



# **Mainstreaming Adaptation to Climate Change into National Policy: An overview for adaptation practitioners**

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# Mainstreaming Adaptation to Climate Change into National Policy: An overview for adaptation practitioners

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## About the Adaptation Partnership

The Adaptation Partnership was formed in May 2010 in response to a recognized need for development practitioners to share information and lessons on adaptation efforts. Chaired by Costa Rica, Spain and the United States, the goal of the partnership is to encourage effective adaptation by serving as an interim platform to catalyze action and foster communication among the various institutions and actors engaged in the effort to scale up adaptation and resilience around the world, particularly in the context of fast start finance. The partnership synthesizes lessons learned and good practices, highlighting needs and priorities, and identifying opportunities for cooperation and alignment of support to build resilience to the adverse effects of climate change. It is also enhancing communities of practice engaged in the adaptation effort.

Adaptation Partnership

Website: <http://www.adaptationpartnership.org/>





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## Abbreviations and Acronyms

|        |   |
|--------|---|
| ADB    | Asian Development Bank  |
| AfDB   | African Development Bank  |
| BMFDM  | Bangladesh Ministry of Food and Disaster Management               |
| CDMP   | Comprehensive Disaster Management Programme (Bangladesh)          |
| CICC   | Inter-Secretarial Commission on Climate Change (Mexico)           |
| CIER   | Centre for Indigenous Environmental Resources                     |
| CLIMAP | Climate Change Adaptation Project for the Pacific                 |
| EC     | Environment Canada  |
| GOB    | Government of Bangladesh  |
| GOCI   | Government of the Cook Islands                                    |
| GON    | Government of the Netherlands                                     |
| GTZ    | Deutsche Gesellschaft für Technische Zusammenarbeit               |
| IPCC   | Intergovernmental Panel on Climate Change                         |
| MANA   | Manitoba Aboriginal and Northern Affairs                          |
| MDG    | Millennium Development Goal                                       |
| MEMR   | Ministry of the Environment and Mineral Resources (Kenya)         |
| MIT    | Manitoba Infrastructure and Transportation                        |
| NCCACC | National Climate Change Activities Coordinating Committee (Kenya) |
| OECD   | Organisation for Economic Co-operation and Development            |
| PRAC   | Prairies Regional Adaptation Collaborative                        |
| SPC    | Secretariat of the Pacific Community                              |
| UNDESA | United Nations Department of Economic and Social Affairs          |
| UNDP   | United Nations Development Programme                              |
| UNEP   | United Nations Environment Programme                              |
| USDS   | United States Department of State                                 |



## Foreword

In response to a growing awareness of the potential adverse effects of climate change and the particular vulnerability of developing countries to this process, a significant increase in adaptation action has been witnessed in recent years in Africa, Asia-Pacific, and Latin America and the Caribbean. These actions are providing opportunities to: increase understanding of the implications of climate change for the achievement of development objectives in the near and long terms; identify strategies and measures that can be taken to reduce climate vulnerability; communicate and build awareness of climate risks, opportunities and potential solutions; and begin implementing actions on the ground that build capacity to adapt to a changing climate.

Although the recent global upsurge in adaptation action is a welcome development, the emergence of a diverse array of efforts initiated by multiple actors within numerous jurisdictions has the potential to create confusion, lead to duplication of effort and limit the potential for sharing good practice guidance based on past efforts. Enhanced coordination among expanding networks of adaptation actors is needed to ensure resources are deployed quickly and effectively. To this end, the Adaptation Partnership was formed in 2010. Chaired by Costa Rica, Spain and the United States, the goal of the Adaptation Partnership is to encourage effective adaptation by serving as an interim platform to catalyze action and foster communication among the various institutions and actors engaged in the effort to scale up adaptation and resilience around the world.

Toward this goal, the Adaptation Partnership commissioned preparation of a technical paper on mainstreaming climate change adaptation into national level policy processes. The paper aims to provide concrete guidance to policy-makers in developing countries regarding lessons learned to date with respect to the integration of adaptation to climate change into national level policy and planning.

Further information about the Adaptation Partnership, its activities and their outputs may be found at [www.adaptationpartnership.org/](http://www.adaptationpartnership.org/)



## Executive Summary

Adaptation to climate change is a multi-faceted, iterative and long-term process involves numerous actors collaboratively changing societal practices and behaviours in order to minimize climate-related risks and take advantage of emerging opportunities. A widely accepted means of preparing for climate change is to mainstream adaptation needs into development processes. Mainstreaming climate change adaptation involves systematically assessing and incorporating information and measures related to climate risks and vulnerabilities into development policies, plans, institutions, programs and projects (OECD, 2009; SPC & GTZ, 2010). It means building a culture in which consideration of potential climate risks, and strategies for addressing these risks, is embedded into everyday decision-making. Numerous advantages can be derived from mainstreaming climate change adaptation, such as: allowing climate concerns to be simultaneously addressed through multiple avenues; leveraging of existing technical, human and financial resources; enhancing capacity to identify trade-offs between adaptation needs and other priorities; and greater cost-effectiveness.

National governments are well-placed to play a critical role in promoting and enabling efforts to mainstream adaptation into development processes. Medium- and long-term development visions and strategies set at the national level establish the framework in which lower levels of government and sector operate. National governments typically lead efforts to ensure policy coherence horizontally across government departments and vertically between different levels of government (Hay et al., 2005; OECD, 2009; UNDP and UNEP, 2011). The collection and distribution of information critical to adaptation decision making, such as climate data and economic analysis, also often occurs at the national level. National governments also lead efforts to establish and implement regional and international agreements with other governments, including those related to the provision of development assistance.

While it is clear that mainstreaming adaptation to climate change at the national level is of critical importance, relatively limited progress towards this goal has been achieved thus far. Few examples exist of adaptation having been mainstreamed into key development processes such as poverty reduction policy frameworks and national sustainable development strategies (Kramer, 2007; Mitchell et al., 2006; OECD, 2009; SPC & GTZ, 2010; UNDP & UNEP, 2011). This paper seeks to assist with accelerating this process by providing developing country policy-makers with concrete guidance regarding how to integrate adaptation to climate change into national-level policy and planning. This guidance is derived from a review of existing literature and an assessment of four case studies of ongoing and completed efforts to mainstreaming adaptation. These case studies examine: the Cook Islands National Sustainable Development Strategy; Bangladesh's Comprehensive Disaster Management Program; the Netherlands' Delta Programme; and, in western Canada, the Province of Manitoba's winter roads system.

Existing studies highlight a number of entry points in the national policy cycle through which adaptation may be mainstreamed. As identified by the OECD (2009), the formation and revision of



long-term (15 to 20 year) and shorter term (3 to 5 year) national policies is one of these entry points. By incorporating key words into national vision documents and poverty reduction strategies, for example, governments signal to their citizens, bureaucracy and the international community their commitment to mainstreaming adaptation. A second entry point is national planning processes, through which policies are translated into operational action plans. Resource allocation processes, such as national economic planning and annual budgetary exercises, provide a further entry point. Additional entry points may be found through the implementation of regional and international agreements, and arrangements established with bilateral and multilateral assistance organizations.

Experience drawn from past efforts to mainstream adaptation into national policy, planning and resource allocation decisions, as well as from efforts to mainstream the environment, gender, and disaster risk management into government initiatives, suggest several good practice guidelines that can help mainstream adaptation through these entry points. These guidelines include:

1. Provide access to the best available information to inform decision-making, recognizing that gaps in knowledge will always be present and their presence should not be a barrier to moving forward on mainstreaming efforts.
2. Increase awareness among key stakeholders, particularly senior government leaders, of the risk climate change poses to the achievement of national development priorities and its potential economic costs, along with the near- and long-term benefits achievable through adaptation measures.
3. Ensure strong leadership within the centers of government power, such as ministries of finance, planning and development, which have the authority to steer national planning processes and promote coordinated action across government.
4. Establish effective mechanisms for coordinating adaptation efforts across government, such as an inter-departmental coordination mechanism chaired by a senior ministry that brings together mid-level sector, environment and development officials.
5. Build on established decision-making and policy processes, giving particular attention to synergies that may exist with established risk management frameworks and disaster risk management mechanisms.
6. Involve a broad range of stakeholders, not only from within national government ministries but also from different sectors, sub-national governments and civil society, to strengthen the design of policy instruments, build commitment to implement adaptation actions, and ensure that policies are informed by practical, ground-level experience.
7. Focus on the near- and long-term benefits that may be derived from mainstreaming adaptation, ensuring that efforts are integrated into policy processes in a manner that assists in meeting immediate needs while building resilience to future climatic changes.
8. Build the human, technical and financial capacity and resources needed to support mainstreaming efforts.
9. Overcome “mainstreaming fatigue” by building on existing mechanisms and processes, having positive and recognizable goals, providing necessary incentives, and ensuring a clear

understanding of how mainstreaming adaptation is essential to achieving established policy objectives.

10. Monitor and evaluate mainstreaming efforts, such as through formal review processes, to determine whether or not desired outcomes are being achieved and promote modifications of policies in light of new information and socio-economic changes.
11. Be opportunistic and look for openings in the political dialogue (sometimes spurred by significant national and international events) that provide new opportunities for mainstreaming adaptation.
12. Be patient, recognizing that mainstreaming climate change adaptation is a long-term process; that it takes time to build understanding of the need to adapt and determine how best this might take place; and that efforts made today may lay the groundwork for greater action in the future.

Drawing upon these guidelines can promote greater success in mainstreaming adaptation at the national level. It is important to recognize, however, that this guidance needs to be interpreted and applied in a manner that is appropriate to each country's circumstances, needs and opportunities. This flexible approach reflects the fact that policy-making processes vary within all countries and are influenced by a variety of political, economic, social, cultural and technical factors as well as resource constraints. The changing nature of the policy process, along with our evolving understanding of climate change adaptation, suggests the need to build continuous learning processes into the design and implementation of mainstreaming efforts. It also suggests that refinement of our understanding of good practice guidance for mainstreaming will occur over time. Greater documentation of ongoing efforts to mainstream adaptation into national policy and planning processes—in developed and developing countries—and sharing lessons learned through these processes would aid in strengthening the capacity of national level policy-makers to prepare for and respond to the impacts of climate change.



## 1.0 Introduction

Throughout the world, national governments are becoming increasingly concerned about the likelihood of a changing climate impeding achievement of their development objectives. Higher temperatures, altered precipitation patterns, more frequent and/or intense extreme weather events, rising seas—each of these manifestations of climate change has clear implications for food security, water security, infrastructure development and the overall health and well-being of people, ecosystems and economies. To ameliorate these risks, governments are increasingly initiating efforts that facilitate adaptation to climate change.<sup>1</sup>

Adapting to a changing climate is a long-term, continual process that will require the implementation of some targeted, standalone measures. It is widely understood that that adapting to climate change will also require the integration or mainstreaming of adaptation needs into development processes. Mainstreaming climate change adaptation involves systematically assessing and incorporating information and measures related to climate risks and vulnerabilities into development policies, plans, institutions, programs, projects and everyday decision-making (OECD, 2009; SPC & GTZ, 2010). This process of embedding climate change considerations into the everyday culture of decision-making, as opposed to treating adaptation as a parallel, separate process, is perceived to provide a number of benefits (Huq & Burton, 2003; Klein et al., 2007; Newell, 2004; OECD, 2005; World Bank, 2006). Mainstreaming expands the range of avenues through which risks may be assessed and adaptation measures introduced—a characteristic that is particularly important given the pervasive implications of climate change across a diversity of socio-economic and ecological issues. It also enables a wide array of existing technical, human and financial resources to be leveraged in support of efforts to adapt. Trade-offs and synergies between adaptation needs and other priorities may be more fully identified and assessed when climate risks are examined in conjunction with other risks. Mainstreaming also is perceived to be a more cost-effective process, and one that reduces exposure to unacceptable, and unexpected, risks. Finally, mainstreaming allows for a continual reassessment of the risk posed by a changing climate in light of new scientific analysis and evolving socio-economic and ecological circumstances.

*Mainstreaming climate change adaptation is the iterative process of integrating considerations of climate change adaptation into policy-making, budgeting, implementation and monitoring processes...It is a multi-year, multi-stakeholder effort grounded in the contribution of climate change adaptation to human well-being, pro-poor economic growth, and achievement of the MDGs.*  
(UNDP & UNEP, 2011: 3)

Mainstreaming climate change adaptation at the national level is viewed as being particularly important. National governments set the vision for a country's medium- and long-term development, and its policies, legislation and regulations form the framework within which sectors

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<sup>1</sup> Adaptation in the context of climate change has been defined as “an adjustment in natural or human systems in response to actual or expected climatic stimuli or their effects, which moderates harm or exploits beneficial opportunities” (IPCC, 2001: 982).



and sub-national governments operate. Mainstreaming at the national level therefore is critical in establishing an enabling environment for adaptation. However, while there is a recognition of this critical need, significantly less progress has been made to mainstream adaptation at the national level in comparison to integration into sectoral development strategies. Few examples exist of adaptation having been mainstreamed into critical initiatives such as poverty reduction policy frameworks and national sustainable development strategies (Kramer, 2007; Mitchell et al., 2006; OECD, 2009; SPC & GTZ, 2010; UNDP & UNEP, 2011).

Given the critical role of national governments in shaping the future direction of developing countries, and the significant risk posed by climate change—particularly for the least developed countries—there is an urgent need to accelerate the mainstreaming of adaptation into national level policies. This paper seeks to assist this process. Drawing on documented experience, it provides concrete guidance to developing country policy-makers regarding how to integrate adaptation to climate change into national level policy and planning. The paper begins by exploring more deeply the rationale for mainstreaming adaptation at the national level and by identifying entry points. Commonly identified good practices, and the barriers that they help to overcome, are then presented. To more fully illustrate the mainstreaming process, examples of historic and ongoing efforts in two developing countries (Bangladesh and the Cook Islands) and two developed countries (Canada and the Netherlands) are subsequently presented. Each case study provides practical insight into ways of mainstreaming that support adaptation over the medium and longer term. The paper concludes by highlighting some of the continuing challenges and opportunities associated with mainstreaming adaptation at the national level.

## 2.0 Conceptual understanding

Adaptation to climate change is a multi-faceted and iterative process. In the near- and long-term, it requires adjustments in societal practices and behaviours; the generation and sharing of knowledge; the development of new or re-purposed tools and technologies; and collaboration between different disciplines, sectors and jurisdictions. National governments are well-placed to play a critical role in shaping these responses by creating an enabling environment that facilitates adaptation by individuals, communities, businesses and sectors. The power of national governments in this context stems from a combination of their roles in policy formation, policy coordination, information and knowledge management, and international relations.

Using the levers at their disposal, national governments can put in place the incentives (and disincentives) needed to ensure that climate risks are integrated into decision-making. Policies set at the national level establish the framework within which lower levels of government and sectors operate (Hay et al., 2005; OECD, 2009; UNDP & UNEP, 2011). National governments also typically lead efforts to ensure policy coherence horizontally between government departments and sectors, and vertically between different levels of government (OECD, 2009). These efforts can ensure that efforts to reduce climate risks are consistently harmonized with national development



plans and processes (Hay et al., 2005). Information important to adaptation decision-making, such as climate data, vulnerability assessments and economic analyses, is often collected by national-level institutions and agencies. As well, national governments take the lead in establishing and implementing international and regional agreements, such as those that govern the management of transboundary resources whose abundance might be altered by climate change. Relationships with the international donor community, which are of particular importance to many vulnerable developing countries, are also generally mediated at the national level (OECD, 2009). Overall, mainstreaming adaptation at the national level enables responsibility for managing climate risks to be shifted from individual ministries or agencies to all sectors of government as well as the private sector and civil society (Mitchell et al., 2006).

## 2.1 Entry points for mainstreaming adaptation

For national governments to create an enabling environment for adaptation, adjustments will be needed to existing and future policies, institutional mandates and governance structures. It will require assessing the degree to which existing and future strategies, policies, plans and programs are vulnerable to climate variability and climate change; identifying entry points through which the design of government policies and measures may be altered; and implementing adjustments to these policies and measures as needed to minimize risks and take advantage of emerging opportunities (OECD, 2009; UNDP & UNEP, 2011). As identified by the OECD (2009), a number of entry points exist within the national policy cycle through which these adjustments can be made.

One of these entry points is **policy formation and revision**. Long-term (15 to 20 years) national vision documents and sustainable development strategies, along with shorter-term (three to five years) national policies like poverty reduction strategies, establish the overarching framework within which operational plans and resource allocations are made. These long- and shorter-term policies are therefore critical entry points for mainstreaming adaptation. By incorporating keywords into these national policies, governments signal to their citizens, bureaucracy and the international community their awareness of the risks posed by climate change to their development goals—and the need to act upon this awareness. Mainstreaming is further facilitated by governments applying a climate lens to the goals and plans articulated within their policies. This process can expedite identification of potential risks and ensure that policy objectives can be met within a changing climate. It can also help ensure that planned investments do not prove to be maladaptive over the near- and long-term (OECD, 2009).

National **planning** processes provide a second entry point. As governments strive to maintain policy coherence, the integration of adaptation into national policies should encourage subsequent mainstreaming into operational action planning and budgeting processes, such as those associated with medium-term or five-year plans. Adaptation mainstreaming into national planning processes can be facilitated by directly integrating specific adaptation components into national plans (e.g. targeted projects, research and assessments) that address unique needs brought about by climate

### **Box 1: Mainstreaming adaptation into Strategic Environmental Assessments**

Strategic Environmental Assessments (SEAs) are a “systematic process for evaluating the environmental consequences of proposed policy, plan or programme initiatives in order to ensure they are fully included and appropriately addressed at the earliest appropriate stage of decision-making on par with economic and social considerations” (Sadler & Verheem, 1996, as cited in Agrawala et al., 2010). In Fiji, a SEA has been undertaken of its Tourism Development Plan that gave strong attention to the risk posed by climate change. Through the SEA process, several policy adjustments were identified and presented to Cabinet. The recommended changes were approved and adjustments made to Fiji’s Tourism Development Plan. As such, climate change has now been permanently integrated into the policies guiding a critical sector of Fiji’s economy (OECD, 2009). Similarly, Viet Nam has prepared draft guidelines to facilitate the inclusion of climate change risk into different stages of the SEA process (OECD, 2009).

change. It can also be accomplished by modifying current guidelines and criteria that guide planning processes (such as Strategic Environmental Assessments) to enable the application of a climate lens to existing and emerging plans (see Box 1). It can also be enabled through the creation of standalone adaptation strategies and plans that encourage cross-sectoral cooperation (OECD, 2009).

**Resource allocation** processes provide a further entry point.. As budgetary allocations are the main instrument through which national governments operationalize achievement of their policy objectives. particular attention should be given to integrating adaptation into national economic planning and budgetary processes (OECD, 2009). Integrating adaptation into these processes can assist national governments to minimize their financial risk, promote macroeconomic stability, set aside sufficient funds to manage the consequences of climate shocks, and provide support for adaptation activities at the local and sectoral level (AfDB et al., 2002). It can also help ensure that climate risk management measures are properly funded and balanced against competing priorities (Mitchell et al., 2006). Taking into consideration existing analysis and policy objectives, governments can chose to prioritize the allocation of funding to vulnerable sectors and regions, and to projects and programs expected to reduce vulnerability to climate change. Budgetary resources can also be allocated to a national fund established specifically to enable ministries to cover the additional costs imposed by adaptation (OECD, 2009).

By mainstreaming adaptation into policy formation, planning and resource allocation processes, national governments strengthen their commitment to managing climate risks and can promote mainstreaming adaptation at the sub-national and sectoral levels. Beyond these domestic policy entry points, national governments can promote adaptation mainstreaming through the relationships they build with other countries and the commitments they make as part of international processes. For instance, climate change adaptation needs can be integrated into regional agreements surrounding the management of transboundary water resources. As well, actions taken by national governments as part of fulfilling their responsibilities related to the implementation of various multilateral agreements—including the United Nations Framework Convention on Climate Change (UNFCCC), United Nations Convention to Combat Desertification, the United Nations Convention on Biological Diversity, and the Ramsar Convention—can be accomplished in a manner that promotes resilience to climate change (OECD, 2009).

Finally, a critical mainstreaming opportunity for many developing country governments resides within their relationships with bilateral and multilateral assistance organizations. Many donor agencies are already supporting adaptation efforts by integrating adaptation into their development cooperation programs. They are using various risk screening tools to understand the implications of climate change for their ongoing and planned investments, and mainstreaming adaptation into their development operations (Klein et al., 2007). Donor agencies are also providing new and additional financial resources to help developing countries to build capacity, develop tools, assess risks and implement actions that support adaptation to climate change. Through their relationships with these agencies, national governments can build the inclusion of climate change adaptation into budgetary support mechanisms, Country Assistance Strategies and Joint Assistance Strategies (OECD, 2009).

## 2.2 Guidance for effective mainstreaming of adaptation

When seeking to mainstream adaptation into policy, planning and resource allocation decisions, national governments can draw upon good guidance derived from a number of different sources (see Box 2) and may increase their capacity through participation in different workshops focused on this subject (see Box 3). Although efforts to mainstream adaptation into national processes have been initiated relatively recently, a longer history exists with respect to the integration of the environment, gender and disaster risk management into government initiatives. This experience, along with that which has been gained so far in the area of climate change adaptation, points to a number of key good practices that contribute to the success of mainstreaming efforts. Ten of these good practice guidelines are described below.

**1. Access to information.** Effective mainstreaming requires access to the best available information to inform decision-making. In relation to climate change, this means having access to: information regarding current climate data and risks; projected changes in climatic conditions; the potential implications of these changes for different regions, economic sectors and segments of society;

### Box 2: Mainstreaming guides

Policy makers and practitioners interested in mainstreaming adaptation into national policies and plans, as well as into sectoral strategies, programs and projects, may turn to the following resources:

- *Mainstreaming Climate Change Adaptation into Development Planning: A guide for practitioners.* Prepared by the UNDP-UNEP Poverty-Environment Initiative in 2011.
- *Mainstreaming Processes for Climate Change Adaptation: Collection of best practices.* Prepared by the Secretariat of the Pacific Community and Deutsche Gesellschaft für Technische Zusammenarbeit in 2010.
- *Integrating Climate Change Adaptation into Development Co-operation: Policy guidance.* Prepared by the Organisation for Economic Co-operation and Development in 2009.
- *Mainstreaming Climate Change Adaptation: A practitioner's handbook.* Prepared by CARE International in Viet Nam in 2009.
- *Mainstreaming Climate Change: A guidance manual for the Pacific Islands Countries and Territories* drafted for the Secretariat of the Pacific Regional Environment Programme in 2010, and its companion document, *Mainstreaming Climate Change into National Development Planning: A training manual.*
- *The Challenges of Environmental Mainstreaming: Experience of integrating environment into development institutions and decisions.* Published by the International Institute for Environment and Development in 2009.

### Box 3: Mainstreaming workshops

Throughout the world, workshops and formal training events are periodically held that provide policymakers with an opportunity to learn more about the process of mainstreaming adaptation to climate change. Recent examples of these events include:

- *Regional Workshop on Mainstreaming Climate Change Adaptation in Environmental Impact Assessment in Asia.* This event took place from October 25 to 26, 2011, in Bangkok, Thailand.
- *Mainstreaming Adaptation to Climate Change in the Formulation of Plans and Projects.* A workshop held September 20 to 23, 2011, in Cartagena de Indias, Colombia.
- *The Second International Workshop on Mainstreaming Adaptation to Climate Change: Managing Adaptation Processes.* A workshop held in New Delhi, India, from November 10 to 12, 2010.
- *Regional Workshop on Mainstreaming Climate Change Adaptation into Developmental Planning.* Held in Tokyo, Japan, this event took place from April 14 to 17, 2009.
- *Integrating climate change adaptation into development planning: A practice-oriented training based on the OECD Policy Guidance.* This 10 module, simulation-based training package (in English and Spanish) was prepared in 2010 and is freely available online.

potential adaptation options; and how to evaluate and prioritize these options (OECD, 2009). As such, along with climate data, information about factors that influence development pathways is required, such as projected changes in population size and distribution, economic growth, and ecological well-being. It also requires an understanding of the extent to which current policies and programs are achieving their objectives and building capacity to adapt to projected climatic changes.

In many countries, availability of the information needed to determine adaptation priorities and support mainstreaming is limited (OECD, 2009). Challenges can include the absence of data, lack of coordination between dispersed institutes that collect and analysis relevant information, the absence of data in digitized formats, and an unwillingness to share data between different parties, even within government. The absence of appropriate skills and capacity to undertake analysis of available data (e.g. to conduct climate modelling, vulnerability assessments, and cost benefit analysis) can also be a constraint (SPC & GTZ, 2010).

To overcome these challenges, countries can tap into a growing availability of research and analysis at the national and international level. Sources for climate data include national hydrometeorological organizations, regional meteorological organizations (e.g. Intergovernmental Authority on Development Climate Prediction and Applications Centre; Water Center for the Humid Tropics of Latin America and the Caribbean), the Intergovernmental Panel on Climate Change, and the World Meteorological Organization. Online sources such as the World Bank's Climate Change Knowledge Portal, WeAdapt, Climate Adaptation Knowledge Exchange and Eldis provide access to range of information regarding the vulnerability of countries and sectors to climate change. These sources can complement the assessments and priorities identified by many developing countries through the development of their National Adaptation Programmes of Action and National Communications to the UNFCCC.

Continuous effort must be made to improve the quantity, quality and policy relevance of information related to climate change adaptation (Huq et al., 2003; Mitchell et al., 2006; OECD, 2009; SPC & GTZ, 2010). In the end, however, a complete picture of how the climate will change in the future, its socio-economic and ecological implications, and appropriate risk management strategies is an unrealistic expectation. Uncertainties will always exist. Adaptation decisions therefore must be made in light of the best available information at hand. And governments should establish systems that foster continual review of climate related data and the updating of policies, plans and programming in light of new understandings (OECD, 2009; Swanson et al., 2009). Achieving this objective requires establishing a closer relationship between policy makers, climate scientists, researchers and adaptation specialists (Mitchell et al., 2006).

**2. Awareness of climate risks and adaptation options.** The absence of awareness among key stakeholders, particularly senior government leaders, of the risks posed by climate change and potential adaptation options is a constraint on current efforts to mainstream adaptation (Huq et al., 2003; Mitchell et al., 2006; OECD, 2009; SPC & GTZ, 2010). Overcoming this constraint requires capacity building, education and training for government officials (SPC & GTZ, 2010). Of critical importance is communicating to key stakeholders within and outside of the government the potential ramifications of climate change for the achievement of national development priorities and the potential economic costs of climate impacts (Mitchell et al., 2006; OECD, 2009; SPC & GTZ, 2010). Establishing the “business case” for adaptation measures—the benefits achievable in the near and long-term versus their costs—and feeding this information into different entry points strengthens the potential for mainstreaming to occur (Dalal-Clayton & Bass, 2009; UNDP & UNEP, 2011). Effectively raising awareness among key stakeholders also requires recognizing their individual differences, and tailoring the content and delivery of communications to their individual needs (Mitchell et al., 2006). In particular, it means translating scientific information into a language and timeframe that policy-makers and other non-climate specialists can easily understand (Huq et al., 2003; Mitchell et al., 2006).

*“Mainstreaming can work only if it is not considered to oppose national goals and the development paradigm, but rather as a means to achieve them”*  
(SPC & GTZ, 2010: 37)

**3. Leadership from senior levels of government.** Efficient mainstreaming of adaptation into national development priorities requires coordinated action and information flows between different ministries, levels of government and civil society (Kramer, 2007). To accomplish this objective, it is widely acknowledged that strong leadership within the centers of government power is required. Mainstreaming efforts are typically hampered if responsibility for this process resides in the hands of national meteorological organizations and ministries of the environment that typically have limited influence in national decision-making processes. Leadership by these sectors of government also can perpetuate a perception of climate change as solely being an environmental issue and not a broader development issue.

**Box 4: Promoting adaptation mainstreaming in the United States**

In 2009, the United States established an Interagency Climate Change Adaptation Task Force co-chaired by the White House Council on Environmental Quality, the Office of Science and Technology Policy, and the National Oceanic and Atmospheric Administration. The Task Force includes representatives from more than 20 Federal agencies and developed recommendations for how the federal government can strengthen policies and programs to better prepare the nation to adapt to the impacts of climate change. To further facilitate the mainstreaming of adaptation, President Obama also signed Executive Order 13514 in 2009, which directed agencies to improve their environmental, energy and economic performance. Under this Executive Order, each federal agency is evaluating agency climate change risks and vulnerabilities to manage both the short- and long-term effects of climate change on its mission, programs and operations.

Effective mainstreaming often requires the involvement of offices of the president or prime minister, who have the authority to steer these processes and promote coordination across government (see Box 4). Ministries of finance and ministries of planning and development, who are responsible for key national development processes such as the MDGs and poverty reduction strategies, should also be actively involved (OECD, 2009; SPC & GTZ, 2010; UNDP & UNEP, 2011). “Champions” within these agencies often are critical to bringing government actors together and ensuring commitment to the mainstreaming process (SPC & GTZ, 2010). Parliaments, private sector organizations, national-level non-governmental organizations and labour organizations, along with development assistance partners, can also play a critical role in facilitating mainstreaming efforts (OECD, 2009).

**4. Effective coordination mechanisms.** Uncoordinated and fragmented government actions on climate change can hinder efforts to minimize climate risks. Ensuring coordinated action across government requires the presence of an inter-departmental coordination mechanism chaired by a senior ministry that brings together mid-level sector, environment and development officials (Dalal-Clayton & Bass, 2009; Mitchell et al., 2006; OECD, 2009). These committees aid information exchange, peer review, the building of expertise, retention of institutional memory and identification of key contacts in different units (SPC & GTZ, 2010). Such committees have been established in numerous developing countries, including Kenya and Mexico as described in Boxes 5 and 6. A clear mandate and institutional strength has been found to be decisive in influencing the success of these inter-departmental coordination mechanisms (SPC & GTZ, 2010).

**Box 5: Inter-departmental collaboration on climate change in Kenya**

In 1992, the Government of Kenya established the National Climate Change Activities Coordinating Committee (NCCACC) to coordinate its climate change activities. Composed of 25 representatives of different ministries, municipalities, public universities, the private sector and NGOs, NCCACC provides policy advice and supports research related to climate change adaptation (Mutimba et al., 2010; Ogola, n.d.). To complement the work of the NCCACC, an Environment and Climate Change Coordination Unit was established in the Office of the Prime Minister in 2008 to “provide high level political support for climate change activities in Kenya” (Mutimba et al., 2010: 43). The Unit promotes the integration of climate change into different ministries. Collaboration was further promoted in 2010 by the creation of a Climate Change Secretariat within the Ministry of the Environment and Mineral Resources (MEMR), which is responsible for coordinating climate change across various sectors (Mutimba et al., 2010). The MEMR is encouraging the establishment of climate change focal points in all ministries to better link climate change activities across government.



**Box 6: Inter-departmental collaboration on climate change in Mexico**

In Mexico, an Inter-Secretarial Commission on Climate Change (CICC) was established in 2005 to coordinate national climate change policies. Under its leadership, Mexico established a National Climate Change Strategy in 2007. To further support implementation of this plan and Mexico's National Development Plan, the CICC established the Special Programme on Climate Change. Between 2009 and 2012, this program aims to achieve 37 adaptation objectives and 142 adaptation targets in eight sectors at the sub-national level (Keller et al., 2011).

**5. Build on existing structures.** At its core, mainstreaming adaptation involves bringing climate considerations into established decision-making and policy processes. It means ensuring that efforts to facilitate adaptation are consistent with existing development objectives and are aligned with existing governance structures and development planning processes (Dalal-Clayton & Bass, 2009; Mitchell et al., 2006; UNDP & UNEP, 2011). In doing so, particular attention should be given to the potential synergies that can be derived from clearly and consistently connecting climate change adaptation and disaster risk management mechanisms, such as through the established of shared tools and frameworks (Mitchell et al., 2006). Care can also be taken to build upon efforts to implement commitments under different multilateral environmental agreements (OECD, 2009). Established risk management frameworks and techniques used by planners in many sectors provide a further opportunity for mainstreaming (Mitchell et al., 2006).

**6. Involve multiple stakeholders.** For mainstreaming efforts to be effective, they need to involve a broad range of stakeholders not only from within national government ministries but also different sectors, sub-national governments and civil society—including the private sector, research institutes, academia and non-governmental organizations (Huq et al., 2003; McGray, 2009; Mitchell et al., 2006; UNDP & UNEP, 2011) (see Box 7). Input from a diversity of perspectives can strength the design of policy instruments that support adaptation mainstreaming, such as prioritization of measures, and help build the commitment needed to mainstream adaptation through a wide breadth of possible avenues. Stakeholder engagement processes can also help ensure that policy actions are informed by practical, ground-level experience (Mitchell et al., 2006; UNDP & UNEP, 2011).

**7. Emphasize near- and long-term benefits.** While the effects of climate change, including higher mean annual temperatures and the lengthening of growing seasons, are beginning to be observed, adaptation planning generally requires preparing for events projected to occur decades in the future. In contrast, policy-making typically has a short-term focus, and government officials are continually striving to address immediate, critical development needs. This situation has been found to directly contribute to a lack of political will to mainstream climate change as it is not seen as being important when compared to shorter term needs such as poverty alleviation (SPC & GTZ, 2010; UNDP & UNEP, 2011). Addressing this concern requires ensuring that adaptation is integrated into policy processes in a manner that assists in meeting immediate needs while simultaneously orienting development in a direction that will increase resilience and capacity to deal with climatic changes over the long-term.

**Box 7: Promoting mainstreaming and inter-governmental coordination in Spain**

The Government of Spain adopted its National Climate Change Adaptation Plan in 2006. A main objective of this plan is to mainstream climate change adaptation into planning in different sectors and/or systems. Two Work Programmes have been established to support implementation of this plan. The first was approved in 2006 and focused on developing regional climate scenarios and assessing the vulnerability of three key sectors: water resources, biodiversity and coastal areas. The second Work Programme was approved in 2009 and includes efforts to mainstream adaptation into sectoral regulations and planning tools. The initial focus of these mainstreaming efforts is the sectors for which the Ministry of Agriculture, Food and the Environment is responsible.

Adaptation plans or strategies have also been established by most of Spain's Autonomous Communities (or regions). To ensure coordination between these sub-national adaptation frameworks and the activities associated with the national adaptation plan, a coordination system composed of several government bodies has been established, namely:

- The Coordination Commission of Climate Change Policies, which serves to ensure coherence and synergy between national, regional and local adaptation actions. A technical working group on impacts and adaptation has been established to support the work of the Commission.
- The National Climate Council, which promotes information sharing between representatives of the national administration, the Autonomous Communities, the Spanish Federation of Municipalities and Provinces, research institutions, social actors, and non-governmental organizations. It also prepares proposals and makes recommendations regarding Spain's climate change policies, including those related to adaptation.
- The Environmental Sector Conference, a high-level political body that promotes cooperation between the environment departments of the national and autonomous community governments.

**8. Build capacity where needed.** The absence of sufficient human, technical and financial capacity can significantly impede mainstreaming efforts. Potential capacity constraints include: insufficient personnel to support the mainstreaming effort; a high turnover of staff, leading to a loss of institutional knowledge, skills and expertise; insufficient time to devote to mainstreaming efforts resulting from competing demands and priorities; lack of expertise to interpret available climate and vulnerability information; lack of leadership capacity to bring disparate stakeholders together and guide mainstreaming processes; unavailability of appropriate science and economic tools to inform policy makers and politicians of adaptation's relevance to development processes; and, underlying all of these constraints, insufficient financial resources to support additional analysis and implementation of adaptation measures (Mitchell et al., 2006; OECD, 2009; SPC & GTZ, 2010). For mainstreaming to be successful, careful consideration first needs to be given to identifying available capacity, potential gaps, and the training, education and support needed to overcome these gaps (Dalal-Clayton & Bass, 2009).

**9. Overcome “mainstreaming fatigue.”** In recent decades, government policy makers and planners have progressively been asked to integrate concerns related to the environment, gender, HIV/AIDS, disaster management, conflict prevention and now climate change into their policies, plans and programs. The additional burden posed by these demands on already overworked staff has created a sense of “mainstreaming fatigue” (Mitchell et al., 2006; SPC & GTZ, 2010). To overcome this challenge, it is important that adaptation mainstreaming efforts build upon existing mechanisms and processes, have positive and recognizable goals, and be clearly understood as essential to ensuring achievement of established policy objectives. The provision of effective and easy-to-use tools that minimize the added workload involved in mainstreaming adaptation is also important

**Box 8: Increasing capacity to mainstream adaptation into Costa Rica's marine protected areas**

Costa Rica is actively engaged in efforts to integrate climate change issues into its national level planning processes. Its commitment was reflected in its *National Development Plan 2007–2010*, which called for the creation of a National Climate Change Plan. In response, the Ministry of Environment, Energy and Transportation (MINEAT) developed a *National Climate Change Strategy* that outlines the importance of integrating adaptation to climate change across all sectors. To further action on this strategy, mainstreaming adaptation to climate change is identified as a priority in Costa Rica's *National Development Strategy 2010–2014*. Water resources and biodiversity, including the management of coastal resources, have been identified by the government as priority areas in which to mainstream adaptation.

To inform how adaptation can be integrated into Costa Rica's marine protected areas, MINEAT and the National System of Protected Areas (SINAC) are conducting research on the vulnerability of the country's coastal zones and working to build the adaptive capacity of protected coastal areas ecosystems. Financed by Deutsche Gesellschaft für Internationale Zusammenarbeit, the goals of the project being implemented by MINEAT and SINAC include: achieving an equitable representation of biodiversity within the protected areas; establishing a management system that is adaptive to climate change; establishing a national knowledge platform for sharing best practices and lessons learned; and developing a conceptual framework that can be transferable and adapted for use by other countries in the region. Key outputs of the project to date include a document that defines the scope of a mitigation and adaptation strategy in protected marine areas, and draft national strategy for integrated management of protected marine areas.

(Mitchell et al., 2006; SPC & GTZ, 2010). Conquering mainstreaming fatigue further involves understanding bureaucratic and regulatory issues that might cause a mainstreaming effort to result in additional transaction costs, and putting in place the incentive structures necessary to address these issues (Mitchell et al., 2006).

**10. Monitor, evaluate and improve.** In the context of climate change adaptation, monitoring and evaluation plays a dual role in helping to understand what works and providing a tool that supports adaptation action within ever-changing circumstances (Spearman & McGray, 2011). Monitoring and evaluating mainstreaming processes—from their initiation through to the implementation of desired actions—can enable policy-makers to determine whether or not desired outcomes are being achieved (SPC & GTZ, 2010). In addition, by formally integrating monitoring and evaluation processes into the design of policies themselves, policy makers can also ensure that their policies remain relevant despite changing circumstances. Formal review processes built into policies can: enable continuous learning regarding new developments in climate science and changing socio-economic and political context; facilitate assessment of the implications of these changes; and promote timely adjustment that will enable a policy to achieve its objectives over time. These steps foster the creation of policies that are adaptive in and of themselves (Swanson & Bhadwal, 2009).

A core message from these guidelines for mainstreaming adaptation is that the critical barriers to be overcome relate to people and their interactions with institutions. Mainstreaming will only occur if people understand that this process will provide an advantage in the long run (SPC & GTZ, 2010). Once this understanding is established, acting on this knowledge requires addressing needs related to organisational and institutional learning (Mitchell et al., 2006). It means building facilitative institutional structures that foster knowledge exchange, collaboration and the building of skill sets. Establishing these structures requires political will and appropriate financing.

### 3.0 Mainstreaming in practice

To better understand the broad guidance previously presented for effectively mainstreaming adaptation at the national level, this section presents a series of illustrative case studies from different regions of the world. The first of these case studies is taken from the Cook Islands, reflecting the proportionally greater number of mainstreaming efforts have been undertaken in the Pacific<sup>2</sup> and the Caribbean<sup>3</sup>—likely due to the greater awareness by government leaders in small island developing countries of the threat posed by climate change (Mitchell et al., 2006). The second case study focuses on Bangladesh, a country widely acknowledged as being particularly vulnerable to climate change. The subsequent two examples are drawn from the developed world. Their inclusion primarily reflects two considerations—the general absence of documented examples of efforts to mainstream adaptation into national level policies, and the potential to share lessons learned between developed and developing countries. The third case study therefore focuses on the Netherlands, a country that, like Bangladesh, is threatened by a greater risk of flooding due to climate change. The final case study is drawn from Canada, a large country with a strong federal system in which much of the responsibility for adapting to climate change rests at the sub-national level. The final case study therefore is drawn from the western Canadian province of Manitoba. All of the case studies, except the one from Canada, were developed primarily through the use of secondary sources of information.

#### 3.1 Cook Islands' National Sustainable Development Strategy<sup>4</sup>

The 15 small islands that form the Cook Islands are vulnerable to rising air and sea-surface temperatures, increased intensity and frequency of extreme rainfall, continued ocean acidification and accelerated sea level rise (Ngari et al., 2011). To address this vulnerability, the Cook Islands in partnership with the Asian Development Bank (ADB) implemented the Climate Change Adaptation Project for the Pacific (CLIMAP) in the early 2000s.<sup>5</sup> As part of this program, the ADB sought to assist the Cook Islands in enhancing its adaptive capacity and preventing the adverse impacts of climate change by piloting risk assessments and mainstreaming adaptation at the national, sectoral and project levels (Hay et al., 2005).

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<sup>2</sup> Examples in the Pacific include the Kiribati Adaptation Programme, which integrated adaptation into its National Development Strategy, economic policies and budgetary allocations (UNDP & UNEP, 2011). Implementation of this program was originally led from the Ministry of Finance and Economic Planning, but subsequently moved to a unit within the Office of the President as climate change became of greater government priority (Mitchell et al., 2006).

<sup>3</sup> For example, between 2004 and 2009, the project “Mainstreaming Adaptation to Climate Change” sought to mainstream climate change adaptation into various Caribbean countries’ national and sectoral planning processes. This initiative was succeeded by the “Special Program on Adaptation to Climate Change: Implementation of adaptation measures in coastal zones.” From 2007 to 2011, this project piloted adaptation measures in coastal zones in countries where adaptation had previously been mainstreamed across sectors (Medeiros et al., 2011).

<sup>4</sup> The content of this case study is derived primarily from: Hay, J.E., et al. (2005). *Climate Proofing: A risk-based approach to adaptation*. Asian Development Bank Pacific Studies Series.

<sup>5</sup> Funding for this project was provided by the Canadian International Development Agency.

Consultations with representatives from government, non-governmental organizations and the private sector led to identification of an opportunity to mainstream adaptation into the Cook Islands' National Sustainable Development Strategy (NSDS). The process for developing the NSDS was in its early stages, and it was recognized that mainstreaming adaptation into this national plan would strengthen the enabling environment for integrating climate change into subsequent economic and sectoral development policies, strategies and projects. The first steps towards development of the NSDS were taken in November 2003, when the First National Development Forum, a major public consultation, was held. Organized by a newly established Coordination Unit<sup>6</sup> within the Office of the Prime Minister, the Forum reviewed the Cook Islands' development status and identified seven strategic priority objectives for the country over the next 20 years. These seven strategic priority objectives were: “good government and law and order; macroeconomic stability and economic development; improved quality of education; improved quality of health care services; improved standard of infrastructure and provision of utilities, including transportation services; increased agricultural productivity and self-sufficiency and food security; and improved development and management of marine resources.” Environmental quality and tourism were subsequently added to this list (Hay et al., 2005).<sup>7</sup>

An effort was then undertaken to consider the potential implications of climate change for each of these nine priority issues. This process was implemented using a framework and methodology called “Climate Change Adaptation through Integrated Risk Reduction” (CCAIRR) that was developed as part of the CLIMAP project. As well, “Adaptation Mainstreaming Guidelines for the Cook Islands” were developed. These guidelines set forward the principles, enabling factors and process for mainstreaming adaptation at the national, sectoral and project levels. Using these guidelines, CLIMAP led consultations with the Project Liaison Committee (which was mostly composed of members of the National Climate Change Country Team) and National Climate Dialogue participants to better understand the links between climate change and the NSDS's priority issues.. The consultations were undertaken using one targeted question on the relationship between climate change and each strategic priority.<sup>8</sup> Responses to these questions were then used to create a draft matrix of key climate change challenges, objectives and actions for each strategic priority. Along with these consultations, information from existing studies was gathered to support identification of adaptation priorities, and new research was done on the implications of climate change for health and infrastructure. Outcomes of the consultations and research provided a strong rationale for mainstreaming climate change adaptation in the NSDP.

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<sup>6</sup> The Coordination Unit was jointly staffed by officials from the Prime Minister's Office and Ministry of Finance and Economic Management (Hay et al., 2005).

<sup>7</sup> At this meeting it was also agreed to combine the Cook Islands' National Development Strategy, National Millennium Development Goals Strategy and National Sustainable Development Plan to form the NSDP for 2006 to 2010 (UNDESA, 2006).

<sup>8</sup> For example, in relation to the strategic priority on the development and management of marine resources, Cook Islanders were asked, “What must be done to ensure the sustainability of the Cook Islands' marine resources despite the risks due to climate variability and change?” (Hay et al., 2005: 68).



These draft outcomes were reviewed by the Project Liaison Committee, refined and subsequently presented to the National Climate Dialogue. After further revisions, the National Dialogue agreed to present the key adaptation challenges, objectives and actions identified to the government for consideration as it prepared the NSDP. The proposals were presented to Cabinet, which resolved to “approve adoption and implementation of the [Adaptation Mainstreaming Guidelines]; and [a]pprove the recommendations for climate proofing the National Sustainable Development Strategy that is currently in preparation” (Hay et al., 2005: 73).

The Cook Islands National Sustainable Development Strategy (2007-2010) reflects some of the guidance presented to Cabinet. For instance, reflecting a recommendation that water resources management be enhanced on all islands, the NSDS calls for a “comprehensive freshwater management plan of action to guide supply and demand of water on each island to ensure universal access to safe drinking water” (GOCI, 2007: 26). The strategy also calls for implementation of short-term priorities contained in the National Environment Strategic Action Framework related to climate change and land, freshwater, marine resources, and coastal zone and freshwater resources. Finally, the 2007-2010 NSDS recognizes the need to climate-proof infrastructure against extreme weather events (GOCI, 2007). Adaptation to climate change is more deeply mainstreamed into the Cook Islands National Sustainable Development Strategy for 2011 to 2015. One of its eight strategic goals is to establish a Cook Islands in which “our people are resilient to disasters and climate change to achieve sustainable livelihoods.” Among other things, it calls for: investments in infrastructure that increase resilience to the impacts of climate change; ensuring the availability of high quality risk information needed to guide decision-making; enhancing disaster preparedness, response and recovery; and integration of climate change adaptation into the management of ecosystems and natural resources (GOCI, 2011).

The Cook Islands efforts in the early 2000s to mainstream climate change considerations into its NSDS required overcoming several barriers. The risk-based approach used to identify areas in which adaptation could be mainstreamed at the national, sectoral and project level was quite information intensive. Although a commitment to using existing information was maintained, accessing this information proved to be challenging. Widespread acceptance of the process, along with the appointment of one government agency (the Geographic Information Systems Division in the Ministry of Works) as the repository for required data helped to improve communication and cooperation between stakeholders, and helped to promote information sharing. Secondly, the process highlighted the need for more in-country expertise in the area of risk-based planning, and for consensus to be reached among key stakeholders regarding levels of acceptable risk (Hay et al., 2005).

Collectively, the experience in the Cook Islands provided an early example of the importance of creating an enabling environment for adaptation at the project and community levels by “climate proofing” policies, plans and regulations. Factors that enabled mainstreaming climate change adaptation into the Cook Islands National Sustainable Development Strategy included:

- *High-level support* – efforts to mainstream adaptation into the NSDS were spearheaded by the Coordination Unit within the Office of the Prime Minister.
- *Donor engagement* – financial and technical assistance for this effort was provided through the CLIMAP project supported by the Asian Development Bank.
- *Stakeholder engagement* – the process was inclusive, involving multiple stakeholders, and encouraged coordination and cooperation between these stakeholders to promote the sharing of relevant information.
- *Clear guidance* – the experience demonstrates the benefits of establishing an operational framework such as CCCIRR to guide the mainstreaming process.

### 3.2 Bangladesh's Comprehensive Disaster Management Program<sup>9</sup>

Bangladesh is one of the most disaster prone countries in the world. Located on the Bay of Bengal, a region susceptible to strong cyclonic storms and tidal waves (CIF, 2010), about two-thirds of this deltaic country lies less than five metres above sea level. As a consequence, about 25 percent of Bangladesh is flooded on average each year; and about 60 percent of the country is flooded every four or five years (Luxbacher & Kamal Uddin, 2010). Climate change is expected to further increase the risk of natural disasters in Bangladesh.<sup>10</sup> The vulnerability of the country also stems from its status as one of the world's least developed countries. Although Bangladesh has made significant development gains in recent decades, nearly half of all Bangladeshis continue to live below the poverty line.<sup>11</sup> It is also one of the most densely populated countries in the world; nearly 150.5 million people lived in Bangladesh in 2011 (UNDESA, 2011), a country 147,570 square kilometers in size (USDS, 2012).

The Government of Bangladesh, with the support of its international development assistance partners, has progressively invested in dykes, early warning systems, flood management schemes, and cyclone and flood shelters in an effort to reduce its vulnerability to flooding. In 1991, however, these investments proved to be inadequate when a category 5 cyclone landed near the densely populated region of Chittagong. An estimated 140,000 people lost their lives and 10 million people lost their homes in this single event. The damage caused by the 1991 cyclone spurred the Government of Bangladesh to re-focus its disaster management efforts from being reactive to proactive. Efforts by the Ministry of Food and Disaster Management (BMFDM) between 1994 and 1998, with the support of UNDP, aimed to improve Bangladesh's disaster preparedness efforts. A

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<sup>9</sup> The content of this case study is largely derived from K. Luxbacher and A.M. Kamal Uddin's World Resources Report case study "Bangladesh's Comprehensive Approach to Disaster Management" written in 2010.

<sup>10</sup> Bangladesh is projected to experience greater and more erratic rainfall, more intense cyclones, larger tidal surges, melting of its Himalayan glaciers, and higher sea levels (BMEF, 2009). The expected impact of these changes include the loss of low-lying areas due to rising sea levels, greater risk of floods and droughts, salt water intrusion, loss of agricultural productivity, less availability of safe drinking water, and higher incidence of water and airborne diseases (BMEF, 2005; Luxbacher & Kamal Uddin, 2010).

<sup>11</sup> The proportion of Bangladesh's population living below the international poverty line of \$1.25 (in purchasing power parity terms) per day was 49.6 percent in 2005 (<http://hdrstats.undp.org/en/indicators/38906.html>)  
<http://hdrstats.undp.org/en/countries/profiles/BGD.html>

cyclone in 1998, however, made clear some of the persistent weaknesses within Bangladesh’s disaster management efforts—including lack of coordination between actors and limited leadership capacity within the BMFDM (Luxbacher & Kamal Uddin, 2010).

Reflecting national level concern about the need to strengthen Bangladesh’s capacity to reduce its vulnerability to disasters, the government set “Comprehensive Disaster Management towards Poverty Reduction and Growth” as one of 19 Strategic Goals in its 2005 Poverty Reduction Strategy Paper (PRSP). This strategic goal focused on “[m]ainstreaming disaster management and risk reduction into national policies, institutions and development process” (GOB, 2005: 262). A key target for achieving this goal was to “[f]actor vulnerability impacts and adaptation to climate change into disaster management and risk reduction plans, programmes, policies and projects” (GOB, 2005: 262).<sup>12</sup> As such, the goals of the PRSP promoted greater integration of both disaster risk management and climate change adaptation into development policies, plans and processes.

A key initiative for achieving Bangladesh’s goal of mainstreaming disaster management and, by extension, adaptation to climate change, was identified in the PRSP as being the Comprehensive Disaster Management Programme (CDMP). The goal of this multi-year program is to undertake a whole of government approach “to optimise the reduction of long-term risk and to strengthen the operational capacities for responding to emergencies and disaster situations including actions to improve recovery from these events” (BMFDM, n.d.: 2). The program is being implemented in two phases, the first of which was initiated in 2003 and ended in 2009; the second is taking place between 2010 and 2014.<sup>13</sup> The focus of the CDMP’s first phase was on building the systems and capacity necessary to engage in disaster risk management. Through this phase of the program, the Government of Bangladesh also sought to integrate long-term disaster management into the work of all ministries.

Implementation of CDMP’s Phase I was led by the BMFDM, the Secretary<sup>14</sup> of which served as the National Project Director. It included several core components, namely: establishment of a Disaster Management Information Centre; creation of Community Risk Assessment and Risk Reduction Action Planning Guidelines; and formation of a Local Disaster Risk Reduction Fund (Luxbacher & Kamal Uddin, 2010). In addition, to factor climate change adaptation into its disaster risk management initiatives, the CDMP included the following two components:

- Establishment of a Climate Change Cell within the Ministry of Environment and Forests. Guided by the CDMP and Department of the Environment, the Cell created a national

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<sup>12</sup> Policy coherence has further been promoted in Bangladesh through its National Adaptation Programme of Action, which acknowledges the PRSP’s identification of adaptation as a priority and the need for comprehensive disaster management (OECD, 2009).

<sup>13</sup> Funding for the first phase of the CDMP was provided by the United Kingdom Department for International Development and the United Nations Office for Project Services; additional funding for the CDMP’s community level and pilot activities was received from the European Commission in 2006 (CDMP, n.d.1). It was implemented by UNDP (Luxbacher & Kamal Uddin, 2010).

<sup>14</sup> The Secretary of the Ministry of Food and Disaster Management is the most senior bureaucratic position within the ministry, second only to the Minister of Food and Disaster Management (Luxbacher & Kamal Uddin, 2010).



database for climate change information, undertook the development of climate impact assessments, and established a network of Liaison Officers in various ministries. The Cell is now fully embedded in the Ministry's organizational structure.

- Implementation of the Livelihood Adaptation to Climate Change Program in areas of Bangladesh prone to drought and saline intrusion (Luxbacher & Kamal Uddin, 2010).

Through its first phase of activity, the CDMP succeeded in providing training to community-level and government officials in disaster risk management. Key studies were also undertaken, such as mapping of tsunami and storm surge risk along Bangladesh's entire coastline, and development of climate change scenarios for specific regions of the country.<sup>15</sup> The program's success in supporting community disaster management initiatives also enabled it to expand from initially being involved in seven districts to being engaged in 32 districts by 2009. Early warning systems strengthened under the program are cited as having significantly reducing the number of lives lost during Cyclone Sidr in 2007. As well, the CDMP is credited with establishing the Bangladesh Disaster Management Policy Framework (Luxbacher & Kamal Uddin, 2010).

Achieving these outcomes required overcoming some significant challenges. For one, implementation of the project experienced significant delays due to political unrest in 2006 and the need to cope with flooding in 2007 and 2008. As a result, it was only effectively active for 2.5 years between 2004 and 2009. High turn-over in leadership positions—with seven Secretaries and five Director Generals of the Disaster Management Bureau in the BMFDM in five years—led to problems with ownership, engagement and capacity retention. Also problematic was getting government officials engaged in the project, and retaining their involvement, given the additional work required for its implementation. It also took the program 18 months of advocacy and engagement with different groups to overcome their skepticism and gain their involvement in its activities. Finally, although CDMP Phase I had a number of accomplishments, mainstreaming of disaster management (along with climate change adaptation) was largely confined to the BMFDM (Luxbacher & Kamal Uddin, 2010).

These challenges were offset by several factors that enabled the success of the CMDP's first phase (Luxbacher & Kamal Uddin, 2010):

- *High-level leadership.* Although the individuals within the position of Secretary to the BMFDM changed frequently, they saw the value of the CDMP and were committed to ensuring its success. Their engagement was critical given the Secretary's role as the National Project Director. Leadership by the Secretary ensured that project decisions were implemented.
- *Stakeholder engagement.* The CDMP engaged representatives from within and outside of government, from the national to the community levels. The establishment of these relationships is demonstrated by the program's expansion at the district level.

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<sup>15</sup> These scenarios were prepared by a climate change study unit within the Bangladesh University of Engineering and Technology. The program improved capacity amongst Bangladeshi researchers to downscale from Global Circulation Models and Regional Climate Models (Luxbacher & Kamal Uddin, 2010).

- *Donor support.* Implementation of the project was facilitated by financial assistance received from the United Kingdom and the United Nations, and UNDP provided technical support throughout the program's implementation.

Overall, Phase I of the CDMP made significant steps towards integrating disaster risk management into national policies, and enhancing capacity to adapt to climate change through initiatives such as establishment of the Climate Change Cell in the Ministry of Environment and Forests. These efforts have provided an important example of efforts to jointly mainstream disaster risk management and climate change adaptation through a combination of tools, funding and institutions (Mitchell et al., 2006).

However, its outcomes also demonstrated that the process of mainstreaming disaster risk and adaptation concerns across government will be a long-term process (Luxbacher & Kamal Uddin, 2010). In its second phase (2010 to 2014), the CDMP “aims to further reduce Bangladesh’s vulnerability to adverse natural and anthropogenic hazards and extreme events, including the devastating potential impacts of climate change. It will do so through risk management and mainstreaming” (CDMP, n.d.2).<sup>16</sup> A key focus of the program<sup>17</sup> is mainstreaming disaster risk management and climate change adaptation into the planning and budgeting processes of the BMFDM and 13 other ministries and agencies. To date, CDMP has engaged with these ministries but adaptation and disaster risk reduction concerns have not yet been systematically incorporated into their policies and plans. It is hoped that this goal will be achieved by the end of the project. Concurrently, though, the CDMP has been actively involved in efforts to redraft Bangladesh’s Disaster Management Act, Disaster Management Policy and a revision of the Standing Orders on Disasters (UNDP Bangladesh, n.d.). These changes have the potential to influence the work of all ministries. Activities within CDMP Phase II continue to be undertaken in collaboration with government, development partners and civil society.

### 3.3 The Netherlands’ Delta Programme

The Netherlands’ Delta Programme (*Deltaprogramma*) is a national initiative that aims “to ensure that the Netherlands remains economically and spatially attractive, to prevent disasters and damage, and to secure the supply of freshwater” (GON, 2010: 14). Its establishment was spurred by growing concern about the Netherlands’ long-term safety and water security. Almost one-third of the Netherlands is below average sea level; a further one-third is exposed to flooding from rivers (de

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<sup>16</sup> Funding for the second phase of the CDMP (a total of US \$50 million) is being provided by the United Kingdom, European Union, Swedish International Development Agency, Australian Agency for International Development, UNDP and the Government of Bangladesh. It is being implemented by UNDP in partnership with BMFDM (CDMP, n.d.).

<sup>17</sup> The six key areas of focus of the CDMP’s second phase are: institutional strengthening in risk reduction; managing adaptation to climate risks, including mainstreaming of disaster risk reduction and adaptation linkages; disaster proofing development funding; rural risk reduction; urban risk reduction; and improving disaster preparedness and response (UNDP Bangladesh, n.d.).

Vriend, 2009). Consequently, nearly 60 percent of the country is at risk of flooding, including its economic centres (GON, 2010).

Following disastrous floods in 1953 that led to the loss of more than 1,800 lives and left 100,000 people homeless (GON, 2010), the Netherlands moved to strengthen its flood management systems. A program established in 1953 led to the introduction of the concept of risk-based flood protection—in which the probability of flooding is considered along with potential consequences. Significant re-orientation and re-design of the country’s flood protection measures in south-western Netherlands subsequently took place (GON, 2008). In 2005, the impact of Hurricane Katrina on New Orleans spurred a re-examination of the Netherlands flood protection measures (Talbot, 2007). Existing safety standards had been established in the 1960s, when significantly fewer people lived in the Netherlands and considerably less capital had been invested. A review of the country’s flood defence system in 2006 found that “24% of dykes did not meet the legal standard” and a further 32 percent of dykes had not been assessed against this standard (GON, 2010: 31). Rising seas, soil subsidence,<sup>18</sup> higher temperatures, enhanced risk of drought, and the potential for greater river discharge further threaten this low-lying country’s future.

In light of these concerns, the Delta Programme was established in 2008. The program is hosted by the Ministry of Infrastructure and the Environment, but works with other government ministries, particularly the Ministry of Economic Affairs, Agriculture and Innovation. It is led by the Delta Commissioner,<sup>19</sup> who is responsible for preparing an annual work plan for review by parliament (GON, 2011). The mandate of the Delta Programme is to assess whether existing standards, rules and agreements governing flood safety, freshwater and spatial planning need to be revised to meet current and future needs in a changing climate. To fulfill this mandate, the program is developing guidance on five leading “Delta Decisions” related to flood risk management and freshwater supply in this century. These decisions are focused on (GON, 2010; GON, 2011):

- Safety – reassessing and updating flood protection standards and relevant safety standards;
- Freshwater – developing a strategy that will guarantee a sustainable and economically optimal long-term supply of freshwater;
- IJsselmeer – defining a long-term water level management strategy for the IJsselmeer, an artificial lake in central Netherlands critical to the country’s freshwater supply, to ensure safety and water supply for the period of 2015 to 2050;<sup>20</sup>
- Rhine-Meuse Delta – determining strategies until 2050 and beyond for protecting populations and economic activity in the Rhine-Meuse Delta, where four of the Netherlands largest cities are located (Delta Alliance, n.d.); and

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<sup>18</sup> The Netherlands is sinking at a rate of 0.2 centimetres annually in some areas due to decomposition of underlying peat soils exposed to the air by drainage efforts (Talbot, 2007).

<sup>19</sup> The Delta Commissioner is appointed by the Dutch Cabinet.

<sup>20</sup> The IJsselmeer was created in 1932 when the Zuiderzee, an inland sea, was closed by constructing a 32 kilometer dam. The IJsselmeer is feed by a tributary of the Rhine and a portion of it has been reclaimed to create agricultural land (see <http://www.britannica.com/EBchecked/topic/282539/IJsselmeer>).

- Spatial adaptation – developing a national policy framework to guide (re)development of built-up area so that they can help limit the impact of dry and wet periods.

To inform the Delta Decisions, the Delta Programme is organized into three broad national programs looking at Safety, Freshwater and New Urban Developments and Restructuring, and six geographically focused sub-programmes.<sup>21</sup> These programs are examining the degree to which existing programs are effective in protecting the Dutch from current flood concerns. They also focus on preparing for the future—understanding what might occur in the coming decades and what response strategies and investments are therefore needed.

By 2014, the program is to identify promising strategies for improved management of the Netherlands' water resources. These strategies will be used to create proposals for policy changes in 2015 (GON, 2011). These Delta Decisions will be used to inform the Netherlands' next National Water Plan, to be drafted in 2015 (GON, 2010). Following its passage in 2011, the mandate of the Delta Programme is now governed by the 2011 Delta Act, and it is financed by the Delta Fund established under this same Act (Anonymous, 2011). The Delta Fund is financed by existing resources allocated to the Netherlands Infrastructure Fund until 2020, and the Dutch Cabinet has since agreed that at least 1 billion Euros per year will be allocated to the Delta Fund after 2020 (Anonymous, 2011).

The Delta Programme takes an integrated approach that considers the multiple linkages between water management, economic development, spatial quality, recreation, the environment and climate change to ensure that the Netherlands remains not only safe but also attractive. In its work, the program is emphasizing the need for flexible planning through adaptive delta management. Traditionally, flood management in the Netherlands has focused on prevention through an intricately developed system of seawalls, storm-surge barriers and dikes. Today, more of a systems-based approach is being followed that focuses on minimizing the damage caused by flooding rather than preventing its occurrence (Talbot, 2007). The program engages a large number of stakeholders, bringing together different national ministries, provinces, municipalities and water boards, as well as social organizations, research institutes and the business community. Actions are combined where possible with existing regional plans and projects, such as the Room for Rivers program (which is creating more room for rivers to flow) and efforts to reinforce dykes and coastal infrastructure (GON, 2010; GON, 2011).

To assess future vulnerability, a common set of scenarios are being used by all of the Delta Programme's various programs and sub-programs. For the climate analysis, the Delta Programme is using four climate scenarios originally developed in 2006 by the Royal Netherlands Meteorological Institute that are updated on a regular basis. It is also developing a common system for evaluating possible solution strategies, and a Delta model that will be used for some of the ongoing and planned analysis of current and future risks (GON, 2010).

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<sup>21</sup> The geographical regions that form these six sub-programs are: the Rhine Estuary-Drechtsteden, Southwest Delta, IJsselmeer region, Rivers, Coast and Wadden region (GON, 2011).

These scenarios are being used to identify adaptation tipping points—points at which current policy and management practices are expected to be insufficient to meet current objectives and adjustments therefore need to be made—and then seeks to delay their occurrence (Kwadijk et al., 2010).<sup>22</sup> For the Delta Programme, therefore, “[it] is not the exact figures for rising sea levels that matter as much as the question of whether or not our current water management and water policy are still satisfactory for the changing climate and if so, for how long” (GON, 2010: 36). The adaptation tipping point approach provides policy-makers with information regarding if and when an adaptation intervention is needed (Kwadijk et al., 2010). It also encourages: short-term interventions that increase the robustness of the Netherlands under different future scenarios; building upon ongoing and planned developments that promote resilience over the long-term; and continuously monitoring and assessment of risks in light of new knowledge (GON, 2010).

Although the outcomes of the Delta Programme will be determined in the coming years, its design firmly mainstreams climate change into its ongoing work and is expected to facilitate the integration of climate risk into the Netherlands next National Water Plan. Factors contributing to its likelihood of success include:

- *Long-term political commitment* – water management is of critical importance to the Netherlands, and current climate variability and climate change are recognized as key risks to the country’s future well-being. The country’s long-term political commitment to the management of Netherlands’ delta region is reflected in the establishment of the Delta Act, which provides the Delta Programme with a legislated mandate. It is further reinforced by the significant funding allocated to the Delta Fund, with commitments to continue the program after 2020.
- *Meeting current needs while preparing for the future* – the program works to identify short-term solutions to current problems that also are expected to enhance the Netherlands’ robustness and flexibility over a range of possible future climate scenarios. It emphasizes the development of systems that are sufficiently robust to withstand projected extreme events, and flexible enough that they can be easily respond to changing conditions.
- *Integrated approach* – the Delta Programme emphasizes the need to undertake its work in a manner that builds upon existing initiatives and finding solutions that incorporate economic, societal, ecological and technical perspectives.
- *Stakeholder engagement* – the program combines input and implementation measures that involve different levels of government and a diverse array of civil society representatives.
- *Flexibility of design* – the requirement that the Delta Programme’s work plan be presented to the Dutch parliament annually means that it can be updated on a regular basis in light of changing circumstances and needs.

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<sup>22</sup> A current strategy may become unviable due to a variety of economic, technical and social reasons, meaning that climate change becomes one of several factors to consider when planning for the future (Kwadijk et al., 2010).

### 3.4 Manitoba's Winter Roads System

The northern part of the Province of Manitoba in central Canada is a vast and sparsely populated region with a highly variable sub-arctic climate; average annual temperatures in central Northern Manitoba range from  $-25^{\circ}\text{C}$  in January to  $+16^{\circ}\text{C}$  in July (EC, 2011). Of the approximately 81,000 people living in this area, which covers 560,000 square kilometers (MANA, 2011), about 30,000 people live in 28 remote communities that are inaccessible by permanent conventional roads or railways as the land is covered primarily by lakes, rivers and low-lying bogs called muskeg (Blair, 2010). Essential goods such as medicine and food are therefore flown into these communities during the warmer months of the year; however, this is very costly and does not allow for the transportation of larger and heavier goods such as vehicles, equipment and building materials. A traditional solution has been the use of “winter roads,” or roadways that are built out of ice and snow in the cold winter months when the land and water is frozen solid. The 2,178 kilometer winter road network is typically viable from mid-January to mid-March, a period of about eight weeks when the ice is thickest on lakes and rivers (Blair, 2010; Kuryk, 2003; MIT, 2011).

The winter road system is of significant socioeconomic importance to Manitoba's remote communities. In addition to allowing goods to be moved at cost that is two to three times lower than air transport, winter roads allow people to visit friends and relatives in nearby settlements; export resources like furs and fish for sale in more populated areas; and gain income by working on road construction and maintenance projects (Blair, 2010; CIER, 2010). The latter two are particularly important benefits; unemployment rates in Northern Manitoba communities are as high as 80 to 90 percent (Blair, 2010; Kuryk, 2003). As winter roads support social networks, economic development, and the provision of infrastructure and essential goods, they are of fundamental importance to remote northern Manitoba communities.

Manitoba's changing climate threatens the integrity and safety of winter roads. Milder winter temperatures and fluctuating ice and water levels in rivers have decreased the number of days that winter roads are usable from a previous average of 50 or 55 days per year to as low as 20 days in 1999/2000 (GOM, 2003). In 1998, an unusually warm winter resulted in an inability to build winter roads to 12 communities. This necessitated air transport of approximately ten million liters of fuel and one million kilograms of foodstuffs, at a cost of \$15 to \$18 million to the governments of Manitoba and Canada (CIER, 2006; Kuryk, 2003). The safety of winter roads continued to be a concern in the early 2000s, when poor road conditions frequently led to drivers becoming stranded and the drowning of a road construction worker when the grader he was driving broke through the ice.

After the events of 1999/2000, the Deputy Minister of Manitoba Transportation and Government Services<sup>23</sup> was supportive of efforts to examine the potential impact of a changing climate on the

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<sup>23</sup> The Deputy Minister is the most senior bureaucratic position within the Ministry, and reports directly to the Minister of Manitoba Transportation and Government Services (who is an elected official).

province's winter road network. Department staff, led by the Manager of Technical Services, sought external expertise to analyze weather and operational data to inform adaptation efforts. As a first step, research was needed on the relationship between winter temperatures and winter road fitness. Coincidentally, the Prairie Adaptation Research Collaborative (PARC), a new partnership of the governments of Canada, Alberta, Saskatchewan and Manitoba, was initiating research on projected climate change impacts to inform adaptation efforts. Taking advantage of this opportunity, Manitoba partnered with PARC to fund a study of the impact of winter temperature variability on winter roads by researchers at the University of Winnipeg. Using regression models on the strength of the relationship between winter temperatures and winter road operations historically, and temperature projections from General Circulation Models for a variety of scenarios, the researchers were able to make projections about future changes to the winter road season. Their projections suggested that the winter road season was likely to continue to shorten as a result of Manitoba's warming winters: by approximately 5 days in the 2020s; 10 days in the 2050s; and 14 days in the 2080s (Blair & Babb, 2008).

These findings were presented at a 2003 workshop attended by policymakers, transportation service providers and users, researchers and other stakeholders that aimed to develop strategies for climate change mitigation and adaptation in the transport sector. Winter roads were identified as a high priority for adaptation during this workshop because of the strong likelihood that they would be affected by climate change; their socioeconomic importance in northern Manitoba; and the prohibitively high cost of other methods of transportation (Kuryk, 2003). The decision to improve the winter road network was, as such, instigated by safety concerns and an informal cost assessment, and supported by scientific research and risk management planning.

The Government of Manitoba responded by dramatically increasing spending on the winter road network in an attempt to improve adaptive capacity. Between 2007 and 2011, the average cost of the winter road network rose to \$13 million annually; funding for winter roads has tripled since the first crisis year of 1998 (Rabson, 2012; MIT, 2011). This funding has gone towards upgrading existing winter roads, as well as relocating roads away from water bodies and constructing new roads on overland routes. This has improved safety, allowed the roads to stay open longer each season (thus saving money on air transport), and reduced construction difficulties (MIT, 2011).

Several factors enabled the Government of Manitoba to successfully make changes to the winter road system:

- *Policy coherence*: the initiative fit into the provincial government's broad northern development strategy because of the positive socioeconomic impact of the winter road system on northern communities.
- *Opportunities management*: Manitoba was able to take advantage of an ongoing research initiative to share the cost of developing the temperature projections and regression models that informed decision makers about likely changes in the winter road season.

- *Senior leadership*: supported by the Deputy Minister, the initiative was spearheaded by two provincial government officials who brought scientists and key decision-makers together and advocated for the project.
- *Policy flexibility*: the initiative was a success in part because the winter road network is already a responsive and adaptable system, as it is partially rebuilt on an annual basis. Community consultations about the relocation of the road network, for example, therefore could be easily incorporated into routine annual road planning processes.

Finally, a key “lesson learned” from the Manitoba winter roads case is that framing adaptation initiatives in a risk management context is an effective way to appeal to policy-makers. The proponents of adaptation were able to make a compelling argument by presenting scientific projections that emphasized the likelihood of the existing winter road system becoming increasingly unreliable, and by highlighting the high costs, potential safety risks, and negative socio-economic effects of “business-as-usual” transportation policies.

### 3.5 Observations from the case studies

The five case studies presented provide contrasting examples of efforts to mainstream climate change adaptation into policy and planning. Yet each helps to illustrate the practical application of some of the good practice guidance widely recognized as being important for successful mainstreaming efforts:

1. **Access to information.** In each of the case studies presented, governments relied to differing extents on the use of existing information, new information and expert judgement to guide adaptation decision-making. In the Cook Islands, the initiative specifically aimed to rely only upon existing information, but still found that it was necessary to undertake new research in the areas of health and infrastructure. In the first phase of Bangladesh’s CDMP, capacity to develop climate scenarios was strengthened and new understanding regarding coastal exposure to storm surges was gained. In Manitoba, new research was undertaken to better understand the potential impact of greater variability in winter temperatures on the future reliability of the winter roads system. And in the Netherlands, scenarios are being developed to identify adaptation tipping points. In all of these cases, the new knowledge gained aided in identifying priority adaptation needs and informs mainstreaming efforts. However, considerable uncertainty remains regarding how the climate will change and its implications for each of the case study locations. Despite this limitation, these mainstreaming efforts proceeded using the best available knowledge, augmented by expert judgement.

The need to use consistent sources of information across government to guide mainstreaming efforts can also be observed through the Netherlands case study. The Government of the Netherlands has established a set of four climate change scenarios that are to be used by all ministries. The Delta Programme is also establishing a common set of impact scenarios to be used across all of its various programs and sub-programs.



2. **Awareness of climate risks and adaptation options.** Through the mainstreaming efforts described, awareness of the potential impacts of climate change was increased among a range of key stakeholders, including senior government officials. In the Cook Islands, this awareness raising was supported through the use of a formal framework—the Climate Change Adaptation through Integrated Risk Reduction framework and methodology—that guided this process. All of the case studies also provide examples of policy makers and other stakeholders being engaged in assessing the risk posed by climate change, identifying potential actions for reducing vulnerability, and recommending how these actions could be incorporated into existing policy development and planning processes. Through these processes, policy makers came to better understand the risks posed by climate change and actions that could be taken to ameliorate these risks.
3. **Leadership from senior levels of government.** Direct engagement by senior government officials was critical to the success of many of the mainstreaming efforts profiled. In Bangladesh, the Secretary of the Ministry of Food and Disaster Management acted as the National Project Director for the CDMP. In the Netherlands, the Delta Programme’s annual work plan is presented to Parliament and approved by Cabinet. In Manitoba, research on the implications of climate change for the province’s winter road systems, and the subsequent decision to re-allocate significant financial resources, was spurred by the interest of the Deputy Minister responsible for transportation.
4. **Effective coordination mechanisms.** To ensure effective and coordinated mainstreaming, it is widely agreed that it should be led by a central-level, inter-departmental coordination mechanism chaired by a senior ministry. Although not an inter-departmental committee per se, the Delta Programme can be seen to play this role in the Netherlands. Housed within the Ministry of Infrastructure and the Environment, it works with other sectoral ministries, particularly the Ministry of Economic Affairs, Agriculture and Innovation. The Netherlands’ Cabinet is also directly engaged in managing its activities, including appointment of the Delta Commissioner.

In contrast, the case study from Bangladesh highlights efforts to mainstream adaptation primary within an individual ministry. Yet the actions taken by this department are expected to influence efforts to mainstream adaptation (and disaster risk management) across government. A main objective of the second phase of CDMP is to mainstream adaptation and disaster risk management beyond the Ministry of Food and Disaster Management and into 13 other ministries and agencies. This case reflects the need to begin adaptation mainstreaming efforts where interest is high and leadership is engaged. While sometimes this interest exists early on at senior levels, it more often is a bottom-up process in which departments that see the direct risk climate change poses to their mandates act first and provide experience and leadership for other segments of government.

5. **Build on existing structures.** In each of the case studies presented, efforts to mainstream adaptation built upon existing structures and were aligned with current development objectives. To differing degrees, they also illustrate how to link mainstreaming of adaptation and disaster risk management, and utilization of established risk management frameworks and techniques.

The Cook Islands identified adaptation needs relative to the nine development priorities to be addressed in the ongoing process to create the National Sustainable Development Strategy. Bangladesh's CDMP works to strength the country's existing disaster management systems and to integrate adaptation into these systems. In Manitoba, the need to adapt was built directly into its ongoing winter roads planning process. Finally, the Delta Programme incorporates existing regional plans and projects, such as the Room for Rivers program and those reinforcing dykes and coastal infrastructure.

6. **Involve multiple stakeholders.** Successful mainstreaming involves not only reaching across government departments at the national level, but also to key stakeholders in sub-national governments, the private sector, academia, research institutes and non-governmental organizations. The engagement of multiple stakeholders fosters the building of a broad cultural consensus on the need to integrate climate risk into routine decision-making. This guidance is perhaps best illustrated in the Cook Islands, where key stakeholders were involved throughout the mainstreaming process. Consultations were undertaken with stakeholders to identify the entry points for the mainstreaming effort; with the Project Liaison Committee and National Climate Dialogue participants to identify the potential implications of climate change for the nine priorities of the emerging NSDS; and again with the Project Liaison Committee and National Climate Dialogue to review and revise the recommendation that were eventually presented to Cabinet. The Netherlands' Delta Programme also engages a large number of stakeholders, including different national ministries, provinces, municipalities and water boards, as well as social organizations, research institutes and the business community. And the Bangladesh CDMP engages individuals from the national government to the community levels, as well as different research institutes and development assistance agencies.
7. **Emphasize near- and long-term benefits.** Several of the case studies describe how the mainstreaming efforts have emphasized the provision of immediate benefits while supporting adaptation over the longer-term. This focus is most clearly articulated in the Delta Programme, the mandate of which focuses on addressing current security needs while preparing for the future. Its use of adaptation tipping points to assess where interventions are needed in the near-term to increase the Netherlands' long-term robustness under different future scenarios provides a useful approach for achieving this objective. Similarly, Bangladesh's effort to strengthen its disaster risk management system in a manner that incorporates climate change concerns addresses an immediate need while preparing for the future. As does Manitoba's ongoing efforts to increase the safety and viability of its winter roads system to ensure continued provision of critical supplies to remote communities now and in the future.
8. **Monitor, evaluate and improve.** As adaptation to climate change is relatively new, it is appropriate to adopt a "learning by doing" approach (McGray, 2009). This attitude can be seen in the Bangladesh case study, where lessons from implementation of the first phase of the CDMP have been incorporated into its second phase, highlighting the benefits of a phased approach to rolling out mainstreaming efforts. In Manitoba and the Netherlands, annual

planning and implementation processes allow for lessons and new information to continuously be incorporated into evolving risk management strategies.

The case studies also suggest some additional guidance for policy makers interested in mainstreaming adaptation:

9. **Be opportunistic.** For adaptation to be mainstreamed into national policies and planning, it requires the presence of clear entry points, the interest and commitment of senior government officials, and the availability of sufficient human, technical and financial resources to support the decision-making process. Having all of these requirements in place at the same time is difficult to achieve—and sometimes it may be necessary to take advantage of a significant event to spur the political and financial commitment needed for mainstreaming to occur. In Bangladesh, for example, the CDMP was initiated following the failure of previous efforts to prevent loss of life and damages during the 1991 and 1998 cyclones. In Manitoba, the failure of the winter roads in 1998, and the millions of dollars in additional expenses therefore incurred, provided incentive for the government to re-evaluate its approach. The Netherlands commitment to re-examining its flood protection measures was spurred in part by the impact of Hurricane Katrina on New Orleans in 2005 (Talbot, 2007). Event such as these open up space within the political dialogue for discussion of climate risks and adaptation concerns, and for champions within and outside of government to be mobilized.
10. **Be patient.** As observed in the case studies, mainstreaming adaptation to climate change is a long-term process. The Netherlands long-term commitment to the Delta Programme through the Delta Act and Delta Fund clearly reflect this understanding. The experience in the Cook Islands and Bangladesh also suggest that the gains from an initial mainstreaming effort may not be realized immediately but over the medium-term. In the Cook Islands, while the National Sustainable Development Strategy for 2007 to 2010 contains elements supportive of adaptation to climate change, it is more deeply mainstreamed into its Strategy for 2011 to 2015. Similarly, in Bangladesh, the second phase of the CDMP has more clearly articulated that one of its core objectives is to support the mainstreaming of adaptation to climate change. These outcomes suggest that the experience and awareness gained through the efforts profiled in the case studies (likely along with other contributing factors) subsequently led to a greater commitment to mainstream climate change.
11. **Make connections to risk management.** Several of the case studies highlight the advantages of linking climate change adaptation to established risk management processes; of presenting climate change as an additional risk to be managed. In Bangladesh, the government is strengthening its risk management capacity in the area of disasters and mainstreaming adaptation into these processes. In the Netherlands, climate risks are assessed along with political, economic, technical and social concerns to identify adaptation tipping points and monitor when they might change.

## 4.0 Conclusions

As illustrated through the case studies presented, mainstreaming adaptation to climate change into national policies and planning takes time to occur. This finding is not surprising when one observes that, despite decades of effort, considerations of gender, disaster risk management and sustainable development remain incompletely integrated into current development planning and policies. For mainstreaming to occur, it takes time to increase awareness within government of the need to adapt and determine how best this might take place—particularly when critical pieces of information and analysis are not yet available. It requires the engagement of senior government leaders and the identification of champions; establishment of mechanisms for sharing information and coordinating actions across sectors, levels of government and with civil society; building of required technical and human resource capacities; and the creation of appropriate monitoring and evaluation systems. Perhaps most importantly, mainstreaming requires persistence and a long-term commitment. Despite these challenges, the potential rewards resulting from mainstreaming adaptation—including minimization of maladaptation, avoidance of economic costs, and early identification of emerging opportunities—accentuate the need to proactively pursue these efforts.

Following the general guidance provided in Section 2 can promote the success of mainstreaming efforts. However, it is also important to recognize that the guidance needs to be interpreted and applied in a manner that is reflective of a country's individual circumstances, needs and opportunities. No single step-by-step process for mainstreaming can be applied in all countries (McGray, 2009). Only general guidance can be provided that then must be tailored to the local context. This flexible approach reflects the fact that, in all countries, policy making itself is not a step-by-step process; rather, in practice, it is a messy, uncertain and multi-dimensional process. Among other factors it requires continually taking into consideration conflicting interests, competing priorities, trade-offs, political timelines, changing socio-economic circumstances, individual personalities, and real restrictions in terms of time, human capacity, financial resources and the availability of information. Each effort to mainstream adaptation needs to be cognizant of these various influences and a process designed that is tailored to local circumstances.

The changing nature of policy making, along with the continuing development of new adaptation knowledge, practice and science, suggests the need to take a learning-by-doing, iterative approach to mainstreaming. This approach emphasizes the need to build continuous learning into the design and implementation of mainstreaming efforts. It is perhaps best illustrated by the case study from the Netherlands, where climate change considerations are being integrated into existing risk management systems. These systems allow for periodic assessments of exposure to risks in light of new economic, social and climatic information; and the modification of plans and policies in light of this new information. A step beyond this iterative approach is the creation of adaptive policies, or policies specifically designed to function well in dynamic and uncertain conditions. Such policies contain features that increase their likelihood of successfully responding to anticipated and unanticipated events, such as integrated and forward looking analysis, enabling of self-organization



and social networking, decentralization of decision-making, and formal policy reviews (Swanson & Bhadwal, 2009).

A challenge for the learning-by-doing approach to mainstreaming adaptation is the currently nascent development of systems for monitoring and evaluating adaptation. While being able to draw upon the experience of the development community, monitoring and evaluating adaptation projects, programs and policies faces some particular challenges. These include differing understandings of what constitutes “adaptation” (Lamhauge et al., 2011); the longer time horizon of adaptation efforts; and the cross-sectoral nature of many adaptation interventions (Spearmann & McGray, 2011). Early lessons from research on systems for monitoring and evaluating adaptation suggest that a cookie-cutter approach is not appropriate. Instead, emphasis should be placed on flexibility, managing for results, promoting continual learning, tailoring adaptation indicators and evaluation systems to local circumstances and needs (Spearmann & McGray, 2011), and building on existing monitoring and evaluation frameworks (Lamhauge et al., 2011). These characteristics are consistent with those of good mainstreaming practice.

Ultimately, the success of mainstreaming efforts must be judged not only by the degree to which adaptation has been integrated into national policies and plans but also the extent to which concrete, measurable changes have resulted from the implementation of these policies and plans. This judgement will take time to assess. This implies that refinement of current good practice guidance for mainstreaming will similarly occur over time. Determining these refinements would be greatly assisted by strong and consistent efforts to document and share the experiences of national governments in mainstreaming climate change—including (perhaps in particular) the problems incurred and how these were overcome. Many countries—developed and developing—are in the early stages of efforts to mainstream adaptation to climate change into their national policies. To the extent possible, these experiences should be recorded and shared with others in a format that is usable, practical and informative. Specific mechanisms should also be established that enable policy-makers in developed and developing countries to share lessons learned and build tacit knowledge. While each mainstreaming experience is unique, ideas shared can be modified for application in different locations and contexts. Analysis of a sufficient number of case studies would also aid in refining existing good practice guidance for mainstreaming.

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