to climate variability and change is, however, exacerbated by extreme poverty. In the last ten years, climate related disasters have hit Mozambique hard. Five out of the ten most serious natural disasters recorded, in terms of total number of people affected, have taken place since 2000 and were caused by floods and droughts, and the economic damage costs of the floods in 2000 and 2007 rank 1, 3 and 5 on the top ten of the most economically damaging natural disasters recorded in Mozambique (EM-DAT, 2010).

The Government of Mozambique recognises the links between climate related hazards and poverty and the need to adapt to climate variability and change to reduce the vulnerability of the population. The Government's Five Year Plan (GoM, 2010), the National Poverty Reduction Strategy (GoM, 2006)⁸ and the Mozambican NAPA (MICOA, 2007) were developed with those challenges in mind and emphasise planning at local level. The legislation is thus conducive for mainstreaming of climate related risk reduction and climate change adaptation, but implementation progress is slow and capacity continues to be limited (Sietz, Boschütz, Klein, & Lotsch, 2008).

The overall objective of the Govuro Coastal Zone project was to promote the integration of climate change adaptation and disaster risk reduction measures in development planning and local practices in the coastal Nova Mambone administrative area of the Govuro district, located in the Inhambane province in Mozambique. The project was implemented from December 2009 to May 2010 by the Centre for Sustainable Development of Coastal Zones (CSD-CZ) under the Ministry for the Co-ordination of Environmental Affairs (MICOA).

The population of the administrative area of Nova Mambone is approximately 21,000 and the main economic activities are subsistence agriculture (rain fed with no or very limited levels of mechanisation), traditional fishing and livestock. Although there is potential for developing tourism in the area, tourism is currently very limited and constrained by poor availability of infrastructure and services. Like other coastal districts in Mozambique, Govuro is frequently affected by climate related hazards including floods, high spatial and temporal rainfall variability, cyclones and droughts. As an example, the floods in 2000 and the hurricanes Eline and Jafett in 2003 had significant adverse effects on the economy and livelihoods in the district and resulted in loss of lives as well as destruction of infrastructure and ecosystems.

Adopting a community based, participatory integrated coastal zone management approach, the project specifically targeted:

- Raising the awareness on climate change and related hazards among villagers, civil society, local government and NGOs and empowering them on environment and climate change issues

Box 4. Enabling environment for mainstreaming CCA and DRR in Mozambique

- Supportive legislation
- Donors have a high awareness of climate risks
- Limited individual, organisational, networking, and financial capacity constrain mainstreaming initiatives.
- Overlapping mandates of government entities tend to create conflicts and slow responses to climate related climate stresses and natural disasters.
- Communication is a major challenge particularly in areas vulnerable to natural disasters
- Climate-relevant ministries and national institutions require clear focal points
- Disaster risk reduction is coordinated by the National Institute for Disaster Management (INGC).
- Ministry for Coordination of Environmental Affairs (MICOA) is the main government institution dealing with climate

⁸ The 2006-2009 National Poverty Reduction Strategy has been extended to 2010.

- Enhancing community coping mechanisms through identification and diversification of livelihoods options based on:
 - Documenting climate related natural hazards
 - Assessing current coping strategies and the resources important for coping
 - Develop a land use plan based on detailed mapping of socio-economic infrastructure and economic activities, natural resources and climate risk zones

A household survey was carried out and in addition to seasonal calendars, vulnerability matrices and Climate Vulnerability and Capacity Analysis (CVCA), the CRiSTAL (Community Based Risk Screening Tool – Adaptation and Livelihoods) tool was used to identify vulnerabilities of the community to impacts of climate change and to understand their current coping strategies, the resources important to coping and the constraints to coping.

- Development of a management plan that introduces ecosystem-based sustainable natural resources use practices as an adaptive response to the risks posed by climate variability and change

The need for land use planning at the local level is emphasised in the recent changes of the planning systems, where districts are introduced as basic planning and development units and communities participate in decision making processes. The project is a practical example of how this can be implemented on the ground and has resulted in the development of land use, climate risk zone and socio-economic mapping and plans for the Govuro district, where no plans existed prior to the project. The project also responds to the Mozambican NAPA, where reduction of climate impacts in coastal zones has third priority, with systematic information collecting and creation of a database on the effects of climate change and climate change adaptation measures stated as specific objectives.

The participatory approach of the project provides some interesting insights for the potential for functional linking of CCA and DRR. Several institutions are involved in disaster management in Govuro and the project implementers note that mechanisms for coordination of activities have gradually been established and awareness about the relationship between poverty and disasters has been raised. Main actors include government institutions, NGOs, UN agencies and other bi- and multi-lateral bodies.

As part of the project, village management nucleuses were established to coordinate and implement resource conservation and disaster management measures at the village level. Recently, however, disaster committees have been established in many villages by INGC (National Institute for Disaster Management). In Nova Mambone, natural resources management committees are furthermore established in many villages. Where village management committees were already in place, the project worked with these during the implementation of the project and provided training on climate change, natural resource management and implementation of the land use plan.

Government officials of the district⁹, provincial delegates for the prevention of natural disasters, local technicians, community leaders, and community based organizations and others were all involved in the data collection during the implementation of the project. The consultation meetings carried out during the application of climate change risk screening tools (CRiSTAL, CVCA, seasonal calendar and vulnerability matrices), were attended by representatives of these structures. This helped them to strengthen their capacity on matters relating to climate change and especially to have the tools to take account of for adaptation planning at local level. Through these tools, new skills have been developed to take account of climate change in their daily activities and perform a Climate Change Risk Screening at local level (district, village or community). The technicians also participated in infrastructures and habitat mapping and they were trained in GPS techniques for data collection, identification of species and environmental problems.

During the implementation of the project, strong institutional collaboration has been established among all major stakeholders. A key issue is to ensure that these institutional relationships are maintained to facilitate effective reduction of vulnerability in the coastal district as well as more effective and efficient integration, coordination, and implementation of disaster risk reduction and adaptation measures in the future.

In the final project report, the following aspects of the participatory approach were highlighted:

- The willingness of the technicians and village population to practice self-help in connection with resource conservation measures grew with the progress of the implementation of the project.
- The existence of village level organizations: The existence of organizations at the village level in the project area (both traditional and established by Government) has been highly advantageous for the project because they have facilitated the communication and data gathering.
- The participatory land use planning approach is successful, because it is performed within the context of a dialogue between the villagers and the project. The villagers contribute knowledge of and experience with the environment, and this body of information then constitutes the basis for integrated analysis of the main problems and identification of effective responses. This approach has stimulated positive changes in attitudes and behaviours in the villages.
- Adaptation options must be consistent with national development plans and priorities. This enables them to be easily incorporated into the national and local development activities.
- Public education and awareness raising is a central component of adaptation strategies.
- Involvement of the vulnerable communities is crucial for adaptation strategies.

⁹ The district government is composed by four main administrative services: Economic activities (Agriculture, Fisheries, Forests, Commerce and Industry); Women, social action and health; Education, youth, sport, culture and technology, and; Planning and Infrastructure.

Historical climate data rescue in Mozambique

The national institute of meteorology, Instituto Nacional de Meteorologia (INAM) is responsible for collecting, processing and archiving climate data in Mozambique. The data available in INAM archives dates back to 1909, but before the implementation of the Historical Climate INAM Database Recovery (HCIDR) project, climate data was only available in digitised form from 1951 onwards. The process of digitisation of climate data started under the CLimate COMputing project (CLICOM) of the WMO in 1992. However, due to financial constraints, only a few people were trained on the use of the CLICOM data archive software and it was not possible to digitise all data. Consequently, a decision was made to prioritise the digitisation of data from 1951 onwards, leaving the remaining historical climate data stored under poor conditions, at the risk of being lost. The main objective of the Historical Climate INAM Database Recover (HCIDR) project was thus to recover and digitise historical climate data for the period 1909 to 1950.

The project involved:

- Acquisition of computers
- Training of project personnel (10 persons) in the use of the CLICOM data archive software
- Digitisation of 60 percent of the historical climate data, including data verification and validation
- A five-day training programme organised in collaboration with two experts on climate data analyses from the Regional Integrated Multihazard Early-warning System (RIMES) for Asia and Africa to assist 10 Meteorologists from INAM and 1 person from INGC in the use of the RCLimDex software, developed and recommended by the WMO Commission for Climatology/CLIVAR Expert Team for Climate Change Detection Monitoring and Indices. RCLimdex is an easy-to-use excel based program that allows assessment of quality of long-term temperature and rainfall data and subsequent analyses of trends and extremes in climate data. The Workshop enabled a preliminary analysis building on the climate data rescued by the project for 25 stations and extreme analyses for 10 stations.
- A one day workshop held to present the results of the project to a wide range of central stakeholders. Main recommendations of the workshop included to proceed with analysis based on the new climate data available, and to continue the inventory and digitisation of data, not only at INAM but also in other institutions as the workshop revealed that the Water Directorate, the Ministry of Agriculture and several Provincial delegations, also have data archived under poor conditions.

Inclusion of historical sequences is central to improve the projections of different climate scenarios and in relation to the validation of downscaling of global climate models. The historical data rescue project has assisted INAM to build capacity for climate change scenarios and adaption studies. One of the upcoming studies that will benefit from this is the second phase of a climate change study by INGC that

focuses on adaptation and resilience to climate change risks, thus simultaneously presenting an opportunity for collaboration between climate/meteorological and disaster risk management institutions. It has also assisted INAM in its endeavours to create a reliable platform for climate variability and to develop climatic scenarios useful for different sectors and national development planners in designing development strategies that integrate climate risk management.

The project developed and implemented by INAM is a good example of the catalytic effects that targeted, small scale and well timed interventions can have. Availability of and access to relevant climate and socio-economic data is crucial for development and implementation of sound development strategies that integrate risks posed by climate variability and change. The need for improving the quality and quantity as well as facilitating access to climate data and for strengthening the capacity of INAM has been emphasised in key literature on climate risks and adaptation in Mozambique ((MICOA, 2007), (INGC, 2006), (Bambaige, 2007) (Sietz, Boschütz, Klein, & Lotsch, 2008)). But it is notoriously difficult to obtain funding for data collection and processing.

Based on the interest generated and the mobilisation of key government, donor and other stakeholders by the project, funding has been obtained from the Africa Adaptation Project (AAP) (<http://www.undp-adaptation.org/africaprogramme/national.html>) to continue the digitisation and analysis of the INAM climate data; to initiate a larger project with joint participation of a number of institutions including INAM, the Water Directorate, Ministry of Agriculture and others that targets inventory and digitisation of all available climate data in the country. AAP will furthermore support an ongoing activity related to standardisation of climate observation methods in Mozambique that similarly involves several stakeholders. Detailed project documents are under preparation and present a noticeable opportunity for establishing clear links to INGC.

Building capacity, raising awareness and adapting to climate change through land and biodiversity conservation in Rwanda

In this section, we examine two projects implemented in Rwanda. Their overall objective was to strengthen systemic, institutional and individual capacity in the country to respond to climate change challenges and to remove barriers to climate change adaptation and mainstreaming into the country's development frameworks.

Rwanda is the most densely populated country in Africa and population growth has exceeded agricultural output growth during most of the past 30 years. This has contributed to the occupation, clearing and cultivation of still more marginal land areas and associated degradation of the fragile ecosystems of the country. The 15 year long post-colonial civil war and genocide compounded these problems, causing dislocation of entire communities and refugees settling in wetlands and forests. The land was cleared for subsistence farming. As a result, the ecosystem was severely compromised.

The environmental degradation caused by unsustainable human practices is furthermore exacerbated by an observed increase in extreme weather events and have caused land slides, floods and torrential rain resulting in loss of lives, damage to infrastructure and human settlements, and destruction of forests and farm land.

It is estimated that in the past two decades, Rwanda has lost about 60 percent of its forest cover. For the Gishwati area, the focus area of one of the projects, NASA images reveals that approximately 99.4 percent of the forest cover has been lost since 1978. Only 600 Hectares of the original 100,000 hectares of forest remain (UNEP, 2010).

Rwanda has made significant advances in environmental policies to tackle environmental degradation, which is highlighted in Rwanda's Vision 2020 as a key obstacle to the national growth objectives. Programmes and measures have been developed to support adequate land, water and environmental management techniques and sustainable forestry development together with a sound biodiversity policy. While policies increasingly are in place, implementation faces several challenges. Main challenges for integration of climate change challenges are:

1. Inadequate information and awareness of Rwandan communities on climate change present barriers to the country's efforts in tackling climate change challenges.
2. Existing government and civil society institutions at all levels lack the knowledge, skills and capacities to effectively incorporate and enforce climate risk management in planning and practices.
3. Institutional and regulatory frameworks need strengthening, particularly at the Local Government level.

Targeting these challenges, two projects were implemented by two national NGOs, the Nile Basin Discourse Forum (NBDF) and Rwanda Environmental Non-Governmental Forum (RENGOF). A participatory approach with stakeholder consultations and partnerships was adopted by both projects and both projects included public sensitisation and awareness raising activities, some of which were implemented in partnership between the two NGOs.

The NBDF project specifically aimed at raising awareness and building capacity building on climate change and adaptive responses of Civil Society Organisations (CSOs) and the Media through training of trainers' workshops and the production and dissemination of CCA awareness and best practices materials. Technical assistance for the training courses was provided by the CC DARE team and from regional consultants from the Department of Meteorology at University of Nairobi, Kenya, and from Farmers Media Link Ltd. in Uganda. Technical assistance was also provided for a survey and evaluation

Box 5. Enabling environment for mainstreaming CCA and DRR in Rwanda

- Supportive environmental policies in place and high awareness of the links between environment and development.
- Limited individual, organisational, networking, and financial capacity constrain mainstreaming initiatives.
- DRM incorporated in the UNDAF

Sources: CC DARE country reports and material, Bhavnani, Vordzorgbe,

report on initiatives and best practices for climate change adaptation in Rwanda produced to support future activities as well as enhance coordination of current and planned adaptation initiatives. The survey report was accompanied by a documentary on climate risks and adaptation measures.

The climate change sensitisation aspects were further supported by increased media coverage in the form of newspaper articles, radio talk shows and broadcasting on national television in the wake of the training of journalists. A manual for training of CSOs and journalists on climate change and climate change adaptation was produced to enable replication of the training workshops.

Through the public sensitisation, awareness raising and capacity building activities of the two projects, more than 45 people from CSOs are now capable of extending the training on climate change and adaptation awareness issues and 36 journalists have improved communication skills in reporting on climate change. At district and provincial levels, about 200 citizens in the five provinces of Rwanda participated in sensitisation workshops through cost sharing partnerships between NBDF Rwanda and five of its member NGOs that were among the CSOs trained under the Training of Trainers. Participants included district mayors, field officers from environment and agriculture, local NGOs in various provinces, private firm owners, religious leaders, teachers, opinion leaders, and media enterprises.

The RENGOF led project responded to a government priority to develop a comprehensive and concerted land suitability assessment and land use plan for the Gishwati area and to establish practical guidelines and recommendations for the rural community to adopt livelihood practices that are environmentally sustainable today as well as in the face of a changing climate.

Prior to the CC DARE Project, the Ministry of Natural Resources of Rwanda conducted a study to analyse the environmental vulnerability of the Gishwati forest area and produced a land use map for the Gishwati area of the Nyabihu District. However, the map did not take future climate change into account and did not include a land suitability assessment, nor was a specific land use plan developed. This presented a barrier for the district and the country as a whole to integrating climate change adaptation into local and national development planning and decision-making. Furthermore, the funding of further climate change adaptation initiatives in the area under the Least Developed Country Fund (LDCF) and the Africa Adaptation Programme (AAP) was contingent on the availability of a revised Land suitability and Land use plan where future climate change is taken into consideration.

Through the project, a validated Land Suitability Plan consisting of 1:1,000,000 and 1:50,000 soil maps and a detailed Land Use Plan have been produced and are now available to local government authorities as a tool for stimulating the implementation of climate change adaptation initiatives in the Gishwati Area of the Nyabihu District and for replication in other vulnerable regions of Rwanda. The plan will also enable the Local Government Authorities to relocate communities to lower and less risk prone ground. The areas that have been vacated already by relocated communities are now rehabilitated and re-vegetated using natural and indigenous plant and grass species. The process of producing the plans entailed data collection exercises through simple surveys, desk research, processing of the data and updating of an existing data bank. The process also included consultative meetings with the community, Local Government Authorities, Government Ministries and Departments, and Civil Society Organizations

(CSOs). Small-scale demonstration activities carried out by local residents were included as part of the project and provided very accurate estimates and information that fed into the design of the Land Suitability and Land Use Plan. National and international review of the land use plan was conducted and the final version of the plan was subjected to an extensive national validation process.

The availability of an updated Land Suitability and Land Use Map and Plan for the Gishwati Area of Nyabihu District has provided the opportunity for the Ministry of Agriculture of Rwanda to access US\$25 Million for its implementation. Furthermore, the outputs of the project have helped Rwanda in securing US\$15.9 million for adaptation activities from the Least Developed Country Fund (LDCF).

Integrating climate risk management into the District Development Planning System in Malawi

In 2004, the Government of Malawi adopted a decentralised planning system. Planning starts at Village Development Committee and Area Development Committee levels and feed into District Development Plans. The District Development Plans subsequently feed into the National Development Plan. District authorities are responsible for disaster risk management and environmental planning and management and there are parallel Village, Area and District Civil Protection committees dealing with disaster risk reduction, whose work is supposed to feed into the development committees planning at the relevant levels. Membership of the civil and development committees is often overlapping. The decentralised planning system implies that climate change adaptation and climate risk reduction strategies and actions must be integrated into the Village Development Committees, Area Development Committees and District Development Plans in order to be mainstreamed in the National Development Plan and its sectoral components. Currently, however, district authorities lack resources including technical capacities to plan and implement the decentralisation programme in general and to integrate climate change risks and responses in particular. Awareness of for example priority areas in the Malawian NAPA is low at the district, area and village level and there is a general need to raise awareness on the intrinsic linkages between climate change adaptation, climate related risks and development issues to foster the consideration of climate variability and change in the formulation of development plans and activities at all levels.

Against this background, the Coordination Union for the Rehabilitation of the Environment (CURE) NGO is currently completing a project in the Karonga district of Malawi, focusing on two key aspects:

- (a) Building capacity at district and village level to mainstream climate change in the development plans and programmes at the respective levels, and
- (b) Documenting and disseminating lessons learned with a view to replicate the initiative in other districts.

The main target groups of the project are district assemblies, area development committees, village development committees, NGOs and civil society organisations, and communities.

Main activities under the project are production of video clips to illustrate climate change adaptation options and practices and sensitise the target groups; conducting a training workshop (training of

trainers) targeting the Karonga district assembly and; facilitating the revision of the Karonga district contingency plan and a district development plan to incorporate climate change adaptation issues. Finally, the experiences and lessons learnt will be compiled and communicated to facilitate the potential replication of the activities in the other 27 districts of Malawi.

The revision of the district development plan and the compilation of experiences and lessons learnt are still ongoing. The training of the district assembly took place in mid-October, 2010, and focused on practical approaches, tools and information requirements for integrating climate change issues into development planning. Special attention was given to the Community-based Risk Screening Tool: Adaptation and Livelihoods (CRISTAL) and Local Options for Communities to Adapt and Technologies to Enhance Capacity (LOCATE) tools. Participants undertook a SWOT¹⁰ analysis of the tools and identified actions needed at village, area and district levels to enable the integration of climate change issues into the district development plan. Following up on these actions, the Karonga District Development Plan will be revised to incorporate climate change adaptation issues.

The 2004 Karonga District Flood Contingency Plan has been revised as part of the project and a 2010 Karonga District Contingency Plan produced, using a consultative process and including a broader range of hydro-meteorological (flood, drought and dry spells, and strong winds) as well as geological (earthquakes and tremors) risks. The plan includes an interesting institutional capacity assessment, reiterating many of the challenges facing DRR in Malawi reported elsewhere ((Bhavnani, Vordzorgbe, Owor, & Bousquet, 2008); (Nkhoma, 2010); (Ng'oma & Mwamlima, 2008)). In this way, the 2010 Karonga District Contingency Plan pinpoints that:

- Although the District Civil Protection Committee is in place, Karonga district does not have a dedicated officer responsible for disaster management.
- The oversight functions on matters of disaster and risk management of the District Civil Protection Committee is not accompanied with the necessary resources.
- The Area Civil Protection Committees are only active when an event has occurred. In practice this means that some of these committees are not functional and above all that they do not engage in disaster risk reduction, but only disaster response.

Box 6. DRM and CCA in Malawi

Climate change is coordinated by the Environmental Affairs Department under the Ministry of Mines, Natural Resources and Environment

The Department of Disaster Management Affairs DoDMA is responsible for the overall coordination of disaster risk reduction.

One UN country and a CCP has been put in place.

Lack of coordination internally emphasised by both CCA and DRR institutions.

There is an enabling planning system structure, but lack of coherent DRM and CCA policies as well as financial, technical and human resources to back it up.

(Nkhoma, 2010)

¹⁰ Strengths, Weaknesses, Opportunities and Threats (SWOT) analysis.

- Most of the Village Civil Protection Committees are not functional and are in need of capacity building. Since these committees are at the end of the ladder, resources dedicated to DRM are often used at district and area level.

The original 2004 Karonga District Flood Contingency Plan was developed as part of a UNDP funded project resulting from the severe floods in Malawi in 2001. The objective of the project, which is highlighted as the main DRR project in Malawi (Bhavnani, Vordzorgbe, Owor, & Bousquet, 2008), was to enable the Department of Disaster Management Affairs (DoDMA) to effectively coordinate response to the floods, but in addition to the response activities, some DRR activities were funded and as part of these, DoDMA assisted 7 districts to develop Flood Contingency Plans.

The Karonga District project is a practical example of how development, disaster risk reduction and climate change is addressed jointly at the district level and of how collaboration can be facilitated by a NGO. It is also an example of how at district and lower levels, there is often limited distinction in practice between climate change adaptation and disaster risk reduction issues. This, on the other hand, implies that it can be complicated to assess whether collaboration between CCA and DRR structures is taking place or is induced in various current activities. Given the overlapping functions of committee members and the lack of specific mentioning of involvement of DRR entities and personnel in the project reports, in the present case this was not apparent at a first glance.

More generally, CCA and DRR seem to be facing many of the same challenges in Malawi, including:

- Limited coordination and reporting of activities on CCA and DRR respectively
- Lack of financial resources and technical capacity at national, district, area and village level to address CCA and DRR challenges
- Lack of training on DRR and CCA
- Linkages and coordination with other partners, including between CCA and DRR partners, not in place
- Lack of coherent national policies on CCA and DRR

These challenges and efforts to address them from both CCA and DRR structures simultaneously illustrate opportunities for establishing coordination of climate related disaster risk reduction and adaptation in Malawi. In acknowledgement of the challenges listed above, the Government of Malawi, United Nations and other Donors have for example entered the formulation phase of the Malawi National Climate Change Programme aiming at developing an evidence-based strategic framework and a comprehensive funded program for managing response to climate change in Malawi (UN, 2010). Malawi is one of the 'One UN' countries, which should facilitate coordination of CCA and DRR efforts. Furthermore, the decentralised planning system provides good opportunities for supporting collaboration on CCA and DRR in the context of development on the ground.

Integrating CCA and DRR into annual investment and development plans at the municipality level in Benin

The Alibori District in northern Benin is highly exposed to climate variability and extreme events, particularly in the form of strong winds, shortening of the rainy season, dry spells, floods, and high spatial and temporal rainfall variability. Although local decision-makers are aware of climate variability and change issues, they currently lack the capacity to incorporate these issues and relevant adaptation measures into existing planning and budgeting frameworks.

Against this background, the Initiatives for Integrated Sustainable Development (IDID)¹¹ NGO has implemented a project aimed at strengthening the capacity at municipality level to adapt to climate change. The project targeted six local municipalities¹² and expanded activities from a previous project implemented by IDID NGO as part of the Climate Change Adaptation in Africa (CCAA) Programme funded by IDRC and DfID.

The project adopted a participatory approach involving a diverse group of relevant stakeholders spanning:

- Local elected officials: mayors, district chiefs and village chiefs.
- Umbrella organisations of farmers and opinion leaders at municipality level: Associations of producers including farmers associations, livestock breeders associations, municipal unions of trade and craftsmen, etc., and their representatives at district level.
- Technical staff of: municipalities, communal agricultural promotion centres, communal centres for environmental protection, NGOs and Civil Society Organisations, and other actors involved in development planning in the district.

The activities under the project centred on the following three components:

- General sensitisation of the population through media broadcasting and strengthening of the technical capacity of key target groups to respond to climate change challenges through 7 training workshops developed specifically for the project. As a result:
 - a. The understanding and knowledge on climate change and risks is improved in the municipalities.
 - b. The capacity on climate change adaptation measures is enhanced.
 - c. Reliable 'champions' that can voice climate risk management concerns are in place.
- Provision of technical support to the staff at the offices of Mayors and Local Government at municipality level for the integration of adaptation options in the Annual Investment and

¹¹ Initiatives pour un Développement Intégré Durable (IDID).

¹² These are Banikoara, Gogounou, Kandi, Malanville, Karimama, and Ségbana.

Development Plans. This was also supported through the dissemination of a practical guideline developed as part of the project. As a result:

- a. Measures to support vulnerability reduction at the local level are taken into consideration in local development plans.
 - b. Adaptation options are planned at the municipality level for a 5 year period.
- Establishing committees for climate risk and disaster management at municipality level and developing an operational framework for these committees. According to IDID NGO this has resulted in institutional strengthening and improved management and reduction of disaster risk. Mobilisation at the local level is highlighted to be of key importance for climate change adaptation and disaster risk management.

Box 7 DRR and CCA in Senegal

- Climate change activities are coordinated by the Direction de l'Environnement et des Etablissements Classés under the Ministry of Environment
- A National Platform for Disaster Risk Prevention and Reduction is in place
- Sectoral involvement in DRR includes Urban and Land Planning, Environment, Industry, Transport, Infrastructure, Agriculture, Livestock, Drought, Fishing, Tourism, Health, Mining and

The project activities have strengthened the institutional bonds between key organisations including the engineering departments of the municipalities, the APIDA (Association pour la Promotion de l'Intercommunalité dans le Département de l'Alibori, an organisation promoting links between local authorities in different municipalities in Alibori), the services responsible for sensitization and communication, IDID NGO, and the institutions of the disaster risk and disaster management committee members. As pointed out in the literature, improved institutional collaboration, information sharing and broadening of stakeholders involved in the climate risk management agenda is a key prerequisite for mainstreaming.

However, an important lesson learnt from the project regards the results on the integration of climate adaptation in the development and investment plans. Although the project has succeeded in incorporating climate change issues into the five year plans at local level, full integration in annual plans has not been achieved. The project managers note that the training undertaken as part of the project was insufficient to ensure complete mastery of the tools for integrating climate risk and adaptation responses. Expansion of the capacity building components is recommended to improve the results realised through the project. Referring back to the section on integration of climate risk management in development planning and decision-making, mainstreaming is a continuous cyclical process and it takes time. The project in Benin has showed some remarkable results in a short time frame. It can be replicated to other districts and municipalities and should be followed up by further activities and funding to ensure the sustainability of the process of reducing vulnerability that has commenced in the six municipalities.

Furthermore, given the relatively weak institutional framework for disaster risk management in Benin (Bhavnani, Vordzorgbe, Owor, & Bousquet, 2008), there could be significant potential for pursuing an

integrated approach to CCA and DRR in the broader context of development. The project carried out by IDID NGO illustrates a significant potential for this at the local level, which could provide an entry point for similar efforts at sectoral and national levels.

Integrating climate risk management in urban development plans in Senegal

The municipalities of Rufisque and Bargny in the region of Dakar are strongly affected by coastal erosion and are at risk of inundation. The population, infrastructure and livelihoods are threatened and have been increasingly impacted by coastal erosion since the 1980s. Natural hazards and environment issues are increasingly recognised as important factors in development strategies and governance structures at various levels in Senegal, but have received very limited attention in land use planning and infrastructure investment decisions.

To initiate a process of integrating climate risks at municipal level, the Department of Regional Planning (Direction de l’Amenagement du Territoire, DAT) implemented a project to update the urban development plans of Rufisque and Bargny to take climate risks into consideration. The aim of the project was to build the capacity of local government to tackle climate risks in planning processes and key project activities included:

- Sensitisation and consultations on the implications of projected climate change.
- Assessment of the efficacy of existing plans and policies for coping with a changing climate.
- Development and adoption of adaptive responses to reduce climate-induced vulnerability and their integration in urban development plans. This included:
 - Producing multi-date maps of the coastal zone along Rufisque and Bargny covering the period 1966-2009
 - A study, technically supported by a national expert and UNEP DHI Centre, modelling the coastal zone of Rufisque and Bargny (past, present and future) and outlining an adaptation strategy.

Throughout the implementation of the project, consultations with stakeholders have taken place to ensure that the needs and opinions of key stakeholders were taken into consideration. Stakeholders included the local population that could be facing relocation, local government officials and other local officials, CSOs and fishermen associations.

The project implementation has recently been completed and based on the results the Centre Suivi d’Ecologie in Dakar has been able to obtain US\$8 million from the Adaptation Fund for nationwide expansion of the activity nationwide.

From the project documentation it is unclear whether DRR institutions have been directly involved in the project activities. With the involvement of the Urban and Land Planning sector in DRR (Bhavnani, Vordzorgbe, Owor, & Bousquet, 2008) and the direct focus of the project on climate hazards and risk reduction strategies it would be surprising if DRR institutions or stakeholders were not included and

informed, and it would be important to ensure the involvement of DRR institutions and experts in the larger upcoming project.

Integrating climate risk management into national planning in Senegal

In Senegal, the Directorate of National Planning under the Ministry of Finance and Economic Planning is currently implementing a project with the twin objectives of determining the impacts of climate change on the national development strategy and planning systems, and recommending a strategy for integrating climate risks in the national planning system and budget allocation process.

The capacity of national and sectoral development and expenditure planning units of the Ministry of Finance and Economic Planning on issues related to climate change has been strengthened through a training workshop conducted by the Directorate of Environment and Classified Establishments (DEEC) and ENDA-TM¹³ Senegal. The workshop provided a starting point for the wider implementation of project activities by raising participants' awareness and knowledge on a number of central issues, such as:

- What is climate change?
- What is the role and place of planning frameworks to address this new challenge?
- What methodologies are available for taking account of climate risks in project formulation and development programs?
- What are the impacts of climate change and which measurement tools can be used?
- How and how much should we adapt (adaptation and levels of intervention)?
- What tools can we use to evaluate the adaptation investments?

Following the training workshop, a study was conducted providing technical and scientific arguments and illustrating opportunities for integration of climate risks and opportunities into socio-economic development planning. After this, activities have centred on developing a guideline for the integration of risks and opportunities related to climate in development planning and programming. The guideline outlines a practical approach to take climate change issues into account in the planning documents and sectoral authorities such as the Integrated Regional Development Plan (PRDI), the Communal Investment Plans (CIP) and Local Development Plans (LDP).

The project is still under implementation with the final version of guideline currently under review by a technical committee. Following the review, regional workshops are planned to disseminate and discuss the guide with parliamentary institutions as well as with institutions at the regional level to support the decentralisation of activities related to climate change.

¹³ Environmental Development Action in the Third World (ENDA-TM), an international non-profit organisation based in Dakar, Senegal.

It is unclear whether any linking to DRR institutions and stakeholders has taken place as part of the project.

Integrating climate change risks into agricultural planning frameworks in Uganda

In 2008, when this project was developed and implementation started, Uganda's Ministry of Agriculture, Animal Industry and Fisheries (MAAIF) was preparing its contribution to the National Development Plan (NDP) and revising its Development Strategy and Investment Plan (DSIP). The objective of the revision was to produce a document that provided a 'roadmap' to assist government and civil society in defining interventions to meet the vision and key objectives in the agricultural sector. The Ministry wished to mainstream climate change into the agricultural sector contributions to the NDP and the DSIP and requested technical and financial assistance to do so.

Three major outcomes were achieved under the project:

1. Climate change issues are integrated into draft Development Strategy and Investment Plan:
 - Identification of climate impacts, vulnerabilities and coping measures as they relate to the various agricultural production strategies pertaining across Uganda;
 - Improved climate forecasts along with procedures for use in agricultural management;
 - Integration of climate risk management in agricultural business strategies; and
 - District production offices strengthened to integrate climate change issues into planning.
 - A five-year budget was prepared for implementation of the climate change component under the draft Development Strategy and Investment Plan. The Agricultural Planning Department in MAAIF is the implementing agency with support from the Ministry of Local Government and districts involved.
2. Enhanced knowledge and skills on climate change amongst key stakeholders in the agricultural sector:
 - Training has been held for the Thematic Working Groups, who are responsible for formulating the plans as well as other stakeholders including local government and line ministries;
 - Training of Local Government Officials with the purpose to exchange experiences among local

Box 8. DRR in Uganda

Uganda has formulated comprehensive policies for disaster risk management. The Disaster Preparedness and Management Policy of Uganda has established an integrated and multisectoral approach to disaster management by providing a broad framework for the harmonization of sectoral and cross-sectoral policy objectives, guiding principles and strategies in key cross-sectoral themes identified as essential for effective disaster management and guidelines for stakeholders involved in disaster management (Bhavnani, Vordzorgbe, Owor, & Bousquet, 2008).

stakeholders to improve their skills in climate change and its adaptation strategies as well as to apply them in the district planning and implementation process. Based on the training, it was concluded that the districts' Production Offices should be strengthened to integrate climate change issues into their local planning and for instance advisory services, food security programs, research and environmental programs.

3. Guidelines for climate change mainstreaming in the agricultural sector produced:

- Guidelines integrating climate change into livestock, fishery and crops were agreed upon at stakeholders meetings and are currently being further developed.

Mechanisms will need to be developed to improve coordination with line ministries, donor agencies, civil society organisations and others. A Climate Change Unit is to be established in the Agricultural Planning Department at the Head Quarter of MAAIF.

During the implementation of the project, Local Governments requested support to create awareness on, operationalise and integrate climate change issues into the local administration of agricultural programmes. Based on this, a follow-up programme was developed together with representatives from the Local Governments and is currently under implementation. Three major outcomes of this programme are expected:

1. A model for institutional set-up for Local Government to integrate climate change issues into their local and sectoral frameworks.
2. A model for climate change issues integrated into agricultural services provided by Local Governments to subsistence farmers.
3. Enhanced knowledge and skills on climate change amongst local key stakeholders in the agricultural sector.

The Agricultural Planning Department in the Ministry of Agriculture will be the implementing agency with support from the Ministry of Local Government and selected districts in the Cattle Corridor, which all are exposed to negative impacts of climate change.

The MAAIF project has had a significant positive impact on the awareness and integration of climate change issues in agricultural sector planning. It has proven to be cost effective and sustainable to a high extent and is replicable with minor assistance from donors.

In light of the information provided in Box 8, DRR institutions are likely to be informed about the project activities, but it has not been possible to verify this and there is no specific mentioning of linking to DRR bodies in the project outputs and documents.

Concluding discussion

At the international, national, and sub-national levels, attention to the overlaps between CCA and DRR is increasing. The need for coordination is recognised and supported in the two main international frameworks for respectively CCA and DRR, i.e. the UN Framework Convention on Climate Change and the Hyogo Framework of Action. Similarly, mainstreaming approaches generally note the need for collaboration and coordination to ensure that CCA to build on existing experience, tools, methods, and platforms for DRR and that DRR incorporates the effects of changes in the types, frequency and intensity of hazards resulting from climate change.

The recognition of the inter-linkages between CCA and DRR in key frameworks and approaches has not yet translated into systematic integration, or functional linking, of DRR and CCA in the context of development efforts on the ground.

Although the nine Sub-Saharan African case examples included in this paper are insufficient as a basis for making generalisations, they do provide a starting point for identifying ways forward for supporting systematic integration of CCA and DRR in the context of development.

As an immediate observation, the case examples confirm the significant scope for pursuing systematic collaboration and coordination of CCA and DRR in the context of development as indicated in the first sections of the paper. They illustrate that there is a general recognition at national and sub-national levels in the countries of the linkages between climate related risks, poverty, and development, as well as of the need for mainstreaming to reduce current and future vulnerabilities and realise development goals in the face of a changing climate. In most cases this is reflected through priorities in key national policies and strategies such as poverty reduction strategies, national development plans and strategies, environmental policy frameworks, UNDAFs, disaster risk management policies, etc.

Nevertheless, the case examples also indicate that actions and activities in the following areas can be stepped up to support functional linking of CCA and DRR in the context of development:

- Promote systematic analyses of climate change adaptation and disaster risk reduction mainstreaming activities at all levels to identify:
 - Cases where integration of CCA and DRR has been successful
 - Opportunities and barriers for enhancing this integration
- Support joint CCA and DRR mainstreaming projects to make the case for functional linking and to showcase resource effectiveness
- Encourage systematic information sharing and coordination of ongoing and planned climate risk management activities between CCA and DRR bodies, focal points, policy makers, donors, and other relevant stakeholders.
- Advocate for incorporation of DRR in planned and ongoing CCA projects and programs and vice versa.

While there are large variations, several countries have supportive enabling policy frameworks for CCA, DRR and mainstreaming. However, weak regulatory frameworks and institutional capacity constraints combined with limited financial and technical resources tend to prevent their implementation or enforcement in practice.

Several countries are also in the process of or have introduced decentralised planning systems. These foster feedback between the various levels at which mainstreaming takes place, which provides an important potential entry point for ensuring that local needs, vulnerabilities, and spatially determined risks are adequately addressed at higher planning and policy levels. In addition, the case examples indicate that it may be less complicated to strengthen coordination of DRR and CCA at the village and district levels than at the sectoral and national levels. Decentralised planning systems therefore present a promising entry point for coordination and joint CCA and DRR efforts at local level that can make the case for comprehensive risk management strategies at higher planning levels. It should be noticed, however, that challenges related to low levels of capacity and awareness at decentralised level need to be adequately addressed.

A number of common barriers to climate change adaptation, risk management and mainstreaming are reported in the case studies. These include:

- Limited awareness on climate change challenges at community level and generally among the population.
- Government institutions, NGOs and civil society organisations at all levels have limited capacity in terms of knowledge, technical skills and tools to effectively integrate climate risk management in planning and practices.
- There are insufficient financial resources at national, district, and community level to address CCA and DRR challenges.
- Lack of training on DRR and CCA

In recognition of these barriers, awareness raising and capacity building have been important elements in most of the case examples presented in this paper. However, the case examples show that at present there is no systematic inclusion of both CCA and DRR experts and practitioners in these awareness raising and capacity building efforts.

There are, nevertheless, several promising examples of how participatory approaches and broad stakeholder consultations foster institutional collaboration and strengthen capacities to address climate change challenges including disaster risk reduction. This is particularly apparent at local and district level. Projects implemented by NGOs in particular seem to foster joint approaches to and involvement of CCA and DRR communities. Furthermore, addressing the issue of climate risk management from the context of development and mainstreaming rather than from established CCA or DRR structures seems to induce joint involvement of CCA and DRR stakeholders.

Two of the cases are practical examples on how specific development, DRR, and CCA objectives are integrated and addressed jointly (Malawi and Benin). These activities can be replicated and scaled up to further the implementation of comprehensive climate risk management.

Duplication of efforts and sub-optimal outcomes are some of the concerns raised with respect to lack of coordination between CCA and DRR. However, in the case examples considered in this paper mainstreaming activities do seem to build on existing experience, tools, methods, and platforms for DRR and CCA. Specific examples include the revision of existing maps to incorporate climate change implications and provide practical planning tools, the inclusion of socio-economic characteristics and infrastructure; the application of climate risk screening tools that have an integrated climate change adaptation and disaster risk reduction approach; the use of existing structures/committees for disaster risk reduction, etc.

The case examples illustrate that even in the absence of a specific focus on supporting collaboration and coordination of CCA and DRR, coordination and collaboration does to a certain extent take place in adaptation driven mainstreaming efforts on the ground. It would be interesting to analyse DRR driven efforts to provide further insights into the challenges and opportunities for coordination and collaboration of CCA and DRR. As the paper has indicated, there are numerous promising options for furthering the adoption of comprehensive risk management strategies to support climate resilient development.

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