Common Ground Between the Paris Agreement and the Sendai Framework

CLIMATE CHANGE ADAPTATION AND DISASTER RISK REDUCTION

OECD

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Foreword

The quick pace of climate change today is altering and intensifying existing risks with destructive consequences for society, the economy and the environment. Changes in temperature and precipitation are leading to more frequent extreme weather events, wildfires, floods and rising sea levels. Public expectations for governments to act have never been higher.

Interventions to adapt to climate change and reduce disaster risks share common objectives, but too often they are developed and deployed through administrative silos. The wide range of institutions and government officials responsible for managing climate hazard exposures and reducing vulnerability often miss potential synergies and duplicate efforts.

Common ground between the Paris Agreement and the Sendai Framework: Climate change adaptation and disaster risk reduction examines the potential for a more coherent approach to the reduction and management of weather- and climate-related disasters and change. The report highlights the benefits of increased coherence between climate change adaptation and disaster risk reduction through comprehensive and co-ordinated action across public administrations. Informed by the national approaches of Ghana, Peru and the Philippines, it points to the role of both government officials and development co-operation in bridging existing gaps between the two policy areas, highlighting examples of good practice and persistent challenges.

This report will be of interest to government officials with responsibility for the design, coordination or implementation of disaster risk reduction and climate change adaptation policies and programmes. It will inform their efforts to build more coherent approaches across the two policy areas. It will also be of interest to countries that seek to adhere to OECD standards such as the Council Recommendation on Governance of Critical Risks and their commitments under international agreements, including the Paris Agreement on climate change and the Sendai Framework for Disaster Risk Reduction.

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Acronyms

1V1D	One-village One-dam
AfDB	African Development Bank
CCA	Climate change adaptation
CCC	Climate Change Commission
CCCAM-DRR	Cluster on Climate Change Adaptation, Mitigation and Disaster Risk Reduction
CDP	Comprehensive Development Plan
CLUP	Comprehensive Land Use Plan
CRS	Creditor Reporting System
DBM	Department of Budget and Management
DENR	Department of Environment and Natural Resources
DILG	Department of the Interior and Local Government
DOF	Department of Finance
DOST	Department of Science and Technology
DPWH	Department of Public Works and Highways
DRM	Disaster risk management
DRR	Disaster risk reduction
DRRMMA	Disaster Risk Reduction and Management Act
DRRMMF	Disaster Risk Reduction and Management Framework
DRRMMP	Disaster Risk Reduction and Management Plan
EPA	Environmental Protection Agency
GAMA	Greater Accra Metropolitan Area
GHG	Greenhouse gas
HLURB	Housing and Land Use Regulatory Board
IDA	Irrigation Development Authority
KIS	Kpong Irrigation Scheme
LCCAP	Local Climate Change Action Plan
LDC	Least Developed Country
LDRRMC	Local Disaster Risk Reduction and Management Council
LDRRMF	Local Disaster Risk Reduction and Management Fund
LDRRMP	Local Disaster Risk Reduction and Management Plan
LGU	Local Government Unit
MESTI	Ministry of Environment, Science, Technology and Innovation
MLGRD	Ministry of Local Governments and Rural Development
MMDAs	Metropolitan/Municipal/District Planning Authorities
MoFA	Ministry of Food and Agriculture
MTDP	Medium-term Development Plan
NADMO	National Disaster Management Organisation
NBS	Nature based solutions
NCCAP	National Climate Change Action Plan
NAP	National Adaptation Plan
NCCP	National Climate Change Policy
NDPC	National Development Planning Commission

NEDA	National Economic Development Authority
NFSCC	National Framework Strategy on Climate Change
NMHSs	National Meteorological and Hydrological Services
OCD	Office of Civil Defense
PAGASA	Philippine Atmospheric, Geophysical and Astronomical Services Administration
PDP	Philippine Development Plan
PHP	Philippine pesos
SDG	Sustainable Development Goal
SIDS	Small Island Developing States
UNDRR	United Nations Office for Disaster Risk Reduction
UNFCCC	United Nations Framework Convention on Climate Change

Executive summary

Countries are faced with the growing challenge of managing increasing risks from climate change and climate variability, putting development and the achievement of the Sustainable Development Goals at risk. The adoption in 2015 of the Sendai Framework for Disaster Risk Reduction and the Paris Agreement on climate change provides a clear mandate for increased coherence in countries' approaches to climate and disaster risk reduction. While both frameworks refer to their respective goals and objectives, each guides progress towards a more sustainable, resilient and equitable future. Domestically, responsibilities for climate change adaptation (CCA) and disaster risk reduction (DRR) tend to be spread across different institutions and stakeholders; internationally, they are supported by separate UN agencies and related processes. The different approaches and mechanisms inevitably result in overlaps and gaps.

Countries are increasingly recognising the benefits of increased coherence in CCA and DRR, exemplified by the number of countries that either have developed joint strategies or put in place processes that facilitate co-ordination across the two policy areas. For increased coherence, certain enabling factors must be in place, including strong leadership and engagement of key government bodies, broad stakeholder participation and co-ordination, clear allocation of roles, responsibilities and resources, and monitoring, evaluation and continuous learning. This can help identify trade-offs (e.g. growing need for public support to post-disaster responses in the absence of a focus on CCA) and synergies (e.g. a more comprehensive assessment of interlinked climate and disaster risks), while minimising redundancies in delivery.

Informed by the country experiences of Ghana, Peru and the Philippines, this report examines the potential for increased coherence in the approach used for CCA and DRR, structured around five entry points:

- **Policy and governance**: Realising the benefits of increased coherence in CCA and DRR requires political support and leadership by a recognised co-ordination entity. Awareness raising and capacity development can ensure that the benefits and trade-offs of greater coherence are understood by key stakeholders and guide the identification of shared solutions. Ministries and agencies with a presence at the local level are well placed to lead efforts to increase coherence in CCA and DRR, subject to the availability of human, institutional and financial capacities.
- **Data and information**: Despite a shift over the past decade from assessing climate and disaster hazards to better understanding the risks there continues to be a gap in related sources of data and information. This gap is furthered by limitations in human and technical capacity to access, generate and use the data and information available. Centralised platforms can support efforts to tailor data and information to user needs. This should be matched by efforts to strengthen the capacity of stakeholders to use the data to translate climate information into a format that can guide decision-making processes.
- **Implementation**: Translating political commitment to increased coherence in CCA and DRR into coherence in implementation requires clear allocation of roles and responsibilities between institutional bodies with a mandate to co-ordinate and those with a mandate to implement and fund. Capacity constraints – human and financial – can exacerbate barriers to implementation, particularly at the local level where most implementation occurs. Lack of coherence and co-ordination at higher levels of government can also lead to conflicting or duplicative demands at the

local level. Stricter enforcement of common policy instruments, such as land-use management and building codes, can also contribute to joint CCA and DRR outcomes.

- **Financing**: Existing budgeting tools and guidelines can help identify funding gaps and priorities for public investments. Risk assessments and economic analysis can support prioritising measures known to foster greater coherence in CCA and DRR. Further, piloting of different financial instruments, in some cases with support from development partners, can also help governments develop solid risk financing strategies to respond to the impacts of climate-related disasters. For such pilots to succeed, however, they must include clear exit, replication or scale-up plans to allow relevant stakeholders to build on examples of good practice.
- **Monitoring, evaluation and learning**: National reporting systems provide an important basis for the monitoring and evaluation of CCA and DRR. The level of detail that can be captured by separate or joint reporting systems for CCA and DRR vary. In all cases, a persistent challenge is to ensure that the information generated informs subsequent policy-making processes. While not unique to the context of CCA and DRR, the uncertain nature of projected climate change impacts and the need for a flexible approach, however, highlights the importance of continuous learning.

Development co-operation can supports partner countries in addressing climate and disaster risks while at the same time strengthening coherence in implementation of CCA and DRR. This includes support to initiatives, including pilots, that strengthen countries' policy frameworks and institutional arrangements and that can facilitate the identification of opportunities for coherence in CCA and DRM. At the same time, development co-operation can create barriers to coherence in CCA and DRR when the intersection between the two is not explicitly or sufficiently taken into account in the support provided, or when there is inadequate co-ordination between entities or providers of support for either CCA or DRR.

Findings and ways forward to achieve increased coherence in climate change adaptation and disaster risk reduction

Countries are faced with the growing challenge of managing increasing risks from climate change and climate variability, putting development and the achievement of the Sustainable Development Goals at risk. The adoption in 2015 of the Sendai Framework for Disaster Risk Reduction and the Paris Agreement on climate change provides a clear mandate for increased coherence in countries' approaches to climate and disaster risk reduction. While both frameworks refer to their respective goals and objectives, each guides progress towards a more sustainable, resilient and equitable future. Domestically, responsibilities for climate change adaptation (CCA) and disaster risk reduction (DRR) tend to be spread across different institutions and stakeholders; internationally, they are supported by separate UN agencies and related processes. The different approaches and mechanisms inevitably result in overlaps and gaps.

Countries are increasingly recognising the benefits of increased coherence in CCA and DRR, exemplified by the number of countries that either have developed joint strategies or put in place processes that facilitate co-ordination across the two policy areas. For increased coherence, certain enabling factors must be in place, including strong leadership and engagement of key government bodies, broad stakeholder participation and co-ordination, clear allocation of roles, responsibilities and resources, and monitoring, evaluation and continuous learning. This can help identify trade-offs (e.g. growing need for public support to post-disaster responses in the absence of a focus on CCA) and synergies (e.g. more comprehensive assessments of interlinked climate and disaster risks), while minimising redundancies in delivery.

Coherence is a means to integrate the pursuit of CCA and DRR in sustainable development. It is a process of co-ordination and can be pursued and operationalised horizontally across sectors; vertically at different levels of government (local, sub-national, national, regional and global); and through collaboration across stakeholder groups (e.g. governments and inter-governmental organisations, the private sector, civil society organisations and citizens). Three main types of coherence can be identified:

- **Strategic**: Aligned visions, goals and priorities on CCA and DRR in national development plans and strategies, providing a framework for pursuing operational coherence;
- **Operational**: Policy frameworks and institutional arrangements supportive of the implementation of aligned objectives on CCA and DRR;
- **Technical**: Strengthened technical capacities to assess the risks and opportunities, to identify and prioritise CCA and DRR measures and to finance them.

Informed by the country approaches of Ghana, Peru and the Philippines, this report examines approaches for increased coherence in CCA and DRR. Good practices identified and lessons learned point to enabling factors and approaches that promote coherence at different levels of government, across sectors and stakeholder groups summarised below. This provides the basis for a set of actionable ways forward not only targeting the government officials in the three case study countries, but also those in other countries as well as providers of development co-operation.

National approaches to increased coherence in CCA ad DRR

Governance arrangements for coherence in CCA and DRR

To realise the benefits of increased coherence in CCA and DRR requires political support and strong leadership by a recognised co-ordination entity. Awareness raising and capacity development are also important in ensuring that the benefits and trade-offs of greater coherence are well understood by key stakeholders and guide the identification of shared solutions. With the implementation of CCA and DRR often occurring at the local or sector level, ministries and agencies with a presence at these levels are well placed to lead efforts to increase coherence in CCA and DRR. This is nonetheless contingent on the availability of the required human, institutional and financial capacities to facilitate such co-ordination. In some country contexts, capacities are stretched due to competing demands generated both by the separate CCA and DRR frameworks and processes, as well as by other development priorities. CCA and DRR also have strengths that can build upon each other. The historically established approach to DRR can offer lessons and entry points for CCA. The international focus on climate change brings resources and political profile to CCA that can also be leveraged for DRR.

Climate services in support of CCA and DRR

The past decade has seen a shift in emphasis from assessing climate and disaster hazards to better understanding their risks. Despite this, there continues to be a gap in exposure and vulnerability data – two key dimensions of risk – compared to hazard data, with the former often spread across ministries and levels of government. Human and technical capacity to access, generate and use the data and information available presents an additional barrier. To overcome these challenges, incentives must be in place to encourage owners of data to make it accessible. Centralised platforms with access to data and information, including risk models, observation systems (meteorological offices) and academia can facilitate robust risk assessments tailored to user needs. Strengthening capacities of stakeholders to use the data to conduct risk analysis – especially at the local level – should be another priority. To further guide decisions on CCA and DRR within the deep uncertainty inherent in climate projections, climate data should also be complemented with information on other ecological, economic and social factors that drive exposure and vulnerability. This in turn can help increase the acceptability of CCA and DRR measures by local stakeholders. Further, climate services are most effective when matched with tools that can translate climate information into a format that can guide decision-making processes, recognising broader drivers of risks, such as population growth and urbanisation.

Implementation of CCA and DRR

Political commitment to greater coherence in CCA and DRR does not always translate into implementation. Institutional bodies with a mandate to co-ordinate often do not have the mandate to implement and fund. Capacity constraints – human and financial – further exacerbate these barriers, particularly at the local level where most implementation occurs. Lack of coherence at higher levels of government can also lead to conflicting or duplicative demands at the local level. Instead, considerations of climate and disaster risks should guide all policy processes. Similarly, a range of common policy instruments, e.g. land-use

management, building codes and infrastructure standards, can contribute to joint CCA and DRR outcomes. Strengthening the capacity to enforce these policies, standards and regulations can therefore be effective in managing and reducing risks, such as limiting the construction of infrastructure in areas highly vulnerable to climate and geophysical hazards. When there is not sufficient political backing to implement identified CCA and DRR measure or to integrate these considerations into all processes, post disaster response in theory provides opportunities to reinforce resilience. The trade-off between the urgency of quick recovery and the need for robust risk assessments to incorporate climate considerations may limit this in practice.

Financing for coherence in CCA and DRR

Investment in coherent implementation of CCA and DRR requires multiple sources and instruments of finance as well as consideration of different time-scales. This often involves complex decision-making on where, to whom, and how much finance should be allocated. Risk assessments and economic analysis can support the prioritisation of funding to measures known to foster coherence in CCA and DRR (e.g. prevention measures). The feasibility and quality of such assessments and analyses nevertheless depends on the capacities of the actors responsible for planning, and the availability of information on climate and disaster risks. Greater clarity in financial management can also help governments promote greater coherence in CCA and DRR. Existing budgeting tools and guidelines, such as budget codes for CCA and DRR, can help identify funding gaps and priorities for public investments. Grants that target coherence can also create incentives for focusing on CCA and DRR across sectors and levels of government, especially when demand for scarce resources for competing development priorities is high. Further, piloting of different financial instruments, in some cases with support from development partners, can support the development of solid risk financing strategies to respond to the impacts of climate-related disasters. For such pilots to succeed, however, they must include clear exit, replication or scale-up plans. Over time, they provide valuable opportunities for relevant stakeholders to build capacity and identify examples of good practice.

Monitoring, evaluation and learning

Robust national reporting systems provide a strong basis for monitoring and evaluation of CCA and DRR, subject to data availability. In some countries, separate reporting systems are in place for CCA, DRR, and their related strategies and plans; in others, the reporting systems for the individual processes refer to established national reporting processes in place for broader national development strategies. While the former is more resource intensive and thus more challenging to implement, the information captured by the latter will be less detailed. Even when monitoring and evaluation systems are in place, it is not always clear how the information generated informs subsequent policy-making processes. This is not unique to the context of CCA and DRR but constitutes a wider challenge. The uncertain nature of projected climate change impacts and the importance of a flexible approach, however, highlights the importance of continuous learning. Development co-operation can play a valuable role in supporting partner countries in strengthening data governance and the capacity of national statistical offices.

The role of development co-operation in supporting coherence in CCA and DRR

Development co-operation also plays an important role in supporting partner countries in addressing climate and disaster risks while strengthening coherence and increasing efficiency. Development co-operation supports all three levels of coherence but plays a particularly significant role in supporting countries achieve operational and technical coherence.

- **Strategic coherence**: Support countries in aligning their visions, goals and priorities with those agreed upon as part of global commitments on CCA and DRR, e.g. through guided stakeholder consultations. Development co-operation can also support the mainstreaming of CCA and DRR

visions into broader national development strategies, by raising awareness and fostering incentives across institutions on the benefits and limitations of enhanced coherence.

- **Operational coherence**: Support countries in identifying opportunities for coherence in implementation through strengthened policy frameworks and institutional arrangements that support local implementation. Development co-operation is also well placed to fund and pilot initiatives that support coherence and are aligned with countries' domestic CCA and DRR priorities. There is also value in continuing, replicating or scaling up pilots that have demonstrated potential but that require time and continued support to fully mature.
- **Technical coherence**: Support initiatives to strengthen technical capacities to assess climate and disaster risks and opportunities, and to identify and prioritise CCA and DRR measures. Adequate time must be factored into the support provided to ensure that the stakeholders involved can assimilate the new skills and knowledge.

Development co-operation can also create a barrier for greater coherence in CCA and DRR, when the intersection between the two is not explicitly or sufficiently taken into account in the support provided, or when there is inadequate co-ordination between entities or providers of support for either CCA or DRR.

Ways forward to achieve greater coherence on climate change adaptation and disaster risk reduction

Informed by the comparative analysis of the national approaches of Ghana, Peru and the Philippines, and supported by an in-depth literature review, countries may consider the following opportunities for achieving greater coherence in CCA and DRR:

- ***Align responsibility for co-ordination with responsibility for implementation of CCA and DRR policies***
  - Ensure ministries and agencies at the national level have information and incentives to integrate CCA and DRR across their portfolios, and report back on progress centrally.
  - Make use of ministries and agencies with a presence at the local level and responsible for implementation to ensure that national directives on CCA and DRR are integrated with local development plans.
  - Reinforce the mandate of relevant ministries and agencies to enforce existing regulatory measures and provide incentives in support of CCA and DRR, such as land-use management and environmental protection.
  - Build on international momentum on CCA policies to also bring domestic attention and resources to the reduction of climate-related disaster risks, and specifically risk prevention measures.
- ***Make tailored climate information readily available to support evidence-based policy***
  - Provide support or incentive mechanisms to encourage owners of data to make climate information easily accessible for users at all levels.
  - Where appropriate, converge risk assessment methods across sectors to support coherent decision-making on CCA and DRR on the ground.
  - Put further emphasis on generating comprehensive information related to current vulnerability and exposure, and layer this with information on future hazards, which is inherently uncertain and requires careful interpretation.
  - Ensure there are channels for locally collected data on vulnerability to contribute to the wider understanding of vulnerabilities.
- ***Enhance capacity to translate coherence in planning into coherence in implementation***

- Support local governments in implementing national directives on CCA and DRR by providing, for instance, incentive and review mechanisms (e.g. funding allocations and approvals of local development plans) as well as guidance, tools and checklists.
- Understand local CCA and DRR priorities and capacity constraints, recognise challenges to continuity in building capacity, and tailor efforts accordingly.
- Provide tools and strengthen the capacity of stakeholders – especially at the local level (e.g. by working with local universities) – to use climate information including projections in a way that supports robust decision making on CCA and DRR.
- Facilitate peer learning on good practices to common challenges (e.g. coastal erosion) among local governments.

- ***Optimise long-term funding allocation across different risks through budgeting tools, ex-ante financing plans and greater transparency in public spending***
  - Make use of financial management tools (e.g. budget coding and expenditure review), risk assessments, and economic analysis (e.g. cost-benefit, cost-effectiveness and multi-criteria analysis) to support budget allocation for CCA for DRR.
  - Improve transparency in national and sub-national public spending (e.g. budget and expenditure tracking) to identify areas for improvement in coherence between CCA and DRR, and review the results to future financial decision-making
  - Establish ex-ante financing plans, including approaches for financial protection that ideally take stock of potential public disaster costs (including future climate impacts) and identify financing options for response, recovery and rehabilitation.
- ***Monitor, evaluate and learn from CCA and DRR***
  - Map data and information available that can inform monitoring, evaluation and learning for CCA and DRR.
  - Identify synergies between the reporting mechanisms for CCA and DRR to optimise resources.
  - Establish mechanisms that allow lessons learned on CCA and DRR to inform subsequent policy processes.

Part I Increased coherence in climate change adaptation and disaster risk reduction

1. Background and rational for increased coherence in climate change adaptation and disaster risk reduction

This chapter presents the rationale for examining the potential for a more coherent approach to climate change adaptation and disaster risk reduction. Common characteristic between the two policy agendas are presented together with the challenges and opportunities of a more coherent approach to their execution. Three types of coherence are identified: strategic, operational and technical. This is complemented by a summary of potential mismatches between the policy areas that can hinder coherence in climate change adaptation and disaster risk reduction. The respective roles of national governments and developing co-operation in supporting coherence are discussed, followed by a summary of the international context driving domestic action on climate change adaptation and disaster risk reduction.

The climate is changing today faster than ever. Global average temperature has increased by 1.1 degree Celsius since the pre-industrial era, and by 0.2 degree Celsius over the period 2015-19 compared to 2011-2015 (WMO, 2019[1]). This makes it the warmest five-year period on record and follows a concerning trend: July 2019 is the hottest month on record, and nine out of the 10 hottest months of July have occurred since 2005 (NOAA, n.d.[2]). Similarly, January 2020 was the hottest January on record, with the temperature departure from average the highest monthly departure ever recorded without an El Niño present in the Pacific Ocean (NOAA, n.d.[3]). The atmospheric concentrations of major greenhouse gases have increased to record levels, locking in the warming trend for generations to come (WMO, 2019[1]).

Impacts associated with climate variability and change are altering and intensifying existing risk patterns. Changes in temperature and precipitation are leading to droughts, more frequent and extreme storms, wildfires, floods and rising sea levels (IPCC, 2018[4]). A selection of recent weather extremes summarised in Table 1.1 illustrates the potentially devastating economic and social impacts of these hazards when they occur.

Table 1.1. Recent examples of extreme weather events and associated impacts

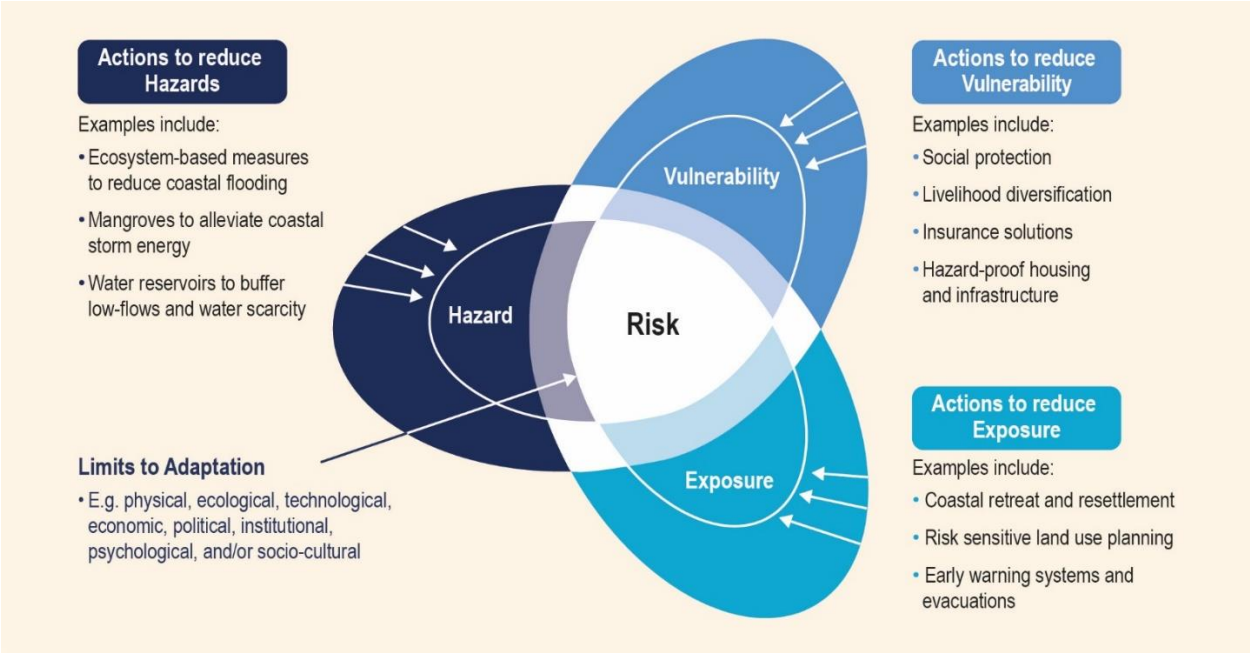
Type	Timing	Location	Impact
Tropical cyclone	March 2019	South-west Indian Ocean (Mozambique, Zimbabwe):	At least 1 236 deaths attributed to Cyclone *Idai* – the highest for a southern hemisphere cyclone for at least 100 years. While Cyclone *Kenneth* was more intense than *Idai*, it made landfall in a sparsely populated area
Flood	August 2018	India (Kerala)	1.4 million people displaced and 5.4 million affected in some way. At least 223 deaths were reported, with economic losses estimated at US$ 4.3 billion
Storm and tornado	June 2016	China	At least 99 deaths were reported – one of the most destructive tornadoes in recorded Chinese history
Heatwave	May and June 2015	India and Pakistan	2 248 deaths were reported due to the heat in India, and 1 229 in Pakistan
Drought	2015-18	Africa	Severely depleted water supply storages contributed to the risk of Cape Town running out of water during 2018. This followed severe drought in many parts of southern Africa in 2015 and 2016. In 2016–2017, 6.7 million people in Somalia were experiencing food insecurity at the drought's peak
Wildfire	2015	Indonesia	Drought led to extensive wildfires in Indonesia in the second half of 2015. 2.6 million hectares were reported to have been burned. 34 deaths were directly attributed to the fires
Cold event	January 2016	East Asia	Abnormally low temperatures extended south from eastern China as far south as Thailand. Guangzhou experienced its first snow since 1967 and Nanning its first since 1983

Source: Adjusted from (WMO, 2019[1]).

At the same time as the number of weather-related disasters per year have increased, so have the damages. This is largely due to the simultaneous increase in exposure of people and assets to increasing hazards. The increase in exposure and hazards, as well as vulnerability, all drive risks, as established by the Intergovernmental Panel on Climate Change (IPCC) (see Figure 1.1). Growing concentration of people and economic assets in hazard-prone areas, for example, contributes to increasing damages and losses from hurricanes, cyclones and typhoons. Globally, trends of increased urbanisation in flood zones are projected to continue, especially in Africa and Asia (Winsemius et al., 2016[5]). With the degradation of ecosystems, the vulnerability of populations and physical assets to disasters is increasing. Wetlands, mangroves, reefs and forests provide vital ecosystem services which reduce water-related risks (Spalding et al., 2014[6]). In Cuba, Indonesia, Malaysia, Mexico and the Philippines alone, the protection from healthy coral reefs in avoided damages is estimated at over USD 400 million, but pressures on these ecosystems

are high (Beck et al., 2018[7]). Global warming, especially at 2 degree Celsius or higher, is likely to increase the risk of irreversible loss of many marine and coastal ecosystems (IPCC, 2018[4]).

Figure 1.1. IPCC risk-based conceptual framework



Source: (IPCC, 2019[8])

Recorded figures on disaster damages underestimate the actual costs of these events. Focusing solely on asset losses masks the impact of disasters on human welfare, as well as how these impacts are distributed (Hallegatte et al., 2016[9]). Social and environmental damages are not usually accounted for in monetary terms, such as fatalities, costs of temporary or permanent displacement of people, or the social and psychological impacts of an event (OECD, 2018[10]). The effect of a disaster event varies with the level of income of the affected country. Poor and marginalised communities feel losses more strongly as their livelihoods depend on fewer assets, their consumption is closer to subsistence levels, they cannot rely on savings to smooth the impacts, their health is at greater risk, and they may need more time to recover and rebuild (Hallegatte et al., 2016[9]). The impacts from climate change are therefore putting development gains at risk unless immediate and ambitious action is taken to both reduce global emissions and manage the risks.

Objective and scope

This report examines the potential for a more coherent approach to the reduction and management of weather- and climate-related disasters and change. Coherence is defined as a means to integrate the pursuit of disaster risk reduction (DRR) and climate change adaptation (CCA) in sustainable development (Dazé, Terton and Maass, 2018[11]). The report assesses challenges to and opportunities for pursuing coherence in CCA and DRR by national governments and development co-operation providers. It further outlines common characteristics between the two policy agendas, highlighting enabling factors in support of coherence in CCA and DRR, and actions that can signal if, and to what extent, coherence is achieved.

The analysis is informed by the county approaches of Ghana, Peru and the Philippines presented in Part II of this report. This is complemented with a broader review of national- and international approaches to

CCA and DRR to shed light on the potential for, and benefits from, coherence in CCA and DRR across six thematic areas:

- Governance arrangements;
- Climate services;
- Implementation measures;
- Financing;
- Monitoring and evaluation;
- Role of development co-operation.

The important and necessary role of other stakeholders – the private sectors and civil society-organisations among others – in taking this agenda forward and bringing about change on the ground is acknowledged and selectively integrated in the report, while not constituting the focus of it.

Climate change adaptation and disaster risk reduction – different origins, common goals

Both DRR and CCA aim to reduce the adverse impacts of hazards by addressing drivers of vulnerability and where possible also exposure (see Box 1.1 for definitions of the concepts). Interventions targeting either objective are likely to be intrinsically linked as climate change is one of the most critical factors affecting many types of disaster risk, and the majority of climate change impacts will materialise through climate variability and extreme weather events (IPCC, 2018[4]).

Box 1.1. Defining climate change adaptation, disaster risk reduction and disaster risk management

The United Nations Office of Disaster Risk Reduction (UNDRR) defines disaster risk reduction (**DRR**) as "preventing new and reducing existing disaster risk and managing residual risk, all of which contribute to strengthening resilience and therefore to the achievement of sustainable development. DRR is the policy objective of disaster risk management, and its goals and objectives are defined in disaster risk reduction strategies and plans" (UNDRR, n.d.[13]).

A number of national and international initiatives also focus on disaster risk management (**DRM**), including those in the three case study countries: Ghana, Peru and the Philippines. UNDRR defines DRM as "the application of disaster risk reduction policies and strategies to prevent new disaster risk, reduce existing disaster risk and manage residual risk, contributing to the strengthening of resilience and reduction of disaster losses" (UNDRR, n.d.[13]). The management of residual risks includes: preparedness, response and recovery activities, but also a mix of different financing instruments, such as national contingency funds, contingent credit, insurance and reinsurance and social safety nets (UNDRR, n.d.[13]).

This report uses the IPCC definition of climate change adaptation (**CCA**): "The process of adjustment to actual or expected climate and its effects. In human systems, adaptation seeks to moderate or avoid harm or exploit beneficial opportunities. In some natural systems, human intervention may facilitate adjustment to expected climate and its effects" (IPCC, 2012[14]). CCA seeks to enable populations to cope with, adapt, or potentially transform to future environmental conditions.

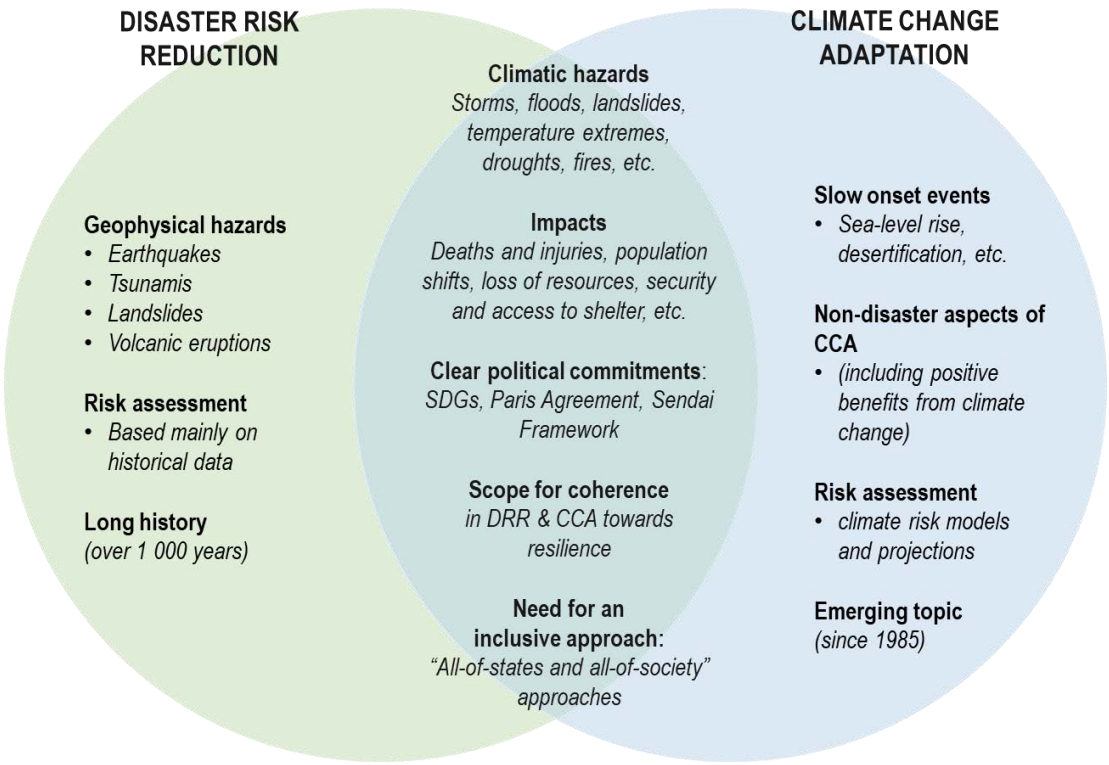
The complementarity and possible trade-offs between CCA and DRR are increasingly recognised, and with it there has been a growing body of research on the benefits of coherence between the two fields

(Banwell et al., 2018[15]; Thomalla et al., 2006[16]; Kelman, Gaillard and Mercer, 2015[17]; Shaw, Pulhin and Jacqueline Pereira, 2010[18]; Glantz and Baudoin, 2014[19]; Tanner, Wilkinson and Mitchell, 2006[20]; Coninx et al., 2016[21]). An important overlap between CCA and DRR is the management of hydro-meteorological hazards. With greater coherence across the two policy areas, DRR needs to take account of changing (more intense and frequent) hazards, and CCA needs to build resilience to their impacts. Two important distinctions are that (Coninx et al., 2016[21]):

- DRR also tackles the risks of geophysical hazards (such as volcanoes and earthquakes) and includes a focus on disaster risk reduction to biological, environmental, geological, hydro-meteorological and technological hazards, whereas CCA does not.
- CCA also considers long-term adjustments to changes in mean climatic conditions, including the opportunities that this can provide, whereas DRR predominantly focuses on sudden onset and extreme events.

Figure 1.2 illustrate key terms used to discuss, plan and implement CCA and DRR, highlighting notable commonalities and differences.

Figure 1.2. Terms and meanings in CCA and DRR: commonalities and differences



Source: Adopted from (Coninx et al., 2016[21]).

Despite these differences, considerable progress has been made towards integrating DRR and CCA, particularly following the adoption in 2015 of the Sendai Framework for Disaster Risk Reduction, the Paris Agreement on climate change, and the 2030 Sustainable Development Agenda (Global Platform for Disaster Risk Reduction, n.d.[22]) (UNFCCC, 2017[23]). Together, the three frameworks guide progress towards a more sustainable, resilient, and equitable future. While they refer to their respective objectives and mandates, the sustainability of the individual agendas depends on the successful implementation of all of them, as it is only in combination that they cover the range of potential risks to sustainable

development. At the same time, pursuing the goals of each in isolation can lead to gaps and redundancies in delivery. Table 1.2 provides a brief summary of the three frameworks, highlighting the objectives related to climate-resilient development.

Table 1.2. Overview of the Sustainable Development Goals, the Paris Agreement and the Sendai Framework

	Sustainable Development Goals	Paris Agreement on climate change	Sendai Framework for Disaster Risk Reduction
Background	Global agenda for action towards sustainable development	Agreement on the global response to climate change; adaptation, mitigation and finance	Global framework to guide multi-hazard management of disaster risk
Climate change adaptation and disaster risk reduction	Climate action and disaster risk reduction are cross-cutting issues, but explicitly mentioned in: • Goal 13 to combat climate change and its impacts, • Goal 11 to make cities inclusive, safe, resilient and sustainable. Climate action also contributes to the achievement of many of the other goals	Articles 7 and 8 explicitly focus on CCA and DRR: • Article 7.1, on enhancing adaptive capacity, strengthening resilience and reducing vulnerability to climate change, with a view to contributing to sustainable development • Article 8.1, on averting, minimising and addressing loss and damage associated with the adverse effects of climate change, including extreme weather events and slow onset events	Paragraph 13 recognises climate change as a driver of disaster risk, and points to the opportunity to reduce disaster risk in a meaningful and coherent manner
Country ownership	Stresses the importance of strengthened national ownership and leadership at the country level	Emphasises the importance of action on adaptation to "*follow a country-driven*, gender-responsive, participatory and fully transparent approach" (*Article 7.5*)	Specifies the role of all-of-society and all-of-State institutions engagement in managing and reducing disaster risk, while emphasising that each State has the primary responsibility to prevent and reduce disaster risk
Role of development co-operation	Stresses the need for strengthened global solidarity, with the participation of all countries, all stakeholders and all people (17.16-17.17)	Recognises the "importance of *support for and international cooperation* on adaptation efforts" (*Article 7.6*) and the provision of scaled-up financial resources that aims to achieve a balance between adaptation and mitigation (Article 9.4)	Recognises that the ability of developing countries to manage risks may be strengthened through the provision of "*adequate, sustainable and timely provision of support*, including through finance, technology transfer and capacity building from developed countries and partners" (*Paragraph 19*)

Source: (UNFCCC, 2015[24]) (UN, 2015[25]), (UNDRR, 2015[26])

At the international level, there is also growing recognition of the value in taking an integrated approach to CCA and DRR within broader sustainable development. This is, for instance, reflected by efforts under the UN Framework Convention on Climate Change's (UNFCCC's) Technical Examination Process on Adaptation (TEP-A) to foster greater understanding of the political and economic benefits of such approaches (UNFCCC, 2017[23]). The Paris Agreement also encourages countries to formulate and implement national adaptation plans (NAPs) that facilitate the integration of CCA into relevant development planning processes and strategies, including on DRR. At least 120 developing countries have initiated or launched the process of formulating their NAP, and as of February 2020, 18 countries had published their first NAP (UNFCCC, n.a.[27]).

The Global Platform on Disaster Risk Reduction has also focused on the importance of a coherent approach to CCA, DRR and sustainable development (Global Platform for Disaster Risk Reduction,

n.d.[22]). Target E of the Sendai Framework calls for a substantial increase in the number of countries with national and local DRR strategies. While there has been progress in the development of DRR plans at the national and subnational level, the plans are not always aligned with the objectives of the Sendai Framework (UNDRR, 2019[28]). A key element in monitoring progress towards this target is that policies in place "promote policy coherence relevant to disaster risk reduction such as sustainable development, poverty eradication, and climate change, notably with the SDGs and the Paris Agreement". Development co-operation providers have also piloted efforts to bring together the two agendas, such as their support to Joint National Action Plans in a few SIDS (SPREP, 2013[29]) and the integrated climate risk management strategy for smallholders and commercial agribusinesses in Ghana (GIZ, n.d.[30]).

Challenges and opportunities of a coherent approach to CCA and DRR

Despite their shared objectives, the Sendai Framework and the Paris Agreement are often implemented in sectoral siloes, and historically, their specialists have operated largely in isolation from one another (OECD/The World Bank, 2016[31]). The frameworks each resulted from negotiations conducted by different UN bodies and in turn communities of research and practice, with their own political contexts, priorities, and origins (Peters et al., 2016[32]). As a result, each agreement has different commitments at national and local levels, in areas such as the development of country-based strategies; information and data management systems; and reporting on progress in compliance.

Coherence between the Sendai Framework and the Paris Agreement requires strong leadership and engagement of key government bodies, broad stakeholder participation and co-ordination, clear allocation of roles, responsibilities and resources, and monitoring, evaluation and continuous learning. This can help identify trade-offs (e.g. growing need for public support to post-disaster responses in the absence of a focus on CCA) and synergies (e.g. a more comprehensive overview of interlinked climate and disaster risks), while minimising redundancies in delivery. Lack of coherence between international frameworks and their associated requirements has the potential to create an additional burden for implementing countries, as well as fragmentation of scarce local capacity and resources – human as well as fiscal (OECD, 2018[33]).

Coherence can be pursued and operationalised horizontally across sectors; vertically at different levels of government (local, sub-national, national, regional, and global); and through collaboration across stakeholder groups (e.g. governments and inter-governmental organisations, the private sector, civil society organisations, and citizens). This can be grouped into three types of coherence:

- **Strategic (visions and goals) coherence**: Aligned visions, goals and priorities on CCA and DRR in national development plans and strategies, providing a framework for pursuing operational coherence. With aligned goals and objectives at the strategic level, the basis for coherence in implementation is strong.
- **Operational (policy and institutions) coherence**: Policy frameworks and institutional arrangements supportive of the implementation of aligned objectives on CCA and DRR, limiting the burden on often stretched human, technical and financial resources. Linking DRR and CCA at the operational level through the development of effective policies and institutional arrangements can also prevent duplication of efforts, or conflicting activities.
- **Technical coherence**: Strengthened technical capacities to assess the risks and opportunities, to identify and prioritise CCA and DRR measures, and to finance them. For example, adaptation planning can benefit from tools and information already well established in the DRR community, such as risk assessments, whereas emerging evidence of good practice approaches to CCA can inform disaster risk mitigation measures, reducing the potential for maladaptation (Urbano M De Bettencourt et al., 2013[34]).

In developing countries, the need for coherence is not limited to national policies and activities, but also includes coherence of development co-operation in support of CCA and DRR. In many developing countries, several development partners are operating alongside each other in co-operation with national and subnational authorities, making it particularly important for the support provided to be aligned with country objectives and mutually reinforcing. In addition, managing climate-related disaster risks should not be viewed in isolation from other development objectives, such as urban development, poverty reduction and environmental management (Urbano M De Bettencourt et al., 2013[34]). In order to strengthen resilience and enable sustainable development, objectives need to be approached in an integrated manner.

Several challenges and mismatches can hinder coherence between CCA and DRR. These include:

- **Fragmented responsibilities**: Responsibilities for CCA and DRR tend to be distributed across ministries that do not always co-ordinate closely on their respective policy agendas and objectives (Seidler et al., 2018[35]). CCA usually falls within the purview of environment, water, or natural resource ministries, as well as and meteorological services. The responsibility for DRR is more commonly located with civil protection, ministries of the interior or defence, or of designated agencies with implementation responsibilities located at the sub-national level or shared across levels of government (OECD, 2015[36]). In addition to separate entities holding responsibilities for CCA and DRR, both CCA and DRR need to be mainstreamed across various sectors, which is a challenge in and of itself.
- **Different funding structures**: With the fragmentation of responsibilities, funding mechanisms are often spread across institutions and levels of government. As a result, funding schemes might be constrained by the defined scope of the issuing organisation, leading to further siloes. Funding structures can also create perverse incentives, for example resulting in the prioritisation of short-term disaster financing needs over long-term risk reduction (OECD, 2018[10]). At the international level, an important difference is that the Sendai Framework does not have a dedicated funding mechanism, while the United Nations Framework Convention on Climate Change (UNFCCC) has the Green Climate Fund (GCF) and the Global Environment Facility (GEF) as the operating entities of its Financial Mechanism. The Adaptation Fund (AF) also serves the Paris Agreement.
- **Data availability and use**: There has been notable progress in recent years in data availability and climate- and disaster risk-related modelling. Examples include recent developments on continental scale hazard and risk assessments (e.g. UNDRR Global Risk Assessment Framework) and exposure mapping (e.g. based on Copernicus Land Monitoring). Projections and information on different factors of uncertainty downscaled to the sub-national level, however, remains a challenge in many countries (Seidler et al., 2018[35]). While information on trends or qualitative information can fill data gaps in some cases, insufficient data generally creates barriers to incorporating climate considerations into DRR efforts.
- **Temporal mismatch**: Disasters caused by extreme environmental events are usually distinct in time and space and require a rapid response. Humanitarian assistance is often event-related and therefore tends to emphasise short-term interventions and procedures (Birkmann and von Teichman, 2010[37]). In contrast, long-term perspectives are a key element of CCA strategies.

Many of these mismatches originate from the fact that DRR and CCA have historically developed and operated independently from each other. CCA has scientific theory-based origin and norms while DRR stems from a longer tradition of civil protection and humanitarian action following disaster events (Thomalla et al., 2006[16]; Birkmann and von Teichman, 2010[37]). Table 1.3 provides an overview of how these differing origins have led to divergence in institutions, international fora, implementing strategies, funding mechanisms and key actors.

Table 1.3. Major actors and institutions for CCA and DRR

Climate change adaptation	Disaster risk reduction
Lead national institutions	
• Environment / National Resource authorities	• Civil protection / Interior / Defence/ Security • Environment / Public Works authorities
Other national stakeholders	
• Finance and other line ministries • Subnational governments • Households • Businesses • Academia • Civil society organisations	
International agreements	
• United Nations Framework Convention on Climate Change (UNFCCC) • Paris Agreement on climate change	• Sendai Framework for Disaster Risk Reduction
National targets and implementation strategies	
• Nationally Determined Contributions (NDCs) • National Adaptation Plans (NAPs)	• National DRR Strategies
Major funding mechanisms and providers	
• National and sub-national budgets for CCA and broader development priorities that in different ways contribute to CCA • Bilateral and multilateral development finance, including international climate-related funds and programmes • Multilateral risk pooling facilities and transfer mechanisms	• National and sub-national budgets for disaster risk reduction, emergency response, disaster recovery and disaster risk management funds • Bilateral and multilateral finance for risk reduction, humanitarian aids, disaster recovery and disaster risk management funds • Multilateral risk pooling facilities and transfer mechanisms • Contingent lending instruments

Source: Adapted from (Thomalla et al., 2006[16])

While coherence and increased linkages are considered beneficial (e.g. more efficient use of human, technical and financial resources as well as information exchange), full integration of the policy agendas may not necessarily be desirable. First, by keeping the policy development negotiations separate, important issues that fall under the purview of only one agenda (for example, non-climate disasters such as earthquakes) can be given appropriate attention (UNFCCC, 2017[23]). Second, it is important that the merging of disaster risk reduction and the contribution of climate change impacts does not overshadow the influence of human factors on disaster risk. Changes in vulnerability and exposure are the primary drivers of disaster risks, whereas climate change affects the frequency and intensity of hazards. The negative consequences of failure to integrate climate consideration into DRR should not be underestimated, but similarly, too much emphasis on the climate change impacts has the potential of reducing the field of DRR to a hazard-centric viewpoint rather than equal considerations on the causes of disaster vulnerability (Kelman, Gaillard and Mercer, 2015[17]).

The integration of both policy agendas can occur on a continuum, from informal to strategic to systematic (Dazé, Terton and Maass, 2018[11]). This stems from the view that policy integration is not an outcome but rather a process of co-ordination (UNFCCC, 2017[23]) . Depending on the country context and capacity, different degrees of coherence may be the most beneficial. While increased coherence brings gains in efficiency and effectiveness, this is not without costs, as it can result in trade-offs between investing in a coherent approach to CCA and DRR and making progress on individual policy processes (Dazé, Terton and Maass, 2018[11]). While there is certain short-term benefit of implementing different policies in silos, the long-term costs of incoherence are expected to be by far higher, making the case for coherence-building but also highlighting the difficulties of making the first steps into this direction. In addition, bringing different communities together may reveal conflicting priorities for climate-resilient development.

International context as a driver for domestic action

National governments bear the primary responsibility to design DRR and CCA policies. They set national and local objectives, establish institutional arrangements and legislative frameworks, allocate funding, put in place an incentive structure that fosters stakeholder engagement and implementation, and monitor and evaluate progress to make the necessary adjustments and improvements over time. The Sendai Framework and the Paris Agreement provide the overarching frame for guiding and reinforcing national policy efforts on DRR and CCA, as national governments are working to operationalise the commitments under these international agreements. Within the two processes, there are different bodies mandated to support countries in implementing actions towards climate action and disaster risk reduction. Table 1.4 and Table 1.5 outline the respective mandates of some of the key processes and bodies and briefly analyse their implications for coherence in CCA and DRR.

Table 1.4. Mandate analysis of international processes and bodies for climate change adaptation

Processes and bodies (adopted/established year)		Mandate	Implication for coherence in CCA and DRR Coherence
Processes	UNFCCC (the Convention) (1994)	To stabilise greenhouse gas concentrations to prevent dangerous anthropogenic interference with the climate system	No particular mention of DRR in the mandate, but sets up the formal bodies for CCA
	Paris Agreement (2015)	To limit global temperature rise to well below 2.0 °C above pre-industrial levels and pursuing efforts to limit it to 1.5°C To increase the ability to adapt to the adverse impacts of climate change To make finance flows consistent with a pathway towards low GHG emissions and climate-resilient development	Mentions the Sendai Framework in the Preamble; Article 7 and 8 focus on strengthening resilience and reducing vulnerability to climate change, which is coherent with DRR
	Kyoto Protocol (1997)	To reduce emissions by committing its parties to internationally binding agreement	No particular mention of DRR in the mandate, but contributes to CCA with emission reduction commitments
Bodies	Adaptation Committee (2010)	To promote coherent implementation of enhanced action on adaptation	No particular mention of DRR in the mandate, but promotes synergies between CCA and DRR by co-operating with organisations at national, regional, and international levels
	LEG (2001)	To provide technical guidance and support to the LDCs for developing NAPs and NAPAs, and accessing GCF the LDCF and the Adaptation Fund	No particular mention of DRR in the mandate, but collaborates with DRR actors and promotes coherence in approaches
	ExCom of WIM (2013)	To guide the implementation of the Warsaw International Mechanism for Loss and Damage which averts, minimises and addresses loss and damage associated with climate change impacts	Promotes comprehensive risk management of climate change related loss and damage and seeks coherence, synergy and capacity-building needed to avert, minimise and address loss and damage from climate change
	Nairobi work programme (2005)	To facilitate and catalyse the development, dissemination and use of information to support adaptation policies and practices, particularly in LDCs and SIDS	Facilitates the development, dissemination, and use of knowledge that would inform and support adaptation policies and practices, especially on LDCs' and SIDS' understanding and assessment of impacts, vulnerability, and adaptation.
	Operating entities for the Financial Mechanism of the Convention -GEF (1991) -GCF (2010) -Adaptation Fund (2010)	GEF: To address most pressing global environmental problems GCF: To assist developing countries in taking climate action Adaptation Fund: To assist developing countries in building resilience and adapting to climate change	GEF: Addresses CCA and vulnerability reduction GCF: Aligns activities with developing countries' priorities and catalyses climate finance for climate-resilient development Adaptation Fund: Supports developing country Parties that are vulnerable to adverse impacts of climate change
	PCCB (2015)	To address current and emerging gaps and needs to implement and build capacity in developing countries	Focuses on capacity and promotes collaboration between actors at all levels and partnerships to enhance synergies potentially related to DRR

Note: ExCom of WIM: Executive Committee of the Warsaw International Mechanism for Loss and Damage; GCF: Global Climate Fund; GEF: Global Environment Facility; GHG: Greenhouse gas; LDC: Least Developed Country; LEG: Least Developed Countries Expert Group; Nairobi work programme: Nairobi work programme on impacts, vulnerability and adaptation to climate change; NAP: National Adaptation Plan; NAPA: National Adaptation Programmes of Action; PCCB: Paris Committee on Capacity-building; SIDS: Small Islands Developing States
Sources: (UNFCCC, n.d.[38]), (UNFCCC, n.d.[39]), (UNFCCC, n.d.[40]), (UNFCCC, n.d.[41]), (UNFCCC, n.d.[42]), (UNFCCC, n.d.[43]), (GEF, n.d.[44]), (GCF, n.d.[45]), (Adaptation Fund, n.d.[46]), (UNFCCC, n.d.[47])

Table 1.5. International processes and bodies for disaster risk reduction

Processes and bodies (adopted/established year)		Mandate	Implication for coherence in CCA and DRR
Processes	Sendai Framework (2015)	To strive for multi-hazard disaster risk reduction in development at all levels (following preceding processes - the Yokohama Strategy adopted in 1995 and the Hyogo Framework for Action in 2005)	Recognises climate related risks and disasters and emphasises resilience and capacity building
	The Global Platform (2007)	To serve as a forum for DRR and to provide strategic and coherent guidance for the implementation of the Sendai Framework, convening every three years and held seven times as of 2019.	Works as a fundamental mechanism to foster practical coherence in DRR implementation with SDGs, Paris Agreement and the New Urban Agenda.
Bodies	UNDRR (1999)	To serve as a focal point of the UN system for disaster reduction co-ordination and synergies, including different subsidiary bodies such as: the Open Ended Intergovernmental Working Group (OEIWG); Stakeholder Engagement Mechanism (SEM); the Science and Technology Advisory Group (STAG); the Private Sector Alliance for Disaster Resilient Communities (ARISE)	Co-ordinates the Sendai Framework and the Global Platform and advocates for sustainable development

Note: The Global Platform: The Global Platform Disaster Risk Reduction
Source: (UNDRR, 2015[26]), (UNDRR, n.d.[48]), (UNDRR, n.d.[49])

Country-led, context-specific policy processes elaborate how individual governments contribute to the achievement of the global goals set out in the Paris Agreement and the Sendai Framework (see examples in Box 1.2). While policy processes are usually driven by national-level governments, the bulk of implementation occurs at the local level. National-level actors must therefore be cognisant of the burden that planning, implementing and monitoring such processes can place on subnational actors. This consideration becomes all the more important with the additional objective of coherence across the two processes.

Box 1.2. Examples of country approaches to CCA and DRR

- **Nationally Determined Contributions (NDC)**, which communicate individual countries' climate objectives and commitments towards the objectives of the Paris Agreement. National targets set in NDCs are to be updated and submitted to the UNFCCC every five years, representing a progression over time, with the next iteration to be submitted before 2020. Responsibility for engagement with the UNFCCC, including the development of NDCs, generally sits with the Ministry of Environment or a central planning ministry. Many countries are also developing practical strategies for achieving the targets set out in NDCs, on both adaptation and mitigation.
- **National Adaptation Plans (NAPs)**, which identify medium- and long-term adaptation needs and put in place strategies and programmes to address them. A NAP can be a policy document, a policy process, or both. The NAP process is supposed to be a continuous, progressive and iterative process, consisting of planning, implementation and monitoring and evaluation, adjusted over time and based on feedback and lessons learned. Further, the goals and priorities identified in a country's NAP can be included in its NDC, and the NAP process itself can be a means of operationalising adaptation commitments under the NDC. (NAP Global Network, 2019[50])

- **National DRR Strategies**, outline national strategies that include targets, indicators and time frames, and are aligned with the recommendations of the Sendai Framework. DRR strategies are usually led by the disaster risk management agency within the government.

The implementation of the Paris Agreement and the Sendai Framework are in relatively early stages in many countries, meaning that evidence of coherence in implementation is still limited. However, coherence in managing climate and disaster risks through actions on the ground is not new, and therefore contributes – if indirectly – to the coherent pursuit of both frameworks. A significant consideration is that the implementation of each framework is country- and context-specific, and therefore the arguments for and nature of coherence in CCA and DRR will differ.

The three country case studies of Ghana, Peru and the Philippines that inform this report were selected given their different stages of economic development, varying levels of capacity and resource availability. The countries are also different in other factors that determine climate risks, such as the characteristics of the natural hazards as well as socio-economic factors, including governance arrangements, education systems, geopolitical situations, inequality and cultural context. A further consideration was the fact that all three countries have considerable experience in CCA and DRR and therefore provide a valuable basis for identifying good practice approaches for coherence in CCA and DRR. A summary of the economic profiles of the three countries is provided in Box 1.3., while more detailed information on their risks and vulnerabilities is outlined in Part 2.

Box 1.3. Overviews of the economies of Ghana, Peru and the Philippines

Ghana has experienced rapid economic growth since the early 1990s, which peaked in 2011 at a real GDP growth rate of 14%, largely due to high commodity prices and the discovery of offshore oil. Agriculture accounts for about 20% of GDP and employs more than half of the workforce, mainly small landholders. Gold, oil, and cocoa exports, and individual remittances, are major sources of foreign exchange. Expansion of Ghana's nascent oil industry has boosted economic growth, but the fall in oil prices since 2015 reduced by half Ghana's oil revenue. GDP of major sectors in 2017 was: services (57%), industry (25%) and agriculture (18%).

Peru achieved 5.6% of the annual GDP growth rate from 2009 to 2013 with a stable exchange rate and low inflation. Peru's metals and minerals exports account for 55% of the country's total exports and have contributed to the economic growth rate. Growth slowed from 2015 to 2017 due to weaker world prices of these natural resources, yet the annual growth rate remained about 3.27% over the period. Peru's rapid expansion coupled with cash transfers and other programmes have contributed to reduction of the national poverty rate by over 35% since 2004, while inequality persists. GDP of major sectors in 2017 was: services (60%), industry (33%) and agriculture (8%).

The Philippines has also accelerated its economic growth, averaging over 6% per year from 2011 to 2017. The current administration aims to reduce the poverty rate to 13 -15% and become an upper-middle income country by the end of President Duterte's term in 2022. Continuity of macroeconomic policy, tax reform, higher investments in infrastructure and human capital development, and improving competitiveness and the overall ease of doing business are high on the agenda for the current administration. GDP of major sectors in 2018 was: services (57.8%), industry (34.1%) and agriculture (8.1%).

Source: (AfDB, 2019[51]; CIA, 2019[52]). (PSA, 2018[53])

References

Adaptation Fund (n.d.), *About the Adaptation Fund*, Adaptation Fund, https://www.adaptation-fund.org/about/ (accessed on 17 October 2019). [46]

AfDB (2019), *Africa Information Highway Portal*, African Development Bank (AFDB), Abidjan, https://dataportal.opendataforafrica.org/wafshze/ghana-at-a-glance (accessed on 14 March 2020). [51]

Banwell, N. et al. (2018), "Towards Improved Linkage of Disaster Risk Reduction and Climate Change Adaptation in Health: A Review.", *International journal of environmental research and public health*, Vol. 15/4, http://dx.doi.org/10.3390/ijerph15040793. [15]

Beck, M. et al. (2018), "The global flood protection savings provided by coral reefs", *Nature Communications*, Vol. 9/1, p. 2186, http://dx.doi.org/10.1038/s41467-018-04568-z. [7]

Birkmann, J. and K. von Teichman (2010), "Integrating disaster risk reduction and climate change adaptation: key challenges—scales, knowledge, and norms", *Sustainability Science*, Vol. 5/2, pp. 171-184, http://dx.doi.org/10.1007/s11625-010-0108-y. [37]

CIA (2019), *The World Factbook*, https://www.cia.gov/library/publications/the-world-factbook/geos/gh.html (accessed on 14 February 2019). [52]

Coninx, I. et al. (2016), *Evolving issues brief 2016*, https://www.placard-network.eu/wp-content/PDFs/Evolving-issues-brief-2016.pdf (accessed on 31 January 2020). [21]

Dazé, A., A. Terton and M. Maass (2018), *Coordinating Climate-Resilient Development Alignment to Advance Climate-Resilient Development. Overview Brief 1: Introduction to Alignment*, NAP Global Network, http://napglobalnetwork.org/wp-content/uploads/2018/08/napgn-en-2018-alignment-to-advance-climate-resilient-development-overview-brief.pdf. [11]

GCF (n.d.), *About the Fund | Green Climate Fund*, GCF, https://www.greenclimate.fund/who-we-are/about-the-fund (accessed on 17 October 2019). [45]

GEF (n.d.), *About Us | Global Environment Facility*, GEF, https://www.thegef.org/about-us (accessed on 17 October 2019). [44]

GIZ (n.d.), *Integrated climate risk management for adaptation to climate change*, GIZ, https://www.giz.de/en/worldwide/44071.html (accessed on 1 August 2019). [30]

Glantz, M. and M. Baudoin (2014), *Working With A Changing Climate, Not Against It: Hydro-Meteorological Disaster Risk Reduction: A Survey of Lessons Learned for Resilient Adaptation to a Changing Climate*. [19]

Global Platform for Disaster Risk Reduction (n.d.), *2019 GP: About the Global Platform*, https://www.unisdr.org/conference/2019/globalplatform/about (accessed on 7 October 2019). [22]

Hallegatte, S. et al. (2016), *Unbreakable: Building the Resilience of the Poor in the Face of Natural Disasters*, The World Bank, http://dx.doi.org/10.1596/978-1-4648-1003-9. [9]

IPCC (2019), *Summary for Policymakers. In: IPCC Special Report on the Ocean and Cryosphere in a Changing Climate*. https://www.ipcc.ch/srocc/chapter/summary-for- [8]

policymakers/

IPCC (2018), *Global warming of 1.5°C An IPCC Special Report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty*, Intergovernmental Panel on Climate Change (IPCC), https://www.ipcc.ch/sr15/ (accessed on 26 March 2020). [4]

IPCC (2012), *Managing the Risks of Extreme Events and Disasters to Advance Climate Change Adaptation: Special Report of the Intergovernmental Panel on Climate Change*, Cambridge University Press, Cambridge UK, and New York, NY, USA, https://www.ipcc.ch/pdf/special-reports/srex/SREX_Full_Report.pdf. [14]

Kelman, I., J. Gaillard and J. Mercer (2015), "Climate Change's Role in Disaster Risk Reduction's Future: Beyond Vulnerability and Resilience", *International Journal of Disaster Risk Science*, Vol. 6/1, pp. 21-27, http://dx.doi.org/10.1007/s13753-015-0038-5. [17]

NAP Global Network (2019), *The National Adaptation Plan (NAP) Process: Frequently Asked Questions* –, http://napglobalnetwork.org/2019/12/the-national-adaptation-plan-nap-process-frequently-asked-questions/ (accessed on 28 January 2020). [50]

NOAA (n.d.), *January 2020 was Earth's hottest January on record*, https://www.noaa.gov/news/january-2020-was-earth-s-hottest-january-on-record. [3]

NOAA (n.d.), *State of the Climate: Global Climate Report for July 2019*, http://www.ncdc.noaa.gov/sotc/global/201907 (accessed on 22 October 2019). [2]

OECD (2018), *Assessing the Real Cost of Disasters: The Need for Better Evidence*, OECD Reviews of Risk Management Policies, OECD Publishing, Paris, https://dx.doi.org/10.1787/9789264298798-en. [10]

OECD (2018), *Policy Coherence for Sustainable Development 2018: Towards Sustainable and Resilient Societies*, OECD Publishing, Paris, https://doi.org/10.1787/9789264301061-en. [33]

OECD (2015), *Aligning Policies for a Low-carbon Economy*, OECD Publishing, Paris, https://dx.doi.org/10.1787/9789264233294-en. [36]

OECD/The World Bank (2016), *Climate and Disaster Resilience Financing in Small Island Developing States*, OECD Publishing, Paris, http://dx.doi.org/10.1787/9789264266919-en. [31]

Peters, K. et al. (2016), *'Resilience' across the post-2015 frameworks: towards coherence? Working Paper*, ODI, https://www.odi.org/sites/odi.org.uk/files/resource-documents/11085.pdf (accessed on 22 March 2019). [32]

PSA (2018), *Philippine Economy Posts 6.6 Percent GDP Growth in the Fourth Quarter of 2017; 6.7 percent in 2017 | Philippine Statistics Authority*, https://psa.gov.ph/content/philippine-economy-posts-66-percent-gdp-growth-fourth-quarter-2017-67-percent-2017 (accessed on 3 March 2020). [53]

Seidler, R. et al. (2018), "Progress on integrating climate change adaptation and disaster risk reduction for sustainable development pathways in South Asia: Evidence from six research projects", *International Journal of Disaster Risk Reduction*, Vol. 31, pp. 92-101, http://dx.doi.org/10.1016/J.IJDRR.2018.04.023. [35]

Shaw, R., J. Pulhin and J. Jacqueline Pereira (2010), "Chapter 1 Climate change adaptation and disaster risk reduction: overview of issues and challenges", in *Community, Environment and Disaster Risk Management, Climate Change Adaptation and Disaster Risk Reduction: Issues and Challenges*, Emerald Group Publishing Limited, http://dx.doi.org/10.1108/s2040-7262(2010)0000004007. [18]

Spalding, M. et al. (2014), "The role of ecosystems in coastal protection: Adapting to climate change and coastal hazards", *Ocean & Coastal Management*, Vol. 90, pp. 50-57, http://dx.doi.org/10.1016/J.OCECOAMAN.2013.09.007. [6]

SPREP (2013), *JNAP development and implementation in the Pacific: Experiences, lessons and way forward*, Secretariat of the Pacific Regional Environment Programme (SPREP), Apia, Samoa, http://www.sprep.org. [29]

Tanner, T., E. Wilkinson and T. Mitchell (2006), "Overcoming the barriers: Mainstreaming climate change adaptation in developing countries", http://dx.doi.org/10.13140/RG.2.2.17956.37765. [20]

Thomalla, F. et al. (2006), *Reducing hazard vulnerability: towards a common approach between disaster risk reduction and climate adaptation*, http://www.geo.mtu.edu/volcanoes/06upgrade/Social-KateG/Attachments%20Used/ReducingVulnerability.pdf (accessed on 26 March 2020). [16]

UN (2015), *2030 transforming our world: the 2030 Agenda for Sustainable Development*, https://sustainabledevelopment.un.org/post2015/transformingourworld. [25]

UNDRR (2019), *Global Assessment Report on Disaster Risk Reduction 2019*, United Nations Office for Disaster Risk Reduction, Geneva, Switzerland, https://gar.unisdr.org (accessed on 16 December 2019). [28]

UNDRR (2015), *Sendai Framework for Disaster Risk Reduction 2015-2030*, https://www.undrr.org/publication/sendai-framework-disaster-risk-reduction-2015-2030 (accessed on 24 January 2020). [26]

UNDRR (n.d.), *Disaster risk management | UNDRR Terminology*, https://www.undrr.org/terminology (accessed on 23 January 2020). [13]

UNDRR (n.d.), *The Global Platform for Disaster Risk Reduction*, UNDRR, https://www.unisdr.org/we/coordinate/global-platform (accessed on 17 October 2019). [48]

UNDRR (n.d.), *Who we are - UNDRR*, UNDRR, https://www.unisdr.org/who-we-are (accessed on 17 October 2019). [49]

UNFCCC (2017), *Opportunities and options for integrating climate change adaptation with the Sustainable Development Goals and the Sendai Framework*, UNFCCC, Bonn, https://unfccc.int/sites/default/files/resource/techpaper_adaptation.pdf (accessed on 2 October 2018). [23]

UNFCCC (2015), *Paris Agreement*, UNFCCC, Bonn. https://unfccc.int/process-and-meetings/the-paris-agreement/the-paris-agreement. [24]

UNFCCC (n.d.), *Adaptation Committee | UNFCCC*, UNFCCC, https://unfccc.int/Adaptation-Committee (accessed on 17 October 2019). [41]

UNFCCC (n.d.), *Nairobi work programme on impacts, vulnerability and adaptation to climate change*, UNFCCC, https://unfccc.int/topics/adaptation-and-resilience/workstreams/nairobi-work-programme-on-impacts-vulnerability-and-adaptation-to-climate-change (accessed on 17 October 2019). [43]

UNFCCC (n.a.), *National Adaptation Plans: NAPs from developing countries*, https://www4.unfccc.int/sites/NAPC/News/Pages/national_adaptation_plans.aspx (accessed on 23 January 2020). [27]

UNFCCC (n.d.), *Paris Committee on Capacity-building (PCCB) | UNFCCC*, PCCB, https://unfccc.int/pccb (accessed on 17 October 2019). [47]

UNFCCC (n.d.), *The Executive Committee of the Warsaw International Mechanism for Loss and Damage*, UNFCCC, https://unfccc.int/wim-excom (accessed on 17 October 2019). [42]

UNFCCC (n.d.), *What is the Kyoto Protocol?*, UNFCCC, https://unfccc.int/kyoto_protocol (accessed on 17 October 2019). [40]

UNFCCC (n.d.), *What is the Paris Agreement?*, UNFCCC, https://unfccc.int/process-and-meetings/the-paris-agreement/what-is-the-paris-agreement (accessed on 17 October 2019). [39]

UNFCCC (n.d.), *What is the United Nations Framework Convention on Climate Change?*, https://unfccc.int/process-and-meetings/the-convention/what-is-the-united-nations-framework-convention-on-climate-change (accessed on 17 October 2019). [38]

Urbano M De Bettencourt, T. et al. (2013), *Building resilience : integrating climate and disaster risk into development - the World Bank Group experience*, http://documents.worldbank.org/curated/en/762871468148506173/Main-report (accessed on 9 January 2019). [34]

Winsemius, H. et al. (2016), "Global drivers of future river flood risk", *Nature Climate Change*, Vol. 6/4, pp. 381-385, http://dx.doi.org/10.1038/nclimate2893. [5]

WMO (2019), *The Global Climate in 2015-19*, World Meteorological Organization, Geneva. [1]

2. National approaches to increased coherence in climate change adaptation and disaster risk reduction

This chapter examines national approaches to policy development and implementation on climate change adaptation and disaster risk reduction, and the potential for introducing greater coherence across the two policy areas. The chapter is structured around five potential entry points through which coherence between the two policy processes can be strengthened: i) policy and governance, ii) data and information, iii) implementation, iv) financing, and v) monitoring, evaluation and learning. Informed by the country experiences of Ghana, Peru and the Philippines, the chapter identifies good practices and lessons learned for coherence at different levels of government, across sectors and stakeholder groups. This contributes to the identification of ways through which governments can put in place enabling conditions that facilitate greater coherence between the two policy areas. The potential role of development co-operation in supporting these efforts is also highlighted.

Aligning governance for CCA and DRR

With the adoption of both the Paris Agreement on climate change and the Sendai Framework for Disaster Risk Reduction in 2015, governments have been equipped with a political mandate for a more coherent approach to climate change adaptation (CCA) and disaster risk reduction (DRR). Both frameworks share the objective of increased resilience to climate-related risks. For CCA, the emphasis is on enhancing the capacity to respond to future climate change and disaster risks as well as to slow onset changes. In the context of DRR, the focus has shifted over the years from primarily being on emergency response towards a more comprehensive approach, encompassing disaster prevention, preparedness, response and recovery. This paradigm shift was initiated with the adoption of the Hyogo Framework of Action on Disaster Risk Reduction in 2005, followed by the Sendai Framework in 2015 when resilience to disaster risk was elevated as a priority, complementing the focus on reducing disaster risks (UNDRR, 2005[1]), (UNDRR, 2015[2]).

The extent to which countries are taking a coherent approach to CCA and DRR – or whether it is even a priority – depends on the political, socio-economic and environmental context and circumstances. At the same time, the priority given to enhancing the level of coherence between the two policy processes may be determined by the nature of the climate and disaster risks in a given country, and by the political priority given to each. Countries, such as the Philippines and Peru that are significantly exposed to natural hazards, have a long history in managing and responding to extreme events, with the institutional frameworks for DRR better developed and established than for CCA. The processes in place and the systematic approach to DRR offers lessons and entry points for a complementary focus on CCA. In other countries such as Ghana where the focus to a larger extent has been on CCA, but where a complementary focus on DRR may be valuable given the nature of emerging hazards, DRR can leverage systems and resources available more recently for CCA. To align policy processes in support of CCA and DRR towards joint objectives, an overview of existing institutional arrangements is needed. To increase co-ordination towards coherence also requires additional resources and capacities and must take different levels of development into account. This requires political support and strong leadership by a recognised co-ordination entity. In some cases, technical assistance by development co-operation can provide valuable support to partner countries to put in place the right co-ordination mechanisms.

In many developing countries, a central government entity oversees the formulation and enforcement of national development strategies. With increasing recognition of the potential impact of climate risks on development objectives, central co-ordination entities are increasingly mainstreaming CCA and DRR objectives into national planning processes. In Ghana, for example, the National Development Planning Commission plays a central co-ordinating role in the formulation of the country's long-term development strategy. The Commission also provides local authorities with guidance and technical support to ensure that local development plans are aligned with national priorities. With Ghana's adoption of the Paris Agreement, this includes guidance on the integration of the objectives of Ghana's Nationally Determined Contribution into sectoral and local development plans by sub-national assemblies (Ghana, 2017[3]). While this, for the time being, does not include a complementary focus on DRR or coherence between the two, the current approach could facilitate this, in case it will be considered a national priority. Similarly, the Philippines' national planning agency has been responsible for integrating DRR and CCA in the various sectoral policies and strategies in its development plan. The current Philippine medium term plan identifies ensuring safety and increasing resilience as one of the bedrock strategies for attaining inclusive growth.

A commonality of both CCA and DRR is the need for measures to be mainstreamed across sectors, including, but not limited to water, urban planning, transport, energy, infrastructure, health, and agriculture. As different stakeholders tend to use diverse terminologies for terms such as risk, impacts, vulnerability and resilience (Leitner et al., 2018[4]), strong leadership and high-level co-ordination play an important role in reaching a common understanding of what coherence in CCA and DRR means in a given country context. In Peru, this responsibility is assigned to the Presidency of the Council of Minister, and in the

Philippines to the Climate Change Adaptation, Mitigation and Disaster Risk Reduction Cabinet Cluster. For coherence in policy processes to translate into coherence in implementation, key ministries such as the Ministry of Finance must also be engaged from the outset to ensure that the allocation of roles and responsibilities is matched with commensurate allocation of resources.

Institutionally, different models exist. For CCA, co-ordination usually falls under a lead ministry or agency: The Ministry of Environment, Science, Technology and Innovation in Ghana, the Ministry of the Environment in Peru, and the Climate Change Commission in the Philippines. Those institutions, however, have limited capacity to encourage other line ministries or agencies to prioritise adaptation measures and ensure mainstreaming. Having said that, the same institutions oversee in some countries the NAP processes that have proven very effective in bringing a diverse set of actors to the table, and in providing a platform for dialogue, collaboration and information exchange.

For DRR, several agencies usually cover different phases of the risk management cycle, notably the prevention and the response phases, which can at times lead to institutional competition for resources. Nevertheless, all three case study countries have their central co-ordination bodies for DRR, namely the National Disaster Management Organisation in Ghana, the Presidency of the Council of Minister in Peru, and the National Disaster Risk Reduction Management Council in the Philippines.

Local governments are responsible for the bulk of CCA and DRR policy implementation, highlighting the importance of strong vertical co-ordination across levels of governments, and clear allocation of roles and responsibilities. However, DRR and CCA implementation at the local level often remains fairly disconnected from national policies. For example, in the Philippines, out of 1634 Cities and municipalities, 748 or less than 50% of local government units had integrated CCA and DRR in the Comprehensive Land Use Plan in 2018 (GOV.PH, 2017[5]). National laws mandate the formulation of Local Disaster Risk Reduction and Management Plans as well as National Climate Change Action Plans, however, compliance rates are still wanting.

While national guidelines on how to integrate DRR and CCA in local development plans are often in place, capacity constraints, lack of awareness, human and financial resources, knowledge and know-how, as well as high turn-over limit the ability of local governments to mainstream DRR and CCA in a coherent manner. Instead, DRR often remains response-oriented through local civil protection offices, whereas the responsibility for mainstreaming CCA often lies with local environment protection offices, which have limited implementation capacities. Empowering local initiatives through incentive mechanisms, capacity-building, knowledge-sharing and regular monitoring are ways national governments can foster coherence between CCA and DRR at the local level (see two examples in Box 2.1).

Box 2.1. Examples of practices that foster coherence in CCA and DRR at the local level

The Philippines and Ghana both provide examples of practices that foster coherence in CCA and DRR at the local level, which have the potential to be applicable elsewhere:

- The Philippines demonstrates the efficiency of sharing human resources across DRR and CCA. Local Disaster Risk Reduction and Management Councils (LDRRMC) are tasked with preparedness activities, such as information dissemination and raising public awareness at the local level by, for example, displaying hazard maps in community spaces and disseminating printed information materials. Where robust LDRRMCs are in place, they can also act as a focal point for mainstreaming climate considerations into DRR plans. Stakeholders interviewed for this study noted that LDRRMCs often act as climate change champions, for example, by communicating sea-level rise risk maps at the community-level.
- Together with other agencies, Ghana's National Development Planning Commission has developed guidelines that provide a checklist to enable local assemblies to integrate Ghana's NDC into their development plans. While there remains scope to better integrate DRR considerations, the checklist specifies that climate actions must be addressed in an integrated manner through the local assemblies' policy planning and implementation. On adaptation, it identifies priority actions across six sectors with the overarching objective being to "increase climate resilience and decrease vulnerability for enhanced sustainable development" (Ghana, 2017[3]).

Beyond government, the engagement of the whole-of-society in CCA and DRR efforts often lacks appropriate governance arrangements. Adopting an inclusive approach to policy-making on both CCA and DRR is fundamental to address the needs of the most vulnerable populations, integrate local knowledge and solutions, and ultimately facilitate policy implementation. *Dialoguemos* in Peru, for example, is an initiative whereby the Ministry of the Environment holds large consultations with civil society for the development of its climate change adaptation policy. During the development of Peru's Climate Change Law and the NDC that frames DRR as a cross-cutting issue for adaptation, 2 000 people from indigenous communities, academia, youth, private sector and other forms of civil society organisations participated in and contributed to *Dialoguemos*.

Development of climate services in support of coherence in CCA and DRR

Coherence in CCA and DRR policy and practice relies on useful, relevant, credible and legitimate weather and climate data and information being accessible to policy makers as well as other state- and non-state actors (UNFCCC, 2017[6]) (Street, 2019[7]). Such information, also referred to as climate services, is defined as:

> *"[T]he transformation of climate-related data and other information into customised products such as projections, trends, economic analysis, advice on best practices, development and evaluation of solutions, and any other service in relation to climate that may be of use for the society at large." (European Commission, 2015[8]).*

There are important synergies between CCA and DRR to be explored through the development of climate services. In fact, the shift in focus of the Sendai Framework from managing disasters to managing risks provides a strong basis for coherence and mutual reinforcement between CCA and DRR. For example, a good understanding of the climate-related risks is essential when defining the priorities of a DRR policy at the national level and designing resilience measures at the local level. This must take into account the

deep uncertainty of climate change projections (see Box 2.2 for examples) while at the same time recognising the broader drivers of risks, such as interactions between human and environmental systems, and social and cultural contexts (Ford et al., 2018[9]). This in turn can help increase the acceptability of CCA and DRR measures by local stakeholders.

1. Countries have made significant advances in strengthening climate services over the past decade with a move away from assessing hazards towards assessing risks. This involves collecting information on exposure and vulnerability – two key dimensions of risk. There are, nonetheless, a number of persistent challenges. First, accessing available information is often challenging or even not possible due to poor data quality (e.g. as a result of lacking or inadequate infrastructure for meteorological stations) and the format of the information (e.g. data being recorded on paper rather than electronically). In some cases, data is only available at a fee or not at all due to confidentiality constrains, further limiting use. Second, beyond hazard analysis, information on exposure and vulnerability to climate-related hazards is often more difficult to obtain, as this requires updated geospatial information on land use and social data and information, which tend to be spread across ministries and levels of government. Third, methodologies to develop risk assessments, when they exist, are often too complex for local users, who lack capacities to develop such analysis. As a result, efforts to strengthen the quality and availability of climate and weather-related data and information is progressing faster at the national than at the local level, despite the recognised need for good information at all levels.

To overcome these challenges, incentives must be in place to encourage owners of data to make it accessible, e.g., through financial compensation from the national budget rather than through user fees from different ministries and agencies. This must be matched by a good understanding of what information is needed and can credibly be provided, and to tailor that information to the respective user needs (Street, 2019[7]). Centralised platforms with access to data and information, including risk models, observation systems (meteorological offices) and academia can facilitate robust risk assessments tailored to user needs. The case study countries are starting to explore such an information sharing approach with the Climate Change Data Hub in Ghana, the Geospatial Information and Analysis System for Hazards and Risk Assessment in the Philippines and the Spatial Data Infrastructure in Peru.

Availability of climate services must be matched by capacity of stakeholders to use the services to conduct risk analysis. Many countries have separate risk assessment processes for CCA and DRR, and in some cases by individual ministries or sources of finance, which can be an inefficient use of the resources available. There remains scope to streamline relevant tools for climate and disaster risk assessments. In the Philippines the Department of the Interior and Local Government is working with the Global Initiative on Disaster Risk Management on harmonising risk-assessment approaches across different government bodies in an effort to overcome current practice where different ministries use different climate and disaster risk assessment (CDRA) tools for their respective planning processes (GIDRM, n.d.[10]). Finally, climate services are most effective when matched with tools that can translate climate information into a format that can guide decision-making processes, such as tools for costing adaptation options relative to estimated impacts avoided and for data visualisation, such as GIS-based tools (Palutikof et al, 2019[53])

Box 2.2. Complementing climate services: Storyline approach and multi-level stakeholder engagement

In the face of deep uncertainties, assessing future climate risks to inform policy or financial decisions in a probabilistic manner will remain extremely challenging, despite enhanced availability and accessibility of climate services. Efforts should therefore be made to combine climate information with other ecological, economic and social factors that drive risks. Such an approach, also known as a storyline (or narrative) approach, uses descriptions of plausible future evolutions, characteristics, general logic and developments underlying a particular quantitative set of scenarios.

Storylines may be developed based on, for instance, particular types of (historical or plausible) events with high societal impacts, or particularly dangerous physical pathways of the climate system (e.g., tipping points). Such storylines can be used to help improve risk awareness, strengthen decision-making, explore the boundaries of plausibility of certain climate projections, provide a physical basis for partitioning uncertainty, and link physical climate information with human aspects of climate change.

To make the best use of information generated by climate change modelling and projections, climate information can also be complemented by community-based assessment of vulnerability and options of CCA and DRR measures. Multi-level stakeholder engagement from national governments to local communities can enhance complementarity between climate services and local knowledge and techniques, while also contributing to the development of local-level capacity in CCA and DRR.

Source: (CICERO, 2019[11]) (IPCC, 2018[12]) (Shepherd et al., 2018[13]) (Butler et al., 2015[14])

National Meteorological and Hydrological Services (NMHSs) are in many countries an important source of weather and climate data. Areas of responsibility include the design, operation and maintenance of national observation systems, data management including quality analysis and control, development and maintenance of data archives, and dissemination of climate products. NMHSs are well positioned to collaborate with academia, government departments, and other stakeholders, including the private sector and international and civil society organisations. Such partnerships can be crucial in enhancing data coverage and quality, and in facilitating the process of gathering and sharing data to make it accessible in a timely and cost efficient manner (WMO & GFCS, 2016[15]).

Across the three case study countries, the respective NMHSs – Philippines Atmospheric Geophysical and Astronomical Services Administration, the Ghanaian Meteorological Service, and the National Institute for Hydrology and Meteorology in Peru – have all seen their capacities improve over the past decade. They have invested in monitoring networks, computing capacities for hydro-meteorological modelling and forecasting, as well as in the development of climate projections, in some cases, with the support of development co-operation. This enables them to produce relevant weather and climate information, from historic databases of hazard events, climate projections, or early warnings. On the hazard side, there are still opportunities to improve the coverage of hydro-meteorological monitoring networks and to further develop hazard modelling, to downscale climate models, and to increase the lead-time for early warnings.

Implementing risk reduction measures for the climate-related risks of today and the future

Coherence in governance arrangements and information should translate into increased resilience on the ground through the implementation of risk reduction measures which take both CCA and DRR into account. Addressing existing and future exposures and vulnerabilities to floods, droughts, storms, forest fires, and other climate-related hazards through risk reduction measures requires a mix of structural and non-

structural measures. The former includes protective infrastructure, and the latter measures, such as early-warning systems, the provision of risk information, land use and building codes or regulation to incorporate disaster risks and climate change into other investments. An integrated approach to CCA and DRR can help to avoid counterproductive investments, such as flood management measures that decrease exposure in the short term but may serve to increase development and associated future vulnerability (OECD, 2019[16]).

Prioritising for and designing structural measures should consider climate change projections, as these investments might otherwise not produce their foreseen benefits over their life cycle, resulting in increased costs. Examples include adjusting protection standards with a safety margin accounting for sea level rise or designing multi-purpose infrastructure (e.g. a dam for both floods, droughts and other uses). Across the three case studies, there is a recognition of the importance of mainstreaming climate risks into structural protection investments; however, this is not yet a consistent practice. In both the Philippines and Peru, guidelines are currently being developed on how to incorporate resilience considerations into general infrastructure investments.

In the context of the rapid urban development taking place in the Philippines, Peru, and Ghana, incorporating disaster risks and climate change into land-use decisions to avoid creating new risks should be a priority. To avoid or limit locking in future risks, public and private investments in urban development should factor in climate-related risks and the potential impacts of climate change under different scenarios. In Peru, while both CCA and DRR legal frameworks call for integration of climate resilience in municipal plans, there is still limited implementation of these provisions: with 70 of 1869[1] municipalities having indicated that they integrated DRR into their development plans in 2017 (CENEPRED, 2017[17]). Capacity gaps at the local level as well as an absence of enforcement mechanisms are cited as key barriers.

Healthy ecosystems play a key role in reducing risks and supporting adaptation over the long term. As the evidence base grows, nature-based solutions (NBS) are becoming an increasingly prominent tool to manage climate-related risks, either on their own or as a compliment to structural measures. Land-use planning can facilitate the use of NBS, by maintaining restrictions or creating incentives that protect ecosystems (e.g. wetlands, forests, mangroves) and ensure the ongoing provision of ecosystem services such as flood defence and erosion control. In Peru, for example, a key advance can be in the mainstreaming of NBS into national investment practices. The public investment programme Invierte.pe explicitly establishes that natural infrastructure can be considered part of the public infrastructure projects. This leadership at a central level opens up financial resources to support the implementation of NBS and between 2015 and 2018, public investments projects in NBS reached USD 300 million in Peru in 209 projects.

[1] Survey responses, and to note that 497 municipalities did not respond to the question and 637 did not participate in the survey

Box 2.3. Nature-based solutions in practice – examples from Ghana and Peru

The Forestry Committee of Ghana has conducted an agroforestry initiative to promote plantation of trees and cocoa in the same geographical areas, which has led to mitigating farmers' vulnerability to climate change (Kalame et al., 2011[18]). The Committee's agroforestry initiative has promoted equitable land-sharing and free access to fertile lands within forest reserves for crop cultivation and subsequent commercial marketing. The Committee provides the seedlings to farmers in rural communities and then buy regenerated seedlings to plant in vulnerable areas to implement, for instance, flood protection measures.

In Peru, the Ministry of Environment, along with other agencies, has worked to restore water channels and reservoirs to increase resilience to drought in the high Andean region. This area of Peru is particularly vulnerable to variability in seasonal patterns and reduction in surface water run-off, as well as frost and extreme events such as hailstorms (Kapos et al., 2019[19]).

Capacity limits at the local level is a crosscutting issue which can create challenges for implementation on the ground. In all three countries, local governments face significant capacity constraints, meaning limited resources (human, technical, financial) needed to cover a wide range of priorities. CCA and DRR investments must compete against the demand for funding other development priorities, which often have more immediate visibility and pay-off. In Ghana, for example, important progress has been made in enhancing capacity at the national level, e.g. to collect and use climate data and for this to inform national planning and reporting processes. The National Climate Change Policy, however, notes the need for further capacity-building at the district level, where policy implementation takes place (MESTI, 2015[20]). This includes greater awareness of the climate policy, what it requires of local governments, and the associated resource needs (Asante et al., 2015[21]).Box 2.1 provides examples of approaches to local capacity building.

Capacity constraints at the local level illustrate the importance of policy coherence between CCA and DRR. In the Philippines, for example, laws under multiple government agencies require the preparation of a plethora of plans, estimated to be over 30 in total (GOV.PH, 2017[5]). The sheer number of requirements often leads to low absorption of guidelines coming from the national level. Instead, new and separate requirements for planning and reporting can impose significant administrative burdens and pressure on already stretched local government units. In addition, confusion can arise in implementation when national guidance lacks technical coherence. For example, in Peru, the DRR and the CCA communities use different definitions for the word "exposure". In the Philippines, different national institutions promote slightly different versions of the same tool, such as the *Climate Disaster Risk Assessment*. This in turn impairs subsequent planning and implementation processes, including efforts to access domestic CCA and DRR funds.

One important opportunity for avoiding the re-creation of existing risks or the creation of new risks is the recovery and reconstruction phase following a disaster. The Sendai "*building back better*" principle is "the use of the recovery, rehabilitation and reconstruction phases after a disaster to increase the resilience of nations and communities through integrating disaster risk reduction measures into the restoration of physical infrastructure and societal systems, and into the revitalization of livelihoods, economies, and the environment" (UNDRR, 2017[22]). In short, the recovery and reconstruction phase after a disaster should be used to rebuild in a way that prevents the same hazards from leading to the same impacts. This can be done through changes in land-use planning (e.g., deciding not to rebuild in an area of high vulnerability), the application or renewed enforcement of regulation (e.g., ensuring building codes account for risks, such as earthquakes), or rethinking organisational measures, such as early warning systems and evacuations routes (Hallegatte, Rentschler and Walsh, 2018[23]). For example, in the Philippines, improvements in early

warning systems were made after Typhoon Yolanda. As the Philippines has so many regional languages, the Philippine Atmospheric, Geophysical and Astronomical Services Administration (PAGASA) did not have a local term to properly communicate the phenomenon of a storm surge to all areas hit by the disaster. After the disaster, PAGASA has worked with linguists to craft simpler meteorological terms to ensure that the dangers from disaster risks are fully understood by all.

A tension that can hinder the implementation of the "build back better" principle is the need for rapid recovery needs versus the time required for undertaking proper risk analysis. This tension was visible in Peru, where the Authority for Reconstruction with Changes (ARRC) was created in 2017, with the goal of implementing a resilient reconstruction process in the aftermath of the damaging 2017 El Niño Costero. Created as an autonomous authority to implement a comprehensive reconstruction plan in the 13 regions affected by this climate-related disaster, ARRC was allocated a significant budget of USD 7.8 billion to rebuild public infrastructure and housing in a more resilient way, which included a comprehensive flood control project in 19 coastal rivers (PCM, 2019[24]). However, despite the well thought out process, time delays, political pressures and capacity gaps have not allowed a comprehensive analysis of where and how to rebuild in a more resilient way. For example, the identification of very high and non-mitigatable risk zones, which would require relocation, was particularly politically challenging. The disbursement of funds has also been slow - with only 36% of the allocated budget transferred, by mid-2019. This has led to questioning of its effectiveness.

One way to overcome this tension is for governments to put ex-ante measures in place that ensure clarity around the reconstruction process. For example, governments should have a contingency plan that allocates responsibility among government agencies (Hallegatte, Rentschler and Walsh, 2018[23]). This plan should also clearly set out how climate change and overall resilience should be considered in the reconstruction process. In addition, contingent financial arrangements—such as contingent credit lines or insurance products can ensure that financing is immediately available and is not delayed by budgetary procedures. This is described further in the following section.

Financing DRR and CCA at the national level

Determining the amount of resources to be allocated towards managing climate-related disaster risks depends on what level of residual risk the country considers acceptable and what resource constraints it faces. It is neither technically nor financially feasible to aim to achieve a "zero risk" level, as there are usually competing demands and more productive allocation choices for available resources (OECD, 2014[25]). Complex decisions regarding the acceptability of risk are routinely faced in decisions on managing disasters, such as setting flood safety standards or defining flood zones (OECD, 2013[26]). Often it is large-scale disasters that prompt countries to revisit the acceptable levels of risks implicit in their policies and measures (OECD, 2013[27]). For example, countries commonly revisit flood defence standards following a hurricane or major storm. A reactive approach such as this, however, may lead to areas recently affected by disasters receiving the bulk of financing, rather than it being used for investments in risk reduction, or in defining an evidence-based policy at the national level (OECD, 2014[28]).

Investments in CCA AND DRR measures can come from a diverse set of funding mechanisms and it is often difficult to get a clear picture on total budgets available. The resources are spread across different budget lines and levels of governments in most countries (OECD, 2018[29]). With the growing demand for risk prevention investments in a changing climate, improved mapping of national resource mobilisation for DRR and CCA should be a priority. Ghana, Peru, and the Philippines all have measures in place to track spending on CCA, DRR, or both, as described in Table 2.1.

Table 2.1. Budget tracking initiatives as an opportunity for coherence

	Description of the initiative	*Contribution to operational coherence*
Ghana	The Climate Change Finance Tracking Tools, developed by the Ministry of Finance, outline climate-relevant budget codes and the policy objectives associated to them. The tools also provide criteria on the degrees of relevance to climate objectives (high, medium or low) and their target (mitigation or adaptation, or multifocal). This is applied through Ghana's budgeting system called the Programme Based Budgeting. Ghanaian ministries, departments and agencies as well as sub-national assemblies prepare their Budget Estimates for programmes and projects for which sub-national governments seek funding. These programmes and projects must be aligned with the national policy direction of the government.	At present, the initiative highlights only climate-related budget codes. However, there is scope for the tools to also bring in budget codes related to DRM to identify areas where public funding can be allocated to enhance synergies between CCA and DRM. Some policy objectives would directly link the two issues (e.g. reversing forest and land degradation) while others would do so more indirectly (e.g. sustainable natural resource management). For now, the integration of CCA and DRM on its own remains limited.
Peru	Budget programme 0068 has a dedicated budget line for "Vulnerability Reduction and Disaster Response". This programme, co-ordinated by the Presidency of the Council of Minister together with the Ministry of Economy and Finance (MEF), is a multi-sectoral programme that aims to finance DRM activities across sectors and levels of governments, with objectives aligned to those of the national disaster risk management plan (PLANEGARD).	At present, the budget programme primarily covers DRM investments, and is considered by most sectors involved in DRM in Peru as a useful tool to integrate different sectoral initiatives under a common, concrete and measurable framework. To mobilise financial resources for implementation of the climate change adaptation policy, valuable lessons learned or potential synergies with the budget programme 0068 could be explored.
The Philippines	The Department of Budget and Management, the Climate Change Commission, and the Department of Interior and Local Government established an initiative on Climate Change Expenditure Tagging at the national and local level in 2015. This initiative tracks, monitors and reports on climate change (mitigation and adaptation) expenditures to identify financing gaps as basis for mobilizing resources. It supports the assessment of the status of the country's response to climate change and ideally guides improvements of its effectiveness.	At present, the initiative only covers climate change measures (adaptation and mitigation). However, the same tagging arrangement for climate change expenses between the Climate Change Commission and the Department of Budget and Management could be adopted by the National Disaster Risk Reduction and Management Council/ Office of Civil Defense and the Department of Budget and Management to get a better sense of disaster risk management-related spending.

Note: This table refers to disaster risk management (DRM) rather than disaster risk reduction (DRR) used in this document, since DRM is the framing used by the three case study countries in their domestic policy and implementation processes.
Source: Country case studies

There is evidence of general under-investment in *ex ante* risk reduction and a bias towards reliance on *ex-post* response. Although the recording of expenditures for *ex-ante* risk reduction spending versus *ex-post* expenditures is incomplete (OECD, 2018[29]), existing evidence suggests that countries tend to allocate significantly more funds to disaster response than disaster risk reduction. Reasons for the *ex-post* bias in spending include:

- lack of incentives (investments to build resilience often do not produce visibility or immediate gains or benefits);
- low levels of risk awareness coupled with lack of willingness to pay upfront;
- moral hazard coupled with capacity gaps (expectations of government compensation *ex-post* impedes upfront investments by subnational governments, households and businesses);
- high political visibility for *ex-post* assistance (OECD, 2014[25]).

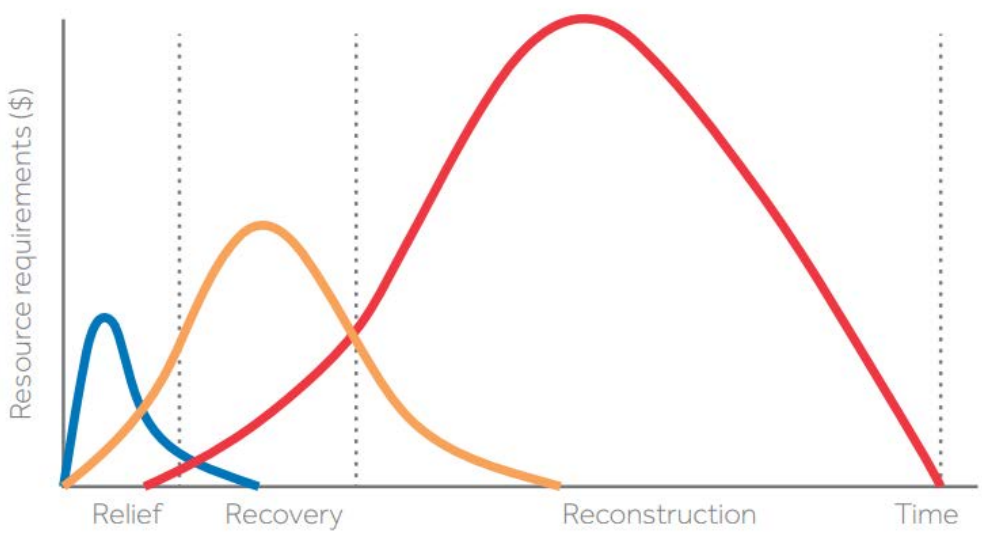
Both Peru and the Philippines have made great efforts in recent years to counter the ex-post bias by increasing investments in prevention. In Peru, over two thirds of all disaster management funds go to *ex-ante* prevention and preparedness measures compared to post-disaster response. In 2010, the Philippines introduced the Disaster Risk Reduction and Management (DRRM) Act. This led to the creation of the National Disaster Risk Reduction and Management Fund, 30% of which is put aside in a Quick Response fund for relief and response, and 70 % for recovery programmes (GOV.PH, 2010[30]). At the same time, the national government has encouraged agencies to incorporate programmes and projects for disaster resiliency – mitigation and preparedness – in their respective agency budgets. The National Budget

Priorities Framework, issued annually by the Department of Budget and Management (DBM) has, since 2014, included resilience building and climate change adaptation among the priorities. Overall allocations for disaster risk reduction and management in the Philippines have been steadily increasing over the past decade, which in part can be explained by an increasing political focus on DRR and by the growing expenses from damages from increasingly intense typhoon events.

Many stakeholders interviewed for this study expressed the potential of targeted grants in facilitating a focus on CCA and DRR across sectors and levels of government, especially when demand for competing resources is high. With some consistency, they provide valuable opportunities for relevant stakeholders to build capacity and to identify examples of good practice. In the Philippines, the People's Survival Fund (PSF) is a targeted grant for projects that address the impacts of disasters and climate change. The annual PHP 1 billion (USD 22.2 million) fund was established as a long-term financing stream to support local governments in their adaptation efforts, and in turn, support DRR activities. However, despite the amount of funding available in the PSF, only 6 projects have been approved so far. It is currently technically challenging to get a proposal approved, as applicants need to demonstrate a stringent vulnerability assessment and the effectiveness of their proposed interventions before submitting a proposal. At the same time, projects that receive funding must be well thought through and include a clear adaptation component.

Even with the best investments in disaster prevention or climate change adaptation, no government can fully protect itself from the costs of extreme events. In addition to clear funding *for ex-ante* prevention, a wide disaster risk-financing toolkit is becoming more largely available to governments to facilitate post-disaster relief, recovery and reconstruction and limit related fiscal risks. The financial requirements for these phases will not be the same and they will not always be needed at the same time, as seen in Figure 2.1. For example, relief activities such as rescue and provision of temporary shelters, are not the largest component of post disaster spending, however funds need to be available immediately.

Figure 2.1. Resource requirements during different disaster risk management phases



Source: Ghesquiere & Mahul, 2010 in (Pillay, 2016[31]).

Governments can ensure liquidity after disasters by (1) maintaining sufficient reserve funds, (2) arranging for contingent credit facilities, or (3) using insurance schemes to transfer risk (Ghesquiere and Mahul, 2010[32]). This difference in timelines and costs for the relief, recovery and reconstruction raises the issue of whether it is more efficient for the government to retain the risk (e.g. reserve funds) or transfer the risk

to the private sector (e.g. insurance). In many cases, the answer is that a combination of different risk retention or risk transfer instruments compatible with the financing requirements of each phase is preferable. For lower risk layers, risk retention instruments are more cost efficient while risk transfer instruments are more appropriate for higher risk layers (Ghesquiere and Mahul, 2010[32]) (OECD, 2015[33]). The expected increase in the severity and frequency of extreme disaster events as a result of climate change requires countries to examine their approaches to disaster risk financing with the aim of encouraging the availability and affordability of disaster insurance coverage (Wolfrom and Yokoi-Arai, 2016[34]).

Financing DRR and CCA is a long-term process, and the piloting of various financing mechanisms, in some cases with support from development partners, can support the development of solid disaster risk financing strategies. For example, in the Philippines, technical assistance from the Asian Development Bank (ADB) has allowed the Ministry of Finance to explore the feasibility of a Philippine City Disaster Insurance Pool. Initial coverage includes earthquakes and typhoons, with the possibility of expanding this to also include floods. One of the advantages of such an insurance pool is that upon the occurrence of a triggering event, payments are made to governments within 15 business days (ADB, 2018[35]). For vulnerable groups, this means that they can bounce back much quicker from a disaster as they do not have to wait for the oftentimes lengthy release of disaster aid by the international community. This in turn prevent these communities from falling into a spiral of poverty. However, for insurance pilots to translate into sustained strategies, they must include clear exit, replication or scale-up plans. In addition, across the case studies further sensitisation and education of the general public on micro risk insurance products is needed before coverage can be increased.

Insurance instruments should be part of an integrated approach to climate and disaster risk financing. Public funds used for climate and disaster risk finance and insurance can leverage substantial amounts of private capital. For example, funds made available to countries to finance insurance premiums can secure a much larger amount of private capital to compensate for damage, thereby contributing to transfer the risks to the private sector. However, in many countries, both public and private insurance coverage is limited, with insurance payments seen as competing for investments in other development priorities. Political attention on climate change can potentially be leveraged to make instruments more largely available and reduce their costs

All countries have contingency reserves in place, however, they vary in structure. In Peru, the contingency reserve managed by the Institute of Civil Defence has quick disbursements channels to finance emergency recovery and immediate preparedness for major disasters. It has disbursed around USD 12 million on average per year since 2003. In addition, a Fiscal Stabilisation Fund can be utilised when a major emergency is declared, and a macroeconomic assessment demonstrates an impact on the country's fiscal stability. In the Philippines, there is funding set aside for quick response. A challenge noted by both countries is that these response instruments are currently ill suited to cover costs associated with the recovery from slow-onset events such as drought. In addition, amounts set aside is informed by the cost of past events, but this does not consider potentially more damaging impacts due to climate change.

Development partners have provided significant assistance in terms of climate and disaster risk financing and insurance. Peru, for instance, has agreed on several contingent credit lines with different development co-operation providers such as Development Bank of Latin America (CAF), the Inter-American Development Bank (IDB), Japan and the World Bank, totalling about USD 4 billion between 2010 and 2015 (OECD/The World Bank, 2019[36]). The Philippines has also benefited from a CAT-DDO (i.e. Disaster Risk Management Development Policy Loan with a Catastrophe-Deferred Drawdown Option). The World Bank disbursed the first CAT-DDO to the Philippines in December 2011 after Tropical Storm Sendong (Washi), and approved the second Cat-DDO (CAT-DDO 2) in December 2015 following Typhoon Ompong (Mangkhut). The Philippines can access the new credit line upon "a state of calamity" declared by the President.

Coherence in monitoring and evaluation frameworks

For national approaches in CCA and DRR to achieve set objectives and be sustainable, mechanisms must be in place to monitor progress and assess whether the approach taken is the right one. This should also guide any adjustments needed. This can for example be in response to changes in the nature of the climate or disaster risks, in the exposures to those risks, or in emerging good practice in addressing them. All countries have a diverse set of reporting mechanisms in place to monitor domestic policy processes. Most countries also have auditing mechanisms to assess whether and to what extent domestic expenditures are in compliance with national and international policy goals, are allocated in accordance with existing rules, regulations and principles of good governance, and if they are allocated in a cost-effective manner (OECD, 2015[37]). A wealth of data is therefore available that can inform domestic reporting processes for CCA and DRR. The objective of this section is to examine the potential for coherence in the approaches commonly applied for monitoring, evaluating and learning for CCA and DRR.

International and domestic reporting mechanisms for DRR

Accountability is a key component of the Sendai Framework, reflected by a set of 38 global indicators to track progress towards the seven targets of the Framework. The indicators aim to measure progress in preventing the creation of new risks, reducing existing risks, and increasing resilience to withstand residual risk. While global progress is assessed biennially by UNDRR, this is informed by national progress reports. Complementing reporting on the 38 global indicators, custom targets and indicators allow Member States to measure domestic progress against their own Sendai Framework priorities. This can include input indicators such as public policy measures in place that support the implementation of the Sendai Framework priorities, or output indicators to measure the reduction of risk or increase in resilience. The information collected is also used to monitor disaster risk-related indicators of SDG 1 *End poverty in all its forms everywhere*, SDG 11 *Make cities and human settlements inclusive, safe, resilient and sustainable* and SDG 13 *Take urgent action to combat climate change and its impacts*. The extent to which this data is differentiated by disaster type, it can also provide a valuable information when measuring progress on CCA (see Table 2.2.).

The Sendai Framework Monitor, an online monitoring system, provides a set of common standards and principles for reporting on the 38 indicators. Given the reliance on countries self-reporting to assess global progress, the platform ensures that data submitted by Member States is comparable in nature. Differing levels of technical and human capacities nonetheless result in variable quality of the data and subsequent reporting. In fact, the Sendai Framework Readiness Review 2017 found significant diversity in the capacity of countries to report against the agreed indicators (UNDRR, 2017[38]).

Box 2.4. Sendai Framework Monitor

Launched in March 2018, the Sendai Framework Monitor provides an online platform for UN Member States to report on progress against the seven global targets of the Sendai Framework, corresponding SDGs 1, 11 and 13, as well as on customised national indicators. It highlights progress made in implementing the Sendai Framework, while at the same time providing a tool to guide risk-informed policy decisions and the subsequent allocation of resources.

The platform is organised into three modules:

- Module 1: Data entry related to the seven global targets of the Sendai Framework, agreed by all Member States.
- Module 2: Data entry related to custom targets and indicators, as defined by individual Member States to support the monitoring of their National Strategies for Disaster Risk Reduction.
- Module 3: An analytics module, which allows validated information to be filtered for comparison by target, indicator, year and/or region and accessed as charts, maps and tables. Only this module is publicly available and facilitates comparison across countries and over time.

Complementary Technical Guidance Notes outline the reporting methodology for each target and indicator, including minimum dataset requirements as well as the recommended optimal dataset (including disaggregation by gender, age, etc.).

Finally, UNDRR has regional offices that provide comprehensive capacity development support in their respective regions targeted at nationally-nominated Sendai Framework Focal Points, and as appropriate, also representatives from National Statistical Offices and other stakeholders.

Source: (UNDRR, 2019[39])

International and domestic reporting mechanisms for CCA

The Paris Agreement establishes a global goal on adaptation of enhancing adaptive capacity, strengthening resilience and reducing vulnerability to climate change, with a view to contributing to sustainable development and ensuring an adequate adaptation response in the context of the temperature goal of the Paris Agreement (UNFCCC, 2015[40]). Compared to the Sendai Framework, there are no agreed indicators to monitor progress. Instead, each Party to the UNFCCC can undertake monitoring, evaluation and learning as appropriate given country circumstances. Parties are encouraged to include this information in voluntary adaptation communications to the UNFCCC. Reporting, monitoring and review is also one out of four elements included in the technical guidelines for the national adaptation plan process (UNFCCC, 2012[41]).

Despite monitoring and evaluation not being a requirement for CCA under UNFCCC, many countries such as Kenya (Mutimba et al., 2019[42]) and Colombia (Cruz, 2019[43]) have developed domestic reporting systems. The objective of such systems is commonly twofold: i) continuous learning to understand the country's climate change risks and vulnerabilities that in turn can inform which approaches are effective in reducing climate risks; and ii) accountability to ensure that resources allocated for adaptation are effective in achieving set objectives (OECD, 2015[37]). Faced with resource constraints, countries tend to draw on domestic sources of data already available (OECD, 2015[37]) (EEA, 2015[44]).

In Ghana, for example, regulatory measures in place mandate every government implementing agency to monitor and evaluate their respective policies, programmes and projects, guided by national indicators, baselines and targets identified in the National Medium Term Policy Framework and in the Sector and

District Planning, a process overseen by the National Development Planning Commission (NDPC). As a result, Ghana's NDC, National Climate Change Policy, National Climate Change Adaptation Strategy, as well as the NAP Framework all refer to the reporting frameworks already in place rather than propose additional adaptation-specific reporting processes. While guidelines have been developed to integrate NDC priorities in local medium term development plans, a process that ensures that climate issues are monitored and evaluated through standard NDCP processes, it does for the time being not include a complementary focus on DRR. Including a complementary focus on DRR in the guidelines could help identify areas of coherence between CCA and DRR.

Areas of convergence in reporting for CCA DRR

At the international level, the policy processes are guided by different reporting framework that have been negotiated through their separate processes. Table 2.2. reveals that there already is considerable overlap and further scope for coherence. In practice, countries are also building coherence into their reporting.

Table 2.2. Examples of indicators for Sendai Framework reporting and linked SDG indicators

Sendai Framework target/indicator	Description	Linked SDG indicator	Relevant CCA measure
Global target A: Substantially reduce global disaster mortality by 2030, aiming to lower average per 100,000 global mortality between 2020-2030 compared with 2005-2015.			
A-1 (compound)	Number of deaths and missing persons attributed to disasters, per 100,000 population	Number of deaths, missing persons and directly affected persons attributed to disasters per 100,000 population (*1.5.1*; *11.5.1*; *13.1.1*)	Elements of this indicator focused on the number of deaths and missing persons attributed to *climate-related disasters* can provide valuable information for tracking progress of CCA
Global target B: Substantially reduce the number of affected people globally by 2030, aiming to lower the average global figure per 100,000 between 2020-2030 compared with 2005-2015.			
B-1 (compound)	Number of directly affected people attributed to disasters, per 100,000 population	Number of deaths, missing persons and directly affected persons attributed to disasters per 100,000 population (*1.5.1*; *11.5.1*; *13.1.1*)	Elements of this indicator focused on the number of affected people (injured or ill), whose dwellings or livelihoods were damaged or destroyed, attributed to *climate-related disasters* can provide valuable information for tracking progress of CCA
Global target C: Reduce direct disaster economic loss in relation to global gross domestic product (GDP) by 2030			
C-1 (compound)	Direct economic loss attributed to disasters in relation to global gross domestic product	Direct economic loss attributed to disasters in relation to global gross domestic product (GDP) (*1.5.2*) Direct economic loss in relation to global GDP, damage to critical infrastructure and number of disruptions to basic services, attributed to disasters (*11.5.2*)	Information on the impact of *climate-related disasters* on peoples' livelihoods and the broader economy will be key in determining the exposure and vulnerability to the risks, and over time, also the outcome of CCA measures
Global target D: Substantially reduce disaster damage to critical infrastructure and disruption of basic services, among them health and educational facilities, including through developing their resilience by 2030			
D-1 (compound)	Damage to critical infrastructure attributed to disasters	Direct economic loss in relation to global GDP, damage to critical infrastructure and number of disruptions to basic services, attributed to disasters (*11.5.2*)	Information on the impact of *climate-related disasters* on critical infrastructure and basic services will be valuable in determining the exposure and vulnerability to the risks, and over time, also the outcome of CCA measures
D-5 (compound)	Number of disruptions to basic services attributed to disasters		
Global target E: Substantially increase the number of countries with national and local disaster risk reduction strategies by 2020			
E-1	Number of countries that adopt and implement national disaster risk reduction strategies in line with the Sendai Framework	Number of countries that adopt and implement national disaster risk reduction strategies in line with the Sendai Framework for Disaster Risk Reduction 2015-2030 (*1.5.3*; *11.b.1*; *13.1.2*)	Assuming that most DRR strategies will include some information on CCA, the number of countries with DRR strategies can provide an indication of national CCA planning processes.

Sendai Framework target/indicator	Description	Linked SDG indicator	Relevant CCA measure
	for Disaster Risk Reduction 2015-2030		
E-2	Percentage of local governments that adopt and implement local disaster risk reduction strategies in line with national strategies	Proportion of local governments that adopt and implement local disaster risk reduction strategies in line with national disaster risk reduction strategies (*1.5.4*; *11.b.2*; *13.1.3*)	Information on sub-national DRR planning processes could potentially provide valuable information on similar sub-national efforts focused on CCA.
Global target F: Substantially enhance international cooperation to developing countries through adequate and sustainable support to complement their national actions for implementation of this framework by 2030			These indicators primarily focus on the nature and scale of bilateral and multilateral cooperation provided in support of DRR. There will certainly be some overlap with the cooperation in support of CCA
Global target G: Substantially increase the availability of and access to multi-hazard early warning systems and disaster risk information and assessments to the people by 2030			
G-1 (compound)	Number of countries that have multi-hazard early warning systems	No SDG indicator specified	Early warning is recognised as a crucial component of CCA. This information can shed light on this element of CCA

Source: Informed by (PreventionWeb, n.d.[45]) and (UNDRR, n.d.[46])

Despite the different approaches and focus of DRR and CCA reporting at domestic and international levels there is considerable scope for coherence across the respective monitoring, evaluation and learning frameworks. For example, both processes require a good understanding of risks, exposures and vulnerabilities. While the scope of CCA and DRR risk assessments will vary, both consider weather-related risks. There will also be some overlap in the associated policy processes and areas of implementation given the joint focus on climate risks. When developing reporting frameworks for CCA and DRR, a starting point can therefore be to review what information is already available on CCA and DRR respectively. A similar link to SDG planning and implementation processes may also be encouraged as noted in Table 2.2.

As part of the process of formulating Peru's National Adaptation Plan, a complementary monitoring and evaluation system is being developed that includes a detailed set of indicators, goals and baselines. The proposed outcome indicators all include a DRR component. While the reporting system will be managed by the Environment Information National System, there are efforts to ensure that it builds on DRR indicators and reporting process, but also aligns with Peru's SDGs reporting process being developed in parallel by the National Institute of Statistics and Informatics. In the Philippines, the responsibility for reporting on CCA and DRR is assigned to different government units, with a focus on progress in implementation rather than results. The possibility of bringing the management of climate change (adaptation and mitigation) and DRR together in one ministry is, however, being discussed. This would facilitate greater coherence in many aspects of CCA and DRR, including monitoring and reporting.

Capacity constraints can present a barrier to the implementation of reporting frameworks (OECD, 2015[37]). This includes the capacity to collect, record and report information across all levels. Co-ordinating bodies at the global level (e.g. UNDRR or UN Statistics Division) can play an instrumental role in promoting potential areas of coherence by, for example, encouraging consistencies in the baselines and indicators used to monitor international frameworks. Clear guidance on data collection and use for monitoring and evaluation can ensure that the data available is at a certain standard, more easily facilitating multiple uses of it (Clarke et al., 2018[47]) (IEAG, 2014[48]).

Complementing efforts to report on outcomes and impacts, it is important to also monitor progress in aligning institutional mechanisms with the objective of policy coherence. The OECD Policy Coherence for Sustainable Development (PCSD) Framework identifies eight building blocks that represent key institutional dimensions that underpin coherent SDG implementation. While this framework was developed

with a focus on the SDGs, it has also been applied to other contexts such as water governance (OECD, 2018[49]) and long-term low emission development strategies (Aguilar-Jaber et al., forthcoming[50]). It can also inspire an assessment of the level of coherence in planning and implementing CCA and DRR (see Table 2.3).

Table 2.3. Examples of indicators for assessing institutional mechanisms for policy coherence in CCA and DRR

Building block	Indicator	Degree of performance	Rationale
Political commitment	The commitment to policy coherence (PC) is formally incorporated into domestic law and/or national strategic framework and/or action plan	**Low**: The government makes public, but not binding, statements supporting PC. **Medium**: A formal institutional "catalyst" (inter-ministerial committees, centralised oversight body, ministry or unit) is mandated to promote PC. **High**: PC is explicitly included in the national strategy / plan / legislation.	Progress towards PC starts with strong leadership and commitment at the highest level backed by clear mandates and time-bound action plans. Political commitment is needed to build ownership across institutions and guide whole-of-government action.
Policy integration	Co-ordination mechanism with the power to take strategic decisions to influence and align planning, budgeting, legislation, sectoral programmes and policies are in place	**Low**: The mechanism can modify sectoral programmes and policies taking into account their interlinkages and/or sets out guidelines to integrate CCA and R **Medium**: The mechanism can merge two or more sectoral programmes, considering synergies and trade-offs. **High**: The mechanism can integrate CCA and DRR into the mandate of each institution, involving budgetary processes, and develops multi-sectoral strategies or programmes.	There is untapped potential to maximize efficiency, effectiveness, and synergies; and minimising trade-offs in the management of climate-related risks through a more coherent approach to CCA and DRR. Responsibilities for DRR and CCA are often divided across different institutions and stakeholders and therefore implemented in sectoral silos.
Inter-generational timeframe	The government has mechanisms in place to consider the long-term effects of policies and take precautionary decisions and maintain commitment to CCA and DRR over time.	**Low**: National policy frameworks recognise current and projected climate and disaster risks but do not include long-term commitments beyond electoral cycles **Medium**: The vision or strategic framework defines concrete long-term challenges and contains objectives, benchmarks and indicators related to economic, social and environmental inter-generational issues related to CCA and DRR where policy coherence is required. **High**: The government has mechanisms to ensure sustained commitment and implementation efforts beyond electoral cycles, and provisions to ensure that future government programmes and budget preparations include CCA and DRR considerations.	A long-term perspective is needed on both CCA and DRR. Broad political agreement is important to ensure continued commitment on long-term objectives. The uncertain nature of future climate and disaster risks requires a flexible approach to CCA and DRR planning and implementation.
Policy effects	The government has mechanisms to systematically assess negative impacts of domestic policies on CCA and DRR at home and abroad, and develops measures to maximise synergies and mitigate negative effects	**Low**: The national strategic framework includes measures to address negative impacts of policies on other countries (particularly least developed countries, and globally) but has not yet established a mechanism to do so. **Medium**: Assessments of CCA and DRR linkages and potential positive and negative effects of policy proposals (including transboundary effects) and legislative proposals are regularly conducted before and after implementation. **High**: Policies are adjusted in light of new information on negative effects.	While the impact of climate and disaster risks often is localised, this is not always confined to national borders. Recognition of the potential impact of domestic CCA and DRR policies on other countries must therefore be considered when assessing their effectiveness.
Co-ordination	The government has mechanisms that allow ministries and public sector agencies to share information, distribute responsibilities, allocate resources, and resolve conflicts of interest or inconsistencies	**Low**: Ministries and public sector agencies regularly share information on their programmes, plans and policies for CCA and DRR. **Medium**: Ministries and public sector agencies align their implementation strategies, plans and policies based on common goals and targets, but work individually and with separate resources. **High**: Ministries and public sector agencies work jointly, based on systematic exchange of information and shared	Co-ordination structures are needed in areas where policies are intrinsically cross-sectoral, such as in the implementation of initiatives at the cross section of CCA and DRR.

Building block	Indicator	Degree of performance	Rationale
		resources, to develop joint programs, plans and policies. The government has an arbitration mechanism to solve policy conflicts.	
Local involvement	There is a mechanism that allows for systematic consultation, collaboration and alignment of efforts at the national, subnational and local levels	**Low**: National, subnational and local decision makers regularly share information on their respective efforts to achieve CCA and DRR. **Medium**: National, subnational and local levels of government align their implementation plans based on shared information and work individually using their own resources to contribute to country's commitment towards CCA and DRR. **High**: National, subnational and local levels of government collaborate, considering their respective competencies and based on systematic exchange of information to develop joint action plans. There is an arbitration mechanism to solve conflicts of interest between different levels of government.	While CCA and DRR strategies and plans are formulated at the national level, the implementation usually takes place at the local level.
Stakeholder engagement	The government has mechanisms to ensure participation of stakeholders (civil society, business and industry, science and academia) in the development of plans and policies	**Low**: The government regularly organises public events involving multiple stakeholders to raise awareness and foster dialogue on CCA and DRR implementation. **Medium**: The government has established mechanisms to consult and work directly with key stakeholders throughout the policy-making process. **High**: The government develops partnerships with stakeholders for CCA and DRR implementation.	A diverse set of stakeholders across levels of government will play an instrumental role in implementing CCA and DRR measures. Their engagement from the outset in identifying and formulating priority areas for action is therefore key for the sustainability of these measures.
Monitoring and reporting	A system is in place to monitor, evaluate and learn from policy processes in place, given the uncertain nature of the risks, and the importance of continued learning	**Low**: The government has monitoring and reporting system in place, but there is no clear evidence of policy change. **Medium**: The government regularly reports on CCA and DRR to relevant international processes and has monitoring and reporting systems in place that informs subsequent policy processes **High**: Systems in place inform both reporting to relevant international processes, but also on the effectiveness of domestic processes, contributing to learning, and informing subsequent policy processes.	Monitoring mechanisms are essential to ensure that sectoral policies supporting CCA and DRR can be adjusted in light of potential negative effects identified during implementation or changing circumstances.

Source: Adjusted from (OECD, 2018[51])

Finally, for the information generated by monitoring and evaluation to inform subsequent policy processes, feedback mechanisms must be in place that facilitate the exchange of information. Since the implementation of monitoring, evaluation and reporting frameworks for CCA and DRR are still in their relatively early stages in many countries, the extent to which such feedback mechanisms are in place is not clear yet. This is not unique to the context of CCA and DRR. The uncertain nature of climate and disaster risks, and the importance of a flexible approach, however, highlight the need for continuous learning. Development co-operation can, for example, play a valuable role in supporting partner countries in strengthening data governance and the capacity of national statistical offices, both crucial for monitoring, evaluating and reporting CCA and DRR.

References

ADB (2018), *Philippine City Disaster Insurance Pool: Rationale and Design*, Asian Development Bank, Manila, https://www.adb.org/sites/default/files/publication/479966/philippine-city-disaster-insurance-pool-rationale-design.pdf (accessed on 26 March 2020). [35]

Aguilar-Jaber, A. et al. (forthcoming), *Long-term low emissions development strategies: cross-country experience*, OECD Publishing. [50]

Asante, F. et al. (2015), *Climate change finance in Ghana*, Overseas Development Institute (ODI), London, http://www.odi.org.uk/projects/2537-climate-finance-climate-change-fast-start-finance (accessed on 27 August 2019). [21]

Butler, J. et al. (2015), "Integrating Top-Down and Bottom-Up Adaptation Planning to Build Adaptive Capacity: A Structured Learning Approach", *Coastal Management*, Vol. 43/4, pp. 346-364, http://dx.doi.org/10.1080/08920753.2015.1046802. [14]

CENEPRED (2017), "Implementación del Plan Nacional de Gestión del Riesgo de Desastres : Resultados de la Encuesta Nacional de Gestión de Riesgo de Desastres - ENAGERD 2017" 01, p. 123, https://dimse.cenepred.gob.pe/src/informes_grd/Informe2017_2.pdf (Accessed on 27 August 2019). [17]

CICERO (2019), *Report on Workshop on Physical modeling supporting a storyline approach*, https://www.wcrp-climate.org/images/grand_challenges/climate_extremes/Documents/report_workshop_Oslo_24-26April2019.pdf (accessed on 16 December 2019). [11]

Clarke, L. et al. (2018), "Knowing What We Know – Reflections on the Development of Technical Guidance for Loss Data for the Sendai Framework for Disaster Risk Reduction", *PLOS Currents Disasters*, Vol. 1, http://dx.doi.org/10.1371/currents.dis.537bd80d1037a2ffde67d66c604d2a78 (accessed on 26 March 2020). [47]

Cruz, L. (2019), *sNAPshot: Colombia's Progress in Developing a National Monitoring and Evaluation System for Climate Change Adaptation*, NAP Global Network, http://napglobalnetwork.org/resource/snapshot-colombias-progress-in-developing-a-national-monitoring-and-evaluation-system-for-climate-change-adaptation/ (accessed on 26 March 2020). [43]

EEA (2015), "National monitoring, reporting and evaluation of climate change adaptation in Europe", *EEA Technical report*, Vol. No 20/2015, http://dx.doi.org/10.2800/629559. [44]

European Commission (2015), *A European research and innovation roadmap for climate services*, European Commission, http://dx.doi.org/10.2777/702151. [8]

Ford, J. et al. (2018), "Vulnerability and its discontents: the past, present, and future of climate change vulnerability research", *Climatic Change*, Vol. 151/2, pp. 189-203, http://dx.doi.org/10.1007/s10584-018-2304-1. [9]

Ghana (2017), *Mainstreaming Ghana's Nationally Determined Contributions (GH-NDCs) into National Development Plans*, https://www.gcfreadinessprogramme.org/sites/default/files/NDC%20Mainstreaming%20Guidan [3]

ce%20Report.pdf (accessed on 26 March 2020).

Ghesquiere, F. and O. Mahul (2010), *Financial protection of the state against natural disasters : a primer*, http://documents.worldbank.org/curated/en/227011468175734792/Financial-protection-of-the-state-against-natural-disasters-a-primer (accessed on 17 October 2019). [32]

GIDRM (n.d.), *Coherence in Practice: Philippines*, https://www.gidrm.net/en/coherence/coherence-in-practice/pilot-country-philippines (accessed on 19 November 2019). [10]

GOV.PH (2017), *Local Planning Illustrative Guide: Preparing and Updating the Comprehensive Development Plan (CDP)*, https://dilg.gov.ph/PDF_File/reports_resources/dilg-reports-resources-2017110_298b91787e.pdf (accessed on 8 August 2019). [5]

GOV.PH (2010), *R.A. No. 10121, "Philippine Disaster Risk Reduction and Management Act of 2010"*, https://www.lawphil.net/statutes/repacts/ra2010/ra_10121_2010.html (accessed on 25 July 2019). [30]

Hallegatte, S., J. Rentschler and B. Walsh (2018), *Building Back Better: Achieving resilience through stronger, faster, and more inclusive post-disaster reconstruction*, World Bank, Washington, DC, https://openknowledge.worldbank.org/handle/10986/29867 (accessed on 5 April 2019). [23]

IEAG (2014), *A World that Counts: Mobilising the data revolution for sustainable development*, The United Nations Secretary-General's Independent Expert Advisory Group on a Data Revolution for Sustainable Development, https://www.undatarevolution.org/wp-content/uploads/2014/11/A-World-That-Counts.pdf (accessed on 26 March 2020). [48]

IPCC (2018), *Global warming of 1.5°C An IPCC Special Report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty*, Intergovernmental Panel on Climate Change (IPCC), https://www.ipcc.ch/sr15/ (accessed on 16 December 2019). [12]

Kalame, F. et al. (2011), "Modified taungya system in Ghana: a win–win practice for forestry and adaptation to climate change?", *Environmental Science & Policy*, Vol. 14/5, pp. 519-530, http://dx.doi.org/10.1016/j.envsci.2011.03.011. [18]

Kapos, V. et al. (2019), *The Role of the Natural Environment in Adaptation, Background Paper for the Global Commission on Adaptation*, Global Commission on Adaptation, Rotterdam and Washington, D.C., https://cdn.gca.org/assets/2019-10/RoleofNaturalEnvironmentinAdaptation_V2.pdf (accessed on 22 October 2019). [19]

Leitner, M. et al. (2018), *Draft guidelines to strengthen CCA and DRR institutional coordination and capacities*, PLACARD project, https://www.placard-network.eu/wp-content/PDFs/PLACARD-Insitutional-strengthening.pdf (accessed on 26 March 2020). [4]

MESTI (2015), *Ghana National Climate Change Master Plan Action Programmes for Implementation*, The Ministry of Environment, Science, Technology and Innovation, Republic of Ghana (MESTI), https://www.un-page.org/files/public/ghanaclimatechangepolicy.pdf (accessed on 26 March 2020). [20]

Mutimba, S. et al. (2019), *sNAPshot: Kenya's Monitoring and Evaluation of Adaptation - Simplified, integrated, multilevel*, Nap Global Network, http://napglobalnetwork.org/resource/snapshot-kenyas-monitoring-and-evaluation-of- [42]

adaptation-simplified-integrated-multilevel/ (accessed on 26 March 2020).

OECD (2019), *Responding to Rising Seas: OECD Country Approaches to Tackling Coastal Risks*, OECD Publishing, Paris, https://dx.doi.org/10.1787/9789264312487-en. [16]

OECD (2018), *Assessing the Real Cost of Disasters: The Need for Better Evidence*, OECD Reviews of Risk Management Policies, OECD Publishing, Paris, https://dx.doi.org/10.1787/9789264298798-en. [29]

OECD (2018), "Implementing the OECD Principles on Water Governance: Indicator Framework and Evolving Practices", *OECD Studies on Water*, http://dx.doi.org/9789264292659-en. [49]

OECD (2018), *Policy Coherence for Sustainable Development 2018: Towards Sustainable and Resilient Societies*, OECD Publishing, Paris, https://doi.org/10.1787/9789264301061-enhttps://doi.org/10.1787/9789264292659-en. [51]

OECD (2015), *Disaster Risk Financing: A global survey of practices and challenges*, OECD Publishing, Paris, https://dx.doi.org/10.1787/9789264234246-en. [33]

OECD (2015), *National Climate Change Adaptation: Emerging Practices in Monitoring and Evaluation*, OECD Publishing, Paris, https://dx.doi.org/10.1787/9789264229679-en. [37]

OECD (2014), *Boosting Resilience through Innovative Risk Governance*, OECD Reviews of Risk Management Policies, OECD Publishing, Paris, http://dx.doi.org/10.1787/9789264209114-en. [25]

OECD (2014), *Seine Basin, Île-de-France, 2014: Resilience to Major Floods*, OECD Reviews of Risk Management Policies, OECD Publishing, Paris, https://dx.doi.org/10.1787/9789264208728-en. [28]

OECD (2013), *Water and Climate Change Adaptation: Policies to Navigate Uncharted Waters*, OECD Studies on Water, OECD Publishing, Paris, http://dx.doi.org/10.1787/9789264200449-en. [26]

OECD (2013), *Water Security for Better Lives*, OECD Studies on Water, OECD Publishing, Paris, https://dx.doi.org/10.1787/9789264202405-en. [27]

OECD/The World Bank (2019), *Fiscal Resilience to Natural Disasters: Lessons from Country Experiences*, OECD Publishing, Paris, https://dx.doi.org/10.1787/27a4198a-en. [36]

Palutikof, J.P., Street, R.B. & Gardiner, E.Pet al. (2019), Decision support platforms for climate change *adaptation*: an overview and introduction, Climatic Change 153, 459–476 (2019), https://doi.org/10.1007/s10584-019-02445-2. [53]

PCM (2019), *Plan Integral para la Reconstrucción con Cambios (PIRCC)*, Presidencia del Consejo de Ministros (PCM), http://www.rcc.gob.pe/plan-integral-de-la-reconstruccion-con-cambios/ (accessed on 26 March 2020). [24]

Pillay, K. (2016), "Climate Risk Management: Opportunities and Challenges for Risk Pooling", *Small States Digest*, No. 2016/2, Commonwealth Secretariat, London, https://dx.doi.org/10.14217/5jln4p72226b-en. [31]

PreventionWeb (n.d.), *Sendai Framework Indicators*, https://www.preventionweb.net/sendai-framework/sendai-framework-monitor/indicators (accessed on 10 October 2019). [45]

Shepherd, T. et al. (2018), "Storylines: an alternative approach to representing uncertainty in [13]

physical aspects of climate change", *Climatic Change*, Vol. 151/555–571 (2018), http://dx.doi.org/10.1007/s10584-018-2317-9.

Street, R. (2019), "How could climate services support disaster risk reduction in the 21st century", *International Journal of Disaster Risk Reduction*, Vol. 24/March, pp. 28-33, http://dx.doi.org/10.1016/j.ijdrr.2018.12.001. [7]

UNDRR (2019), *United Nations Office for Disaster Risk Reduction: 2018 Annual Report*, UNDRR, Geneva, https://reliefweb.int/sites/reliefweb.int/files/resources/64454_unisdrannualreport2018eversionlight.pdf (accessed on 26 March 2020). [39]

UNDRR (2017), *Disaster-related Data for Sustainable Development: Sendai Framework Data Readiness Review 2017. Global Summary Report*, UNDRR, Geneva, https://www.undrr.org/publication/sendai-framework-data-readiness-review-2017-global-summary-report (accessed on 26 March 2020). [38]

UNDRR (2017), *Terminology - UNDRR*, UNDRR, Geneva, https://www.unisdr.org/we/inform/terminology (accessed on 4 July 2019). [22]

UNDRR (2015), *Sendai Framework for Disaster Risk Reduction*, UNDRR, Geneva, https://www.unisdr.org/we/coordinate/sendai-framework (accessed on 17 October 2019). [2]

UNDRR (2005), "Hyogo Framework for Action 2005-2015: Building the resilience of nations and communities to disasters", UNDRR, Geneva, https://www.unisdr.org/we/inform/publications/1037 (accessed on 26 March 2020). [1]

UNDRR (n.d.), *The Sendai Framework and the SDGs*, https://www.unisdr.org/we/monitor/indicators/sendai-framework-sdg (accessed on 10 October 2019). [46]

UNFCCC (2017), *Opportunities and options for integrating climate change adaptation with the Sustainable Development Goals and the Sendai Framework for Disaster Risk Reduction 2015-2030*, UNFCCC, Bonn, https://unfccc.int/sites/default/files/resource/techpaper_adaptation.pdf (accessed on 26 March 2020). [6]

UNFCCC (2015), *Paris Agreement*, UNFCCC, Bonn, https://unfccc.int/process-and-meetings/the-paris-agreement/the-paris-agreement (accessed on 26 March 2020) [40]

UNFCCC (2012), *National Adaptation Plans: Technical guidelines for the national adaptation plan process*, Least Developed Expert Group, UNFCCC, Bonn, https://unfccc.int/topics/adaptation-and-resilience/workstreams/national-adaptation-plans-naps/guidelines-for-national-adaptation-plans-naps (accessed on 26 March 2020) [41]

WMO & GFCS (2016), *Climate Services for Supporting Climate Change Adaptation: Supplement to the Technical Guidelines for The National Adaptation Plan Process*, World Meteorological Organization (WMO), Geneva, https://library.wmo.int/doc_num.php?explnum_id=7936 (accessed on 26 March 2020) [15]

Wolfrom, L. and M. Yokoi-Arai (2016), "Financial instruments for managing disaster risks related to climate change", *OECD Journal: Financial Market Trends*, Vol. 2015/1, https://dx.doi.org/10.1787/fmt-2015-5jrqdkpxk5d5. [34]

3. The role of development co-operation in supporting increased coherence in climate change adaptation and disaster risk reduction

This chapter examines the role of development co-operation in supporting developing countries in their efforts to enhance resilience through climate change adaptation and disaster risk reduction. The chapter first analyses the role of development co-operation in supporting more coherent implementation between the two policy areas at strategic, operational and technical levels. Second, it outlines different financial instruments and mechanisms which development co-operation uses to support each area. Finally the chapter provides a brief analysis of ways forward for development co-operation to more effectively support coherence in climate change adaptation and disaster risk reduction informed by the national approaches of Ghana, Peru and the Philippines.

Supporting coherence in CCA and DRR at different levels

Development co-operation plays an important role in supporting developing countries in enhancing coherence in planning and implementation of climate change adaptation (CCA) and disaster risk reduction (DRR). Providers of development co-operation here include, among others, bilateral and multilateral providers of development finance, donor agencies, intergovernmental organisations, philanthropic institutions, civil society organisations and research institutes.

National budgets play an important role in financing action to build climate and disaster resilience. Yet, some countries rely on international support to complement domestic resources, for instance, to finance infrastructure investments and to pilot and capitalise risk finance mechanisms for DRR and CCA (OECD/The World Bank, 2016[1]). Development co-operation also plays an increasingly important role in mobilising private finance to fill investment gaps in CCA and DRR (OECD, 2019[2]). Technical assistance can also support countries in putting in place enabling environments supportive of coherence in CCA and DRR, such as the formulation of policies, development of data and information systems, and for capacity development. Despite its importance, development co-operation can also create a barrier to coherence between CCA and DRR when the intersection of the two is not explicitly taken into account in the support provided, or when there is inadequate co-ordination between entities or providers of support for either CCA or DRR.

International processes and actors have been conducive in bringing CCA and DRR on the agenda and in incentivising and driving action by state and non-state actors on various levels. Chapter 1 frames the different levels of coherence as (i) strategic, (ii) operational, and (iii) technical. Development co-operation plays a particularly important role in supporting countries' work towards operational and technical coherence between CCA and DRR, and to a lesser extent, strategic coherence, as demonstrated in the case studies of Ghana, Peru and the Philippines. More specifically, development co-operation often engages with partner countries to:

- Improve coherence in national goals and targets on CCA and DRR in line with relevant international agendas;
- Strengthen policy frameworks and institutional arrangements to pursue the goals and targets on CCA and DRR in a coherent manner;
- Facilitate exchange of technical expertise, knowledge, data and information to support such policy frameworks and institutional arrangements.

Strategic coherence: Development co-operation's role in supporting national vision

Countries have agreed on collective goals on CCA and DRR with the adoption of the Paris Agreement on climate change and the Sendai Framework for Disaster Risk Reduction. The Paris Agreement requires each Party to prepare, communicate and raise ambitions of successive Nationally Determined Contributions (NDCs). While the Sendai Framework is a voluntary, non-binding agreement, it stresses that each country has the primary responsibility to prevent and reduce disaster risk (UNDRR, 2015[3]). By design, the Sendai Framework encourages a bottom-up approach as part of an all-of-society engagement and partnerships. This has driven individual countries' effort to make their national goals more ambitious and coherent on CCA and DRR, while ensuring that they are aligned with the country's broader development priorities.

Based on countries' goals and targets, development co-operation can provide financial and technical support to countries in developing their strategic policy documents, such as NDCs and National Adaptation Plans (NAPs), as well as in taking CCA and DRR considerations into account in broader national development strategies. Development co-operation, in turn, incorporates the mandate of these international processes into their programmes and actions. Development co-operation, bilateral providers

in particular, are also engaged in the international processes and bodies that play a prominent role in promoting CCA and DRR. Some providers of development co-operation also feed into discussions and negotiations at international fora such as the Conferences of the Parties to the UNFCCC and its subsidiary bodies.

Operational coherence: Development co-operation's role in supporting national policies and institutional settings

Strategic coherence in CCA and DRR has driven the discourse on linking the two agendas, but countries also need to link implementation of CCA and DRR measures at the operational level. Development co-operation can support countries in bringing about such operational coherence through support for strengthened policy frameworks and institutional arrangements, maximising the efficiency of the human, technical and financial resources used to reach the common goals of CCA and DRR.

Development co-operation can also facilitate peer learning and exchange of good practice approaches by bringing together different countries and relevant stakeholders that, for instance, face similar climate risks, socio-economic situations, or hydro-metrological conditions. By sharing insights into CCA and DRR from experiences across different country contexts, development co-operation can also inform national policy dialogues and support effective policies (Benzie et al., 2018, p. 1[4]). This sharing can also be more systemic, for instance, through triangular co-operation, whereby a recipient country benefits from working together with a facilitating partner (typically a provider of development co-operation) and a pivotal country, which has solutions, technology and knowledge that may be applicable to the needs and capacity of the recipient country.

At the national level, either formally as part of national co-ordination mechanisms, or informally working closely with relevant stakeholders, development co-operation can support coherence in CCA and DRR in the design, update and implementation of countries' policies. For instance, the government of Ghana worked closely with development partners such as the UNDP for the preparation of its National Climate Change Policy, which includes several policy areas directly linked to disaster risk reduction and management, and has become the key policy document for climate policies in the country (MESTI, 2013[5]). In Peru, the Ministry of Economy and Finance worked with the World Bank to develop the Comprehensive Strategy for Financial Protection against Natural Disasters. It outlines strategic actions for strengthening the management of contingent fiscal risks from disasters, including climate-related hydrometeorological events such as extreme rainfall, floods, droughts, El Niño phenomenon and strong winds (World Bank and Ministry of Economy and Finance, 2016[6]).

Development co-operation also supports sub-national governments through efforts to enhance local-level policy planning and implementation for CCA and DRR, either directly or through national governments. Such support, if appropriately designed, often significantly supports local actors to cope with human and financial resource constraints to implement actual operation of CCA and DRR measures. An associated challenge for national governments however is to monitor progress and evaluate effectiveness of development co-operation provided directly to local governments. This may lead to less transparency as to whether such direct support is in line with national priorities and strategic direction.

Technical coherence: Development co-operation's role in supporting partners in bridging the gap between policy and implementation

Development co-operation can also play an instrumental role in supporting countries in enhancing their technical capabilities for taking a coherent approach to CCA and DRR at national and local levels. This can be through the development and dissemination of data and information, and provision of toolkits and guidance in areas, such as climate risk assessment, infrastructure planning, project appraisal, monitoring, evaluation and learning, among others. Development co-operation also often supports the piloting of

innovative approaches that have the potential to bring CCA and DRR together, such as nature-based solutions and post-disaster reconstruction. Below examples of development co-operation that can lead to enhanced coherence between CCA and DRR at the technical level, as well as management of residual risks, are outlined.

Climate data and information

Good and reliable data and information on climate change and disaster risks are essential for informed policy processes and implementation on CCA and DRR. Data and information is also an area where further support of development co-operation can be effective. While the focus in some cases will be to put processes in place for generating good data and information, in others, the focus may instead be on scaling-up and maintaining data and information processes already in place. Further, development co-operation can support partner countries in making the data accessible to different stakeholders across local, national and even regional levels. Development co-operation is also well-placed to support users of the data and information through efforts aimed at strengthening their capacty to use different types of data and information available, especially at the local level.

There are already a number of good practices by development co-operation. For instance, Italy and 17 African countries in the Sahel are working to develop shared methodologies and mechanisms of knowledge management in the national meteorological and hydrological services and other relevant technical agencies (World Meteorological Organization, n.d.[7]). The Italian Ministry of Foreign Affairs and International Cooperation, the Italian Institute of Biometeorology (IBIMET-CNR) and the Permanent Interstate Committee for Drought Control in the Sahel participate in the programme. Further, the German Federal Ministry for Economic Cooperation and Development in cooperation with the Potsdam Institute for Climate Impact Research (PIK) is currently conducting in-depth climate risk analysis in Sub-Saharan African countries, aiming to provide a scientific base for informed decision-making for investors and politicians, at national and sub-national levels

Development co-operation has also supported countries in strengthening the capacities of relevant government agencies in charge of producing climate and weather data and information. For instance, USAID's Office of Foreign Disaster Assistance and the U.S. National Weather Service, in partnership with the World Meteorological Organization and other participating national meteorological and hydrological services, has implemented the Weather Ready Nations project in South Africa, Barbados, El Salvador, Costa Rica, Guatemala and Indonesia. The project focuses on strengthening capacity of national meteorological and hydrological services and national disaster management agencies. This in turn also improves the availability and use of weather and climate related information for CCA and DRR (USAID, 2019[8]).

Enhancing capacity and tools for decision making

Development co-operation works with a range of national governments to develop guidelines and tools to incorporate climate-resilience consideration into public and private sector investments, early warning systems, disaster risk financing mechanisms, among others. Development co-operation also supports investment in enhancing local capacities and reducing vulnerability to climate and disaster risks. The French Development Agency (AFD) and the Asian Development Bank (ADB), for instance, have supported the decentralisation reform policy in the Philippines to empower Local Government Units and assist in their pursuit of improved institutional and technical capacity for disaster risk reduction at the local level (AFD, n.d.[9]). Empowering sub-national governments to strengthen disaster risk governance at various levels is a priority in the Sendai Framework (UNDRR, 2015[3]).

In Ghana, UNDP and the Ministry of Finance developed in 2015 the Climate Change Project Prioritization Tool and Guidelines that aims to provide guidance to relevant stakeholders on the prioritisation of policies, programmes and projects on climate change and green economy. The objective is to mobilise scaled up

resources, especially from the Green Climate Fund (GCF) (Ministry of Finance, n.d.[10]). Further, the World Bank and the GCF have supported the Greater Accra Climate Resilient and Integrated Development project. Complementing the focus on infrastructure investments, one component of the project aims to strengthen the capacity of the city of Accra to: plan, co-ordinate, monitor and evaluate climate smart urban development planning; facilitate access to climate risk information; and improve co-ordination between government agencies, the Metropolitan, Municipal and District Assemblies in the Greater Accra area, and other relevant stakeholders (World Bank, 2018[11]).

In the Philippines, the Housing and Land Use Regulatory Board, the Climate Change Commission, Australian Aid and UNDP joined forces to develop the Supplemental Guidelines on Mainstreaming Climate Change and Disaster Risks in the Comprehensive Land Use Plan. The guidelines built on the National Economic Development Authority, Housing and Land Use Regulatory Board, UNDP, Australian Aid, and New Zealand Aid project on Integrating Disaster Risk Reduction and Climate Change Adaptation and Local Development Planning and Decision-making Process which piloted the mainstreaming of DRR and CCA in the CLUP and produced a Reference Manual on Mainstreaming DRR/CCA into CLUPs. The Guidelines provide LGUs with practical tools for climate and disaster risk assessment and formulation of a risk sensitive land use plan (HLURB, 2015[12]).

Piloting innovative and emerging solutions

Working with different stakeholders across sectors and countries, development co-operation often provides technical and financial assistance to pilot new initiatives to CCA and DRR, and to scale up and replicate successful approaches. For example, the Consultative Group on International Agricultural Research (CGIAR), a global research partnership for better food security, works to bridge academic research in climate smart agriculture. CGIAR's co-operation includes a farmer-led experimentation model, supporting local solutions for different locations. This, for example, includes learning through facilitated workshops on timely seasonal weather forecasts and information on agricultural management options with meteorological and agricultural extension experts in Western and Eastern African regions (Kristjanson and Jost, 2014[13]).

Similarly, in several countries development co-operation is supporting pilot initiatives that use nature-based solutions (NBS) to complement 'grey' infrastructure for CCA and DRR. NBS also aim to achieve other social benefits, while protecting, sustainably managing and restoring natural or modified ecosystems. The World Bank has implemented over 100 NBS projects in 60 countries (World Bank, 2019[14]). AFD and other partners have funded NBS projects, including the Sponge Cities project. Shenzhen, the world's first Sponge City, is proving to be more resilient to floods and landslides that have been increasing with climate change. At the same time, water supply for local residents is increased while excess water has been reduced by 65% (AFD, 2019[15]). Some countries have embraced NBS (e.g. multiple references are made to NBS in Peru's Climate Change Law), while others still see numerous barriers to embarking on it, including higher costs and knowledge gaps. Development co-operation can contribute towards the identification of low-cost solutions, using its experience in other countries and building on the country's vision on climate action and disaster risk reduction.

Post-disaster reconstruction

By supporting governments financially and technically to build back stronger, faster and more inclusively following a disaster, development co-operation can contribute to more resilient development and limit asset and non-asset losses (Hallegatte, Rentschler and Walsh, 2018[16]). Building back better faces several challenges in practice, which include a lack of technical know-how (leading to longer lead-time for decision making), social and cultural preference for infrastructure types that existed before a disaster, affordability and availability of construction materials, and existing technical restrictions, among others (Haris, Cheema and Subasinghe, 2019[17]). There is also a tendency that affected populations are in many cases reluctant to relocate to a new place even if it is less risky, also seen in Peru and the Philippines. One factor is that it

can be difficult to find available land for people to relocate to, or that is near to the traditional sources of their livelihoods. Such challenges can lead to trade-offs between quick recovery and building back in a way that is more resilient than before the disasters.

Development co-operation has an important role to play in addressing such trade-offs by bridging technical and financial gaps. For instance, when Tonga was hit by Tropical Cyclone Ian in January 2014, development providers, such as the World Bank and the Asian Development Bank provided financial and technical support to assess the damages and to institute a new recovery and reconstruction policy to build back better through repairs, retrofitting and the creation of a public grievance system (UNDRR, 2017[18]). As climate disasters threaten human settlements and urban development, development agencies such as UN-Habitat, have worked with the private sector (AXA) to develop guidelines for governments, development co-operation, construction sector and disaster-affected communities to build back better (AXA and UN Habitat, 2019[19]).

Private sector engagement

Development co-operation is increasingly engaging with private-sector actors in supporting efforts to manage negative impacts of climate change and disasters on their business operations, and where relevant, seize opportunities emerging from climate change (e.g. supplying technologies, products, and services that support CCA and DRR) (Schaer and Kuruppu, 2018[20]; Tähtinen, Ravikumar and Kellet, n.d.[28]). Some private-sector actors, irrespective of their size, have engaged on CCA and DRR, and consider climate and disaster resilience an integral part of their business plan. The majority, however, still lack awareness of climate risks, suited measures, or the capacity to implement them. Governments and development co-operation therefore play an important role in enhancing the awareness and capacity of private-sector actors to deal with climate and disaster risks, while ensuring business continuity and building the resilience of vulnerable communities (Schaer and Kuruppu, 2018[20]) (Noble et al., 2014[21]).

Development co-operation actively engages with the private sector in facilitating their input in national policy dialogues. Some have also created platforms dedicated to private enterprises. One example is the Connecting Business Initiatives, in which UNDRR provides technical advice on DRR and UNDP and UN Human Rights operational support to enhance private sector's engagement before, during and after crises (Tähtinen, Ravikumar and Kellet, n.d.[28]).

Development co-operation also supports the private sector in managing climate risks and contributing to local resilience by improving access to data, providing decision-support tools, guiding the use of financial instruments (including insurance products), and involving them in national or local dialogues for exchange of good practices. Moreover, development co-operation can assist governments in developing policy frameworks to incentivise private sector to take CCA and DRR actions, such as economic instruments, regulatory policies and grants for capacity development and purchase of necessary equipment (Schaer and Kuruppu, 2018[20]). This can help align private sector priorities with the governments' long-term development goals, given the focus of most private sector entities on profit-maximisation (Linnenluecke, Griffiths and Winn, 2013[21]).

Development finance for climate change adaptation and disaster risk reduction

Governments have a key role to play in investing in, and incentivising, CCA and DRR measures. Public finance tends to withstand a degree of investment risks that the private sector cannot. It is also often challenging for the private sector to find CCA and DRR activities that lead to robust financing flows and payback streams. Yet, facing competing development priorities, the availability of domestic sources of finance does not always meet the needs for CCA and DRR in many developing countries. It is in those cases that development finance acts as a crucial source of funding.

Financing instruments for climate and disaster risks

A variety of sources of development finance exists for CCA and disaster risk reduction and management, here defined as DRR and the management of residual risks. This includes multilateral and bilateral development finance institutions, donor governments, multilateral climate funds, private sector facilities and philanthropic funding. Development co-operation also provides finance for CCA and disaster risk reduction and management through different financial instruments, some of which are provided through development co-operation providers' own initiatives, while others are provided with co-finance by national governments or the private sector. Table 3.1 provides an overview of different financial instruments that providers of development co-operation use to finance CCA and disaster risk reduction and management. It illustrates that the suitability of different financial instruments is determined by the type of CCA or disaster risk reduction and management activities being financed, as well as the climate and disaster risk profiles of partner countries. The table outlines the challenges and opportunities of different instruments, with further details provided below.

Table 3.1. Overview of financing instruments for CCA and disaster risk reduction and management

Instrument		Potential activities	Prevalence, Challenges and Potential
Grants	*Ex ante*	• Improvement of climate and weather information • Structural measures for climate adaptation and disaster risk preventions and preparedness (e.g. infrastructure) • Non-structural measures (e.g. improved policies, public awareness, training and education, etc.) • Early warning systems • Evacuation facilities, training and contingency plans	• Prevalent use • Increased finance to CCA could provide opportunities for disaster risk preparedness and reduction
	Ex post	• Response (after disasters) • Reconstruction	• Prevalent use • Challenges for middle-income countries "graduating" from ODA-eligibility to humanitarian aid flows
Debt finance instruments	*Ex ante* (loans, green and climate bonds)	• Structural measures for climate adaptation and disaster risk preventions and preparedness	• Generally used for measures that have revenue streams
	Ex post (contingent loans and credit lines, and catastrophe bonds)	• Response • Reconstruction, primarily of physical infrastructure	• Prevalent use • Must be repaid, e.g. potentially not well suited for irreversible and permanent loss and damage • Not well suited for slow-onset events
Risk financing	*Ex-post* (disaster risk insurance and re-insurance)	• Rapid response (risk pooling, innovative risk transfer) • Reconstruction activities (risk transfer through traditional insurance)	• Limited prevalence • Potential affordability barriers to joining existing risk pools or purchasing climate and disaster risk finance and insurance more generally. (Especially for the most vulnerable, disaster-prone countries, development partners have provided further funding to support the uptake of disaster risk financing instruments, including insurance). • Challenges for private-sector insurance products, such as low consumer risk awareness/demand and ability of insurers to provide low-cost coverage given data gaps and lack of sufficient pooling.

Source: Authors

Grants

A grant is a transfer in cash, goods or services for which no repayment is required. This is an important characteristic for enhancing the resilience to current climate variability and future climate change, as well as to respond to residual risks, while mitigating risks for high indebtedness to those affected by disasters. Financing for immediate relief from a catastrophic disaster usually comes through humanitarian aid in the form of grants. Grants for technical assistance also support developing countries in enhancing operational and technical coherence in CCA and DRR. These include developing policy frameworks that strengthen CCA and DRR and enhance coherence between the two agendas, establishing data and information systems, strengthening stakeholder capacity, and supporting specific actions such as the establishment of early warning systems.

Debt finance instruments

Development co-operation also provides debt finance, such as concessional and non-concessional loans as well as bonds, particularly relevant for structural measures such as climate-resilient infrastructure. Loans are also often provided in the form of co-financing with domestic financial sources or private-sector

actors. Apart from loans, some providers of development co-operation have started to explore the use of debt capital instruments for their infrastructure investments that takes into account climate-related risks. A recent example is a four-year climate resilience bond, issued by the European Bank for Reconstruction and Development to invest in climate resilient infrastructure, business and commercial operations, and agriculture and ecological systems, amounting to USD 700 million for their first issuance (EBRD, 2019[22]).

Even with substantive investments in CCA and DRR, no government can fully protect itself from the cost of extreme events. Contingent credit lines are another common debt instrument, often used for ex post disaster risk management. Contingent credit lines are credit arrangements that have been negotiated and established before an event has occurred, with the objective of supporting countries in dealing with risks that are difficult to mitigate ex-ante. Contingent credit lines provide rapid access to funding following a disaster related to natural hazards. Their purpose is to reduce financing delays, and associated loss escalation, after a disaster hits.

Peru, for instance, has agreed on several contingent credit lines, called Catastrophe Deferred Drawdown Option (CAT-DDO), with different development co-operation providers such as Development Bank of Latin America (CAF), the Inter-American Development Bank (IDB), Japan and the World Bank. The total contingent credit lines agreed upon between 2010 and 2015 amounted to about USD 4 billion (OECD/The World Bank, 2019[23]). The Philippines has also benefited from CAT-DDO. The World Bank disbursed CAT-DDO to the Philippines in December 2011 after Tropical Storm Sendong (Washi), and approved another USD 500 million of CAT-DDO (CAT-DDO 2) in December 2015. The Philippines can access the new credit line following “a state of calamity” related to a tropical storm declared by the President.

Risk financing instruments

Development co-operation also supports countries in establishing and operationalising climate and disaster risk finance and insurance instruments. These allow governments to share certain weather and climate-related risks (risk sharing and pooling) or to transfer them to third parties in exchange for regular premium payments (risk transfer). Several donor-supported insurance facilities are already in place, such as the African Risk Capacity (ARC) and the Caribbean Catastrophe Risk Insurance Facility (CCRIF). These are regional risk pooling initiatives, provided in collaboration with governments in the respective regions. The ARC, for instance, provides parametric insurance coverage to African countries affected by severe droughts. Development co-operation partners also provide technical and financial support for the creation of insurance facilities through, for example, the Disaster Risk Financing and Insurance Program led by the World Bank Group. Another example is the InsuResilience Global Partnership (IGP) that provides a global platform to co-ordinate donor contributions and aims to address challenges to applying insurance products, such as low consumer risk awareness or demand and insufficient ability of insurers to provide low-cost coverage given data gaps and lack of sufficient pooling, among others.

While climate and disaster risk finance and insurance have shown to provide benefits, the uptake of such financial instruments still faces several technical and political challenges. Ghana, for instance, has been signatory to the ARC since 2016. Preparations for formally entering the parametric insurance scheme have been led by the National Disaster Management Organisation and the Ministry of Finance. The formalisation, however, has been delayed by parliament, in part due to limited willingness by lawmakers to pay the premium. While this may be due to lack of awareness of the benefit of such sovereign disaster risk insurance schemes, competing development priorities also make it difficult for government officials to justify the relatively high upfront premiums with uncertain returns. More generally, as climate events increase in frequency and intensity, related premiums may rise, decreasing the viability of insurance mechanisms and increasing downside risks (Hallegatte et al., 2016[24]). In the case of the Philippines, efforts towards climate and disaster risk financing were initiated but have not been sustained. Through the Ministry of Finance, the national government has engaged in parametric insurance to cover risks of 25 provinces that are highly vulnerable to typhoon and earthquake. In 2017 and 2018, the Congress allocated

PHP 1 billion and PHP 2 billion budget respectively, to provide insurance coverage for government facilities against natural calamities. In 2019, however, no similar budget was appropriated.

Concessional finance (e.g. premium subsidies for crop insurance and government support in emergency responses) has an important role to play in promoting instruments for climate and disaster risk finance and insurance by mitigating economic and political barriers to dissemination. At the same time, such financial support, if poorly designed, might also provide a false sense of security that could weaken incentives for reducing risks, and lead to significant economic cost and inefficiency (Hazell, Sberro-Kessler and Varangis, 2017[25]). It is therefore important that development co-operation works with governments to strengthen linkages between risk financing and other risk management approaches, such as CCA, introduction of early warning systems, and the appropriate enforcement of regulations related to urban planning or environmental protection.

State of development finance for CCA and disaster risk reduction and management

This section illustrates development finance available at the intersection of disaster risk reduction and management and CCA through different financial instruments that fall under the broad definition of development finance. The analysis draws on data reported by bilateral and multilateral providers of development co-operation into the OECD Creditor Reporting System (CRS) (see Box 3.1). Data are collected on individual project and programme commitments and differentiated here by the purpose of the support, namely:

1. Disaster risk prevention and preparedness,
2. Flood prevention and control,
3. Reconstruction, relief and rehabilitation.

Box 3.1. OECD Creditor Reporting System

The OECD Creditor Reporting System (CRS) collects data on development co-operation. Data are collected on individual projects and programmes from bilateral and multilateral providers. Reporting is mandatory for members of the OECD Development Assistance Committee (DAC). In their reporting to the CRS, development co-operation providers include information on the purpose of the support provided through the use of sector and sub-sector codes.

Further, the CRS includes a policy marker system that facilitates the monitoring of members' activities in support of the objectives of the 1992 Rio Conventions on climate change, biodiversity and desertification[2], using the so-called "Rio markers". Reporting on CCA became mandatory for members of the DAC in 2010.

For each activity reported, DAC members (and other bilateral providers) indicate whether it targets the objectives of the Rio Conventions as a 'principal' or 'significant' objective. Activities marked 'principal' would not have been funded but for that policy objective; activities marked 'significant' have other prime objectives but have been formulated or adjusted to help meet the policy objective. This differentiation provides an indication of the degree of mainstreaming of environmental considerations into development co-operation portfolios.

Seven large Multilateral Development Banks (MDBs) and a few climate-specific funds and programmes also report project-level data on their climate-related development finance to the DAC. This allows for the publication of consolidated activity-level data for bilateral and multilateral climate-related development finance from 2013 onwards. Note that while the climate-related funds apply the Rio marker methodology, the MDBs only report the climate components within projects, based on a joint MDB methodology (EBRD, 2017[26]).

In 2018, a new policy marker on disaster risk reduction was approved. Reporting on this marker started in 2019 on 2018 flows. This will in the future facilitate analysis of activities that at the same time include a focus on CCA and DRR. In the absence of this data for 2013-2017, analysis on development finance in support of DRR can draw on data reported on three sub-sector codes focused on aspects of DRR:

- Flood prevention/control;
- Disaster prevention and preparedness;
- Reconstruction relief and rehabilitation.

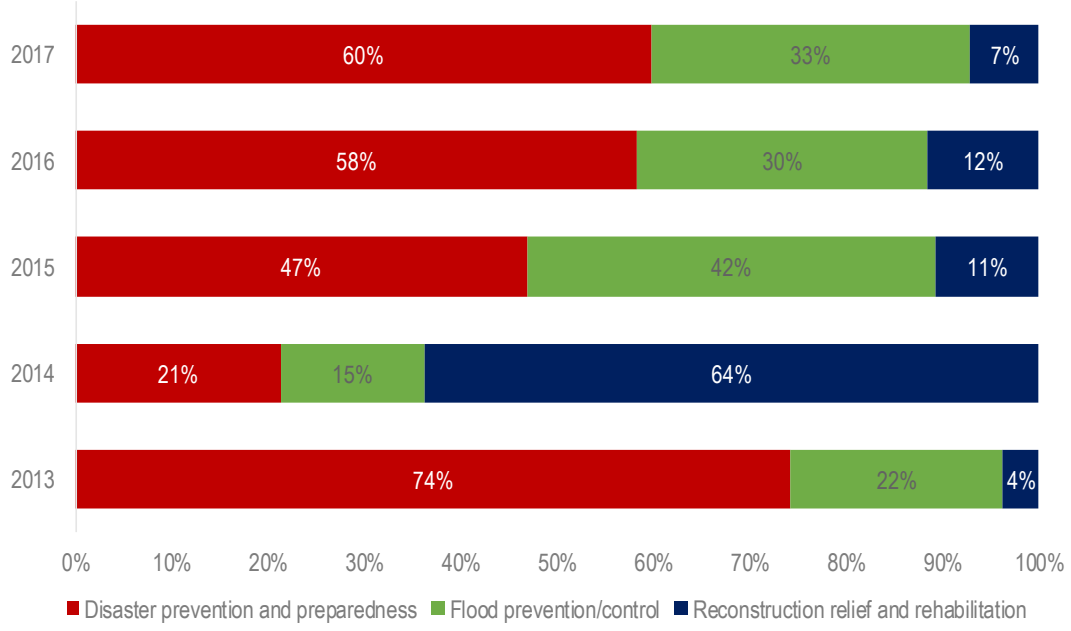
In general, activities reported under the sub-sector category Reconstruction relief and rehabilitation would likely qualify as ex post financing mechanism, whereas the others either explicitly (Flood prevention/control and Disaster prevention and preparedness) or implicitly (broader development sectors that integrate CCA and DRR considerations) would be ex ante approaches.

Source: (OECD, n.d.[27])

[2] United Nations Framework Convention on Climate Change (UNFCCC), the Convention on Biological Diversity (CBD), and the United Nations Convention to Combat Desertification (UNCCD).

Figure 3.1 and Figure 3.2 illustrate how providers of development finance supported activities at the intersection of CCA, DRR and disaster risk management over the period between 2013 and 2017. Figure 3.1 provides data reported by bilateral and relevant climate-related funds and programmes[3] (henceforth, other multilateral providers), while Figure 3.2 shows data provided by multilateral development banks (MDBs), applying the joint MDB reporting methodology. The focus of finance committed by bilateral and other multilateral providers to activities at the intersection of CCA, DRR and disaster risk management has remained relatively constant across the three categories over the period 2013 and 2017, with the largest share committed in support of disaster risk prevention and preparedness (Figure 3.1). The exception in 2014 is in large part explained by a loan provided by Japan to the Philippines following Hurricane Haiyan[4]. Over half of the commitments (52%) by bilateral and other multilateral providers were provided in the form of grants over the period 2013-17. Over the period, the majority (52%) of the commitments focused on Lower-Middle Income Countries (LMICs), followed by Least Developed Countries (LDCs) and other Low Income Countries (LICs) (24%), and Upper Middle Income Countries (UMICs) (11%).

Figure 3.1. Adaptation-related commitments by bilateral and other multilateral providers for activities in support of disaster risk reduction and management, by year and focus



Source: (OECD, n.d.[27]).

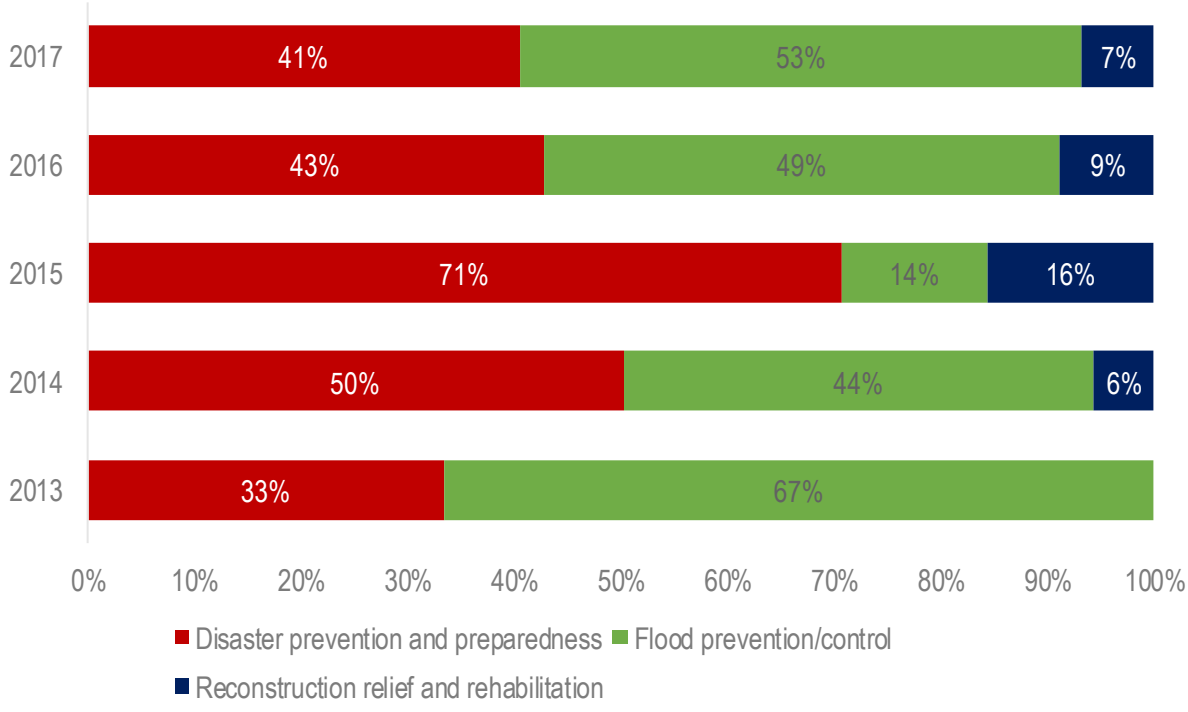
MDBs committed a relatively large share of their support to flood prevention and control, with a substantial share also focused on disaster risk prevention and preparedness over the period between 2013 and 2017 (Figure 3.2). Nearly all commitments by MDBs were provided in the form of loans (over 99%) across all income groups. It should be noted that the data is limited to the World Bank, Asian Development Bank,

[3] They include: Adaptation Fund, Climate Investment Funds (CIFs), Green Climate Fund (GCF), Global Environment Facility (GEF), Global Green Growth Institute (GGGI), International Fund for Agricultural Development (IFAD) and Nordic Development Fund (NDF), as reported into OECD Development Assistance Committee's (DACs) Creditor Reporting System (CRS)

[4] It is specified in the project description that this is a post-disaster stand-by loan of over USD 470 million, provided with the objective of enhancing domestic capacity for disaster risk reduction and management.

Asian Infrastructure and Investment Bank (2017 data only), Inter-American Development Bank, and Islamic Development Bank (2013 data only). The majority of commitments by MDBs (52%) was committed to LMICs, followed by UMIC (24%) and LDCs (23%).

Figure 3.2. Adaptation-related commitments by MDBs for activities in support of disaster risk reduction and management, by year and focus



Source: (OECD, n.d.[27]).

Finally, it is important to note that in order to ensure sustainability, all development finance must be responsive to both their direct and indirect impacts of climate change. For some projects, this is already the case, without such projects explicitly being recognised or reported as CCA in the CRS. This suggests that the commitments reported at the intersection of CCA and disaster risk reduction and management do not provide the full picture.

In addition to the three sub-sectors that provide an explicit link between CCA, DRR and disaster risk management, there are a number of other sectors for which the inclusion of CCA, DRR and disaster risk management considerations reduces vulnerability to climate risks, in turn enhancing the sustainability of the support provided. These sectors and underlying assumptions include:

- While most infrastructure investments, including in support of urban development, undergo some climate risk screening, a more explicit focus on disaster risk reduction may be needed;
- Social welfare services and support for agricultural services are mechanisms that can both enhance people's resilience to shocks – included those related to climate change – and help them recover from adverse impacts from climate change;
- Noting that many disasters include a natural resource component, which will only increase with climate change, the inclusion of climate considerations in emergency response is important.

- The focus here is less on the absolute numbers and instead on the level of mainstreaming and on the types of funding available for these areas.

Effective development co-operation for coherence in CCA and DRR

This chapter has demonstrated that development co-operation is supporting countries in addressing climate and disaster risks through a range of activities. This includes provision of different financial resources to investment projects, technical assistance and investment-related risk mitigation, piloting of innovative technologies and activities, and establishing disaster risk finance mechanisms. Development co-operation can also support partner countries in achieving the different types of coherence introduced in chapter 2 – strategic, operational and technical – aligned to partner countries' visions and priorities.

At the strategic level, development co-operation can support countries in aligning their visions and targets with those under the Paris Agreement and the Sendai Framework. At the same time such efforts should be guided by partner countries' own priorities. In Peru, for instance, the Ministry of Environment plans to convene meetings with different development co-operation providers to discuss their initiatives and to have a clear understanding of how they are aligned with the country's development priorities.

Development co-operation plays an important role in piloting CCA and DRR initiatives. The case study countries, however, noted that due consideration is not always given at the outset to the replication or scale-up potentials of pilots. The time required for the full benefits of pilots to mature also does not always match with their relatively shorter project cycles before a decision is made whether to scale-up, replicate, or terminate them. Further, the focus of development co-operation on piloting innovative initiatives in a country should not undermine the needs of that country for support in more basic capacity building and policy development support, in areas such as enforcement of land-use or environmental regulations and capacities in accessing and using available data and information for CCA and DRR.

Coherence in CCA and DRR is contingent on technical capacities to understand the risks and opportunities, to assess and prioritise measures, and to finance them, all of which development co-operation can support. The three country case studies have all put in place national funding mechanisms for CCA and DRR and worked with international providers of development finance. Yet, all three countries consider that domestic capacity in developing robust project proposals remains a major challenge to accessing such funding. Capacity development support in this area should factor in adequate time to ensure that the stakeholders involved can assimilate the new skills.

Finance is an essential enabler for CCA and DRR. While CCA and DRR measures often are financed through national budgets, many developing countries, particularly LDCs, are seeking resources from external sources to cover the additional costs associated with managing the impacts of climate change. Development co-operation provides a range of ex-ante and ex-post support. No single financial instrument addresses all risks, and national agencies such as ministries of finance can further benefit from support of development co-operation in identifying and developing financial solutions that are aligned with the country's overall approach to climate resilience. The identification and formulation of suitable financial instruments hinges on the availability and quality of data and information, which development co-operation can also support with.

References

AFD (2019), *"Nature-Based Solutions": Making Nature an Ally*, https://www.afd.fr/en/nature-based-solutions-making-nature-ally (accessed on 2 September 2019). [15]

AFD (n.d.), *Supporting the decentralization policy and improving natural risk management in the Philippines*, https://www.afd.fr/en/supporting-decentralization-policy-and-improving-natural-risk-management-philippines (accessed on 10 October 2019). [9]

AXA and UN Habitat (2019), *Taking on the challenge of post-disaster reconstruction*, https://group.axa.com/en/newsroom/news/taking-on-the-challenge-of-post-disaster-reconstruction (accessed on 2 September 2019). [19]

Benzie, M. et al. (2018), *Meeting the global challenge of adaptation by addressing transboundary climate risk*, SEI, IDDRI, ODI, https://www.sei.org/wp-content/uploads/2018/04/meetingtheglobalchallengeofadaptation.pdf (accessed on 2 September 2019). [4]

EBRD (2019), *World's first dedicated climate resilience bond, for US$ 700m, is issued by EBRD*, The European Bank for Reconstruction and Development (EBRD), https://www.ebrd.com/news/2019/worlds-first-dedicated-climate-resilience-bond-for-us-700m-is-issued-by-ebrd-.html (accessed on 24 September 2019). [22]

EBRD (2017), *2016 Joint Report on Multilateral Development Banks' Climate Finance*, The European Bank for Reconstruction and Development (EBRD), https://www.ebrd.com/2016-joint-report-on-mdbs-climate-finance.pdf. [26]

Hallegatte, S., J. Rentschler and B. Walsh (2018), *Building Back Better: Achieving resilience through stronger, faster, and more inclusive post-disaster reconstruction*, GFDRR, Washington DC, https://www.gfdrr.org/sites/default/files/publication/Building%20Back%20Better.pdf (accessed on 10 October 2019). [16]

Hallegatte, S. et al. (2016), *Unbreakable: Building the Resilience of the Poor in the Face of Natural Disasters*, The World Bank, http://dx.doi.org/10.1596/978-1-4648-1003-9. [24]

Haris, M., A. Cheema and C. Subasinghe (2019), "Why lessons learnt are lost", *Disaster Prevention and Management: An International Journal*, Vol. 28/5, pp. 677-690, http://dx.doi.org/10.1108/DPM-04-2019-0103. [17]

Hazell, P., R. Sberro-Kessler and P. Varangis (2017), *When and How Should Agricultural Insurance be Subsidized? Issues And Good Practices*, World Bank Group, Washington, DC, https://doi.org/10.1596/31438 (accessed on 13 December 2019). [25]

HLURB (2015), *the Supplemental Guidelines on Mainstreaming Climate Change and Disaster Risks in the Comprehensive Land Use Plan*, Housing and Land Use Regulatory Board (HLURB), https://tuewas-asia.org/wp-content/uploads/2017/06/Supplemental-Guidelines-on-Mainstreaming-Climate-Change-and-Disaster.pdf (accessed on 16 October 2019). [12]

Kristjanson and Jost (2014), *Tackling Innovation in Climate Change Research, presentation by Chris Jost and Patti Kristjanson*, ICRAF Research Seminar Nairobi (20 May 2014), https://www.slideshare.net/cgiarclimate/tackling-innovation-in-climate-change-research-presentation-by-chris-jost-and-patti-kristjanson-ccafs. [13]

Linnenluecke, M., A. Griffiths and M. Winn (2013), "Firm and industry adaptation to climate change: a review of climate adaptation studies in the business and management field", *Wiley Interdisciplinary Reviews: Climate Change*, Vol. 4/5, pp. 397-416, http://dx.doi.org/10.1002/wcc.214. [21]

MESTI (2013), *Ghana National Climate Change Policy*, Ministry of Environment, Science, Technology and Innovation (MESTI), https://www.un-page.org/files/public/ghanaclimatechangepolicy.pdf (accessed on 2 September 2019). [5]

Ministry of Finance (n.d.), *Natural Resources, Environment and Climate Change (NREC) Unit | Ministry of Finance | Ghana*, https://www.mofep.gov.gh/divisions/rsd/climate-change (accessed on 26 July 2019). [10]

Noble, I. et al. (2014), *Adaptation Needs and Options*, Intergovernmental Panel on Climate Change, Cambridge University Press, Cambridge, New York, https://www.ipcc.ch/site/assets/uploads/2018/02/WGIIAR5-Chap14_FINAL.pdf (accessed on 5 September 2019). [29]

OECD (2019), *Making Blended Finance Work for Water and Sanitation: Unlocking Commercial Finance for SDG 6*, OECD Studies on Water, OECD Publishing, Paris, https://dx.doi.org/10.1787/5efc8950-en. [2]

OECD (n.d.), *OECD Creditor Reporting System*, https://stats.oecd.org/Index.aspx?DataSetCode=CRS1 (accessed on 23 March 2020). [27]

OECD/The World Bank (2019), *Fiscal Resilience to Natural Disasters: Lessons from Country Experiences*, OECD Publishing, Paris, https://dx.doi.org/10.1787/27a4198a-en. [23]

OECD/The World Bank (2016), *Climate and Disaster Resilience Financing in Small Island Developing States*, OECD Publishing, Paris, http://dx.doi.org/10.1787/9789264266919-en. [1]

Schaer, C. and N. Kuruppu (2018), *Private-sector action in adaptation: Perspectives on the role of micro, small and medium size enterprises*, UNEP DTU, Copenhagen, https://orbit.dtu.dk/ws/files/162053774/MSME_Adaptation_updated_WEB.pdf (accessed on 6 September 2019). [20]

Tähtinen, J., U. Ravikumar and J. Kellet (n.d.), *UNDP and the Private Sector: 25 Years of Partnership on Climate Change, Disaster Risk Reduction and Sustainable Energy*, UNDP, https://www.undp.org/content/dam/geneva/docs/UNDPGeneva_UNDP_PrivateSector_Report.pdf (accessed on 10 October 2019). [28]

UNDRR (2017), *Build Back Better in recovery, rehabilitation and reconstruction*, UNDRR, Geneva, https://www.unisdr.org/files/53213_bbb.pdf (accessed on 14 October 2019). [18]

UNDRR (2015), *Sendai Framework for Disaster Risk Reduction 2015 - 2030*, UNDRR, Geneva, https://www.unisdr.org/files/43291_sendaiframeworkfordrren.pdf (accessed on 6 September 2019). [3]

USAID (2019), *Weather Ready Nations*, USAID, Washington D.C., https://www.weather.gov/wrn/wrns (accessed on 31 January 2020). [8]

World Bank (2019), *Nature-based Solutions: a Cost-effective Approach for Disaster Risk and Water Resource Management*, https://www.worldbank.org/en/topic/disasterriskmanagement/brief/nature-based-solutions- [14]

cost-effective-approach-for-disaster-risk-and-water-resource-management (accessed on 10 October 2019).

World Bank (2018), "Concept Note: Greater Accra Climate Resilient and Integrated Development Project", https://www.greenclimate.fund/document/greater-accra-climate-resilient-and-integrated-development-project (accessed on 15 October 2019). [11]

World Bank and Ministry of Economy and Finance (2016), *Peru: the Comprehensive Strategy for Financial Protection against Natural Disasters*, Wprld Bank, Washington DC, http://documents.worldbank.org/curated/en/718281475183108912/Peru-a-comprehensive-strategy-for-financial-protection-against-natural-disasters (accessed on 23 March 2020). [6]

World Meteorological Organization (n.d.), *Training Programme on Climate Change Adaptation and Disaster Risk Reduction in Agriculture (PACC/RCC)*, World Meteorological Organization, https://public.wmo.int/en/projects/training-programme-climate-change-adaptation-and-disaster-risk-reduction-agriculture (accessed on 2 September 2019). [7]

Part II. National approaches in Ghana, Peru and the Philippines to increased coherence in climate change adaptation and disaster risk reduction

4. Approaches in Ghana to increased coherence in climate change adaptation and disaster risk reduction

This chapter presents national and sub-national approaches to policy development and implementation on climate change adaptation and disaster risk reduction in Ghana. It outlines the policy context and governance arrangements for these two policy agendas, approaches to implementation of the policies, financing, and monitoring and evaluation. The chapter also provides dedicated discussion on the approaches in the agriculture sector and those in urban areas. The role of developing co-operation in supporting domestic efforts to manage climate risks and build resilience is also outlined. Drawing on these insights, the chapter highlights ways forward on how the government and development co-operation can facilitate greater coherence in efforts to build resilience to climate and disaster risks.

Summary and ways forward

With climate change, Ghana is projected to see average annual temperatures increase by between 1.7°C and 3.6°C by 2080, which is likely to cause more intense and frequent climate-related disasters. Efforts to mitigate greenhouse gas emissions have therefore been complemented by a strong focus on both climate change adaptation (CCA) and disaster risk management (DRM[5]). Governance arrangements in Ghana facilitate coherence between CCA and DRM across ministries and agencies. The decentralised governance system, however, places the responsibility for implementing CCA and DRM on local authorities. The National Development Planning Commission (NDPC) and the Ministry of Local Government and Rural Development (MLGRD) provide their support to local authorities in formulating their Medium-term Development Plans well placed to bridge the gap between national planning for CCA and DRM and local implementation. However, in the absence of a joint CCA and DRM policy, attention is skewed towards CCA where domestic awareness of the changing risks (e.g. drought, floods and sea level rise) is growing and national participation in international climate processes is high.

Ways forward to enhance coherence in CCA and DRM in Ghana

Government officials in Ghana interviewed for this study recognised the value of greater coherence in CCA and DRM. To translate this into action on the ground, an important first step will be to strengthen institutional capacities at the sector and sub-national levels to better understand the climate and disaster risks, but also to see planning through to implementation (e.g. identify and prioritise CCA and DRM options, conduct budget estimates to mobilise funding, and learn from implementation, guided by data and information).

Different government institutions have been instrumental in enhancing the quality of climate-related data and information, but there remains scope to further expand coverage and to ensure that the data and information is available to inform CCA and DRM policy processes. A more centralised approach, such as the Climate Change Data Hub developed by the Environmental Protection Agency (EPA), to collecting and disseminating data and information could enhance accessibility and possibly also use.

Domestic financing mechanisms can guide the mainstreaming of CCA and DRM into budget processes. Yet, budget limitations still constrain implementation of CCA and DRM, rendering it in many cases dependent on support from development co-operation.

There remains room to further enhance coherence between CCA and DRM across all levels of government, and in doing so, to strengthen the coherence between the two policy areas. In taking this agenda forward, actionable ways forward include:

- Leverage the attention given to CCA at the national level to better understand the broader risk landscape and identify synergies in policy planning and implementation;
- Encourage greater enforcement of existing legal standards and regulations (e.g. land-use management and urban planning policies) as a basis for CCA and DRM. Particular attention may be given to ministries and agencies with a presence at the local level and responsible for of CCA and DRM measures;
- Expand the coverage of existing weather data (e.g. data to improve the quality of climate forecasts), enhance the timeliness of information, and inform the monitoring of the effects of disasters (financial and non-financial), building on recent progress made by various government institutions;

[5] Disaster risk management (DRM) is used in this chapter rather than disaster risk reduction (DRR) used in Part I since DRM is better aligned with the terminology used in relevant policy documents in Ghana as demonstrated by the National Disaster Management Plan (NDMP).

- Adjust the guidance developed by NDPC in support of the integration of climate commitments into local plans to include a complementary focus on DRM to ensure that both CCA and DRR are factored into local development plans.
- Revisit the National Urban Policy that precedes the 2015 international agreements to include a complementary focus on DRM to the current focus on CCA.
- Mainstream priority actions identified in the Climate-Smart Agriculture Plan into broader policies for the agriculture sector development in a way that strengthens coherence between DRM and CCA and improves farmers' resilience to negative impacts of climate change and natural hazards.
- Broaden the current focus of DRM on response, to also include preparedness and prevention. This is also where the potential synergies with CCA are greatest.
- Complement the Climate Finance Tracking Tools with similar budget codes for DRM to support policy makers in identifying opportunities for coherent public investments in CCA and DRM.
- Review mechanisms in place to monitor and evaluate CCA and DRM to ensure that they support efforts to assess whether the approach taken to CCA and DRM is the right one, is efficient, or if adjustments in either the focus or approach are required.

Ways forward for development partners

- Aligned with the domestic approach to CCA and DRM, ensure that support provided facilitates coherence between the two policy areas.
- Support sub-national assemblies in developing their capacity to assess and manage the impact of climate change and disaster risks in light of medium-term development plans at the local level.
- In addition to pilot programmes, consider providing continuous exposure and training that can better capacitate local practitioners to enhance climate resilience on the ground.

Ghana profile

Climate change and risks

Ghana has a tropical climate that includes a rainy and a dry season. Annual average temperature has increased by around 1.0°C since 1960, and monthly rainfall has decreased by 2.4% (De Pinto et al., 2012[1]). Average annual temperature is projected to increase by between 1.7°C and 3.7°C by 2080, with northern inland areas experiencing the largest impact (Murken et al., 2019[2]). Future precipitation trends are highly uncertain, with either no change or a slight decline in mean annual precipitation projected for the country as a whole, with both dry and wet periods becoming more extreme (Murken et al., 2019[2]).

Risks arising from climate variability and change affect all regions and sectors. In fact, over 80% of disasters in Ghana are considered climate-related (MESTI, 2015[3]). With climate change, the frequency and intensity of extreme events such as floods, drought and wildfires is projected to increase, with impacts manifested extensively in the agriculture, water resources, health and fisheries sectors (MESTI, 2015[3]). With increasing frequency and intensity of extreme events, vulnerability to both climate and broader risks increases.

Box 4.1. Socioeconomic overview of Ghana

Ghana is a unitary democratic republic divided into 10 administrative regional units, with the plan to add an additional six in 2019. The units are organised into three types of assemblies: Metropolitan (six), Municipal (56) and District (154) (MMDAs), each headed by a Chief Executive. Ghana has undergone a comprehensive decentralisation process since the 1980s aimed to deliver the national objectives of

democracy, development and effective delivery of municipal services. This has positioned MMDAs as the highest political, legislating, budgeting and planning authority at sub-national levels.

Ghana spans an area of 239,000 km^2 crossing four ecological zones: Coastal Savannah, High Forest, Transition, Guinea and Sudan Savannah. It borders Cote d'Ivoire to the west, Burkina Faso to the north, Togo to the east and Gulf of Guinea to the south with a coastline of 539 kilometres (CIA, 2019[4]). Over half of the population that exceeds 28 million resides in urban areas along the coast. While the rate of urbanisation over time has decreased, the share of Ghana's urban population continues to grow (CIA, 2019[4]).

Ghana is endowed with rich natural resources, with top exports including gold, petroleum, cocoa and nuts (Simoe, 2019[5]). Agriculture also plays a major role in the Ghanaian economy, accounting for over 20% of GDP and half of the active labour force in 2018 (AfDB, 2019[6]). Since the early 1990s, Ghana has experienced rapid economic growth that peaked in 2011 at a real GDP growth rate of 14%, largely due to high commodity prices and the discovery of offshore oil (AfDB, 2019[6]; CIA, 2019[4]). This decreased to just under 4% in 2015 when low oil prices reduced half of the country's revenue in the sector (AfDB, 2019[6]). Growth, in real terms, has since picked up to nearly 6% in 2017 and 8.5% in 2018 (AfDB, 2019[6]).

Consultations with local communities that informed the development of the national climate change policy (NCCP) revealed that the perceived and felt impacts (social, economic and physical) of climate risks vary across Ghana's four ecological zones (MESTI, 2013[7]). The majority of identified high-level risks are linked to either too much, too little or erratic rainfall. The risk of soil erosion is considered extremely high in the Coastal Savannah, while the risk of sea-level rise is considered high. Other extreme or high-level risks include dry spells, flooding and rising temperatures in the Guinea and Sudan Savannah, and crop failures in the Transition zone.

Similarly, Ghana's National Disaster Management Plan identifies six categories of disaster hazards that inform domestic prevention and response measures. One category is composed of hydrometeorological hazards,[6] grouped into five disaster types as summarised in Table 4.1. While the focus and categorisation of the risks and disaster types identified in the context of climate change and disaster management are not directly comparable, Table 4.1 unpacks some of the risks identified in the context of climate.

Table 4.1. Geographical distribution of hydrometeorological disasters in Ghana

Disaster type	Areas of occurrence	Period of occurrence
Floods Rainfall – runoff floods	Ashanti, Brong Ahafo, Central, Eastern, Greater Accra, Northern & Volta Regions Upper East & Upper West Regions	May – July & September – November
Man-made floods (Dam-burst spillage)	Greater Accra, Northern, Upper East, Upper West & Volta Regions	January - December
Tidal waves	Central, Greater Accra, Volta & Western Regions	August - October
Rain/wind storm	Central, Eastern, Northern, Upper East, Upper West, Mid/Northern Volta & Western Regions	March – May June - August
Drought	Greater Accra, Northern, Upper East, Upper West & Volta Regions	November – April & May – October (when the rains fail)

Source: (NADMO, 2010[8]).

[6] The other hazards include: 1) pest and insect infestation, 2) disease epidemics, 3) fires (domestic fires, industrial/commercial fires, bushfires, fires caused by lightening), 4) geological (earthquakes, landslides, soil erosion, expansive soils, coastal erosion, ground subsidence) and 5) man-made hazards.

Objective and outline

This chapter presents national and sub-national approaches to policy development and implementation on CCA and DRM in Ghana. It also explores the extent to which they build resilience to climate-related risks by leveraging coherent and mutually reinforcing approaches. Drawing on these insights, the chapter offers ways forward for how national governments and development partners can facilitate greater coherence in efforts to build resilience to climate-related risks.

The following section reviews the policy context and governance arrangements for CCA and DRM in Ghana, the institutional mechanisms in place, approaches to implementation, financing, and monitoring and evaluation. The approach by the agriculture sector is then highlighted, followed by an examination of approaches in urban areas. Finally, the role of developing co-operation in supporting domestic efforts to manage climate risks and build resilience is outlined.

National approaches to CCA and DRM

Policy context and governance arrangements for CCA and DRM

Ghana became a party to the United Nations Framework Convention on Climate Change (UNFCCC) in 1995. Upon ratification, Ghana committed to pursue co-ordinated actions to reduce greenhouse gas emissions and to limit the adverse impacts from climate change on the most vulnerable people, while advancing national economic development. Ghana has also committed to implement the Sendai Framework (2015–2030), following the Hyogo Framework for Action (2005-2015), both developed under the auspices of the United Nations Office for Disaster Risk Reduction (UNDRR).

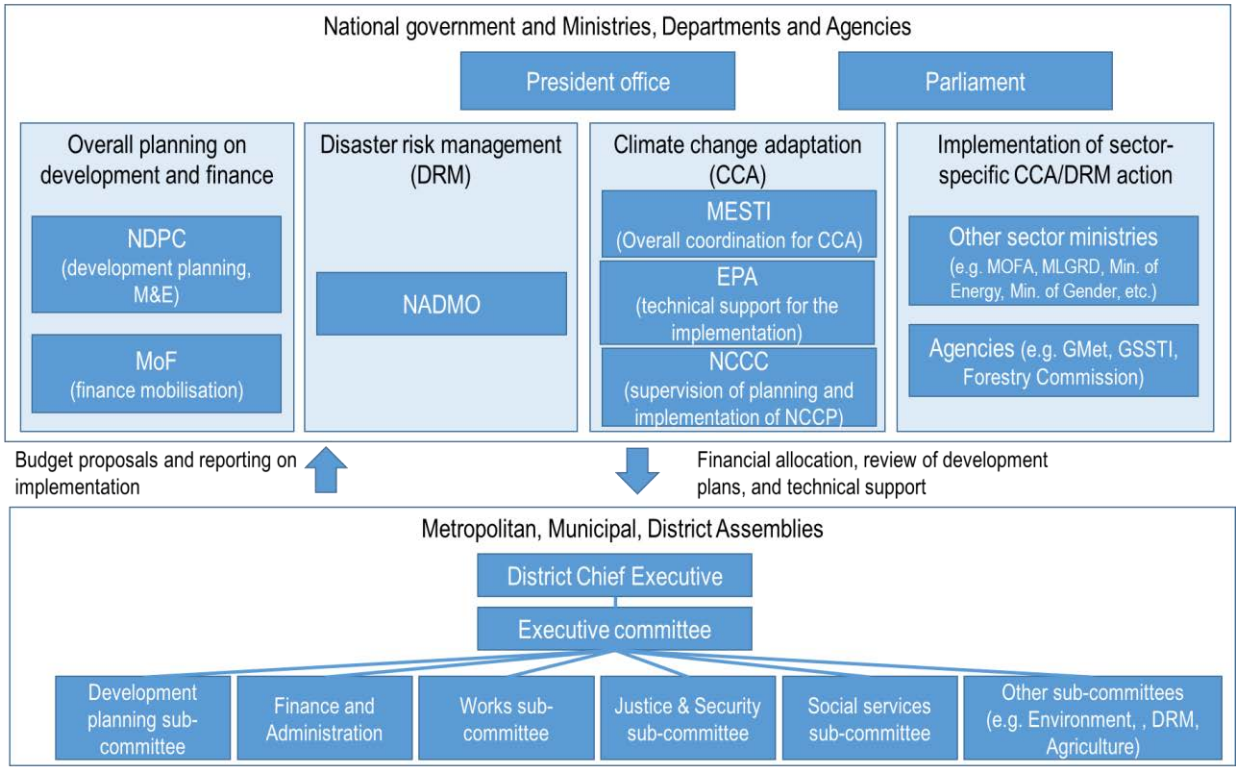
Policy development for CCA and DRM at the national level is governed by different ministries and agencies. The Ministry of Environment, Science, Technology and Innovation (MESTI) and the Environmental Protection Agency (EPA) as well as the National Development Planning Commission (NDPC) are the key actors in mainstreaming CCA and, to a lesser extent, DRM into the country's development agenda. The National Disaster Management Organisation (NADMO) that operates under the Ministry of Interior is responsible for the management of disaster risks and similar emergencies, as well as for rehabilitation after disasters (Government of Ghana, 1996[9]). NADMO functions under a National Secretariat, 10 Regional Secretariats, 243 MMDA Secretariats and more than 900 zonal offices throughout the country[7] (NADMO, n.d.[10]).

Governance arrangement

Ghana has put in place institutional arrangements that contribute to policy coherence between CCA and DRM across different ministries, departments and agencies as well as between national and sub-national governments (Figure 4.1.). MESTI and EPA on the one hand are responsible for development and implementation of policies and programmes on climate change. They also co-ordinate with relevant international partners and other ministries as well as sub-national assemblies (MESTI, 2015[11]). NADMO, on the other hand, has the mandate to manage disaster risks by co-ordinating the resources of government institutions and non-governmental agencies, and by developing the capacity of communities to respond effectively to disasters and to improve their livelihoods (NADMO, n.d.[10]). In response to increasing costs of emergency relief operations and contraction of donor funding, NADMO is shifting its emphasis from emergency response to prevention (Korah and Cobbinah, 2019[12]).

[7] These numbers are expected to change following the creation of six additional regions in 2019.

Figure 4.1. Overview of Ghana's governance arrangement for implementation of CCA and DRM policies



Note: **DRM**: Disaster Risk Management, **EPA**: Environment Protection Agency, **GMet**: Ghana Meteorological Agency, **GSSTI**: Ghana Space Science and Technology Institute, **MESTI**: Ministry of Environment, Science, Technology and Innovation, **MoF**: Ministry of Finance, **NADMO**: National Disaster Management Organisation, **NCCC**: National Climate Change Committee, **NDPC**: National Development Planning Commission
Source: Authors

One example of governance arrangements in support of coherence between CCA and DRM is the co-ordination between EPA and NADMO. This co-ordination, for instance, contributed to the development of the Ghana Plan of Action on Disaster Risk Reduction and Climate Change Adaptation (NADMO, 2011[13]) and the National Climate Change Policy (NCCP) (Korah and Cobbinah, 2019[12]). NADMO's Climate Change / Disaster Risk Reduction (CC/DRR) Department takes the lead in reducing vulnerability related to climate change and disasters as well as other economic, social and environmental challenges that are associated with disasters (NADMO, 2019[14]). More specific functions of the DD/DRR Department include:

- Formulation, implementation and evaluation of CCA and DRR programmes at all levels within NADMO;
- Collection and sharing of information on CCA and DRR within NADMO and other stakeholders;
- Liaison with relevant actors to mainstream CCA and DRR into plans, programmes and policies, as well as assistance with the implementation of UN protocols that relate to CCA and DRR;
- Education and enhancement of capacity for the implementation of CCA and DRR actions at national, regional and district levels.

Under Ghana's NCCP detailed below, NADMO holds the main responsibility for implementing several programme areas, which are particularly relevant to disaster risk management. These include the climate proofing of key existing infrastructure, the protection of coastal resources and communities, rapid response and disaster management and promotion of early warning systems (MESTI, 2015[3]).

Other ministries, departments and agencies also have dedicated units in charge of climate change:

- The Natural Resources, Environment and Climate Change Unit at the Ministry of Finance is mandated to oversee, co-ordinate and manage financing of, and support to, climate change and green economy activities in Ghana. The Unit oversees the process of climate and green budgeting that promotes transparency and accountability in international and domestic public finance. The Unit is also responsible for tracking climate-related finance disbursed by development co-operation providers to ministries, other public agencies and sub-national assemblies to be reported to the UNFCCC. In so doing, the Ministry of Finance has developed multiple guidelines such as the Climate Change Project Prioritization Tool and Guidelines, and the Climate Change Finance Tracking Tools (Ministry of Finance, n.d.[15]). The Ministry also acts as Ghana's National Designated Authority to the Green Climate Fund.
- The Environment and Climate Change Unit at the Ministry of Food and Agriculture (MoFA) is responsible for the co-ordination, implementation, dissemination and capacity development for climate action in the agriculture sector. At the national level, MoFA co-ordinates with MESTI, the Ministry of Finance, the Ministry of Local Government and Rural Development (MLGRD) and development co-operation providers. It also co-ordinates with the Departments of Agriculture of MMDAs at the local level, as well as with the Regional Co-ordination Councils at the regional level.

NDPC co-ordinates through its statutory function the development planning system at the national as well as the sub-national level. At the national level, NDPC works in close collaboration with ministries, departments and agencies to ensure that climate change is well integrated into all planning and budget processes. NPDC also supports local governments through the budget hearing and policy hearing processes. All MMDAs are required to elaborate climate policy statements and plans in order to receive budget allocation. NDPC shares responsibility with MLDRG and the Ministry of Finance for supporting MMDAs.

The National Climate Change Committee that supervised the development of the National Climate Change Policy Action Programme 2015–2020 and subsequently oversees its implementation is another example of governance structure in support of coherence in CCA and DRM (MESTI, 2015[3]). The Committee, meeting twice a year, consists of representatives of various government and non-governmental institutions including: MESTI, the Ministry of Finance, NDPC, MoFA, other sector ministries as well as civil society organisations and bilateral and multilateral development co-operation partners.

Policy context

Mandated by key policy frameworks, Ghana has taken a mainstreamed approach to CCA and DRM (MESTI, 2015[3]) (NADMO, 2011[13]). This aims to ensure that CCA and DRM policies are embedded in the broader goals of the country's sustainable development. Both CCA and DRM are featured in Ghana's Co-ordinated Programme of Economic and Social Development Policies (2017-2024) and the President's mid-term development vision. The Programme highlights several policy areas that directly or indirectly link to CCA and DRM without explicitly calling for greater coherence between the two. Examples include water management, drainage and flood control, land administration and management, and human settlements and housing (Government of Ghana, 2017[16]).

NCCP is the main policy document for climate change in Ghana (MESTI, 2015[3]). It was produced by MESTI under the guidance of the National Climate Change Committee. It aims to provide a pathway towards 2020 for addressing challenges caused by climate change, highlighting increasing temperature, rainfall variability and sea-level rise as key drivers for the country's vulnerability. NCCP consists of three phases: an analysis of status quo, the development of a master plan with specific actions and the development of operational plans by sector ministries and MMDAs for mainstreaming (MESTI, 2015[3]).

The 10 policy areas of the NCCP (summarised in Table 4.2) were selected given the possible synergies with other policy domains, a positive indication for the potential for coherence with DRM. Certain measures are also directly linked to disaster risk reduction and management. For instance, the focus on climate-resilient infrastructure aims to ensure that design standards, relevant building codes and spatial planning include parameters related to climate change and variability, and reflect future scenarios. Similarly, NADMO is identified as the lead in developing hazard monitoring and early warning systems with a sound scientific and technological basis in order to increase resilience of vulnerable communities to climate-related risks (MESTI, 2015[3]).

The National Climate Change Policy Master Pan 2015-2020 provides specific information on the actions and associated costs for each of the 10 policy areas of the NCCP (e.g. objectives, individual actions, lead ministries and agencies). While it is commendable that the Master Plan includes detailed cost estimates for the individual action areas, some stakeholders interviewed for this study expressed their concerns that this costing in some cases was done under considerable time pressure with limited human capacity.

The EPA in partnership with NDPC developed in 2018 the National Adaptation Plan (NAP) Framework. The Framework outlines the country's expected approach to the NAP process, articulates the country's vision of climate change adaptation with the objective of ensuring that the process is aligned with existing policies, strategies and programmes (EPA, 2018[17]). The framework proposes a sectoral approach to adaptation planning in Ghana. Building on the NAP Framework, the government is developing a sectoral adaptation plan for infrastructure (water, transport and energy) identified as a priority in the Framework. A complementary plan focused on private sector engagement is also underway, with both expected to be finalised in early 2020. In parallel, EPA has organised a series of awareness-raising workshops with different stakeholders, including parliamentarians, sub-national governance stakeholders and the media.

On disaster risk management, Ghana adopted the National Disaster Management Plan in 2010, which refers to climate change as an integral part of the disaster management model for Ghana (NADMO, 2010[8]). The Plan was developed to support NADMO to achieve its mandate of ensuring that disasters in whatever form are properly managed. The plan consists of seven key components, some of which are relevant to climate change adaptation (see Table 4.2).

Table 4.2. Policy frameworks on climate change adaptation and disaster risk management in Ghana

	CLIMATE CHANGE ADAPTATION	DISASTER RISK MANAGEMENT
National legislation	Coordinated Programme of Economic and Social Development Policies (2017-2024)	
Enacted by	NDPC	
Objective	To provide the President's comprehensive vision for the mid-term economic and social development of Ghana, including the following policy areas related to CCA and DRM:	
Key elements	• climate variability and change • disaster management • water for development • drainage and flood control • water and sanitation • land administration and management • human settlements and housing	
Points of convergence	• Several actions in the programme are linked directly or indirectly to CCA and DRM, but the programme does not explicitly call for enhanced policy coherence.	
National frameworks	National Climate Change Policy (NCCP) and Master Pan (2015-2020)	National Disaster Management Plan *(published in 2010)*
Lead institution	MESTI (with support from EPA)	NADMO
Objective	To set out the initiatives and programmes identified in NCCP	To guide NADMO in achieving its mandate of ensuring that disasters in whatever form are properly managed
Key elements	10 priority areas: • climate-resilient agriculture and food security • climate-resilient infrastructure • resilience of vulnerable communities • management and resilience of terrestrial, aquatic and marine ecosystems • human health • reduction of climate risks on water and sanitation • gender issues in climate change • climate change and migration	Seven key components: • disaster hazard mapping • education, training and research • emergency responses and relief management • rehabilitation, resettlement and reconstruction • monitoring and evaluation • financing • disaster risk management system
Points of convergence	• NCCP contains programme areas explicitly linked to disaster risk management while the National Disaster Management Plan sees climate change as an integral part of the disaster management model for Ghana.	
National action plans	National Climate Change Adaptation Strategy (adopted in 2012)	National Drought Management Plan (as of November 2019, this was still a draft but it is included for illustrative purposes since there is no DRM action plan)
Objective	To enhance Ghana's current and future development to climate change impacts by strengthening its adaptive capacity and building resilience of the society and ecosystems.	To set out ex-ante and ex-post drought management activities
Key elements	• vulnerability assessment • objectives and strategies • priority policy responses such as: early warning systems, alternative livelihoods, research and awareness raising, environmental sanitation, agriculture, healthcare, energy system	• response measures to droughts • capacity building • research • education and awareness raising • institutionalising better drought management approaches over time
Points of convergence	Unclear until the National Drought Management Plan is finalised and published.	

Source: Author's own

While coherence in the governance arrangement and policy frameworks for CCA and DRM has improved, the implementation of necessary policy actions remains a challenge, especially for local stakeholders in MMDAs. As the subsequent sections illustrate, coherence on the ground still faces gaps in data, information, awareness, funding, and institutional and personal capacities among MMDAs as well as in some sector ministries and agencies.

Data and information

Representatives from both policy and scientific communities consulted for this study emphasised the focus on and demand for evidence-based CCA and DRM policies (EPA, 2018[17]) (MESTI, 2019[18]). The Ghana Meteorological Services Agency (GMet) plays a critical role in providing climate and meteorological data and information in Ghana. GMet has its own Climate Research Unit that is responsible for conducting analytical work on, for instance, climate variability and change, seasonal forecasting, climate services, climate information, drought and floods alerts (GMet, n.d.[19]).

Using meteorological data from GMet, the Ghana Space Science and Technology Institute (GSSTI) also provides policy makers with climate and risk-related information. This includes the institute's involvement in climate scenario development and vulnerability assessment for the country's National Communications (NCs). Ghana's third NC (NC3) published in 2015, simulates and downscales data on rainfall and temperature obtained from 22 synoptic stations deployed across the country, which results in nine scenarios for each of the stations (Government of Ghana, 2015[20]).

Ghana's Water Resources Commission, NADMO, GMet, EPA among others, collaborated with the World Bank to put in place a flood forecasting system for the White Volta River with technical and financial support from the Global Facility for Disaster Reduction and Recovery (GFDRR). This system is based on extensive river gauge and meteorological data, along with historical data to identify flood-prone areas. The hazard assessment covered the genesis of the flooding of the White Volta, the mapping of flood hazards and the effectiveness of structural and non-structural measures to reduce flood impacts. This assessment led to a flood forecasting system launched in 2012 with a three-day lead time (World Bank, 2013[21]).

While the quality and coverage of data and information have steadily improved in Ghana, there remains significant room for improvement in further supporting evidence-based decision-making. For instance, lack of near real-time information and insufficient quality of climate forecasts still prevents the development of effective early warning systems (DHI, 2018[22]) (see Box 4.2 for an example of an early warning pilot). Historical information on losses and damages caused by natural hazards and different types of weather data is not readily available, and in many cases, the information is scattered among different sources (GIZ and MCII, 2019[23]). Fees required to obtain climate-related information from GMet may also discourage some ministries, public agencies and private entities from using this information. Complementary hardware and infrastructure for producing climate-related information, such as satellite receiving stations, computers and online platforms for dissemination of climate information, has also not yet been sufficiently deployed or maintained when in place.

Box 4.2. Example of development co-operation in support of early warning in Ghana

GMet provides NADMO daily weather forecasts to inform early warning signals. NADMO, in collaboration with UNDP and with funding support from the Government of Norway, implemented in 2013 the Community Resilience through Early Warning (CREW) project. The project aims to provide an integrated early warning system (EWS) to communities for climate risks that is both scientific and people-centred. Through the implementation of hazard mapping, early warning and vulnerability assessment and reduction, the project will contribute towards:

- A reduction of economic and human losses and damages from priority disasters;
- Establishment of effective early warning and communication for priority hazards to reduce disaster risk.

The initiative was piloted in five rural and five urban areas. Outcomes include:

- Hazard mapping: e.g. multi-hazard EWS and EWS Master Plan for Ghana, floods and droughts, hazards, vulnerability and risk maps at current (2010) and future scenarios (2050) for the entire country;
- The installation of technical equipment: e.g. early warning communication equipment at NADMO headquarters and in 20 subnational offices, and of seven automated weather stations;
- Software: e.g. an expert system that calculates forecasts and presents relevant data, a dashboard that visualises specific warnings and flood hazard information;
- Capacity development: e.g. 30 young professionals from NADMO, Water Resource Commission and Hydrological Service Department trained in conducting risk assessment, updating risks maps and effective EWS operations;
- Broader development benefits: e.g. a 25-meter footbridge in Accra, and a 20-acre irrigation facility in Lawra District of the Upper West region.

An assessment of the initiative, however, finds that the implementation of the software has faced challenges due to the lack of technical capacity of the staff operating it, and that the initiative as a whole has suffered from a weak institutional framework and the need for improved inter-sector policy implementation.

Source: (Cobbinah et al., 2019[24]) (UNDP, 2012[25]) (UNDP, n.d.[26]).

To ensure that data informs policy and decision-making processes, it must be accessible to a diverse set of stakeholders. Training sessions provided through a collaboration between GMet, GSSTI and MoFA that aimed to sensitise farmers on data use provides an encouraging example. Information and communication technologies (ICTs) such as mobile phones, radios and internet-based applications can also help users access climate-related information and translate it into the planning and implementation of CCA and DRM measures in Ghana (International Telecommunication Union, 2012[27]). Examples include the initiative Farmradio International that helps disseminate information, including climate-related information, to smallholder farmers in Ghana. A second initiative BLUETOWN provides internet connectivity to rural parts of Ghana via solar powered Wi-Fi hotspots. ICTs can also support the monitoring and evaluation of CCA and DRM actions (International Telecommunication Union, 2012[27]). Other notable examples include provision of weather related information by the Esko and a localised weather forecast mobile delivery service provided by Isak.

Satellite images are also a useful source of information for climate and disaster risk management in Ghana. There is, however, a perceived need for a more streamlined approach to collect and use this data more

efficiently (UNDP, 2016[28]). For instance, multiple agencies separately purchase from commercial providers satellite images for the same area. GSSTI is developing a platform to obtain, store and disseminate such satellite images that government agencies can access free of cost, reducing both the barriers and the costs of using satellite data for CCA and DRM.

Other platforms also provide Ghanaian stakeholders with relevant data and information. For instance, GSSTI participates in the RainWatch-Africa initiative. This initiative provides free information on rainfall and temperature in nearly 20 areas in Ghana (and even more in other participating African countries). The data is available online with a readily usable graphics interface (RainWatch, n.d.[29]). This platform has the potential to be a useful tool for officials at the national government and in MMDAs, while the importance of additional financial support to broaden the geographic and temporal coverage is recognised.

Finally, the Climate Change Data Hub, established by EPA, aims to provide a portal to disseminate information on Ghana's actions to tackle climate change and the benefits thereof (e.g. a climate-related project pipeline, actions under the NDC, GHG inventories). It also contains information on relevant policy documents, such as the country's NAP Framework (EPA, n.d.[30]). While the Hub as of June 2019 had mainly focused on the dissemination of data related to greenhouse gas emissions and climate finance, it aims in the future to also collect and disseminate information on issues related to CCA and DRM. The Hub has the potential to evolve into a consolidated platform that stores and provides primary and secondary climate and meteorological information, making it more accessible to policy makers as well as the broader public.

Implementing measures

The decentralised governance system in Ghana means that MMDAs play a crucial role in implementing CCA and DRM policies. This section examines the systems in place to support MMDAs in doing so, while discussion below provides concrete examples in the context of the agriculture sector and urban areas.

NDPC and MLGRD support MMDAs in formulating their Medium-term Development Plans (MTDPs). This includes a review of the extent to which climate change, including CCA, is considered. While MLGRD plays a key role in translating national level policies to local level planning, NDPC provides MMDAs with guidance and technical support to ensure that plans: i) conform to the national development framework and key thematic areas, ii) support the participation and representation of concerned actors and iii) create uniformity in the planning process across all districts in Ghana. With Ghana's adoption of the Paris Agreement, this also includes guidance developed in close collaboration with a range of stakeholders such as MESTI, and with support from UNDP, on the integration of Ghana's NDC into sectoral and local development plans (Government of Ghana, 2017[31]).

The guidelines provide a checklist that specifies that climate change mitigation and adaptation must be addressed in an integrated manner through MMDAs policy planning and implementation (Government of Ghana, 2017[31]). On adaptation, it identifies priority actions across six sectors: i) agriculture and food security, ii) sustainable forest resource management, iii) resilient infrastructure and built environment, iv) climate change health, v) water resources and vi) gender and the vulnerable. Across these sectors the overarching objective is to "increase climate resilience and decrease vulnerability for enhanced sustainable developed" (see Annex 4.B) (Government of Ghana, 2017, p. 14[31]).

Informed by guidance provided by NDPC, MTDPs outline the programmes, projects, activities and budgets for each MMDA. This puts NDPC in an important strategic position since MMDA's budgets do not get released until their MTDPs have been verified by NDPC to be in compliance with domestic objectives, including on climate change, and signed off. While some indicators include an implicit consideration of DRM, interviews with NDPC officials for this study indicated that greater consideration of DRM commitments could be included in the NDC checklist.

As noted above, NADMO has established the CC/DRR Department to advance, among others, activities that address climate change and disaster risk reduction under the NCCP. While this is a positive direction towards policy coherence in CCA and DRM, NADMO still faces challenges in implementation. A draft implementation plan of Ghana's NDC points out that NADMO should fully incorporate climate change activities into its structure by setting up climate change desks in all its regional and district offices, or by building staff capacity in these offices. Further, it suggests that the CC/DRR Department should establish a technical committee to support and guide its activities related to CCA and DRM. (MESTI, 2019[18]). Other ministries and departments have established similar climate units and desks, including the Energy Commission, the Ministry of Food and Agriculture, the Forestry Commission and the Ministry of Finance.

Local capacity is key for ensuring that policies get translated into implementation. Important progress has been made in enhancing capacity at the national level to collect and use climate data and for this to inform national planning and reporting processes. The NCCP, however, notes the need for further capacity-building at the district level, where policy implementation takes place (MESTI, 2015[3]). This includes greater awareness of the NCCP, what it requires of the MMDAs and the associated resource needs (Asante et al., 2015[32]).

Financing mechanisms

While a range of financial mechanisms have been put in place for CCA and DRM in Ghana, funding remains a major barrier to implementation. This section first discusses public budgeting processes that have incorporated CCA and DRM considerations. Next, it outlines the budget allocation mechanism to sub-national assemblies. Finally, it discusses the current status and challenges in the introduction of disaster risk transfer mechanisms in Ghana.

Budgetary instruments and tracking

The Ministry of Finance oversees Ghana's budgeting system called Programme Based Budgeting, a system considered effective in encouraging sector ministries and MMDAs to mainstream CCA into their budget planning processes. Ghanaian ministries, departments and agencies (MDAs) as well as the MMDAs prepare their Budget Estimates annually. The Budget Estimates contain programmes and projects for which MDAs and MMDAs seek funding. These must be aligned with the national policy direction of the government. (Ministry of Finance, n.d.[33]).

The Programme Based Budgeting can facilitate coherence in CCA and DRM through its budget planning processes, especially for cross-cutting issues. Both CCA and DRM have dedicated budget codes, which MDAs and MMDAs are requested to report for related activities in their Budget Estimates. As illustrated in Table 4.3, the Climate Change Finance Tracking Tools, developed by the Ministry of Finance to support the preparation of the Budget Estimates, outline climate-relevant budget codes and the policy objectives associated to them. The tools also provide criteria on the degrees of relevance to climate objectives (high, medium or low) and their target (mitigation, adaptation or multifocal) (Ministry of Finance, 2016[34]).

While the Climate Finance Tracking Tools currently highlight only climate-related budget codes, they could also bring in DRM-related codes to identify areas where public funding can be allocated to enhance synergies between CCA and DRM. Based on the guidance in the Tools, Table 4.3. highlights the potential for enhancing linkages between CCA and DRM. Some policy objectives would directly link the two issues (e.g. reversing forest and land degradation) while others would do so more indirectly (e.g. natural resource management). For now, the integration of CCA and DRM on its own remains limited.

Table 4.3. Climate-relevant budget codes and policy objectives

Budget Codes	Policy objectives	Degree of relevance to climate objectives[1]	Target[1] 1: Adaptation only, 2: Adaptation and Mitigation	Potential links with climate-related disaster risk management
030103	Promote seeds and planting material development	Medium	1	Directly linked through enhancing resilience of agriculture sector to climate risks
030403	Promote sustainable environment, land and water management	Medium	2	Directly linked through better land-use and water management measures
030802	Ensure sustainable management of natural resources	Medium	2	Indirectly linked through better natural resource
030901	Reduce loss of biodiversity	Medium	2	Indirectly linked through enhanced resilience of ecosystems that could help improve livelihoods of people living nearby
031101	Reverse forest and land degradation	Medium	2	Directly linked through prevention of e.g. mudslides
031301	Ensure sustainable use if wetlands and water resources	Medium	1	Directly linked through prevention of e.g. flooding
031601	Enhance capacity to adapt to climate change impacts	High	1	Directly linked through enhanced capacity of citizens to manage negative impacts of climate change
031701	Enhance capacity to mitigate and reduce natural disasters and reduce risk and vulnerability	High	1	The objective targets both DRM and CCA in itself.
050102	Create efficient and effective transport system that meets user needs	Medium	2	Indirectly linked through enhanced resilience of transport systems to climate change and natural disasters
051101	Promote proactive planning to prevent and mitigate disasters	Medium	1	The objective targets both DRM and CCA in itself.
051301	Improve management of water resources	Medium	1	Directly linked through e.g. the management of damages from droughts
060105	Ensure continued provision of life skills training and management for personal hygiene, fire safety, environment, sanitation and climate change	Medium	1	Directly linked through enhanced capacity of citizens to manage the negative impacts of climate change and natural disasters

Note: These indicators are specified in the Climate Change Finance Tracking Tools (Ministry of Finance, 2016[34])
Source: Authors' elaboration based on (Ministry of Finance, 2016[34])

Dedicated funding mechanisms for local governments

The District Assemblies' Common Fund (DACF) offers a mechanism for distributing financial resources from the central government to the sub-national level. A minimum of 5% of the national revenue is to be shared among all District Assemblies in Ghana with a formula approved by the Parliament. Of the budget allocated from DACF, all districts are mandated to set aside a certain amount for emergency response, while the percentage varies across districts, based on the available internal funds for a particular year and on the district assembly's priority areas. (NADMO, 2012[35]). MLGRD, the Ministry of Finance as well as other MDAs are involved in the management of the DACF. Local assemblies consider the DACF to be a key source of finance for CCA and DRM, complementing scarce MMDAs funding to conduct capacity building, awareness raising and sensitisation (Korah and Cobbinah, 2019[12]). DACF has introduced an incentive mechanism for incorporating, among other policy domains, CCA and DRM into the budgeting at sub-national level as outlined below.

The District Assemblies Performance Assessment Tool (DPAT) from 2018 is used to evaluate the efficiency and accountability of the services provided by MMDAs so that those with satisfactory performance can be financially rewarded in accessing DACF (MLGRD, 2016[36]). The Performance Measures, which include a measure on "Environment and Climate Change", determine each assembly's share of the Performance Grant of the DACF, supported by donors, at present Switzerland and Germany. The Environment and Climate Change measure includes multiple indicators, for instance, whether more than 5% of the programmes and projects of the MMDA's annual action plan focus specifically on climate change and disaster risk reduction measures (MLGRD, 2016[36]).

Despite efforts to mainstream CCA and DRM into budget allocation, financing remains an important barrier for implementation. The budget constraints are due to multiple factors including competing development priorities and a low level of awareness of climate and disaster risks by sector ministries and agencies as well as by the MMDAs (see section on the context of the agriculture sector below). Funding for CCA and DRM measures therefore tends to be largely driven by development co-operation providers and is often project-based. However, Ghana's status as a middle-income country means that support from development providers will be limited, and as discussed below, the nature of this co-operation is set to change.

Limited budget allocation to disaster risk prevention and preparedness further impacts opportunities for creating coherence between CCA and DRM. The stakeholder consultation for this study revealed that budget allocations to disaster risk prevention and preparedness are more limited than those for response measures. Studies also point out that NADMO should shift from a primary focus on response to prevention through modernising its operations and collaborating with other stakeholders (Kranjac-Berisavljevic, Teye and Gandaa, 2019[37]).

Box 4.3. UN Local Climate Adaptive Living (LoCAL) in Ghana

The Local Climate Adaptive Living (LoCAL) Facility of the UN Capital Development Fund (UNCDF) contributes through the sub-national level to country achievement of the Paris Agreement and climate-related Sustainable Development Goals. It promotes climate change–resilient communities and local economies by establishing a standard, internationally recognised country-based mechanism to channel climate finance to local government authorities in developing countries. LoCAL increases climate change awareness and capacities at the local level, integrates climate change adaptation into local government planning and budgeting in a participatory and gender-sensitive manner and increases the financing available to local governments for climate change adaptation.

The UNCDF has since 2015 worked in Ghana to support MMDAs and communities in strengthening their climate resilience by increasing access to adaptation financing through performance-based climate resilience grants (PBCRG). Following the pilot phase, LoCAL is being scaled up to 13 MMDAs with support from the European Union as part of an integrated programme that is further strengthening climate resilience by including a complementary focus on socioeconomic developmental needs by, for example, establishing targets on local job creation, particularly in the green economy. A portion of the PBCRG are to be implemented by local government authorities through cash-for-work schemes, targeting in particular youth and women, and through procurement to local small and medium-sized enterprises (SMEs). Further, access to finance and skills development

support to cash for work beneficiaries and the larger communities are integral components of the programme.

Source: (UNCDF, n.d.[38])

Disaster risk transfer instruments

Risk transfer instruments, such as sovereign disaster risk insurance and agricultural insurance products, address residual risks associated with climate change and disasters. The Ministry of Finance used to hold a contingency fund for disaster response. This fund, however, has since 2018 been incorporated into relevant ministries' programme budgets, such as the Ministry of Interior under which NADMO is placed.

Ghana joined the African Risk Capacity (ARC) programme as a signatory in 2016, but the formalisation of Ghana's participation in ARC is still under consideration by parliament. A decision has been delayed partly due to limited awareness among lawmakers on the role of sovereign climate and disaster risk finance and insurance, and hence limited willingness of paying the premium. Moreover, the ARC contingency plan has certain temporal and geographical limitations. The plan relates only to actions implemented within the first 120 days following the pay-out, and would thus not cover longer-term response and recovery. Further, only Ghana's three northern regions would be covered (MCII & GIZ, 2019[39]).

Ghana has also introduced agriculture insurance products, especially for small and subsistent farmers vulnerable to drought risks. Introduction of crop insurance has been embedded in both the NCCP and the Climate Smart Agriculture Plan. The Ghana Insurers Association, in co-operation with MoFA, the Ministry of Finance and the National Insurance Commission and their development partners, launched the Ghana Agricultural Insurance Pool (GAIP) in 2011, which offers drought index insurance, multi-peril crop insurance, poultry insurance and area yield insurance (see (Ghana Agricultural Insurance Pool, n.d.[40]) for further information on the products). GAIP has continuously developed new insurance products to provide safety nets for farmers and to encourage them to invest more in their agriculture practices for higher yields and income. The up-take of these insurance products has nevertheless been limited, in part due to low financial literacy of the target group. Given the focus on subsistence farmers, the government may also need to subsidise some part of the insurance premium (Oppong Mensah et al., 2018[41]).

Monitoring, evaluation and learning

NDPC oversees the national monitoring and evaluation system in Ghana. Regulatory measures in place mandate every government implementing agency to monitor and evaluate their respective policies, programmes and projects, guided by national indicators, baselines and targets identified in the National Medium Term Policy Framework and in the Sector and District Planning Guidelines. Reporting across all sectors and levels of government informs the National Annual Progress Report. Despite this strategic cross-cutting role of NDPC, there is no convergence between the monitoring and evaluation of CCA and DRM.

As noted above, NDCP has issued guidelines to MMDAs for the preparation of their MTDPs, which includes a checklist for mainstreaming NDCs (see Annex 4b). This in turn ensures that climate issues are monitored and evaluated through standard NDCP processes in place. To date, a similar checklist has not been developed for DRM, although the NDC checklist does include related elements. A more explicit focus on DRM would provide a mechanism through which a focus on monitoring and evaluation of disaster risk management to a greater extent also could be ensured.

For CCA, the NDC, NCCP, NCCAS as well as the NAP Framework all include sections on monitoring and evaluation. Rather than proposing additional reporting frameworks, they each refer to the reporting

frameworks already in place in support of the Annual Progress Reports. Further, the need for enhanced capacity to monitor changes in the climate as well as the impacts of these is emphasised. Ghana's obligations under the UNFCCC to monitor, verify and report (MRV) international support received and the effectiveness of measures being implemented is also emphasised in the NCCP.

Finally, the NCCAS specifies that a monitoring and evaluation unit will be established within the National Climate Change Committee to oversee the monitoring and evaluation of the strategy (Government of Ghana, 2012[42]). This will be informed by existing systems in place. Further, it will put in place mechanisms to monitor the timely completion of the tasks outlined in the strategy for which resources will be allocated to ensure their effective use (against strategy baselines and core targets)[8]. Evaluations at mid-term and after the end of the strategy will assess its impact and determine the success or failure in its formulation and implementation. The NCCP refers to data gaps on disaster impacts monitored by NADMO, but beyond that, there is no explicit reference to potential synergies with the National Disaster Management Plan.

The National Disaster Management Plan also specifies that NDPC will oversee the monitoring progress at the national level and the Regional Disaster Management Committee at the Regional and District levels. The plan specifies that there will be periodic monitoring and evaluation to ensure consistency with national initiatives and government priorities. Key indicators identified primarily focus on activities or processes and include:

- Measure the expected outcomes of the Plan.
- Set benchmarks.
- Measure the effectiveness of policies, strategies and programmes and inform policy development.
- Identify Agencies and Departments accountable and responsible for each performance indicator.
- Identify opportunities for improvement that lead to enhancement of the Disaster Management System.

In parallel, the Ministry of Finance publishes the consolidated Annual Budget Performance Report, an assessment of the implementation of the budget within a fiscal year (Government of Ghana, 2019[43]). The aim of these budget reports is to ensure transparency and accountability in the management of public resources. They provide valuable insights into the status of implementation of climate adaptation and risk management initiatives, but as such, do not necessarily provide opportunities for enhancing the coherence between the fields.

Focus on the agriculture sector

Background

The productivity of the agriculture sector is vulnerable to climate change and weather events (e.g. floods and droughts). Climate change is also expected to lead to substantial shifts in suitable crop types across the country (Murken et al., 2019[2]). Greater coherence in CCA and DRM could therefore make a significant contribution to Ghana's agriculture productivity, as well as food security and human well-being. The northern region, for instance, is particularly vulnerable to droughts, which often leads to temporary and localised increases in food prices. In response to such droughts, a common response by the government

[8] Components of the monitoring systems include: i) Physical progress of implementation of the Strategy within time and cost schedules; ii) Quantitative and qualitative progress of implementation of programmes and projects where targets are set; iii) Maintenance of capital assets created to be monitored selectively so that the expenditure earmarked for the purpose in the national and district budgets is in fact utilized for the purpose; iv) Plan expenditure

has been to provide farming inputs for the next season through MoFA, and basic items such as blankets, mattresses and bottled water through NADMO.

The Ghanaian agriculture sector accounted for around 20% of GDP and half of the active labour force in 2018 (AfDB, 2019[6]). It is also the main source for livelihood of the country's poorest population (World Bank, 2017[44]). The sector is dominated by smallholder subsistence farming with about 90% of farm holdings less than 2 hectares, contributing to 80% of total agricultural output. The agriculture sector has a large multiplier effect on employment, with the possibility of creating more than 750 jobs for every additional USD one million of output (World Bank, 2010[45]). Yams and sweet potatoes are mainly grown for subsistence farming, while cocoa, rubber and sugarcane are primarily grown for the export market. Facing a range of challenges, such as the fluctuating prices of agricultural products in the global market and the country's poorly developed transport infrastructure, the current president has launched an initiative called "One District One Factory" to attract private sector investment into rural agro-industry that would create greater value-added (Afriyie Akoto, 2018[46]).

Policy development and implementation

MoFA has been active in aligning CCA and DRM policies into sectoral policies for agriculture. In co-operation with EPA and with support of the Climate Change Agriculture and Food Security Programme, MoFA has developed the National Climate-Smart Agriculture and Food Security Action Plan 2016-2020 (Climate-Smart Agriculture Plan). The overall goal of the Plan is to facilitate and operationalise the agriculture-related elements of the NCCP for effective integration of climate change into the policies and programmes of the food and agriculture sector (MOFA, 2015[47]). The programme areas, for example, focus on institutional capacity for research and development, climate-resilient cropping systems, livestock production, fisheries and aquaculture, water efficient irrigation, risk transfer, post-harvest management and marketing systems (MOFA, 2015[47]).

The Climate-Smart Agriculture Plan has a potential to enhance synergies between DRM and CCA in Ghana by enhancing farmers' resilience to negative impacts of climate change. For instance, the Plan outlines several programme areas relevant to promoting coherence in CCA and DRM, such as: developing crop varieties and livestock breeds which are tolerant to flooding and droughts, diversifying land-use by and enhancing capacity of farmers to better cope with droughts and floods and designing fishery programmes that better integrate climatic and hydrological parameters. The Plan also highlights the importance of institutionalising weather-related risk transfer schemes, as well as the role of private sector actors through the entire agricultural value chain, namely micro, small, medium and large farmers and enterprises, as well as financial institutions. (MOFA, 2015[47]).

Box 4.4. Climate-smart agriculture and agroforestry in Ghana

Climate-smart agriculture is also anchored in Ghana's national strategy for reducing emissions from deforestation and forest degradation 2016-2035 (Ghana REDD+ Strategy), despite the primary focus of the REDD+ Strategy on climate change mitigation (Forestry Commission, 2016[48]). The Forestry Commission of Ghana led the development of the Ghana REDD+ Strategy. The strategy highlights how climate-smart agriculture can contribute to improved land-use and socioeconomic development in the high forest zones and cocoa growing areas. (Forestry Commission, 2016[48]) Linked to the strategy, the Forestry Commission and the World Bank recently launched a new REDD+ project under the Forest Carbon Partnership Facility. The project aims to support farmers and communities to increase cocoa production without expansion of cocoa farms into forest lands, and to secure more predictable income streams for communities. (World Bank, 2019[49]).

The Forestry Committee has also conducted agroforestry initiatives to promote plantation of trees and cocoa in the same areas. The Committee provides the seedlings to farmers in rural communities and then buys the regenerated seedlings to plant in vulnerable areas to implement, for instance, flood protection measures. The farmers are responsible for clearing the land, planting and successful regeneration of the seedlings, weeding and pruning of the trees. An evaluation finds that this initiative has increased the capacity of farmers to reduce their vulnerability to climate change by, for example, promoting equitable land sharing and free access to fertile lands within forest reserves for crop cultivation and subsequent commercial marketing (Kalame et al., 2011[50])

Actions by the Ghana Irrigation Development Authority (IDA) presents another example of attempts to promote coherence between CCA and DRM. A review of initiatives by IDA reveals that while most initiative do not explicitly focus on CCA and DRM, many do in fact take climate change impacts into account, and in some cases also manage disaster risks. One of IDA's main responsibilities is to "formulate, develop and implement irrigation and drainage plans for all year round agriculture production in Ghana". This primarily entails identification of possible irrigation projects, and management and maintenance of irrigation schemes. While not explicitly reflected in IDA's mandate, the expansion of small-scale irrigation development is identified as a priority in the NCCAP that includes a focus area on *Climate-resilient Agriculture and Food Security Systems* (MESTI, 2015[3]). While there is no equivalent reference to the specific role of irrigation in the National Disaster Management Plan, drought is recognised as a hydro-meteorological hazard (NADMO, 2010[8]). Box 4.5 summarises examples of IDA's activities that indirectly take CCA and DRM into account.

Box 4.5. Implementation of CCA and DRM by the Ghana Irrigation Development Authority

The One-village One-dam (1V1D) project

As President Akufo-Addo's flagship programme, 1V1D commits to the construction of 570 community dams with the objective of making access to water available to small holder farmers all year round, particularly in the Northern, Upper-West and Upper-East Regions (Ministry Of Special Development Initiatives, 2018[51]). 1V1D project aims to improve food security and rural livelihoods, in turn reducing migration to the southern coastal areas. After some analytical work, the planning and construction of dams under the initiative now takes into account the projected impacts of climate change, leading to measures such as the construction of additional spillways, reinforcing the height or the length of the dams.

The Kpong Irrigation Scheme (KIS)

KIS is a 3 000-ha irrigation scheme and the largest public irrigation infrastructure in Ghana, supporting the cultivation of double cropped rice – i.e. rice cultivated during each of the two seasons - with the aim of enhancing food security and the competitiveness of Ghana's agricultural sector (MOFA, 2019[52]). While climate change adaptation is not a priority of the project, it is noted that the proposed renovation and modernisation of the KIS will enhance the resilience of farmers and the local economy by providing a more resilient alternative to rain-fed agriculture given the year-round supply of water for farming (MOFA, 2019[52]). A challenge for stakeholders and engineers in planning the modernisation of the KIS is how to decide on the appropriate level of upgrade to the irrigation infrastructure given increasing intensities of rainfall which have already occurred or are projected for the future.

Dredging of river confluences

The dredging of certain river confluences in the northern region can also contribute to mitigating climate risks. The primary purpose of this project is to remove sediments within the river channel and train areas with slumped slopes. IDA considers that sedimentation and siltation of certain tributaries or small river channels impede free flows of water into main rivers (i.e. White and Black Volta rivers), hence exacerbate flood risks.

Financing

Despite progress made in policy development under the Climate-Smart Agriculture Plan, implementation remains partial. Insufficient funding was the biggest challenge identified by many stakeholders interviewed for this study. Limited public budget has been allocated for the implementation of the majority of the programme areas under the Action Plan, and there is little foresight on future budget allocation. Ghana's public expenditure on agriculture has in general been declining over the past two decades, while public investment in the extractive industries and the domestic service sector has increased (World Bank, 2017[44]) (Aykut et al., 2017[53]). Public spending on agriculture as a percentage of the total spending was 5.3% in 2001, and decreased to 1.2% in 2014 (Aykut et al., 2017[53]). More than 60% of the budget the ministry is allocated is spent on operational costs, covering mainly the ministry's day-to-day operations. Sectoral public investment projects tend to be modest, and development finance covers about 70% of funding for fixed capital formation in the agriculture sector (World Bank, 2017[44]). Public spending on agriculture may increase in the future. The government introduced in 2017 a five-year initiative "Planting for Food and Jobs" that aims to encourage all Ghanaians to take farming as a full time or part time activity through, for instance, subsidies for fertilisers and seeds as well as support in market access (MOFA, n.d.[54]).

Many actions under the programme areas of the Climate-Smart Agriculture Plan are conditional on development finance being available, rather than on domestic budget allocations. While the responsible ministries, mainly MoFA, appreciate the support of development co-operation partners, it was noted during the stakeholder consultations for this study that this support is not always aligned with the priorities, geographical coverage or timeframes of the Climate-Smart Agriculture Action Plan. Competing priorities between different policy domains within MoFA also inhibit budget allocation for the implementation of Climate-Smart Agriculture Plan. For instance, studies suggest that a significant part of public expenditure on agriculture is allocated to subsidies for agricultural input, especially for cocoa. The sustainability of these subsidy programmes is questioned, due to their rising costs and ineffective targeting mechanisms (World Bank, 2017[44]). A means-tested and well-targeted subsidy programme may be effective in addressing specific market failures in the agriculture sector. Instead, the current subsidy programmes constrain financial resources that could be used to support climate smart agriculture practices and potentially other measures aimed at strengthening the sector's competitiveness (World Bank, 2017[44]) (Aykut et al., 2017[53]).

Apart from the funding gap, lack of awareness among local farmers of the climate risks and limited access to granular weather and climate-related information is also a significant challenge to the implementation of the Plan. Efforts by MESTI, EPA, GMet or GSSTI to provide better weather and climate data and information is an important enabler for farmers to adopt climate smart agriculture practices. Promoting the uptake of drought-resilient and fast-maturing crop varieties would help farmers to better adapt their production methods to an increasingly unpredictable climate (World Bank, 2017[44]) (World Bank, 2010[45]).

Focus on urban resilience

Background

Between 1984 and 2013, growth in urban areas outpaced that in non-urban areas, increasing from 31% to 51%; a number projected to increase to 65% by 2030 (World Bank, 2015[55]). Complemented with a period of political stability and rapid economic growth, urban centres became attractive for migrants. In turn, the reallocation of labour from subsistence farming to economic activities with higher economic returns was conducive for economic growth and contributed to reduction in poverty levels and improvements in human capital. High rates of urbanisation have also contributed to the expansion of informal housing, and inadequate supply of basic services has made city centres susceptible to natural and man-made disasters (e.g. floods, sea-level rise, fire, disease outbreaks and building collapse) (World Bank, 2017[56]). For the Greater Accra Metropolitan Area (GAMA), risks are compounded by those related to its coastal location. Around 80% of GAMA's 225 kilometres shoreline is at risk of erosion from sea level rise and a number of houses have already been consumed by coastal erosion (World Bank, 2017[56]).

Box 4.5. The 2015 flood in Accra

In June 2015, Accra experienced the worst flood in recent history, affecting over 52,000 people, triggering an explosion at a gas station, resulting in 150 casualties and causing damages to housing and infrastructure (transport, water and sanitation) totalling USD 55 million, with rebuilding costs estimated at USD 105 million (World Bank, 2017[56]). While the flood followed a period of heavy rainfall, its impact was exacerbated by the nature of the city's development, including inadequate enforcement of land use regulations and lack of maintenance of the drainage networks.

Policy development and implementation

Urban planning in Ghana has traditionally focused on economic development and on improved provision of basic social services. Much less focus has been on environmental issues, including climate change (Cobbinah et al., 2019[24]). The important role of urban areas in managing climate risks is nonetheless recognised in key policy documents. Examples include:

- **NDC**: City-wide Resilient Infrastructure Planning is highlighted as one of seven adaptation policy actions, focusing on building standards for strategic infrastructure in housing, transport, coastal, waste management, telecommunication and energy (MESTI, 2015[11]).
- **NCCAS**: Only one adaptation-related programme (*Improved Drainage in Urban Areas*) explicitly highlights the role of urban areas, but urban areas are a prominent focus in a few programmes and the role of urban planning in managing climate change impacts in cities is recognised (e.g. *Build Capacity to Design Climate Resilient Infrastructure; Climate-resilient Sectoral and Local Development Planning; Flood Prevention Activities*) (MESTI, 2015[3]).

MLGRD supports district assemblies in translating national policies to the local level. While the 2012 National Urban Policy was introduced before the adoption of the Paris Agreement and the Sendai Framework, it does include objectives focused on the environment and on climate change adaptation and mitigation (MLGRD, 2012[57]). No objective explicitly focuses on DRM, but it is indirectly reflected in some of the objectives, e.g. focused on urban safety and security, and on strengthening MMDA's capacity for drainage planning, development and management, and flood disaster prevention, preparedness and management (MLGRD, 2012[57]). A select set of objectives (there are 12 in total) and corresponding initiatives are summarised in Table 4.4.

Table 4.4. Policy objectives and initiatives of Ghana's National Urban Policy Framework

Policy Objective	Examples of Initiative for implementation
1. Facilitate balanced re-distribution of the urban population	• Ensure that existing and newly created centres adhere to best environmental and land management practices
4. Improve the environmental quality of urban life	• Protect open spaces, green belts, forest reserves, water bodies, wetlands, water catchment areas and other ecologically sensitive areas from physical development and urban encroachment • Develop and implement a systematic programme of flood control measures in urban communities • Establish adequate measures against natural hazards in urban areas • Prepare and implement coastal management plans to effect coastal re-vegetation and erosion of denuded and neglected coastal towns
5. Ensure effective planning and management of urban growth and sprawl, especially of the primate cities and other large urban centres	• Ensure adoption and implementation/enforcement of relevant recommendations from the Land Use Planning and Management Project (LUPMP) regarding legislation, development guidelines, planning standards, spatial development frameworks, structure plans, local plans and land use control
8. Promote urban safety and security	• Incorporate specific security and disaster prevention and management mechanisms in urban planning and management • Strengthen emergency rapid response to disaster and emergency situations
9. Strengthen urban governance	• Improve and enforce legislation and standards on urban development including the validation and adoption of those developed and recommended by the LUPMP
10. Promote climate change adaptation and mitigation mechanisms	• Impose and enforce more effective coastal zone and wetlands management regulations • Strengthen the capacities of agencies that are charged with promoting environmental standards • Generate public awareness on climate change and litigation strategies through mass media educational campaigns
11. Strengthen applied research in urban and regional development	• Develop an extended urban and regional information system to reinforce the land use planning and information system that is being developed by the LUPMP

Source: (MLGRD, 2012[57]), adjusted from (Cobbinah et al., 2019[24])

A 2019 review of the implementation of the National Urban Policy in Kumasi concludes that it has not contributed to any significant and meaningful planning outcomes on climate change. This is attributed to unclear policy objectives, absence of institutional mechanisms, including for financial resource mobilisation and inadequate human and technical capacity to facilitate effective implementation of the policy (Cobbinah et al., 2019[24]). Non-compliance with planning laws by developers, as well as local residents, also exacerbates the city's exposure to climate change, while at the same time weakening resilience to climate risks. Similarly, financial resource constraints and weak institutional capacity has resulted in a limited focus on climate change-related matters in local policy development and implementation (Cobbinah et al., 2019[24]).

The Accra Resilience Strategy provides an example of an MMDA approach to resilience planning. Published in 2019 with support of the 100 Resilient Cities initiative – a global network that supports cities to become more resilient to a diverse set of physical, social and economic challenges – the strategy presents a roadmap for "a smart, sustainable, and resilient city that anticipates and plans for shocks, rather than reacts to them." (AMA, 2019[58]). It is guided by a set of shocks (fires, floods, disease outbreaks, building collapse and earthquakes), and stresses (ageing infrastructure, poor waste management and sanitation, inefficient transportation system, high cost of living and proliferation of informal settlements). While the focus on flood risk is primarily considered an outcome of choked drains from improper waste management and inconsistent application of land use policies, the role of climate change in compounding shocks and stresses is recognised. The strategy is structured around three pillars, two of which include consideration of climate change and/or flood risk (AMA, 2019[58]) (see Table 4.5.).

Table 4.5. Focus of climate change adaptation and disaster risk management in the Accra Resilience Strategy

Focus	Goal	Initiative
Pillar 1: An Integrated Approach to Infrastructure Planning and Service Provision		
A City that takes an integrated approach to infrastructure planning and service provision to account for ***changing climate*** patterns, economic trends and population growth.	1.2: Design and adapt infrastructure to maximise co-benefits and simultaneously address Accra's ***flooding***, waste, sanitation and ***climate challenges***	4. ***Strengthen drain design*** and performance through an assessment of existing and proposed road and drainage infrastructure, incorporating meaningful community engagement
Pillar 2: Optimise New and Existing Resources with Accountability and Transparency		
A City that optimises the use of new and existing resources to proactively serve citizens with greater accountability and transparency.	2.1 Improve the use of data for sound long-term integrated planning and reflective decision-making	13. Collaborate with the Ministry of Sanitation and Water Resources (MSWR) on the development of the ***Accra Climate Strategy and Integrated Urban Environmental Sanitation Strategy and Master Plan***
Pillar 3: embrace informality's contribution to resilience building		
A City that embraces informality in its urban systems to harness its contribution to resilience building.	No explicit focus	No explicit focus

Source: Authors own based on (AMA, 2019[58])

The strategy provides an important step in the right direction. However, limiting the focus of climate change to floods is a missed opportunity to respond to some of the underlying climate and disaster risk challenges. A 2017 study, undertaken by the MMDAs of the GAMA and relevant ministries, with support from the World Bank, provides a diagnostic of the root causes of the broader shocks and stresses not limited to climate change. It put forward four recommendations endorsed by MESTI and MLGRD (World Bank, 2017, pp. xxi-xxiii[56]):

- **Improve Metropolitan Planning and Co-ordination**. Emphasis should be given to key factors for urban resilience such as land management, information systems, and provision of infrastructure.
- **Integrate Urban Flood and Coastal Zone Management**. Quick wins include finalising the GAMA-wide Drainage and Flood Control Master Plan and updating existing plans for incorporation into current spatial development strategies and land use plans. In the medium- to long-term, drainage and flood control infrastructure and management systems should be improved.
- **Enhance Resilience in Vulnerable Communities**. Identify vulnerable settlements so investments can be focused on the most exposed places. This information can feed into a comprehensive urban upgrading and redevelopment strategy, which needs to be integrated with local economic development initiatives and any existing development plans.
- **Improve Disaster Preparedness and Response to multi-hazards**. Conduct comprehensive and detailed risk assessments in order to fulfil MMDAs' mandate to plan, mainstream and implement evidence-based disaster and climate risk management actions.

In general, GAMA's DRM focus has largely been on response measures. Less focus has been on addressing the underlying risks and enhancing local resilience to those risks. This makes the region susceptible to a wide range of risks, including those related to climate change. Lack of data is an underlying barrier, limiting the ability to clearly identify the risks and to determine priority areas for action, and subsequent implementation (World Bank, 2017[56]).

Financing

Dedicated funding mechanisms that include incentives for incorporating CCA and DRM into budget processes are in theory available to local governments. In practice, with decentralisation, the responsibility

of funding local development priorities falls on MMDAs themselves, a responsibility that is not always matched by the capacities needed to generate revenues (Musah-Surugu, Ahenkan and Bawole, 2019[59]). Instead, many MMDAs, including urban centres such as Accra, have experienced budget deficits (AMA, 2019[58]). This is creating dependencies on financial support for CCA and DRM, both through central government transfers and from development partners (Musah-Surugu, Ahenkan and Bawole, 2019[59]).

Policy frameworks such as the NCCP and NDMP do not include legal requirements for integrating climate change in local government budgets, preventing the enforcements of such budget allocations as well as subsequent punitive sanctions for non-compliance (Musah-Surugu et al., 2018[60]). This leaves the explicit focus, as well as the integration of climate and disaster risk management, at the discretion of local governments. Despite this, a review of six MMDAs, including the Accra Metropolitan Assembly, found that the majority of adaptation-related expenditures also consider climate-related disaster management (Musah-Surugu et al., 2018[60]).

MMDAs have started to generate funds for which they can respond to climate and disaster risk. While the potential scope of these sources in some cases are considerable, local circumstances, e.g. outdated tax structures and poor administration, mean that they are largely untapped and in some cases not explored at all (Musah-Surugu, Ahenkan and Bawole, 2019[59]). Interviews conducted for this study also highlight that irregular releases of quarterly government transfers to local departments (e.g. to NADMO and the Ministry of Agriculture) make it challenging for MMDAs to implement identified CCA and DRM priorities. This especially applies to urgent interventions, such as early warning measures and the development and implementation of flood and evacuation plans (Musah-Surugu, Ahenkan and Bawole, 2019[59]).

Some MMDAs have benefitted from support from development co-operation providers, but this support is always time-bound, and traditionally has favoured support to specific issues or sectors. At the same time, multilateral sources of funding often are not accessible to MMDAs. This is in part due to the nature of these funds which primarily target national governments. Further, the capacity of MMDAs to apply and successfully access international funds is in many cases limited (Musah-Surugu, Ahenkan and Bawole, 2019[59]).

The role of development co-operation

In March 2017, President Akufo-Addo shared his ambition of building a Ghana beyond aid that no longer is dependent on foreign support, but instead draws on own domestic resources for its development. This appeal by the President was primarily targeted at Ghanaian citizens and businesses to take the lead in building the country's future. In February 2019, it was complemented by guidelines devised by the Ghana Beyond Aid Charter Committee that also included an overall vision of building a i) wealthy, ii) inclusive, iii) sustainable, iv) empowered and v) resilient Ghana. It emphasised the importance of transforming and growing out of dependence on aid, without rejecting it. It specified that development co-operation should be aligned to Ghana's strategy for economic transformation, and that the government itself should provide basic services such as education, health, sanitation and water resources (Government of Ghana, 2019, p. 11[61]).

The report by the Committee highlights that development co-operation as a share of Ghana's budgetary expenditures was on average 5.7% over the period 2016-18. However, beyond this aggregate number, and when focusing solely on expenditures on goods and services and on capital, support from development co-operation averaged 38.3% over the period. Further, when focusing on the expenditure of some ministries and services, the numbers are much higher. For MoFA, development co-operation as a percentage of expenditures financed by the government averaged at almost 103%; for the Ministry of Water and Sanitation, this figure was over 310% and for the Ministry of Local Government 104% (Government of Ghana, 2019[61]). This demonstrates that while the Government pays the salaries of

government employees, the implementation of initiatives continues to rely on support from development partners. This is consistent with views expressed by people interviewed for this study.

In response to Ghana Beyond Aid, providers of development co-operation have started to adjust the focus of their support. For example, the strategic objective of joint programming by the European Development Partners in Ghana[9] for the period 2017-2020, and with an indicative financial envelope of EUR 1.25 billion, is to accompany Ghana's transformation process as outlined in Ghana Beyond Aid. In practice, this will result in a gradual shift away from traditional support provided in the form of grants and concessional loans, towards increased focus on political and policy dialogue, inclusive economic development and trade co-operation in support of Ghana's objectives (EEAS, 2017, p. 6[62]). Further, climate change is highlighted as a cross-cutting strategic priority (together with migration and mobility, gender, youth, human rights based approach). Specifically, support for the implementation of the Paris Agreement is highlighted, with the need for European Partners to develop future joint actions in line with the priority areas set out in Ghana's NCCP and NDC. Box 4.6 provides three examples of support provided by European bilateral donors.

Box 4.6. Examples of development and climate finance in support of CCA and DRM in Ghana

Integrated climate risk management for adaptation to climate change: Supported by Germany and in collaboration with the Ministry of Food and Agriculture, the Ministry of Finance and NADMO, this five-year project aims to implement an integrated climate risk management strategy to protect smallholders and commercial agribusinesses against financial risks associated with extreme events. In doing so, it combines elements of disaster relief and risk reduction with the benefits of insurance solutions. The project consists of three components focused on the agriculture sector (MCII & GIZ, 2019[39]):

1. *Sovereign drought risk insurance*: Supporting the Government of Ghana in the accession process to the African Risk Capacity.
2. *Building capacities for risk prevention and risk reduction*: Undertaking climate-smart agriculture pilots in two districts in the Northern and Volta regions, and building capacity of NADMO and MoFA staff at national and sub-national levels on Climate Disaster Risk Management.
3. *Supporting the development of the agricultural insurance market*: Including a market study, that includes a gap analysis and lessons learned.

Climate Risk Analysis for Identifying and Weighing Adaptation Strategies in Ghana's Agricultural Sector: Supported by the German Ministry for Economic Cooperation and Development (BMZ), GIZ and the Potsdam Institute for Climate Impact Research in collaboration with EPA of Ghana conducted a comprehensive climate risk analysis for the agriculture sector. The analysis employed different impact models, such as an eco-hydrological model and a semi-statistical and process-based crop yield model The study focuses on the evolving trends for temperature and precipitation, future water availability and the country´s suitability to grow crops, and assesses different priority adaptation options for the agriculture sector (Murken et al., 2019[2]).

Adapt'Action: Supported by France, the objective of this project is to equip countries with the capacities required to access climate finance, and to facilitate the emergence of adaptation to climate change investments. Further, it also aims to better account for gender-related climate vulnerabilities and support nature-based solutions. The project is composed of three components (AFD, 2018[63]):

[9] Here referring to the EU, Denmark, France, Germany, the Netherlands, Switzerland and the United Kingdom

4. *Support climate governance for a successful implementation of the NDCs*: i) strengthen the institutional processes for the implementation and monitoring of the NDC; ii) build technical capacities and raise the awareness of partners to ensure greater ownership of the NDC;
5. *Support the mainstreaming of adaptation issues into sectoral public policies*: i) develop one or two sectoral policies for the implementation of the NDC; ii) improve knowledge about the expected impacts of climate change in key sectors; iii) develop action and investment plans to implement the adaptation objectives;
6. *Support the preparation of structural projects and programmes in the field of adaptation*: i) finance vulnerability and feasibility studies; ii) support efforts to seek financing and financial partners.

Developing Disaster Risk Management Approaches for Climate Risk (Urban Resilience Infrastructure for Ghana): Supported by develoPPP.de on behalf of BMZ and Allianz Climate Solutions GmbH (ACS) in collaboration with Accra Metropolitan Assembly, Ga East Municipal Assembly, Ga West Municipal Assembly and Ghana Meteorological Agency. The project is a 3-year project that is jointly implemented by GIZ and ACS to prepare the grounds for implementing risk transfer solutions within an integrated flood risk management approach targeting public assets belonging to municipalities. The project is structured under the following:

1. *Gather data, measure and understand flood risk*. In achieving this, exposure analysis is conducted to identify the public assets that are at risk. An Economics for Climate Adaptation (ECA) assessment has also been conducted to analyse the cost-benefit of various adaptation measures possible for the municipalities. Insurance, which can only be designed based on the data gathered is one of these measures.
2. *Identify and implement flood risk reduction measures within a holistic Disaster Risk Management on a local level.* The project in collaboration with the municipalities identified replicable flood risk reduction measures such as using mobile applications in efficient waste collection to enable water to pass through the drains freely. In addition, the project is capacitating the municipalities to standardise and update their contingency plans. The project is also in the process of developing a mobile application that would serve as awareness and information tool that citizens can use for managing their flood risk.
3. *Design risk transfer solutions based on the existing data and preferences of the municipalit*y. The Allianz Climate Solution, an implementing partner, is designing three insurance products based on the data collected on the exposure analysis.

All these initiatives would contribute towards integrated approaches the municipalities can use to manage their flood risk.

***Green Climate Fund support to the agriculture sector in Ghana*:** Ghana had by early 2020 received funding for two projects in the agriculture sector from the Green Climate Fund (GCF):

1. *Acumen Resilient Agriculture Fund (ARAF)*: ARAF aims to improve climate resilience to ensure long-term sustainable increases in agriculture productivity and incomes for farmers. It also provides aggregator functions and a digital platform, as well as innovative financial services especially to micro, small and medium-sized enterprises (MSMEs)
2. *Affirmative Finance Action for Women in Africa (AFAWA)* – Financing Climate Resilient Agriculture Practices in Ghana: This credit line programme is to empower women groups in the country's most vulnerable agricultural zone by improving their participation in low-emission, climate- resilient agricultural practice through enhanced access to finance, targeting exclusively women-led MSMEs.

There is a broader presence of development co-operation in Ghana, which includes other bilateral and multilateral providers, including multilateral development banks and funds. These have all played an important role in financing and implementing CCA and DRM initiatives. They also provide important technical assistance to pilot new initiatives and support the government and non-state actors in enhancing the awareness of the climate and disaster risks, and in formulating and implementing response measures. Officials interviewed for this study confirmed this observation. While many highlighted the need for development co-operation to align with national priorities on CCA and DRM, some also expressed frustration over the emphasis of some providers of development co-operation on their own priorities rather than those of the government. In advancing coherence in CCA and DRM, three types of support from development co-operation were highlighted:

- **Capacity building**: A lack of capacity remains a key challenge for planning and implementation, particularly at local assembly level, given Ghana's decentralised governance system. There is a range of areas where opportunities for greater coherence in CCA and DRM in sectors and at the local level exist. These include the capacity of local officials to assess the impact of climate change and disaster risks on medium-term development plans, complemented by know-how on how to address the risks. One-off capacity building efforts have not proved effective. Instead, continuous exposure and training can better capacitate practitioners to enhance climate resilience on the ground.
- **Data and information**: The importance of robust and accessible data and information on natural hazards and climate risks for policy development and implementation is recognised. Progress in recent years has in large part been possible with the support from development co-operation. To maintain this progress, continued support is needed to broaden the coverage and further enhance the geographic coverage and granularity of data so that it can inform risk assessments and policy responses.
- **Finance**: Financial support for the implementation of CCA and DRM initiatives will continue to play an important role as Ghana transitions out of aid. It is, for example, noteworthy that the agriculture sector, a key sector given its contribution to annual GDP and employment, relies on support from development partners for the implementation of many of its measures under the Climate Smart Agriculture Action Plan 2016-2020. Similarly, support from development co-operation will play an important role in financing investments in all sectors, including for resilient infrastructure.

Finally, financing DRM and CCA is a long-term process. The piloting of different measures and financial instruments for CCA and DRM, in some cases with support from development partners, is key in developing solid policy measures and strategies to respond to climate and disaster risks. For such pilots to succeed, however, they must include clear exit, replication or scale-up plans. Officials interviewed for the study also mentioned that there were multiple pilots of similar initiatives by different development co-operation agencies in parallel, which could have benefited from a greater level of co-ordination between the agencies and involvement of the government in their planning phases.

Annex 4.A. Stakeholders interviewed

Environmental Protection Agency
Forestry Commission
Ghana Atomic Energy Commission
Ghana Irrigation Development Authority
Ministry of Agriculture
Ministry of Environment, Science, Technology and Innovation
Ministry of Finance
Ministry of Gender and Social Protection
Ministry of Local Government and Rural Development
National Development Planning Commission
National Disaster Management Organisation
University of Ghana
Private sector (National Insurance Commission)
Civil society (Women, Media and Change and a private consultant)
Development partners (Canada, European Commission, France, Germany, Japan, United States, International Food Policy Research Institute (IFPRI), International Organisation for Migration (IOM), United Nations Development Programme (UNDP))

Annex 4.B. NDPC checklist for mainstreaming NDCs into the Medium-term Development Plans of MMDAs

Annex Table 4.B.1. NDPC checklist for mainstreaming NDCs into the Medium-term Development Plans of MMDAs

Sector	Policy Action(s)	Programme of Action	Key Issues for Mainstreaming in MTDPs	Indicator	Supporting National documents
Agriculture and food security	Agriculture resilience buildings in climate vulnerable landscapes	Modified community-based conservation agriculture adopted in 43 administrative districts	• Promoting climate smart agriculture (CSA) practices such as agro-forestry, mixed cropping, mulching as well as other agriculture conservation practices • Promoting organic farming • Provision of drought resistant and improved seeds • Efficient use of agro-chemical that manages the residual effect on soil and land • Prevention of soil erosion • Promotion of irrigation	• Number of farmers rained in CSA practices • Adoption rate of climate smart agriculture • Use of improved seeds • Level of chemical use in agriculture • Percentage of land protected against soil erosion • Food security of the district • Total area of land under irrigation	• Ghana's Medium-term Agriculture Sector Investment Plan II • Ghana Commercial Agriculture Programme • Land Management Policy • Ghana Shared Growth and development Agenda
Resilient infrastructure in built environment	City-wide resilient infrastructure planning	Building standards for strategic infrastructure in housing, transport, coastal, waste management, telecommunication and energy adopted in 10 urban administrative regions	• Promote climate friendly infrastructure (e.g. higher compactness of road, use of louvre blades instead of sliding window) • Enforcement of building codes waste management	• Compactness of roads • Durability of roads • Durability of concrete pavements • Building codes developed	• Local Government Act 462 • National Building Regulation • National Climate Change Master Plan • Integrating Climate Change and Disaster Risk Reduction into National Development Policies and Planning in Ghana (guide)
Resilient infrastructure in built environment	Early warning and disaster prevention	Expand and modernise the current 22 synoptic stations based on needs assessment, and increase the number to 50 stations for efficient weather information management	• Disaster management plans • Promote effective disaster management • Provision of weather smart information • Prevent building on unapproved areas, e.g. water ways to avoid man-made disasters	• Number of disasters prevented • Number of communities trained in disaster prevention and management (especially bush fires and flooding) • Number of Disaster Volunteer Groups trained equipped	• Ghana Integrating Climate Change and Disaster Risk Reduction into National Development Policies and Planning in Ghana • Meteorological Agency Act 682
Resilient infrastructure in built environment		Improving disaster resilience of vulnerable communities and	• Formation of disaster volunteer groups	• Number of trees planted along the sea coast	•

Sector	Policy Action(s)	Programme of Action	Key Issues for Mainstreaming in MTDPs	Indicator	Supporting National documents
		infrastructure	• Protecting a settlement against coastal erosion or flooding • Prevention of tidal surge and wind storms • Sea defence walls • Early warning systems	• Response time to disasters • Availability of early warning systems	
Climate change and health	Managing climate-induced health risk	Strengthen climate-related disease surveillance in vulnerable communities in 3 Districts Adopt climate change informed health information systems including traditional knowledge on health risk management	• Health infrastructure design and construction should be resilient • Improve nutrition • Preventive health instead of focus on curative • Prevention of environmental pollution • Environmental cleanliness, sanitation and hygiene	• Health infrastructure built to withstand climate hazards • Proportion of the population educated on preventive health • Proportion of the population sensitised on environmental hygiene	• Ghana Health Policy • Health Sector Gender Policy • Medium-Term national development policy framework • GSGDAII • National Climate Change Master Plan • Child Health Policy • Environmental Health Policy
Water resources	Integrated water resources management	Strengthen equitable distribution and access to water for 20% of the population living in climate change risk communities Sustainable management of water resources e.g. rivers, lakes, groundwater	• Improved access to safe drinking water • Protection of water bodies • Protection of water ecosystems • Catchment area protection • Reduction in pollution of water bodies • Efficient utilisation of water resources • Recycling waste water	• Number of people with access to improved drinking water • Proportion of water bodies protected • Proportion of catchment areas protected • Level of pollution of water bodies	• National Water Policy • Water Resources Commission Act, 1996 (Act 522) • Water Use Regulation, 2001 • Sustainable Development Goals 2015-2030 • Riparian Buffer Zone Policy
Water resources			• Promote water harvesting technologies e.g. rain harvesting in houses and Government Institutions • Stakeholder participation in water resources management	• Percentage of the community members harvesting rain water • Proportion of bodies of water with good ambient water quality • Level of stakeholder participation in water resources management	•
Gender and vulnerable	Resilience for gender and the vulnerable	Implementation of community led adaptation and livelihood diversification for vulnerable groups	• Vulnerability and coping mechanisms of different social groups • Livelihood diversification of vulnerable groups • Ender sensitive approach to development • Gender equity • Women empowerment	• Proportion of women benefitting from social interventions • Gender sensitive approach to development adopted at the district • Gender integrated in resources management	• National Climate Change Policy and Master Plan • National Gender Policy
Energy	Double energy efficiency improvement	Promotion of rooftop solar panelling to fit the	• Promotion of rooftop solar programme	• Adoption rate of rooftop solar energy	• Nation Energy Policy • Renewable Energy Act

Sector	Policy Action(s)	Programme of Action	Key Issues for Mainstreaming in MTDPs	Indicator	Supporting National documents
	to 20% in industrial facilities Scale up renewable energy penetration by 10% by 2030; Promote clean rural household lightning; programme on market-based cleaner cooking solutions; double energy efficiency improvement to 20% in power plans	Rooftop Solar Programme aimed at the installation of 200,000 solar PV systems on rooftops in the country to provide 200MW peak load relief on the grid by 2030	• Promote the use of clean energy resources e.g. use of LPG, ethanol, biogas, solar, lanterns, clean cook stoves, efficient charcoal production technologies, etc.	• Number of people with access to solar energy • Percentage of the population using efficient stoves • Number of people engaged in renewable energy jobs (e.g. solar lantern, clean cook stoves production	• Renewable Energy Master Plan • National Climate Change Master Plan • Sustainable Energy Plan
Energy	Promote clean rural households lightning	Kerosene Lantern Replacement Project Build local capacity in the assembly to maintenance of solar lanterns in Ghana	• Build local capacity for assembling to maintenance of solar lanterns in the districts • Expansion of Petroleum products Supply Infrastructure	• Number of people with access to solar lantern • Number of technicians with capacity to assemble and maintain solar lanterns	• Sustainable Energy Action Plan • National Energy Policy
		National Policy of LPG Promotion	• Increasing access to LPG at the district level	• Percentage of the population with access to LPG	• Sustainable Energy Action Plan • National Energy Policy • National Bioenergy Strategy • National Natural Gas Master Plan
Waste	Programme on alternative urban solid waste management	Improve effectiveness of urban solid collection (achieve 70-90%) Improve waste recycling	• Improving urban solid waste collection • Waste recycling • Landfills constructions with methane recovery • Institutional biogas in schools • Provision of composting facilities in the districts	• Percentage of solid waste collected • Percentage of waste recycled • Landfills constructed in the district • Number of schools that benefited from biogas • Number of composting facilities in the district	• National Sanitation Policy • National Sanitation Strategy • Environmental Assessment Regulation (LI. 1652) • Environmental Protection Act (Act 490) • National Bioenergy Strategy
Transport	Sustainable mass transport	Expansion of inter- and intra-city transportation modes (bus transit system) in 4 cities	• Facilitate efficient and safe use of Non-Motorised Transport facilities such as bicycle lanes • Development of pedestrian walkways in congested central business districts	• Coverage of bicycle lanes developed • The safety of pedestrian walkway developed	• National Transport Policy • Transport and Climate Change Policy • National Climate Change Master Plan

Source: (Government of Ghana, 2017[31])

References

AFD (2018), *Adapt'Action: Addressing Climate Impacts Together*, Agence française de développement, Paris, https://www.afd.fr/sites/afd/files/2019-01-02-20-45/brochure-adapt-action-en.pdf(accessed on 30 March 2020). [63]

AfDB (2019), *Africa Information Highway Portal*, African Development Bank (AFDB), Abidjan, https://dataportal.opendataforafrica.org/wafshze/ghana-at-a-glance (accessed on 14 February 2019). [6]

Afriyie Akoto, O. (2018), *Statement by the Honourable Dr Owusu Afriyie Akoto, Minister For Food And Agriculture, Ghana, and IFAD Governor, during the forty first (41st) session of the IFAD governing council – 13-14, February, 2018*, https://www.ifad.org/documents/36783902/40181656/Ghana.pdf/eb528a8a-6706-48e0-8b32-4aed67a66681 (accessed on 25 July 2019). [46]

AMA (2019), *Accra Resilience Strategy*, 100 Resilient Cities, Accra Metropolitan Assembly (AMA), https://ama.gov.gh/documents/Accra-Resilience-Strategy.pdf (accessed on 30 March 2020). [58]

Asante, F. et al. (2015), *Climate change finance in Ghana*, Overseas Development Institute (ODI), London, https://www.odi.org/publications/9306-climate-change-finance-ghana (accessed on 27 August 2019). [32]

Aykut, D. et al. (2017), *Ghana public expenditure review: Fiscal consolidation to accelerate growth and support inclusive development.*, World Bank Group, Washington DC, http://documents.worldbank.org/curated/en/972961498157963462/pdf/Ghana-PER-FINAL-June-19-2017.pd (accessed on 30 March 2020). [53]

CIA (2019), *The World Factbook*, Central Intelligence Agency (CIA), Virginia, https://www.cia.gov/library/publications/the-world-factbook/geos/gh.html (accessed on 14 February 2019). [4]

Cobbinah, P. et al. (2019), "Urban planning and climate change in Ghana", *Journal of Urban Management*, Vol. 8, pp. 261-271, http://dx.doi.org/10.1016/j.jum.2019.02.002. [24]

De Pinto, A. et al. (2012), *Ghana: Climate Change, Agriculture and Foodcrop Production in Ghana*, IFPRI, https://www.ifpri.org/publication/climate-change-agriculture-and-foodcrop-production-ghana (accessed on 30 March 2020). [1]

DHI (2018), *Implementing a drought early warning system in Ghana*, https://www.dhigroup.com/global/news/2018/04/implementing-a-drought-early-warning-system-in-ghana (accessed on 26 August 2019). [22]

EEAS (2017), *European Partners Working Together in Ghana: Joint Co-operation Strategy 2017-2020*, European Union External Action, Brussels https://eeas.europa.eu/sites/eeas/files/european_partners_working_together_in_ghana_2017-2020_final_26_09_2017.pdf (accessed on 30 March 2020). [62]

EPA (2018), *Ghana's National Adaptation Plan Framework*, Environmental Protection Agency of Ghana (EPA), Accra. [17]

EPA (n.d.), *Climate Change Data Hub*, http://climatedatahubgh.com/ (accessed on 23 July 2019). [30]

Forestry Commission (2016), *Ghana REDD+ Strategy*, Forestry Commission, Accra, [48]

https://www.fcghana.org/userfiles/files/REDD+/Ghana%20REDD+%20Strategy.pdf (accessed on 30 July 2019).

Ghana Agricultural Insurance Pool (n.d.), *Ghana Agricultural Insurance Pool Website*, Accra, http://gaip-info.com/downloads (accessed on 5 August 2019). [40]

GIZ and MCII (2019), *Infocus: Access to the African Risk Capacity Programme*, Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH and the Munich Climate Insurance Initiative (MCII), https://reliefweb.int/report/ghana/focus-access-african-risk-capacity-programme (accessed on 27 August 2019). [23]

GMet (n.d.), *Departments of Ghana Meteorological Agency*, Accra, https://www.meteo.gov.gh/ (accessed on 23 July 2019). [19]

Government of Ghana (2019), *End-year Report on the Budget Statement and Economic Policy of the Republic of Ghana for the 2018 Fiscal Year*, Government of Ghana, Accra, https://www.mofep.gov.gh/sites/default/files/budget-statements/2018-Consolidated-MDAs-Annual-Budget-Performance-Report.pdf (accessed on 30 March 2020). [43]

Government of Ghana (2019), *Ghana Beyond Aid: Charter and Strategy Document*, Government of Ghana, Accra, http://agricinghana.com/wp-content/uploads/2019/05/Ghana-Beyond-Aid-Charter-and-Strategy-Document-April-2019_Agricinghana-Media-Copy.pdf (accessed on 30 March 2020). [61]

Government of Ghana (2017), *Mainstreaming Ghana's Nationally Determined Contributions (GH-NDCs) into National Development Plans*, Government of Ghana, Accra, https://www.gcfreadinessprogramme.org/sites/default/files/NDC%20Mainstreaming%20Guidance%20Report.pdf (accessed on 30 March 2020). [31]

Government of Ghana (2017), *The Coordinate Programme of Economic and Social Development Policies 2017-2024*, Accra, https://s3-us-west-2.amazonaws.com/new-ndpc-static1/CACHES/PUBLICATIONS/2018/04/11/Coordinate+Programme-Final+(November+11,+2017)+cover.pdf (accessed on 25 June 2019). [16]

Government of Ghana (2015), *Ghana's Third National Communication Report*, Accra, https://unfccc.int/resource/docs/natc/ghanc3.pdf (accessed on 23 July 2019). [20]

Government of Ghana (2012), *National Climate Change Adaptation Strategy*, Accra, https://www.adaptation-undp.org/sites/default/files/downloads/ghana_national_climate_change_adaptation_strategy_nccas.pdf (accessed on 22 July 2019). [42]

Government of Ghana (1996), *National Disaster Management Organisation Act, 1996 (Act 517 of 1996)*, Government of Ghana, Accra, https://www.preventionweb.net/files/28048_ghana1996act.pdf (accessed on 18 July 2019). [9]

International Telecommunication Union (2012), *Information and communication technologies (ICTs) and climate change adaptation and mitigation: the case of Ghana*, International Telecommunication Union, https://www.itu.int/dms_pub/itu-t/oth/4B/01/T4B010000020001PDFE.pdf (accessed on 26 August 2019). [27]

Kalame, F. et al. (2011), "Modified taungya system in Ghana: a win–win practice for forestry and adaptation to climate change?", *Environmental Science & Policy*, Vol. 14/5, pp. 519-530, http://dx.doi.org/10.1016/j.envsci.2011.03.011. [50]

Korah, P. and P. Cobbinah (2019), "Institutional Responses to Climate Change Adaptation: Flood Management at the Metropolitan Level in Accra, Ghana", in Cobbinah P. and Addaney M. (eds.), *The Geography of Climate Change Adaptation in Urban Africa*, Palgrave Macmillan, Chambridge. https://doi.org/10.1007/978-3-030-04873-0_16 [12]

Kranjac-Berisavljevic, G., G. Teye and B. Gandaa (2019), *Disaster management in Ghana-review of efforts by Government and Research*, 4th Global Summit of Research Institutes for Disaster Risk Reduction, http://gadri.net/4gsridrr/4thGlobalSummit_presentations/19gadri4079.pdf (accessed on 30 March 2020). [37]

MCII & GIZ (2019), *Roadmap for Integrated Climate Risk Management: Drought Risk in Ghana´s Agricultural Sector.*, United Nations University Institute for Environment and Human Security (UNU-EHS) / Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH., Bonn/Eschborn, https://www.indexinsuranceforum.org/sites/default/files/Roadmap_ACRI_DINA4_Ghana_WEB_190516.pdf (accessed on 22 July 2019). [39]

MESTI (2019), *Multi-sectoral implementation plan for Ghana's Nationally Determined Contributions to the Paris Climate Agreement*, Ministry of Environment, Science Technology and Innovation (MESTI), Accra, http://www.epa.gov.gh (accessed on 25 June 2019). [18]

MESTI (2015), *Ghana National Climate Change Master Plan Action Programmes for Implementation 2015-2020*, The Ministry of Environment, Science, Technology and Innovation, Republic of Ghana (MESTI), Accra, https://www.preventionweb.net/english/policies/v.php?id=59575&cid=67 (accessed on 30 March 2020). [3]

MESTI (2015), *Ghana's Intended Nationally Determined Contribution (INDC) and accompanying explanatory note*, Ministry of Environment, Science, Technology and Innovation, Accra, https://www4.unfccc.int/sites/ndcstaging/PublishedDocuments/Ghana%20First/GH_INDC_2392015.pdf (accessed on 30 March 2020). [11]

MESTI (2013), *Ghana National Climate Change Policy*, Ministry of Environment Science, Technology and Innovation, Accra, https://www.un-page.org/files/public/ghanaclimatechangepolicy.pdf (accessed on 30 March 2020). [7]

Ministry of Finance (2016), *Climate Change Finance Tracking Tools : Manual for Ghana*, Ministry of Finance, Accra, https://www.mofep.gov.gh/sites/default/files/docs/Climate-Change-Tracking-Tool.pdf (accessed on 29 July 2019). [34]

Ministry of Finance (n.d.), *Budget Estimates*, Ministry of Finance, Accra, https://www.mofep.gov.gh/publications/budget-estimates (accessed on 29 July 2019). [33]

Ministry of Finance (n.d.), *Natural Resources, Environment and Climate Change (NREC) Unit | Ministry of Finance,* Accra, https://www.mofep.gov.gh/divisions/rsd/climate-change (accessed on 26 July 2019). [15]

Ministry Of Special Development Initiatives (2018), *One Village One Dam*, Ministry of Special Development Initiatives, Accra, https://www.msdi.gov.gh/projects/3 (accessed on 27 August 2019). [51]

MLGRD (2016), *District Assembly Performance Assessment Tool (DPAT) Operational Manual*, Ministry of Local Government and Rural Development (MLGRD), Accra, [36]

http://www.mlgrd.gov.gh/ctn-media/filer_public/b1/d2/b1d2f2c0-66fb-4f1a-9366-bfc169e49396/2018_dpat_operational_manual.pdf (accessed on 30 July 2019).

MLGRD (2012), *National Urban Policy Framework & Action Plan*, Ministry of Local Government and Rural Development (MLGRD), Accra. [57]

MOFA (2019), *Environmental and Social Management Plan (ESMP) for the Proposed Rehabilitation and Modernization of the Kpong Irrigation Scheme (KIS)*, Ministry of Food and Agriculture (MOFA), Accra, http://documents.worldbank.org/curated/en/107111560241758141/pdf/Environmental-and-Social-Management-Plan-for-the-Rehabilitation-and-Modernization-of-the-Kpong-Irrigation-Scheme.pdf (accessed on 27 August 2019). [52]

MOFA (2015), *National Climate-Smart Agriculture and Food Security Action Plan of Ghana*, Ministry of Food and Agriculture of Ghana (MOFA), Accra, https://ccafs.cgiar.org/publications/national-climate-smart-agriculture-and-food-security-action-plan-ghana-2016-2020#.Xm_0saj0nIU (accessed on 30 March 2020). [47]

MOFA (n.d.), *Planting for Food and Jobs (PFJ)*, Ministry of Food & Agriculture (MOFA), Accra, https://mofa.gov.gh/site/business/pfj (accessed on 1 October 2019). [54]

Murken, L. et al. (2019), *Climate Risk Analysis for Identifying and Weighing Adaptation Strategies in Ghana's Agricultural Sector*, Potsdam Institute for Climate Impact Research (PIK) , Potsdam, https://doi.org/10.2312/pik.2020.001. [2]

Musah-Surugu, I., A. Ahenkan and J. Bawole (2019), "Local Government Financing of Climate Change in Ghana: Politics of Aid and Central Government Dependency Syndrome", *Journal of Asian and African Studies*, Vol. 54/5, pp. 619-637, http://dx.doi.org/10.1177/0021909618812911. [59]

Musah-Surugu, J. et al. (2018), "Mainstreaming climate change into local governance: financing and budgetary compliance in selected local governments in Ghana", *Development in Practice*, Vol. 28/1, pp. 65-80, http://dx.doi.org/10.1080/09614524.2018.1398717. [60]

NADMO (2019), *Climate Change and Disaster Risk Reduction*, National Disaster Management Organization (NADMO) , Accra, http://nadmo.gov.gh/index.php/departments/58-climate-change (accessed on 14 May 2019). [14]

NADMO (2012), *Ghana National progress report on the implementation of the Hyogo Framework for Action (2011-2013)*, National Disaster Management Organization (NADMO) , Accra, http://www.preventionweb.net/english/countries/africa/gha/ (accessed on 4 September 2019). [35]

NADMO (2011), *Ghana Plan of Action on Disaster Risk Reduction and Climate Change Adaptation*, National Disaster Management Organisation (NADMO), Accra, http://nadmo.gov.gh/images/NADMO_documents/2015_documents/GHANA%20PLAN%20OF%20ACTION%20ON%20DRRCCA%202011-2015.pdf (accessed on 13 September 2019). [13]

NADMO (2010), *Ghana National Disaster Management Plan*, National Disaster Management Organisation of Ghana (NADMO), Accra, http://nadmo.gov.gh/images/NADMO_documents/2015_documents/Disaster%20Magt%20Plan.pdf (accessed on 21 July 2019). [8]

NADMO (n.d.), *About us - National Disaster Management Organisation (NADMO)*, National Disaster Management Organisation (NADMO), Accra, [10]

https://www.nadmo.gov.gh/index.php/about-us# (accessed on 26 July 2019).

Oppong Mensah, N. et al. (2018), "Agricultural Insurance in Ghana: An examination of Concepts, Structure and Challenges", *Advance Research Journal of Multi-Disciplinary Discoveries*, Vol. 28/1, http://www.journalresearchijf.com/wp-content/uploads/Agricultural-Insurance-in-Ghana-An-Examination-of-Concepts-Structure-and-Challenges-PP-01-08.pdf (accessed on 5 August 2019). [41]

RainWatch (n.d.), *Rain Watch Africa*, http://www.rainwatch-africa.org/ (accessed on 23 July 2019). [29]

Simoe, A. (2019), *The Observatory of Economic Complexity: Ghana*, https://atlas.media.mit.edu/en/profile/country/gha/ (accessed on 14 March 2019). [5]

UNCDF (n.d.), *UNCDF in Ghana - UN Capital Development Fund*, UN Capital Development Fund, New York, https://www.uncdf.org/ghana (accessed on 27 February 2020). [38]

UNDP (2016), *Advocacy and Capacity Building for Disaster Risk Reduction and Preparedness in Ghana Project*, UNDP, United Nations Development Programme (UNDP), New York, https://www.gh.undp.org/content/dam/ghana/docs/Doc/Susdev/DRM%20Training%20Manual_pdf.pdf (accessed on 7 August 2019). [28]

UNDP (2012), *Project Document: The Community Resilience through Early Warning*, UNDP, New York, https://www.undp.org/content/dam/ghana/docs/Doc/Susdev/UNDP_GH_SUSDEV_CREW_ProDoc_Final_All.pdf (accessed on 3 September 2019). [25]

UNDP (n.d.), *Community Resilience through Early Warning*, United Nations Development Programme (UNDP), New York, http://www.gh.undp.org/content/ghana/en/home/operations/projects/environment_and_energy/crew.html (accessed on 3 September 2019). [26]

World Bank (2019), *Ghana Signs Landmark Deal with World Bank to Cut Carbon Emissions and Reduce Deforestation*, The World Bank Group, Washington DC,, https://www.worldbank.org/en/news/press-release/2019/07/09/ghana-signs-landmark-deal-with-world-bank-to-cut-carbon-emissions-and-reduce-deforestation (accessed on 30 July 2019). [49]

World Bank (2017), *Enhancing urban resilience in the Greater Accra Metropolitan Area*, World Bank Group, Washington, D.C., http://documents.worldbank.org/curated/en/949241495793834492/Enhancing-urban-resilience-in-the-Greater-Accra-Metropolitan-Area (accessed on 30 March 2020). [56]

World Bank (2017), *Ghana: Agriculture Sector Policy Note - Transforming Agriculture for Economic Growth, Job Creation and Food Security*, The World Bank Group, Washington, DC, http://documents.worldbank.org/curated/en/336541505459269020/Ghana-Agriculture-sector-policy-note-transforming-agriculture-for-economic-growth-job-creation-and-food-security (accessed on 25 July 2019). [44]

World Bank (2015), *Rising through cities in Ghana: Urbanization review - overview report*, World Bank Group, Washington, D.C., http://documents.worldbank.org/curated/en/613251468182958526/Rising-through-cities-in-Ghana-urbanization-review-overview-report (accessed on 30 March 2020). [55]

World Bank (2013), *State-of-the-Art Flood Forecasting Model Launched for White Volta River in* [21]

Ghana, World Bank Group, Washington DC,, https://www.worldbank.org/en/news/feature/2013/10/21/state-of-the-art-flood-forecasting-model-launched-for-white-volta-river-in-ghana (accessed on 27 August 2019).

World Bank (2010), *Ghana - Economics of Adaptation to Climate Change*, The World Bank Group, Washington DC, https://openknowledge.worldbank.org/bitstream/handle/10986/13212/762420V10ESW0P00Box374367B00PUBLIC0.pdf?sequence=1&isAllowed=y (accessed on 25 July 2019). [45]

5. Approaches in Peru to increased coherence in climate change adaptation and disaster risk reduction

This chapter describes national approaches to policy development and implementation on climate change adaptation and disaster risk reduction in Peru. It outlines the policy context and governance arrangements for these two policy agendas, approaches to implementation of the policies, financing, and monitoring and evaluation, with a special focus on public finance. Drawing on these insights, the chapter offers recommendations for how efforts in the two policy communities by both the government and development co-operation can facilitate greater coherence in efforts to build resilience to climate and disaster risks.

Summary and ways forward

In light of its significant vulnerabilities, Peru considers disaster risk management (DRM)[10] and climate change adaptation (CCA) as a policy priority in its strategic orientation towards the country's sustainable development. Its Strategic Vision for 2050 includes building population resilience through the development of a prevention culture and an integrated national system for disaster risk management (CEPLAN, 2019[1]). The recent adoption of the Framework Law on Climate Change in 2018 highlights the national importance of CCA. The on-going development of Peru's National Adaptation Plan (NAP) has also started to engage representatives from government sectors and institutions working on CCA in light of the NAP's conceptual model that includes DRM as a key aspect.

This context creates an opportunity to align national and local efforts to strengthen resilience to climate-related risks, making the best use of data and information, financial resources and institutional capabilities. Coherent and mutually reinforcing policies for DRM and CCA will be more efficient and effective than addressing these topics in isolation. Although the need for closer integration is widely recognised, in practice there is scope for improvement to fully benefit from the potential synergies between the two policy areas.

Ways forward to enhance coherence in CCA and DRM in Peru

Peru has stepped up its policy instruments for DRM and CCA in recent years, and invested significantly to develop legislation, institutions, budget tools and implementation processes to strengthen its climate resilience. After six years of implementation, the National System for Disaster Risk Management (SINAGERD) is under review for improvement and the recent climate change law provides new momentum for adaptation. While efforts are made to align policy approaches, there is a clear margin of progress to further develop synergies between these two agendas, avoid redundancies and benefit from opportunities.

Both PCM and MINAM have indicated their willingness to better link their policy approaches, notably through: (1) the ongoing development process of the implementation decree of the climate change law and (2) the update of the National DRM Plan after 2021. These processes could further enhance coherence between DRM and CCA. Furthermore, the emphasis on territorial development with the future creation of a dedicated Office for risk management and territorial planning in PCM could be a good opportunity to elevate the two topics and their key linkage with local development planning

The priority should be on local-level policy implementation, as significant capacity and implementation gaps are challenging the proper strengthening of Peru's climate resilience on the ground. It is particularly important to align the incentive structure and foster capacity development so that local governments and communities can further engage in resilience. To achieve this objective, ways forward include:

- Use the opportunities of the on-going development of the new policy and plan on DRM, the creation of the by-laws of the climate change law and the creation of a new policy on territorial development to foster horizontal and vertical co-ordination between these two agendas.
- Make use of the new Climate Change Law to call for a review of local-level plans on climate action, developing similar instruments at the municipal level, as well as integrating climate change in the local planning, investment projects and budget. Such review processes may offer ways to enhance synergies in and learn lessons from existing DRM and CCA processes. For instance, a guideline for municipalities on integrating DRM and CCA in planning and budget process could be jointly designed by CENEPRED and MINAM, instead of having separated approaches

[10] Disaster risk management (DRM) is used in this chapter rather than disaster risk reduction (DRR) used in Part I since DRM is better aligned with the terminology used in relevant policy documents in Peru as demonstrated by the National Disaster Risk Management System (SINAGERD).

- Leverage the on-going NAP process led by MINAM in collaboration with other government agencies and key sectors to strengthen coherence between the ministry's adaptation work and broader sustainable development agendas including DRM.
- Increase collaboration between MINAM and PCM, the two lead institutions on climate change and DRM, so that visions, priorities, information, financing and monitoring tools can be aligned and redundancies avoided.
- Further develop linkages between risk assessment processes and information systems: CENEPRED, SENAMIH and ANA together with other technical institutions should adopt common definition standards for climate risk information and analysis, and make sure their information systems are fully interoperable. Existing guidelines for risk assessment should also incorporate climate change.
- Develop guidelines on how to integrate DRM in a context of climate change in public investments across the various sectors so that the public investment system invierte.pe contributes to climate resilience. The model of the health sector could be utilised by others in this respect.
- Take the opportunities of climate financing to mobilise additional resources for climate change adaptation and support implementation of the Climate Change Framework Law.
- Learn lessons from the difficulties to integrate DRM and CCA in the post El Niño reconstruction process with the process of the Authority for Reconstruction with Changes so that Build Back Better processes contribute best to climate resilience.

Peru profile

Climate change and risks

Peru is highly exposed to disaster risks caused by natural hazards. In 2017, it was one of 10 most affected countries by those disasters worldwide in terms of economic damages, estimated at USD 3.2 billion (EM-DAT, 2018[2]). This was mainly due to the extreme weather events influenced by the El Niño climate phenomena, which affected 1.7 million people (see Box 5.1). According to national statistics, 50 000 disasters impacted Peru between 2003 and 2015, causing 2 125 deaths and affecting more than 12 million people (PCM, 2019[3]). Beyond their impacts on human lives, public health and livelihoods, these events damaged and destroyed housing, infrastructure and agriculture, with consequences in most economic sectors. In this period, hydro-meteorological hazards have triggered 57% of emergencies at the national level. Heavy rainfalls, high winds, low temperatures and floods have affected all regions, from its densely populated coastal areas, to isolated communities in the Andean mountainous regions, or in the tropical forest. This high percentage demonstrates the importance of climate-related risks in Peru, in addition to the geological hazards that can affect this earthquake-prone country.

Peru's significant exposure to natural hazards is exacerbated by physical and socio-economic vulnerabilities. These range from inadequate asset protection, poor design and construction of buildings, rapid urbanization and building in risk prone areas, deforestation and land degradation among others. Taken together, this makes disaster risk management a pressing issue for the sustainable development of the country.

Climate change is exacerbating these large exposures and vulnerabilities to natural hazards, as it affects their magnitude, frequency and duration. Precipitation is projected to increase on average in the coastal areas and in the northern mountains, which are flood prone. According to the Peruvian Hydro-Meteorological Service SENAMHI, average temperature will increase between two and three degrees by the end of the century for emission scenarios RCP4.5 and RCP8.5 (SENAMHI, 2014[4]). Such a temperature increase will lead to more intense heatwaves and droughts, with impacts on public health and agriculture, as well as to a larger prevalence of tropical diseases.

Beyond its impact on extreme events, slow onset changes due to climate change are also critical to consider for their potential consequences on disaster risks, in addition to other losses and damages, as well as severe distortions. Glacier melt is accelerating rapidly in Peru, which concentrates 71% of the world's tropical glacier, representing one of the main water resources for the country (MINAM, 2016[5]). This could also have consequences on the risk of floods and increase the risk of the glacier's lake outburst. Sea level rise is increasing risks for the urban coastal populations (58% of the country population lives along the coast). Biodiversity losses and increased desertification will negatively affect ecosystems, which in turn will increase societal vulnerabilities. With a projected adverse impact on economic growth of 6.8% by 2030 compared to a baseline growth scenario, and many sectors of the economy at risk, climate change has the potential to affect overall the economic and social resilience of the country to disaster risks, which demonstrates the importance of tackling these two policy issues with a coherent approach.

Objective and outline

The objective of this case study on Peru is to present its national and sub-national approaches to policy development and implementation on climate change adaptation and disaster risk reduction in the country. The section also explores the extent to which they build resilience to climate-related risks by leveraging coherent and mutually reinforcing approaches. Drawing on these insights, the section offers some ways forward on how efforts in the two policy communities by both national government officials and development co-operation partners can facilitate greater coherence in strengthening resilience to climate-related risks, building on current efforts.

This case study first outlines the policy context and governance arrangements for climate change adaptation (CCA) and disaster risk management (DRM) in Peru, approaches to implementation, financing and monitoring and evaluation. The case study also has a dedicated discussion to the country's approach to public finance for CCA and DRM. Finally, the case study outlines the role of developing co-operation in supporting domestic efforts to manage climate risks and build resilience.

Box 5.1. Impact of El Niño Costero Phenomenon in 2017 on the health sector

In 2017, the impact of the El Niño Southern Oscillation (ENSO) was particularly severe for Peru. Occurring on average every four years, this climatic phenomenon usually causes increased rainfall associated with extreme events on the Peruvian coastal areas. Between January and April 2017, more than 1.7 million people were affected by this event, with the greatest impact in the northern region of the country. While there is not a definitive figure of the total damages, some estimates to damages to infrastructure and housing equalled USD 4 billion.

The 2017 El Niño event was also revealing possible consequences on public health that disasters can have in Peru, as it increased the prevalence of infectious diseases in the country and also significantly damaged health infrastructure. As a result of the rains, infectious diseases started to spread in the country, including dengue fever, chikungunya, zika and leptospirosis. In particular, a high transmission of cases of dengue was reported mainly in the regions of Piura, Ica, La Libertad and Lambayeque. According to the Ministry of Health, 64,777 cases of dengue were reported in all of Peru, which is a threefold increase compared to the same period in 2016. In this same period, 56 people died of dengue fever.

This was intensified by the fact that 937 health facilities were impacted by the floods. Among them, 61 collapsed, affecting the capacity of health services to respond to the increasing demands due to the emergency, as well as to the longer term need for health services in the region due to the long reconstruction process. This demonstrates the importance of building safe and resilient health infrastructure to reduce the public health consequences of disasters.

Source: (Chávez Cresta, Burbano and Villalobos, 2018[6]).

National approaches to CCA and DRM

Governance arrangements and policy frameworks for CCA and DRM

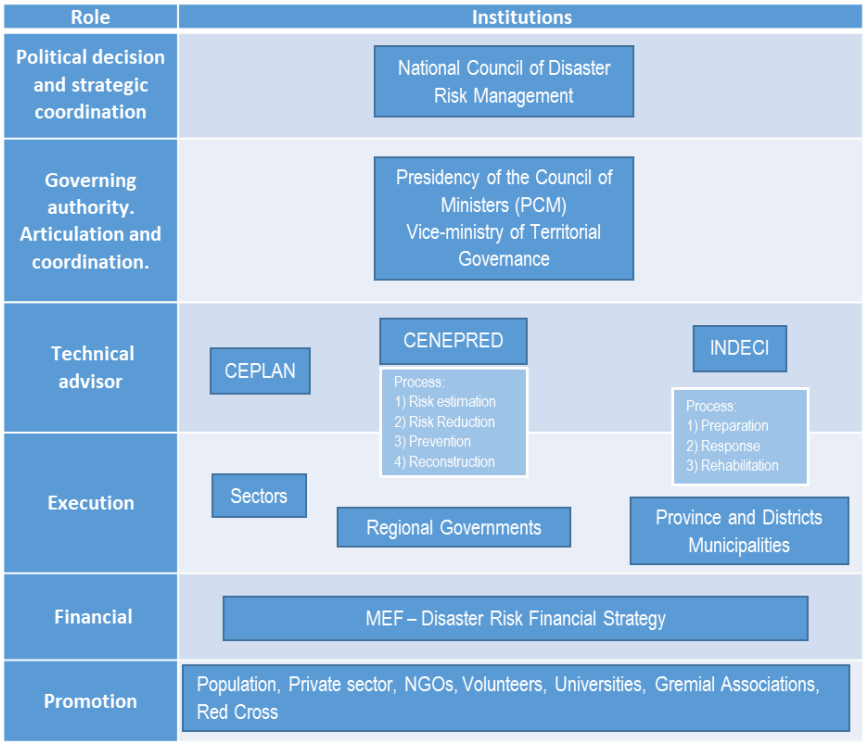
In light of its significant vulnerabilities to extreme hydro-meteorological events now and in the future, Peru has developed governance arrangements and ambitious policies for both DRM and CCA. The mature DRM policy presents a set of regulations, co-ordination mechanisms, budgetary and financial toosl. Despite considerable progress already made, the focus on climate change adaptation is more recent, with the adoption of the Framework Law on Climate Change in 2018. While both approaches have made mainstreaming a priority, there is an opportunity to better align those two policy domains and to strengthen coherence and co-ordination in the future.

Governance arrangement

Regarding the governance arrangement for DRM at the national level, in 2012, Peru established the National Disaster Risk Management System (SINAGERD), which governs nationwide efforts to strengthen resilience against disaster risks. With the overall objective to reduce the vulnerability of populations and livelihoods to disaster risks, SINAGERD co-ordinates the efforts for DRM of all three levels of government (national, regional and local). The overall co-ordination is ensured by the Centre of Government, the Presidency of the Council of Minister (PCM), through the Deputy Ministry of Territorial Governance and the National DRM Council chaired by the President (see Figure 5.1). This is a clear signal of the country's political commitment towards DRM as well as the intention of achieving a whole-of-government engagement in the area.

SINARGERD is supported by two dedicated institutions, the National Centre for Disaster Risk Estimation, Prevention and Reduction, CENEPRED and the Civil Defence Institute, INDECI which supports national efforts respectively in prevention or corrective management for the former and emergency preparedness and response activities or reactive management for the latter. The Ministry of Economy and Finance is tasked with the disaster risk financing strategy and the National Centre for Strategic Planning CEPLAN to support the incorporation of DRM in planning at the national, regional and local levels. This institutional framework covers the entire risk management cycle with clear roles and responsibilities assigned to the main stakeholders, although some redundancies exist for instance between INDECI and CENEPRED, and the need to better articulate the functions of these two institutions is clear to many stakeholders in Peru.

Figure 5.1. Articulation and co-ordination between entities in SINAGERD (Law 29664)



Source: Adopted from (PCM, 2018[7])

Local governments have key responsibilities in both DRM and CCA legal frameworks, reflecting the multi-level governance system of the country and its strong regulatory framework (Table 5.1). The on-going implementation of PLANAGERD reveals how gaps in local capacities and limited levels of vertical co-ordination are impeding progress in this area. These challenges are also exacerbated by the unfinished decentralisation process (OECD, 2016[8]).

Table 5.1. Main regional and local government responsibilities according to SINAGERD and Framework Law on Climate Change

Responsibility	Disaster Risk Management SINAGERD law N° 29 664 and its by-law	Framework Law on Climate Change N° 30 754
Policy management	• Design, management, implementation and monitoring of disaster risk management related plans and processes, such as disaster risk reduction plans, contingencies plans, prevention plans.	• Implementation of national public policies in CC. • Design, implementation and monitoring of regional strategies in CC.
Harmonization and articulation with other plans	• Articulation between territorial planning and the National Policy in DRM.	• Incorporate adaptation measures in their Territorial, Regional and Local Development Plans, Strategic Institutional Plan, Operative Institutional Plan, Budget Programs and investment tools.
Reporting to	• Presidency of Council of Ministries (PCM),	• Ministry of Environment (MINAM).
Production of technical and scientific information	• Production of technical and scientific information regarding risk and vulnerabilities in their territories. • Integration of the produced information into SIGRID (the DRM Information System).	• Promotion of the development of comprehensive vulnerability and adaptation studies for the identification of vulnerable zones, • Promotion of scientific research and technological development for adaptation to CC, considering indigenous traditional knowledge.
Creation of technical offices	• Municipal Civil Defence Office	• Designate a focal point on climate change (usually in Municipal Environmental Office)
Co-ordination mechanisms	• Creation of DRM Working Groups	• Creation of Working Groups to develop regional strategies in CC integrating public, private and civil society actors.

Source: Author's elaboration based on (PCM, 2018[7]) and (MINAM, 2019[9]).

SINAGERD requires regional and local governments to develop DRM plans and to integrate DRM in their local planning and budget processes. The prevention focus of PLANAGERD 2014-2021 has translated into regulations mandating all the local governments to develop Disaster Risk Prevention and Reduction Plans (*Plan de Prevencion y Reduccion de Riesgo de Desastre - PPRRD*). In addition, both the local Concerted Development Plan (*Plan de Desarollo Concertado*) and Budget (*Plan Presupestal*) need to incorporate DRM as well. CENEPRED provides guidelines and trainings for the development of these plans to the local governments and the budget programme 0068 can incentivise their development by local governments.

Despite this well-designed scheme to foster local DRM implementation, there is still a large number of municipalities in Peru which have not yet developed such local plans, and where plans have been developed, their quality varies. Over the last few years, local governments made progress to establish Working Groups on Disaster Risk Management across the country – 72% of municipalities had established such groups in 2016 (INEI, 2016[10]) – but CENEPRED reports that in 2017, out of the 1869 municipalities, only 70 had indicated having PPRRD in place, 665 did not, while the others did not respond (CENEPRED, 2017[11]). Furthermore, even fewer municipalities have integrated DRM in their Concerted Development Plans and in their budgets. This demonstrates that municipalities in Peru are just starting to incorporate the prevention focus of SINAGERD. On the contrary, on the reactive side, a larger number have developed contingency and emergency response plans. While guidance and incentive mechanisms are good tools to support local policy implementation, the lack of stronger enforcement mechanisms, as well as significant local capacity gaps are major issues to mainstream further DRM in Peru at the local level (see further discussion below). This is also revealing the low political priority given to DRM at the local level.

Table 5.2. Entities with prevention and disaster risk reduction plans in Peru

Type of entity	Entities with Disaster prevention and risk reduction plans				Total entities
	Yes	No	Did not respond	Did not participate	
Regional government	8	13	4	0	25
Municipalities	70	665	497	637	1869
Total	78	678	501	637	1894

Source: Adopted from (CENEPRED, 2017[11])

Regarding climate change adaptation, the regional level has been a preferred scale for action up until now. According to MINAM, 23 out of the 25 regions of the country have advanced on the development of regional climate change strategies and their implementation plans in recent years. MINAM supports the development of these regional strategies through guidance and advisory services. The new Climate Change Law will call for a review of these plans, developing similar instruments at the municipal level, as well as integrating climate change in the local planning, investment projects and budget. However, there could be ways to find synergies and learn lessons from both existing DRM and CCA processes to facilitate the local uptake of these two policies.

Given the large number of guidance documents and insufficient capacities at the local level in applying them, creating linkages between the various instruments at the right scales would be particularly relevant. For instance, a guideline for municipalities on integrating DRM and CCA in planning and budget process could be jointly designed by CENEPRED and MINAM, instead of having separated approaches. On non-DRM related topics of CCA, the regional scale appears as a preferred level of action compared to the municipal level, at least in a first approach, given the good results obtained for the regional strategies. The guidelines under development by MINAM for the regional governments are an opportunity to better integrate DRM in these regional strategies. In doing so, the new momentum on climate change adaptation could serve as a way to strengthen DRM implementation at the local level, and CCA implementation would benefit from instruments that are becoming more largely utilised for DRM.

Beyond government, engaging the civil society and the private sector in DRM and CCA is essential to foster a whole-of-society effort towards climate resilience. In Peru, this need for an open and inclusive approach to policy-making and implementation is well recognised by the main co-ordinators of PCM and MINAM. Most stakeholders of the national government indicated that public awareness on climate risks was amongst the first priorities to develop a culture of prevention and facilitate behaviour changes towards resilience.

Regarding policy-making, an extensive consultation process led to the development of the climate change adaptation policy, through the "*Dialoguemos*" that is a participatory space of MINAM. More than 2000 people from civil society, indigenous communities, academia, youth and the private sector contributed to this process, during the development of the Climate Change Law and the NDC, among others (MINAM, 2019[9]).

This good practice in CCA could inspire the development of the next plan of action for Disaster Risk Management. While there is no dedicated multi-stakeholder group on DRM, PCM has organised national dialogues on DRM in the context of the National Roundtable on Poverty Reduction, which conveys national unions, women's organisations, federations of businesses and development cooperation partners, among others. This is promising for the development of the future plan of action, to ensure that all voices are heard in the development of this priority policy. Making sure that those platforms address both DRM and CCA during these multi stakeholder dialogues would be a good way to identify synergies in a bottom-up approach early on in the policy development process.

In addition to consultations, key policies on CCA and DRM recognise increasing awareness of climate risks among stakeholders as one of their strategic lines of actions. For instance, PLANAGERD strategic

objective 6 promotes strengthening population and civil society participation for the development of a prevention culture and the climate change law makes also ample references to societal engagement, including with the private sector. In practice, however, there are limited examples of actions where NGOs and the private sector are engaged as partners for climate resilience. Local NGOs, such as "*Soluciones Practicas*" met during the mission work on DRM projects with communities and development cooperation partners. But, except some insurance services in the agriculture sector developed in partnership between the Ministry of Agriculture and private insurers, there are no real incentives or partnerships in place for the private sector to engage in climate resilience efforts. The new climate change law should offer an opportunity to strengthen economic resilience and climate finance.

Box 5.2. "Dialoguemos" participatory space

To foster multi-stakeholder participation and inclusion in climate change policy-making, the Ministry of the Peruvian Ministry of the Environment MINAM created a specific participatory process named "Dialoguemos". More than 2000 people from the civil society, indigenous communities, academia, youth organisations and private sector were convened to discuss the development of the Peruvian NDC, the by-laws of the climate change framework law or other topics of interest. With various formats from large forums to working groups or high-level dialogues, this participatory process was much welcome by the participants and civil society organisations. MINAM prepared specific didactic documents to foster a good understanding of the issues in discussion and shares the results of these dialogues in its website. Dialoguemos is a good practice of open government favouring inclusiveness and transparency in policy-making, and responds well to the participatory approach called for on the Framework Climate Change law. According to participants, the organisation, format and information provided were instrumental to support a meaningful exchange of opinions and hear the voices that are not always heard in policy-making.

Source: Based on interview during fact-finding mission (2019), MINAM brochure on NDC (2019) http://www.minam.gob.pe/cambioclimatico/wp-content/uploads/sites/127/2019/01/Memoria-de-Dialoguemos-sobre-las-NDC.pdf, MINAM website http://www.minam.gob.pe/cambioclimatico/dialoguemos/ (consulted 20 July 2019).

Policy context

With a comprehensive, decentralised and multi-sectoral approach, the National Policy for Disaster Risk Management represented a shift from emergency response towards integrating resilience to disasters in the development process of the country, with a focus on prevention. SINAGERD is supported by a strong regulatory framework, as the National Policy for DRM is of mandatory compliance for all public entities, and is one of the 35 national policies of Peru National Agreement, which reorganised the structure of the government in 2002.

The 7-year National Plan for Disaster Risk Management 2014-2021 (PLANAGERD) delineates priority actions for all the public entities around six strategic objectives: risk knowledge, risk reduction, risk culture, emergency preparedness, recovery/reconstruction and capacity-building, which are well aligned with the Sendai Framework.

Regarding CCA, the adoption of the Framework Law on Climate Change (*Ley Marco sobre Cambio Climatico*) in 2018 provides momentum for ambitious action on CCA. This law demonstrates important political support to advance the adaptation agenda, making it mandatory for all levels of government to incorporate climate change into development planning, as it is for disaster risk management. In addition, the law recognises the importance of climate-related risks. As the national authority for implementation, the Ministry of the Environment – *Ministerio del Ambiente* MINAM - is developing by-laws, to complement

this legal instrument with relevant policy tools for effective implementation as of 2019. The law also established the High Level Commission on Climate Change, chaired by PCM and composed by all Ministers, which provides a good opportunity for co-ordination with DRM.

MINAM also led the development of a large multi-sectoral process to develop the National Determined Contribution (NDC), which highlights not only mitigation but also adaptation. Among the climate change adaptation measures prioritised nationwide, 25% of them are related to DRM. As the momentum on CCA is more recent than DRM, it would be important to build on what already exists and avoid duplication.

Nonetheless, there still exist greater opportunities for PCM and MINAM to work on DRM and CCA in a more coherent manner to maximise synergies between the two policy agendas. As of the middle of 2019, PCM had not participated in the multi-sectoral working group for the development of the NDC. Similarly, climate change is not amongst the priorities of PLANAGERD 2014-2021, even though it is mentioned as one of the risk factors for Peru. However, both PCM and MINAM have indicated their willingness to better connect their policy approaches, notably through: (1) the ongoing development process of the implementation decree of the climate change law and (2) the update of the National DRM Plan after 2021. These processes could further enhance coherence between DRM and CCA. Furthermore, the emphasis on territorial development with the future creation of a dedicated Office for risk management and territorial planning in PCM could be a good opportunity to elevate the two topics and their key linkage with local development planning.

Most sectors that met for this case study indicated a great level of awareness and technical understanding of the importance of both DRM and CCA. Ministries and agencies in charge of Water, Health, Agriculture, Housing and Public Works, for instance, are all members of the SINAGERD, and contributed to the development of the section on CCA of Peru's NDC. According to SINAGERD, all sectors are responsible for promoting, implementing, articulating and monitoring DRM within their areas of competencies and jurisdictions. Similarly, the Climate Change Law promotes a whole-of-government approach to climate change adaptation.

The large planning process governing the activities of sectorial ministries is used as an opportunity to integrate DRM across these various sectors, and a similar process could be set up for climate change adaptation as well. The National Center for Strategic Planning (CEPLAN) provides guidelines for the integration of DRM in the Institutional Strategic Plan and Operational Strategic Plan (CEPLAN, 2019[12]) that all public entities must develop. CENEPRED provides more detailed guides for the development of sectoral plans on Disaster Risk Management (CENEPRED, 2016[13]). Despite this regulation, an evaluation of PLANAGERD conducted by CENEPRED in 2017 indicated that only a few of the sectors had developed such plans in practice (CENEPRED, 2017[11]). This implementation gap raises concerns on the effectiveness of such large mandatory planning process to mainstream DRM in sectoral planning.

DRM mainstreaming across sectors is also facilitated in Peru through the budget process. As many OECD countries, Peru has developed a result-based budgetary process, which has a dedicated budget line for "Vulnerability Reduction and Disaster Response", called budget programme 0068 (PCM, 2019[3]). This programme, co-ordinated by PCM together with the Ministry of Economy and Finance (MEF), is a multi-sectoral program that aims to finance DRM activities across sectors and levels of governments, with objectives aligned to those of PLANAGERD. This integrated budget programme is considered by most of the stakeholders as a useful tool to integrate different sectoral initiatives under a common, concrete and measurable framework. PCM is tasked with the priority-setting and monitoring of this budget programme, which reinforces its co-ordination role on DRM with all the different sectors. As implementing the climate change adaptation policy will require financial resources, there would be benefits from learning lessons or seeking synergies with this programme 0068 in the future.

Engaging sectors in a co-ordinated CCA process is more recent. In 2018, the development of Peru's NDC, a key contribution to the Paris Agreement, was used strategically by MINAM to foster multi-stakeholder engagement and strengthen its co-ordination role in CCA. 13 ministries have been working together to

identify five key thematic areas for adaptation (agriculture, forests, water, health and fisheries and aquaculture), and 91 specific measures. The quality of this inter-ministerial process was underlined by all the Ministries and therefore enabled the strengthening of co-ordination between sectors on CCA, and the consolidation of MINAM's leadership. Going forward, MINAM's added value in facilitating access to financial resources for the implementation of these measures will be essential to maintaining the momentum (see below). The on-going development of Peru's National Adaptation Plan (NAP) has also started to engage representatives from government sectors and institutions working on CCA in light of the NAP's conceptual model that includes DRM as a key aspect (MINAM, 2019[14]).

In the NDC, 25% of the measures are related to Disaster Risk Management, which demonstrates the potential for synergies between the two agendas. As indicated earlier, PCM has not participated in their design. Nevertheless, some of the sectors have already developed integrated approaches to CCA and DRM, such as in the agriculture sector with the Plan on Risk Management and Climate Change Adaptation 2012 – 2021 or in the water sector with the National Strategy on water resources which has a dedicated pillar on Climate Change Adaptation and Extreme events.

Many stakeholders highlighted the importance of these initiatives in the integration of both the DRM and the CCA agendas, despite some differences in their dynamics. The co-ordination of DRM actions is led by the Centre of Government, which reflects a high-level political commitment to advance this agenda. The co-ordination of CCA is carried on by a line ministry (MINAM), which might generate greater challenges to influence the CCA agenda across government.

Data and information

Understanding climate-related risks in terms of their likelihood and potential impacts is essential to define the priorities of a DRM and CCA policy at the national level and to design resilience measures at the local level. Peru has good scientific and technical capacities for climate risk assessment, and has seen significant progress in this domain in recent years. In Peru, capacities of scientific and technical institutions to monitor, collect and analyse climate-related risks are well advanced at the national level. The hydro-meteorological service SENAMIH has a large monitoring network, historic databases with information related to meteorological events and capabilities to make tailored products supporting risk analysis. The National Water Agency (ANA) also collects hydrological information from the River Basin Organisations, and the National Institute of Civil Defence (INDECI) has a database on disasters impacts and losses. Furthermore, Peru can count on other specialised agencies, such as the National Glacier and Mountain Ecosystem Institute (INAIGEM), the Sea Institute (SIMARPE), the Mining and Metallurgical Geological Institute (INGEMMET) and the Peruvian Geophysical Institute (IGP). Such collaboration can benefit the government's effort to collect complementary information for hazard analysis. The National Statistical Institute and the National Planning Commission could also further provide data and information on exposure and vulnerability.

CENEPRED, the main technical arm of the country for risk assessment, has produced a state-of-the-art methodology for risk assessment compiling all this wealth of information to produce a risk index. This methodology is based on a matrix combining hazard, exposure and vulnerability analysis (CENEPRED, 2014[15]).The mapping of this index at the national and territorial levels allows to characterise risk zones with four levels of risks (i.e. low, medium, high or very high). CENEPRED's technical guidelines and its advisory services, as well as the financing from the Budget programme PP0068 for risk analysis, support the implementation of this risk assessment programme from the national to the local levels, aligned with Objective 1 of PLANAGERD to improve risk knowledge. For instance, CENEPRED has elaborated 162 risk assessments for the risk of El Niño Costero in 2018. There are also some other agencies responsible for risk assessments. For example, ANA has mapped the critical points for flooding nationwide, although this mapping exercise dates back to 2008 and appears now outdated given the rapid urban development in the last decade.

Regarding climate change, in 2012-2013, SENAMHI produced climate scenarios for 2030-2050 for the Third National Communication to UNFCCC, at the national level and in selected regions and river basins, and is enhancing its climate modelling capabilities. Using IPCC reference scenarios, these downscaled climate projections of the main meteorological variables are very useful for adaptation policies, as well as for DRM. If this analysis made an interesting focus on public health impacts of climate change, they have not included a dedicated analysis on extreme events. Furthermore, the integration of climate change in hazard, exposure and vulnerability analysis is not taken into consideration in CENEPRED guidelines and products. This is an area to be improved for the future, with a potential for synergies between DRM and CCA, which could build on the on-going strengthening of SENAMIH's capacities, supported by PP 0068 and development co-operation. In this respect, it will be important to build consensus on the main definitions of vulnerability and exposure, which can differ between MINAM and CENEPRED. Reaching a common understanding would be particularly useful for synergies to be effective.

Developing partnerships for user-driven climate services has also been a priority in Peru's approaches to enhancing climate data and information. Aligned with Peru open data policy, risk-related data sets and information are made available on web-based information platforms, in order to facilitate access and dissemination and support decision-making. According to SINAGERD law, all the information produced by regional and local governments must be systematised in the Disaster Risk Management Information System (SIGRID), managed by CENEPRED. With an interactive geospatial map, SIGRID integrates all disaster related information. Similarly, SENAMHI is developing an interactive open-source web-platform that allows dissemination of climate information to decision-makers and the population - the Spatial Data Infrastructure (IDESE) - developed in the context of the Global Framework for Climate Services of the World Meteorological Organization (WMO).

Despite the availability of data and information, many local governments have not yet undertaken their risk assessment. While hazard information is largely available, information on exposure and vulnerability is less accessible, and the well-elaborated risk assessment methodology can be too complex for many local governments with limited capacities to use.

The multiplicity of information platforms to disseminate data and information can also create confusion, as these are not always using the same formats and standards. For instance, while the abovementioned platforms (SIGRID and IDESE) are proven to be useful, they are not layered with each other.

Peru has all the technical ingredients and capacities to better develop climate risk information tailored to the needs of decision-makers from the national to the local levels, from the different sectors. There is, however, potential for more a joined-up approach to best leverage this expertise, finalise the coverage of the territory and further promote user-driven services for climate resilience. Specifically, the country would benefit from further efforts to develop synergies between its technical institutions. In particular, enhanced co-ordination between CENEPRED, SENAMIH and ANA in provision and dissemination of climate services should be a priority for the next PLANAGERD and can be a good example of DRM and CCA coherence.

One approach to enhancing such a synergy would be to develop common standards and approaches, so that information systems and associated risk analysis are fully interoperable. There are already emerging good practices in such technical co-operation. The Technical Committee on early warning systems meets regularly to define a common approach to warning citizens for disaster risks. Similarly, the National Multi-sectoral Commission on the Study of El Niño (EFEN) also meets regularly to assess the strength of El Niño season. SENAMHI's project to support climate change management is a good example, as it will lead to updates of the climate scenario and its impact on public health and water availability with MINSA and ANA.

Table 5.3. Main risk data and information system in Peru

Institution	Main risk data and information	Information system
CENEPRED	Disaster risk analysis Risk scenarios	Integrated disaster risk management system SIGRID
INDECI	Data and information on disaster occurrence and damages	National Information System for Response and Rehabilitation - SINPAD
SENAMHI	Hydro-meteorological hazards database Climate scenarios	Spatial data infrastructure portal IDEP
ANA	Identification of flood critical points Flood extension maps	Official water information system - SOFIA

Source: Author's own

Implementing measures

Once risks are properly assessed, there are a range of measures governments can implement to address existing and future exposure and vulnerabilities to climate-related risks. In Peru, these measures are more advanced on DRM, given the now well-established SINAGERD. However, the on-going development of CCA measures, the modernised public investment programme and the focus on nature-based solutions and territorial development provide opportunities for increased synergies.

Resilient territorial and urban planning a priority for the future

Land-use and territorial planning are a fundamental element to build climate resilience in practice beyond the specific DRM and CCA measures. In the context of the rapid urban development taking place in Peru, avoiding construction in risk-prone areas is a major challenge. As in many OECD countries, territorial planning is a key responsibility of local governments. While both CCA and DRM legal frameworks call for the integration of climate resilience in the municipal concerted development plans, there is still limited implementation of these provisions: according to CENEPRED, only 3.52% of municipalities have integrated DRM into their development plans in 2017 following the specific guidelines for municipalities (CENEPRED, 2017[11]). Despite the on-going efforts supported by CENEPRED, many stakeholders consider the lack of precise risk information at the right scale for urban and territorial planning to be a key reason for this low rate. In addition, the absence of enforcement mechanisms combined with the lack of political support are also key to understanding why limited progress has been achieved so far.

The most powerful existing instrument in Peru is on resettlement for risk prone areas. The specific law on "population relocation in very high and non-mitigatable risk zones" N° 29869 provides the legal framework for resettlement. Local governments should develop a resettlement plan in these zones after a detailed technical analysis supervised by CENEPRED. The plans need to be approved by the Ministry of Housing, Public Works and Sanitation. While this legal instrument has been reinforced after El Niño Costero in 2017, there is limited evidence on the size of these resettlement processes in the country.

Several complementary instruments exist at the national level to support a climate resilient territorial and urban planning. However, different sectoral ministries and levels of governments manage these instruments (some examples are outlined below). This creates gaps in policy coherence and reduces their effectiveness in practice.

- First, the public investment system also applies to local governments, and has requirements on DRM and CCA that must be applied to access to public funds.
- Second, MINAM supports the development of environmental and economic zoning of the country at the regional level to guide sustainable development. 15 out of the 24 regions of the country have developed this zoning under MINAM guidance, which covers 52% of the national territory. Zoning is just a guiding instrument without a real enforcement mechanism.

- Third, the National Water Agency (ANA) has identified, mapped and delineated with watermarks buffer zones along the main water resources of the country, and regulates settlements within these risk-prone areas.

In this context, the national government recently decided to strengthen its territorial planning policy, by creating a new undersecretary within PCM dedicated to territorial planning. This would be a good opportunity to strengthen multi-sectoral co-ordination and better link territorial planning with DRM and CCA.

The lack of co-ordination between central and national governments and the mismatch of responsibilities between sectors make it particularly complex to operationalise in land-use and territorial planning policies (OECD, 2016[16]). Better articulating the various existing instruments with clear objectives and standards on DRM and CCA, would greatly help improve climate resilience in Peru. The on-going update of the national cadastral information financed through PP 0068 will provide the necessary basic information for this purpose.

The potential of nature-based solutions for increased synergies between DRM and CCA

Nature-based solutions, which involve working with nature to enhance ecosystem services (such as the flood retention capacity of forests), can provide effective ways to increase resilience and appear as an area of convergence between CCA and DRM in Peru. As one of the most ecologically diverse countries in the world, Peru can therefore benefit from their rich natural heritage in addressing climate resilience challenges. Measures such as the reforestation of upper water catchment and riverine flood control through the development of riparian buffers or wetlands can provide cost effective and multi-beneficial complements or alternatives to traditional grey infrastructures. The flexibility and greater adaptation capability to change is also a strong argument to favour these types of solutions.

In order to promote the use of those measures, MINAM, as the lead ministry supporting nature-based solutions, has been particularly attentive to their incorporation into CCA and DRM policy instruments. There is specific reference to the use of nature-based solutions in the NDC across the various sectors, which provides a good basis for further implementation of such measures.

PCM also recognises that this area would be a major domain for co-operation with MINAM, and has adopted a specific DRM-related budget line to nature-based solutions. Similarly, MINAM has co-operated with the MEF so that the public investment programme *invierte.pe* recognises the importance of nature-based solutions to achieve greater social benefits, and the multipurpose nature of these green solutions was a good fit with promotion of multipurpose approaches under *invierte.pe*. According to the MEF project bank, between 2015 and 2018, public investment projects in nature-based solutions reached USD 300 million in Peru in 209 projects. MINAM guidelines on Public investment in biodiversity and ecosystem services proved to be particularly useful to foster the development of those projects. The upcoming PLANAGERD should also ideally further promote these types of approaches as a domain for important synergies with CCA.

Post-disaster reconstruction, an opportunity to reinforce climate resilience

In the aftermath of disasters, the reconstruction process, if properly conducted, can provide an important opportunity to strengthen resilience, commonly known as “Build Back Better” that is also reflected in the Sendai Framework. Peru provides an interesting example of such an approach as it created in 2017 the Authority for Reconstruction with Changes (ARRC) to implement a resilient reconstruction process in the aftermath of the damaging 2017 El Niño costero. Created as an autonomous authority under PCM to implement comprehensive reconstruction plans in the 13 regions affected by this climate-related disaster, ARRC was allocated a specific – and significant - budget of USD 7.8 billion to rebuild public infrastructure and housing as well as to finance risk mitigation measures. The reconstruction plan identified more than 12 000 interventions, 73% corresponding to the reconstruction of infrastructure, 21% to disaster risk

prevention and 4% for housing (PCM, 2019[17]). This represents a significant amount of investment in prevention overall, which was mostly used to implement comprehensive flood control projects in 19 coastal rivers.

Despite the adoption of the process, implementation gaps have so far limited this positive impact on resilience. Time delays, political pressures and capacity gaps have not allowed a comprehensive analysis of where and how to rebuild in a more resilient way. The identification of very high and non-mitigatable risk zones was particularly difficult given the impact it would have on population having to move to new neighbourhoods. The disbursement has been particularly slow - with only 36% of the allocated budget transferred by the middle of 2019, leading to doubts among stakeholders about its effectiveness and integrity.

Given the high public expectations for a rapid reconstruction process, the ARRC could indeed operate with a simplified investment process, outside of *invierte.pe*. The direct control of the General Comptroller of the Republic of Peru as well as participatory oversight with the affected population under the process "we monitor the reconstruction with you" have contributed to reinforced transparency and accountability. Nevertheless, there remain inherent tensions between rapid recovery needs and thorough risk analyses for the formulation of resilient projects in reconstruction processes. While the 2017 El Niño was particularly damaging, necessitating the creation of this ad-hoc structure bypassing existing institutions and regulations, lessons should be learned so that future reconstruction processes have clearer rules of engagement and favour resilience not only through specific DRM projects, but more broadly in the overall reconstruction plan.

Monitoring and Evaluation in DRM and CCA

Peru has established a thorough monitoring and evaluation system with the aim of supporting implementation of DRM policies, but there is limited evidence on how monitoring and evaluation results are used in practice to inform improvement of the policies. The development of the next DRM plan of action is an opportunity to make best use of the monitoring and evaluation process for its main aim: to improve policies.

From the onset, the PLANAGERD 2014-2021 defined short, medium and long term indicators to monitor the implementation of the overall action plan and its six national objectives and PCM conducted a baseline analysis to measure these indicators in 2012 (see Table 5.4). A dedicated monitoring information system, called SIMSE, is managed by CENEPRED. It conducts a yearly survey on the implementation of the DRM policies by the three levels of governments, monitoring all the actions with 91 indicators. The survey process is well designed and receives in general a good response rate – 1 309 public entities, out of 1 964, responded to the survey in 2017. However, the quality of the responses received and the lack of evidence behind it create challenges to obtaining meaningful information.

The results of the yearly survey are demonstrating the large gap between national objectives and local level implementation, with for instance only a few local governments having integrated DRM in their local development or budget plans, or performed risk assessments. In addition to this survey, the budget programme for results also has its set of indicators, but these are more linked to outputs than outcomes. In this respect, while this elaborated monitoring system has strengths, it is unclear how it is used in practice to inform priority setting.

Table 5.4. Peru's DRM objectives and indicators

DRM Objective	Indicator	2012 Baseline
	Overall objective	
Reduce the vulnerability of the population and their livelihoods to disaster risk	% of the population in vulnerability conditions	61%
	Strategic objective	
Develop risk knowledge	% of SINAGERD entities that generate and register information and risk studies in the National Information System	0%
Prevent and reduce risk conditions of the population livelihoods with a territorial approach	% of SINAGERD entities that implement structural and non-structural measures for risk reduction	8,2%
Develop response capacity to emergency and disasters	% SINAGERD entities that implements preparedness measures	7,8%
Strengthen rehabilitation and physical, social and economic recovery capacities	% SINAGERD entities that implements recovery measures	0%
Strengthen institutional capacities for DRM	% SINAGERD entities that includes DRM in their organisations and roles.	3,2%
Strengthen the participation of the population and civil society for the development of a prevention culture	% of population that participates in DRM activities	3%

Source: Authors' elaboration based on (PCM, 2018[7])

Development of a monitoring and evaluation system for CCA measures is still under way as of July 2019, but could offer an opportunity to enhance coherence between CCA and DRM. Peru is currently working on its National Adaptation Plan and the last phase of its road map concerns the development of a monitoring and evaluation system. This phase has been completed with the development of 151 indicators, goals and baselines. 151 indicators related to the 91 adaptation measures contribute to the overall objective of "increasing the State, population and economic agents' awareness and adaptive capacity of action to the adverse effects and opportunities of climate change". Each of the overall outcome-based indicators foreseen has a DRM component, which shows how much CCA actions can be linked to DRM. MINAM is about to adopt the indicators and establish a monitoring system as part of the Environment Information National System (SINIA). At the same time it will be important to build on indicators under the Disaster Risk Management Information System (SIGRID) and its reporting process to avoid redundancies, which would have benefits for the implementation of both policies. Efforts should also be made to align this monitoring system with the SDGs reporting process under development by the National Institute of Statistics and Informatics (INEI).

Focus on public finance for DRM and CCA

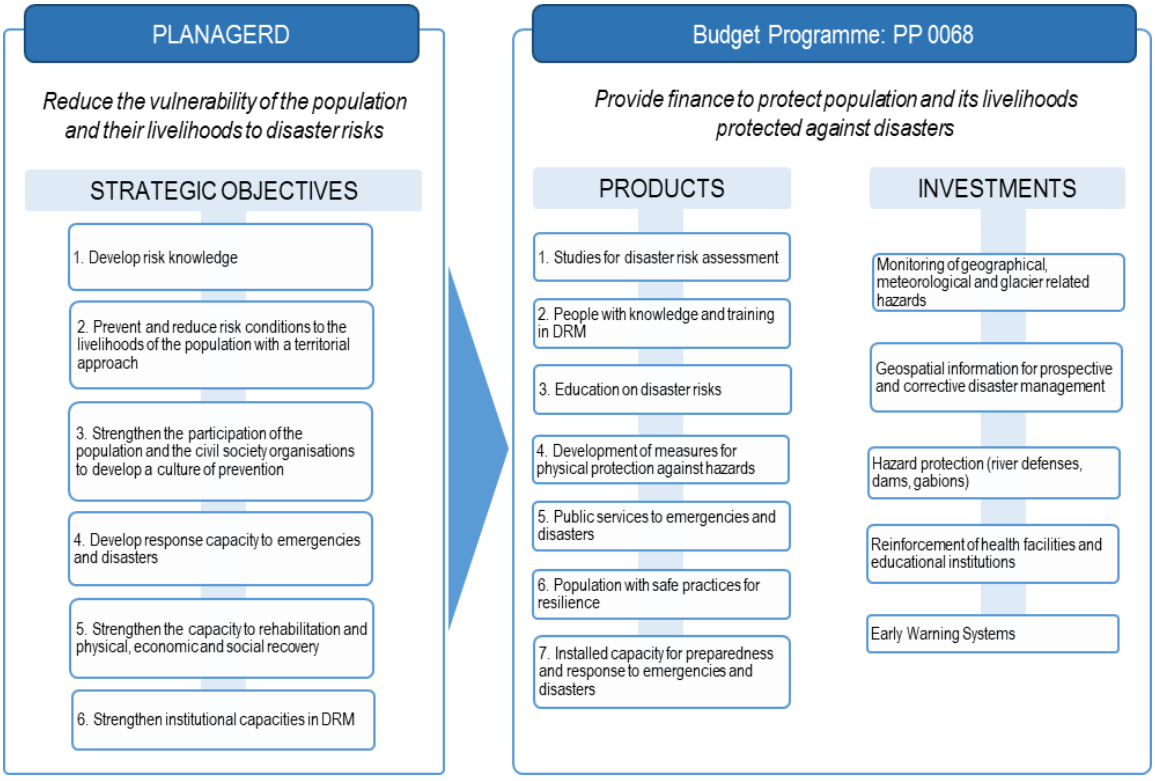
Prioritisation of investments in DRM and CCA measures

With specific budget line on "Disaster vulnerability reduction and emergency preparedness" of the Peruvian budget programme for results (called PP0068), Peru has a comprehensive tool to allocate DRM budget priorities established in PLANAGERD across different levels of the government (see Figure 5.2). For projects to be financed through PP0068, they need to follow PLANAGERD priorities and feed in the various project categories promoting structural and non-structural measures across the DRM cycle. These measures include: risk assessment, protective measures and early warning systems, among others. Under the co-ordination of PCM, the Multi-sectoral Commission of the programme defines for each budget cycle the priorities for DRM public investments and activities based on the results obtained in PLANAGERD implementation and the identification of problems in each thematic area.

Since its creation in 2012, this budget programme has allocated 18 billion Peruvian soles (USD 5.4 billion) on average or 2.25 billion soles per year (USD 675 million). According to PCM, out of this programme, 67.9% of the financing goes to *ex-ante* prevention and preparedness measures compared to post-disaster

response. The share of these DRM investments and activities devoted to climate-related risks compared to other types of natural hazards is not directly accessible and many of these projects have a multi-risks approach. Nevertheless, climate-related risks constitute a significant part. For instance, in 2017, with the El Niño Costero event, a large part of the programme was devoted to structural protective measures against floods and heavy rains. There is no evidence that those structural projects integrated climate change uncertainties. This is a significant missed opportunity to strengthen the resilience of these investments to future climate impacts.

Figure 5.2. Alignment of PLANAGERD objectives with the activities and products of PP 0068



Source: Authors' elaboration based on (PCM, 2019[3]).

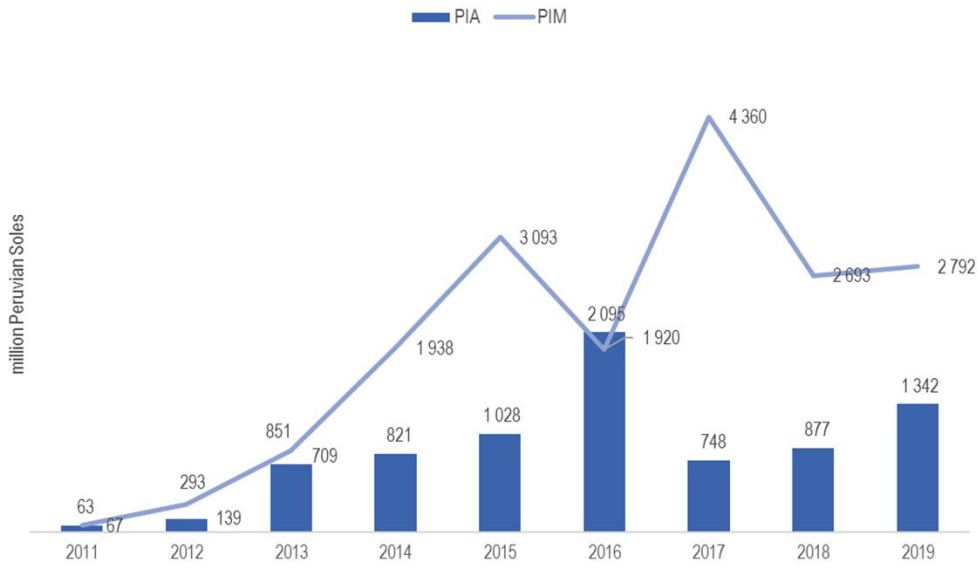
Access to this fund is also contingent on the existence of DRM strategies and plans, based on risk assessments. This is a powerful incentive for the development of risk knowledge and planning, which can also be financed through this programme.

Regarding climate change, the priority adaptation actions identified through the NDC Working Group on the five priority sectors (water, forestry, agriculture, fisheries and health) include around 25% of DRM-related activities. Complementary to the PP0068 actions, these activities have brought additional types of actions in sectors that have not received much attention of PLANAGERD, such as the fishery sector, which is key to the Peruvian economy. The prioritisation process followed a methodology based on the public value chain from problem identification to addressing their root causes and effects. In addition, the NDC development process undertook economic evaluations, demonstrating the social profitability of adaptation measures and the avoided losses they would generate. Such evaluations could be further implemented in the context of other DRM projects and of PP0068.

Finance allocated through PP 0068 has steadily increased since its creation in 2012 (Figure 5.3). Yearly budget discussions are informed by the results obtained in the previous year, as well as by risk scenarios for the year to come, particularly regarding the forecasted strength of the El Niño phenomena. For instance,

in 2016, the initial budget was doubled compared to the previous year, reaching 2.1 billion Peruvian soles, to prepare for the intense El Niño predictions. There is some flexibility to adjust to the needs throughout the year and reallocate funding towards emergency responses and disaster management once a disaster has occurred, as shown by the important difference that can be noticed between the initial budget allocation and the modified budget. All in all, this *ex-ante* funding for DRM in Peru amounting a yearly average of USD 675 million appears significant and reflects the national DRM priority. However, with an estimated average disaster loss valued at USD 4 billion in Peru (PreventionWeb, 2014[18]), there might be a need to continue increasing this budget if risk reduction goals are to be achieved.

Figure 5.3. Allocation of initial and modified budget of Programme 0068 (2011 – 2019)



Note: PIA is the initial budget, PIM is the modified budget – in million Peruvian soles
Source: Based on information provided in (PCM, 2019[17]).

Public investment system invierte.pe

In 2017, Peru revised its public investment policy to simplify the process of accessing funds and focus on citizen-centred service delivery. This standardised public investment system, co-ordinated by the MEF, applies a project life cycle approach from multi-year programming, project formulation and evaluation, execution and operational stage.

As a result of the reform, Peru has created *invierte.pe* that has a series of innovative features outlined below, which potentially favour investments in DRM and CCA measures:

- it applies a social discount rate that takes into consideration long term benefits of investment projects, such as those of improved climate resilience;
- it incentivises multi-purpose investments so projects integrating a DRM or CCA purpose in addition to targeting other social benefits can be positively ranked;
- it makes ex-post evaluation a priority, which can favour resilient projects given the high-risk exposure of the country – as non-resilient projects may have been affected by disasters compared to non-resilient ones; and,
- it considers nature-based solutions amongst the types of projects for public investments

While the innovations within *invierte.pe* are a positive step for DRM and CCA, the simplification process has lowered the level of expectations related to pre-investment risk analysis. As highlighted by UNDDR, since 2011, the previous public investment system was specifically mentioning minimum DRM and CCA requirements in its guidelines for pre investment and feasibility studies. Risk analysis had to be conducted for all projects with attention to hazard, vulnerability and exposure, levels of resilience and risk management measures (UNDRR, 2015[19]). These requirements were increasingly taken into consideration – the number of public investment projects having identified hazards in the project area increased from 8% to 13% between 2012 and 2014.

In comparison, while *invierte.pe* refers to DRM in a climate change context in its specifications, this is very generic and, two years after its creation, there are no dedicated guidelines yet for project formulation units. Guidelines could help bridge capacity gaps to some extent while there remains the need for enhancing the capacity in project development of these units. While in this new system the responsibility has been transferred to the line Ministries to produce such guidelines that are specific to their sector, these documents have not been developed yet. While a key objective of developing *invierte.pe* was to reduce time for, and cost of, project formulation and assessment, climate resilience should remain an important element of the system, and developing these sectoral guidelines should therefore be a priority. In this regard, the health sector is a model to follow (Box 5.2), as the Ministry of Health has collaborated with MINAM and CENEPRED to develop these guidelines. This demonstrates that the joint work on climate change conducted by MINAM has generated practical results towards better coherence between CCA and DRM in the priority sectors for adaptation, such as the health sector.

Box 5.2. Incorporating risk management in a climate change context in the health sector

Health consequences of disasters and climate change impact on public health are important issues in Peru, as demonstrated by El Niño Costero in 2017. Significant efforts are underway in the health sector to strengthen climate resilience, in areas such as the resilience of health infrastructure to disasters, the development of early warning systems in partnership with SENAMIH for heatwaves and infectious diseases and by dedicating sectoral budget for identified adaptation measures.

The Ministry of Health has drafted a guideline that incorporates DRM in a context of climate change in the process of formulating public investment projects. These guidelines highlight particular issues that allow the alignment between DRM and CCA, such as: investment sustainability for DRM in CCA, climate change risks and health, risk analysis for corrective and prospective management, risk management in climate change and recommendations to risk management in a climate change context in health establishment.

Furthermore, the Ministry of Health is implementing a programme named Safe Hospitals "*Hospitales Seguros*" aimed at supporting the resilience of health institutions with a dedicated work programme for the period 2017-2021.

Source: (MINSA, 2017[20])

A comprehensive strategy for financial protection against disasters

In the context of SINAGERD, Peru developed a comprehensive strategy for financial protection against disasters in co-operation with the World Bank, Switzerland and other development partners (World Bank and Ministry of Economy and Finance, 2016[21]). The strategy includes dedicated instruments covering the entire risk management cycle from ex-ante investment in prevention and preparedness to ex post recovery and reconstruction. The strategy is managed by the Ministry of Economy and Finance (MEF) together with

PCM. It also combines budget allocations through the PP0068, public investments under *invierte.pe,* sub-national-level budgets and ex-post financing through contingency reserves and credit lines. In addition, the MEF intends to develop climate risk transfer instruments in the context of the Pacific Alliance, which Peru formed with Mexico and Colombia. As for climate change adaptation, there is not yet a dedicated financial strategy, but the identification of potential funding sources and mechanisms done during the NDC process provides avenues for synergies with DRM.

Regarding *ex-post* financing and beyond budget reallocations, Peru can count on a contingency reserve, the use of the Fiscal Stabilisation Fund, as well as contingent credit lines, which demonstrates the abovementioned comprehensive financing strategy for disasters. The contingency reserve managed by the Institute of Civil Defence (INDECI) has quick disbursement channels to finance emergency recovery and immediate preparedness for major disasters, and has disbursed around USD 12 million on average per year since 2003 (OECD/The World Bank, 2019[22]). The Fiscal Stabilisation Fund can be used when a major emergency is declared and a macroeconomic assessment demonstrates the impact on the country's fiscal stability (World Bank, 2016[23]).

The diversity of financial coverage tools available in Peru in case of disasters reflects its strategic approach to DRM financing, but it appears to be based more on opportunities than on a robust assessment of explicit and implicit contingent liabilities. A thorough multi-hazard probabilistic risk analysis would better support the tailoring of these various instruments to the country's needs, especially if climate change is to be taken into consideration. The creation of the "*Intervention Fund against the occurrence of natural disasters (FONDES)*" to better manage and allocate these diverse financial resources is a promising way for streamlining and strengthening the coherence of these financial instruments.

Regarding adaptation to climate change, there is not yet a financial strategy in place nor a specific budget programme, implying a potential challenge ahead for implementation. However, the working group on the NDC identified a series of financial tools which could be mobilised to finance adaptation measures in each of the different priority sectors. As the tools identified include the various DRM financing instruments just described, from PP 0068 to FONIPREL and FONDES, there is a clear potential for synergies between these instruments in areas of common interest. In the on-going reflections for the by-law of the framework law on climate change, whether a dedicated budget programme for climate change will be needed has both pros and cons. While it would certainly support the good dynamic on climate change policy in Peru at the moment and reinforce MINAM as its co-ordinator, there is a risk when it comes to synergies with DRM to increase the complexity of the instruments available for financing both policies. There would be benefits to consolidate the existing DRM financing tools by incorporating further climate change adaptation to best ensure synergies. For instance, it would be important to integrate the long term perspective of climate change impacts in the design of the disaster risk financing instruments, so that Peru best prepares itself to the climate shocks foreseen in the future and has a more forward looking financing strategy for their management. The on-going development of a pilot climate financing strategy for one of the targeted sectors in 2020 will be a good opportunity to further explore those synergies.

Another interesting area for convergence relates to the development of the insurance market for climate-related risks. In Peru, a subsidised programme, called the Catastrophic Agriculture Insurance (SAC), is a partnership between the Ministry of Agriculture and the private insurer La Positiva. The SAC does not cover all costs of production or the total estimated losses which may be caused by a catastrophic event. Its objective is to provide a basic compensation that increases the capacity of the more vulnerable farmers to cope with the negative impacts of an extreme weather event, in concrete, which allows them to replant and recover the potential income of their agricultural work. From 2009 to 2015, the SAC has been implemented in eight departments and has insured on average 425,300 hectares of farm land (MINAGRI, 2015[24]). There are further prospects to develop climate risk insurance in the different sectors of the country, with the association of Peruvian insurers APESEG, but there has not been major progress up to now.

The role of development co-operation

Peru has engaged with development co-operation partners in various areas that relate to coherence between CCA and DRM, for instance, developing DRM and CCA policies, enhancing capacity of national and local governments, establishing disaster risk finance mechanisms, piloting innovative approaches and exchanging good practices. Bilateral and multilateral development co-operation providers have been active in this area as climate resilience is high in their strategic priority for the country. Peru, Switzerland, the World Bank and the Global Facility for Disaster Reduction and Recovery (GFDRR) collaborated to develop a comprehensive strategy for financial protection against disasters (World Bank and Ministry of Economy and Finance, 2016[21]).

Complementing various national financial mechanisms put in place, several multilateral and bilateral providers of development finance have extended contingent credit lines to Peru against disasters (Table 5.5). The committed volume amounted to a total of USD 4 billion between 2016 and 2019, providing liquidity in the event of a disaster. The World Bank also worked with the Ministry of Economy and Finance on developing risk transfer instruments in the context of the disaster initiative of the Pacific Alliance. A first parametric cat-bond for earthquakes was issued in 2018 for USD 200 million, and there is a potential to develop a similar product for extreme-weather events. The roles of the World Bank in developing and applying these market-based financial instruments include leveraging its high credit rating (e.g. AAA rating for the IBRD) to attract a greater number of investors and lower premium rates (World Bank, 2019[25]).

Table 5.5. Peru's contingent credit lines

Lending institution/ issue date/ loan type	Loan amount (million USD)	Expiration
Inter-American Development (IDB) 2015 - Catastrophe Deferred Drawdown Option (CAT DDO)	300	2018
World Bank 2016 – human capital (DDO)	1 250	2019
World Bank 2016 – fiscal risk (DDO)	1 250	2019
World Bank 2010 – risk management (CAT DDO)	100	2016
CAF–Development Bank of Latin America 2013 – natural disasters	300	2016
IDB 2013 – natural disaster emergencies	300	2019
Japan International Cooperation Agency (JICA) 2014 – natural disasters	100	2017
World Bank 2015 – risk management (CAT DDO)	400	2018
TOTAL	4 000	

Source: (OECD/The World Bank, 2019[22])

Over the period from 2013 to 2017, bilateral and multilateral providers committed USD 2.86 billion of climate-related development finance to Peru, according to data reported to the OECD CRS. Of the total climate-related development finance, 21.6% (or USD 619 million) targeted adaptation measures and 11.5% (USD 330 million) targeted both mitigation and adaptation. USD 204 million (or 22.5%) of adaptation-related development finance was committed to three sub-sectors related to DRM, namely: disaster prevention and preparedness (4.9% of the total adaptation finance), flood prevention and control (6.7%) and reconstruction relief and rehabilitation (9.9%) (OECD, n.d.[26]).

The co-ordinating role of MINAM in CCA, and PCM in DRM, has been key to facilitate alignment between development co-operation and Peru's national priorities for DRM and CCA. The Integral Management of Climate Change, for example, consists of multiple arrangements for implementation of Peru's NDC, including promotion of engagement with development co-operation, the private sector, indigenous people, civil society, academia and other actors. Another example is the roundtable to fight poverty as a forum where both development co-operation partners and the different sectors of the government met to ensure proper alignment and co-ordination.

Co-ordination and alignment between development co-operation and the national priorities remain more challenging at the local level where the diversity of development co-operation projects has not always been tracked comprehensively by the national government. The Ministry of the Economy and Finance is initiating the development of a monitoring and evaluation system for development co-operation projects, which could contribute to a clearer view and greater co-ordination of their support. There are also challenges related to coherence between the DRM and CCA agendas within development co-ordination providers. Their initiatives on DRM and CCA are not always co-ordinated or aligned in their approach among themselves, which could favour the existing separated approaches in the country.

Development co-operation fosters the use of innovative approaches in Peru, such as to nature-based solutions for CCA and DRM, or climate resilient infrastructure as part of their co-operation approach, in order to demonstrate their value and transfer knowledge and know-how.

Going forward to best leverage development cooperation support to a climate resilient Peru, fostering the exchange of knowledge and access to international development finance from the Green Climate Fund and private sector investment appear as key approaches. As an upper-middle income country, Peru needs to further explore ways in which it can more wisely use development finance for CCA and DRM. Promoting DRM and CCA in public investment projects as in cooperation projects would be an area of joint learning for development cooperation partners and the Peruvian DRM and CCA stakeholders.

Annex 5.A. Stakeholders interviewed

Ministry of the Environment
Presidency of the Council of Ministers
Ministry of the Economy and Finance
National Centre for Disaster Assessment, Prevention and Reduction
National Institute of Civil Defence
Ministry of Health
Ministry of Housing, Sanitation and Public Works
Ministry of Agriculture
Ministry of Education
Ministry of Energy and Mining
National Water Agency
National Service of Meteorology and Hydrology
National Institute of Glaciology and Mountainous Ecosystems
National Forestry Service
National Nature Conservation Service
World Bank
Swiss Development Cooperation
GIZ
Japanese International Cooperation Agency
United Nations development Programme

References

CENEPRED (2017), *Implementación Del Plan Nacional De Gestión Del Riesgo De Desastres-Resultados de la Encuesta Nacional de Gestión de Riesgo de Desastres - ENAGERD 2017*, Centro Nacional De Estimacion, Prevencion Y Reduccion Del Riesgo De Desastres (CENEPRED), Lima, https://dimse.cenepred.gob.pe/src/informes_grd/Informe2017_2.pdf (accessed 17 March 2020). [11]

CENEPRED (2016), *Guía Metodológica para elaborar el Plan de Prevención y Reducción de Riesgo de Desastres en los tres niveles de gobierno*, CENEPRED, Lima, http://www.cenepred.gob.pe/web/wp-content/uploads/Guia_Manuales/Guia-PPRRD-CENEPRED.pdf (accessed 17 March 2020). [13]

CENEPRED (2014), *Manual para la Evaluacion de Riesgos originados por Fenomenos Naturales*, Centro Nacional De Estimacion, Prevencion Y Reduccion Del Riesgo De Desastres (CENEPRED), Lima, https://sigrid.cenepred.gob.pe/sigridv3/documento/257 (accessed 17 March 2020). [15]

CEPLAN (2019), *Guía para el Planeamiento Institucional*, Centro Nacional de Planeamiento Estratégico (CEPLAN), Lima, https://www.ceplan.gob.pe/documentos_/guia-para-el-planeamiento-institucional-2018/ (accessed 17 March 2020). [12]

CEPLAN (2019), *Vision del Peru al 2050*, Centro Nacional de Planeamiento Estratégico (CEPLAN), Lima, https://www.ceplan.gob.pe/visionperu2050/ (accessed 17 March 2020). [1]

Chávez Cresta, J., C. Burbano and M. Villalobos (2018), *Fortaleciendo la respuesta ante desastres en el Perú: Lecciones Aprendidas del Fenómeno El Niño Costero 2017 en el Perú*, Instituto Nacional de Defensa Civil (INDECI), Lima, https://resourcecentre.savethechildren.net/node/13445/pdf/fortaleciendo_la_respuesta_ante_desastres_en_el_peru.pdf (accessed 17 March 2020). [6]

EM-DAT (2018), "Natural disasters in 2017: Lower mortality, higher cost", *Centre for Research on the Epidemiology of Disasters (CRED)* 50, p. 2, https://www.emdat.be/ (accessed 17 March 2020). [2]

INEI (2016), *Estadisticas Municipales*, Instituto Nacional de Estadística e Informática (INEI), Lima, http://www.inei.gob.pe (accessed 17 March 2020). [10]

MINAGRI (2015), *SEGURO AGRÍCOLA CATASTRÓFICO: acción pública desde el Ministerio de Agricultura y Riego para el apoyo a la pequeña agricultura*, Ministerio de Agricultura y Riego (MINAGRI), Lima, http://www.minagri.gob.pe/portal/download/pdf/sa-catastrofico-2015/sac-021115.pdf (accessed 17 March 2020). [24]

MINAM (2019), Dialoguemos sobre las NDC en el Péru : Proceso participativo, inclusivo, multiactor y multinivel para proover el diálogo, el compromiso y la acción para las NDC en el Perú, Ministerio del Ambiente (MINAM), Lima, http://www.minam.gob.pe/cambioclimatico/wp-content/uploads/sites/127/2019/01/Memoria-de-Dialoguemos-sobre-las-NDC.pdf (accessed 17 March 2020). [9]

MINAM (2019), *Peruvian Ministry of Environment launches participatory process for the development of the National Adaptation Plan on Climate Change*, Ministerio del Ambiente (MINAM), Lima, http://www.napglobalnetwork.org/2019/12/peruvian-ministry-of-environment-launches-participatory-process-for-the-development-of-the-national-adaptation-plan-on- [14]

climate-change/ (accessed on 27 January 2020).

MINAM (2016), *El Perú y el Cambio Climático Tercera Comunicación Nacional del Peru a la Convención Marco de las Naciones Unidas sobre Cambio Climático*, Ministerio del Ambiente (MINAM), Lima, http://www.minam.gob.pe/wp-content/uploads/2016/05/Tercera-Comunicaci%C3%B3n.pdf (accessed 17 March 2020). [5]

MINSA (2017), *Política nacional de hospitales seguros frente a los desastres*, Search Results Web results Ministerio de Salud (MINSA), Lima, http://www.minsa.gob.pe (accessed on 17 March 2020). [20]

OECD (2016), *OECD Territorial Reviews: Peru 2016*, OECD Territorial Reviews, OECD Publishing, Paris, https://dx.doi.org/10.1787/9789264262904-en [16]

OECD (2016), *Peru Public Governance Review - Integrated Governance for Inclusive Growth*, OECD Publishing, Paris, https://doi.org/10.1787/9789264265172-en. [8]

OECD (n.d.), *OECD DAC Creditor Reporting System (CRS)*, OECD Publishing, Paris, https://stats.oecd.org/Index.aspx?datasetcode=CRS1 (accessed on 8 February 2019). [26]

OECD/The World Bank (2019), *Fiscal Resilience to Natural Disasters: Lessons from Country Experiences*, OECD Publishing, Paris, https://dx.doi.org/10.1787/27a4198a-en. [22]

PCM (2019), *Plan Integral para la Reconstrucción con Cambios (PIRCC)*, Presidencia del Consejo de Ministros (PCM), Lima, http://www.rcc.gob.pe/plan-integral-de-la-reconstruccion-con-cambios/ (accessed 17 March 2020). [17]

PCM (2019), *Programa Presupuestal de reduccion de la Vulnerabilidad y Atencion de Emergencias por Desastres -PREVAED- Contenidos Minimos*, Presidencia del Consejo de Ministros (PCM), Lima. [3]

PCM (2018), *Estrategia de Implementación del Plan Nacional de Gestión del Riesgo de Desastres – PLANAGERD 2014-2021*, PCM, Lima, http://www.pcm.gob.pe/wp-content/uploads/2018/07/TEXTO-ESTRATEGIA-IMPLEMENTACION-PLANAGERD.pdf (accessed 17 March 2020). [7]

PreventionWeb (2014), *Peru Basic Country Statistics and Indicators (2014)*, https://www.preventionweb.net/english/hyogo/gar/2015/en/home/data.php?iso=PER (accessed 17 March 2020). [18]

SENAMHI (2014), *Regionalización Estadística de Escenarios Climáticos en Perú*, Servicio Nacional de Meteorología e Hidrología del Perú (SENAMHI), Lima, http://www.fao.org/3/a-bt558s.pdf (accessed 17 March 2020). [4]

UNDRR (2015), *Review of Peru Interim Report: Working Paper on Public Investment Planning and Financing Strategy for Disaster Risk Reduction*, United Nations Office for Disaster Risk Reduction (UNDRR), Geneva, https://www.undrr.org/publication/unisdr-working-papers-public-investment-planning-and-financing-strategy-disaster-risk-1 (accessed 17 March 2020). [19]

World Bank (2019), *Super-sized Catastrophe Bond for Earthquake Risk in Latin America Background*, World Bank Group, Lima, http://pubdocs.worldbank.org/en/192341554318525877/case-study-financial-products-Pacific-Alliance-final-4-1-2019.pdf (accessed on 13 November 2019). [25]

World Bank (2016), *Perú: Estrategia Integral De Protección Financiera Ante El Riesgo De Desastres Asociados a Fenómenos Naturales*, World Bank Group, Washington DC, http://documents.worldbank.org/curated/en/770641470123157437/pdf/107353-WP-PUBLIC-SPANISH.pdf (accessed 17 March 2020). [23]

World Bank and Ministry of Economy and Finance (2016), *Peru: a Comprehensive Strategy for Financial Protection against Natural Disasters*, World Bank Group, Washington DC, http://documents.worldbank.org/curated/en/718281475183108912/Peru-a-comprehensive-strategy-for-financial-protection-against-natural-disasters (accessed 17 March 2020). [21]

6. Approaches in the Philippines to increased coherence in climate change adaptation and disaster risk reduction

This chapter describes national approaches to policy development and implementation on climate change adaptation and disaster risk reduction in the Philippines. It outlines the policy context and governance arrangements for these two policy agendas, approaches to implementation of the policies, financing, and monitoring and evaluation, with a special focus on the tourism sector. Drawing on these insights, the chapter offers ways forward for how both the government and development co-operation can facilitate greater coherence in efforts to build resilience to climate and disaster risks

Summary and ways forward

The Philippines is one of the most disaster-prone countries in the world, experiencing numerous typhoons annually and being highly exposed to the impacts of a changing climate. In light of its significant vulnerabilities, disaster risk management (DRM)[11] and climate change adaptation (CCA) are strategic priorities for the country. This case study examines how the Philippines is encouraging coherence between DRM and CCA in its domestic policy development and implementation, with the objective of identifying good practices, challenges and lessons learned.

This chapter shows that the Philippines has well established institutional structures and policy frameworks for DRM and CCA, and has invested significantly to develop data and information, and financial instruments to strengthen its resilience to climate related disasters. However, despite the high-level conceptual convergence on CCA and DRM policies and institutional arrangements, implementation has been slow in many areas due to parallel strategies, action plans, tools and reporting mechanisms. This is compounded by capacity gaps at the local level.

While strong efforts have been made to align policy approaches across DRM and CCA, there is space to further develop synergies between these two agendas, to avoid redundancies, benefit from opportunities and strengthen resilience on the ground. To achieve this objective, the main ways forward are summarised below.

Ways forward to enhance coherence in CCA and DRM in the Philippines:

- Augment the capacities of DRM and CCA key players at the national level. At present, both the Climate Change Commission and the Office of Civil Defense serve a co-ordinating role, however, they lack the tools to push implementation.
- Establish a good structure for relaying information from the local government level back up to the national level. This should cover both assessment of vulnerabilities as well as effectiveness of implemented actions.
- Strengthen both enforcement and incentives around implementation. A good example of a positive incentive already in place is the “Gawad Kalasag” award, which provides acknowledgement for excellence in programmes, activities and projects that protect high-risk communities. This is effective as it both rewards good practices but also provides a model of what good practices look like for other communities.
- Centralise and improve ease of access to the various climate data products that already exist. The creation of GEORiskPH recognises these needs, however, given that the initiative is still recent, it is too early to evaluate its effectiveness.
- Build on existing stock-take exercises to streamline planning processes where redundancies exist. For example, climate change and disaster risk management plans could potentially be integrated into existing planning processes. Methodologies for conducting risk assessments should be harmonized and centralized.
- Provide technical support to local government units to assist them in accessing and effectively using funds for CCA and DRM, such as the Peoples Survival Fund. This support could be given through existing institutional structures. For example, the Local Disaster Risk Management Councils could serve to support CCA activities in addition to their existing DRM mandate.
- Imbed the “Disaster Risk Financing and Insurance Strategy” within the National Disaster Risk Management Strategy, to ensure a link between prevention strategies and financial protection measures.

[11] Disaster risk management (DRM) is used in this chapter rather than disaster risk reduction (DRR) used in Part I since DRM is better aligned with the terminology used in relevant policy documents in the Philippines.

- Work to increasingly build local awareness on the availability of existing disaster risk financing instruments, and the role and importance of insurance for disaster risks. This could be done through a public information and awareness raising campaign, for example.
- Develop a strategic vision for a sustainable tourism sector, which builds on successes from existing pilot projects and clearly demonstrates how tourism development can be leveraged to increase resilience. Increase co-ordination between sectors and associations of the tourism industry, to help the tourism sector pursue economies of scale for CCA and DRM initiatives.

Ways forward for development partners:

- Take stock of all existing efforts in the Philippines and ensure that climate and disaster risks have been considered within all activities. If coherence between CCA and DRM is considered a priority for development partners, this must be reflected in the support they provide.
- Continue past good practices of meeting regularly with other donor countries and agencies who provide support on the same thematic areas.

The Philippines profile

The Philippines is experiencing increasing urbanisation and a growing middle-class. The country saw an average annual growth of 6.3% between 2010 and 2017 and is expected to move from a lower-middle income country with a gross national income per capita of USD 3 660 in 2017 to an upper-middle income country (per capita income range of USD 3 896 – USD 12 055) in the near future (World Bank, 2019[1]). The Philippines' main economic sectors are Services, which account for about 58 % of GDP, with Industry accounting for 34 % and Agriculture, Hunting, Forestry and Fisheries comprising 8 % of the economy. Tourism, which is under the Services sector, is growing in importance, and in 2017 employed over 13 % of the population (GOV.PH, 2018[2]).

The Philippines has 17 regions, with Metro Manila and its surrounding regions, Central Luzon and Southern Luzon accounting for nearly two-thirds of domestic production. The country's poverty incidence in 2015 was estimated at 21.6 %. However, in 2018, poverty incidence was reduced to 16.6 percent and is targeted to further decrease to about 14 percent by 2022 (PSA, 2019[3]).

Climate change and risks

The geographical location of the Philippines means that it is particularly vulnerable to a range of disasters, including tropical typhoons, earthquakes and volcanoes. Most areas of the Philippines experience periods of torrential rain, flooding, landslides, high winds and thunderstorms, especially during the rainy season between June and November. As a low-lying island nation dominated by coastal communities, it is also highly susceptible to tsunamis, sea-level rise and storm surges (World Bank, 2018[4]). In its report "The Human Cost of Weather-Related Disasters", UNDRR lists the Philippines as the fourth-most-disaster-affected country in the world, with a total of 130 million people affected by weather-related disasters over the period 1995-2015 (UNDRR, 2015[5]).

Box 6.1 The Impact of Typhoons in the Philippines

An average of 20 typhoons hit the Philippines each year, of which five to seven are destructive. Typhoons are one of the most dangerous types of natural hazards and every year, they cause considerable loss of life and immense damage to property. Since 2009, the Philippines has experienced multiple highly destructive extreme weather events with Typhoon Ondoy, Pepeng, Sendong, and Pablo causing over 3,000 deaths, affecting more than 10 million people and causing economic damages and losses amounting to approximately USD 5.7 billion. In 2013, Super Typhoon Yolanda (Haiyan) made landfall as one of the most intense and deadly tropical typhoons on record. Yolanda caused over 6,000 reported fatalities, and 4 million people were displaced. The estimated economic damage by Yolanda, in terms of infrastructure, social damages and production losses ranged from about USD 12–15 billion. Over the past ten years, typhoons making landfall have increased in strength with devastating consequences. With climate change, their impact is expected to worsen due to an increase in intensity and unpredictability (seasonality change) of hazards.

Source: (Anticamara and Go, 2017[6]); (COA.GOV.PH, 2014[7]) (Cruz, 2017[8]).

Climatological variations in the Philippines are significantly influenced by El Niño and La Niña episodes, monsoons and mesoscale systems (Cruz, 2017[8]). While the impact of climate change on any of these is not clear, increased variability in rainfall is considered to be among the most significant impacts of climate change in the Philippines. In some parts of the country, the intensity and frequency of rainfall events are increasing, whereas in others, decreasing (Cruz, 2017[8]). Further, storm patterns are changing and the country is also witnessing longer episodes of drought, linked to the El Niño phenomenon, which disrupts agricultural production and therefore the economy (GOV.PH, 2014[9]). For example, the El Niño weather phenomenon in 2015 had devastating effects on agriculture and water supply, leading to damages estimated at around USD 138.3 million (Oxford Business Group, 2018[10]).

Further, rapid urbanisation and the proliferation of informal settlements and urban slums have compounded vulnerabilities, especially among poor households migrating from rural areas. Unregulated urban expansion has intensified flood risk and is expected to continue to do so in the future (GFDRR, 2016[11]). For example, the Philippine's second national communication to the UNFCCC notes that while the rise in flood risk in part can be explained by increased rainfall variability, it is also caused by sewers and waterways clogged by waste trapping the water (GOV.PH, 2014[9]). Other anthropogenic factors, such as deforestation and land use change also affect flood risk (Verburg et al., 2006[12]).

Low-income households are disproportionately affected by climate-related disasters in the Philippines; a trend not unique to the Philippines but observed globally. Climate change, when combined with factors such as unmanaged development, has adverse impacts on ecosystems and the role of these systems for many rural populations as sources of income and subsistence (Hallegatte et al., 2016[13]). Further, lower income households often reside in areas more exposed to the risks of climate change, in some cases because these areas are more readily available, but in others, because they provide desirables services (e.g. access to water and markets). Complemented by heightened vulnerabilities to climate impacts, poorer households also have relatively fewer resources at their disposal for responding to these impacts. As a result, many Filipinos that live just above the poverty line cycle in and out of poverty (Hallegatte et al., 2016[11]).

Objectives and outline

This section presents national and sub-national approaches to policy development and implementation in the Philippines, exploring the extent to which they are leveraging coherent and mutually reinforcing

approaches to climate change adaptation and disaster risk management, with the goal of increasing resilience. Drawing on these insights, the section offers ways forward for how efforts in these two policy communities by both national government officials and development partners can facilitate greater coherence in efforts to build resilience to climate-related risks. It draws on interviews conducted in Manila and Cebu, as well as complimentary desk research.

National Approaches to CCA and DRM

Policy context and governance arrangements for CCA and DRM

Climate change adaptation (CCA) and disaster risk management (DRM) are central priorities in policy processes in the Philippines. This is, for example, illustrated by the coverage of resiliency in the Philippine Long-Term Vision, the Philippine Development Plan 2017-2022, which includes ensuring safety and building resiliency as one of its foundation strategies for achieving inclusive growth. Moreover, it points to climate change as a global driver to be considered if development is to be sustainable. The interlinkages between CCA and DRM are also highlighted, for example in the context of agriculture and infrastructure sectors.

Recognition at the highest political level of the importance and need for action on CCA and DRM is reflected in the policies and institutional framework in place. The Philippines has made great efforts to integrate CCA and DRM in their core institutions and both issues are recognised in legal and policy frameworks as interrelated concepts that require strengthened coherence for effective implementation.

The policy frameworks and institutional arrangements around CCA and DRM in the Philippines have been influenced by international agreements. For climate change, the Philippines signed the UN Framework Convention on Climate Change (UNFCCC) on 12 June 1992. Since then, various institutional entities have co-ordinated and monitored the country's participation and initiatives on climate change and related issues – culminating with the creation of the *Climate Change Commission* (CCC) with the enactment of Republic Act No. 9729 (RA 9729) in 2009. Notably, the Philippines is the second country in the world (after the United Kingdom) to enact a climate change law.

In terms of DRM, the Philippines is a signatory of the Sendai Framework and its predecessor the Hyogo Framework for Action. In 2010, Congress enacted Republic Act No. 10121 (RA 10121), *Philippine Disaster Risk Reduction and Management Act of 2010*, to deal specifically with disaster risks. This law mandated the creation of the *National Disaster Risk Reduction and Management Council (NDRRMC)* to oversee the implementation of the law. An overview of the main legislative documents for CCA and DRM and their associated frameworks and plans is presented in Table 6.1.

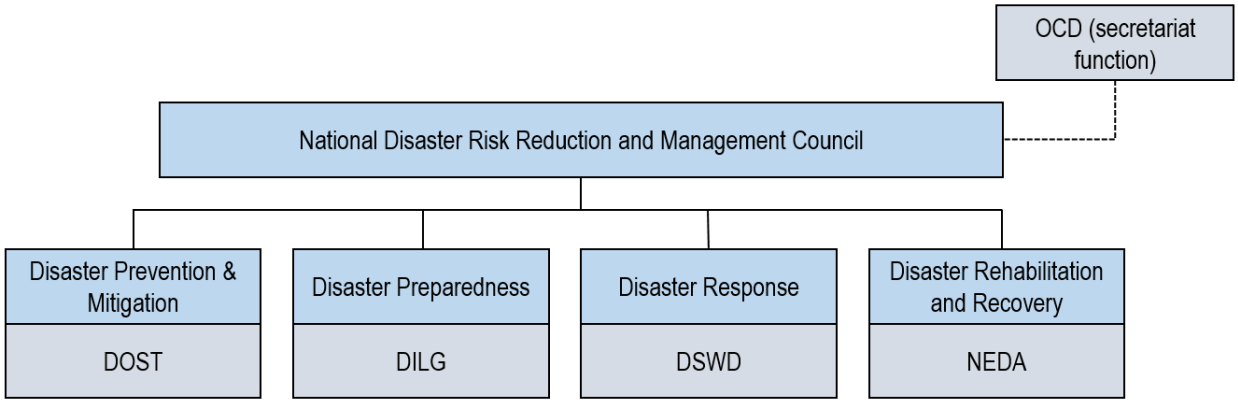
Table 6.1. Overview of legislation, frameworks and plans regarding CCA and DRM in the Philippines

	CLIMATE CHANGE ADAPTATION	DISASTER RISK MANAGEMENT
National legislation	Climate Change Act 2009 (RA 9729)	Disaster Risk Reduction and Management Act 2010 (RA 10121)
Enacted by	Philippine Senate and Congress	
Objective	Mainstream climate change in government policy	Strengthen DRM and its institutional framework
Key elements	• Creation of Climate Change Commission assisted by the Climate Change Office • Creation of National Strategy Framework to be reviewed every three years • Creation of National and Local Action Plans	• Creation of National Disaster Risk Reduction and Management Framework • Creation of National Disaster Risk Reduction and Management Plan • Integration of DRR with development processes • Mandates the creation of local DRRM plans
Points of convergence	• Aim to reduce risks to and vulnerabilities from natural hazards • Recognise both areas of focus and their interrelationships • Aim to mainstream CCA and DRR in local development plans	
National frameworks	National Framework Strategy on Climate Change 2010–2022	National Disaster Risk Reduction and Management Framework 2011–2028
Lead institution	Climate Change Commission	National Disaster Risk Management Council (with Office of Civil Defense as the Secretariat)
Objective	Guide the development of national and subnational planning processes on CCA	Guide national and local efforts on DRR; develop a common understanding of DRR and management; and provides a criteria for benchmarking and tool for evaluating progress Adopts four aspects of DRM, namely: mitigation, prevention, response and rehabilitation and recovery as provided under the DRM Act, but gives emphasis on strengthening proactive and preventive activities
Key elements	• Enhanced vulnerability and adaptation assessments • Use of various tools and technologies from the social and natural sciences to address disasters • Enhancing monitoring, forecasting, and warning systems • Mainstreaming climate and DRR-based planning	• Mainstreaming DRR in national, regional, provincial Physical Framework Plans, Comprehensive Development Plan (CDP) Comprehensive Land-Use Plans (CLUP) • DRR and CCA-sensitive management • Disaster-resilient infrastructure • Local awareness drills and exercises • Advocacy and education for DRR and CCA • Contingency planning • Networking and partnership building
Points of convergence	• Recognise both areas of focus and their interrelationships • Highlight the importance of science-based early warning systems, capacity-building for local government units and vulnerability assessment	
National action plans	National Climate Change Action Plan 2011–2028	National Disaster Risk Reduction and Management Plan 2011–2028
Objective	Outlines specific programmes and strategies for adaptation and mitigation with a long-term sustainable development goal	Outlines priority actions for DRM with development
Lead institution	• Climate Change Commission (CCC)	• National Disaster Risk Management Council (with Office of Civil Defense as the Secretariat)
Key elements	• Sectors of concern: Food, water, ecosystem and environment stability, human security, sustainable energy, knowledge and capacity development • Enhanced knowledge and capacity for CCA • Gender-sensitive provincial-level vulnerability and risk assessments • Creation of long-term plan for extremely vulnerable communities	• Scaled institutionalisation of DRR and management • Mainstreaming DRR and CCA in development processes (policies, plans, and budget) • Community-level capacity building efforts • Disaster-resilient infrastructure • Community-based vulnerability and risk assessments
Points of convergence	CCA and DRM integrated in local plans DRM actions aligned with CCA strategies to achieve human security	

The long history of the Philippines in managing and responding to extreme events from natural hazards (both weather and geophysical events) means that DRM has a much more established institutional history in the country than CCA. Disaster response and recovery has its roots in the Civil Defense Act of 1954, which was followed by the creation of the National Disaster Coordinating Council in 1978. The 2010 introduction of the DRRM Act represented a paradigm shift from primarily responding to disasters to a stronger focus on prevention (COA.GOV.PH, 2014[7]). The prominence of DRM over CCA can be seen in the difference in size and power of the institutions responsible for DRM and the amount of funding available for DRM-related projects. For example, in 2017, PHP 15 billion was earmarked for DRM, whereas PHP 1 billion was set aside for dedicated adaptation projects. DRM has a stronger institutional presence at the local level, with national offices in each region and a dedicated governance structure. However, the strength and institutionalisation of DRM can potentially be leveraged to increase awareness of CCA, as CCA can be mainstreamed into existing DRM structures and processes.

The National Disaster Risk Reduction Management Council (NDRRMC) is the co-ordinating body for DRM in the country. The NDRRMC is chaired by the secretary of the Department of National Defense with the Office of Civil Defense (OCD) serving as its secretariat. The NDRMC oversees the lead agencies for each of the four thematic pillars in the National Disaster Risk Reduction and Management Plan (NDRRMP) (see Figure 6.1)

Figure 6.1. Governance structure for disaster risk management in the Philippines



A persistent challenge under the current structure is that the OCD is not fully empowered as the secretariat of the NDRMMC. The OCD is mandated with a co-ordinating role in the identification, implementation, and monitoring of DRRM programmes, projects, and activities. This means DRRM-related tasks and responsibilities are passed on to council members that are occupied with different primary mandates, and the mandate of the NDRRMC suffers from competition with other departmental missions (Domingo and Olaguera, 2017[14]). In addition, the NDRRMP provides guidance, but does not have funding attached to each identified initiative12. This has resulted in initiatives being developed and implemented with relative independence from the NDRRMC, leading to potential gaps and overlaps (Domingo and Olaguera, 2017[14]). One example that emerged from the interviews conducted for this study was that while responsibility for disaster prevention and mitigation falls with the Department of Science and Technology (DOST), they lack influence with major implementing agencies such as the Department of Public Works

[12] The actions proposed under the NDRRMP and NCCAP must be incorporated in the PDP and the Public Investment Program in order to be included in the national budget. However, not all the projects in the Public Investment Program are given budgetary allocations. Agencies, together with the Department of Budget and Management (DBM) prioritise these based on certain development objectives or sectoral outcomes.

and Highways (DPWH). That said, DPWH is still implementing risk reduction measures, such as an initiative on inspection and retrofitting of critical infrastructures (e.g. bridges) for disaster resiliency.

For CCA, the CCC faces similar challenges to the OCD on DRM. As the institutional body in charge of climate change, the CCC has responsibility for leading all climate policy work, as well as co-ordinating, monitoring and evaluating climate change programmes. The CCC has the mandate to guide line agencies in their implementation, but there are limited tools available to the CCC to encourage other agencies to prioritise adaptation measures, and no recourse if actions are not taken. That said, there is evidence of effective mainstreaming in places, and it can be expected that agencies which have principal mandates on the environment and agriculture have more initiatives on climate change. For example, the Department of Environment and Natural Resources (DENR) has an office dedicated to climate communication. It could be valuable to perform an assessment of the level of mainstreaming that is taking place, to establish how the CCC can dedicate its limited resources effectively.

Robust co-ordination measures are also in place to encourage harmonisation among government agencies involved in climate risk management discussions. Created in 2011[13], the Climate Change Adaptation, Mitigation, and Disaster Risk Reduction Cabinet Cluster is a cross-departmental body, composed of 20 government agencies. It is chaired by the DENR Secretary and the CCC serves as the secretariat. The purpose of the cluster is to ensure co-ordination, and complementarity of policies and programmes on CCA, DRM and sustainable development. The Cluster serves as a venue to align and complement programmes, activities and projects among departments and government agencies in delivering the national vision on climate change adaptation, mitigation and DRM (GOV.PH, 2018[15]). The cluster reports on a 4 year roadmap which was set in 2018, with the objective of:(1) increasing adaptive capacities of vulnerable communities; (2) ensuring adequate supply of clean air; (3) increased resilience of critical infrastructure; (4) enhanced knowledge and access to information and institutional capacities (GOV.PH, 2018[15]).

Despite the high-level conceptual convergence on CCA and DRM policies and institutional arrangements, implementation has been slow due to parallel strategies, action plans, tools, institutions, monitoring and reporting. Illustrating the recognition that there is a need to strengthen the leadership and institutional platform for DRM, the government has a proposal to create a new national department on “Disaster Resilience”. This department would cover all four phases of the DRM cycle[14], which are currently under the responsibility of separate departments, and possibly absorb certain functions of the CCC. In general, this was viewed as a positive development by the people interviewed for this study as it would give more weight to disaster prevention and CCA. Some concern, however, was expressed linked to the broad scope of such a department.

Subnational approaches to CCA and DRM

National legislation for both CCA and DRM delegate local government units (LGUs) as the frontline agency responsible for planning, implementation and response. The NCCAP and the NDRRMP provide the framework for LGUs in developing their local CCA Plans (LCCAP) and local DRRM plans (LDRRMP). They have the same components as the CCAP and DRRMP discussed above, but scaled down to the local level. A major impediment is that local governments often lack the institutional, technical, and financial capacity to develop these plans and subsequently to implement them.

[13] The cluster on Climate Change Adaptation, Mitigation was created in 2011, and Disaster Risk Management was added to the cluster in 2017 (GOV.PH, 2018[15])

[14] i) Prevention/Mitigation, ii) Prepardness, iii) Response, iv) Rehabilitation and Recovery

Box 6.2. Recognising excellence in LGU planning for Disaster Management in the Philippines

In recent years there have been improvements in the number of LGUs demonstrating greater capacities and innovations in leading DRM and CCA activities. Such initiatives have been recognised by the NDRRMC through the annual awards called "Gawad Kalasag", which provides acknowledgement for excellence in programmes, activities and projects that protect high risk communities against hazards and provide more capabilities in addressing vulnerabilities and coping from disasters. It was noted in the interviews that a system of public recognition is an effective way to motivate good practices in the Philippines.

In addition to the award system, there are many initiatives in place to support local capacity building for CCA and DRM. These include:

- The Local Government Academy conducts training on governance and DRRM;
- The Philippine Public Safety College has a master's course on crisis and disaster risk management;
- DILG has been partnering with academia for technical augmentation;
- The Housing and Land Use Regulatory Board (now Department of Human Settlements and Urban Development) provides assistance to LGUs in the preparation of their comprehensive land use plans;
- The Manila Observatory hosts training sessions on the Climate and Disaster Risk Assessment (CDRA) for LGUs.

In addition to the LCCAP and the LDRRMP, The Local Government Code mandates all cities and municipalities[15] to prepare two basic plans, namely the Comprehensive Development Plan (CDP) (a socio-economic plan) and the Comprehensive Land Use Plan (CLUP) (see Figure 6.2.). A challenge among LGUs, however, is that laws under multiple government agencies require the preparation of a plethora of plans, estimated to be over 30 in total (GOV.PH, 2017[16]). The sheer number of requirements often leads to low absorption of guidelines coming from the national level.

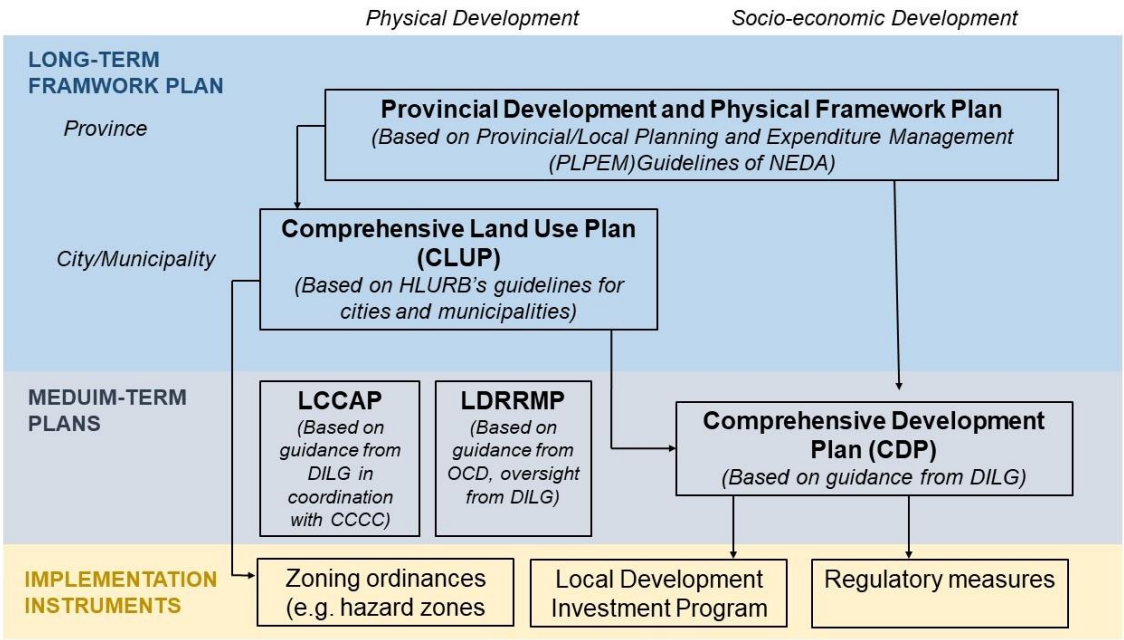
The mismatch between institutional responsibilities and capacities at the local level go beyond CCA and DRM policies (COA.GOV.PH, 2014[7]). For example, national agencies have been receiving complaints from LGUs that one of the basic planning requirements, putting together the CDP, is already overwhelming (GIZ, 2018[17]). While the CDP is a mandatory requirement, as of 2015, less than 50% of LGUs have a CDP in place (GOV.PH, 2017[16]). This has acute consequences for CCA and DRM implementation. A 2013 assessment of LGU compliance to the DRRM Act found that only 23% of LGUs located in flood-prone areas are prepared for disasters in terms of awareness, institutional capacities and co-ordination (SENATE.GOV.PH, 2017[18]).

Capacity constraints at the local level illustrate the importance of policy coherence between CCA and DRM. A common complaint is that while there are respective international communities working on CCA and DRM and two somewhat co-ordinated national communities, at the local level there is often one or two people responsible for the formulation of all initiatives that include a focus on CCA and DRM. New and separate requirements for planning and reporting can impose significant administrative burdens and pressure on already stretched LGUs.

[15] Provinces are required to develop the Provincial Development and Physical Framework Plan (PDPFP) under the guidance of NEDA, as there is no CLUP on provincial level.

The twin challenges of capacity constraints and plan proliferation are widely recognised at the national level, and there are ongoing efforts to promote the mainstreaming of sectoral issues into the CLUP and CDP, the key planning documents at the local level. Figure 6.2. provides an overview of how these key documents are linked to implementation instruments, as well as the role of different national agencies. An example of an implementation instrument would be coastal easements. According to the Water Code of the Philippines, there should be an easement of 40 meters from the highest tide of the shorelines. A CLUP cannot pass the provincial land use committee technical review if easements go below this regulation.

Figure 6.2. Overview of local planning requirements and their links with national agencies



Source: Author's elaboration, based on DILG local government handbook

Key national government agencies have developed various guidelines and references that encourage and build capacity for LGUs to mainstreaming climate change adaptation and disaster risk management into the planning process. These include:

- Department of Interior and Local Government (DILG) created Local Planning Illustrative Guide: Preparing and Updating the Comprehensive Development Plan (CDP) in 2017. This includes entry points for mainstreaming CCA and DRM.
- DILG created an LGU Guidebook on the Formulation of Local Climate Change Action Plan Book 4 in 2017 (first version released in 2014). The guidebook focuses on helping LGUs define their local priority actions for adaptation, and detailing the relevant scale (area of implementation) and time (short, medium, long term).
- The Housing and Land Use Regulatory Board (HLURB) updated its' 2006 CLUP guidance in 2014 in compliance with the CCA Act and the DRRM Act that require that CCA and DRM are mainstreamed in all national and local development plans.
- NEDA has prepared guidance on mainstreaming DRR and CCA in the Provincial Development and Physical Framework Plans.

While the burden of planning can seem heavy, the preparation of such plans is intended to guide LGUs in identifying programmes and projects in support of various sectoral objectives, and ultimately as a basis for

budget support. However, as the LGUs are autonomous entities, there are no sanctions imposed on them if they are not able to comply with the plans required of them.

A key governance mechanism for DRM at the local level is the Local Disaster Risk Reduction and Management Councils (LDRRMC). Mandated by the DRRM Act, local councils replicate the NDDRMC responsibilities and are tasked with approving, monitoring and implementing LDRRMPs; ensuring that DRM concerns are integrated into local development plans, programmes and budgets; and undertaking evacuation procedures for local residents before disasters. The LDRRMCs are also tasked with preparedness activities through information dissemination and raising public awareness at the local level by, for example, displaying hazard maps in community spaces and disseminating printed information materials.

Where robust LDRRMCs are in place, they can also act as a focal point for mainstreaming climate considerations into DRM plans. Stakeholders interviewed for this study noted that LDRMCs often act as climate change champions, for example, by communicating sea-level rise risk maps at the community-level.

A persistent challenge to the LDRRMC structure is local capacity, echoing broader capacity gaps at the LGU level. Although many LGUs complied with the provision of the act and set up LDRRMCs, others failed to hire permanent personnel due to fiscal limitations. In several instances, DRRM personnel assignments and institutional involvement remained ad hoc and temporary (COA.GOV.PH, 2014[7]). The lack of permanent personnel then makes capacity building within LGUs more difficult (Domingo and Olaguera, 2017[14]) In addition, the NDRRMC does not have the capacity to supervise all the local councils (Alcayna, T.; Bolletino, V.; Dy, P.; Vinck, 2016[19]).

Data and information

Credible and transparent information on hazards, exposure and vulnerabilities are required to inform CCA and DRM planning. In addressing climate change, historical records need to be complemented with projections of how trends might change in the future (OECD, 2015[20]). Given that better information will become available and new risks will become apparent over time, the analysis of climate risks needs to be an iterative process that monitors the evolution of risks and communicates these to the decision makers and stakeholders who most need this information (OECD, 2015[20]).

There has been steady progress in the Philippines in responding to climate and disaster related information needs. DOST, through the Philippines Atmospheric, Geophysical and Astronomical Services Administration (PAGASA), provides early warnings and daily weather forecasts, as well as a medium to long-term weather outlook. PAGASA is currently working on moving from assessing hazards to assessing risks. This implies a shift from passive weather forecasting to a multi-hazard impact-based early-warning system and forecasting which integrates climate information. For example, in advance of recent typhoon-related flood events in Manilla, PAGASA issued a yellow ‘take action’ weather warning which alerted communities to the risk (GOV.UK, 2017[21]). In the recent past, general weather forecasts needed to be interpreted by individuals, as they would provide a warning of heavy rains but not the risk of flood (see Box 6.3).

Box 6.3. Lessons learned from Typhoon Yolanda

In December 2013, Typhoon Yolanda left over 6,000 people dead and millions displaced. While the extreme damage and loss of life from Yolanda were mainly due to the strength of the storm and the geographic exposure of the Philippines, areas of disaster preparedness have since been improved. These include:

1. **Communicating risks** - While the area hit hardest by the storm received early warnings, many communities were unfamiliar with the term "storm surge". As the Philippines has so many regional languages, PAGASA did not have a local term to properly communicate the uncommon phenomenon to everyone. After the disaster, PAGASA has worked with linguists to craft simpler meteorological terms to ensure that the dangers from disaster risks are fully understood by all.
2. **Improvements in forecasting** - Tropical typhoons are notoriously one of the most difficult weather phenomena to predict. While Yolanda's track was predicted accurately using a global forecasting model, its intensity was underestimated. Working in partnership with UK Aid and the UK Met office, PAGASA has worked to improve its forecasting with the following results:
   - Better forecast representation of the low pressure associated with tropical storms, which helps with forecasting storm intensity.
   - Improved model initialisation, which increases forecast accuracy and has pushed the timeline of forecasting typhoon landfall from 24 hours to 36 hours.

Source: (Jibiki et al., 2016[22]) (GOV.UK, 2017[21])

Whilst PAGASA and other information providers produce a lot of weather and climate information, the uptake of such information is limited. One reason is that many potential end-users (such as sectors and communities) are not aware of what information is available and how it can be accessed. Further, there is a lack of capacity to analyse and interpret climate information across government, but most acutely at the local government level. This is particularly problematic given the role of LGUs in DRM and CCA planning. Further, while many information sources exist, comparability and usability are often limited. For example, interviewees noted that many sources of information are only available as downloadable pdfs, which makes it difficult to use them as input data in decision-making processes. In others cases, the data may have to be officially requested in writing or require payment to access.

The lack of and difficulty in accessing adequate DRM and CCA data and information compounds existing challenges around CCA and DRM coherence and implementation. Data management systems need to be developed to facilitate data sharing and access to decision-relevant information. Recent efforts from the government demonstrate recognition for the need to centralise information and facilitate access (see Box 6.4). Given that the initiative is still recent, it is too early to evaluate its effectiveness.

Box 6.4. The GeoRiskPH Initiative – Centralising information needs

The "Geospatial Information Management and Analysis System for Hazards and Risk Assessment in the Philippines" (GeoRiskPH) is a recent initiative by the Philippine Institute of Volcanology and Seismology (PHIVOLCS), supported by the Department of Science and Technology (DOST). Partner agencies include PAGASA, National Mapping and Resource Information Authority (NAMRIA), Mines and Geosciences Bureau (MGB) and OCD. The goal of GeoRiskPH is to be the Philippines' central source of information for accurate and efficient hazards and risk assessment. It aims to address issues such as mapping inaccuracies, gaps, overlaps and duplication of efforts that are due to the absence of mapping standards, protocols and codes.

The project is in the development phase, with a focus on web and mobile applications to enable easy access to hazard and disaster exposure data, which can be used by government and other stakeholders to perform hazards and risk assessment. All participating government agencies agreed to contribute their individual data to the GeoRiskPH platform at a Cabinet Meeting on July 1, 2019.

Source: Interviews

Risk and vulnerability assessments are also key tools for informing planning processes to identify and prioritise investments. There is current momentum to standardise one such tool, *The Climate and Disaster Risk Assessment* (CDRA). The CDRA generally consists of:

- identifying different hazards and hazard-prone areas;
- evaluating the likelihood of occurrence and severity of consequence of different hazards;
- understanding exposure for different critical areas (e.g. population, infrastructure, natural resources);
- recommending appropriate measures for CCA and DRM (GOV.PH, 2017[23]).

An ongoing challenge that has created confusion in implementation and generated possible inefficiencies is that different national institutions (e.g. NEDA, CCC, NDRRMC, DILG) promote slightly different versions of the climate and disaster risk assessments, with different definitions and methodologies. This inconsistency is partly due to the desire of national agencies to make the process less resource intensive to ensure that lower income (and thus lower capacity) LGUs were not excluded from the risk assessment process due to requirements they cannot meet. More importantly, the variations in the different methodologies reflect the specificities of the policy planning processes they serve.

Similar to capacity gaps around governance and planning, at the LGU level, challenges remain in conducting climate and disaster risk assessments. This in turn impairs subsequent planning and implementation processes, including efforts to access domestic CCA and DRM funds. There is an additional gap in translating information LGUs collect on local vulnerabilities back up to the national level so that these can be factored into those planning processes as well.

Implementing measures

While the Philippines has made progress in their DRM and CCA policies, obstacles remain in implementation. There are two major overarching challenges:

1. **Weak risk reduction regulation, incentives and enforcement:** Poor regulation in the construction of buildings and other physical establishments in disaster-prone areas contributes to increased risks in communities. The lack of governance and weak enforcement of disaster management-related policies and laws have led to the proliferation of establishments and informal settlers in low-lying and

high-risk areas in the Philippines. For example, in many LGUs, appropriate building codes and standards are compromised to reduce construction costs (COA.GOV.PH, 2014[7]). Other examples include the low uptake of mandatory insurance for public buildings, and low compliance with wastewater disposal requirements (see Box 6.8 on the temporary Boracay closure).

2. **Low risk reduction investments at the local government level.** As described in the preceding section, LGUs face significant capacity constraints, meaning limited resources need to cover a wide range of priorities. CCA and DRM investments must compete against the demand for funding from other development priorities of LGUs, which often have more immediate visibility and pay-off. In addition, while there is a dedicated budget for DRM at the local level (see section on financing), LGUs often lack the technical capacity to identify effective risk reduction measures, and therefore may end up spending the dedicated funding on low-hanging measures such as response equipment.

In addition to these overarching challenges, the remainder of this section focuses on three key areas which are of high importance for the integration of CCA and DRM: encouraging climate and disaster resilient infrastructure, the use of nature based solutions and building back better after a disaster occurs.

Climate Resilient Infrastructure

The Philippines is in the process of undertaking massive infrastructure investment and it is critical that climate change and disaster risks are considered in these projects. Decisions made about the location, construction and operation of infrastructure strongly influences the Philippines future vulnerability and resilience to the impacts of climate related disaster risk. First, the location of infrastructure networks can drive development patterns and has the potential to increase the concentration of people and assets in areas of high exposure to hazards. Second, the way infrastructure is built and maintained can increase vulnerability if plans do not account for changing conditions. The long-lived nature of infrastructure assets means that decisions made now will lock-in vulnerability if they fail to consider climate impacts (Vallejo and Mullan, 2017[24]).

The “Build, Build, Build” agenda of the current government plans to intensify investments on public infrastructure whilst addressing implementation bottlenecks, ensuring the readiness of infrastructure projects in the pipeline and enhancing the absorptive capacities of implementing agencies in project preparation, development and implementation (GOV.PH, 2017[25]). This agenda plans to spend an ambitious USD 180 billion on infrastructure over the next decade. This investment will cover 75 flagship projects, which include six airports, nine railways, 32 roads and bridges, ten water resource projects, as well as irrigation systems that will raise agricultural output; and five flood control facilities (GOV.PH, 2017[25]). Given the high exposure of the country to both sudden events and slow-onset change such as sea-level rise, it is crucial that these new investments are assessed both for their individual resilience to disasters but also how they contribute to the resilience of the country as a whole. Box 6.5 provides examples of how other countries have added extra safety margins for climate impacts.

Box 6.5. Incorporating sea-level rise margins into coastal defence infrastructure in OECD countries

A measure that is being used in OECD countries to manage the impacts of sea-level rise is applying a climate change safety margin during the design process for coastal defence infrastructure, such as dykes, levees and seawalls. Coastal defence infrastructure is designed to achieve a level of service (such as protecting a community from a 100-year flood), and in general, this level of service is determined using historical climate information, which does not incorporate changing conditions. Several countries have updated design standards to include a climate change safety margin, such as Denmark, Germany, the Netherlands and the United Kingdom. For example, in Germany, dyke crests have been widened in order to address uncertainty in future sea-level rise.

Source: (OECD, 2019[26])

The use and enforcement of up-to-date building codes are another opportunity to mainstream climate and disaster risk considerations into infrastructure investment. In the Philippines, the National Building Code[16] was issued in 1977, and did not account for natural hazards. DPWH is in the process of reviewing and revising the code, with the support of the World Bank, in order to integrate disaster risk reduction measures for earthquakes (World Bank, 2016[27]), as well as incorporate wind load related to typhoons. The process of revising the building code should be used as an opportunity to incorporate future climate considerations as well.

The use of nature-based solutions

Healthy natural systems can provide many of the key services communities seek from engineered, hard infrastructure — for example, mangroves can provide coastal protection by reducing the impact of waves, storm surge and coastal erosion. Nature-based solutions (NBS) are an approach to risk management that involve working with nature and enhancing ecosystem services to help address societal goals. Actions cover a spectrum of interventions, from protecting, restoring and improving the management of marine or terrestrial ecosystems, to the creation of natural processes in modified or artificial ecosystems (Nesshöver et al., 2017[28]). A key advantage of the use of NBS for disaster management in the context of climate change is that they can be flexible in the face of changing conditions if not disturbed (Spalding et al., 2014[29]). In addition, NBS can provide co-benefits in a way hard infrastructure may not. Looking again at mangroves, they provide coastal protection, but can also support fisheries and food security, timber, non-timber forest products, tourism and act as a significant carbon sink (Narayan et al., 2016[30]).

The Philippines has a high level of ecosystem degradation, which has increased vulnerability to climate and disaster risks. For example, modelling based on the Philippines's current population found that the mangroves lost between 1950 and 2010 have resulted in increases in flooding to more than 267,000 people every year (Tercek, 2017[31]). At the same time, there is a strong economic case to protect, manage and restore ecosystems given the valuable services they provide. Continuing with the mangrove example, restoring mangroves would bring more than USD 450 million per year in flood protection benefits (Tercek, 2017[31]). Existing mangroves currently protect 613,000 people from flooding, of which 23% live in poverty (Tercek, 2017[31]).

National CCA policies in the Philippines identify the critical linkages between people and their surrounding ecosystems. In addition, there is a good level of awareness among national and regional policy makers of

[16] In 2016, The Philippine Green Building Code was released, which aims to improve building efficiency to mitigate negative environmental impacts of the building sector.

the importance of healthy ecosystems to support development priorities. For example, the NCCAP has specific programmes and strategies for adaptation relevant to NBS, which include “enhancing adaptive capacity and resilience of communities and natural ecosystems to climate change” and “adopting the total economic valuation of natural resources while ensuring biodiversity conservation” (NCCAP). However, capacity gaps and governance challenges have in many cases hindered implementation. For example, while the HLURB 2014 CLUP guidance promotes the importance of a “ridge to reef” ecosystem approach to land-use planning, it lacks clear guidance around responsibilities for the implementation of NBS (GIZ, 2018[17]). There is a strong need for government agencies to take a coherent approach to NBS, which includes clear roles for monitoring and enforcement.

Post disaster reconstruction as an opportunity to reinforce climate resilience

In the aftermath of disasters, the reconstruction process, if properly conducted, can be a good opportunity to strengthen resilience to future risks. It also provides an opportunity to construct safer structures by enforcing higher disaster resiliency standards, and promote inclusiveness by addressing socioeconomic vulnerabilities. Linking early response with longer-term recovery and disaster risk reduction remains one of the most persistent challenges of the aid sector globally, largely due to continued under-funding of recovery programmes. Another major challenge in recovery process are the budgetary and procurement rules and prescriptive time periods which observe the fiscal calendar. The post-Typhoon Yolanda experience showed that less than half of the USD 788 million needed for recovery had been received six months after the disaster (Alcayna, T.; Bolletino, V.; Dy, P.; Vinck, 2016[19]). Much of the funding for rehabilitation and recovery came from the national budget.

Financing mechanisms

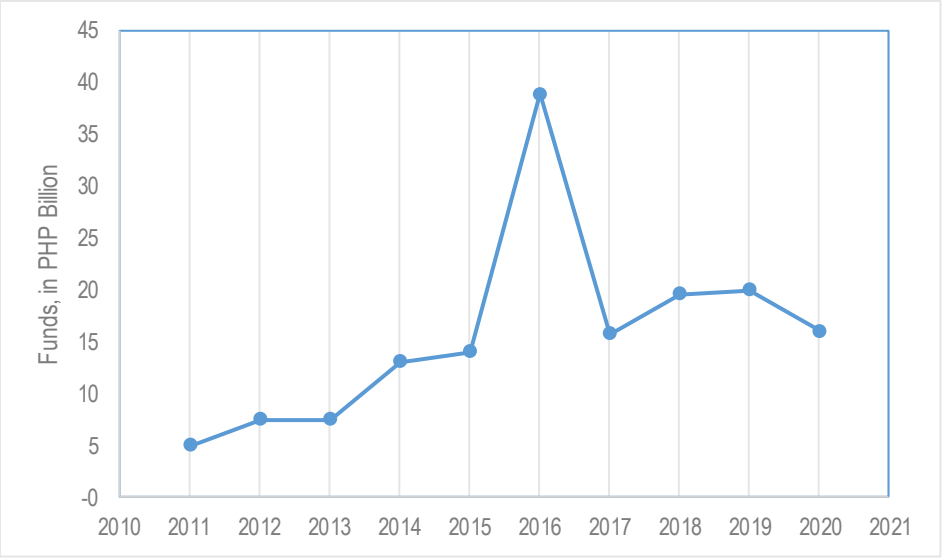
The Philippines has recent experience with the serious short and long-term economic and fiscal impacts of disasters. The ramifications of the USD 12.9 billion in damage and losses caused by Typhoon Yolanda were widespread; national economic activity slowed by nearly a full percentage point in 2013 and another 0.3% in 2014. Approximately 2.3 million people were pushed into poverty as result of these shocks (GFDRR, 2017[32]).

Recognising the high economic and fiscal risks associated with its vulnerability to disasters, the Philippines has devoted considerable effort to increasing its financial resilience to disasters. The government has put a mixture of arrangements in place for climate and disaster risk management, which includes dedicated funds for preparedness investments, contingency funds in anticipation of potential disaster events and sources of financing to turn to after an event. These instruments are outlined in the section below.

Budgetary instruments

The Philippine DRRM Act establishes a DRM fund at the national level, both to fund prevention and to respond to urgent needs during emergencies. The annual allocation is determined in the national budget upon the approval of the President, as recommended by NDRRMC. Of the total fund amount, 70% is mandated for disaster risk reduction and prevention, and 30% is a Quick Response Fund available for relief, response and recovery programmes (GOV.PH, 2010[33]). Prior to the passing of the DRRM Act, the primary national fund for DRM was known as the Calamity Fund, which was 100% for relief, response and reconstruction. The 70% allocation has been used mostly for rehabilitation and recovery programs, which has had the biggest funding requirement in DRM. The overall allocations to the NDRRM fund have been steadily increasing over the past decade, which can be explained by 1) an increasing political focus on DRM and 2) increasing expenses from damages from increasingly intense typhoons, earthquakes and even human-induced events.

Figure 6.3. NDRRM Fund allocation, 2010-2018



Note: A major increase (178%) in the budget for disaster risk management was observed in 2016 following the devastating impact of typhoon Yolanda in late 2013. Of the PHP 38.9 billion NDRRM budget for 2016, about PHP18.9 billion (nearly 50% of the total) was allocated to the Comprehensive Rehabilitation and Recovery Plan (CRRP) for Typhoon Yolanda-devastated areas. The NDRRM Fund was significantly lower in 2017, which can be attributed to the completion of the CRRP.
Source: (GOV.PH, 2019[34]) (SENATE.GOV.PH, 2017[18])

In theory, part of the 70% allocation of the NDRRM Fund[17] towards prevention can be used for climate adaptation projects. However, in practice, there can be limited funding for prevention. A 2017 review of how the fund was disbursed over the past ten years found that it is mainly used for relief, recovery and reconstruction, due to the high and immediate financing needs in these areas. In some years the amount in the NDRRM Fund has been inadequate to meet post-disaster financing needs, much less risk reduction efforts (Villacin[35]). In addition, disaster prevention activities should be included in the regular budgets of agencies rather than charged to the NDRRMF, as they can be determined in planning exercises and programmed by agencies.

The Local Disaster Risk Reduction and Management Fund (LDRRMF)[18] is the primary instrument for LGUs. The DRRM Act of 2010 requires LGUs to set aside no less than 5% of their annual revenue from regular sources to their LDRRMF. Those contributions are allocated as follows:

- **Quick Response Fund (QRF)** - 30% of the annual LDRRMF allocated for post-disaster financial liquidity. Resources from the QRF are available upon the declaration of a state of calamity at a local (city or higher) or national level by a relevant body.
- **Disaster Mitigation Fund** - 70% of the annual LDRRMF allocated for use in disaster prevention, mitigation, preparedness, response, rehabilitation and recovery projects identified in a city's local disaster risk reduction and management plan and integrated in its annual investment programme.

[17] The NDRRMF covers all disaster risks, including seismic, therefore has a broader scope than CCA in terms of types of hazards covered

- **Special Trust Fund (STF)** - unspent balances of the LDRRMF at the end of a budget year accrue to a special trust fund for use within 5 years for the sole purpose of disaster risk reduction and management activities.

While LGUs have ultimate control over the use of their LDRRMF, the Local Disaster Risk Reduction and Management Councils (LDRRMC) recommend the programmes and projects for which the LDRRMF shall be spent on, based on the Local Disaster Risk Reduction and Management Plan. The structure of the LDRRMF fund can be considered a best practice. By requiring local governments to set aside a portion of their operating budgets for disaster management and encouraging local governments to use a significant portion of that funding for pre-disaster preparedness and risk reduction measures, the Philippines has established the components for a comprehensive local government risk financing system that is well incorporated in existing budgeting structures.

There are also visible limitations to the current scheme, which include:

- There is a wide disparity of overall budgets among LGUs. There is a significant imbalance between the risk exposure of poor, vulnerable LGUs and their available resources to prevent and cope with the impact of disasters, and LGUs with higher vulnerability to disasters often are those which have the lowest income (COA.GOV.PH, 2014[7]). While the act encourages LGUs to invest in disaster risk management, the current system can put LGUs in poorer provinces at a disadvantage as they have lower revenues and fewer available resources for their Quick Response Fund (COA.GOV.PH, 2014[7]).
- All LGUs are not equally prone to disasters, however, the national policy for devolution of finances (see Box 6.6) does not recognise differentiated vulnerabilities.
- Actions in practice often differs significantly from the LDRMMF provision. A 2014 audit found that many LGUs, especially the low-income municipalities, do not usually meet what they plan to set aside as their actually revenue collection is often lower than estimated. Therefore, even if LGUs comply with the mandatory provision for their LDRMMF, they do not usually back it up with actual cash (COA.GOV.PH, 2014[7]).

One option for low-income LGUs is to get additional assistance from the national government by accessing the NDRRMF; however, the process can be resource and time intensive. To be eligible, LGUs must have exhausted their internal resources and have requests reviewed and endorsed by the OCD and the NDRMC. A common criticism is the lengthy and complicated process to gain access to the NDRRMF, as it can take between a few months to years to receive funds (Villacin, 2017[35]). In addition, a 2014 audit found that the Department of Budget and Management (DBM) is not getting requests for supplemental funds from lower income LGUs (COA.GOV.PH, 2014[7]), demonstrating the high complexity of requirements to access funds and capacity constraints.

Box 6.6. Devolution of Power in the Philippines – The Internal Revenue Allotment

The internal revenue allotment (IRA) is provided to allow LGUs to carry out functions that are devolved to them by the Local Government Code (LGC) of 1991. This law decentralised many functions previously handled by the national government with the premise that local governments are nearer to the people, and thus can better respond to their needs and preferences. The LGC of 1991 mandates that IRA is allocated in the following way: 23% goes to provinces and cities each, 34% to municipalities, and 20% to barangays[19]. It is distributed among each group according to the following criteria: 50% based on population size, 25% based on land area and 25% shared equally.

Source: (Canare, 2016[36])

Aside from the NDRRMF, the People's Survival Fund (PSF) also provides financial assistance to projects that address the impacts of disasters and climate change. The PSF was established as a long-term financing stream to support LGUs in their adaptation efforts, and the Philippines is one of few countries with dedicated funding set aside for local level adaptation. The climate act was amended in 2014 to include provisions for an annual PHP 1 billion (USD 22.2 million) fund, with any unused amount being added to the following year's amount (GOV.PH, n.d.[37]). LGUs, NGOs and CSOs are eligible to submit community-led climate change adaptation proposals to the board of the People's Survival Fund, chaired by the finance secretary, which will shortlist and approve projects (GOV.PH, n.d.[37]). Activities eligible to be supported through the fund include adaptation in water resource management, agriculture and fisheries, forecasting and early warning systems, contingency planning, in particular, for droughts and floods, and more. The fund may also serve as a guarantee for risk insurance needs for farmers, agricultural workers and other stakeholders.

Despite the amount of funding available in the PSF, only 6 projects have been approved so far. This reflects the difficulty in getting the balance right between accessibility of funds and fiduciary standards. It is currently technically challenging to get a proposal approved, as proponents need to demonstrate a stringent vulnerability assessment and the effectiveness of their proposed interventions before submitting a proposal. At the same time, projects that receive funding must be well thought out and include a clear adaptation component, as it was noted in a few interviews conducted for this study that LGUs have applied for PSF funding for other priorities with no climate change component. Given the high adaptation needs of the country, it will be important to find ways to improve uptake of the fund, by both potentially easing requirements and supporting LGUs in their applications. One way of providing support would be by making applications of successful projects publicly available, so other LGUs could learn from precedent. Projects that have been approved thus far include addressing the challenge of saltwater intrusion in water supply in the Camotes Islands, in Cebu.

The 2015 Disaster Risk Financing and Insurance Strategy

In 2015, the government formulated a Disaster Risk Financing and Insurance Strategy. The strength of this approach is that it takes stock of existing disaster risk financing measures in the Philippines and positions them within a broad framework of disaster resilience for the country. This reveals key gaps, for example around financial protection at the local level, and availability of funds that can be dispersed quickly. The strategy, elaborated in Table 6.2. , proposes potential instruments that could fill these gaps. The on-going Sunset Review of the DRRM Act should be used as an opportunity to strengthen the standing

[19] A barangay is the smallest administrative division in the Philippines and is the native Filipino term for village, distract or ward

of the Disaster Risk Financing and Insurance Strategy by incorporating it into the Act. This could also be used as an opportunity to make sure climate change considerations are incorporated.

Table 6.2. Disaster Risk Financing and Insurance Strategy

Level	Goal	Measure in place	Gap identified in the strategy	Donors involved
National	Improve the financing of post-disaster emergency *response, recovery and recon*struction needs	• Two contingent credit lines totalling USD1 billion: the first DRM Development Policy Loan with a Catastrophic Deferred Drawdown Option (Cat-DDO) provides the government with up to USD 500 million in rapid liquidity in the aftermath of a disaster. The Cat-DDO was disbursed in December 2011 after Tropical Storm Sendong (Washi), and the World Bank approved a second USD 500 million Cat-DDO (CAT-DDO 2) in December 2015. This new credit line can be accessed following "a state of calamity" declared by the President. The CAT-DDO 2 gives the Philippines flexibility to use the funds as needed. • Use risk transfer to access international private reinsurance and capital markets. Php 1 billion in 2017 and Php 2 billion in 2018 were allocated for risk insurance under the national budget, and were reinsured under a parametric insurance scheme.	• The need to take stock of the contingent liabilities facing the government by gathering and developing the necessary risk information to analyse likely government spending for future disasters.	The World Bank, JICA
Subnational/ Local	Improve the financing of post-disaster emergency response, recovery and reconstruction needs	• A pilot to establish a Local Disaster Insurance Fund. The government is currently working with provinces to establish a catastrophe risk insurance facility to improve access to quick liquidity for emergency response and early recovery. • A pilot to establish a city-level risk pool.	• The need to improve compliance of LGUs in terms of purchasing insurance from the GSIS for public property.	ADB, the World Bank
Individual	Empower poor and vulnerable households and owners of small and medium-sized enterprises to quickly restore their livelihoods after a disaster.	• n/a	• The need to create private property catastrophe risk insurance for homeowners and small- and medium-size businesses • The need to strengthen the link between disaster risk financing and social protection by establishing a post-disaster emergency income support programme which integrates a post-disaster component in the national conditional cash transfer programme	

Note: Php: Philippine Peso

Work on the DRFI strategy has also highlighted the general challenges that remain around the rollout and uptake of financial protection instruments. These include the social acceptability of insurance, the ability of LGUs and individuals to pay for premiums, the limited practice of saving in the country and low awareness of existing products.

Insurance

Insurance of public assets is mainly provided by the state-owned Government Service Insurance System (GSIS) which indemnifies the government for any damage to, or loss of, its properties due to fire,

earthquake, storm (including typhoons) or other casualty (OECD, 2015[38]). Indemnity insurance provides payouts in accordance with the actual losses suffered by a policyholder. For this to function properly, LGUs must share detailed information on the assets covered under the policy in order to enable GSIS to assess and price the risk to those assets. As the damage assessment process for an indemnity policy can be complex, it can potentially take a long time for LGUs to receive a payout, and once the payout is received, it can typically only be used to repair or replace the specific assets insured under the insurance policy and cannot be "diverted" to support other post-disaster needs. Notwithstanding the GSIS, government assets, particularly those of local governments, are often uninsured or underinsured. While LGUs are legally required to purchase insurance from the GSIS, currently only around 30% of local government properties are actually insured (GOV.PH, 2018[37]).

Box 6.7. Parametric insurance pilots in the Philippines

The Philippines, along with development partners, is working on two parametric insurance pilots to fill gaps in the financial protection of the country against disaster risks. Parametric insurance makes a specified payment upon the occurrence of a triggering event, satisfying pre-agreed characteristics, such as the magnitude of an earthquake or the intensity of a typhoon. Since the payment of claims depends on parametric triggers (and not on actual losses, which take time to assess), claims can be made within weeks compared to several months for traditional insurance. The rapid payouts available through these pilots complement existing post-disaster financing arrangements, such as indemnity insurance purchased through the GSIS which is targeted at longer-term financing needs during the post-disaster reconstruction phase.

The two pilots are:

- The Philippines entered a reinsurance arrangement intermediated by the World Bank in July 2017. Under this pilot, the GSIS will provide USD 206 million in aggregate coverage for national government assets against earthquakes and severe typhoons, and protection against severe typhoons for 25 provinces. This type of insurance acts as the last line of defence, complementing other funding sources such as the NDRRMF, LDRRMF and contingent credit that protects against less severe events.
- The Department of Finance is with technical assistance from the Asian Development Bank exploring the feasibility of a Philippine City Disaster Insurance Pool (PCDIP). Initial coverage would include earthquakes and typhoons that in the future could be expanded to also include flood coverage. Upon the occurrence of a triggering event, payments would be made within 15 business days (ADB, 2018[39]).

Budget Tracking

The DBM, CCC and DILG have established an initiative on Climate Change Expenditure Tagging (CCET) at the national and local level that came into effect in 2015. The purpose of this initiative is to track, monitor and report climate change programmes, activities and projects. This is to support the assessment of the status of the country's response to climate change and ideally to guide improvements of its effectiveness. The amount tagged for each budget year has been increasing: from PhP 137.1 Billion (USD 2.64 Billion) in 2016 to PhP 204.6 Billion (USD 3.94 Billion) in 2017 and to PhP 276.1 Billion (USD 5.32 Billion) in 2018 (GOV.PH, 2018[40]). The same tagging arrangement for climate change expenses between the CCC and the DBM could be adopted by the NDRRMC/OCD and the DBM to get a better sense of DRRM-related spending. This would also enable more coherence between the two areas.

Monitoring, evaluation and learning

In terms of climate change adaptation at the national level, monitoring and reporting on the NCCAP implementation progress has been challenging, as systems are not in place to collect and integrate results from various line agencies. The CCC has overall responsibility of monitoring, reporting, and evaluating the progress of the NCCAP implementation. While national agencies do report on the activities they are implementing, they do not necessarily collect or provide information on the results. Further, there are no guidelines to ensure that the collected information can be aggregated across activities.

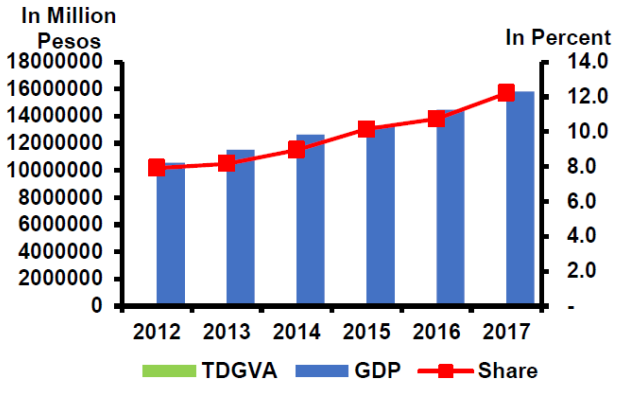
For disaster risk management, the DRM law assigns the task of monitoring, evaluation and co-ordination to the OCD. The OCD faces similar challenges as the CCC, where line agencies report on implementation but not results. The OCD is also tasked with monitoring local implementation, however, interviews noted that the DILG is in a better strategic and resource position to review and make recommendation on LGU plans. While the OCD has the mandate for this work under the DRRM Act, the task requires some actions and resources that may be better suited to the capacities of the DILG.

At the local level, some LGUs have begun to develop and implement LCCAPs (often as part of their CLUPs). However, no system is in place to monitor, review and learn from these plans, within LGUs, but also across LGUs. The situation is quite similar for local DRRM implementation; while policy development (e.g. the creation of a plan) is reported, their implementation and the subsequent results are not (COA.GOV.PH, 2014[7]). Noting that capacity constraints consistently are cited as an important barrier to implementation, an approach in addressing these constraints could be to monitor the progress and challenges of local implementation, to guide the CCC and NDDRMC in tailoring their support to the LGUs. In addition, communities often have their own mechanisms to manage disaster risks, and documenting and sharing the experiences of communities from previous disasters could contribute to a sustainable disaster management system with strong community ownership.

Focus on the Tourism sector

Tourism is a fast growing sector in the Philippines (see Figure 6.4.), and contributes to the economic growth and well-being of local communities. In 2017, the tourism industry contributed 12.2% to the country's economy, playing an important role in advancing development (GOV.PH, 2018[2]). Employment in tourism was estimated at 5.3 million in 2017, and share of employment in tourism to total employment in the country was recorded at 13.1% in 2017 (GOV.PH, 2018[2]).

Figure 6.4. Share of Tourism to GDP, Philippines: 2012-2017



Source: GOV.PH (2018), *Contribution of Tourism to the Economy is 12.2 Percent in 2017*, https://psa.gov.ph/sites/default/files/PR_PTSA%202017%200606.pdf

Given the overall exposure of the country to hazards, many popular touristic areas are highly prone to disasters and vulnerable to increasing impacts from climate change. As the Philippines is an archipelago, many of its tourist destinations are in coastal and marine areas, which are vulnerable to sea level rise, drought conditions, monsoon rains and sea surface temperature changes. Beach erosion is already occurring on many islands and is expected to become more pronounced with the effects of sea-level rise, compounded by seasonal typhoons and monsoons (Maguigad, King and Cottrell, 2015[41]). Ilocos, Cagayan Valley, Central Luzon, Central Visayas, and Western Visayas are projected to lose over 50% of their existing coastal wetlands by 2100 (Cruz, 2017[8]). Other changes already observed by locals include (i) damage to historically resilient property (e.g., hotels, resorts, houses) during tropical cyclones or low pressure area; (ii) a number of houses relocated due to coastal erosion; and (iii) older homes and established trees washed out during tropical cyclones and (iv) coral bleaching (Cruz, 2017[8]).

Climate change and disaster risks affect the lives and livelihoods of many who are dependent on the tourism industry. Disaster events have direct impacts – the devastation of Yolanda included closure of and damages to popular hotels, beach resorts and dive sites. Slow onset events can also bring long-term consequences. To illustrate, estimates of the impacts of coral bleaching in El Nido Resort are roughly USD 1.5 million a year in losses to the local economy (GOV.PH, 2014[9]).

Depending on how it is managed, the tourism sector can contribute to continued environmental degradation, which increases vulnerability. Large-scale developments have increased pressure on fragile ecosystems in the Philippines, especially in coastal zones. These impacts include destruction of local biodiversity (including mangroves and coral reefs which in turn increases vulnerability), pollution, introduction of invasive species and land erosion (Nitivattananon and Srinonil, 2019[42]). As reported in the NCCAP, as coastal populations have increased, so has excavation, dredging and coastal transformation to accommodate coastal development practices. The recent closure of Boracay provides an example of the potential damage from unrestrained tourism development (see Box 6.8).

Box 6.8. Boracay closure and the enforcement of environmental regulation

Boracay is a small island in the Western Visayas, known for its striking natural beauty and white sand beaches. In 2017 alone over 2 million people visited it, many of them arriving en masse from cruise ships. Increasing numbers of visitors has put an immense strain on the islands' fragile ecosystems. In addition to the mass influx of people, environmental degradation over the years has been driven by fast-growing development, encroachment of structures along the coastline and poor implementation and enforcement of environmental regulations. For example, a 2017 DENR survey found that 716 of 834 businesses and residences lacked wastewater permits and many were discharging sewage into the sea. Furthermore, unsustainable tourism and construction practices led to beach erosion, needing stricter regulations.

In April 2018, the President ordered the closure of the island for six months to undertake a large-scale clean-up operation. Authorities limited the number of tourists to 6,400 a day, required hotels and other businesses to install proper sewage treatment systems, mandated that tourists stay in government-accredited hotels with proper sanitation, banned single-use plastics, created steep fines for littering and required recreational vehicles to operate more than 100 meters offshore. The island partially reopened to tourists in October 2018, although full rehabilitation will take at least two years.

The abrupt closure of Boracay gave weight to the governments renewed seriousness on environmental regulation, and could potentially serve as a signal that environmental policies elsewhere will be reinforced. However, while the closure of the island had great benefits for the natural environment and for the long-term sustainability of the tourism trade in Boracay, it had serious short-term social and economic repercussions for those whose livelihood depended on the income from the tourism sector.

Source: (Reyes et al., 2018[43])

At the same time, tourism can be leveraged to increase resilience. The town of San Vincente, in Palawan, provides a concrete example. The government's Tourism Infrastructure and Enterprise Zone Authority (Tieza)[20] has concentrated on a series of infrastructure investments in the area to promote tourism, which include the completion of San Vicente Regional Airport, as well as new sewage and water facilities. Tieza has additionally created a "one-stop-shop" for investors in the area, which streamlines permitting, enforces environmental regulation and insures investments follow the town's vision of sustainable development (GOV.PH, 2018[44]). Funding from Tieza has additionally been used to hire consultants to develop San Vincentes CDP, which incorporated climate considerations. CCA measures include the imposition of a 50-meter setback at the principal beach, even when the national law on coastal easement requires only 40 meters of foreshore clearance for any structure being put up near the sea (GOV.PH, 2018[44]). This has both tourism (bigger beach) and climate change (bigger buffer against sea level rise) benefits. Another measure is a restriction that coastal property owners keep at least half of their lots as green and open spaces. One of the main motivations for linking environmental protection, climate adaptation and tourism development was to limit the damage to tourism revenues caused by environmental degradation in other big sites, such as El Nido and Boracay (GOV.PH, 2018[44]).

There are many examples of positive initiatives where the DOR, the DENR and LGUs have worked to encourage initiatives where tourism revenues support environmental and resilience objectives. These include eco-tourism to help fund mangrove maintenance, hotels and fisher folk collaborating on enforcing

[20] Tieza is an agency under the Department of Tourism responsible for implementing policies and programs of the department pertaining to the development, promotion, and supervision of tourism projects.

marine protected areas, and green hotel certificates incentivising efficient water usage. Some examples include:

- DOT, through its Grassroots Entrepreneurship and Employment in Tourism (GREET) programme, gives assistance to programmes and projects that demonstrate environmental sustainability in concerned regions throughout the country. This assistance is provided in the form of financial aid, provision of skills and knowledge, values formation and other entitlements. The programme seeks to empower communities to be leaders in protecting ecotourism sites by building up their micro, small and medium enterprises.
- DOT has recently included agri-tourism or farm tourism as a priority tourism product in the Philippines. DOT is keen to include climate-smart agriculture in its promotion of agri-tourism, noting that climate-smart agriculture is a "fairly new concept to some" but it is something that the DOT could include in its promotion of farm tourism.
- DOT, with support of the World Bank Group (WBG) and the Asian Development Bank (ADB), launched an initiative called the Transforming Communities towards Resilient, Inclusive and Sustainable Tourism (TouRIST). DOT, WBG and ADB identified the seven targeted destinations for the rollout of its program: Bohol, Siargao, Siquijor, Davao City, Samal Island, Coron and El Nido in Palawan. Among the objectives of the TouRIST project, is to develop the capacity of local stakeholders to protect and conserve healthy oceans and rehabilitate key biodiversity–based tourism sites in order to promote sustainable tourism in the country.

While positive examples exist, they remain on an individual project basis without an overall vision for or strategy to link tourism development with increased resilience. DOT has traditionally been a policy planning department and not yet obtained sufficient financial resources or know-how to implement projects or directly support resilience in the tourism industry. Given the important interlinkages between tourism development and resilience building, future efforts are needed to scale up this practice and shift demand towards sustainable tourism, including a greater level of co-ordination between DOT, NEDA, DILG, LGUs, associations of the tourism industry and development co-operation providers. Benefits of such greater co-ordination would also help the tourism sector pursue economies of scale for CCA and DRM initiatives, which have so far been done in a fragmented way with different actors involved and timeframes applied.

The role of development co-operation

Development financing in the Philippines

In the Philippines, development co-operation – both bilateral and multilateral – has played an important role in the context of CCA and DRM in i) providing technical assistance, ii) piloting new initiatives and in iii) bringing initiatives to scale. Examples include support to pilots of parametric financing instruments, such as the Philippine City Disaster Insurance Pool (see Box 6.7), and technical assistance in developing relevant policy instruments. An example is the support provided by the World Bank in suggesting revisions to the National Building Code to include disaster risk reduction measures for earthquakes and to incorporate wind load related to typhoons.

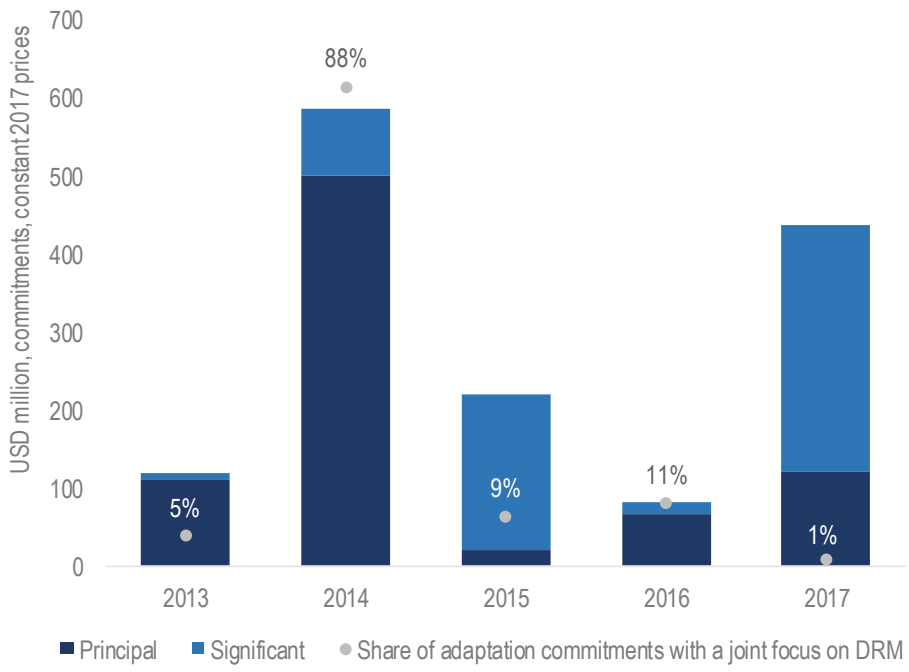
A review of adaptation-related commitments by bilateral providers and other multilateral providers[21] reported into the OECD CRS show considerable variation over the period, ranging from a high of USD 586 million in 2014 to a low of USD 82 million in 2016. In general, the majority of commitments include a significant rather than principal focus on adaptation. This can in part be explained by the fact that over the period 2013-17, nearly half of commitments were targeting three broader sectors: i) general environmental

[21] Other multilateral providers included CIF, GEF, GGGI, IFAD. Commitments from these four funds and initiatives accounted for 4% of total adaptation-related commitments over the period 2013-17.

protection, ii) water supply and sanitation and iii) government and civil society. An examination of the adaptation-related commitments show that only a small share, ranging between 1% and 11%, target the three DRM-linked sub-sectors. Again, this can be linked to the predominant focus on broader sectors that do not necessarily facilitate a focus on DRM. An exception is 2014, when Japan, ADB and the World Bank committed post-disaster stand-by loans following Typhoon Yolanda in November 2013.

Despite its advanced economic status, it is interesting to note for illustrative purposes that the majority of climate-related commitments in 2016 and 2017 focused on adaptation rather than mitigation, for which the use of loans generally is considered more likely to generate returns than for adaptation. In 2016, adaptation accounted for 59%, mitigation for 18% and initiatives with a focus on both adaptation and mitigation for 23%. In 2017, these numbers were 91%, 4% and 5% respectively.

Figure 6.5. Bilateral and other multilateral commitments for adaptation only (2013-17)



Source: (OECD, n.d.[45])

In comparison, adaptation-related commitments from MDBs are recorded only in 2015 (one commitment of USD 498 million) and 2017 (USD 393 million), of which only the commitment from 2015 made by the World Bank includes a focus on disaster preparedness. For 2017, it is worth nothing that while none of the commitments by the Asian Infrastructure Investment Bank and the World Bank are recorded as including a focus on DRM sub-sector codes, all six are in support of flood management in Manila or Metro Manila. In all cases, these commitments are provided in the form of loans.

Examination of the CRS data of activities reported as having a focus on CCA and DRM illustrate that there are efforts to bring the two agendas together. While this analysis highlights the current level of overlap, it is hard to say whether the numbers could or should be different. A shared objective of the Paris Agreement and the Sendai Framework is the emphasis of country ownership and leadership. It is therefore important that support provided by development co-operation is aligned with and supportive of national objectives. Practice to date has shown that development co-operation has played a valuable role in supporting the

government in piloting new initiatives that have proved effective in making the Philippines more resilient to climate risks.

Table 6.3. Examples of commitments to the Philippines that include a focus on both Climate Change Adaptation and Disaster Risk Management

Focus	Year	Description
Disaster prevention and preparedness	2014	A loan, USD 498 million, from the World Bank for Second Disaster Risk Management Development CAT-DDO Policy
	2014	A grant, USD 6.6 million, from the Government of Australia and channelled via UNDP for the Philippines Disaster and Climate Risks Management initiative. Starting in 2005-6, and with a total value of USD 31 million, the objective of this eleven-year initiative is to strengthen the Philippines' capacity for disaster preparedness, by: • supporting institutional strengthening and capacity building for technical agencies on disaster response and monitoring, early warning and forecasting, hazard and risk analysis, climate science and adaptation options to better inform disaster and climate risk management in vulnerable areas; • providing government agencies with technical and policy support on integrating disaster risk management and climate change and mainstreaming across government and development sectors; • improving collaboration and information sharing by facilitating linkages between technical agencies in the Philippines with their Australian counterparts and non-government organisations to support government priorities; • strengthening the capacity of communities to prepare for and respond to disasters; • enhancing the capacity of Post to better respond to disasters and GOP requirements.
Reconstruction, relief and rehabilitation	2014	A loan, USD 470 million, from Japan following Typhoon Yolanda. This is a post-disaster stand-by loan with the objective of enhancing the capacity for disaster risk reduction and management
	2014	A 2014 grant, USD 15 million, from Germany to finance the reconstruction of public, social and economic infrastructure of Typhoon Yolanda affected areas
Emergency response	2014	A grant, USD 1.1 million, from Sweden for material relief and assistance services. Following Typhoon Yolanda, this contribution is in support of UN Organisations and in the form of secondments, base camp material and medical teams
	2013	A grant, USD 140,000, from Iceland in response to emergency appeal of the Red Cross in the aftermath of Typhoon Yolanda. The operation aims to deliver assistance to affected families, focusing on food and non-food relief, un-conditional cash grants, health, psychosocial support, water and sanitation, emergency shelter, shelter repair assistance, transitional shelter and early livelihoods recovery. In addition to meeting the direct needs of affected people, this operation will support the enhancement of PRC's capacity to respond to multiple disasters.

Source: (OECD, n.d.[45])

Challenges and best practices

A good practice in the Philippines is that NEDA serves as a focal point for Development Cooperation, and has organized regular sessions with all Development Cooperation providers who were supporting CCA and DRM efforts. These meetings allow for strong communication between partners, and has minimized duplication in efforts. However, they have steadily decreased in frequency and importance in recent years.

One challenge that remains in the Philippines is moving from capacity building to projects on the ground that increase resilience over the long term. Many existing capacity-building efforts do not have long-term effects, which is in part due to broader systemic issues such as high staff turnover in LGUs. The three-year term of local chief executives, with a maximum of three terms, is also seen as a reason for the lack of continuity of certain LGU initiatives. One way to work on the sustainability of projects is to make sure development cooperation efforts are well aligned with domestic processes and priorities. Strong political commitment guided by clear development objectives has been critical in the success of local projects, coupled with the willingness of the LGU to allocate their resources for such. Development cooperation

could help build capacity in a way that enables LGUs to understand new concepts and paradigms to better access the domestic funding that is available but largely unused in the People's Survival Fund.

Another challenge that must be addressed is ensuring coherence across all development efforts. This means mainstreaming CCA and DRR considerations across all projects, and in particular those that could be maladaptive, such as infrastructure investment that could inadvertently increase vulnerability.

Annex 6.A. Stakeholders interviewed

National Economic and Development Authority, both national and regional office(Our project focal point)
Department of Tourism, both national and regional office
Climate Change Commission
National Disaster Risk Reduction and Management Council
Office of Civil Defense
Housing and Land Use Regulatory Board
Department of Environment and Natural Resources
Department of Finance
Department of Interior and Local Government
Philippines Atmospheric, Geophysical and Astronomical Services Administration
Region 6 Tourism Office
Region 6 Disaster Risk Reduction and Management Office
Manilla Observatory
Development partners (GIZ, KOICA, Australia, ADB)

References

ADB (2018), *Philippine City Disaster Insurance Pool: Rationale and Design*, Asian Development Bank, Manila, https://www.adb.org/sites/default/files/publication/479966/philippine-city-disaster-insurance-pool-rationale-design.pdf. [39]

Alcayna, T.; Bolletino, V.; Dy, P.; Vinck, P. (2016), "Resilience and disaster trends in the Philippines: Opportunities for national and local capacity building | PreventionWeb.net", https://www.preventionweb.net/publications/view/50197 (accessed on 24 May 2019). [19]

Anticamara, J. and K. Go (2017), "Impacts of super-typhoon Yolanda on Philippine reefs and communities", *Regional Environmental Change*, Vol. 17/3, pp. 703-713, http://dx.doi.org/10.1007/s10113-016-1062-8. [6]

Canare, T. (2016), "The relationship between IRA and local government expenditures: evidence from a cross-section of Philippine cities", *Philippine Political Science Journal*, Vol. 37/3, pp. 167-189, http://dx.doi.org/10.1080/01154451.2016.1236476. [36]

COA.GOV.PH (2014), *Assessment of Disaster Risk Reduction and Management (DRRM) at the Local Level Commission on Audit 2014 1 Assessment of Disaster Risk Reduction and Management (DRRM) at the Local Level*, https://www.coa.gov.ph/phocadownloadpap/userupload/DRRM/Assessment_of_DRRM_at_the_Local_Level.pdf (accessed on 15 July 2019). [7]

Cruz, R. (2017), *2017 Philippine Climate Change Assessment: Impacts, Vulnerabilities and Adaptation*. [8]

Domingo, S. and M. Olaguera (2017), *Philippine Institute for Development Studies Policy Notes Have we institutionalized DRRM in the Philippines?*, https://pidswebs.pids.gov.ph/CDN/PUBLICATIONS/pidspn1712.pdf (accessed on 24 July 2019). [14]

GFDRR (2017), *Comprehensive Financial Protection in the Philippines*, https://www.gfdrr.org/sites/default/files/publication/Philippines%20RiR%20v1.pdf (accessed on 1 March 2020). [32]

GFDRR (2016), *The Philippines: Country Profile*, https://www.gfdrr.org/sites/default/files/publication/PHILIPPINES2016.pd (accessed on 26 March 2020). [11]

GIZ (2018), *Entry Points for Mainstreaming Ecosystem-based Adaptation The Case of Philippines*, https://www.adaptationcommunity.net/wp-content/uploads/2018/06/EbA_Entry-Points_Philippines.pdf (accessed on 4 June 2019). [17]

GOV.PH (2019), *Status of National Disaster Risk Reduction and Management Fund*, https://www.dbm.gov.ph/index.php/programs-projects/status-of-national-disaster-risk-reduction-and-management-fund (accessed on 6 August 2019). [34]

GOV.PH (2018), *Cabinet Cluster on CCAM-DRR*, http://climatechange.denr.gov.ph/index.php/programs-and-activities/cabinet-cluster-on-ccam-drr (accessed on 8 August 2019). [15]

GOV.PH (2018), *Contribution of Tourism to the Economy is 12.2 Percent in 2017*, https://psa.gov.ph/sites/default/files/PR_PTSA%202017%200606.pdf (accessed on [2]

25 July 2019).

GOV.PH (2018), *DBM Secretary discusses climate and infrastructure financing on second day of World Bank Annual Meetings*, https://www.dbm.gov.ph/index.php/secretary-s-corner/press-releases/list-of-press-releases/853-dbm-secretary-discusses-climate-and-infrastructure-financing-on-second-day-of-world-bank-annual-meetings (accessed on 25 July 2019). [40]

GOV.PH (2018), *San Vicente Flagship TEZ – the newest eco-town in the Philippines | Tourism Infrastructure and Enterprise Zone Authority (TIEZA)*, https://tieza.gov.ph/san-vicente-flagship-tez-the-newest-eco-town-in-the-philippines/ (accessed on 16 September 2019). [44]

GOV.PH (2017), *Accelerating Infrastructure Development*, http://www.neda.gov.ph/wp-content/uploads/2018/10/PIP-2017-2022-19.pdf (accessed on 4 August 2019). [25]

GOV.PH (2017), *Enhanced LGU Guidebook on the Formulation of Local Climate Change Action Plan (LCCAP) Book 4*, http://www.lga.gov.ph (accessed on 9 August 2019). [23]

GOV.PH (2017), *Local Planning Illustrative Guide: Preparing and Updating the Comprehensive Development Plan (CDP)*, https://dilg.gov.ph/PDF_File/reports_resources/dilg-reports-resources-2017110_298b91787e.pdf (accessed on 8 August 2019). [16]

GOV.PH (2014), *Second National Communication to the United Nations Framework Convention on Climate Change Philippines*, https://unfccc.int/sites/default/files/resource/phlnc2.pdf (accessed on 25 July 2019). [9]

GOV.PH (2010), *R.A. No. 10121, Philippine Disaster Risk Reduction and Management Act of 2010*, https://www.lawphil.net/statutes/repacts/ra2010/ra_10121_2010.html (accessed on 25 July 2019). [33]

GOV.PH (n.d.), *People's Survival Fund (PSF)*, http://psf.climate.gov.ph/ (accessed on 8 March 2020). [37]

GOV.UK (2017), *Improving resilience to severe weather and climate change in the Philippines*, Met Office, https://www.metoffice.gov.uk/binaries/content/assets/metofficegovuk/pdf/business/international/17_0015-pagasa_case_study_final.pdf (accessed on 9 August 2019). [21]

Hallegatte, S. et al. (2016), "Shock Waves: Managing the Impacts of Climate Change on Poverty", *Climate Change and Development Series*, http://dx.doi.org/10.1596/978-1-4648-0673-5. [13]

Jibiki, Y. et al. (2016), "Analysis of early warning systems: The case of super-typhoon Haiyan", *International Journal of Disaster Risk Reduction*, Vol. 15, pp. 24-28, http://dx.doi.org/10.1016/J.IJDRR.2015.12.002. [22]

Maguigad, V., D. King and &. Cottrell (2015), *Political Ecology, Island Tourism Planning, and Climate Change Adaptation on Boracay*, http://dx.doi.org/10.20958/uis.2015.9 (accessed on 25 July 2019). [41]

Narayan, S. et al. (2016), "The Effectiveness, Costs and Coastal Protection Benefits of Natural and Nature-Based Defences", *PLOS ONE*, Vol. 11/5, p. e0154735, http://dx.doi.org/10.1371/journal.pone.0154735. [30]

Nesshöver, C. et al. (2017), "The science, policy and practice of nature-based solutions: An [28]

interdisciplinary perspective", *Science of The Total Environment*, Vol. 579, pp. 1215-1227, http://dx.doi.org/10.1016/J.SCITOTENV.2016.11.106.

Nitivattananon, V. and S. Srinonil (2019), "Enhancing coastal areas governance for sustainable tourism in the context of urbanization and climate change in eastern Thailand", *Advances in Climate Change Research*, Vol. 10/1, pp. 47-58, http://dx.doi.org/10.1016/J.ACCRE.2019.03.003. [42]

OECD (2019), *Responding to Rising Seas: OECD Country Approaches to Tackling Coastal Risks*, OECD Publishing, Paris, https://doi.org/10.1787/9789264312487-en. [26]

OECD (2015), *Climate Change Risks and Adaptation: Linking Policy and Economics*, OECD Publishing, Paris, https://dx.doi.org/10.1787/9789264234611-en. [20]

OECD (2015), *Disaster Risk Financing: A global survey of practices and challenges*, OECD Publishing, Paris, https://dx.doi.org/10.1787/9789264234246-en. [38]

OECD (n.d.), *OECD Creditor Reporting System*, https://stats.oecd.org/Index.aspx?DataSetCode=CRS1 (accessed on 24 February 2020). [45]

Oxford Business Group (2018), *The Report: Philippines 2018*, https://oxfordbusinessgroup.com/philippines-2018 (accessed on 4 August 2019). [10]

PSA (2019), *Proportion of Poor Filipinos was Estimated at 16.6 Percent in 2018*, Philippine Statistics Authority, https://psa.gov.ph/poverty-press-releases/nid/144752 (accessed on 24 February 2020). [3]

Reyes, C. et al. (2018), "The Boracay Closure: Socioeconomic Consequences and Resilience Management", https://pidswebs.pids.gov.ph/CDN/PUBLICATIONS/pidsdps1837.pdf (accessed on 14 September 2019). [43]

SENATE.GOV.PH (2017), "Examining the Philippines' Disaster Risk Reduction and Management System", https://senate.gov.ph/publications/SEPO/PB_Examining%20PH%20DRRM%20System_05June2017.pdf. [18]

Spalding, M. et al. (2014), "The role of ecosystems in coastal protection: Adapting to climate change and coastal hazards", *Ocean & Coastal Management*, Vol. 90, pp. 50-57, http://dx.doi.org/10.1016/J.OCECOAMAN.2013.09.007. [29]

Tercek, M. (2017), *Mangroves: A Star Player in the Coastal Protection Game*, The Nature Conservancy, https://www.nature.org/en-us/about-us/who-we-are/our-people/mark-tercek/mangroves-a-star-player-in-the-coastal-protection-game/ (accessed on 12 June 2019). [31]

UNDRR (2015), *The human cost of weather-related disasters 1995-2015*, https://www.unisdr.org/we/inform/publications/46796 (accessed on 1 August 2019). [5]

Vallejo, L. and M. Mullan (2017), "Climate-resilient infrastructure: Getting the policies right", *OECD Environment Working Papers*, No. 121, OECD Publishing, Paris, https://dx.doi.org/10.1787/02f74d61-en. [24]

Verburg, P. et al. (2006), "Analysis of the effects of land use change on protected areas in the Philippines", *Applied Jeography*, Vol. 26/2, pp. 153-173, http://dx.doi.org/10.1016/j.apgeog.2005.11.005. [12]

Villacin, D. (2017), *A Review of Philippine Government Disaster Financing for Recovery and Reconstruction*, Philippine Institute for Development Studies, Quezon City, https://pidswebs.pids.gov.ph/CDN/PUBLICATIONS/pidsdps1721.pdf (accessed on 1 August 2019). [35]

World Bank (2019), *Philippines Overview*, https://www.worldbank.org/en/country/philippines/overview (accessed on 11 June 2019). [1]

World Bank (2018), *World Bank Climate Change Knowledge Portal for global climate data and information: Philippines*, https://climateknowledgeportal.worldbank.org/country/philippines (accessed on 25 July 2019). [4]

World Bank (2016), *Mainstreaming Risk Reduction in the National Building Code: Protecting Lives and Property from Disaster Risk in the Philippines*, https://www.worldbank.org/en/news/feature/2016/06/27/mainstreaming-risk-reduction-in-the-national-building-code-protecting-lives-and-property-from-disaster-risk-in-the-philippines (accessed on 1 August 2019). [27]

Common Ground Between the Paris Agreement and the Sendai Framework

CLIMATE CHANGE ADAPTATION AND DISASTER RISK REDUCTION

Countries are faced with the growing challenge of managing increasing risks from climate change and climate variability, putting development and the achievement of the Sustainable Development Goals at risk. The adoption in 2015 of the Sendai Framework for Disaster Risk Reduction and the Paris Agreement on climate change provides a clear mandate for increased coherence in countries' approaches to climate and disaster risk reduction. Countries increasingly recognise the benefits of improved coherence between the two policy areas, exemplified by the number of countries that either have developed joint strategies or put in place processes that facilitate co-ordination.

Informed by the country approaches of Ghana, Peru and the Philippines, in addition to a review of relevant literature, this report examines the potential for increased coherence in approaches to climate change adaptation and disaster risk reduction across levels of government and sectors. It identifies ways in which government officials, development co-operation and other stakeholders can support efforts to further enhance coherence between the two policy areas, not only in the three case study countries, but also those in other countries as well as providers of development co-operation.

Consult this publication on line at ***https://doi.org/10.1787/3edc8d09-en***.

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