Review of Current and Planned Adaptation Action: South Asia

Afghanistan, Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan and Sri Lanka

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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 is 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/

iisd International Institute for Sustainable Development / Institut international du développement durable

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 initiated a Review of Current and Planned Adaptation Action in the fall of 2010. Its purpose is to provide a baseline understanding of who is doing what on adaptation in three developing regions—Africa, Asia-Pacific, and Latin America and the Caribbean—and in priority adaptation sectors. Based on available resources, it seeks to provide a rapid assessment of: priority interests and adaptation needs; efforts by governments to support adaptation though policy and planning; the scope of international support for adaptation efforts in different countries and sectors; and potential gaps in adaptation efforts at the country and regional levels.

This document is one of 12 regional profiles completed as a contribution to the Review of Current and Planned Adaptation Action in Africa, Asia-Pacific and Latin America and the Caribbean. It presents a review of current and planned adaptation action in South Asia, which is defined as including the following countries: Afghanistan, Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan and Sri Lanka. It first provides an overview of adaptation action at a regional level, highlighting commonalities and differences between South Asian countries. The appendices that follow discuss adaptation action taking place in each of the eight countries in the region.

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Abbreviations and Acronyms

ADB	Asian Development Bank
BCCSAP	Bangladesh Climate Change Strategy and Action Plan
BMEF	Bangladesh Ministry of Environment and Forests
BMZ	Bundesministeriums für Umwelt, Naturschutz und Reaktorischerheit/ Ministry for Economic Cooperation and Development (Germany)
CICERO	Centre for International Climate and Environmental Research
DA	Development Alternatives
DEFRA	Department for Environment, Food and Rural Affairs (United Kingdom)
DFID	Department for International Development (United Kingdom)
FAO	Food and Agriculture Organization
GCCA	Global Climate Change Alliance
GDP	Gross Domestic Product
GEF	Global Environment Facility
GIRA	Government of the Islamic Republic of Afghanistan
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit
GLOF	Glacial lake outburst flood
GOB	Government of Bangladesh
GOI	Government of India
ICIMOD	International Centre for Integrated Mountain Development
ICRISAT	International Crop Research Institute for the Semi-Arid Tropics
INCCA	Indian Network on Climate Change Assessment
IPCC	Intergovernmental Panel on Climate Change
ISET	Institute for Social and Economic Transition
LAPA	Local Adaptation Plans of Action
LDC	Least-developed country
MFF	Mangroves for the Future
MMEEW	Maldives Ministry of Environment, Energy and Water
MMHAHE	Maldives Ministry of Home Affairs, Housing and Environment
NAPA	National Adaptation Programme of Action
NAPCC	National Action Plan on Climate Change (India)
NCAP	Netherlands Climate Assistance Program
NGO	Non-governmental organization
NMOE	Nepal Ministry of the Environment
OECD	Organisation for Economic Co-operation and Development
PMOE	Pakistan Ministry of the Environment
PPCR	Pilot Program for Climate Resilience
RGB	Royal Government of Bhutan
SAARC	South Asian Association for Regional Cooperation
SAWI	South Asia Water Initiative

SCCF	Special Climate Change Fund
SIDA	Swedish International Development Agency
SLMOE	Sri Lanka Ministry of the Environment
SLMFE	Sri Lanka Ministry of Forests and Environment
TAP-CC	Technical Advisory Panel on Climate Change
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UNFCCC	United Nations Framework Convention on Climate Change
UNITAR	United Nations Institute for Training and Research
USAID	United States Agency for International Development
WWF	World Wide Fund for Nature / World Wildlife Fund

Executive Summary

Growing understanding of the need to adapt to the impacts of climate change has led to a significant increase in ongoing and planned adaptation action in the developing regions of the world, including South Asia. This upsurge in climate change adaptation action is a welcome occurrence, but enhanced coordination among expanding networks of adaptation actors is needed to ensure resources are deployed quickly and effectively. Responding to this concern, a review of current and planned adaptation action in Central Asia was undertaken by the Adaptation Partnership[1] between October 2010 and April 2011. Covering the countries of Afghanistan, Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan and Sri Lanka, the rapid review examined: priority adaptation needs; efforts by governments to support adaptation though policy and planning; the scope of international support for adaptation efforts in different countries and sectors; and potential gaps in adaptation efforts at the country and regional levels. This review of adaptation action in South Asia is one of 12 profiles covering regions in Africa, Asia-Pacific, and Latin America and the Caribbean completed by the Adaptation Partnership.

Climate variability and change pose a serious concern to the South Asian countries of Afghanistan, Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan and Sri Lanka. The scale of the challenge within this region is particularly acute given the size of the population directly affected (over one billion people), the level of underdevelopment (nearly 600 million people in South Asia subsist on less than one U.S. dollar a day), regional dependency on agriculture (60 per cent of employment is linked to agriculture), and the rapid rate of largely unplanned urbanization (in 2008, 464 million people lived in urban areas and nearly 40 per cent in slums). More than half of the countries in the region—Afghanistan, Bangladesh, Bhutan, Maldives and Nepal—are classified as least-developed countries (LDCs).

To assess the level of adaptation action in South Asia, a desk-based review of Internet sources and relevant documentation was undertaken. The content of these sources was assessed in relation to a set of parameters established to focus the review's scope and ensure consistency across regions. Notably, it examines *discrete* adaptation actions, or *policies, programs and projects designed and implemented specifically to address the current and projected impacts of climate change*. The review therefore presents only a portion of the breadth of efforts underway to reduce the vulnerability of developing countries to the impacts of climate. In particular, it does not capture the broad array of development activities that are increasing the adaptive capacity of communities and countries. As well, within the review, adaptation actions have been deemed to be "current" if they were ongoing or completed in 2009 or later. As such, the review does not include projects completed prior to 2009 that may have contributed to building local and national capacities to adapt. The review only identifies those actions currently underway; it does not offer judgment of the effectiveness of actions taking place.

[1] Formed in 2010, the Adaptation Partnership is chaired by Costa Rica, Spain and the United States. Its goal 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.

In addition, reflecting the desk-based nature of the review, it is acknowledged that the content is biased toward identification of large-scale projects funded by international development assistance organizations, and those projects about which information is available online. As such, small-scale projects that meet the review's definition of adaptation action, particularly those occurring at the community level, are not fully represented within the review.

Climate Vulnerability

Over the past several decades, South Asian countries have become increasingly prone to weather-related threats that previously had not been experienced at a regional scale, and have witnessed an increase in the intensity and frequency of extreme weather events. In addition, rising annual mean temperatures have caused many Himalayan glaciers to retreat at a rapid rate of several tens of meters per year. These observed trends are likely to continue in the future; it is expected that annual temperature increases for South Asia may be between 2.4 and 4.5°C by the end of the century, with the greatest warming occurring between the months of December and February. The region is expected to experience an increase in precipitation during most seasons, as well as an increase in the frequency and intensity of tropical storms. Sea level rise in South Asia is anticipated to be greater than the global average, rising at a rate of 1 to 3 millimeters per year, a process that is expected to lead to coastal flooding, saltwater intrusion into freshwater resources, and impacts on drinking water, local fisheries, aquaculture, agriculture, tourism, infrastructure and industry (Cruz et al., 2007). Sea level rise is a particular concern to the island countries of Maldives and Sri Lanka, as well as the low-lying coastal belts of India and Bangladesh.

Future climatic trends—including rising temperatures, increased frequency and/or intensity of extreme weather events and more variable precipitation—have the potential to impact South Asia's agricultural productivity, water quality and availability, natural resources and public health, among other impacts. Future climate changes may affect key socioeconomic sectors in South Asia in the following ways (Cruz et al., 2007; Government of the Islamic Republic of Afghanistan [GIRA], 2009; Government of India [GOI], 2008; BMEF, 2005; BMEF, 2009; Maldives Ministry of Home Affairs, Housing and Environment [MHAHE], 2001; Royal Government of Bhutan [RGB], 2006; United States Agency for International Development [USAID], 2010):

- Water resources: saline intrusion into drinking water; lower hydroelectric potential (a significant source of energy in south Asia); increased water stress
- Agriculture: changes in the length of growing seasons; a reduction in crop yields and food security; higher variability in water quality and availability; increased incidence of droughts and floods
- Natural resources: changes to the distribution and composition of natural habitats and forests, especially coastal mangroves; a possible negative impact on South Asia's fisheries
- Public health: increased risk of drought and floods; variable rain patterns; high sea surface temperatures and a higher number of heat days; impacts on the prevention and distribution of communicable and non-communicable diseases

- Coastal zones and infrastructure: increased risk of floods, sea-level rise, and coral bleaching; potential for increased human migration; damage to coastal infrastructure; impacts on coastal tourism

Identified Adaptation Needs and Priorities

Common adaptation priorities for South Asian countries have been identified through National Communications to the United Nations Framework Convention on Climate Change (UNFCCC) and, in LDCs, National Adaptation Programmes of Action (NAPAs), as well as national adaptation strategies and plans. These documents reveal that South Asian countries share many of the same adaptation priority areas of concern, including: water and energy (all countries in the region); agriculture (all countries in the region); coastal zones (all except Afghanistan, Bhutan and Nepal); forestry, nature and biodiversity (all countries in the region); health (Bangladesh, Bhutan, Maldives, Nepal, Pakistan and Sri Lanka); and risk reduction and policy integration (Bangladesh, India, Maldives, Nepal, and Pakistan). A wide range of priority adaptation actions have been identified by South Asian countries to respond to climate change within these areas, including the following (BMEF, 2009; BMEF, 2005; Maldives Ministry of Environment, Energy and Water [MMEEW], 2007; MFE, 2000; PMOE, 2003; NMOE, 2010; RGB, 2006):

- *Agriculture*: testing of new crop and seed varieties; improving meteorological information for farmers; exploring insurance schemes to guard against the effects of crop loss; improved weather forecasting for farmers; and the development of climate resilient agricultural practices
- *Coastal zones*: repairing existing infrastructure (including coastal embankments, river embankments and drainage systems); undertaking strategic planning of future infrastructure needs; coastal afforestation; protection of drinking water in coastal communities; integrated coastal zone management; and formulation of coastal zone adaptation strategies
- *Forestry, nature and biodiversity:* control of forest pests; changes in tree species and varieties; preservation of watersheds; energy efficiency measures in fuel-wood use; promotion of alternative timber species; conservation measures; increasing resilience of coral ecosystems through enhanced research and programming; and ecosystem management
- *Health*: enhanced early-warning systems; improved public awareness around the likely impacts of climate change; mainstreaming adaptation considerations into healthcare strategies; prevention and management of vector-borne diseases; mapping of major communicable diseases and water and food-borne diseases; and exploring indigenous knowledge and community practices for health adaptation
- *Risk reduction and policy development*: comprehensive disaster management, including enhancing cyclone, storm surge and flood early-warning systems; plan, design and construct new infrastructure, including cyclone shelters and coastal and river embankments; improved climate change modeling scenarios and data collection; improved awareness raising within vulnerable communities; landslide management; flood prevention; and glacial lake outburst flood monitoring

Policy-Level Actions

To date, there is limited coordinated policy action taking place at the regional level to address adaptation to climate change. The South Asian Association for Regional Cooperation (SAARC) has released a Declaration on Climate Change, and has formulated the SAARC Action Plan on Climate Change (2009–2011); however countries in the region have not yet agreed as to how this action plan will be financed.

LDCs in the region have completed NAPAs and certain countries—including Bangladesh, Maldives, Pakistan and Sri Lanka—have established or are in the process of developing national adaptation strategies. At present, it appears few countries in the region have integrated climate change considerations deeply into sectoral policies and plans.

Projects and Programs that Support Adaptation

South Asian countries are currently participating in a number of regional adaptation projects and programs, with the majority primarily addressing transboundary watershed management, agricultural issues, improved access to information for decision-making, and risk reduction. In addition, South Asian countries are participating in regional projects spanning the rest of Asia and the globe, with the majority of these projects emphasizing capacity building, research and strengthening the policy development process. Prominent funders of regional projects in the region include the Asian Development Bank, Australia, Norway and the United Kingdom.

Despite facing similar and grave threats from climate change, countries in South Asia differ considerably in the degree to which planning, preparedness and action on the ground is taking place to tackle climate change. A small number of countries are benefitting from a large number of on-the-ground activities to address the impacts of climate change—in particular, Bangladesh, India and, to a lesser extent, Nepal—with the remainder of countries undertaking a comparatively low or modest range of activities.

Adaptation Communities of Practice

There are a variety of communities of practice in the region working on climate change adaptation issues, with the majority primarily aiming to advance knowledge sharing. These communities broadly fall into the categories of science/research, advocacy, and implementation and knowledge networks, with examples including Climate Challenge India, Climate Change Network Nepal, the National Network on Climate Change in Pakistan, and Climate Vision Sri Lanka. Many of these forums provide the much-needed interface between major development actors such as government and bilateral/multilateral donors on the one hand, and civil society and non-governmental organizations (NGOs) on the other hand. In addition, these communities often serve as the platforms for providing valuable independent (often field-verified) feedback on the efficacy of national and international efforts to adapt to and mitigate climate change.

Needs and Gaps

The region of South Asia faces significant vulnerability to the adverse effects of climate change and—collectively as well as individually—these countries have been actively involved in understanding their particular vulnerabilities and in developing and implementing adaptation strategies and actions. Many consider South Asia as a "laboratory" for testing and learning about what works and what does not in regards to adaptation to climate change. South Asia has a number of new and innovative initiatives underway or in the pipeline from which valuable lessons can be gained, and the region is currently implementing adaptation activities across a range of identified priority areas. Thus, despite the fact that most adaption efforts started less than a decade ago, some good practice guidance may already be derived by reviewing recent efforts in this region. Examples of these innovative programs include the establishment of dedicated national Trust Funds for climate change in Bangladesh and Maldives.

While a breadth of adaptation action is taking place in South Asia, it is clear that the region's unparalleled need is such that more could be undertaken in a number of areas. This review has identified the following key gaps:

- The importance of the agriculture and water sectors in South Asia suggests that greater effort is needed to ensure that adaptive capacity is meaningfully improved in these sectors. In particular, integrated water resource management and coastal-zone management are areas where greater effort may be pursued.
- There is a need to address gaps in adaptation efforts in urban areas, particularly outside of Bangladesh and India.
- The human health sector is one identified priority area where adaptation activity is currently limited.
- There needs to be a stronger focus on assessing the gender implications of climate change impacts and designing gender-sensitive measures.
- In general, there is a need to scale up existing efforts and to widen the scope of action in key priority areas.
- In addition, lessons learned from current efforts could be examined and shared within the region in order to strengthen capacity and effectiveness.

Review of Existing and Planned Adaptation Action: South Asia

1.0 Introduction

The South Asian countries of Afghanistan, Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan and Sri Lanka[2] are vulnerable to the impacts of climate change—both to gradual changes in temperature and sea-level rise and to increased climate variability and extremes, including more intense floods, droughts and cyclones (UNEP & DA, 2008). The scale of the challenge is unparalleled given the size of the population directly affected (over a billion people), the level of under-development (nearly 600 million people in South Asia still survive on less than one U.S. dollar a day), regional dependency on agriculture (60 per cent of employment is linked to agriculture), and the rapid rate of largely unplanned urbanization (in 2008, 464 million people lived in urban areas and nearly 40 per cent in slums). More than half of the countries in the region (Afghanistan, Bangladesh, Bhutan, Maldives and Nepal) are classified as being least-developed countries (LDC).

To better understand the efforts underway in South Asia to prepare for and respond to the impacts of climate change, this report provides a rapid review of current and planned adaptation action within the region. Based on available resources, it examines: identified priority adaptation needs; efforts by governments to support adaptation though policy and planning; the scope of international support for adaptation efforts in different countries and sectors; and potential gaps in adaptation efforts at the country and regional levels. The main body of the report provides an overview of adaptation action at the regional level, highlighting

Figure 1: Map of South Asia

Source: http://www.vbmap.org/content/south-asia-political-map-170/

[2] For the purposes of this review of current and planned adaptation action, South Asia has been defined in accordance with the membership of the South Asian Association for Regional Cooperation. Hence, although assigned to the South Asian region under the United Nations classification system, Iran is not included in this study.

commonalities and differences among Afghanistan, Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan and Sri Lanka. In the appendices that follow, adaptation action taking place in each of these countries is discussed.

2.0 Methodology

A rapid review of current and planned adaptation action in South Asia—one that gives attention to policies, programs and projects at the national and regional levels—presents a considerable task given the breadth of actions that can and are being taken to reduce vulnerability in the short-, medium- and long-term. Prior to undertaking this review, it therefore was necessary to clarify the terms that would be used within it and establish a set of parameters to limit its scope. This section provides an understanding of the research parameters established for this rapid review and the process by which the information it contains was gathered. These guidelines are presented to help clarify what the study does and does not aim to achieve.

Definition of "Adaptation Action"

Adaptation is generally defined as being 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."[3] Given the breadth of actions that may be taken that are in keeping with this definition, a critical first step in initiating the rapid review was determining the definition of "adaptation action" to be used within it.

This process was influenced by the outcomes of a review of 135 "adaptation" activities undertaken by McGray, Hammill & Bradley (2007), which led to the identification of three different models of adaptation activity:

- *Serendipitous adaptation:* "activities undertaken to achieve development objectives [that] have outcomes that incidentally may also support adaptation" (McGray, Hammill & Bradley, 2007, p. 13). This type of adaptation reflects the widely acknowledged intimate linkage between sustainable development and building capacity to adapt to the impacts of climate change. Specifically, sustainable development can enhance adaptive capacity by strengthening institutions, promoting sound management of natural resources, improving health and education systems, promoting gender equity and fostering economic growth.
- *Climate-proofing of development efforts:* where activities are "added to an ongoing development initiative to ensure its success under a changing climate. In these cases, adaptation is seen as a means to a development end" (McGray, Hammill & Bradley, 2007, p. 13).
- *Discrete adaptation:* where "adaptation to climate change is the primary objective of a project or initiative. From the beginning, implementers and funders of these efforts have climate change in mind" (McGray, Hammill & Bradley, 2007, p. 13).

[3] United Nations Framework Convention on Climate Change (UNFCCC) glossary of climate change acronyms: http://unfccc.int/essential_background/glossary/items/3666.php

While recognizing the critical role of "serendipitous" adaptation and climate-proofing of development efforts in fostering adaptation to climate change in developing countries, a review of all three types of adaptation activities would be unmanageable. This study therefore focuses on an examination of discrete adaptation activities. Adaptation action within the review is therefore defined as *policies, programs and projects designed and implemented specifically to address the current and projected impacts of climate change*. As such, specific reference has been made to supporting adaptation to climate change, and/or climate risk reduction in the objectives and/or rationale of each policy, program or project included in the study.

Due to the selection of this definition, the review automatically presents a narrow snapshot of the wide breadth of activity (often funded though official development assistance[4]) that is helping developing countries build adaptive capacity and reduce their vulnerability to the impacts of climate change. The review therefore should not be viewed as fully representative of the entirety of adaptation action occurring in developing countries—nor of the degree to which vulnerability reduction is occurring in the countries and regions profiled. Rather, the review aims to contribute to an understanding of the identified adaptation needs and priorities of different countries and regions, and the degree to which discrete adaptation activities are contributing to meeting these needs.

Definition of "current" action

To further focus the study, adaptation actions have been deemed to be "current" if they were ongoing or completed in 2009 or later. As such, the review does not include a range of projects completed prior to 2009 that may have significantly contributed to building local and national adaptive capacity. This observation is particularly true of adaptation action in the Caribbean and the Pacific; reflecting the early interest and commitment of Small Island Developing States to understanding and reducing their vulnerability to the impacts of climate change, countries in these regions began to explore adaptation concerns as early as the late 1990s.

While the review's definition of "current" adaptation action limits the scope of the study, the volume of discrete adaptation initiatives has accelerated in recent years, as reflected in the following trends:

- Financing for approved projects through the LDC Fund has risen from nearly US$24 million in 2008 to US$177 million as of mid-2011[5]
- Adaptation financing through the Special Climate Change Fund has increased from 22 projects worth nearly US$90.73 million in 2009 (GEF, 2009) to 31 projects approved for financing in the amount of US$128 million as of mid-2011[6]

[4] In 2010, official development assistance totaled US$128.7 billion[4] (Organisation for Economic Co-operation and Development [OECD], 2011)—a level of funding that significantly outstrips that which is presently provided in support of adaptation to climate change. See, for example, Stockholm Environment Institute (SEI) and United Nations Environment Programme (UNEP) (2010).

[5] GEF, Least Developed Countries Fund website: http://www.thegef.org/gef/ldcf. Accessed September 2011.

- Financing for adaptation by four Bilateral Financial Institutes increased by 31 per cent from US$3,029 million in 2008 to US$3,963 million in 2009 (SEI & UNEP, 2010).

The review therefore reflects the growing number of adaptation efforts initiated in recent years.

Identification of Projects and Programs

A wide range of climate adaptation-related initiatives are underway throughout the world—covering the gamut from original scientific research that informs our understanding of current and future climate patterns, to capacity building and knowledge sharing, to the adoption of new planting practices by farmers, to the building of infrastructure that anticipates future climatic extremes. While acknowledging this diversity, to better achieve the specific objectives of the review, it has focused on time-bounded projects that support preparation for and/or implementation of practical adaptation actions. As such, the review does not include projects and programs that focus on:

- Conducting original scientific research that enhances knowledge of climate change impacts and development of the tools and techniques for reducing vulnerability;
- Ongoing, long-term monitoring efforts (whether climatic or socioeconomic) that are needed to inform decision-making
- Stand-alone capacity-building and knowledge-sharing workshops, conferences and training programs
- Activities solely related to participation in the ongoing international climate change negotiations

As well, the review only captures adaptation action financed through international development assistance; it does not capture adaptation efforts financed solely by national governments. This focus reflects the original impetus for conducting the review—the current scaling up of adaptation action and the potential for duplication of effort and limited sharing of good practice—and the challenge of rapidly identifying nationally funded adaptation projects. This parameter is particularly important for countries such as Brazil and China, whose governments are engaged in self-driven and self-funded adaptation efforts that are not included within this review.

Data Collection

Projects and programs were primarily identified through a desk-based review of the websites of United Nations agencies, bilateral development agencies, multilateral financial institutions, international research organizations and non-governmental organizations (NGOs). Reflecting the desire for a rapid review, a comprehensive examination of all of these organizations was not undertaken; rather, emphasis was placed on capturing initiatives involving organizations generally recognized as being actively engaged in fostering climate change adaptation. Additional information regarding current and planned adaptation action was gathered through an examination of relevant reports.

[6] GEF, Special Climate Change Fund website: http://www.thegef.org/gef/sccf. Accessed September 2011.

The process by which data was gathered for inclusion in the review has biased its content. Notably, it is highly likely that a number of small-scale projects meeting the review's definition of adaptation action, particularly those occurring at the community level, have not been captured. As well, the accuracy of the data captured in the review significantly depends upon the accuracy and completeness of the Internet resources used.

Classification of projects

To support analysis of the degree to which ongoing projects are addressing the priority adaptation needs of developing countries, identified initiatives have been classified in relation to two general characterizations—their sector or areas of focus and the types of activities being implemented. For the sectors or areas in which projects are supporting adaptation action, a classification system comprised of the following 14 macro project categories was developed: food, fiber and forests; ecosystems; freshwater resources; oceans and coastal areas; disaster risk management; migration and security; gender; business; infrastructure; human settlements; human health; climate information services; governance; and multi-sectoral. These macro project categories were then divided further to provide a more detailed picture of the types of projects identified through the review. For example, the macro project category of "food, fiber and forests" was sub-divided into agriculture, pastoralism, forestry and fire management. Current adaptation projects were then labeled in relation to one or more of these sub-categories.

For the types of projects being implemented, a shorter list of categories was developed. Current adaptation projects have been assessed in relation to the degree they support research, assessment, capacity building, knowledge communication, policy formation and integration, field implementation and community-based adaptation. A fuller discussion of the project classification system used during this review is provided at the beginning of the appendices.

Gender Analysis

Within the review, assessments of the degree to which gender-sensitive adaptation actions are underway in different countries and regions has focused solely upon the extent to which addressing gender inequalities is a specified objective of projects and programs. The review did not assess the degree to which individual projects and programs may or may not have integrated gender issues into their detailed design.[7] The gender analysis provided in the review therefore should not be viewed as fully representative of the degree to which current adaptation actions are gender-sensitive.

Assessment of the Effectiveness of Adaptation Action

It should also be noted that this rapid review does not assess the quality or effectiveness of the projects and programs it includes. The review therefore does not provide a basis upon which to

[7] For example, a project may have as its objective building resilience in the agriculture sector and target farmers in general. As no reference to gender is made in the project's objectives, it would not be considered a gender-focused adaptation action within the review. This finding would stand even if the detailed design of the project includes having set targets to ensure the involvement of women farmers.

judge the degree to which completed and ongoing projects have either achieved their stated objectives and/or made a positive contribution to increasing the ability of a country or region to adapt to the impacts of climate change. It only provides an indication of the intended outcomes of the identified initiatives, the type of action being taken (e.g., capacity building, policy integration, implementation of practical actions) and their area of focus (e.g., agriculture, water, health).

Scientific Information

Synopsis of projected climate changes in different countries and regions included in the review are based primarily upon the content of *the Fourth Assessment Report of the Intergovernmental Panel on Climate Change* and national assessment reports (e.g., National Communications). New scientific analysis published since the completion of these reports may have refined and presented revised understandings of the projected consequences of climate change in different regions of the world. The climate projections sections of the review therefore should be viewed as indicative of anticipated trends in climatic change at the time of publication of the cited reports.

Qualification of Degree of Adaptation Action

In order to evaluate and consistently describe the relative level of adaptation activity occurring by country in each region, a simple benchmarking process has been applied across the review. Using a scale from zero to "X," where "X" is equivalent to the number of current adaptation projects underway in the country in a particular region with the largest number of current projects,[8] the scale was divided into five equivalent quintiles. Each quintile was then assigned a descriptor as follows:

- "Very Low" level of adaptation action = 0 to 20 per cent of "X"
- "Low" level of adaptation action = 21 to 40 per cent of "X"
- "Moderate" level of adaptation action = 41 to 60 per cent of "X"
- "High" level of adaptation action = 61 to 80 per cent of "X"
- "Very High" level of adaptation action = 81 to 100 per cent of "X".

All countries in the region were allocated to one of these quintiles based on the total number of current adaptation projects and programs identified through the review.

This benchmark approach enabled a standard methodology to be applied across all 12 regions examined in the Review of Current and Planned Adaptation Action, while also recognizing their individual differences. (For example, the smaller geographies and populations of Small Island Developing States suggest that hosting, for instance, 15 projects might reflect a higher level of activity than what might be possible in other regions of the world in which countries are larger and more populous). However, this methodology does not assess the financial size of individual projects; small projects are given equal weight in comparison to large projects. Within individual regions, this approach also accounts for a country's comparative geographic size, population, development level

[8] In other words, the country in the region with the highest total number of current adaptation projects was identified and used as a benchmark against which to assess performance in all other countries.

and other factors that may affect its level of adaptation activity. These contextual influences are therefore discussed within individual country profiles and regional comparisons.

Countries and Regions Incorporated in the Review

To identify countries to be included in the Review of Current and Planned Adaptation Action in Africa, Asia-Pacific and Latin America and the Caribbean, and determine their regional allocations, the following criteria were considered:

- Inclusion only of non-Annex I Parties to the United Nations Framework Convention on Climate Change (UNFCCC)
- Allocation by region in accordance with the classification system used by the United Nations Statistics Division (UNSD, 2010)
- The Organisation for Economic Co-operation and Development's Development Assistance Committee's list of countries eligible to receive official development assistance in 2009 and 2010 (OECD, 2009)

Definition of "Communities of Practice"

Communities of practice traditionally have been defined as "groups of people who share a concern or a passion for something they do and learn how to do it better as they interact regularly" (Wenger, 2006). These groups are usually defined by a shared domain of interest and relationships than enable mutual learning. Broadly speaking, two different types of communities of practice with an interest in adaptation to climate change may be identified:

- Established communities of practice, usually defined by a sector or issue, that have begun to integrate consideration of adaptation needs and priorities into their existing knowledge sharing efforts (e.g., a community of foresters discussing methods of integrating projected climate risk into their management planning); and
- New communities of practice established specifically due to a shared interest in adaptation to climate change (e.g., community-based adaptation experts).

Of these two broad groupings, the review gives attention only to communities of practice that have originated due to their shared interest in adaptation to climate change. This includes networks of NGOs actively engaged in sharing information regarding climate change. This focus reflects the greater challenge of identifying and assessing the degree to which the vast array of traditional associations and networks have begun to integrate adaptation concerns into their discussions.

Anticipated Reader

Finally, it should be noted that the review has been written in a manner that assumes that its readers will have a basic understanding of adaptation to climate change. As such it does not provide definitions of terms such as "National Communication" or "National Adaptation Programmes of Action." Nor are explanations of key concepts included, such as "adaptive capacity," "mainstreaming," the relationship between climate change and development, or the challenges associated with the implementation of adaptation actions at the policy and program levels.

3.0 Climate Projections

South Asia is increasingly prone to weather related threats that previously have not been experienced at a regional scale. Across Asia, temperatures have risen at a rate of less than 1°C to 3°C per century (Cruz et al., 2007); in Sri Lanka[9] and India,[10] for example, temperatures have risen by 0.3°C and 0.48°C respectively over the past century (Institute for Social and Economic Transition [ISET], 2009). There are also indications that inter-seasonal, inter-annual and spatial precipitation patterns within the region have shifted in the past few decades, with declines in precipitation occurring in Bangladesh, India and Pakistan. Along with these changes there has been an increase in the intensity and frequency of extreme weather events.[11] In recent years, for example, India has experienced an increase in summer monsoon rains in the northwest of the country, while the numbers of rainy days on the east coast of the country have declined; similarly, Sri Lanka has experienced similar seasonal shifts in rainfall, with increases in February and decreases in June (Cruz et al., 2007, and citations therein).

Table 1: Projected changes in surface air temperature and precipitation.

Season	Projected Temperature Change (in °C)					
	2010 to 2039		2040 to 2069		2070 to 2099	
	B1	A1F1	B1	A1F1	B1	A1F1
DJF	1.11	1.17	1.97	3.16	2.93	5.44
MAM	1.07	1.18	1.81	2.97	2.71	5.22
JJA	0.55	0.54	0.88	1.71	1.56	3.14
SON	0.83	0.78	1.49	2.41	2.17	4.19
	Projected Precipitation Change (in %)					
DJF	4	-3	0	0	-6	-16
MAM	8	7	24	26	20	31
JJA	7	5	11	13	15	26
SON	3	1	6	8	10	26

Note: Projections based on a comparison of two IPCC standard scenarios—the lowest future emission scenario trajectory (B1) and the highest future emission scenario trajectory (A1F1)—and in comparison to a base period of 1961 to 1990. Projections represent an average over the area of 5°N to 30°N and 65°E and 100°E. Temperature projections based on use of Atmosphere-Ocean General Circulation Models.

Source: adapted from Cruz *et al.* (2007, p. 480)

In addition, many Himalayan glaciers are now retreating at a rate that ranges from a few meters to several tens of meters per year, resulting in an increase in the number and size of glacial lakes and a concomitant increase in the threat of glacial lake outburst floods (GLOFs) (Cruz et al., 2007). Twenty-one GLOF events have adversely affected Nepalese territory in the recent past, and to date over 200 potentially dangerous glacial lakes have been documented across the Himalayan region (Bajracharya, Mool & Shrestha, 2007).

The Fourth Assessment Report of the Intergovernmental Panel on Climate Change (IPCC) projects that that Asia will experience "a significant acceleration of warming over that observed in the 20th

[9] Temperatures rose by an average of 0.016°C per year in Sri Lanka between 1961 and 1990; this temperature increase has varied in different parts of the country, ranging from 0.008 to 0.025°C (IPCC, 2011, p. 1).

[10] In India, there has been an increase in the number of hot days and multiple day heat waves since 1900. In recent decades this has led to an increase in the number of heat-related deaths in the states of Orissa and Andhra Pradesh, among others (Cruz et al., 2007)

[11] However, although the intensity of cyclones originating from the Bay of Bengal has increased since the 1970s, their number has decreased (Cruz et al., 2007).

century" prior to 2100, and that this warming will be stronger in South Asia (Cruz et al., 2007: 478). Projections for South Asia as a whole suggest that the region may experience increases in average annual temperatures of between 2.4° and 4.5°C by the end of this century (Cruz et al., 2007),[12] with the greatest warming occurring in the December-to-February period (see Table 1).

With respect to rainfall patterns, as presented in Table 1, overall it is anticipated that the region will experience an increase in precipitation during most seasons, with a decrease during the months of December to February (Cruz et al., 2007). However, the effects of climate change on rainfall patterns are anticipated to vary widely by country, and there is uncertainty as to the magnitude of the shifts and seasonal distribution (USAID, 2010).

Accompanying these changes in rainfall, it is also anticipated that South Asia will experience an increase in the frequency and intensity of tropical storms and other extreme weather events; stronger winds also could amplify storm surge heights (Cruz et al., 2007). Uncertainty remains regarding projected changes in the characteristics of tropical cyclones within individual basins, although there is greater consistency in projections when averaged for the globe as a whole (Knutson et al., 2010).[13]

At a global level, sea levels are projected to rise (due to thermal expansion alone) by 0.18 to 0.6 meters[14] over the course of the century (Meehl et al., 2007). Along coastal Asia, the rate of sea-level rise is reported to be greater than the global average—rising at a rate of 1 to 3 millimeters per year. In South Asia, this process is expected to lead to coastal flooding, intrusion of saltwater into freshwater resources,[15] an increase in storm surges and coastal erosion, with consequent impacts on drinking water sources, local fisheries, aquaculture, agriculture, tourism and coastal infrastructure and industry (Cruz et al., 2007).

[12] In Bangladesh and India, by the end of the century, temperatures may reach 4.9°C (ISET, 2009).

[13] Projections of tropical cyclones are challenging due to limited historical data and because their significant fluctuations in frequency and intensity make it difficult to detect long-term trends (Knutson et al., 2010). "However, future projections based on theory and high-resolution dynamical models consistently indicate that greenhouse warming will cause the globally averaged intensity of tropical cyclones to shift towards stronger storms, with intensity increases of 2–11% by 2100. Existing modelling studies also consistently project decreases in the globally averaged frequency of tropical cyclones, by 6–34%. Balanced against this, higher resolution modelling studies typically project substantial increases in the frequency of the most intense cyclones, and increases of the order of 20% in the precipitation rate within 100 km of the storm centre" (Knutson et al., 2010, p. 157). For the Asia region, the IPCC has stated that, should average sea-surface temperatures increase between 2° and 4°C relative to the current threshold temperature, projections suggest that the intensity of tropical cyclones could increase by 10 to 20 per cent (Cruz et al., 2007).

[14] IPCC emissions scenarios present a range of sea-level rise predictions, based on various emissions scenarios and resulting from thermal expansion of the oceans and land ice changes. On one end of the spectrum, under the B1 emissions scenario of the Special Report on Emissions Scenarios (2001), global sea levels are expected to rise from between 0.18m to 0.38m over the course of the century. On the opposite end of the spectrum, emissions scenario A1F1 predicts a global sea-level rise of between 0.25m and 0.6m over the same time period. There is still a significant amount of uncertainty in these projections, as records on sea-level rise remain relatively short and there are uncertainties relating to the loss of land ice (Meehl et al., 2007).

[15] During the dry season, salt water from the Bay of Bengal is already reported to have intruded 100 kilometers or more inland along tributary channels (Cruz et al., 2007).

Sea-level rise is of particular concern to the island countries of Maldives[16] and Sri Lanka, the former of which faces the danger of almost total submergence due to rising sea levels. The lives and livelihoods of millions of people occupying the low-lying coastal belts of India and Bangladesh are also threatened. Linked to this threat is a concern that unabated climate change may eventually lead to large scale relocation of climate-displaced people and cause major socioeconomic and security concerns.

Climate variability and change therefore poses a serious concern to the countries of South Asia, with expected changes of precipitation patterns, rising temperatures, increased incidence of extreme weather events, sea-level rise and glacial melt anticipated to adversely affect agriculture, water resources, infrastructure, human health and natural ecosystems. These changes have the potential to adversely impact the economic performance of South Asian countries[17] and undermine their efforts in achieving the Millennium Development Goals.

4.0 Needs and Priorities within South Asia

South Asian countries share many common climate change adaptation needs and priorities, including: water and energy; agriculture; coastal zones and infrastructure; forestry, nature and biodiversity; health; and risk reduction and policy integration (as presented in Table 2). These common priorities have been identified through countries' National Communications to the UNFCCC, National Adaptation Programmes of Action (NAPAs) and—in the case of Bangladesh, India and Sri Lanka—through national adaptation strategies and plans.

Freshwater and Energy

South Asian countries identify water resources as being highly vulnerable to the effects of climate change. Rising temperatures, uncertain precipitation patterns, the threat of saline intrusion into surface and underground drinking water sources in coastal areas, and glacial melt are all noted as reasons for concern, along with the increased risk of flooding and drought (GIRA, 2009; GOI, 2008; Bangladesh Ministry of Environment and Forests (BMEF), 2005; BMEF, 2009). South Asian countries like Bangladesh, India, Nepal and Pakistan are already facing water shortages due to population growth, rapid urbanization and industrialization and inefficient water use. Should the Ganga, Indus and Brahmaputra rivers become seasonal due to climate change—as is likely to happen in the future—the areas of South Asia under water stress will increase. Of particular concern is the potential for declines between December and February, reducing water availability during the monsoon period (Cruz et al., 2007).

[16] Over 80 per cent of the land area of Maldives is less than one meter above mean sea level (MHAHE, 2001).

[17] Recent historical events provide evidence of the potential adverse effects of extreme climatic events on the economies of South Asian countries. In 2007, Cyclone Sidr caused damages and losses worth US$1.674 billion in Bangladesh—equivalent to 2.8 per cent of its Gross Domestic Product—and might have slowed its economic growth rate by as much as 0.5 per cent (GOB, 2008). In 2010, flooding in Pakistan caused approximately $8.7 to 10.9 billion billions of dollars' worth of direct damage (World Bank, 2011).

Table 2: Identified sectors of concern in South Asian countries

	Agriculture	Water (& energy)	Coastal zones management	Forestry & rangelands	Ecosystems & biodiversity	Fisheries	Disaster risk management & policy	Human health
Afghanistan	✓	✓		✓				
Bangladesh	✓	✓	✓	✓	✓	✓	✓	✓
Bhutan	✓	✓	✓	✓	✓			✓
India	✓	✓	✓	✓		✓	✓	
Maldives	✓	✓	✓		✓	✓	✓	✓
Nepal	✓	✓	✓	✓			✓	✓
Pakistan	✓	✓	✓	✓	✓	✓	✓	✓
Sri Lanka	✓	✓			✓	✓		✓

Source: BMEF (2005, 2009); GIRA (2009); GOI (2008); MMEEW (2007); MMHAHE (2001); NMOE (2010); Pakistan Ministry of the Environment (PMOE) (2003); RGB (2006); Sri Lanka Ministry of Environment (SLMOE) (2010); Sri Lanka Ministry of Forestry and Environment (SLMFE) (2000)

In South Asia, vulnerabilities in the water sector directly impinge upon energy supply, as many countries in the region depend significantly on hydropower for electricity generation and export to neighboring countries, particularly in Bhutan, Nepal and Pakistan (NMOE, 2010; RGB, 2008).

Adaptation options for the water sector identified by South Asian governments include: improved water management use and efficiency; implementation of drinking water and sanitation programs in areas affected by coastal flooding; improved early-warning systems to decrease the risk of damaging floods; improved capacity of water management institutions; lowering glacial lake levels to reduce the risk of flood; flood protection in downstream and agricultural areas; GLOF monitoring and disaster risk reduction; development of policies—economic and structural—to practice water conservation in urban areas; and enhanced weather forecasting (GIRA, 2009; GOI, 2008; PMOE, 2003; NMOE, 2010; RGB, 2006).

Agriculture

Closely related to vulnerability in the water sector, agriculture is identified by all South Asian countries as a priority adaptation concern. Agriculture is a key source of livelihoods for the majority of people in South Asia; approximately 85 per cent of Afghans and Nepalese depend on rain-fed agriculture for their livelihoods, while in Bhutan and India the figures are 80 and 64 per cent respectively (NMOE, 2010; BMEF, 2005; RGB, 2008; USAID, 2010). Increased variability in seasonal rains, changes in the length of growing season, increased incidence of droughts and floods and other anticipated climate impacts could have a negative effect on food security in the region. Projections suggest, for instance, that crop yields could decrease by up to 30 per cent across South

Asia[18]—varying by crop and location[19]—with substantial declines in rain-fed wheat and rice likely to occur should mean temperatures increase more than 2.5°C. As nearly all land suitable for agricultural development in South Asia is already utilized, intensified food production (such as through precision agriculture) likely will be needed to address long-term food security concerns in the region (Cruz et al., 2007).

Within the agricultural sector, South Asian countries have proposed the following adaptation measures: testing of new crop and seed varieties; improving meteorological information for farmers; exploring insurance schemes to guard against the effects of crop loss; improved weather forecasting for farmers; and the development of climate-resilient agricultural practices (BMEF, 2005; BMEF, 2009; NMOE, 2010; RGB, 2006).

Coastal Zone Management

Coastal South Asian countries—Bangladesh, India, Maldives, Pakistan and Sri Lanka—have each emphasized the vulnerability of their coastal zones to the effects of climate change, including flooding, sea-level rise and coral bleaching. These impacts are considered especially grave for Maldives, as over 80 per cent of its land area is less than one meter above mean sea level (MMHAHE, 2001)—putting at risk its future existence as a country. Millions of additional people living in low-lying areas of Bangladesh, India, Pakistan and Sri Lanka also are expected to be flooded on an annual basis, leading potentially to large migrations. In addition, many South Asian countries note the vulnerability of key infrastructure to the effects of climate change, as well as their tourism sectors. A further concern is the potential impact of climate change on fisheries; declines in fish larvae are projected to occur if the frequency of El Niño events increases (Cruz et al., 2007).

Adaptation options identified by national governments to address these vulnerabilities include: repairing existing infrastructure (including coastal embankments, river embankments and drainage systems); undertaking strategic planning of future infrastructure needs; coastal afforestation; protection of drinking water in coastal communities; integrated coastal zone management; and formulation of coastal zone adaptation strategies (BMEF, 2005; BMEF, 2009; MMEEW, 2007).

Forestry, Ecosystems and Biodiversity

South Asian countries express concern that climate change may precipitate changes in the distribution and composition of natural habitats and forests. This possibility is particularly a concern in countries where mangrove forests protect coastal zones, including the Sandarban forests in Bangladesh (BMEF, 2005; BMEF, 2009). In Bhutan, 70 per cent of the country is forested—much

[18] This projection is based upon use of the HadCM2 model and takes into consideration the potential increase in production that might result from atmospheric fertilization of carbon dioxide. Even under the most conservative climate change scenarios, net cereal production in South Asia is projected to decline by at least four to ten per cent by 2100 (Cruz et al., 2007).

[19] In Bangladesh, for example, projections suggest that rice production could decline by 8 per cent by 2050, while wheat production could decline by 32 per cent within the same time period (Cruz et al., 2007, and citations therein).

of it primary forest—and its degradation may exacerbate climate change vulnerabilities, particularly those related to water and agriculture.

Adaptation options in the area of forestry, nature and biodiversity include: control of forest pests; changes in tree species and varieties; preservation of watersheds; energy-efficiency measures in fuel wood use; promotion of alternative timber species; conservation measures; increasing resilience of coral ecosystems through enhanced research and programming; and ecosystem management (PMOE, 2003; NMOE, 2010; SLMFE, 2000; MMEEW, 2007).

Human health

The risk posed by climate change—due to factors such as increased risk of drought and floods, variable rain patterns, high sea-surface temperatures and a greater number of hot days—to human health is substantial. Climate change is likely to affect the prevalence and distribution of communicable and non-communicable diseases in South Asian countries. For instance, the prevalence of dengue fever is projected to be higher in India by 2050, and an increase in coastal water temperatures could encourage the survival and spread of cholera. The risk of diarrheal disease—currently a source of endemic morbidity and mortality in South Asia due to poor water and sanitation—may also increase as higher temperatures encourage the growth of bacteria (Cruz et al., 2007). As such, health is noted as a priority concern in many countries' NAPAs and national adaptation strategies.

Suggested adaptation options to address this vulnerability include: enhanced early-warning systems; improved public awareness about the likely impacts of climate change; mainstreaming adaptation considerations into healthcare strategies; prevention and management of vector-borne diseases; mapping of major communicable diseases and water and food-borne diseases; and exploring indigenous knowledge and community practices for health adaptation (MMEEW, 2007; BMEF, 2005; NMOE, 2010).

Disaster-Risk Management and Policy Development

Extreme weather events—including the threat of tropical cyclones, GLOFs, floods and droughts—are anticipated to increase in frequency and/or intensity in South Asia in the coming decades, and countries have identified a need to establish risk-reduction measures to address these impacts and to establish national policies that effectively anticipate and address the impacts of climate change. This need is closely related to adaptation activities in each the aforementioned priority areas; effective policy and risk-reduction measures will facilitate adaptation in the areas of water, agriculture, health, biodiversity and coastal zones, as well as others (e.g., infrastructure, urban development).

South Asian countries propose several options to enhance efforts in comprehensive disaster management, including: enhancing cyclone, storm surge and flood early-warning systems; planning, designing and constructing new infrastructure, including cyclone shelters, and coastal and river embankments; improving climate change modeling scenarios and data collection; improving

awareness raising within vulnerable communities; landslide management and flood prevention; and GLOF monitoring (BMEF, 2009; RGB, 2006).

Additional Priorities

In addition to the key categories mentioned above, certain South Asian countries have identified additional priority areas in which adaptation measures are needed. Bangladesh, Nepal and Sri Lanka have each identified urban areas as being particularly vulnerable to the impacts of climate change, while Bangladesh has also stressed the importance of communication and education to addressing its vulnerabilities to climate change. In addition, the Maldives and Sri Lanka have identified their fisheries sectors as being particularly vulnerable to the impacts of climate change.

5.0 Assessment of Adaptation Action within South Asia

Recognizing the threats posed by climate change, a growing number of policies, programs and projects have been initiated to reduce the vulnerability of people and communities in South Asia to climate change. Severely affected countries are coming forward with their own initiatives to prepare for and respond to the inevitable impacts of climate change. This includes formulating policies and strategies, supporting research on climate change impacts and adaptation, capacity building, and setting up dedicated funds to tackle climate change. Some governments are allocating sizable amounts of their own scarce resources to set up necessary institutions and integrate climate change into sector interventions.[20]

Many of these initiatives, however, are of a "pilot" nature and need to be carefully monitored and evaluated to learn early lessons, and to be scaled-up when feasible. At the same time, a higher level of coordination has to be ensured to identify gaps, avoid duplication of efforts, enhance value for money, check political bias towards specific sectors, and prevent maladaptation.

5.1 Regional-Level Action

Tackling the challenge of climate change adaptation in South Asia will require sustained domestic political commitment in addition to financial and human resources, dynamic institutions and appropriate technologies. However, due to close geographic, economic and political ties, and interdependencies across the region, tackling a global challenge such as climate change will also require close collaboration regionally.

[20] For example, Bangladesh was the first developing country to prepare a national Climate Change Strategy and Action Plan in 2008. It has also allocated US$200 million of its own money to support a range of adaptation activities in the 2009–10 and 2010–11 fiscal years.

Regional Policy Actions

The eight countries of South Asia are members of the South Asian Association for Regional Cooperation (SAARC).[21] Founded in 1985, climate change has been part of the SAARC agenda since its 5th Summit in 1990. The SAARC Declaration on Climate Change (also known as the Dhaka Declaration), presented in 2007, recognizes the need for greater regional collaboration to effectively address adaptation.[22] It commits the eight SAARC member states to implementing the SAARC Action Plan on Climate Change 2009–2011, which aims to achieve the following objectives:

- "Identify and create opportunities for activities achievable through regional cooperation and support in terms of technology and knowledge transfer between SAARC countries.
- Provide impetus for a regional level action plan on climate change through national level activities.
- Support the global negotiation process of the UNFCCC such as the Bali Action Plan, through a common understanding or elaboration of the various negotiating issues to effectively reflect the concerns of SAARC Member States" (SAARC, 2008, p. 22).

The SAARC Action Plan has identified seven thematic areas for action that are expected to be consistent with the national action plans of member states. The first of these thematic areas is "Adaptation to Climate Change"; the sixth focuses on management of impacts and risks due to climate change (SAARC, 2008). Primary responsibility for implementing the Action Plan on Climate Change rests with the national governments.

To help stimulate more concrete action, at the 16th SAARC Summit held in April 2010, the eight heads of state adopted the *Thimphu Statement on Climate Change,* which is fairly detailed and more specific than previous statements (see Box 1). The leaders, therefore, pledged to review implementation of the Dhaka Action Plan and establish an expert group under the SAARC Secretariat to develop a clear policy direction. They also directed that the recommendations contained in the Thimphu Statement be implemented in earnest.

SAARC countries have not yet agreed on how to finance the SAARC Action Plan on Climate Change and other commitments made in Thimphu during 2010 SAARC Summit. As most SAARC countries are struggling to gather enough funds to carry forward their national adaptation plans of action,[23] SAARC likely will need assistance from the international community to undertake strategic regional programs.

[21] These member states are the eight countries in South Asia, namely: Afghanistan, Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan and Sri Lanka.
[22] This declaration was partly aimed at securing additional funding for adaptation for South Asia (through the Adaptation Fund and other channels) at the 2009 UN Climate Conference in Copenhagen.
[23] An exception is India, which, reflective of its higher level of development, is less dependent of grant money from international donors.

Box 1: Key initiatives proposed in the Thimphu Statement on Climate Change (mitigation and adaptation) during the 16th SAARC Meeting

1. Establish an Inter-governmental Expert Group on Climate Change to develop clear policy direction and guidance for regional cooperation
2. Commission a study on climate risks in the region
3. Explore the feasibility of a SAARC mechanism that will provide financial capital for low-carbon technology and renewable energy projects
4. Strengthen the understanding of shared water bodies in the region through a Marine Initiative
5. Establish an Intergovernmental Mountain Initiative to study mountain ecosystems and glaciers, and their contribution to livelihoods and sustainable development
6. Establish an Intergovernmental Monsoon Initiative on the evolving pattern of monsoons to assess vulnerability due to climate change.
7. Establish the SAARC Intergovernmental Climate-related Disasters Initiative on the integration of Climate Change Adaptation with Disaster Risk Reduction (DRR).
8. Establish institutional linkages among national institutions in the region to facilitate sharing of knowledge and capacity-building programs in climate change.
9. Enhance cooperation in the energy sector to facilitate energy trade, development of efficient conventional and renewable energy sources, including hydropower.
10. Action Plan on Energy Conservation would be prepared by the SAARC Energy Centre, Islamabad; create a web portal on Energy Conservation for exchange of information; and share best practices among SAARC Member States.

Regional Projects and Programs

In addition to activities occurring at the policy level, South Asian countries are engaged in a number of regional projects that address shared adaptation priorities. As described in Table 3, these projects primarily address shared concerns related to transboundary watershed management, including glacial melt and GLOFs. Other priority areas addressed include sustainable agricultural production, improving access to information for decision-making, and risk reduction. Many of these projects contribute to achievement of the objectives outlined in the Thimphu Statement on Climate Change.

South Asian countries are also participating in several projects that involve countries from other parts of Asia, as well as the rest of the world. As with those projects focused specifically on South Asia, the majority of these projects emphasize capacity building, research and strengthening policy process. Attention is less focused on needs within specific sectors, although projects do address water, agriculture, energy, coastal management and forestry concerns.

Two of the on-going projects deserve special mention: the regional project South Asia Water Initiative (SAWI) and the Asia-wide project Mangroves for the Future (MFF). SAWI is a particularly important initiative that aims to create an environment conducive for collaboration on transboundary water issues; resolution of these issues is absolutely crucial for successful adaptation to climate change in the region. The latter project, MFF, attempts to promote country-led initiatives based on global best practices related to management of coastal and marine water bodies. Both these initiatives will contribute to strengthening understanding of shared water bodies (and ecosystems) in the region.

In addition to the projects listed in Table 3, the Special Climate Change Fund is considering funding for two additional regional projects in South Asia (GEF, 2009):

- Climate Change, Environment and Migration in Bangladesh and Western India
- Information Sharing Systems to Enhance Coping Capacities of Farming Communities in Dealing Effectively with Climate Variability and Climate Change, which would be implemented in India and Pakistan.

Funders active in supporting regional-level adaptation action in South Asia include the Asian Development Bank (ADB), the World Wildlife Fund (WWF), and the governments of Australia, Norway, Switzerland, the United Kingdom and the United States.

Table 3: Regional-Level Adaptation Action in South Asia

Name		Objectives	Participating Countries	Project Details	
South Asian Adaptation Projects					
1.	Floods from the Roof of the World: Protection thanks to applied research[24]	The project seeks to protect people and infrastructure from the hazards of GLOFs. Based on previous fundamental research, the countries of Nepal, Bhutan, India, Pakistan and China/Tibet now have an inventory of glaciers and glacier lakes as well as a GLOF monitoring system. The data gathered is used as the basis for early-warning systems. This enables priorities to be set and corresponding action to be taken. The database is also used to determine the amount of total available water resources the region will have in the future.	Bhutan India Nepal Pakistan *Plus:* China	**Funder(s)**	Swiss Development Corporation
				Total Budget	US$500,000
				Implementing Agency(s)	International Centre for Integrated Mountain Development (ICIMOD)
				Duration	Phase One: 1999–2007; Phase Two: 2008–2012
				Project Type	Community-based adaptation; Research
				Focus Area	Disaster risk management
2.	Monitoring the Glaciers of the Himalayas[25]	Glacier retreat has been a major indicator of climate change impacts in the Himalayas. This project aims to support biodiversity conservation and livelihoods of people affected by glacier retreat. The main objectives of the project are documentation of threats posed due to glacier retreat as well as development of community-	Eastern Himalayas, India and Nepal	**Funder(s)**	WWF
				Total Budget	
				Implementing Agency(s)	
				Duration	2005–2009
				Project Type	Research; Community-based adaptation
				Focus Area	Biodiversity; Ecosystem conservation

[24] SDC, http://www.sdc.admin.ch/en/Home/Projects/Floods_from_the_Roof_of_the_World
[25] WWF, http://www.wwfnepal.org/our_solutions/projects/index.cfm?uProjectID=NP0898

Name		Objectives	Participating Countries	Project Details	
		driven programs for improving their resilience.			
3.	Management of Flash Floods: Capacity building and awareness raising in the Hindu Kush Himalayas[26]	Flash floods have caused huge losses of lives and properties in the Hindu-Kush Himalayan region. This project aims to improve the capacity of stakeholders of the region to cope with flash floods.	Hindu Kush Himalaya region: Nepal Pakistan *Plus:* China	**Funder(s)**	USAID
				Total Budget	
				Implementing Agency(s)	ICIMOD
				Duration	*Phase I:* 2006–2007 *Phase II:* 2008–2010
				Project Type	Capacity building
				Focus Area	Disaster risk management
4.	Glacial Melt and Downstream Impacts on Indus-Dependent Water Resources and Energy[27]	Provide adequate risk management and adaptation requirements supporting the water and hydro-energy sectors in the Indus river basin	Afghanistan India Pakistan	**Funder(s)**	ADB (Small Grants for Adaptation)
				Total Budget	US$200,000
				Implementing Agency(s)	ICIMOD, UNEP, Centre for International Climate and Environmental Research (CICERO)
				Duration	2007–2009
				Project Type	Community-based adaptation; Policy formation and integration
				Focus Area	Freshwater supply; Energy
5.	Adaptation to Climate Change in the Hindu Kush Himalayas and Central Asia[28]	This project is addressing how to adapt to too much and too little water in the Hindu Kush Himalayas and Central Asia, covering the following activities: • Improved scenarios for climate change variation and impacts • Scenarios for water demand and availability • Improved knowledge on climate change effects on biodiversity and ecosystem services • Improved understanding of impacts on agro-ecology and	India Nepal Pakistan *Plus:* China	**Funder(s)**	Norway (through UNEP)
				Total Budget	US$62 million
				Implementing Agency(s)	ICIMOD, CICERO, UNEP, UNDP, participating countries
				Duration	2007–2011
				Project Type	Research; Policy formation and integration
				Focus Area	Climate information services; Biodiversity; Agriculture

[26] ICIMOD, http://www.icimod.org/?q=258
[27] ADB, http://www.adb.org/climate-change/afg-ind-downstream.asp
[28] ALM, http://www.adaptationlearning.net/reasearch/too-much-too-little-water-adaptation-climate-change-hindu-kush-himalayas-and-central-asia

Name		Objectives	Participating Countries	Project Details	
		food production systems and food security • Critical factors for achieving sustainable adaptation			
6.	SAARC-Australia Agricultural Research and Training[29]	The objectives of this project are to: • Enable Australian scientific and technical experts to collaborate with their counterparts in the SAARC region to build capacity in sustainable use of water resources for agricultural production. • Research on and sharing of data and findings on GLOF in the Himalayas region.	South Asia – countries unspecified	**Funder(s)**	Australia
				Total Budget	AUD$1 million
				Implementing Agency(s)	SAARC Secretariat; Australian Centre for International Agricultural Research; CSIRO
				Duration	2009–2010
				Project Type	Research; Capacity building
				Focus Area	Freshwater supply; Agriculture; Disaster risk management
7.	South Asia Water Initiative (SAWI)[30]	Working with Department for International Development (U.K.) (DFID) and the World Bank, the South Asia Water Initiative is building capacity for water resource management to address serious water availability issues in Himalayan watershed countries of Afghanistan, Bangladesh, Bhutan, India, Nepal and Pakistan.	Afghanistan Bangladesh Bhutan India Nepal Pakistan	**Funder(s)**	U.K., Australia, Norway
				Total Budget	US$9.6 million
				Implementing Agency(s)	World Bank (lead); regional and national bodies
				Duration	2009–2013
				Project Type	Capacity building; policy formation and integration
				Focus Area	Freshwater supply
8.	Vulnerability to Climate Change: Adaptation strategies and layers of resilience[31]	Provide science-based solutions and pro-poor approaches for adaptation of agricultural systems to climate change for the rural poor and most vulnerable farmers in semi-arid regions of Asia, specifically Bangladesh, India, Peoples' Republic of China, Pakistan and Sri Lanka.	Bangladesh India Pakistan Sri Lanka *Plus:* China	**Funder(s)**	ADB
				Total Budget	
				Implementing Agency(s)	International Crop Research Institute for the Semi-Arid Tropics (ICRISAT)
				Duration	2012
				Project Type	Capacity building; Field implementation
				Focus Area	Agriculture

[29] AusAID, http://www.ausaid.gov.au/country/country.cfm?CountryID=28152753&Region=SouthAsia
[30] United Nations, http://www.un.org/climatechange/projectsearch/proj_details.asp?projID=182&ck=aVmfG453KHSJI81
[31] ICRISAT, http://ongoing-research.cgiar.org/factsheets/vulnerability-to-climate-change-adaptation-strategies-and-layers-of-resilience/

Name		Objectives	Participating Countries	Project Details	
Participation in projects exclusively involving other Asia-Pacific countries					
9.	Mangroves for the Future (MFF)[32]	The project has two main objectives: to strengthen the environmental sustainability of coastal development; and to promote the investment of funds and efforts in coastal ecosystem management. MFF reorients the current focus of coastal investment by moving from a reactive response to disasters, to progressive activities that address long-term sustainable management needs. These include building awareness and capacity for improved food and livelihood security, disaster preparedness and climate change adaptation.	**India**, Indonesia **Maldives**, **Pakistan**, Seychelles, **Sri Lanka**, Thailand and Vietnam	**Funder(s)**	2007–2009: Australia, Germany, Norway, Sweden, UNDP, UNEP 2010 to now: Norway and Sweden
				Total Budget	
				Implementing Agency(s)	National governments with CARE International, Food and Agriculture Organization (FAO), International Union for the Conservation of Nature, UNDP, UNEP and Wetlands International with NGOs and community based organizations
				Duration	2006–present
				Project Type	Research; Knowledge communication; Policy formation and implementation
				Focus Area	Coastal zone management
10.	Protection of Sustainable Policy Initiatives in the Management of Natural Resources in the Hindu Kush Himalayas[33]	The program strengthens the role of International Centre for Integrated Mountain Development (ICIMOD) as an organization and service provider in the region, and increases the accountability of the eight member countries. It helps develop and implement regionally agreed concepts and strategies to facilitate adaptation to climate change and sustainable resource management. This is realized by institutional strengthening of ICIMOD in areas such as data collection related to climatic changes and forests. GIZ further	*Regional:* **Afghanistan**, **Bangladesh**, **Bhutan**, China, **India**, Myanmar, **Nepal, Pakistan**	**Funder(s)**	German Federal Ministry for Economic Cooperation and Development (BMZ)
				Total Budget	
				Implementing Agency(s)	ICIMOD, Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ)
				Duration	2008–2012
				Project Type	Capacity building
				Focus Area	Government

[32] MFF, http://www.mangrovesforthefuture.org/ and http://www.mangrovesforthefuture.org/Assets/documents/IUCN-MFF-Brochure-Web.pdf
[33] GIZ, http://www.gtz.de/en/weltweit/asien-pazifik/33473.htm

Name		Objectives	Participating Countries	Project Details	
		promotes the ICIMOD priority program Environmental Change and Ecosystem Services.			
11.	Strengthening Adaptive Capacities to the Impacts of Climate Change in Small-scale Aquaculture[34]	The project (also known as "Aqua Climate") aims to strengthen the adaptive capacities of rural farming communities to the impacts of climate change. It is strengthening adaptive capacities to the impacts of climate change in resource-poor small-scale aquaculture and aquatic resources-dependent sectors in the South and Southeast Asian regions. The project will: (1) map farmers' perceptions and attitudes towards prospective climate change impacts and their adaptive capacities to address these impacts; (2) develop future scenarios based on the current trends; (3) assess the potential adaptive measures for different aquatic farming systems and prioritie better management practices; and (4) suggest Codes of Practices and improved methodologies for such systems.	**India**, Philippines, **Sri Lanka,** Viet Nam	**Funder(s)**	Norwegian Agency for Development Cooperation
				Total Budget	
				Implementing Agency(s)	Network of Aquaculture Centres in Asia-Pacific
				Duration	2009 – 2011
				Project Type	Capacity building; Assessment
				Focus Area	Freshwater fisheries
12.	Adaptation Knowledge Platform[35]	The goal of the Adaptation Knowledge Platform is to strengthen adaptive capacity and facilitate climate change adaptation in Asia at local, national and regional levels. Its specific purpose is to establish a regionally and nationally owned mechanism that facilitates the integration of climate change adaptation into national and regional economic and development policies, processes and plans, strengthen linkages between adaptation and the sustainable development agenda	**Bangladesh**, **Bhutan**, Cambodia, China, Indonesia, Lao PDR, Malaysia, Myanmar, **Nepal**, Philippines, **Sri Lanka,** Thailand, Viet Nam	**Funder(s)**	Swedish International Development Agency (SIDA)
				Total Budget	
				Implementing Agency(s)	SEI, Swedish Environmental Secretariat for Asia, UNEP, Asian Institute of Technology and UNEP Regional Resource Centre for Asia and the Pacific
				Duration	2009–2012
				Project Type	Capacity building; Policy formation and integration

[34] NACA, http://www.enaca.org/modules/inlandprojects/index.php?content_id=10
[35] AKP, http://www.climateadapt.asia/about-us

Name		Objectives	Participating Countries	Project Details	
		in the region and enhance institutional and research capacity, in collaboration with a wide range of national and regional partners.		**Focus Area**	Government
13.	Cities and Climate Change Initiative Asia Pacific[36]	This initiative aims to strengthen the climate change response of cities and local governments. The main objectives are to: promote active climate change collaboration between local governments and associations; to enhance policy dialogue on climate change; to support local governments in preparing climate action plans; and to foster awareness, education and capacity building.	China, Fiji, Indonesia, Mongolia, **Nepal**, Papua New Guinea, Samoa, **Sri Lanka**, Vanuatu and Viet Nam	**Funder(s)**	UN-Habitat
				Total Budget	US$10 million
				Implementing Agency(s)	Local governments, universities
				Duration	2010– ?
				Project Type	Capacity building; knowledge Communication; policy formation and integration
				Focus Area	Urban areas
14.	Enhancing Adaptation to Climate Change by Integrating Climate Risk into Long-Term Development Plans and Disaster Management[37]	This project aims to undertake a comparative analysis of the immediate to medium-term post-disaster recovery scenario in the aftermath of extreme weather events of flooding faced by vulnerable cities in three Asian developing countries, namely, Mumbai (India), Bangkok (Thailand) and Dhaka (Bangladesh). It also aims to quantify the developmental impacts of flooding with the objective of integrating climate change risk considerations into long-term investment and development plans.	**Bangladesh**, **India**, Thailand	**Funder(s)**	APN
				Total Budget	
				Implementing Agency(s)	K J Somaiya Institute of Management Studies & Research Vidyanagar
				Duration	2010–2011
				Project Type	Research
				Focus Area	Disaster risk management; Urban areas
15.	Asia-Pacific Climate Change Adaptation Project Preparation Facility (ADAPT)[38]	Increase access to financial resources for climate change adaptation investment projects; strengthen national human and institutional capacity in preparation of financing proposals; and strengthen regional knowledge platform to	**Bangladesh**, Cambodia, Federated States of Micronesia, Fiji, Indonesia, Lao PDR, Malaysia,	**Funder(s)**	USAID
				Total Budget	US$18.0 million
				Implementing Agency(s)	WWF, Conservation International, the Nature Conservancy, ARD Inc., National Oceanic and Atmospheric

[36] CCCI, http://www.fukuoka.unhabitat.org/programmes/ccci/index_en.html
[37] APN, http://www.apn-gcr.org/newAPN/activities/ARCP/2010/list2010projects.htm
[38] USDS, http://www.state.gov/documents/organization/151686.pdf

Name		Objectives	Participating Countries	Project Details	
		share information and processes on climate change projects, funds and best practices to promote replication and scaling up.	**Nepal**, Palau, Philippines, Solomon Islands, **Sri Lanka**, Thailand, Viet Nam		Administration
				Duration	2011–2016
				Project Type	Capacity building; Knowledge communication
				Focus Area	Government
Participation in projects involving countries from Asia-Pacific, Africa and Latin America and the Caribbean					
16.	Advancing Capacity for Climate Change Adaptation (ACCCA)[39]	The rationale for this project is that countries lack scientific knowledge and understanding of climate risks, and that this is an impediment to addressing climate variability. Activities include the following: identify and prioritize climate risks; assess available knowledge about risks and adaptation opportunities; develop, test, and disseminate risk communication materials that are designed to assist adaptation decisions; and identify critical knowledge gaps that impede effective adaptation decisions.	**Bangladesh**, Burkina Faso, Cameroon, Ethiopia, Ghana, Kenya, **India**, Malawi, Mali, Mongolia, **Nepal**, Niger, Nigeria, Philippines, South Africa, Tanzania, Tunisia	**Funder(s)**	International Development Research Centre, Department for Environment, Food and Rural Affairs (U.K.) (DEFRA), Swiss Federal Office for the Environment, Netherlands Climate Assistance Program (NCAP), European Commission
				Total Budget	
				Implementing Agency(s)	United Nations Institute for Training and Research (UNITAR)
				Duration	2007–2010
				Project Type	Assessment; Capacity building; Policy formation and integration
				Focus Area	Multi-sectoral
17.	Capacity Development for Policy Makers: Addressing climate change in key sectors[40]	The project is a targeted capacity-development initiative that supports two goals: (1) To increase national capacity to coordinate ministerial views for more effective participation in the UNFCCC process and (2) To assess investment and financial flows to address climate change for selected key sectors. As a result of this project, both the technical understanding of key climate change issues and their economic	Algeria, **Bangladesh**, Colombia, Costa Rica, Dominican Republic, Ecuador, Gambia, Honduras, Liberia, Namibia, **Nepal**, Nicaragua, Niger, Paraguay, Peru, St. Lucia, Togo, Turkmenistan,	**Funder(s)**	UNDP; UN Foundation; Government of Norway; Government of Finland; Government of Switzerland
				Total Budget	US$6,953,413
				Implementing Agency(s)	UNDP
				Duration	2008–2010
				Project Type	Capacity building; Policy formation and integration

[39] ACCCA, http://www.acccaproject.org/accca/files/ACCCA_Brochure_19pilotactions.pdf
[40] UNDP, http://www.undp.org/climatechange/capacity-development.html

Name		Objectives	Participating Countries	Project Details	
		and policy implications within the context of the UNFCCC will be enhanced.	and Uruguay	**Focus Area**	Government
18.	Pilot Program for Climate Resilience (PPCR)[41]	PPCR aims to pilot and demonstrate ways in which climate risk and resilience may be integrated into core development planning and implementation in a way that is consistent with poverty reduction and sustainable development goals. In this way, the PPCR provides incentives for scaled-up action and initiates transformational change. The pilot programs and projects implemented under the PPCR are country-led, and build on NAPAs and other relevant country studies and strategies.	*Regional Programs:* Caribbean and Pacific *Country programs:* **Bangladesh,** Bolivia, Cambodia, Mozambique, **Nepal,** Niger, Tajikistan, Yemen, Zambia	**Funder(s)**	World Bank's Strategic Climate Fund
				Total Budget	US$971.75 million pledged as of February 2011
				Implementing Agency(s)	World Bank
				Duration	2008–present
				Project Type	Policy formation and integration
				Focus Area	Multi-sectoral
19.	Integrating Climate Change Mitigation and Adaptation into Development Planning (CCMAP) project[42]	START and its partners are engaging scientists and policy makers in West Africa, East Africa and South Asia in a range of activities that aim at raising awareness and improving access to scientific information, so that decision-makers can better integrate climate change issues in development planning and poverty-reduction measures. The activities include national science-policy dialogues, regional knowledge assessments, regional knowledge-sharing strategies, and regional trainings. It also includes assessments of climate change risk to agriculture in nine urban and peri-urban areas.	**Bangladesh**, **Bhutan**, Burundi, Ghana, **Nepal**, Nigeria, Rwanda, Senegal, Tanzania	**Funder(s)**	European Commission; UNEP; USAID
				Total Budget	
				Implementing Agency(s)	Global Change System for Analysis, Research and Training with World Meteorological Organization, IPCC, UNEP, University of Dar es Salaam, University of Ghana, and the Bangladesh Centre for Advanced Studies
				Duration	2009–2010
				Project Type	Capacity building; assessment; Policy formation and integration
				Focus Area	Government; agriculture; Urban areas; Peri-urban areas
20.	Support to Policy Consultation and Actions to Boost	The project will assist in building the capacity of governments and civil society for the following	30 countries in the Near East and North Africa,	**Funder(s)**	FAO
				Total Budget	US$436,000
				Implementing	FAO; Organisation of

[41] PPCR, http://www.climatefundsupdate.org/listing/pilot-program-for-climate-resilience
[42] START, http://start.org/programs/ccmap

Name		Objectives	Participating Countries	Project Details	
	Sustainable Use of Water and Energy Resources for Agricultural Production and Livelihood Improvement in the Near East and North Africa Region in the context of Climate Change[43]	purposes: to prepare national reviews, to analyze the current national policies for water development, to examine cooperation on transboundary water management, and to identify the investment needs and investment strategies for food, water and energy security to be adopted on national and regional bases in the context of climate change.	including Afghanistan and Pakistan	**Agency(s)**	the Islamic Conference
				Duration	2010–2011
				Project Type	Capacity building; Policy formation and integration; Research
				Focus Area	Freshwater supply; Energy; Agriculture
21.	Climate Risk Management Technical Assistance Support Project: Phase II[44]	Building capacities for climate risk management among national stakeholders.	**Bangladesh**, **Bhutan**, Dominican Republic, Honduras, **India**, Kenya, **Maldives**, Mongolia, **Nepal**, Nicaragua, Niger, **Pakistan**, Papua New Guinea, Peru, Timor-Leste and Uganda	**Funder(s)**	Sweden and SIDA through UNDP, UNDP core finance
				Total Budget	
				Implementing Agency(s)	ADPC, International Institute for Sustainable Development
				Duration	2010–2011
				Project Type	Research; Policy formation and integration
				Focus Area	Multi-sectoral
22.	Global Climate Change Alliance[45]	The Global Climate Change Alliance seeks to: (1) deepen the policy dialogue between the European Union and developing countries on climate change (2) increase support to target countries to implement priority adaptation and mitigation measures, and (3) integrate climate change into their development strategies. The program's five priority areas for funding are: improving the knowledge base of developing	**Bangladesh**, Belize, Cambodia, Ethiopia, Guyana, Jamaica, **Maldives**, Mali, Mozambique, Mauritius, **Nepal**, the Pacific Region, Rwanda, Senegal, Seychelles, Solomon Islands, Tanzania and	**Funder(s)**	European Commission, Czech Republic, Sweden, 10th European Development Fund
				Total Budget	€140 million
				Implementing Agency(s)	National governments
				Duration	2008–ongoing
				Project Type	Policy formation and implementation; Knowledge management
				Focus Area	Disaster risk

[43] FAO, https://extranet.fao.org/fpmis/FPMISReportServlet.jsp?div=&type=countryprofileopen&language=EN&countryId=SD and SESRIC, http://www.sesric.org/activities-oicfao.php

[44] UNFCCC, http://unfccc.int/files/adaptation/nairobi_workprogramme/partners_and_action_pledges/application/pdf/iisd_furtherinfo_water_190411.pdf

[45] Global Climate Change Alliance (GCCA), http://www.gcca.eu/pages/1_2-Home.html

Name		Objectives	Participating Countries	Project Details	
		countries to the effects of climate change; promoting disaster risk reduction; mainstreaming climate change into poverty reduction development strategies; reducing emissions from deforestation and degradation; and enhancing participation in the Clean Development Mechanism.	Vanuatu		management; Government

5.2 National-Level Action

Despite facing similar and grave threats from climate change, countries in South Asia differ significantly in terms of planning, preparedness and action on the ground to tackle climate change. In particular, prevailing geopolitical conditions in some countries (e.g., prolonged wars in Afghanistan and Sri Lanka) have diverted national attention and resources to addressing other immediate and pressing issues. A summary of current activity is presented in Table 4.

However, awareness about climate change-induced risks has increased significantly in the recent

Table 4: Comparison of adaptation action at the policy and program levels in South Asia (as of April 2011)

	Policy Action			*Participation in Projects/Programs*		
	1st National Communication	NAPA	National Strategy/Plan	National	Multi-country	Total
Afghanistan		2009		2	5	7
Bangladesh*	2002	2005	Bangladesh Climate Change Strategy and Action Plan (2009)	15	15	30
Bhutan	2000	2005		2	7	9
India	2004	*Non-LDC*	National Action Plan on Climate Change (2008)	13	20	33
Maldives	2001	2007	Strategic National Action Plan (2011)	4	3	7
Nepal	2004	2010		7	15	22
Pakistan	2003	*Non-LDC*	Report of the Task Force on Climate Change (2010)	3	10	13
Sri Lanka	2000	*Non-LDC*	National Climate Change Adaptation Strategy for Sri Lanka, 2011-2016 (2010)	2	7	9

**Includes only large-scale, national-level programs and therefore under-estimates total activity in Bangladesh.*

***Note:** Information contained in this table is based upon research completed as of April 2011. Additional projects and programs, for example, may be underway in each country. Full information regarding adaptation action in each country as of April 2011 is available in the Appendix of this report.*

past, particularly in the run-up to the Copenhagen Climate Conference (the 15th Conference of the Parties to the UNFCCC) in 2009—as witnessed by the SAARC Declaration on Climate Change. Multilateral and bilateral development partners and NGOs are also playing an important role in highlighting climate change-related risks and opportunities. As a result, a range of new initiatives have been launched or are being planned in the region to deal with climate change.

In addition to the preparation of NAPAs, the countries of Bangladesh, India, Sri Lanka and Maldives have prepared specific national climate change adaptation strategies, and Pakistan's is in development. Bangladesh has also established two innovative financing arrangements to address priority adaptation concerns in the country, as identified through the Bangladesh Climate Change Strategy and Action Plan (BCCSAP): the Bangladesh Climate Change Resilience Fund and the Bangladesh Climate Change Trust Fund. These funds are a first of their kind, and the Bangladesh Climate Change Trust Fund has begun to finance approved projects. Similarly, Maldives has established a multi-donor trust with support from the European Union and the World Bank that aims to build a climate-resilient economy through various mitigation and adaptation activities.

5.3 Communities of Practice

South Asia hosts numerous associations and groups formed specifically to address climate change (adaptation) issues that have noticeable national and/or regional visibility. Most of these groups were formed recently and they share at least one common agenda—knowledge sharing. Table 5 provides an overview of these groups in terms of their geographic scope and area(s) of work. For convenience, these communities have been grouped into the following categories: science/research, advocacy, implementation and knowledge networks. However, most of these groups are involved in more than one area of work.

The groups presented in the Table are of a mixed nature; some are primarily information sharing platforms, while others are seriously involved in policy debates, partnership building and implementation (by network members). Another noticeable feature is that most of these communities include civil society organizations that are usually not part of professional bodies. These forums provide the much-needed interface between major development actors such as government and bi-/multilateral donors on the one hand, and civil society and NGOs on the other.

Collectively, members of these groups could deliver a considerable amount of the knowledge, advocacy and policy discourse on impacts of and adaptation to climate change. Many of them have a strong presence in international forums on climate change. Associated NGOs and community-based organizations of these associations are involved in delivering a significant portion of the community-level adaptation work in South Asia (usually financed by government or donor-funded national or regional programs).

Most importantly, these communities serve as the platforms for providing extremely valuable independent (often field-verified) feedback on the efficacy of national and international efforts to adapt to and mitigate climate change. In other words, these communities often serve as the "eyes and ears" for assessing national and sector policies and for monitoring and evaluating progress on the ground.

South Asia also includes numerous local, district, national and international associations and networks addressing issues related to sectors that are vulnerable to the impacts of climate change, such as water, agriculture, engineering and coastal zone management. Assessing the degree to which these communities of practice are incorporating adaptation to climate change into their work is unclear and will require additional research.

Table 5: Select climate change communities of practice in South Asia

Name		Scope	Category	Sector / area of work
1.	Indian Network on Climate Change Assessment (INCCA)	India	Science research	INCCA is a government-sponsored network established to promote domestic research on climate change. Presently a network of over 200 scientists from 120 premier research organizations, the INCCA will carry out research on the effects of climate change in different regions and sectors in India and suggest suitable adaptation and mitigation steps.
2.	Climate Challenge India	India	Advocacy; Knowledge communications	Independent, non-political mobilization effort to spread awareness and promote action on climate change in India. Also runs the most comprehensive climate change portal in India.
3.	Climate Change Network Nepal	Nepal UNDP is the Network Coordinator	Advocacy; Knowledge communications; Capacity building	Facilitates the process of informing, empowering and influencing the Nepalese people and government to take effective actions towards addressing climate change and its impacts. This is a semi-formal group of local and international development partners.
4.	Local Consultative Group on Environment and Climate Change	Bangladesh DFID is to co-chair with Ministry of Environment and Forests	Advocacy; Knowledge communications; Field implementation	Policy dialogue, coordination, sharing of experience and knowledge. The overarching goal is to help Bangladesh implement the Bangladesh Climate Change Strategy and Action Plan. This is a semi-formal group of government bodies, international development partners and NGOs.
5.	National Network on Climate Change	Pakistan Secretariat at LEAD Pakistan	Advocacy; Knowledge communications; Field implementation	Raise the level of attention and interaction on climate change issues by involvement of different tiers of stakeholders including the government, civil society organizations, the media, decision-makers, field practitioners,

Name		Scope	Category	Sector / area of work
				researchers, scientists and advocacy communities. Members include national and international research and environmental organizations.
6.	Climate Vision Sri Lanka	Sri Lanka	Advocacy; Knowledge communications	Facilitate networks between Sri Lankan civil society organizations working on climate change and to find a shared civil society vision.
7.	Climate Action Network South Asia—part of global Climate Action Network	South Asia Secretariat in Dhaka	Advocacy; Knowledge communications; Field implementation	Network of mostly NGOs working to promote government and individual action to limit human-induced climate change to ecologically sustainable levels.
9.	Alliance on Community-Based Adaptation to Climate Change	Global (Bangladesh Centre for Advanced Studies; International Institute for Environment and Development; Ring Alliance of Policy Research Organisations)	Advocacy; Knowledge communications; Field implementation	Sharing global experience and best practices on community-based adaptation through a biannual global conference and annual regional conference. Mostly involves NGOs and community-based organizations, along with some development partners and government agencies.
10.	Technical Advisory Panel on Climate Change (TAP-CC)	Pakistan	Capacity building; Policy formation and integration	TAP-CC was established in 2007 with the objective of providing technical advice to the Government of Pakistan and to the Ministry of Environment. It aims to: bridge the gap between technical knowledge and policy; facilitate the integration of climate change into relevant national policies and plans; and enable Pakistan to effectively participate in international negotiations.

6.0 Conclusions

Over the course of the next century, South Asia is expected to experience an increase in average annual temperatures of 2.4 to 4.5°C, and an increase in precipitation over much of the year. Accompanying these changes are expected to be: an increase in the frequency and intensity of tropical storms and other extreme events; significant glacial melt with greater risk of GLOFs in the near term and declines in water availability over the long-term; and loss of low-lying areas of land, coral reefs and fisheries due to higher sea temperatures and sea-level rise. These changes are expected to have significant negative impacts on the availability of water for drinking, agriculture, energy production and industrialization. They are also expected to lead to: declines in the productivity of important cereal crops (including wheat and rice); potentially adverse impacts on

food security; greater prevalence of communicable and non-communicable diseases; and greater morbidity and mortality due to extreme weather events. These problems are already beginning to affect millions of people in South Asia on a daily basis (Cruz et al., 2007).

For a region of the world that is home to more than one sixth of the global population and that faces a number of existing challenges such as poverty, land degradation, rapid urbanization and civil unrest, these projected changes are a source of significant concern. As such, many South Asian countries have been actively involved in understanding their particular vulnerabilities and in developing and implementing adaptation strategies and actions. Many consider South Asia as a "laboratory" for testing and learning about what works and what does not in regards to adaptation to climate change. South Asia has a number of new and innovative initiatives underway or in the pipeline, from which valuable lessons may be gained. Thus, despite the fact that most adaptation efforts started less than a decade ago, some good practice guidance can already be derived from a review of efforts in this region.

One of the innovative efforts in South Asia has been the establishment of dedicated national trust funds for climate change in each of Bangladesh and the Maldives. These funds are the very first of their kind to finance adaptation and mitigation efforts in support of national strategies and action plans. If managed carefully, these funds will help harmonize donor efforts and align actions with national needs and priorities—and will provide guidance for similar initiatives in other countries.

A second notable innovation from South Asia has been the initiation of Local Adaptation Plans of Action (LAPA) in Nepal as part of its NAPA process. As Nepal was among the last of the LDCs to initiate development of a NAPA, it was able to learn from the previous efforts of other countries and add new elements by integrating top-down planning with an institutionalized bottom-up feedback process. The creation of LAPAs has been initiated by Nepal in recognition of the need to maintain a focus on the contextual nature of vulnerability to climate change, and the corresponding requirement to have a range of inputs—from vulnerable local communities and NGOs through to the technical experts of scientists and engineers (Nepal, n.d.). Nepal's experience with the development of LAPAs and their integration into the NAPA process will provide important lessons with respect to discovering a system for participatory development and implementation of national adaptation plans.

A third strength of adaptation action in South Asia is the degree to which countries are engaged in understanding and addressing transboundary watershed issues. These include those related to the melting of the Himalayan glaciers and the implications of this event for the millions of people downstream who depend on water flowing in the Indus, Ganga and Brahmaputra rivers. Action now may assist in reducing the potential impact of declines in the quantity and quality of water resources on agriculture, livestock, transportation and human health—and therefore minimize the potential for conflict in the future.

Although a breadth of adaptation action is taking place in South Asia, it is clear that the region's need is such that more could be undertaken in a number of areas. A number of ongoing projects at the country and multi-country levels are addressing critical concerns related to agriculture and water. Yet, the importance of these sectors suggests that greater effort is needed to ensure that adaptive capacity is built meaningfully within the areas of agriculture and water. In this regard, particular attention may be given to the introduction and enhancement of integrated water resource management. Coastal zone management, including protection of human settlements and infrastructure, is also an area of ongoing activity in which greater effort might be pursued.

Particular gaps in effort also appear to exist. For example, although South Asia is home to five of the world's 20 largest megacities (Cruz et al., 2007) and urban population in the region is expected to double by 2030 (World Bank, 2009), little attention appears to be given at present to the particular needs of urban areas with respect to adaptation to climate change (particularly outside of Bangladesh and India). As well, although identified as a critical priority by most countries in the region, the number of projects focused on human health is limited. Similarly, hydropower production in Bhutan and Nepal may require additional attention. Additional gaps appear to exist with respect to adaptation within the livestock and fisheries sectors. There are also very few ongoing adaptation initiatives that appear to mainstream and integrate gender conditions into project work, with only two known gender-related adaptation projects occurring in Bangladesh and India. As well, existing action in the region is dominated by capacity building, policy development, research, and knowledge creation and sharing. It may be anticipated that a growth in the number of community-based and infrastructure-focused adaptation projects will be needed in the future to reduce vulnerability in the region.

Through their individual efforts, as well as their joint commitment to tackling climate change—as expressed through the SAARC Action Plan on Climate Change and the Thimphu Statement on Climate Change—the countries of South Asia are providing leadership in the area of climate change adaptation. Going forward, lessons from current efforts may be shared within the region—and also with countries in other regions facing similar challenges—will strengthen capacity and effectiveness.

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Appendices: Country Profiles

Profiles of adaptation needs and action in the South Asian countries of Afghanistan, Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan and Sri Lanka are presented in the following appendices.

To assess the level of adaptation action occurring in each of these countries, a desk-based review of internet sources and relevant documentation was undertaken. The content of these sources was assessed in relation to a set of parameters established to focus the review's scope and ensure consistency across regions. Notably, it examines *discrete* adaptation actions, or *policies, programs and projects designed and implemented specifically to address the current and projected impacts of climate change*. Therefore, the review presents only a portion of the breadth of the efforts underway to reduce the vulnerability of developing countries to the impacts of climate change. In particular, it does not capture the broad array of development activities that are increasing the adaptive capacity of communities and countries. As well, within the review, adaptation efforts have been deemed to be "current" if they were ongoing or completed in 2009 or later. Therefore, the review does not include projects completed prior to 2009 that may have contributed to building local and national capacity to adapt. The review also only identifies those actions currently underway; it does not offer judgment of the effectiveness of actions taking place. In addition, reflecting the desk-based nature of the review, it is acknowledged that the content is biased toward identification of large-scale projects funded by international development assistance organizations and those projects about which information is available online. Therefore, small-scale projects that meet the review's definition of adaptation action, particularly those occurring at the community level, are not fully represented within the review. A fuller explanation of the methodology used to develop the country profiles that follow is provided in the methodology section of this report.

To facilitate analysis of the degree to which current adaptation projects and programs identified through the review are helping to meet the adaptation needs and priorities of developing countries, a common classification system was developed. This system examined identified projects and programs from two perspectives—their sector or areas of focus and the types of activities they are supporting. A fuller description of these two types of classifications is provided below.

Sector or Area of Focus

To support development of a general classification system for adaptation projects on the basis of their sector or area of focus, a review of the categories used by the Adaptation Learning Mechanism, Intergovernmental Panel on Climate Change (IPCC), United Nations Environment Programme (UNEP) and the Nairobi Work Programme was completed and used to guide development of a series of

categories for characterizing activities included in this review. Based on this review and expert judgment, a set of 14 macro project categories were identified: food, fiber and forests; ecosystems; freshwater resources; oceans and coastal areas; disaster risk management; migration and security; gender; business; infrastructure and transportation; human settlements; human health; climate information services; governance; and multi-sectoral. Where appropriate, these macro project categories were further refined through the identification of various sub-categories. These sub-categories were then used to label the discrete adaptation projects included in the review.

Definitions of the macro project categories used in the review along with descriptions of the types of projects included within their individual sub-categories are presented below.

1. **Food, Fiber and Forests** – Defined as the management and use of terrestrial natural resources to directly improve human well-being. Its sub-categories are:
   - *Agriculture* – Encompassing subsistence agriculture, commercial agriculture and the rearing of confined domestic animals.
   - *Pastoralism* – Encompassing the use of domestic animals as a primary means for obtaining resources from habitats (UNEP, 2007), particularly in nomadic and semi-nomadic communities.
   - *Forestry* – Encompassing afforestation, reforestation, agroforestry, commercial forestry, community-based forest management and woodland management.
   - *Fire management* – encompassing monitoring, planning and management to address the impact of fires on settlements and ecosystems, including forested and grassland ecosystems.

2. **Ecosystems** – Defined as a system of living organisms interacting together and with their physical environment, the boundaries of which may range from very small spatial scales to, ultimately, the entire Earth (IPCC, 2007). Its sub-categories are:
   - *Biodiversity* – Encompassing activities related to the maintenance of living organisms at various spatial scales, including the establishment and protection of parks and bio-reserves.
   - *Ecosystem conservation* – Encompassing efforts to *maintain* the health of particular ecosystems, such as wetlands, grasslands, forests, mangroves and coral reefs.
   - *Ecosystem restoration* – Encompassing efforts to *restore* the health of particular ecosystems, such as wetlands, grasslands, forests, mangroves and coral reefs.

3. **Freshwater Resources** – Defined as the management and use of freshwater contained in terrestrial ponds, lakes, rivers, watersheds, among others. Its sub-categories are:
   - *Freshwater fisheries* – Encompasses the catching, packing and selling of fish and shellfish derived from lakes, rivers and ponds, as well as through freshwater aquaculture.
   - *Watershed management* – Encompassing management of the basins that supply water to different streams, rivers, lakes and reservoirs, including integrated watershed management.
   - *Freshwater supply* – Encompassing efforts to access and preserve freshwater for human consumption and use including drinking water sources, groundwater resources, rainwater harvesting and water infrastructure such as wells, dams and dikes.

4. **Oceans and Coastal Areas** – Defined as the management and use of coastal areas and oceans. Its sub-categories are:
   - *Coastal zone management* – Encompassing the management of land and water resources in coastal areas, including through integrated coastal zone management and the establishment and maintenance of coastal infrastructure.
   - *Marine management* – Encompassing the management and use of off-shore ocean and sea resources.
   - *Marine fisheries* – Encompassing the catching, packing and selling of fish, shellfish and other aquatic resources found in the oceans and seas, including through marine and coastal aquaculture.

5. **Disaster Risk Management** – Defined as the "systematic process of using administrative directives, organizations, and operational skills and capacities to implement strategies, policies and improved coping capacities in order to lessen the adverse impacts of hazards and the possibility of disaster" (UNISDR, 2009, pp. 10). It includes emergency response measures, preparation for extreme events and early warning systems. No sub-categories were established in relation to this macro project category.

6. **Migration and Security** – Defined as efforts to support the movement of people and maintain their personal security in the face of incremental climate changes or climate shocks.
   - *Migration* – Encompassing preparations for and responses to the potential movement of people from one location to another due to climate change impacts.
   - *Security* – Relates to personal security and freedom from violence, crime and war due to natural and human-induced disasters (UNEP, 2007) and encompasses peace building, conflict reduction and conflict avoidance activities.

7. **Gender** – Defined as the social attributes and opportunities associated with being male and female and the relationships between women and men, and girls and boys, as well as the relations between women and those between men. These attributes, opportunities and relationships are socially constructed and are learned through socialization processes (UN Women, undated). It includes efforts to understand the vulnerability of women to the impacts of climate change, gender-sensitive adaptation strategies, and measures to improve the situation of women at the local and policy level, including through gender mainstreaming. No sub-categories were established in relation to this macro project category.

8. **Business** – Defined as the purchase and sale of goods and services with the objective of earning a profit. Its sub-categories are:
   - *Tourism* – Encompassing the adjustment and development of tourist facilities and operations to account for current and future vulnerabilities, including these actions in relation to ecotourism.
   - *Private sector* – Encompassing potential impact of climate change and potential adaptation strategies on the diverse activities underway in the portion of the economy in which goods and services are produced by individuals and companies including industry, mining and other economic sectors.
   - *Trade* – Encompassing the exchange of goods and services within and between countries.
   - *Insurance* – Encompassing the development, testing and adjusting of insurance and risk-management schemes, including weather-based index systems.

9. **Infrastructure** – Defined as the basic equipment, utilities, productive enterprises, installations, institutions and services essential for the development, operation and growth of an organization, city or nation (IPCC, 2001). Its sub-categories are:
   - *Energy* – Encompassing energy-related systems and infrastructure, including small-scale and large-scale energy generation through hydroelectric power generation, wind, solar and other forms of traditional and new energy sources, as well as transmission networks.
   - *Transportation* – Encompassing the components of the system required to move people and goods, including roads, bridges, railway lines, shipping corridors and ports.
   - *Waste management* – Encompassing sanitation, sewage systems, drainage systems and landfills.
   - *Buildings* – Encompassing actions related to built structures such as houses, schools and offices, including changes to building codes, building practices and green ways of construction.

10. **Human Settlements** – Defined as a place or area occupied by settlers (IPCC, 2001). Its sub-categories are:
    - *Peri-urban areas* – Encompassing the outskirts of urban centers, and the transition zone between rural and urban areas.
    - *Urban areas* – Encompassing municipalities, towns and cities, as well as areas in these centers (such as slums).
    - Rural areas – Encompassing villages and other small settlements, as well as rural landscapes and integrated rural development.

11. **Human Health** – Defined as a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity (WHO, undated). It includes efforts to assess vulnerabilities to and the impacts of climate change on human health directly and indirectly, and the development and implementation of appropriate adaptation strategies at the local, regional and national levels. No sub-categories were established in relation to this macro project category.

12. **Climate Information Services** – Defined as the production and delivery of authoritative, timely and usable information about climate change, climate variability, climate trends and impacts to different users at the local, sub-national, national, regional and global levels.[46] It includes efforts to develop, adjust and provide short- and long-term climate forecasts, including climate change projections, to different audiences. No sub-categories were established in relation to this macro project category.

13. **Governance** – Defined as the institutions (laws, property rights systems and forms of social organization) through which societies define and exercise control over resources.[47] Its sub-categories are:
    - *Government* – Encompassing efforts to build the capacity of government officials, either at the national or sub-national level, to prepare for and facilitate adaptation to climate change, including through the development of policies, plans, frameworks and strategies, as well as the establishment and operation of climate change trust funds.
    - *Civil society* – Encompassing efforts to build the capacity of the public including non-governmental organizations, to understand, prepare for and respond to climate change.

14. **Multi-sectoral** – Defined as actions that simultaneously address more than one sector in one and/or multiple locations. It includes efforts that address more than one sector, which are challenging to tease apart, and in the context of this review includes large, multi-country projects in which the specific sector of focus is nationally determined and, therefore, varies from country to country. No sub-categories were established in relation to this macro project category.

[46] Derived from: http://www.joss.ucar.edu/cscc/climate-service-definition-condensed.pdf
[47] Derived from UNEP, 2007.

Types of Activities

The following categories were used to organize the types of activities being completed as part of current adaptation projects and programs identified through the review:

- *Research* – Encompassing efforts to develop new knowledge and/or organize existing information so as to increase understanding of the links between climate change, human society and ecosystems and inform adaptation decision-making.
- *Assessment* – Encompassing risk, impact and vulnerability assessments, as well as monitoring of ecological and societal trends.
- *Capacity building* – Encompassing the provision of technical training, technical assistance, institutional strengthening and education.
- *Knowledge communication* – Encompassing efforts to share information, knowledge and practices related to climate change adaptation, including awareness raising and engagement of media.
- *Policy formation and integration* – Encompassing efforts to inform, develop and implement climate change adaptation plans, strategies, frameworks and policies at the local, sub-national, national and international levels.
- *Field implementation* – Encompassing physical measures to reduce vulnerability to the impacts of climate change, including the implementation of pilot projects, construction of infrastructure, development and modification of technologies and the management of physical resources.
- Community-based adaptation – Encompassing actions that directly engage community members in efforts to understand, plan for and respond to the impacts of climate change.

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1.0 Afghanistan

ADB	Asian Development Bank
BMZ	German Federal Ministry for Economic Cooperation and Development
DFID	Department for International Development (United Kingdom)
FAO	Food and Agriculture Organization
GIRA	Government of the Islamic Republic of Afghanistan
ICIMOD	International Centre for Integrated Mountain Development
LDCF	Least Developed Country Fund
NAPA	National Adaptation Programme of Action
NCSA	National Capacity Needs Self-Assessment
NEPA	National Environmental Protection Agency
UNEP	United Nations Environment Program
USDS	United States Department of State

Afghanistan is a landlocked country located along historic trade routes leading from Central Asia into South Asia. A turbulent history has impeded development within the country, and the international community is engaged in efforts to secure Afghanistan's borders and improve governance capacity. Although there are some indications of improvements within the areas of health and education, Afghanistan continues to have one of the highest child mortality rates in the world; life expectancy hovers around 44 years for men and women (USDS, 2010). Agriculture contributes an estimated 31 per cent to the country's Gross Domestic Product, and approximately 85 per cent of Afghans depend on primarily rain-fed agriculture and agribusiness for their livelihoods (USDS, 2010). Additional industries include natural gas, coal and copper, as well as small-scale production of textiles, furniture, and cement.

A. Adaptation Needs and Priorities

Afghanistan's climate is arid and semi-arid—falling within the Desert or Desert Steppe climate classification—but varies considerably from one region to another given its diverse topography (GISA, 2009). The country experiences cool winters and hot summers. A wet season runs from winter to early spring and seasonal snows fall from October to April in the mountains. Although climate data is sparse, key climatic hazards that Afghans face include periodic drought, floods due to untimely and heavy rainfall, floods due to thawing of snow and ice, increasing temperatures, frost and cold spells, hail storms and 120-day winds (GISA, 2009). Among these, prolonged

droughts, floods due to untimely and heavy rainfall, and rising temperatures present the greatest hazards to ecosystem services and livelihood security in Afghanistan (GIRA, 2009).[48]

Afghanistan's National Adaptation Programme of Action (NAPA), which was jointly developed with its National Capacity Needs Self-Assessment (NCSA), notes the difficulty in projecting the future impacts of climate change in the region given inaccessibility of baseline data, scarce resources, and lack of capacity (GIRA, 2009). Nonetheless, the NAPA identifies a number of climate hazards that may worsen with climate change: periodic drought, floods due to untimely and heavy rainfall, flooding due to thawing of snow and ice, rise in temperatures, frost and cost spells, monsoon and 120-day winds. The NAPA identifies the following sectors as most vulnerable to climate change: water resources, forestry and rangelands, and agriculture.

B. National Level Policies and Strategic Documents

Due to years of political conflict, wars, insecurity and lack of in-country capacity, Afghanistan has not been able to keep pace with other South Asian countries in terms of preparing for climate change and implementing necessary measures. The recently completed joint NCSA and NAPA is the main policy document of Afghanistan to deal with climate change. The three high-level objectives in Afghanistan's NCSA/NAPA are to:

(i) identify priority projects and activities that can help communities adapt to the adverse effects of climate change;
(ii) seek synergies with existing multi-lateral environmental agreements and development activities with an emphasis on both mitigating and adapting to the adverse effects of climate change; and,
(iii) integrate climate change considerations into the national planning processes.

At the national and regional levels, the National Environmental Protection Agency (NEPA) may lead the implementation of the action plan, in collaboration with other actors.

C. Current Adaptation Action

Table 1 below lists the climate change projects in Afghanistan which are on-going or are in the process of being developed. The main priority sector being addressed through current projects is the water sector, with additional areas of focus including meteorology, agriculture, forestry, land, infrastructure, as well as energy and food security. Funders include the Asian Development Bank (ADB),

[48] During the last 50 years, average temperatures in Afghanistan has increased by approximately 0.8 to 1°C, while average precipitation has decreased by 90 to 100 millimeters per year. Temperature variability has also amplified, with extreme temperatures exceeding long term maximum and minimum temperatures by 30 percent, according to the Climate Research Unit of the University of East Anglia.

European Commission, the Food and Agriculture Organization (FAO), German Federal Ministry for Economic Cooperation and Development (BMZ), the Least Developed Countries Fund (LDCF) and the United Kingdom, with implementing agencies including: the Ministry of Agriculture, Irrigation and Livestock; Ministry of Energy and Water; NEPA; the Organization of the Islamic Conference; and the United Nations Environment Programme (UNEP).

In addition to the projects listed below, Afghanistan is addressing transboundary related water issues through the Central Asia Regional Economic Cooperation Program.[49] This program is looking at incorporation of climate change into the development of participating countries economic and transport corridors (ADB, 2010), but this far has not been strongly engaged in climate change adaptation issues.

Table 1: Current Adaptation Projects and Programs active in Afghanistan

Name		Objectives	Funder(s)	Implementing Agency(s)	Type of project	Duration	Priority Sector(s)	Geographic focus (if any)
National Action								
1.	Climate Proofing of Horticulture in Afghanistan	The objective of this project is to develop an improved range of horticulture practices and products to adapt to the climate change threat.	UK	Ministry of Agriculture, Irrigation and Livestock	Capacity building; Research	2008 – 2012	Agriculture	
2.	Building Adaptive Capacity and Resilience to Climate Change in Afghanistan	The objective of this project is to increase capacity and the knowledge base for assessment, monitoring and forecasting of climate change to water related risks in Afghanistan.	LDCF, co-financing *Budget:* US$20.9 million	UNEP, NEPA	Capacity building; Research	2011 - 2015	Freshwater supply	
Participation in Regional and Global Projects								
3.	Glacial Melt and Downstream Impacts on Indus-dependent Water Resources and Energy[50]	Glacier-fed river basins are a major source of irrigation and hydropower in Himalayan countries, with the Indus river basin of major importance for the economy of several countries in South Asia. This project will develop climate adaptive measures to	ADB Small Grant for Adaptation Project *Budget:*	ICIMOD, UNEP-GA, CICERO	Community based adaptation; Policy formation and integration	2007 – 2009	Freshwater supply; Energy	Regional: Pakistan, Central and East Afghanistan, North India

[49] This program involves Afghanistan, Azerbaijan, China, Kazakhstan, Kyrgyz Republic, Mongolia, Tajikistan and Uzbekistan.
[50] ADB, http://www.adb.org/climate-change/afg-ind-downstream.asp

Name		Objectives	Funder(s)	Implementing Agency(s)	Type of project	Duration	Priority Sector(s)	Geographic focus (if any)
		reduce some of the adverse climate impacts on environmental degradation, building a level of climate resilience at the target watersheds. The project will support the mainstreaming of climate adaptation activities into ADBs projects and programs in the water and hydro-energy sector in these countries.	US$200,000					
			In Afghanistan: Further information required.					
4.	Protection of Sustainable Policy Initiatives in the Management of Natural Resources in the Hindu Kush Himalayas[51]	The program strengthens the role of International Centre for Integrated Mountain Development (ICIMOD) as an organization and service provider in the region, and increases the accountability of the eight member countries. It helps develop and implement regionally agreed concepts and strategies to facilitate adaptation to climate change and sustainable resource management. This is realized by institutional strengthening of ICIMOD in areas such as data collection related to climatic changes and forests. GIZ further promotes the ICIMOD priority program Environmental Change and Ecosystem Services.	BMZ	GIZ, ICIMOD	Capacity building	2008 – 2012	Government	*Asia Region:* Afghanistan, Bangladesh, Bhutan, China, India, Myanmar, Nepal, Pakistan
			In Afghanistan: Further information required.					
5.	South Asia Water Initiative[52]	Working with DFID and the World Bank, the South Asia Water Initiative is building capacity for water resource management to address serious water availability issues in Himalayan watershed countries of Afghanistan, Bangladesh, Bhutan, India, Nepal and Pakistan.	DFID, Australia, Norway *Budget:* US$9.6 million	World Bank (lead); regional and national bodies	Capacity building; Policy formation and integration	2009 – 2013	Freshwater supply	*Regional:* Afghanistan, Bangladesh, Bhutan, India, Nepal and Pakistan

[51] GIZ, http://www.gtz.de/en/weltweit/asien-pazifik/33473.htm
[52] UN, http://www.un.org/climatechange/projectsearch/proj_details.asp?projID=182&ck=aVmfG453KHSJI81

Name		Objectives	Funder(s)	Implementing Agency(s)	Type of project	Duration	Priority Sector(s)	Geographic focus (if any)
			In Afghanistan: Further information required.					
6.	Water and Adaptation Intervention in Central and West Asia[53]	Project will "develop and introduce measures to adapt to changing hydrological regimes. These measures will build climate resilience in target watersheds against anticipated disaster scenarios, reducing potentially adverse climate impact on energy supply, food production, and environmental sustainability." The project is to lead to more efficient national strategies for climate change adaptation and improved national capacity to model climate scenarios and develop adaptation strategies. The focus area of the study is the Amu Darya and Syr Darya river basins.	Asian Development Bank *Budget:* US$1.0 million	Asian Development Bank	Research; Policy formation and integration; Knowledge communication; Capacity building	2010 – ?	Watershed management; Disaster risk management; Agriculture; Climate information services	*Amu Darya and Syr Darya River Basins:* Afghanistan, Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan and Uzbekistan
			In Afghanistan: Further information required.					
7.	Support to Policy Consultation and Actions to boost Sustainable Use of Water and Energy Resources for Agricultural Production and Livelihood Improvement in the Near East and North Africa Region in the context of Climate Change[54]	The project will assist in building the capacity of governments and civil society to prepare national reviews, analyze the current national policies for water development, examine cooperation on transboundary water management, and identify the investment needs and investment strategies for food, water and energy security to be adopted on a national and regional basis in the context of climate change. Its main objectives are: • Carry out studies and workshops to increase awareness of water-energy-food interrelation and their sustainable use.	FAO Budget: US$436,000	FAO; Organisation of the Islamic Conference	Capacity building; Policy formation and integration; Research	2010 – 2011	Freshwater supply; Energy; Agriculture	*Global:* 30 countries including: Afghanistan, Algeria, Djibouti, Egypt, Kazakhstan, Kyrgyzstan, Libya, Mauritania, Morocco, Pakistan, Somalia, Sudan,

[53] ADB, http://pid.adb.org/pid/TaView.htm?projNo=44066&seqNo=01&typeCd=2

[54] FAO, https://extranet.fao.org/fpmis/FPMISReportServlet.jsp?div=&type=countryprofileopen&language=EN&countryId=SD and SESRIC, http://www.sesric.org/activities-oicfao.php

Name		Objectives	Funder(s)	Implementing Agency(s)	Type of project	Duration	Priority Sector(s)	Geographic focus (if any)
		• Address food and energy security in the Near East and North Africa region through a convergent approach which integrates four critical resource factors - water, energy, technology, and knowledge under the stress of climate change. • Carry out studies on the use of water resources, on the management strategies and on the investment needs at national level. • Capacity-building of governments and civil societies for optimal natural resource management.						Tajikistan, Tunisia, Turkmenistan, Uzbekistan, and Yemen
			In Afghanistan: Further information required.					

D. Proposed Adaptation Action

During the NAPA process, the working groups identified a total of 51 potential activity options for adapting to climate change. Through a series of evaluation exercises, two adaptation options were shortlisted and developed into summary project proposals:

- Improved Water Management and Use Efficiency; and,
- Land and Water Management at the Watershed Level.

The first step towards implementing these projects is to build necessary technical, institutional and community capacity. The recently approved capacity building project funded through the Least Development Country Fund (LDCF) should contribute to addressing this issue.

Table 2: Priority Proposed Adaptation Projects and Programs in Afghanistan's NAPA

Name		Objectives	Type of project	Priority Sector(s)	Geographic focus (if any)
1.	Improved Water Management and Use Efficiency	The overall objective is to reduce livelihood vulnerability in drought-affected communities through improved water management and use efficiency. The project would involve mainstreaming climate change and water management issues at the national level, introducing water saving irrigation methods, water distribution technologies, and the	Policy formation and integration; Community based adaptation; Capacity building	Freshwater supply	
			Notes:		

Name		Objectives	Type of project	Priority Sector(s)	Geographic focus (if any)
		creation of community water resource management associations.			
2.	Community Based Watershed Management	Degradation of watersheds in Afghanistan is widespread. This project will focus on realizing holistic intervention in specific watersheds, with activities addressing deforestation and destruction of land cover, soil erosion, flooding, and uncoordinated natural resource management decisions. The project would focus on mainstreaming watershed management issues at the national level, establish watershed management committees, and raise awareness around natural resource use.	Capacity building; Knowledge communication; Community based adaptation	Watershed management	
			Notes: This project's objectives are being partially addressed through the regional project "Support to Policy Consultation and Actions to boost Sustainable Use of Water and Energy Resources."		

E. Assessment

Afghanistan's current economic development policy framework does not appear to integrate climate considerations into its decision-making, particularly regarding the integration of climate change risks into integrated water resources management, land use planning and management, drought preparedness and risk reduction plans. Afghanistan also lacks the capacity and expertise needed to identify vulnerabilities and adaptation measures that could help adjust current policies in order to integrate climate change threats and mainstream climate change adaptation in all impacted sectors—not just water resources and agriculture (i.e. in health, infrastructure, energy). This latter concern could be at least partially addressed through the planned capacity building project supported by the LDCF. Overall, however, ongoing adaptation projects are in line with the priorities identified in Afghanistan's NAPA, including the current focus on water and agriculture.

In Afghanistan, the overarching barriers to adaptation such as conflict, weak policy and legal frameworks, and low capacity and awareness are likely to remain challenging for many years to come. However, Afghanistan may benefit from a sustained transition that would provide opportunities for integrating climate change considerations into policy reforms.

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2.0 Bangladesh

ADB	Asian Development Bank
AusAID	Australian Agency for International Development
BCCRF	Bangladesh Climate Change Resilience Fund
BCCSAP	Bangladesh Climate Change Strategy and Action Plan
BMZ	German Federal Ministry for Economic Cooperation and Development
CIF	Climate Investment Fund
DFID	Department for International Development (United Kingdom)
FAO	Food and Agriculture Organization
GEF	Global Environment Fund
GOB	Government of Bangladesh
LDCF	Least Development Country Fund
MEF	Bangladesh Ministry of Environment and Forestry
NAPA	National Adaptation Programme of Action
NCAP	Netherlands Climate Assistance Program
SCCF	Special Climate Change Fund
SIDA	Swedish International Development Agency
UNDP	United Nations Development Program
UNEP	United Nations Environment Program
USAID	United States Agency for International Development
USDS	United States Department of State

Bangladesh is a low-lying riparian country, with the Bay of Bengal in the south and Himalayas to the north. Aside from mountainous regions in the northeast, Bangladesh is one of the largest deltas in the world, formed by a dense network of tributaries of the country's rivers (MEF, 2005). Bangladesh remains one of the world's poorest and most densely populated countries despite its considerable development gains in the past several decades, including in the areas of gender parity, education, and infant and maternal health (MEF, 2009). The country's economy is primarily agricultural, and the majority of the population depends on agriculture for their livelihoods (USDS, 2010). The country's main crops are rice and jute, along with maize, vegetables and tea.

A. Adaptation Needs and Priorities

Bangladesh's current climate is monsoonal and subtropical, and the country experiences seasonal rainfall, warm temperatures and high humidity. Bangladesh's marshy coast is located at the tip of the northern Indian Ocean, an area that is susceptible to strong cyclonic storms and tidal waves; nearly annually the country experiences floods, cyclones, tornadoes and tidal bores, caused in part by the country's unique geography (CIF, 2010). With an average elevation of four to five meters above sea level, approximately one-third of the country is prone to tidal inundation, and during monsoons up to 70 per cent of the country becomes flooded (CIF, 2010).

Recent data indicates that Bangladesh's temperature has increased during the monsoon season, which lasts from June through to August (MEF, 2005). The country is experiencing the impacts of a warmer climate; summers are growing hotter, monsoon seasons are becoming more irregular, and heavy rainfall is occurring over short periods (CIF, 2010). The country's National Adaptation Programme of Action (NAPA) indicates there is also evidence of greater saline intrusion in coastal zones.

Bangladesh is generally recognized as the country most at risk due to climate change, particularly to the effects of sea-level rise (CIF, 2010; MEF, 2010). The country is likely to experience more frequent and severe tropical cyclones, heavier and more erratic rainfall, higher river flows, erosion of river banks, melting of Himalayan glaciers, and sea level rise (MEF, 2009). By 2050, 70 million people could be affected annually by floods, 8 million by droughts, and up to 8 per cent of low-lying lands may be under water due to rising sea levels. Climate projections using older and newer versions of General Circulation Models have revealed that the water related impacts of climate change in Bangladesh are likely to be the most severe challenges the country faces (MEF, 2005). These impacts include the possibility of drought during winter—the dry season—and coastal and riverine flooding. A number of studies indicate the coastal zone impacts will be severe, given the combined effects of sea level rise, subsidence, changes in upstream river discharge and erosion of coastal embankments (MEF, 2005). Moreover, most of the coastal population will face increasingly intense cyclones and tidal surges along with increasing salinity in water and soil.[55]

In physical and economic terms, climate change is expected to severely impact Bangladesh's: agricultural crops, fisheries and livestock (food security); water resources (in- and off-stream availability, navigation); health (malnutrition, frequent outbreak of vector borne diseases); infrastructure (coastal and inland embankments, road and drainage systems); and forests (especially the Sundarbans) and

[55] Source: various publications and reports of the Climate Change Cell of the Ministry of Environment and Forests and the Centre for Environmental and Geographic Information Services.

biodiversity (MEF, 2005). Moreover, urban areas—which are extremely densely populated and largely unplanned—are likely to face incidences of severe water logging due to poor drainage conditions and possible leakage through or breach of defensive levees.

The prospect of large scale relocation of people from coastal districts (due to cyclones, inundation and increased salinity) to other parts of Bangladesh and abroad is considered by some as a serious security concern. There are 19 coastal districts in Bangladesh with a population of close to 40 million. Should adaptation measures in the coastal belt fail, around 10 to 15 per cent of this population may become displaced.[56]

The Bangladesh Climate Change Action Plan (BCCAP), updated in 2009, provides a review of the country's adaptation needs by priority area, as summarized in Table 1 below.

Table 1: Priority actions by area of concern as identified in the Bangladesh Climate Change Strategy and Action Plan (2009)[57]

Area of focus	Priority actions
Food security, social protection and health	• Increase resilience of most vulnerable groups through community-level adaptation, diversification of livelihoods, improved access to services and social protection schemes (e.g. insurance); • Develop climate resilient cropping systems (including agricultural research), as well as fisheries and livestock systems to ensure local and national food security; • Implement surveillance systems for existing and new disease risks and to ensure health systems are poised to meet future demands; and • Implement drinking water and sanitation programs in areas at risk from climate change, including coastal zones and other flood- and drought-prone areas.
Comprehensive disaster management	• Improve the government's and civil society's ability to manage natural disasters and ensure that effective policies, laws, and regulations are in place; • Enhance community-based adaptation programs and ensure they are in place in disaster prone parts of the country; and • Enhance cyclone, storm surge, and flood early-warning systems.
Infrastructure	• Repair existing infrastructure – including coastal embankments, river embankments, and drainage systems – to ensure effective operation and maintenance systems; • Plan, design and construct needed new infrastructure, including cyclone shelters, coastal and river embankments, water management systems, urban drainage systems, etc.; and • Undertake strategic planning of future infrastructure needs, and take into account (a) patterns of urbanization and socioeconomic

[56] Personal communication by various experts.
[57] The BCCAP also includes information on a mitigation and low-carbon development plan for the country, which was not included in the table.

Area of focus	Priority actions
	development; and (b) the changing hydrology of the country.
Research and knowledge management	• Improve climate change modeling scenarios for Bangladesh by applying methodologies at the regional and national levels; • Model the likely hydrological impacts of climate change in the Ganges-Brahmaputra-Meghna system in order to assess future system discharges and river levels to feed into flood protection embankment measures; • Monitor and research the impacts of climate change on ecosystems and biodiversity; • Analyze the impacts of climate change on Bangladesh's macro-economy as well as key sectors; • Research the linkages between climate change, poverty, health, and vulnerability in order to ascertain how the resilience of the most vulnerable households may be improved; and • Create a Centre for Research and Knowledge Management on Climate Change to ensure that Bangladesh has access to the most current ideas and technologies available globally.
Capacity building and institutional strengthening	• Revise all government policies to ensure they consider climate change and its impacts; • Mainstream climate change considerations in national, sectoral, and spatial development planning; • Build the capacity of key government ministries and agencies to move forward on climate change adaptation; • Improve the capacity of the government to undertake international and regional negotiations on climate change; • Build the capacity of government, civil society, and the private sector on carbon financing; and • Build the capacity for education and training of environmental refugees to ease migration to other countries and integration into new societies.

B. National Level Policies and Strategic Documents

Awareness of the potential effects of climate change in Bangladesh occurred comparatively earlier than many other LDCs, with knowledge of impacts existing in the academic community as early as the mid-1980s (Ayers, 2008). Throughout the 1990s, a number of prominent studies raised awareness of the impacts of climate change in the country, including those by the Bangladesh Centre for Advanced Studies in 1994,[58] Bangladesh Unnayan Parishad in 1994,[59] and the Bangladesh Climate Change Country Studies Program in 1997[60] (Anwar, 1999), as well as a study published by the World Bank in 2000 entitled "Bangladesh: Climate Change and Sustainable Development." While the country has a long history of research on the effects of climate change, as well as a number of early climate

[58] See: Bangladesh Center for Advanced Studies (1994). Vulnerability of Bangladesh to climate change and sea level rise: concepts and tools for calculating risk in integrated coastal zone management, Vols 1 & 2. Technical Report, Bangladesh Center for Advanced Studies, Dhaka.

[59] See: Bangladesh Unnayan Parishad (1994). Bangladesh: greenhouse effect and climate change. Briefing documents, Nos. 1–7, Bangladesh Unnayan Parishad (BUP), Dhaka, Bangladesh; Center for Environmental and Resource Studies (CEARS), University of Waikato, Hamilton; and Climate Research Institute, University of East Anglia, Norwich.

[60] See: Bangladesh Climate Change Country Study Program (1997). Assessment of vulnerability and adaptation to climate change. Final report, Department of Environment, Government of Bangladesh.

change adaptation projects, studies note a lag between research and policy initiatives, which were not implemented until the 2000s (Ayers, 2008; Adaptation Knowledge Platform, 2010).

However, given the country's long history of dealing with climate related natural disasters, the Government of Bangladesh has invested over US$10 billion over the past 30 years to make the country more resilient to extreme climate events. This process has included shifting from a response based approach to one characterized by emergency preparedness and risk mitigation (CIF, 2010). Bangladesh has established a Participatory Disaster Management Program that focuses on disaster management and prevention as well as adaptation to climate change. In addition, in 2003, the government established a Comprehensive Disaster Management Programme with donor support, aiming to refocus the government's efforts towards disaster preparedness and risk reduction (EP, 2007).

The key policy framework for climate change action in Bangladesh is the Bangladesh Climate Change Strategy and Action Plan (BCCSAP) completed in 2009, which supersedes its NAPA and various previous positions papers. All on-going and planned climate change adaptation efforts in Bangladesh are essentially about supporting the BCCSAP. It was estimated that US$5 billion would be required in the first five years to implement this Action Plan. Bangladesh, like most other least developed countries affected by climate change, will require external financial support to implement its planned actions under the BCCSAP without sacrificing other development priorities.

The BCCSAP identifies six pillars under which climate change mitigation and adaptation will take place: (i) food security, social protection and health; (ii) comprehensive disaster management; (iii) infrastructure; (iv) research and knowledge management; (v) mitigation and low carbon development; and, (vi) capacity building and institutional strengthening. Based on review of earlier national assessments, stakeholder consultations and expert opinions, a set of 44 priority actions to be undertaken in the next 10 years have been identified under these six pillars. Of these 44 priority actions, 34 are to support adaptation to climate change (see Table 1). As the BCCSAP is a "living document," it will be reviewed and periodically updated by a review committee appointed by the Government of Bangladesh (GOB). As such, new priority actions may be added and present ones amended in future versions of this document.

As most of Bangladesh's sectoral development policies and plans were drafted before the BCCSAP was prepared, climate change has yet to be integrated formally into them. For example, the National Water Management Plan of 2004 recognizes climate change as a potential threat, but it also identifies climate change as a knowledge gap area and calls for quantifying the risk associated with it. This need has been recognized as a priority in the Action Plan of the BCCSAP.

The GOB has designated the Ministry of Environment and Forests (MEF) as the "focal ministry" for providing coordination and the technical lead on all climate change related matters. MEF led the drafting of Bangladesh's Initial National Communication, NAPA, various position papers and the BCCSAP. In 2010, MEF established a new department—the Department of Climate Change—which will eventually take up the responsibility for coordinating climate change adaptation efforts in Bangladesh at the operational level.

Table 2: Key Government Policies and Reports reflecting Adaptation Needs, Priorities and Planned Actions

Name of Policy Action		Government Division Responsible	Status	Sector(s) of Focus	Summary description
1.	National Communication	Ministry of Environment and Forest	2002	Freshwater supply, coastal zone management, agriculture, forestry, biodiversity, marine fisheries, and human health	This document provides an overview of Bangladesh's national circumstances (climate and development indicators), reviews the country's emissions inventory, discusses the country's vulnerability to climate change by sector, and discusses adaptation and mitigation policy options.
2.	National Adaptation Programme of Action	Ministry of Environment and Forest	2005	Human health agriculture, freshwater supply, coastal zone management, forestry	This document provides an overview of Bangladesh's national circumstances and discusses the country's vulnerability to climate change by sector. Fifteen priority adaptation projects are identified in the NAPA.
3.	Coastal Zone Policy	Ministry of Water Resources	2005	Coastal zone management	This document lays out Bangladesh's approach to integrated coastal development, noting the potential effects of climate change on this sector, and outlines the policy framework and institutional environment that will enable this approach to coastal zone protection.
4.	Bangladesh Climate Change Strategy and Action Plan (BCCSAP)	Ministry of Environment	2009 (update of 2008 version)	Multi-sectoral	The BCCSAP is designed as a "living document," and provides a framework to guide Bangladesh's response to climate change. As the country implements its adaptation and mitigation programs, it plans to continually modify the document to reflect circumstances. The document summarizes the anticipated effects of climate change within the country and provides details of priority actions required to address both mitigation and adaptation. All climate change actions within Bangladesh are to reinforce and support this broader strategy.

C. Current Adaptation Action

There are a number of significant on-going and planned climate change interventions in Bangladesh that essentially are large-scale, national level programs. Each presently supports or would support many subsidiary projects. Many community level pilot projects (too numerous to be documented separately) are supported through these national programs. These programs are funded by the government and/or bilateral and multilateral development partners, including Australia, Denmark, European Union, Germany, Norway, Sweden, Switzerland and the United States, as well as the Asian Development Bank (ADB), Global Environment Facility (GEF), and World Bank. Ongoing projects are primarily focused on risk reduction, policy formulation and integration, and water, with fewer activities focused on agriculture, forestry, coastal zones, urban areas, and infrastructure. Table 3 lists the major adaptation projects in Bangladesh.

In addition, there are a few small-scale or region-specific projects supported by international NGOs and implemented by local partners. Many of these projects are primarily focused on strengthening the livelihoods of the poor and vulnerable, with elements of disaster risk reduction and adaptation to climate change added in.

It should also be noted that the World Bank, ADB and a number of bilateral donors have large scale infrastructure projects—particularly in the southern and coastal districts of Bangladesh (e.g., on integrated water resources planning and management)—that will help in adapting to increased climatic variability and climate change. However, these projects were conceived solely as infrastructure development or rehabilitation projects and therefore are not included in this review. For example, relevant agencies of the GOB, with oversight from the World Bank, are undertaking the Emergency 2007 Cyclone Recovery and Reconstruction Project. The focus of this US$105-million, five year (2008-2013) project is restoration and recovery from the damage to livelihoods and infrastructure caused by Cyclone Sidr and to build long-term disaster preparedness. It has significant components focused on disaster risk reduction, water supply and sanitation and strengthening of local institutions and livelihoods that will contribute to the improving the adaptive capacity of the target communities.

Table 3: Current Adaptation Projects and Programs active in Bangladesh

Name		Objectives	Funder(s)	Implementing Agency(s)	Type of project	Duration	Priority Sector(s)	Geographic focus (if any)
National Action								
1.	Livelihood Adaptation to Climate Change Project[61]	This project promoted climate change adaptation and risk reduction processes and capacities for sustainable livelihoods and food security in the rural sectors, including crops, livestock, fisheries, forestry and other factors of rural livelihoods in drought prone and coastal regions of Bangladesh.	FAO	Department of Agricultural Extension	Community based adaptation; Assessment	2005 – 2009 (closed)	Agriculture	Coastal and drought prone regions of Bangladesh
2.	Assistance to Local Community on Climate Change Adaptation and Disaster Risk Reduction[62]	The different regions of Bangladesh face different adverse effects of climate change. Drought, flood and river erosion, salinity, cyclone and sea level rise are the major problems that the project will address in three different pilot sites. The project intends to improve the resilience of the livelihoods of local people and their adaptive capacity to cope with climate change.	Danish Government	ActionAid	Community based adaptation	2008 – 2009	Disaster risk management	Bangladesh
3.	Improving Adaptive Capacity to Climate Variability and Change for Sustainable Food and Livelihood Security in Drought Prone and Coastal Regions of Bangladesh[63]	This project aims at assessing current vulnerability, risks and local livelihoods. The institutional and technical capacity building for adaptation and validating suitable location specific adaptation options have been emphasized in this project.	FAO	Bangladesh Water Development Board; Forestry, Livestock and Fisheries Department; etc.	Capacity building; Community based adaptation	2008 – 2009	Agriculture; Disaster risk management	Districts: Chapai Nawabganj, Naogaon, Natore, Khulna, Pirojpur, Bangladesh

[61] Information on this project indicates that it is a subcomponent of the Comprehensive Disaster Management Programme of the Ministry of Food and Disaster Management of Bangladesh. Further information available here: http://www.fao.org/climatechange/laccproject/en/

[62] http://www.ambdhaka.um.dk/NR/rdonlyres/6FD82EAF-05CD-44E7-8E3A-9DCF4A93BEC1/0/ClimateChangeAdaptationandDisasterRiskReductioninBangladesh.pdf

[63] http://www.asiapacificadapt.net/node/216

Name		Objectives	Funder(s)	Implementing Agency(s)	Type of project	Duration	Priority Sector(s)	Geographic focus (if any)
4.	Disaster Risk Reduction Programme in Bangladesh[64]	This project seeks to prevent death and devastation due to natural disasters by helping rural communities in specific regions cope with the adverse effects of cyclones and extreme weather events associated with climate change.	Swiss Government	UNDP, FAO, local partners	Capacity building; Community based adaptation	2008 – 2010	Disaster risk management	Bangladesh
5.	Strengthening Resilience of Water Sector to Climate Change in Khulna[65]	Assess the impacts of climate change and identify adaptation options in the area of Khulna where the impact of climate change is expected to be severe. In particular, the project will develop a list of adaptation options in order to prepare for two planned investment projects – the City Region Development Project and the Khulna Water Supply Project – as well as for other government projects and policy actions.	ADB *Budget:* US$0.7 million		Research; Policy formation and integration	2008 – 2011	Freshwater supply; Urban areas	Khulna, Bangladesh
6.	Integrated Protected Area Co-management[66]	Develop protected area strategy, build technical capacity, increased area under co-management and enhance adaptive capacity to tackle climate change on forests and wetlands.	USAID *Budget:* US$13 million	MEF, Forest Department, Fisheries Department	Policy formation and integration; Capacity building	2008 – 2012	Ecosystem conservation	Bangladesh
7.	Jolobayhoo-O-Jibon Climate Change Program[67]	Climate change adaptation and risk reduction measures to protect and improve the lives and livelihoods of 15 million poor and vulnerable people by 2013.	DFID *Budget:* GBP 75 million[68]	GOB	Capacity building; Field implementation	2008 – 2013	Disaster risk management	Bangladesh
8.	Bangladesh Pilot Framework on Research	Develop a framework for collaboration on research on climate change and the land,	UK Collaborative	International Institute for	Research	2009 – 2010	Agriculture; Freshwater	Bangladesh

[64] SDC, http://www.swiss-cooperation.admin.ch/bangladesh/en/Home/Humanitarian_Aid_and_Disaster_Risk_Reduction_DRR
[65] ADB, http://www.adb.org/climate-change/strengthening-resilience-water-sector.asp
[66] USAID, http://www.usaid.gov/bd/programs/environ_response.html
[67] DFID, http://projects.dfid.gov.uk/project.aspx?Project=114058
[68] Some of funding for this project is also used to support the Climate Change Trust Fund.

Name		Objectives	Funder(s)	Implementing Agency(s)	Type of project	Duration	Priority Sector(s)	Geographic focus (if any)
	Collaboration on Climate Change and the Land, Water and Food Interface[69]	water and food interface in Bangladesh	on Development Sciences *Budget:* GBP 45,000	Environment and Development			supply	
9.	Bangladesh Climate Change Trust Fund	Support implementation of climate change projects in line with BCCSAP 2009.	Multiple donors *Budget:* US$200 million	GOB	Capacity building; Field implementation	2009 – 2011	Government	Bangladesh
10.	Supporting Implementation of BCCSAP[70]	Capacity building of MEF and other ministries involved in implementing climate change adaptation and mitigation projects.	ADB, GOB *Budget:* US$890,000	MEF	Capacity building	2009 – 2011	Government	Bangladesh
11.	Community-based Adaption to Climate Change through Coastal Afforestation in Bangladesh[71]	Enhance resilience of coastal communities and protective ecosystems through coastal afforestation and livelihood diversification. This includes: ensuring buffer zone measures are promoted; livelihoods are diversified; sources of potable water are secured for communities vulnerable to saline intrusion; develop capacities for at the national level to better integrate climate change risk into development planning; etc.	LDCF, UNDP, GOB *Budget:* US$10.89 million	UNDP, MEF, other GOB ministries/ departments	Community based adaptation; Capacity building; Policy formation and integration	2009 – 2013	Coastal zones management; Ecosystem restoration	Coastal zones of Bangladesh
12.	Bilateral US government program in Bangladesh[72]	USAID has launched a new activity to help enhance Bangladesh communities'	USAID	Government of Bangladesh	Community based	Starting in 2010	Coastal zone management;	Bangladesh

[69] UKCDS, http://www.ukcds.org.uk/page-Bangladesh-115.html
[70] ADB, http://pid.adb.org/pid/TaView.htm?projNo=42478&seqNo=02&typeCd=2
[71] UNDP, http://www.undp.org.bd/projects/proj_detail.php?pid=71
[72] USDS, http://www.state.gov/documents/organization/164656.pdf

Name		Objectives	Funder(s)	Implementing Agency(s)	Type of project	Duration	Priority Sector(s)	Geographic focus (if any)
		resilience and capacity to adapt to climate change. The activity will expand efforts to conserve and better manage the Sundarbans, the largest mangrove forest in the world and Bangladesh's first line of defense against sea level rise. These activities will not only mitigate disaster effects, such as climate-related extreme weather events, but will also provide poor communities with income from sustainable forest and fishery resources, helping them cope with disaster-related vulnerabilities in the near term.	*Budget:* initial investment of US$3 million		adaptation; Capacity building		Ecosystem conservation; Disaster risk management	
13.	Bangladesh Integrated Water Resources Assessment[73]	Bangladesh water demand will grow with its expanding population and increasing economic development. Whereas surface water resources are well studied, there are significant knowledge gaps in groundwater resources, the joint use of surface and groundwater, management strategies that enhance the efficiency in the equitable allocation of scarce water resources and improve livelihoods, and the potential impacts of climate change. This project will conduct an integrated water resources / socio-economic study to provide a national overview of the resource, the impacts of development and climate change, and the way the impacts will affect the poor and vulnerable.	AusAID, CSIRO, Research for Development	Bangladesh Water Development Board, Institute of Water Modelling, Bangladesh Institute of Development Studies, Centre for Environmental and Geographic Information Services, CSIRO	Research; Assessment	2010 – 2013	Freshwater supply	Bangladesh
14.	Bangladesh Climate Change	Support implementation of climate change	UK, EU,	GOB with TA	Capacity	Initially for	Government	Bangladesh

[73] Research for Development, http://www.rfdalliance.com.au/site/c_proj_four.php

Name		Objectives	Funder(s)	Implementing Agency(s)	Type of project	Duration	Priority Sector(s)	Geographic focus (if any)
	Resilience Fund (BCCRF)	projects in line with BCCSAP 2009.	Denmark, Sweden *Budget:* US$120 million[74]	from the World Bank	building; Field implementation	2010 – 2014		
15.	Comprehensive Disaster Management Program Phase II[75]	Operationalize the Hyogo Framework for Action by supporting disaster preparedness and adaptive capacities of the vulnerable communities in more than 30 vulnerable districts. The project 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.	UK, EU, SIDA, AusAID, UNDP, GOB *Budget:* US$50 million	UNDP with Ministry of Food and Disaster Management	Community based adaptation; Policy formation and integration	2010 – 2014	Disaster risk management	Bangladesh
Participation in Regional and Global Projects								
16.	Advancing Capacity for Climate Change Adaptation (ACCCA)[76]	The rational for this project is that countries lack scientific knowledge and understanding of climate risks, and that this is an impediment to addressing climate variability. Activities include the following: identify and prioritize climate risks; assess available knowledge about risks and adaptation opportunities; develop, test, and disseminate risk communication materials that are designed to assist adaptation	IDRC, DEFRA, Switzerland, NCAP, European Commission	UNITAR	Assessment; Capacity building; Policy formation and integration	2007 – 2010	Multi-sectoral	*Global:* 17 countries[77] including: Bangladesh, India, Nepal
			In Bangladesh: This program funded a project entitled "Participatory Climate Risk Assessment and Development of Local Adaptation Action Plans in Bangladesh." The purpose of the project was to develop a community-driven adaptation plan of action and					

[74] Rounded off based on initial commitments from the UK, EU, Denmark and Sweden as of November 2010.
[75] CDMP, http://www.cdmp.org.bd/
[76] Further information available here: http://www.acccaproject.org/accca/files/ACCCA_Brochure_19pilotactions.pdf
[77] These countries are: Bangladesh, Burkina Faso, Cameroon, Ethiopia, Ghana, Kenya, India, Malawi, Mali, Mongolia, Nepal, Niger, Nigeria, Philippines, South Africa, Tanzania and Tunisia.

Name		Objectives	Funder(s)	Implementing Agency(s)	Type of project	Duration	Priority Sector(s)	Geographic focus (if any)
		decisions; and identify critical knowledge gaps that impede effective adaptation decisions.	to facilitate the mainstreaming of climate change into sustainable development planning processes.[78]					
17.	Capacity Development for Policy Makers: Addressing climate change in key sectors[79]	The project is a targeted capacity development initiative that supports two goals: 1. To increase national capacity to co-ordinate Ministerial views for more effective participation in the UNFCCC process; and 2. To assess investment and financial flows to address climate change for selected key sectors. As a result of this project, both the technical understanding of key climate change issues and their economic and policy implications within the context of the Convention will be enhanced.	UNDP, UN Foundation, Government of Norway, Government of Finland, and Government of Switzerland *Budget:* US$6,953,413	UNDP	Capacity building; Policy formation and integration	2008 – 2010	Government	*Global:* 19 countries[80] including: Bangladesh and Nepal
			In Bangladesh: Further information required.					
18.	Economics of Adaptation to Climate Change[81]	The two specific objectives of the study were: (1) to develop a global estimate of adaptation costs to inform the international community's efforts to tailor support and provide new and additional resources to help vulnerable developing countries meet adaptation costs; and (2) to support decision makers in developing countries to better evaluate and assess the risks posed by climate change and to better design strategies to adapt to climate change.	Gov'ts of the Netherlands, Switzerland and the United Kingdom	World Bank	Research; Policy formation and integration	2008 – 2010	Multi-sectoral	*Global:* Bangladesh, Bolivia, Ethiopia, Ghana, Mozambique, Samoa and Viet Nam
			In Bangladesh: Results of the country case study in Bangladesh are accessible here: http://climatechange.worldbank.org/content/country-case-studies-economics-adaptation-					

[78] ACCCA, http://www.acccaproject.org/accca/files/ACCCA_Brochure_19pilotactions.pdf
[79] UNDP, http://www.undp.org/climatechange/capacity-development.html
[80] These countries are: Algeria, Bangladesh, Colombia, Costa Rica, Dominican Republic, Ecuador, Gambia, Honduras, Liberia, Namibia, Nepal, Nicaragua, Niger, Paraguay, Peru, Saint Lucia, Togo, Turkmenistan and Uruguay.
[81] World Bank, http://climatechange.worldbank.org/content/economics-adaptation-climate-change-study-homepage

Name		Objectives	Funder(s)	Implementing Agency(s)	Type of project	Duration	Priority Sector(s)	Geographic focus (if any)
			climate-change					
19.	Protection of Sustainable Policy Initiatives in the Management of Natural Resources in the Hindu Kush Himalayas[82]	The program strengthens the role of International Centre for Integrated Mountain Development (ICIMOD) as an organization and service provider in the region, and increases the accountability of the eight member countries. It helps develop and implement regionally agreed concepts and strategies to facilitate adaptation to climate change and sustainable resource management. This is realized by institutional strengthening of ICIMOD in areas such as data collection related to climatic changes and forests. GIZ further promotes the ICIMOD priority program Environmental Change and Ecosystem Services.	BMZ	GIZ, ICIMOD	Capacity building	2008 – 2012	Government	*Asia Region:* Afghanistan, Bangladesh, Bhutan, China, India, Myanmar, Nepal, Pakistan
			In Bangladesh: Further information required.					
20.	Pilot Program for Climate Resilience[83]	PPCR aims to pilot and demonstrate ways in which climate risk and resilience may be integrated into core development planning and implementation in a way that is consistent with poverty reduction and sustainable development goals. In this way, the PPCR provides incentives for scaled-up action and initiates transformational change. The pilot programs and projects implemented under the PPCR are country-led, build on NAPAs and other relevant country studies and strategies.	World Bank's Strategic Climate Fund *Budget:* $971.75 million pledged as of February 2011	World Bank	Policy formation and integration	2008 – present	Multi-sectoral	*Global:* Regional Programs: Caribbean and Pacific Country programs: Bangladesh, Bolivia, Cambodia, Mozambique, Nepal, Niger, Tajikistan,

[82] GIZ, http://www.gtz.de/en/weltweit/asien-pazifik/33473.htm
[83] PPCR, http://www.climatefundsupdate.org/listing/pilot-program-for-climate-resilience

Name		Objectives	Funder(s)	Implementing Agency(s)	Type of project	Duration	Priority Sector(s)	Geographic focus (if any)
								Yemen, Zambia
			In Bangladesh: the PPCR is focused on promoting climate resilience agriculture and good security, coastal embankments improvement and afforestation, coastal climate resilient water supply, and climate change capacity building and knowledge management.[84]					
21.	Integrating Climate Change Mitigation and Adaptation into Development Planning (CCMAP) project[85]	START and its partners are engaging scientists and policy makers in West Africa, East Africa and South Asia in a range of activities that aim at raising awareness and improving access to scientific information, so that decision-makers can better integrate climate change issues in development planning and poverty reduction measures. The activities include national science-policy dialogues, regional knowledge assessments, regional knowledge sharing strategies, and regional trainings. It also includes assessments of climate change risk to agriculture in nine urban and peri-urban areas.	European Commission; UNEP; USAID	START with WMO, IPCC, UNEP, University of Dar es Salaam, University of Ghana, and the Bangladesh Centre for Advanced Studies	Capacity building; Assessment; Policy formation and integration	2009 – 2010	Government; Agriculture; Urban areas; Peri-urban areas	*Global:* Bangladesh, Bhutan, Burundi, Ghana, Nepal, Nigeria, Rwanda, Senegal, Tanzania
			In Bangladesh: Further information required.					
22.	Community-based Adaptation (CBA) Programme[86]	The objective of the program is to enhance the capacity of communities in the pilot countries to adapt to climate change including variability. Planned outcomes are: • Enhanced adaptive capacity allows communities to reduce their vulnerability to adverse impacts of future climate hazards; • National policies and programs include	GEF (Strategic Priority on Adaptation), co-financing *Budget:* US$4.5 million	UNDP	Knowledge communication; Capacity Building; Community-based adaptation	2009 – 2011	Multi-sectoral	*Global:* Bangladesh, Bolivia, Guatemala, Jamaica, Kazakhstan, Morocco, Namibia, Niger,

[84] CIF, http://www.climateinvestmentfunds.org/cif/sites/climateinvestmentfunds.org/files/PPCR%205%20SPCR%20Bangladesh%20nov2010.pdf
[85] START, http://start.org/programs/ccmap
[86] UNDP, http://www.undp-adaptation.org/projects/websites/index.php?option=com_content&task=view&id=203

Name		Objectives	Funder(s)	Implementing Agency(s)	Type of project	Duration	Priority Sector(s)	Geographic focus (if any)
		community-based adaptation priorities to promote replication, up-scaling and integration of best practices derived from community-based adaptation projects; and • Cooperation among member countries promotes global innovation in adaptation to climate change including variability.						Samoa, Viet Nam
			In Bangladesh: The CBA project has partnered with DFID and the Comprehensive Disaster Management Programme and is implementing projects through its local disaster risk reduction fund. Supported initiatives are: • Promoting agro-based diversified activities for improving food and household livelihood security of vulnerable Adibashi Community in hilly areas of Bakshiganj Upzila under Jamalpur District (with Research and Development Organization for the People); • Strengthening Resilience of Climate Change-Affected Communities in South-western Coastal Areas of Bangladesh (with Practical Action); and • Community-Based Wetland Management Project (with Boudhi Investigate and Research Assembly of Men).					
23.	Adaptation Knowledge Platform[87]	The goal of the Adaptation Knowledge Platform is to strengthen adaptive capacity and facilitate climate change adaptation in Asia at local, national and regional levels. Its specific purpose is to establish a regionally and nationally owned mechanism that facilitates the integration of climate change adaptation into national and regional economic and development policies, processes and plans, strengthen linkages between adaptation and the sustainable development agenda in the region and enhance institutional and research capacity, in collaboration with a wide range of national and regional partners.	SIDA	SEI, SENSA, UNEP, AIT and UNEP Regional Resource Centre for Asia and the Pacific	Capacity building; Policy formation and integration	2009 – 2012	Government	*Asia:* Bangladesh, Bhutan, Cambodia, China, Indonesia, Lao PDR, Malaysia, Myanmar, Nepal, the Philippines, Sri Lanka, Thailand, Viet Nam
			In Bangladesh: Further information required.					
24.	South Asia Water Initiative[88]	Working with DFID and the World Bank, the South Asia Water Initiative is building	DFID, Australia,	World Bank (lead); regional	Capacity building;	2009 – 2013	Freshwater supply	*Regional:* Afghanistan,

[87] AKP, http://www.climateadapt.asia/
[88] UN, http://www.un.org/climatechange/projectsearch/proj_details.asp?projID=182&ck=aVmfG453KHSJI81

Name		Objectives	Funder(s)	Implementing Agency(s)	Type of project	Duration	Priority Sector(s)	Geographic focus (if any)
		capacity for water resource management to address serious water availability issues in Himalayan watershed countries of Afghanistan, Bangladesh, Bhutan, India, Nepal and Pakistan.	Norway *Budget:* US$9.6 million	and national bodies	Policy formation and integration			Bangladesh, Bhutan, India, Nepal and Pakistan
			In Bangladesh: Further information required.					
25.	Enhancing Adaptation to Climate Change by Integrating Climate Risk into Long-Term Development Plans and Disaster Management[89]	This project aims to undertake a comparative analysis of the immediate to medium-term post-disaster recovery scenario in the aftermath of extreme weather events of flooding faced by vulnerable cities in three Asian developing countries, namely, Mumbai (India), Bangkok (Thailand) and Dhaka (Bangladesh). It also aims to quantify the developmental impacts of flooding with the objective of integrating climate change risk considerations into long-term investment and development plans.	APN	K J Somaiya Institute of Management Studies & Research Vidyanagar	Research	2010 – 2011	Disaster risk management; Urban areas	*Asia Region:* Bangladesh, India, Thailand
			In Bangladesh: Further information required.					
26.	Climate Risk Management Technical Assistance Support Project: Phase II[90]	Building capacities for climate risk management among national stakeholders.	Sweden and SIDA through UNDP, UNDP core finance	ADPC, International Institute for Sustainable Development	Research; Policy formation and integration	2010 – 2011	Multi-sectoral	*Global:* Bangladesh, Bhutan, Dominican Republic, Honduras, India, Kenya, Maldives, Mongolia, Nepal, Nicaragua, Niger,

[89] APN, http://www.apn-gcr.org/newAPN/activities/ARCP/2010/list2010projects.htm
[90] UNFCCC, http://unfccc.int/files/adaptation/nairobi_workprogramme/partners_and_action_pledges/application/pdf/iisd_furtherinfo_water_190411.pdf

Name		Objectives	Funder(s)	Implementing Agency(s)	Type of project	Duration	Priority Sector(s)	Geographic focus (if any)
								Pakistan, Papua New Guinea, Peru, Timor-Leste and Uganda
			In Bangladesh: Further information required.					
27.	Mainstreaming Gender Aspects in Climate Change Adaptation and Low-Carbon Development[91]	This project contributes to mainstreaming gender into climate change adaptation and low-carbon development measures in climate policy. It produces training material and over the long term will improve the adaptive capacity of local communities in Bangladesh and the Pacific region.	German Federal Ministry for the Environment, Nature Conservation, and Nuclear Safety	GenerCC – Women for Climate Justice, Centre for Global Change, Secretariat of the Pacific Community	Capacity building	2010 – 2013	Gender	*Asia Region:* Bangladesh, Kiribati, Nauru, Marshall Islands
			In Bangladesh: Further information required.					
28.	Global Climate Change Alliance[92]	The Global Climate Change Alliance seeks to deepen the policy dialogue between the European Union and developing countries on climate change; and to increase support to target countries to implement priority adaptation and mitigation measures, and integration climate change into their development strategies. The program's five priority areas for funding are: improving the knowledge base of developing countries to the effects of climate change; promoting disaster risk reduction; mainstreaming	European Commission, Czech Republic, Sweden, 10th European Development Fund *Budget:* € 140 million	National Governments	Policy formation and implementation; Knowledge communication	2008 – ongoing	Disaster risk management; Government	*Global:* 17 countries and the Pacific region,[93] including: Bangladesh, Maldives and Nepal
			In Bangladesh: the Global Climate Change Alliance is supporting all six pillars of the					

[91] ADB, http://www.bmu-klimaschutzinitiative.de/en/projects?p=1&d=673
[92] GCCA, http://www.gcca.eu/pages/1_2-Home.html
[93] These countries are: Bangladesh, Belize, Cambodia, Ethiopia, Guyana, Jamaica, Maldives, Mali, Mozambique, Mauritius, Nepal, the Pacific Region, Rwanda, Senegal, Seychelles, Solomon Islands, Tanzania and Vanuatu.

Name		Objectives	Funder(s)	Implementing Agency(s)	Type of project	Duration	Priority Sector(s)	Geographic focus (if any)
		climate change into poverty reduction development strategies; reducing emissions from deforestation and degradation; and enhancing participation in the Clean Development Mechanism.	BCCSAP, with interventions in the following sectors: "food security; health/social protection; infrastructure; research/knowledge management; mitigation; disaster risk reduction; government capacity building; and low carbon development."[94] *Budget:* Euros 8.5 million *Timeline:* 2011 - 2015					
29.	Vulnerability to Climate Change: Adaptation strategies and layers of resilience[95]	Provide science-based solutions and pro-poor approaches for adaptation of agricultural systems to climate change for the rural poor and most vulnerable farmers in semi-arid regions of Asia, specifically India, Peoples' Republic of China, Sri Lanka, Bangladesh, and Pakistan.	ADB	International Crops Research Institute for the Semi-Arid Tropics	Research; Field implementation	2010 – 2012	Agriculture	*Asia Region:* Bangladesh, China, India, Pakistan, Sri Lanka
			In Bangladesh: Further information required.					
30.	Asia Pacific Climate Change Adaptation Project Preparation Facility (ADAPT)[96]	Increase access to financial resources for climate change adaptation investment projects; strengthen national human and institutional capacity in preparation of financing proposals; and strengthen regional knowledge platform to share information and processes on climate change projects, funds and best practices to promote replication and scaling up.	USAID *Budget:* US$18.0 million	WWF, Conservation International, the Nature Conservancy, ARD Inc., NOAA	Capacity building; Knowledge communication	2011 – 2016	Government	*Asia Region:* Bangladesh Cambodia Federated States of Micronesia, Fiji, Indonesia, Lao PDR, Malaysia, Nepal, Palau, Philippines, Solomon Islands, Sri Lanka, Thailand, Viet Nam

[94] GCCA, http://www.gcca.eu/cgi-bin/datadirs.pl?&lg=2&id_datadir_family=1&extlink=8&sw=detail&id_datadir_sheet=16
[95] ICRISAT, http://ongoing-research.cgiar.org/factsheets/vulnerability-to-climate-change-adaptation-strategies-and-layers-of-resilience/
[96] USDS, http://www.state.gov/documents/organization/151686.pdf

Name		Objectives	Funder(s)	Implementing Agency(s)	Type of project	Duration	Priority Sector(s)	Geographic focus (if any)
			In Bangladesh: Further information required.					

D. Proposed Adaptation Action

Two main policy documents summarize proposed adaptation actions in Bangladesh—the NAPA and the BCCSAP. The most recent of these, the BCCSAP, lists proposed adaptation actions by the following categories: food security, social protection and health; comprehensive disaster management; infrastructure; research and knowledge management; and capacity building and institutional strengthening. Bangladesh's NAPA lists a number of priority adaptation activities, many of which are being addressed through ongoing adaptation projects. As well, it is engaged in the development of some regional projects that have not yet received funding. These initiatives are described in Table 4.

Table 4: Proposed Adaptation Projects and Programs in Bangladesh identified in (a) its NAPA and (b) other sources

Name		Objectives	Type of project	Priority Sector(s)	Geographic focus (if any)
A) Projects proposed in Bangladesh's NAPA					
1.	Reduction of climate change hazards through coastal afforestation with community participation	The objectives of this project are to strengthen the adaptive capability of Bangladesh, create a shelterbelt along the coastal zone, generate employment opportunities, and enhance the carbon sink in the context of global climate change.	Community based adaptation; Field implementation	Coastal zone management; Forestry	Coastal zones
			Notes: The LDCF-funded project "Community based adaptation to climate change through coastal afforestation in Bangladesh" is addressing the objectives of this priority adaptation action.		
2.	Providing drinking water to coastal communities to combat enhanced salinity due to sea level rise	The objective of this project is to develop a comprehensive strategy for safe drinking water supply in coastal areas.	Policy formation and integration	Coastal zone management; Freshwater supply	Coastal zones
			Notes:		
3.	Capacity building for integrating climate change into planning, designing of infrastructure, conflict management and land-water zoning for water management institutions	The objectives of this project, among others, are to incorporate climate change issues and concerns into water sector policies and plans, develop capabilities and networks of water resource sector planners, and develop mechanisms and analytical tools.	Capacity building; Policy formation and integration	Freshwater supply	
			Notes:		

Name		Objectives	Type of project	Priority Sector(s)	Geographic focus (if any)
4.	Climate change and adaptation information dissemination to vulnerable communities for emergency preparedness measures and awareness raising on enhanced climatic disasters	The objectives of this project are to protect people from climate related health problems through awareness raising programs, and to develop guidelines for awareness and behavioral change programs.	Capacity building; Knowledge communication	Human health	
			Notes: A number of ongoing projects appear to be contributing to these objectives, including the multi-donor "Comprehensive Disaster Management Program" and the Swiss government funded "Disaster Risk Reduction in Bangladesh."		
5.	Construction of cyclone food shelters and information and assistance center to cope with enhanced recurrent floods in major floodplains	This project would involve the construction of multipurpose cyclone food shelters in highly vulnerable areas of the country. The objective is to increase the height and strengthening proposed shelters from climate change induced hazards.	Field implementation	Disaster risk management	
			Notes:		
6.	Mainstreaming adaptation to climate change into policies and programs in different sectors (focusing on disaster management, water, agriculture, health and industry)	This project would mainstream climate change impact assessments and adaptation into sectoral planning and policy in the disaster management, water, agriculture, health and industry sectors.	Policy formation and integration	Disaster risk management; Freshwater supply; Agriculture; Human health; Private sector	
			Notes: These objectives are being addressed through a number of ongoing projects, including the GEF-funded global project "Capacity Building for Policymakers."		
7.	Inclusion of climate change issues in curriculum at secondary and tertiary education institutions	Climate change impacts and adaptation would be integrated into school curriculum at the secondary and primary levels.	Capacity building; Knowledge communication	Education	
			Notes:		
8.	Enhancing resilience of urban infrastructure and industries to impacts of climate change including floods and cyclones	This project would aim to enhance resilience to climate change in urban and industrial sectors in major cities. This would include developing better building codes for buildings, developing better waste management, etc.	Capacity building; Knowledge communication	Urban areas	
			Notes: The Asian Development Bank is currently funding two projects addressing urban infrastructure.		
9.	Development of eco-specific adaptive knowledge (including	The objective of this project is to develop actions in each of the main ecological	Community based adaptation; Capacity	Ecosystem conservation	

Name		Objectives	Type of project	Priority Sector(s)	Geographic focus (if any)
	indigenous knowledge) on adaptation to climate variability to enhance adaptive capacity for future climate change	regions of the country to adapt to the eco-specific impacts of climate change, and to disseminate knowledge on eco-specific adaptation to the most vulnerable communities in each eco-region.	building; Knowledge communication		
			Notes:		
10.	Promotion of research on drought, flood saline and tolerant varieties of crops to facilitate adaptation in the future	The objective of this project is to develop new varieties of crops such as rice, wheat, etc. to tolerate saline, flood and drought conditions.	Research	Agriculture	
			Notes:		
11.	Promoting adaptation to coastal crop agriculture to combat salinization	The objective of this project is to promote alternate agricultural practices that are adapted to future climate conditions.	Community based adaptation; Research	Agriculture	Coastal zones
			Notes:		
12.	Adaptation to agriculture systems in areas prone to enhanced flash flooding – North East and Central Region	The objective of this project is to promote alternate agricultural practices that are adapted to future climate conditions.	Community based adaptation; Research	Agriculture	North East and Central Bangladesh
			Notes:		
13.	Adaptation to fisheries in areas prone to enhanced flooding in North East and Central region through adaptive and diversified fish practices	The overall objective of the activity is to reduce the fish crop loss from increased flooding and promote adaptive viable options for fish culture suitable for the flood prone areas of Bangladesh.	Community based adaptation; Research	Freshwater fisheries	North East and Central Bangladesh
			Notes:		
14.	Promoting adaptation to coastal fisheries through culture of salt tolerant fish special in coastal areas of Bangladesh	The overall objective of the project is to utilize the saline waters of the coastal areas to boost up fish production.	Research	Marine fisheries; Coastal zone management	Coastal zones
			Notes:		
15.	Exploring options for insurance to cope with enhanced climatic disasters	The objective of this project is to explore the possibility of an insurance market for climate vulnerability in different vulnerable sectors of the country.	Research	Agriculture; Insurance	
			Notes:		
B) Other Emerging Projects					
16.	Climate Change, Environment and Migration in Bangladesh and				Bangladesh and Western India

Name	Objectives	Type of project	Priority Sector(s)	Geographic focus (if any)
Western India		**Notes:** Project is not yet financed by the SCCF, but is being considered by the board *Proposed Budget:* Proposed to SCCF = $1,072,500; proposed co-financing = $1,850,000		

E. Assessment

As evidenced in Table 2, Bangladesh is at an advanced stage in comparison to other LDCs in terms planning and implementing climate change adaption projects. By and large, projects underway in the country are in line with the priorities identified in its BCCSAP and NAPA. In fact, two of the programs, the Climate Change Trust Fund (CCTF) and the Bangladesh Climate Change Resilience Fund (BCCRF), are trust funds in support of the BCCSAP. Projects supported through these facilities must conform to the national needs and priorities identified in the BCCSAP. Given that these funds are a first of their kind, the government and development partners are on a learning curve with respect to fine tuning their operational modalities.

While the multi-donor BCCRF is yet to come into operation, the GOB-CCTF started to review and approve projects in 2009. A quick review of the 34 projects approved by the BCCTF indicates that the distribution of the approved projects across the six pillars of the BCCSAP is fairly balanced with infrastructure claiming a few more projects that other sub-sectors.[97] Out of these 34 projects: five address food security, social protection and health; three focus on comprehensive disaster management; 10 on infrastructure; six on research and knowledge development; seven on mitigation and low carbon development; and three on capacity building and institutional strengthening. Public sector agencies from 10 ministries received funding for these 34 projects and no award was received by NGOs or civil society organizations as of October 2010 (although a large number of proposals were received from them). Delay in processing applications from NGOs was due to the lack of sufficient capacity within the Ministry of Environment and Forests that coordinated the project screening process for the GOB Trust Fund.

It may be noted that there are only three projects addressing comprehensive disaster management (pillar two of the BCCSAP). This small number of projects is unsurprising given that the multi-year Comprehensive Disaster Management Program is already being directly funded by GOB and development partners. The same is true for efforts to address the sixth pillar of the BCCSAP—-Capacity Building and Institutional Strengthening—for which three projects have been approved. Again, a number of capacity building projects

[97] This bias may be expected as most large-scale adaptation efforts could involve significant investment in infrastructure.

are already underway Bangladesh. On the other hand, there are quite a few projects on mitigation, even though Bangladesh is not obligated to undertake greenhouse gas reduction projects.

One limitation of the BCCTF funded projects to date is the establishment of a funding cap of US$3.5 million per government-implemented projects and US$0.7 million per project proposed by NGOs to accommodate the size of available resources within the Fund. This funding cap has caused fragmentation in project design as no substantial sector projects can be implemented under these caps. GOB's justification for this decision is that these approved projects will help build capacity and generate the knowledge needed to undertake bigger projects that can be funded through the BCCRF or other global funds.

The Pilot Program for Climate Resilience (PPCR), which is a significant global program, has selected Bangladesh as a pilot country. Initial missions have identified a number of coastal "hot spots" (five to seven) as target areas for this project. It will primarily focus on disaster risk reduction through structural and non-structural means and building community resilience. PPCR may offer an opportunity to co-finance the second phase in which an adaptation project will be implemented.

In terms of scaling up, consideration could be given to supporting an integrated coastal zone management program in Bangladesh that addresses both vulnerability and development issues.[98] This zone is highly vulnerable to multiple impacts of climate change and the affected populations are poorer in comparison to people in other regions. Moreover, successful adaptation in the coastal zone will help check potential out-migration from the most affected districts and address underlying security concerns. In addition, although Bangladesh is participating in a multi-country project focused on mainstreaming gender considerations into climate change policy, it would appear that there is room to more significantly address the gender-based implications of future climatic changes.

Other options include: supporting comprehensive livelihoods programs in non-coastal vulnerable regions; long-term investment in research and development to pilot and scale up innovations in agriculture, water management and water supply; and investing in planned urban growth centers.

[98] Bangladesh has excellent policies and strategies for Integrated Coastal Zone Development and donors are supporting a number of (unconnected) projects in coastal different districts. Recent PPCR missions have identified the institutional and financial challenges associated with integrated projects. But precisely because of these challenges the coastal zone may provide the best opportunity to try out innovative approached and aim for a transformative change.

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3.0 Bhutan

ADB	Asian Development Bank
BMZ	German Federal Ministry for Economic Cooperation and Development
DFID	Department for International Development (United Kingdom)
GEF	Global Environment Fund
GLOF	Glacial lake outburst flood
LDCF	Least Developed Country Fund
NAPA	National Adaptation Programme of Action
NCAP	Netherlands Climate Assistance Program
RGB	Royal Government of Bhutan
SCCF	Special Climate Change Fund
UNFCCC	United Nations Framework Convention on Climate Change
WHO	World Health Organization

Bhutan is a small, land locked country located in the fragile eastern Himalayan ecosystem for which climate change is not just an environmental problem but a serious challenge to sustainable development and the livelihoods of its people. Around 70 per cent of the country is forested (much of it primary forests), and approximately 80 per cent of the country's population depends on subsistence farming for their livelihoods (RGB, 2006). Bhutan's hydropower production—much of which it exports to India—is described as the backbone of the country's economy, and there are early concerns that this resource may be adversely impacted by climate change (RGB, 2008).

A. Adaptation Needs and Priorities

Bhutan's climate varies considerably from one area to another due to dramatic changes in topography. The country has three climatic zones: (a) the southern plains, which are subtropical and characterized by high humidity and heavy rainfall; (b) the central belt of flat valleys characterized by cool winters and hot summers, with moderate rainfall; and (c) high valleys with cold winters and cool summers (RGB, 2006). This complex climate is due mainly to the country's situation at the periphery of the tropical circulation in the north and on the periphery of the Asian monsoon circulation in the south. Summer monsoons typically last from late June through to late September, at times causing flash floods and landslides; monsoons generate approximately 70 per cent of the annual rainfall in Bhutan.

Modeling of the projected impacts of climate change has not yet been undertaken for Bhutan due to a paucity of data and a lack of capacity (RGB, 2009). The meteorological network in the country is limited, with stations limited to inner and southern Bhutan; these stations require manual recording. Climate modeling in Bhutan also faces the additional challenge of handling its complex mountain topography and the implications this geography has on local climatic conditions (RGB, 2009). However, the country's National Adaptation Programme of Action (NAPA) anticipates that an increasing trend of precipitation will occur (RGB, 2006). This conclusion is consistent with climate modeling for South Asia as a whole, which project that the region will experience: a median increase in temperature of 2.3°C by 2100; that the greatest amount of warming will take place at higher altitudes; precipitation during the dry season will decline by 5 per cent by 2100, but during the remainder of the year will increase by a median of 11 per cent (RGB, 2009).[99]

Bhutan's National Environment Strategy, "The Middle Path," highlights hydropower development, industrial growth and intensification of agriculture as the three major avenues for sustainable development in Bhutan (RGB, 1998). Tourism is also an important economic sector. All of these sectors are highly climate sensitive and vulnerable to the adverse effects of climate change. Hydropower critically depends on predictable and stable patterns of precipitation which will be perturbed due to climate change. Subsistence farmers will be directly affected by temperature changes and monsoon patterns that are less predictable as a result of climate change. Bhutan's roads and other important infrastructure will suffer more damage from landslides and flashfloods. The rapid melting of glaciers, besides affecting the base flow of Bhutan's rivers, will dramatically increase the risk of GLOFs. Bhutan's extensive forest cover, rich biodiversity and clean water resources will also be affected by climate change, which will then negatively impact the tourism and service sectors.

As a part of the NAPA process, the country has identified key climate change vulnerabilities by sector as presented in Table 1.

Table 1: Vulnerabilities by sector as identified in Bhutan's NAPA

Key sector	Vulnerabilities
Forestry and biodiversity	• Drought combined with more frequent lightning may cause greater risk of forest fires; • Possible loss of endemic plant and animal species; • Change in migratory pattern of transboundary wildlife, which may result in loss/degradation of forest ecosystems and reduction of alpine range lands; and • Possible increase in vector-borne disease in wildlife due to warming.
Agriculture	• Possible crop yield instability, loss of production and quality (due to variable rainfall, temperature, etc.), decreased water availability for crop production, and increased risk of extinction of already threatened crop species (traditional crop varieties);

[99] Projections in based upon 21 models using the A1B scenarios (a scenario that assumes a balanced use of energy sources)

	• Loss of soil fertility due to erosion of top soil and runoff; loss of fields due to flash floods; and loss of soil and nutrients; • Crop yield loss (flowers & fruit drop) to hailstorms; deteriorated produce quality (fruit & vegetables) due to unanticipated heavy rains and hailstorms; • Delayed sowing (late rainfall), as well as damage to paddy and potato crops due to sudden early and late spring frost respectively; and • Outbreak of pests and diseases in fields and during storage where they were previously unknown.
Natural disaster and infrastructure	• Debris-covered glaciers forming huge moraine dam lakes that ultimately lead to GLOFs (i.e. flash floods and landslides, heavy siltation of the rivers, and other geotechnical hazards); • GLOF will affect "essential" infrastructure, namely: o Hydropower systems (generation plants, transmission and distribution infrastructure), Bhutan's main export product; o Industrial estates/infrastructure; o Human settlements: urban, suburban and rural settlements; o Historical and cultural monuments: *dzongs*, monasteries, *chortens,* etc.; and o Public utilities: roads, bridges and communication systems
Water (and energy)	• Temporal & spatial variation in flow, notably affecting electricity production/exports due to disruption of average flows for optimum hydropower generation; • Increased sedimentation of rivers, water reservoirs and distribution network, affecting notably irrigation schemes' productivity/ agricultural crop yields; • Reduced ability of catchment areas to retain water/increased runoffs with enhanced soil erosion (deterioration of environment); and • Deterioration of (drinking) water quality.
Human health	• Loss of life from frequent flash floods, GLOF and landslides; • Spread of vector-borne tropical disease (malaria, dengue) into more areas (higher elevations) with warming climate; and • Loss of safe (drinking) water resources increasing water borne diseases.

Source: RGB, 2006

B. National Level Policies and Strategic Documents

Bhutan completed its Initial National Communication to the United Nations Framework Convention on Climate Change (UNFCCC) in 2000. It identifies the key climate change concerns for the country and highlighted the fact that Bhutan is one of few countries that has the potential to increase carbon sequestration. These issues were further clarified in the Bhutan's 2006 NAPA. This document was prepared under the direction of Bhutan's National Environment Commission and supported by Task Force and Working Groups from five key areas: agriculture and livestock; forestry and biodiversity; health; water resources and energy; and natural disasters and infrastructure. The NAPA process was transparent and included regional and grassroots level consultations. Although the vulnerability analysis could not have adequate scientific grounding (primarily due to lack of country-specific hydro-meteorological data), this weakness was largely compensated by the robust process that was followed to identify national priorities and actions. The concerned sectors and the Department of Aid and Debt Management will be the main custodians of Bhutan's NAPA and will foresee its implementation with input from stakeholders in the government and local communities. The Bhutan NAPA is conceived as a living document, which may be from time to time be updated once the prioritized projects are implemented.

Table 2: Key Government Policies and Reports reflecting Adaptation Needs, Priorities and Planned Actions

Name of Policy Action		Government Division Responsible	Status	Sector(s) of Focus	Summary description
1.	The Middle Path	Royal Government of Bhutan (division unspecified)	1998	Energy, agriculture, private sector	This document describes the nature of Bhutan's environment and describes the government's efforts to ensure that future development in Bhutan is sustainable and preserves these natural assets.
2.	First National Communication to the UNFCCC	National Environment Commission	2000	Forestry, energy, private sector, freshwater supply, agriculture, human health	This document provides a review of Bhutan's national circumstances, analyzes the possible future impacts of climate change on the country, and discusses how Bhutan may meet global environmental objectives.
3.	National Adaptation Programme of Action	National Environment Commission	2006	Forestry, biodiversity, agriculture, disaster risk management, freshwater supply, energy, human health	This document provides an overview of Bhutan's national circumstances, discusses the country's key vulnerabilities to climate change, and reviews a number of adaptation actions which are narrowed down to nine priority activities.

C. Current Adaptation Action

There appear to be a limited number of adaptation projects ongoing within Bhutan. These projects are focused on the areas of risk reduction, water, policy formulation and health, and correspond with the priority adaptation actions identified in Bhutan's NAPA. Funders of these projects include the Netherlands, Germany, Japan, Switzerland and the UK.

Table 3: Current adaptation projects and programs active in Bhutan

Name		Objectives	Funder(s)	Implementing Agency(s)	Type of project	Duration	Priority Sector(s)	Geographic focus (if any)
National Action								
1.	Reduce Climate Change-induced Risks and Vulnerabilities from Glacial Lake Outbursts in Pukakha-	This project addresses urgent priorities identified through Bhutan's NAPA. The project will integrate climate risk projections into existing disaster risk management	LDCF, GOB, other donors *Budget:*	UNDP	Capacity building; Policy formation and	2008-2013	Disaster risk management	Pukakha-Wangdi and Chamkhar Valleys, Bhutan

Name		Objectives	Funder(s)	Implementing Agency(s)	Type of project	Duration	Priority Sector(s)	Geographic focus (if any)
	Wangdi and Chamkhar Valleys[100]	practices and implement capacity development at the national, district, and community levels. Outputs include: improved national, regional, and local capacities to prevent climate related disasters; and reduced human and material losses.	US$7.7 million		integration			
2.	Capacity building of Bhutan's National Environment Commission[101]	Capacity building of NEC for managing climate change mitigation and adaptation in energy and water resources management.	ADB, Bhutan *Budget:* US$0.75 million	NEC Secretariat	Capacity building	2010 – 2011	Government; Energy; Freshwater supply	Bhutan
Participation in Regional and Global Actions								
3.	Floods from the Roof of the World: Protection thanks to applied research[102]	The project seeks to protect people and infrastructure from the hazards of GLOFs. Based on previous fundamental research, the countries of Nepal, Bhutan, India, Pakistan and China/Tibet now have an inventory of glaciers and glacier lakes as well as a GLOF monitoring system. The data gathered is used as the basis for early-warning systems. This enables priorities to be set and corresponding action to be taken. The database is also used to determine the amount of total available water resources the region will have in the future.	Swiss Development Corporation	ICIMOD	Community based adaptation; Research	Phase One: 1999 – 2007 Phase Two: 2008 – 2012	Disaster risk management	*Regional:* China/Tibet, Bhutan, India, Nepal, Pakistan
			In Bhutan: Further information required.					
4.	Protection of Sustainable Policy Initiatives in the Management of Natural	The program strengthens the role of International Centre for Integrated Mountain Development (ICIMOD) as an organization	BMZ	GIZ, ICIMOD	Capacity building	2008 – 2012	Government	*Asia Region:* Afghanistan, Bangladesh,

[100] ALM, http://www.adaptationlearning.net/bhutan-reducing-climate-change-induced-risks-and-vulnerabilities-glacial-lake-outburst-floods-punakh
[101] ADB, http://pid.adb.org/pid/TaView.htm?projNo=43021&seqNo=01&typeCd=2
[102] SDC, http://www.sdc.admin.ch/en/Home/Projects/Floods_from_the_Roof_of_the_World

Name		Objectives	Funder(s)	Implementing Agency(s)	Type of project	Duration	Priority Sector(s)	Geographic focus (if any)
	Resources in the Hindu Kush Himalayas[103]	and service provider in the region, and increases the accountability of the eight member countries. It helps develop and implement regionally agreed concepts and strategies to facilitate adaptation to climate change and sustainable resource management. This is realized by institutional strengthening of ICIMOD in areas such as data collection related to climatic changes and forests. GIZ further promotes the ICIMOD priority program Environmental Change and Ecosystem Services.						Bhutan, China, India, Myanmar, Nepal, Pakistan
			In Bhutan: Further information required.					
5.	Integrating Climate Change Mitigation and Adaptation into Development Planning (CCMAP) project[104]	START and its partners are engaging scientists and policy makers in West Africa, East Africa and South Asia in a range of activities that aim at raising awareness and improving access to scientific information, so that decision-makers can better integrate climate change issues in development planning and poverty reduction measures. The activities include national science-policy dialogues, regional knowledge assessments, regional knowledge sharing strategies, and regional trainings. It also includes assessments of climate change risk to agriculture in nine urban and peri-urban areas.	European Commission; UNEP; USAID	START with WMO, IPCC, UNEP, University of Dar es Salaam, University of Ghana, and the Bangladesh Centre for Advanced Studies	Capacity building; Assessment; Policy formation and integration	2009 – 2010	Government; Agriculture; Urban areas; Peri-urban areas	*Global:* Bangladesh, Bhutan, Burundi, Ghana, Nepal, Nigeria, Rwanda, Senegal, Tanzania
			In Bhutan: Further information required.					
6.	Adaptation Knowledge Platform[105]	The goal of the Adaptation Knowledge Platform is to strengthen adaptive capacity and facilitate climate change adaptation in	SIDA	SEI, SENSA, UNEP, AIT and UNEP Regional	Capacity building; Policy	2009 – 2012	Government	*Asia:* Bangladesh, Bhutan,

[103] GIZ, http://www.gtz.de/en/weltweit/asien-pazifik/33473.htm
[104] START, http://start.org/programs/ccmap
[105] AKP, http://www.climateadapt.asia/

Name		Objectives	Funder(s)	Implementing Agency(s)	Type of project	Duration	Priority Sector(s)	Geographic focus (if any)
		Asia at local, national and regional levels. Its specific purpose is to establish a regionally and nationally owned mechanism that facilitates the integration of climate change adaptation into national and regional economic and development policies, processes and plans, strengthen linkages between adaptation and the sustainable development agenda in the region and enhance institutional and research capacity, in collaboration with a wide range of national and regional partners.		Resource Centre for Asia and the Pacific	formation and integration			Cambodia, China, Indonesia, Lao PDR, Malaysia, Myanmar, Nepal, the Philippines, Sri Lanka, Thailand, Viet Nam
			In Bhutan: Further information required.					
7.	South Asia Water Initiative[106]	Working with DFID and the World Bank, the South Asia Water Initiative is building capacity for water resource management to address serious water availability issues in Himalayan watershed countries of Afghanistan, Bangladesh, Bhutan, India, Nepal and Pakistan.	DFID, Australia, Norway *Budget:* US$9.6 million	World Bank (lead); regional and national bodies	Capacity building; Policy formation and integration	2009 – 2013	Freshwater supply	*Regional:* Afghanistan, Bangladesh, Bhutan, India, Nepal and Pakistan
			In Bhutan: Further information required.					
8.	Piloting Climate Change Adaptation to Protect Human Health[107]	The objective of the project is "to increase the adaptive capacity of national health system institutions, including field practitioners, to respond to and manage long-term climate change-sensitive health risks." The project focuses on: (1) enhancing early-warning systems; (2) improving capacity of health sector institutions; (3) piloting prevention measures; and (4)	SCCF, WHO, UNDP, National governments *Budget:* US$22 million	UNDP, WHO, Ministries of Health in the pilot countries	Capacity building; Field implementation	2009 – 2014	Human health; Disaster risk management	*Global:* Barbados, Bhutan, China, Fiji, Jordan, Kenya, Uzbekistan

[106] UN, http://www.un.org/climatechange/projectsearch/proj_details.asp?projID=182&ck=aVmfG453KHSJI81
[107] ALM, http://www.adaptationlearning.net/project/piloting-climate-change-adaptation-protect-human-health

Name		Objectives	Funder(s)	Implementing Agency(s)	Type of project	Duration	Priority Sector(s)	Geographic focus (if any)
		promoting innovation through cooperation among participating countries.	*In Bhutan*: Further information required.					
9.	Climate Risk Management Technical Assistance Support Project: Phase II[108]	Building capacities for climate risk management among national stakeholders.	Sweden and SIDA through UNDP, UNDP core finance	ADPC, International Institute for Sustainable Development	Research; Policy formation and integration	2010 – 2011	Multi-sectoral	*Global:* Bangladesh, Bhutan, Dominican Republic, Honduras, India, Kenya, Maldives, Mongolia, Nepal, Nicaragua, Niger, Pakistan, Papua New Guinea, Peru, Timor-Leste and Uganda
			In Bhutan: Further information required.					

D. Proposed Adaptation Action

The NAPA process in Bhutan considered some 55 project ideas, which were narrowed down to 22 and eventually to nine top-priority adaptation projects, as summarized in Table 4. They primarily focus on disaster risk management, freshwater supply, climate information services, as well as agriculture, human health and forestry.

Table 4: Proposed Adaptation Projects and Programs in Bhutan's NAPA

Name		Objectives	Type of project	Priority Sector(s)	Geographic focus (if any)
1.	Disaster Management Strategy (Pilot Implementation of Food Security and Emergency Medicine)	The objective of this project is to plan and implement components of the national disaster management strategy relating to food security,	Community based adaptation	Disaster risk management; Human health; Agriculture	Eastern Bhutan

[108] UNFCCC, http://unfccc.int/files/adaptation/nairobi_workprogramme/partners_and_action_pledges/application/pdf/iisd_furtherinfo_water_190411.pdf

Name		Objectives	Type of project	Priority Sector(s)	Geographic focus (if any)
		health, and first aid in eastern Bhutan.	**Notes:** The GEF-funded global project 'Piloting climate change adaptation to protect human health' is contributing to the objectives of this activity.		
2.	Artificial Lowering of Thorthomi Glacier Lake	The objective of this project is to lower the water level of the Thorthormi Lake be excavating an artificial channel-widening of the existing outlet channel. The purpose of these activities is to reduce the future GLOF threat.	Field implementation	Disaster risk management	Thorthormi Lake, Bhutan
			Notes:		
3.	Weather Forecasting System to Serve Farmers and Agriculture	The objective of this project is to establish a weather forecasting office and provide agrometeorological early-warning system against inclement weather conditions.	Research	Climate information services	Bhutan
			Notes:		
4.	Landslide Management & Flood Prevention (Pilot Schemes in Critical Areas)	The objectives of this project are to predict and effectively intervene in major landslide affected areas of Bhutan. Key areas include Chaskar, Ramjar, and critical road links. Activities will include mapping vulnerable areas, assessing the spatial distribution of landslides, developing a meteorological data center, and establishing early-warning measures.	Assessment; Field implementation	Disaster risk management	Chaskar and Ramjar, Bhutan
			Notes: The LDCF funded project is contributing to the objectives of this activity.		
5.	Flood Protection of Downstream Industrial and Agricultural Area	The objectives of this project are to intervene in landslide and flood affected areas of the country, and will include the following activities: mapping of vulnerable areas, implement landslide prevention activities such as cross drainage, etc.	Assessment; Field implementation	Disaster risk management	Bhutan
			Notes:		
6.	Rainwater Harvesting	The objective of this project is to safeguard farmers from water shortages during dry periods and irregularities in the monsoonal rainfall, thereby enhancing household food security and the income of farmers in vulnerable areas.	Capacity building; Community based adaptation	Freshwater supply	Bhutan
			Notes:		

Name		Objectives	Type of project	Priority Sector(s)	Geographic focus (if any)
7.	GLOF Hazard Zoning (Pilot Scheme – Chamkar Chu Basin)	The main objective of this project is to prepare a hazard zonation map for GLOFs. Outputs would include training of staff to handle equipment, creating awareness of people settled along the river, create a high-quality zonation map delineating areas with high risk, medium risk, and low risk, etc.	Assessment; Knowledge communication	Disaster risk management	Chamkar Chu Basin, Bhutan
			Notes: The NCAP project is contributing to the objectives of this activity, as well as the project funded by the LDCF.		
8.	Installation of Early-warning System on Pho Chu Basin	The main objective of this project is to install a flood warning station on the Pho-Chu River basin in order to establish an early-warning system for floods and GLOFs.	Field implementation	Disaster risk management	Pho-Chu river basin, Bhutan
			Notes:		
9.	Promote Community-based Forest Fire Management and Prevention	The main objective of this project is to enhance the capacity of the Department of Forests and rural people in the management of forest fires.	Capacity building	Fire management	Bhutan
			Notes:		

E. Assessment

Bhutan's effort to build national capacity and climate proof its development efforts appears to be underway, although it is in its early stages. Although the number of current projects is limited, the actions they are supporting address issues of importance to the country. Bhutan is particularly concerned about GLOFs because, in addition to causing unexpected floods and damages, they can threaten the existence of Bhutan's economically important hydropower infrastructure. Due to climate change and GLOFs, undertaking new hydro projects has become risker and more expensive. In this regard, the LDCF funded project on reducing GLOFs related risks is a high-priority action for Bhutan.

It is widely recognized that strengthening the capacity of a central coordinating body, the NEC in this case, can significantly improve the quality of delivery on the ground. The project "Capacity Building of Bhutan's National Environment Commission" is therefore likely to have long-term benefits, particularly for a county like Bhutan where development investments are almost exclusively undertaken and implemented by the government.

Overall, current adaptation activities in Bhutan are consistent with the priorities identified through the country's NAPA, National Communication and environment strategy, and although current projects are clustered within the areas of risk reduction and water, these are areas identified as key threats for the country. Gaps in current adaptation programming appear to exist within the agriculture

sector as well as on projects that focus on the impacts of climate change on hydropower. These two areas are critical to the country's economic development and are anticipated to be affected by future climate changes. In addition, there is room for investments in other priority areas identified by Bhutan, such as early-warning systems, disaster management, water conservation and forest fire management and prevention. Furthermore, none of the current projects specifically focus on gender considerations of climate change. Bhutan may also learn from its neighbors about community based adaptation to climate change and invest in building the adaptive capacity of its people scattered in numerous small and remote communities.

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4.0 India

ACCCA	Advancing Capacity for Climate Change Adaptation
ADB	Asian Development Bank
APN	Asia-Pacific Network for Global Change Research
BMZ	German Federal Ministry for Economic Cooperation and Development
DFID	Department for International Development (United Kingdom)
GEF	Global Environment Fund
GDP	Gross Domestic Product
GOI	Government of India
FAO	Food and Agriculture Organization
ICRISAT	International Crop Research Institute for the Semi-Arid Tropics
KFW	KfW Entwicklungsbank
MEF	Ministry of Forests
MFF	Mangroves for the Future
NABARD	National Bank for Agricultural and Rural Development
NAPCC	National Action Plan on Climate Change
SCCF	Special Climate Change Fund
UNDP	United Nations Development Program
UNITAR	United Nations Institute for Training and Research
USDS	United States Department of State
WHO	World Health Organization
WWF	World Wildlife Fund

India is a very large country, covering 3.28 million square kilometers, or 2.4 per cent of the world's land surface area (MEF, 2004). It has the second largest population in the world, being home to approximately 1.17 billion people in 2010, or 15 per cent of the world's population. About 29 per cent of this population lives in urban areas (USDS, 2010). Although India's economy has diversified substantially over the past several decades, approximately 64 per cent of the country's population remains dependent upon agriculture

for their livelihoods (MEF, 2004). Agriculture generated 18 per cent of the country's Gross Domestic Product (GDP) in 2008, superseded by its services (54 per cent of GDP) and industrial (29 percent) sectors (USDS, 2010).

A. Adaptation Needs and Priorities

India's geography is highly diverse, comprising the Himalayan mountain range, coastal plains, and the Great Peninsular Plateau. This diverse topography produces a spectrum of climates over the subcontinent. The northern part of the country experiences a continental climate with extreme summer heat and very cool winters; in contrast, the coastal areas of the country experience year-round warm temperatures and frequent precipitation (MEF, 2004). Rainfall across the country is highly variable, and the country experiences four distinct seasons, described in relation to the monsoon: (a) winter: December to February; (b) pre-monsoon or summer: March to May; (c) southwest monsoon: June to September; and (d) post-monsoon or northeast monsoon: October and November (MEF, 2004).

The anticipated future impacts of climate change, identified by the Government of India (GOI) in its Initial National Communication to the United Nations Framework Convention on Climate Change (UNFCCC) include (GOI, 2004):

- Decreased snow cover, affecting snow-fed and glacial systems such as the Ganges and Brahmaputra; 70 per cent of the summer flow of the Ganges comes from snowmelt;
- Erratic monsoons with serious effects on rain-fed agriculture, peninsular rivers, water and power supply;
- Decline in wheat production by 4-5 million tonnes with as little as a 1ºC rise in temperature;
- Rising sea levels causing displacement along one of the most densely populated coastlines in the world and threatening freshwater sources and mangrove ecosystems;
- Increased frequency and intensity of floods; increased vulnerability of people in coastal, arid and semi-arid zones of the country; and
- Over 50 per cent of India's forests are likely to experience a shift in forest types, adversely impacting associated biodiversity and regional climate dynamics, as well as livelihoods based on forest products.

For the more than 800 million Indians who live in rural areas and depend on climate-sensitive sectors for their livelihoods—agriculture, forests and fisheries—the future looks alarming with the prospect of declining crop yields, degraded lands, water shortages and ill health. According to a 2008 report commissioned by the European Parliament, "[t]he majority of the vulnerable population of India is poorly equipped to cope effectively with the adversities of climate change due to low capabilities, weak institutional mechanisms and lack of access to adequate resources" (Kumar, 2008).

B. National Level Policies and Strategic Documents

India has been an active and influential global player in the climate change arena from the beginning of the debate. However, domestically, India only started to commission concrete actions on climate change very recently. It completed its Initial National Communication in 2004 and is presently working on its Second National Communication. It formed the high-level Prime Minister's Council on Climate Change in June 2007, which was immediately directed to: (a) prepare a coordinated response to issues relating to climate change (mitigation and adaptation) at the national level; (b) provide oversight for formulation of action plans in the area of assessment, adaptation and mitigation of climate change; and (c) periodically monitor key policy decisions. An Expert Committee on the Impact of Climate Change has also been set up. It will assess climate change impacts and provide advice on the research activities needed to strengthen efforts to address climate change.

On June 30, 2008, India launched its National Action Plan on Climate Change (NAPCC), which outlines existing and future policies and programs addressing climate mitigation and adaptation. Emphasizing the overriding priority of maintaining high economic growth rates to raise living standards, the plan "identifies measures that promote our development objectives while also yielding co-benefits for addressing climate change effectively." The Action Plan identifies eight core "national missions" running through to 2017: Solar Energy; Enhanced Energy Efficiency; Sustainable Habitat; Water; Sustaining the Himalayan Eco-system; Green India; Sustainable Agriculture; and Strategic Knowledge for Climate Change. Most of these missions have strong adaptation imperatives.

Ministries with lead responsibility for each of the missions have been directed to develop objectives, implementation strategies, timelines, and monitoring and evaluation criteria that will be submitted to the Prime Minister's Council on Climate Change. The Council will also be responsible for periodically reviewing and reporting on each mission's progress. To be able to quantify progress, appropriate indicators and methodologies will be developed to assess both avoided emissions and adaptation benefits. In addition, the Central Government has recently requested the State Governments to prepare State level Adaptation Action Plans on Climate Change consistent with the objectives of NAPCC.

Based on India's National Communication, NAPCC and available literature, India's most vulnerable sectors to the effects of climate change are water, agriculture, forests, natural ecosystems, coastal zones, health, and energy and infrastructure.

Table 1: Key Government Policies and Reports reflecting Adaptation Needs, Priorities and Planned Actions

Name of Policy Action		Government Division Responsible	Status	Sector(s) of Focus	Summary description
1.	Initial National Communication to the UNFCCC	Ministry of Environment and Forests	2004	Agriculture, forestry, biodiversity coastal zone management, human health, energy	This document provides a review of India's national circumstances, its current climate, mitigation profile, and vulnerabilities to climate change by key area of concern. The document then analyzes ways that India may address climate change going forward.
2.	National Action Plan on Climate Change	Prime Minister's Council on Climate Change	2008	Energy, freshwater supply, biodiversity, agriculture	This document sets out an action plan for India on climate change, dealing with both mitigation and adaptation. The document sets out eight separate missions: national solar mission, mission for enhanced energy efficiency, mission on sustainable habitat, water mission, mission for sustaining the Himalayan Ecosystem, mission for a Green India, mission for sustainable agriculture, and a mission on strategic knowledge for climate change.

C. Current Adaptation Action

India's new generation of climate change adaptation projects as per the NAPCC directives and missions are mostly in development at the moment. However, a number of adaptation focused projects have been launched recently with donor-support or concessional loans. Table 2 provides a list of such projects. Donors of these projects include the Asian Development Bank, Global Environment Facility (GEF), Rockefeller Foundation, Swiss Development Corporation (SDC), Special Climate Change Fund (SCCF), World Bank, World Wildlife Fund, United States Agency for International Development (USAID), and Australia's Centre for International Agricultural Research. The majority of these projects are focused on policy formulation and integration, water, and agriculture, with a smaller number focused on coastal zones, forestry, land and nature. The areas of meteorology, gender, infrastructure, health, and energy only have one ongoing adaptation action.

Additional adaptation projects may be financed through the Climate and Development Fund, which was established by the United Kingdom to provide a flexible source of funding (US$0.66 million) to support shared priorities of the United Kingdom and India between 2008 and 2013. While new plans and programs for adaptation are being developed, many completed or on-going programs (especially water, coastal, agriculture, forests and disaster management sector programs) have strong adaptation components. In 2007, for instance, there were 22 programs in crop management, 19 in drought proofing, 19 in health, six in risk finance, six in disease control,

12 in forestry and 30-odd in poverty alleviation in India—all supported by the central and/or state governments. The Government therefore has claimed that India is already spending over two per cent of its GDP on various programs that also support adaptation.

Table 2: Current Adaptation Projects and Programs active in India

Name		Objectives	Funder(s)	Implementing Agency(s)	Type of project	Duration	Priority Sector(s)	Geographic focus (if any)
National Action								
1.	Sustainable Land and Ecosystems Management Partnership Program[109]	The Partnership's global environment objective is to restore and maintain globally significant ecosystem functions and services through enhanced local capacity, restoration of degraded areas, and dissemination, replication and scaling-up of successful sustainable land and ecosystem management best practices within and across individual Indian states. Its overall development objective is to contribute to poverty alleviation in India by promoting enhanced efficiency of natural resource use, improved land and ecosystem productivity, and reduced vulnerability to extreme weather events (droughts, floods).	GEF Trust Fund *Budget:* US$50 million	World Bank, Ministry of Environment and Forest, Ministry of Rural Development, Ministry of Agriculture	Capacity building	2007 - ?	Ecosystem restoration	India
2.	Gender-sensitive Strategies for Adaptation to Climate Change: Drawing on Indian farmers' experiences[110]	This project captured how men and women farmers in drought-prone districts perceived and responded to seasonal climate variability and long-term changes to the climate.	Sweden	FAO	Research	2008 – 2010 (closed)	Agriculture; Gender	Andhra Pradesh of India
3.	Environmentally Sustainable Water Resources Management in the Upper	The study is pioneering and unique in several aspects. First, a detailed environmental flow analysis has been carried out for a large river		International Water Management	Research; Assessment; Capacity	2008 – 2011	Freshwater supply	Upper Ganga Basin, India

[109] ALM, http://www.adaptationlearning.net/project/sustainable-land-and-ecosystem-management-slem-partnership-program and GEF, http://gefonline.org/projectDetailsSQL.cfm?projID=3268

[110] FAO, http://www.fao.org/climatechange/54818/en/

Name		Objectives	Funder(s)	Implementing Agency(s)	Type of project	Duration	Priority Sector(s)	Geographic focus (if any)
	Ganga Basin, under Climate Change[111]	basin i.e. the Upper Ganga Basin for the first time in India. Second, the environmental flow analysis links with hydrological regimes anticipated under future climate change. Also, the study is conducted in the conditions of severe lack of observed flow data in the basin and by the lack of national expertise in environmental flow assessment.		Institute, WWF India	building			
4.	Umbrella Program on Natural Resource Management, Climate Change and Biodiversity	Upscale existing approaches (watershed and *adivasi* development), explore other sub-sectors like forestry, farming systems management, agro-processing, and climate change adaptation.	German Federal Ministry for Economic Cooperation and Development (BMZ)	National Bank for Agricultural and Rural Development	Community based adaptation	2008 – 2013	Biodiversity; Watershed management	India
5.	Increasing Resilience to Climate Impacts of Vulnerable Communities and Critical Ecosystems in the Eastern Himalayas of India[112]	This project will develop and apply methodologies that can help to gain an understanding of human and ecosystem vulnerability to climate impacts. In addition, climate adaptation strategies for poor, resource-dependent and vulnerable communities will be put in place and work with the state governments towards integration of climate proofing of development strategies will be expanded. The project will be coordinated with the German-Indian Climate Adaptation Programme focusing on the North East Indian Union States.	International Climate Initiative of the German Government *Budget:* Euros 200,000	KfW Development Bank, WWF Germany, WWF India	Capacity building; Assessment; Policy formation and integration	2009 – 2010	Ecosystem conservation; Rural areas	Eastern Himalayas, India

[111] CGIAR, http://ongoing-research.cgiar.org/factsheets/environmental-sustainable-water-resources-management-in-the-upper-ganga-basin-under-changing-climate-conditions/

[112] BMU, http://www.bmu-klimaschutzinitiative.de/en/projects?p=13&d=554

Name		Objectives	Funder(s)	Implementing Agency(s)	Type of project	Duration	Priority Sector(s)	Geographic focus (if any)
6.	Indian-German Climate Change Adaptation Programme[113]	India's north-east, with its higher altitudes and, in some areas, high mountains, faces major problems on a similar scale. The Federal Government has therefore started to support a further adaptation program, comprising financial and technical cooperation, in north-east India.	German Federal Ministry for Economic Cooperation and Development (BMZ)	GIZ and KfW	Capacity building		Rural Areas	North-east India
7.	Integrated Land and Ecosystem Management to Combat Land Degradation and Deforestation in Madhya Pradesh[114]	To promote community-driven sustainable land and ecosystem management at the landscape level through integration of watershed management, joint forest management, and sustainable livelihoods.	GEF plus co-finance *Budget:* US$101.6 million	UNDP, Ministry of Environment and Forests, State Government of Madhya Pradesh	Community based adaptation; Policy formation and integration	2009 – 2012	Forestry; Watershed management	Madhya Pradesh, India
8.	Sustainable Rural Livelihood Security through innovations in Land and Ecosystem Management[115]	The purpose of the project is to strengthen institutional and community capacity for sustainable land and ecosystem management through restoring and sustaining the natural resource base, while taking account of climate variability and change. The GEF support is incremental to the original project and will finance activities that address specifically land degradation, biodiversity and adaptation to climate change. The GEF support will also pilot local operationalization of adaptation strategies to climate change.	GEF plus co-finance *Budget:* US$95.37 million	World Bank, Indian Council Of Agricultural Research; Ministry of Agriculture	Capacity building; Field implementation	2009 – 2013	Biodiversity; Ecosystem conservation	India

[113] GIZ, http://www.gtz.de/de/dokumente/gtz-2009-en-climate-newsletter-adapt-09-04.pdf
[114] ALM, http://www.adaptationlearning.net/project/integrated-land-and-ecosystem-management-combat-land-degradation-and-deforestation-madhya-pr
[115] World Bank, http://web.worldbank.org/external/projects/main?pagePK=64283627&piPK=73230&theSitePK=40941&menuPK=228424&Projectid=P112060

Name		Objectives	Funder(s)	Implementing Agency(s)	Type of project	Duration	Priority Sector(s)	Geographic focus (if any)
9.	Climate Change Adaptation in Rural Areas of India[116]	In four states (Madhya Pradesh, Rajasthan, Tamil Nadu and West Bengal), the project supports adaptation in rural areas targeting vulnerable population groups. Measures include risk assessment at the state level, pilot schemes in the agriculture and forestry sectors and in coastal protection and climate proofing government programs. In addition, Germany is assisting states in producing State Action Plans on Climate Change.	German Federal Ministry for Economic Cooperation and Development (BMZ)	GIZ	Assessment; Capacity development; Policy formation and integration; Field implementation	2009 – 2014	Agriculture; Forestry; Coastal zone management; Government	Madhya Pradesh, Rajasthan, Tamil Nadu and West Bengal
10.	Agriculture and Food Security Program (USAID)[117]	"To advance research and technologies on climate-resilient crops and adapt local farming systems to climate change."	USAID *Budget:* US$3 million		Research; Community based adaptation	2010 – ?	Agriculture	
11.	Sustainable Coastal Protection and Management Project[118]	Investment project for the states of Karnataka, Maharashtra, and Goa to increase climate resilience of coastal territories through implementation of protection works that are economically viable, environmentally sound and socially acceptable. The main focus is on developing a workable integrated approach to meet the needs of communities and other stakeholders.	ADB, GOI, private sector *Budget:* US$775 million	State Executing Agencies of Maharashtra, Goa and Karnataka	Field implementation	2010 – 2018	Coastal zone management	Karnataka, Maharashtra, and Goa: India
12.	SDC Partnership with Watershed Trust on Climate Change Adaptation[119]	In collaboration with the authorities of Ahmed Nagar District of Maharashtra and the non-governmental organization Watershed Organization Trust, the SDC has developed an innovative climate change adaptation program. The project is being	SDC, National Bank for Agriculture and Rural Developmen	Watershed Organization Trust	Community based adaptation; Field implementation; Capacity	2011 – ?	Disaster risk management; Climate information services	Maharashtra, India

[116] GIZ, http://www.gtz.de/en/weltweit/asien-pazifik/indien/33409.htm
[117] USDS, http://www.state.gov/documents/organization/164650.pdf
[118] ADB, http://www.adb.org/climate-change/sustainable-coastal-protection-management.asp
[119] SDC, http://www.eda.admin.ch/eda/en/home/reps/asia/vind/embnd/ccd/gpcc/ccacrd.html.html

Name		Objectives	Funder(s)	Implementing Agency(s)	Type of project	Duration	Priority Sector(s)	Geographic focus (if any)
		implemented in 25 villages, and its overall objective is "to have capacitated and empowered rural communities to effectively adapt to climate change impact and integrate disaster risk reduction strategies into development programmes." The creation of small weather stations, just one of many measures, will enable locally trained specialists to anticipate the risk of floods and reduce the vulnerability of local populations to climate change. It is part of SDC's Global Climate Change Program launched in 2011.	t		building			
13.	Sustainable Civil Society Initiatives to address Global Environmental Challenges[120]	"The aim of the project is to develop viable economic models for community groups vulnerable to climate change impact on sustainable community carbon clusters that promote adaptation and mitigation strategies for vulnerability reduction and promoting low carbon growth. The project area is Bundelkhand, covering selected districts in Uttar Pradesh and Madhya Pradesh." It is part of SDC's Global Climate Change Program launched in 2011.	SDC	Development Alternatives	Field implementation	2011 – ?	Rural areas	Districts in Uttar Pradesh and Madhya Pradesh
Participation in Regional and Global Projects								
14.	Floods from the Roof of the World: Protection thanks to applied research[121]	The project seeks to protect people and infrastructure from the hazards of GLOFs. Based on previous fundamental research, the countries of Nepal, Bhutan, India, Pakistan and China/Tibet now have an inventory of glaciers and glacier lakes as well as a GLOF	Swiss Development Corporation	ICIMOD	Community based adaptation; Research	Phase One: 1999 – 2007 Phase Two: 2008 – 2012	Disaster risk management	*Regional:* China/Tibet, Bhutan, India, Nepal, Pakistan

[120] SDC, http://www.eda.admin.ch/eda/en/home/reps/asia/vind/embnd/ccd/gpcc/ccacrd.html.html
[121] SDC, http://www.sdc.admin.ch/en/Home/Projects/Floods_from_the_Roof_of_the_World

Name		Objectives	Funder(s)	Implementing Agency(s)	Type of project	Duration	Priority Sector(s)	Geographic focus (if any)
		monitoring system. The data gathered is used as the basis for early-warning systems. This enables priorities to be set and corresponding action to be taken. The database is also used to determine the amount of total available water resources the region will have in the future.	*In India*: Further information required.					
15.	Monitoring the Glaciers of the Himalayas[122]	Glacier retreat has been a major indicator of climate change impacts in the Himalayas. This project aims to support biodiversity conservation and livelihoods of people affected by glacier retreat. The main objectives of the project are documentation of threats posed due to glacier retreat as well as development of community driven programs for improving their resilience.	WWF		Research; Community based adaptation	2005 – 2009	Biodiversity; Ecosystem conservation	*Regional:* Eastern Himalayas, Nepal and India
			In India: Further information required.					
16.	Mangroves for the Future (MFF)[123]	The project has two main objectives: to strengthen the environmental sustainability of coastal development; and to promote the investment of funds and efforts in coastal ecosystem management. MFF re-orients the current focus of coastal investment by moving from a reactive response to disasters, to progressive activities that address long-term sustainable management needs. These include building awareness and capacity for improved food and livelihood security, disaster preparedness, and climate change adaptation. Initially focused on countries that were highly affected by the 2004 tsunami—India, Indonesia, Maldives,	2007 – 2009: Australia, Germany, Norway, Sweden, UNDP, UNEP 2010 to now: Norway and Sweden	National governments with CARE International, FAO, IUCN, UNDP, UNEP and Wetlands International with NGOs and CBOs	Research; Knowledge communication; Policy formation and implementation	2006 – present	Coastal zone management	*Asia Region:* India, Indonesia Maldives, Pakistan, Seychelles, Sri Lanka, Thailand, and Viet Nam
			In India: In India, MFF is requiring that the projects it funds effectively integrate climate change adaptation considerations. Current project work includes encouraging sustainable coastal livelihoods, mangrove conservation and regeneration, coastal ecotourism, and sustainable freshwater aquaculture.					

[122] WWF, http://www.wwfnepal.org/our_solutions/projects/index.cfm?uProjectID=NP0898
[123] MFF, http://www.mangrovesforthefuture.org/ and http://www.mangrovesforthefuture.org/Assets/documents/IUCN-MFF-Brochure-Web.pdf

Name		Objectives	Funder(s)	Implementing Agency(s)	Type of project	Duration	Priority Sector(s)	Geographic focus (if any)
		Seychelles, Sri Lanka and Thailand—the project has expanded to include Pakistan and Viet Nam.						
17.	Glacial Melt and Downstream Impacts on Indus-dependent Water Resources and Energy[124]	Glacier-fed river basins are a major source of irrigation and hydropower in Himalayan countries, with the Indus river basin of major importance for the economy of several countries in South Asia. This project will develop climate adaptive measures to reduce some of the adverse climate impacts on environmental degradation, building a level of climate resilience at the target watersheds. The project will support the mainstreaming of climate adaptation activities into ADBs projects and programs in the water and hydro-energy sector in these countries.	ADB Small Grant for Adaptation Project *Budget:* US$200,000	ICIMOD, UNEP-GA, CICERO	Community based adaptation; Policy formation and integration	2007 – 2009	Freshwater supply; Energy	Regional: Pakistan, Central and East Afghanistan, North India
			In India: Further information required.					
18.	Advancing Capacity for Climate Change Adaptation (ACCCA)[125]	The rational for this project is that countries lack scientific knowledge and understanding of climate risks, and that this is an impediment to addressing climate variability. Activities include the following: identify and prioritize climate risks; assess available knowledge about risks and adaptation opportunities; develop, test, and disseminate risk communication materials that are designed to assist adaptation decisions; and identify critical knowledge gaps that impede effective adaptation decisions.	IDRC, DEFRA, Switzerland, NCAP, European Commission	UNITAR	Assessment; Capacity building; Policy formation and integration	2007 – 2010	Multi-sectoral	*Global:* 17 countries[126] including: Bangladesh, India, Nepal
			In India: The ACCCA program funded a project in India entitled "Promoting Integration of Adaptation Strategies into Developmental Policies by Effectively Communicating Climate Risks and Adaptation measures," focusing on the region of Bundelkhand. The goal of the project was to address the challenges of climate change on water and agriculture, and assessed the vulnerability of these sectors to potential climate change. The project then validated communication approaches to conveying this information, and pilot adaptation					

[124] ADB, http://www.adb.org/climate-change/afg-ind-downstream.asp

[125] Further information available here: http://www.acccaproject.org/accca/files/ACCCA_Brochure_19pilotactions.pdf

[126] These countries are: Bangladesh, Burkina Faso, Cameroon, Ethiopia, Ghana, Kenya, India, Malawi, Mali, Mongolia, Nepal, Niger, Nigeria, Philippines, South Africa, Tanzania and Tunisia.

Name		Objectives	Funder(s)	Implementing Agency(s)	Type of project	Duration	Priority Sector(s)	Geographic focus (if any)
			strategies were developed.					
19.	Adaptation to Climate Change in the Hindu Kush Himalayas and Central Asia[127]	This project is addressing how to adapt to too much and too little water in the Hindu Kush Himalayas and Central Asia, covering the following activities: • Improved scenarios for climate change variation and impacts; • Scenarios for water demand and availability; • Improved knowledge on climate change effects on biodiversity and ecosystem services; • Improved understanding of impacts on agro-ecology and food production systems and food security; • Critical factors for achieving sustainable adaptation.	Norway (through UNEP) *Budget:* US$62 million	Center for International Climate and Environmental Research, UNEP, International Centre for Integrated Mountain Development, national governments	Research; Policy formation and integration	2007 – 2011	Climate information services; Biodiversity; Agriculture	*Asia Region*: China, India, Nepal, Pakistan
			In India: Further information required.					
20.	Health Vulnerability and Climate Change Adaptation Assessments[128]	To provide national level evidence of the linkages between climate and health; improve understanding of local and specific health risks and vulnerabilities; provide the opportunity for capacity building; and serve as a baseline analysis to monitor how health risks may be influenced by a changing climate over time.	WHO	National Ministries	Assessment	2008 – 2010 (Closed)	Human health	*Global:* Bolivia, Brazil, Cambodia, Costa Rica, Ghana, India, Kyrgyz Republic, Macedonia, Mongolia, Russia, Tunisia

[127] ALM, http://www.adaptationlearning.net/reasearch/too-much-too-little-water-adaptation-climate-change-hindu-kush-himalayas-and-central-asia
[128] WHO, http://www.who.int/globalchange/mediacentre/events/2010/costa_rica_consultation_200710/en/index.html

Name		Objectives	Funder(s)	Implementing Agency(s)	Type of project	Duration	Priority Sector(s)	Geographic focus (if any)
			In India: Research undertaken in District Mewat, Haryana, and looked at climate-sensitive diseases, disaster preparedness, water resources, agriculture, livelihoods and land-use. Methods used in the assessment include: Current Burden of Disease, Climate Vulnerability Index, GIS mapping and climate proofing of interventions.[129]					
21.	Asian Cities Climate Change Resilience Network[130]	The project seeks to establish a network of cities in Asia will have developed robust plans to prepare for, withstand and recover from the predicted impacts of climate change by 2012. The network will catalyze attention, funding and action on building climate change resilience for poor and vulnerable people by creating robust models and methodologies for assessing and addressing risk through active engagement and analysis of various cities.	Rockefeller Foundation, USAID *Budget:* US$40 million	ISET, Arup International Development, ProVention, ICLEI, APCO Worldwide	Capacity building; Knowledge communication; Policy formation and integration	2008 – 2012	Urban areas	*Asia Region:* India, Indonesia, Thailand, Viet Nam
			In India: Key activities in India have involved assessing the vulnerability to climate change in the cities of Surta (Gujarat), Indore (Madhya Pradesh), and Gorakphur (Uttar Pradesh), as well as investigating the readiness of those cities to engage with the project on resilience.					
22.	Protection of Sustainable Policy Initiatives in the Management of Natural Resources in the Hindu Kush Himalayas[131]	The program strengthens the role of International Centre for Integrated Mountain Development (ICIMOD) as an organization and service provider in the region, and increases the accountability of the eight member countries. It helps develop and implement regionally agreed concepts and strategies to facilitate adaptation to climate change and sustainable resource management. This is realized by institutional strengthening of ICIMOD in areas such as data collection related to climatic changes and forests. GIZ further promotes the ICIMOD priority program Environmental	BMZ	GIZ, ICIMOD	Capacity building	2008 – 2012	Government	*Asia Region:* Afghanistan, Bangladesh, Bhutan, China, India, Myanmar, Nepal, Pakistan
			In India: Further information required.					

[129] WHO, http://www.who.int/globalchange/mediacentre/events/2010/costa_rica_consultation_200710/india_va_Presentation.pdf
[130] ACCCRN, http://www.rockefellerfoundation.org/what-we-do/current-work/developing-climate-change-resilience/asian-cities-climate-change-resilience/
[131] GIZ, http://www.gtz.de/en/weltweit/asien-pazifik/33473.htm

Name		Objectives	Funder(s)	Implementing Agency(s)	Type of project	Duration	Priority Sector(s)	Geographic focus (if any)
		Change and Ecosystem Services.						
23.	Strengthening Adaptive Capacities to the Impacts of Climate Change in Small-scale Aquaculture[132]	The project (also known as "Aqua Climate") aims to strengthen the adaptive capacities of rural farming communities to the impacts of climate change. It is strengthening adaptive capacities to the impacts of climate change in resource-poor small-scale aquaculture and aquatic resources-dependent sectors in the south and south east Asian region. The project will: (1) map farmers' perceptions and attitudes towards prospective climate change impacts and their adaptive capacities to address these impacts; (2) develop future scenarios based on the current trends; (3) assess the potential adaptive measures for different aquatic farming systems and prioritise better management practices; and (4) suggest Codes of Practices and improved methodologies for such systems.	NORAD	NACA	Capacity building; Assessment	2009 – 2011	Freshwater fisheries	*Asia Region:* India, Philippines, Sri Lanka, Viet Nam
			In India: Further information required.					
24.	Strengthening Capacity for Policy Research on Mainstreaming Adaptation to Climate Change in Agriculture and Water Sectors[133]	Project aims to strengthen research capacity on mainstreaming climate change adaptation concerns into agricultural and water policies and create a network for adaptation policy research in Asia (ARPNAP: Adaptation Research Policy Network for Asia and the Pacific). The project enhances capacity to bridge gaps in adaptation research, policy and implementation through networking and communication among researchers and policy makers focusing on adaptation.	APN	IGES, IMHEM, Universiti Kebangsaan Malaysia, M.S. Swaminathan Research Foundation	Capacity building; Research; Policy formation and integration	2009 – 2012	Agriculture; Freshwater supply	*Asia Region:* India, Malaysia, Viet Nam
			In India: Further information required.					

[132] NACA, http://www.enaca.org/modules/inlandprojects/index.php?content_id=10

[133] APN, http://www.ukm.my/apn/ and http://www.earthsystemgovernance.org/affiliated-projects/strengthening-capacity-policy-research-mainstreaming-adaptation-climate-change-a

Name		Objectives	Funder(s)	Implementing Agency(s)	Type of project	Duration	Priority Sector(s)	Geographic focus (if any)
25.	South Asia Water Initiative[134]	Working with DFID and the World Bank, the South Asia Water Initiative is building capacity for water resource management to address serious water availability issues in Himalayan watershed countries of Afghanistan, Bangladesh, Bhutan, India, Nepal and Pakistan.	DFID, Australia, Norway *Budget:* US$9.6 million	World Bank (lead); regional and national bodies	Capacity building; Policy formation and integration	2009 – 2013	Freshwater supply	*Regional:* Afghanistan, Bangladesh, Bhutan, India, Nepal and Pakistan
			In India: Further information required.					
26.	Scientific Capacity Development of Trainers and Policy-Makers for Climate Change Adaptation Planning in Asia and the Pacific[135]	Building capacity of trainers and policy-makers in the Asia-Pacific in order to mainstream climate change adaptation principles and practices in some member countries of UNEP's Global Climate Change Adaptation Network.	APN *Budget:* US$30,000	IGES, Asia Institute of Technology (AIT) and the AIT/UNEP Regional Resource Center in Asia and the Pacific	Capacity building; Policy formation and integration	2010 – 2011	Government	*Asia Region:* Australia, China, India, Japan, Kazakhstan, Republic of Korea, Philippines, Thailand
			In India: Further information required.					
27.	Enhancing Adaptation to Climate Change by Integrating Climate Risk into Long-Term Development Plans and Disaster Management[136]	This project aims to undertake a comparative analysis of the immediate to medium-term post-disaster recovery scenario in the aftermath of extreme weather events of flooding faced by vulnerable cities in three Asian developing countries, namely, Mumbai (India), Bangkok (Thailand) and Dhaka (Bangladesh). It also aims to quantify the developmental impacts of flooding with	APN	K J Somaiya Institute of Management Studies & Research Vidyanagar	Research	2010 – 2011	Disaster risk management; Urban areas	*Asia Region:* Bangladesh, India, Thailand
			In India: Further information required.					

[134] UN, http://www.un.org/climatechange/projectsearch/proj_details.asp?projID=182&ck=aVmfG453KHSJI81
[135] APN, http://www.apn-gcr.org/newAPN/resources/proceedingsAndMeetingReports/proceedings/igm-spg15.pdf
[136] APN, http://www.apn-gcr.org/newAPN/activities/ARCP/2010/list2010projects.htm

Name		Objectives	Funder(s)	Implementing Agency(s)	Type of project	Duration	Priority Sector(s)	Geographic focus (if any)
		the objective of integrating climate change risk considerations into long-term investment and development plans.						
28.	Climate Risk Management Technical Assistance Support Project: Phase II[137]	Building capacities for climate risk management among national stakeholders.	Sweden and SIDA through UNDP, UNDP core finance	ADPC, International Institute for Sustainable Development	Research; Policy formation and integration	2010 – 2011	Multi-sectoral	*Global:* Bangladesh, Bhutan, Dominican Republic, Honduras, India, Kenya, Maldives, Mongolia, Nepal, Nicaragua, Niger, Pakistan, Papua New Guinea, Peru, Timor-Leste and Uganda
			In India: Further information required.					
29.	Food Security and Climate Change in the Asia-Pacific Region: Evaluating mismatch between crop development and water availability[138]	The project will focus on crops of local importance including rice, wheat, maize, sorghum, chickpea and cotton in key sites in India, China and Australia. Four questions will be addressed: a) What are the expected temporal shifts in crop phenology under future climates? b) What are the likely shifts in the pattern of rain	APN *Budget:* US$119, 700	University of Western Sydney	Research; Capacity building	2010 – 2011	Agriculture; Freshwater supply	*Asia region:* India China Australia
			In India: Further information required.					

[137] UNFCCC, http://unfccc.int/files/adaptation/nairobi_workprogramme/partners_and_action_pledges/application/pdf/iisd_furtherinfo_water_190411.pdf
[138] APN, http://www.apn-gcr.org/newAPN/activities/ARCP/2010/list2010projects.htm and University of Western Sydney, http://www.uws.edu.au/health_science/chs/news/news_archive/food_security_and_climate_change_in_the_asia-pacific_region

Name		Objectives	Funder(s)	Implementing Agency(s)	Type of project	Duration	Priority Sector(s)	Geographic focus (if any)
		and water availability? c) To what extent climate change will contribute to any mismatch between crop phenology and water availability? And d) What are the expected consequences of this mismatch for food security?						
30.	Vulnerability to Climate Change: Adaptation strategies and layers of resilience[139]	Provide science-based solutions and pro-poor approaches for adaptation of agricultural systems to climate change for the rural poor and most vulnerable farmers in semi-arid regions of Asia, specifically India, Peoples' Republic of China, Sri Lanka, Bangladesh, and Pakistan.	ADB	International Crops Research Institute for the Semi-Arid Tropics	Research; Field implementation	2010 – 2012	Agriculture	*Asia Region:* Bangladesh, China, India, Pakistan, Sri Lanka
			In India: Further information required.					
31.	Impacts of Climate Change and Watershed Development on whole-of-basin Agricultural Water Security in the Krishna and Murray-Darling Basins[140]	This project seeks to gauge impacts and offer strategies to addressing climate change and watershed development impacts in the Krishna and the Murrumbidgee basins. Relevant objectives include: assess the combined impact of watershed interventions and climate change projections on surface and groundwater hydrology at different spatial scales; develop a framework for identification of stakeholder defined adaptation scenarios in the context of relevant policies; integrate the hydrological outputs from the first two objectives and create a coupled hydro-economic methodology to assess response strategies to the combined impacts of climate change and watershed	Australian Centre for International Agricultural Research	International Water Management Institute	Assessment; Research	2010 – 2013	Agriculture; Watershed management	*Asia Region:* India, Australia
			In India: Further information required.					

[139] ICRISAT, http://ongoing-research.cgiar.org/factsheets/vulnerability-to-climate-change-adaptation-strategies-and-layers-of-resilience/
[140] Australian Centre for International Agricultural Research, http://aciar.gov.au/project/LWR/2007/113

Name		Objectives	Funder(s)	Implementing Agency(s)	Type of project	Duration	Priority Sector(s)	Geographic focus (if any)
		development at basin and sub-basin level; facilitate cross-learning of methodologies and adaptation strategies to climate change between India and Australia.						
32.	Cities in Asia Develop Climate Change Adaptation Plans[141]	The project aims to raise awareness, enhance knowledge levels and boost the capacity to act among municipalities in India and the Philippines. To that end, researchers, an international network of municipalities and four cities in each of the two countries are working together to ascertain the local impacts of climate change and draw up future scenarios and decision-making aids.	German Federal Ministry for Environment, Nature Conservancy and Nuclear Safety	ICLEI	Knowledge communication; Capacity building	2010 – 2013	Urban areas	*Asia Region:* India, Philippines
			In India: Further information required.					
33.	Partners for Resilience[142]	To increase the resilience of citizens against natural disasters, climate change and the deterioration of ecosystems, through various intervention strategies: stimulating sustainable economic developments; strengthening the capacity of local organizations and local authorities, among other things by making a risk assessment, natural disaster risk management plans and warning systems; advocacy and stimulation of knowledge sharing between governments, civil society, knowledge institutes and the private sector in the field of natural disaster reduction and climate adaptation.	Netherlands *Budget:* EUR 40m total	Dutch Red Cross, Red Cross Climate Centre, CARE, Cordaid, Wetlands International	Capacity building; Knowledge communication	2011 – 2015	Disaster risk management	*Global:* Ethiopia, Guatemala, India, Indonesia, Kenya, Mali, Nicaragua, the Philippines, Uganda
			In India: Further information required.					

[141] BMU, http://www.bmu-klimaschutzinitiative.de/en/projects?p=1&d=552
[142] Red Cross Climate Centre, http://www.climatecentre.org/site/partners-for-resilience

D. Proposed Adaptation Action

Of the various adaptation initiatives that are being developed in India, two have been presented to the SCCF for funding as presented in Table 3. It also notes programs being developed by SDC.

Table 3: Proposed Adaptation Projects and Programs in India

Name		Objectives	Type of project	Priority Sector(s)	Geographic focus (if any)
1.	Climate Change, Environment and Migration in Bangladesh and Western India[143]			Migration	Bangladesh and Western India
			Notes: This project is being submitted to the SCCF. *Budget:* Proposed SCCF = $1,072,500; Proposed co-financing = $1,850,000		
2.	Information Sharing System to Enhance Coping Capacities of Farming Communities in Dealing Effectively with Climate Variability and Climate Change[144]				India and Pakistan
			Notes: This project is being submitted to the SCCF. *Budget:* Proposed SCCF = $550,000; Proposed co-financing = $500,000		
3.	Climate-Resilience Development and Adaptation[145]	Develop a framework for implementing adaptation measures that will increase the resilience of key development sectors – water, agriculture, coastal areas.	Policy formation and integration	Freshwater supply; Agriculture; Coastal zone management	India
			Notes: This project is being submitted to the SCCF. *Budget:* Proposed SCCF = $5.5 million; Proposed co-financing = $16 million *Implementing agency*: UNDP		
4.	Climate Resilience through Risk Transfer[146]	The overall goal of the project is to "enhance climate resilience and promote adaptive capacities of the vulnerable through innovative risk transfer options and solutions, which are complimentary and supplementary to existing risk reduction measures. The project aims at designing a long term implementation program for		Disaster risk reduction; Insurance	India
			Notes: Being developed as part of SDC's Climate Change Adaptation and Climate Resilience Development program.		

[143] GEF, http://www.thegef.org/gef/sites/thegef.org/files/publication/adaptation-actions_0.pdf
[144] GEF, http://www.thegef.org/gef/sites/thegef.org/files/publication/adaptation-actions_0.pdf
[145] GEF, http://www.thegef.org/gef/sites/thegef.org/files/publication/adaptation-actions_0.pdf and http://www.climateanddevelopment.org/Adaptation/portfolio/risk02.html
[146] SDC, http://www.eda.admin.ch/eda/en/home/reps/asia/vind/embnd/ccd/gpcc/ccacrd.html.html

Name		Objectives	Type of project	Priority Sector(s)	Geographic focus (if any)
		enhancing climate resilience through insurance solutions. It will also work towards strengthen enabling framework of policies and regulations for commercially viable solutions."			
5.	Indian Himalayas Climate Change Adaptation Programme[147]	"The objective of the proposed program is to strengthen the resilience of the vulnerable communities in the Himalayas and knowledge and capacities of research institutions, communities and decision makers are connected and enhanced. The program aims at integrating science, community based climate resilient development, and contributing to existing national and state policy frameworks for improved action in the Indian Himalayas."	Capacity building; Knowledge communication; Community-based adaptation		Indian Himalayas
			Notes: Being developed as part of SDC's Climate Change Adaptation and Climate Resilience Development program.		

E. Assessment

India has been cautious about making public commitments to dealing with climate change—be it through mitigation or adaptation. As noted in a 2009 commentary (Mehra, 2009): "[w]hile it recognizes that 'global warming will affect us seriously,' the government concludes that 'the process of adaptation to climate change must have priority' and that 'the most important adaptation measure is development itself'." India's position on how to adapt was only made explicit in the NAPCC of 2008. The NAPCC was the first systematic attempt by the Government to frame a comprehensive policy framework to deal with climate change (mitigation and adaptation). The NAPCC's approach is to encourage mainstreaming of climate change adaptation into development planning from the beginning, and to relegate significant responsibilities to the State governments.

The NAPCC is an ambitious document and full implementation of its recommendations will require high levels of institutional, technical and human capacities, as well as a huge amount of (as yet unknown) financial resources. The Government may need to clarify how it wants to prioritize its eight missions and, more importantly, how it wishes to finance the plan. While the Prime Minister's Council

[147] SDC, http://www.eda.admin.ch/eda/en/home/reps/asia/vind/embnd/ccd/gpcc/ccacrd.html.html

on Climate Change is providing valuable inputs to the Government, it should also encourage more open discussions and consultations across the nation on how to implement the NAPCC (and update it if needed).

India, due to its sheer size, faces a mammoth task but it also has a number of large-scale adaptation programs either on-going or in development (see Table 2). The development of a framework for implementing adaptation projects as part of the "Climate-resilient Development and Adaptation" project is an extremely important and timely initiative. The other listed projects are in line with the sector priorities identified in different national missions although the process by which they have been prioritized is not clear. For example, the areas of agriculture, water and risk reduction have a greater number of ongoing activities than the prioritized areas of coastal zones, forestry, infrastructure, nature, health and energy. Going forward it will be important to diversity adaptation actions across a broader array of priority areas. An additional observation is that most of these projects primarily focus on one particular sector—water, coastal zone, urban areas etc. As climate change is a cross-cutting issue, more multi-sector and regional projects will be needed to address adaptation gaps in India in a holistic manner. As well, although India is participating in a domestically focused project addressing climate change and gender issues, it appears that there is room for greater focus on this issue. Particular attention to the needs of indigenous groups may also be appropriate. Finally, India's success in adaptation could have a huge beneficial spill-over effect on its neighbors, and vice versa. India may consider supporting and/or leading a number of regional initiatives that will synergize adaption efforts in South Asia.

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5.0 Maldives

CCFT	Climate Change Trust Fund
IUCN	International Union for the Conservation of Nature
LDCF	Least Developed Country Fund
MEEW	Ministry of Environment, Energy and Water
MFF	Mangroves for the Future
MHAHE	Ministry of Home Affairs, Housing and Environment
NAPA	National Adaptation Programme of Action
SCCF	Special Climate Change Fund
SNAP	Strategic National Action Plan
UNDP	United Nations Development Program
UNFCCC	United Nations Framework Convention on Climate Change

A. Adaptation Needs and Priorities

Maldives is an archipelago of 25 low-lying coral atolls located in the Indian Ocean southwest of the Indian subcontinent. The country's climate is characterized as "tropical monsoon," with monsoons occurring from May to November and from January to March (MEEW, 2007). Climate change is an existential threat to the small coral islands that make up the Maldives. Over 80 per cent of the land area of Maldives is less than one meter above mean sea level; as such, a sea level rise of even a meter would cause the loss of the entire land area of Maldives (MHAHE, 2001). In the near term, the islands of the Maldives are very vulnerable to inundation and gradual sea level rise will aggravate the existing problem of beach erosion; in the recent past, 62 per cent of all inhabited islands and 45 per cent of tourist resorts reported severe beach erosion (Shaig, 2006). Rising sea levels also threaten the scarce fresh water resources of Maldives. Salt water intrusion is gradually encroaching in to the islands' small pockets or 'lenses' of fresh water underground.

The coral reefs surrounding the Maldives are at risk due to gradual warming of sea water (in addition to pollution from man-made sources). Given that these reefs support both the country's tourism and fisheries industries upon which the people depend almost exclusively, climate change is a profound threat to its very economic base.

Maldives' National Adaptation Programme of Action (NAPA) identifies the following key areas of climate change related vulnerabilities: land, beach and human settlements; critical infrastructure; tourism; fisheries; human health; water resources; agriculture and food security; and coral reef biodiversity (MEEF, 2007).

B. National Level Policies and Strategic Documents

Maldives completed its Initial National Communication to the United Nations Framework Convention on Climate Change (UNFCCC) in 2001. In addition to identifying key vulnerabilities, this report also proposed 12 high-priority adaptation and mitigation projects, clearly recognized the finance gap and indicated that adaptation action would have to be carried out using external resources.

As a follow up, Maldives initiated its NAPA process in 2004. Progress towards it completion was immediately interrupted in December 2004 by the Indian Ocean tsunami. This single event changed Maldives' status from a developing country back to a least developed country (LDC) and exposed how vulnerable this small country is to natural calamities. Maldives eventually completed the NAPA in 2007.

Recommendations made in Maldives' NAPA are based on a systematic review of the risk-vulnerability context. Within it, adaptation is seen as "a multi-dimensional goal that aims to increase resilience of the vulnerable systems against climate hazards and risks to achieve sustainable development outcomes" (MEEW, 2007). After consultations with the stakeholder groups and reviewing expert assessments, Maldives came up with 12 priority adaptation projects, as summarized in Table 3. The NAPA envisioned that implementation of the adaptation activities would be overseen by the National Commission for Protection of the Environment. A special interagency task force would ensure the respective agencies of the government mobilize international financial assistance and allocate public financing to the priority project profiles in the NAPA.

In 2011, Maldives announced it had signed the world's first Strategic National Action Plan that integrates disaster risk reduction and climate change adaptation. The policy was formulated using broad consultations with key sectors including housing, construction, environment and health, and focuses on governance and decentralization as key to the success of risk reduction and adaptation. The policy is viewed as a landmark initiative within the disaster risk reduction and adaptation communities.[148]

[148] UNISDR, http://www.unisdr.org/archive/20500

It may be mentioned that Maldives is a very active and visible player in the international climate conferences and negotiation meetings. And, even though its own greenhouse gas emissions are insignificant, Maldives has declared a national ambition to become a carbon neutral country by 2020.

Table 1: Key National Level Policies and Reports reflecting Adaptation Needs, Priorities and Planned Actions in Maldives

Name of Policy Action		Government Division Responsible	Status	Sector(s) of Focus	Summary description
1.	Initial National Communication to the UNFCCC	Ministry of Home Affairs, Housing and Environment	Published in 2001	Coastal zone management; Tourism, fisheries, agriculture, water, human health	Provides a review of Maldives' national circumstances, greenhouse gas emissions profile, key vulnerabilities to climate change, and possible adaptive measures by sector.
2.	Nation Adaptation Programme of Action	Ministry of Environment, Energy and Water	Published in 2007	Coastal zone management, tourism, fisheries, human health, freshwater supply; agriculture, biodiversity	Provides an overview of Maldives' national circumstances, climate projections, and key vulnerabilities by sector, as well as outlines priority adaptation projects.
3.	Strategic National Action Plan (SNAP)	Ministry of Environment	Published in 2011	Human health, tourism, buildings, policy formation and integration	The policy is the world's first Strategic National Action Plan that integrates disaster risk reduction and climate change adaptation. SNAP builds upon lessons learned from past disasters, promotes good governance, empowers local communities, builds resilience, and promotes risk sensitive regional and local development.
4.	Safer Island Strategy	Ministry of Environment, Energy and Water	Climate change being integrated into the strategy through LDCF project (see Table 2)	Coastal zone management, freshwater supply, disaster risk management, etc.	The term "safe islands" in the Maldives refers to the archipelago's larger islands which may provide safe havens to people who are forced to migrate due to natural disasters. Given the threat of sea level rise, climate change is being integrated into the strategy.

C. Current Adaptation Action

Table 2 lists the climate change adaptation projects that have recently commenced in Maldives. Compared to other South Asia countries, the number of discrete adaptation projects underway in Maldives appears to be low, although each addresses Maldives' adaptation priorities as identified though its national policies. One project, "Integration of Climate Change risks into the Maldives Safer Island

Development Program," explicitly addressing a priority need identified in Maldives' NAPA. In addition, a Climate Trust Fund was established in December 2009 by the European Union and the World Bank for the Maldives. It aims to build a climate resilient economy through various mitigation and adaptation activities. The majority of projects are focused on policy formulation and integration, although the areas risk reduction, coastal zones, water, forestry and meteorology are also being addressed. Funders of these projects include the Australia, European Commission, French Global Environment Fund, Germany, the Least Developed Countries Fund (LDCF), Norway, Sweden, the United States Agency for International Development (USAID), and the World Bank.

Table 2: Current Adaptation Actions in Maldives

Name		Objectives	Funder(s)	Implementing Agency(s)	Type of project	Duration	Priority Sector(s)	Geographic focus (if any)
National Action								
1.	Cartography of Maldives and Climate Change[149]	The project aims to: improve national capacity for data management and climate change impacts monitoring; collect and analyze environmental data; develop monitoring methods and adaptation actions; elaborate a platform to consult reference data and conduct multi-criteria analysis; and organize an international colloquium to share experiences on technical tools.	EU; World Bank; French Global Environment Fund *Budget:* Euros 6.337 million	Various government ministries	Capacity building; Research	2009 – 2011	Climate information services	Maldives
2.	Climate Change Vulnerability Analysis[150]	A critical climate change vulnerability for the country is the limited supply of fresh drinking water within the coral atolls—more frequent extreme weather events, saltwater intrusion, and other climate stresses threaten the Maldives' already limited freshwater supply. To address this vulnerability, the program that aims to improve access to drinking water supplies and enhance resilience to climate change. The program will provide assistance to the Maldives on climate change	USAID *Budget:* US$3.0 million	Government of Maldives	Assessment; Community based adaptation	2010 – ?	Freshwater supply	Maldives

[149] AFD, http://www.afd.fr/webdav/site/afd/shared/ELEMENTS_COMMUNS/Newsletter-AFD/NewsletterAFD-fevrier-2010-en.html
[150] USDS, http://www.state.gov/documents/organization/164640.pdf

Name		Objectives	Funder(s)	Implementing Agency(s)	Type of project	Duration	Priority Sector(s)	Geographic focus (if any)
		adaptation strategies, with special emphasis on integrated water resources management.						
3.	Integration of Climate Change Risks into the Maldives Safer Island Development Program[151]	Ensure that climate change risks are integrated into planning in Maldives so that national, atoll and island authorities and communities are able to prioritize and implement climate change adaptation measures. The primary aim of this project is to reduce the vulnerability of the population to climate change, including climate-related natural disasters. In this context, the Maldives government will, among other things, re-evaluate and improve its "Safer Island Strategy." [152]	LDCF, co-financing *Budget:* US$9.34 million	UNDP, Ministry of Environment, Energy and Water	Policy formation and integration; Capacity building	2010 – 2014	Government; Coastal zone management	Maldives
4.	Maldives Climate Change Trust Fund (CCTF)	The CCTF will support the development and implementation of the climate change strategy for Maldives to build a climate resilient economy and society through adaptation and mitigation activities. A majority of the trust funds will be for projects/activities directly implemented by the Government of Maldives. The governance arrangements for the CCTF comprise the National Planning Council, Climate Change Advisory Council and the Technical Committee.	World Bank, EU, Australian Development Agency	World Bank, Government of Maldives	Capacity building; Field implementation	Established in December 2010	Government	Maldives
Participation in Regional and Global Projects								

[151] ALM, http://www.adaptationlearning.net/project/integration-climate-change-risks-maldives-safer-island-development-programme

[152] The term "safe islands" in the Maldives refers to a range of larger islands which should ultimately provide safe havens for people who are forced to migrate before or after extreme natural disasters. "Safe islands" enable communities to sustain social and economic development during emergencies and disasters. This will be achieved by providing ecologically safe zones and structures to mitigate the impact of climate change induced events such as storm surges, tidal swells, as well as have benefits in the context of other hazards such as tsunamis.

Name		Objectives	Funder(s)	Implementing Agency(s)	Type of project	Duration	Priority Sector(s)	Geographic focus (if any)
5.	Global Climate Change Alliance[153]	The Global Climate Change Alliance seeks to deepen the policy dialogue between the European Union and developing countries on climate change; and to increase support to target countries to implement priority adaptation and mitigation measures, and integration climate change into their development strategies. The program's five priority areas for funding are: improving the knowledge base of developing countries to the effects of climate change; promoting disaster risk reduction; mainstreaming climate change into poverty reduction development strategies; reducing emissions from deforestation and degradation; and enhancing participation in the Clean Development Mechanism.	European Commission, Czech Republic, Sweden, 10th European Development Fund *Budget:* € 140 million	National Governments	Policy formation and implementation; Knowledge communication	2008 – ongoing	Disaster risk management; Government	*Global:* 17 countries and the Pacific region,[154] including: Bangladesh, Maldives and Nepal
			In Maldives: this program appears to address mainstreaming climate change into national development strategies, low carbon development, and waste and water management.					
6.	Mangroves for the Future (MFF)[155]	The project has two main objectives: to strengthen the environmental sustainability of coastal development; and to promote the investment of funds and efforts in coastal ecosystem management. MFF re-orients the current focus of coastal investment by moving from a reactive response to disasters, to progressive activities that address long-term sustainable management needs. These include building awareness and capacity for improved food and livelihood security, disaster preparedness, and climate	2007 – 2009: Australia, Germany, Norway, Sweden, UNDP, UNEP 2010 to now: Norway and Sweden	National governments with CARE International, FAO, IUCN, UNDP, UNEP and Wetlands International with NGOs and CBOs	Research; Knowledge communication; Policy formation and implementation	2006 – present	Coastal zone management	*Asia Region:* India, Indonesia Maldives, Pakistan, Seychelles, Sri Lanka, Thailand, and Viet Nam
			In Maldives: Climate change projections and considerations have been mainstreamed into this program in Maldives. MFF's priorities for Maldives are: the development of a national					

[153] GCCA, http://www.gcca.eu/pages/1_2-Home.html

[154] These countries are: Bangladesh, Belize, Cambodia, Ethiopia, Guyana, Jamaica, Maldives, Mali, Mozambique, Mauritius, Nepal, the Pacific Region, Rwanda, Senegal, Seychelles, Solomon Islands, Tanzania and Vanuatu.

[155] MFF, http://www.mangrovesforthefuture.org/ and http://www.mangrovesforthefuture.org/Assets/documents/IUCN-MFF-Brochure-Web.pdf

Name		Objectives	Funder(s)	Implementing Agency(s)	Type of project	Duration	Priority Sector(s)	Geographic focus (if any)
		change adaptation. Initially focused on countries that were highly affected by the 2004 tsunami—India, Indonesia, Maldives, Seychelles, Sri Lanka and Thailand—the project has expanded to include Pakistan and Viet Nam.	framework for integrated coastal management; mainstreaming coastal zone management into existing policies and programs; capacity building on climate change mitigation and adaptation; and the development of protocols for data collection and standardization of data.					
7.	Climate Risk Management Technical Assistance Support Project: Phase II[156]	Building capacities for climate risk management among national stakeholders.	Sweden and SIDA through UNDP, UNDP core finance	ADPC, International Institute for Sustainable Development	Research; Policy formation and integration	2010 – 2011	Multi-sectoral	*Global:* Bangladesh, Bhutan, Dominican Republic, Honduras, India, Kenya, Maldives, Mongolia, Nepal, Nicaragua, Niger, Pakistan, Papua New Guinea, Peru, Timor-Leste and Uganda
			In Maldives: to be determined					

D. Proposed Adaptation Action

Maldives identifies 12 priority adaptation actions in its NAPA, one of which is currently receiving funding through the LDCF: "Integration of future climate change scenarios into the Safer Island Strategy." In addition, the Special Climate Change Fund (SCCF) is currently considering funding for an additional project that may address NAPA priorities (see Table 3). The majority of these proposed

[156] UNFCCC, http://unfccc.int/files/adaptation/nairobi_workprogramme/partners_and_action_pledges/application/pdf/iisd_furtherinfo_water_190411.pdf

adaptation actions focus on risk reduction in coastal zones, as well as the building of infrastructure to reduce the vulnerability of coastal populations. Proposed project activities also address the areas of health, tourism, water, agriculture, nature and fisheries.

Table 3: Proposed Adaptation Actions in Maldives

Name		Objectives	Type of project	Priority Sector(s)	Geographic focus (if any)
Actions Identified in Maldives' NAPA					
1.	Integrations of future climate change scenarios in the Safer Island Strategy to adapt sea level rise and extreme weather risks associated with climate change	To undertake detailed hazard and vulnerability assessments for five of the proposed safer islands, develop a hazard mitigation and vulnerability reduction plan, develop the human resource and institutional capacity to manage coastal zones, enhance technical capacity to design coastal modifications suitable for small coral islands.	Assessment	Government; Coastal zone management	Coastal zones, Maldives
			Notes: This project is currently being funded by the LDCF.		
2.	Coastal protection of safer islands to reduce the risk from sea induced flooding and predicted sea level rise	To demonstrate innovative coastal protection measures suitable for small islands, and demonstrate innovative coastal protection measures for a Safer Island.	Community based adaptation	Coastal zone management	Coastal zones, Maldives
			Notes:		
3.	Coastal protection of Male International Airport to reduce the risk from sea induced flooding and predicted sea level rise	To protect the airport from sea induced hazards and predicted climate change impacts. Activities would include detailed technical and engineering studies and the construction of demonstration coastal protection measures.	Research; Assessment; Field implementation	Coastal zone management; Transportation	International airport, Maldives
			Notes:		
4.	Enhanced adaptive capacity to manage climate change related risks to fresh water availability by appropriate technologies and improved storage facilities	To increase adaptive capacity to manage climate change related risks to fresh water availability. This includes increasing rainwater harvesting capacity and storage and acquiring technology for emergency freshwater provision.	Community based adaptation; Field implementation	Freshwater supply	
			Notes:		
5.	Enhance adaptive capacity to manage climate change related risks to fresh water availability by appropriate wastewater treatment technologies	To identify and demonstrate innovative, appropriate and cost-effective wastewater treatment and disposal systems, and to educate the community on appropriate wastewater treatment.	Research; Knowledge communication	Waste management	
			Notes:		
6.	Increase the resilience of local food production through enhancing the	To strengthen the links between farmers and consumer markets to ensure sustainable local food production, and	Capacity building; Research	Agriculture	

Name		Objectives	Type of project	Priority Sector(s)	Geographic focus (if any)
	capacity of local farmers and communities to address food security issues caused by climate change and climate variability	improve local food production to reduce dependency on food imports.	**Notes:**		
7.	Improve the health status of the population by the prevention and management of vector-borne diseases caused by changes in temperature and flooding due to extreme rainfall	To undertake integrated vector management to control climate change related vector-borne diseases, develop national capacity for disease surveillance, undertake community based behavior change programs, and improve accessibility to health care.	Capacity building; Field implementation	Human health	
			Notes:		
8.	Improve resilience of island communities to climate change and variability through sustainable building designs	To develop and demonstrate climate change resilient building structures, and develop building methodology to enable replication of more resilient building design.	Research	Buildings	
			Notes:		
9.	Investigate alternative live bait management, catch, culture, and holding techniques in the Maldives to reduce vulnerability of the run fishery sector to predicted climate change and variability	To enhance knowledge on bait use and utilization, alternative live bait, catching methods and improved holding techniques.	Capacity building	Marine fisheries	
			Notes:		
10.	Protection of human settlements by coastal protect measures on safer islands	To demonstrate innovative coastal protection measures for Safer Islands, with activities including evaluation of existing coastal protection options, and undertaking detailed technical studies for selected coastal protection options.	Research; Field implementation	Coastal zone management	Coastal zones, Maldives
			Notes:		
11.	Increase resilience of coral reefs to reduce the vulnerability of islands, communities and reef dependent economic activities to predicted climate change	To increase the knowledge base and understanding of the natural adaptation process in coral reefs. Activities include conducting research to better understand how coral reefs and islands adapt to climate change, and conduct research on how human induced stresses affect reefs.	Research	Marine management	Coastal zones, Maldives
			Notes:		
12.	Flood control measures for vulnerable islands	To reduce the vulnerability of low lying islands to flooding from heavy rain at severe weather conditions from future climate risks.	Field implementation	Disaster risk management	Coastal zones, Maldives
			Notes:		
Additional projects in development in the Maldives					
13.	Enhancing the Resilience of the Maldives	Description not available.	Policy formation and	Tourism	Maldives

Name		Objectives	Type of project	Priority Sector(s)	Geographic focus (if any)
	to Climate Change through Integrating the Tourism Sector and Associated Communities into National Adaptation Planning[157]		integration		
			Notes: Proposed project under the SCCF. *Proposed budget:* Proposed to the SCCF = $3,030,000; proposed co-financing = to be confirmed		

E. Assessment

There is a relatively low level of adaptation projects and programs being implemented in Maldives, however it is clear that at the national policy level significant planning is underway at to integrate climate change and disaster risk reduction through SNAP and related initiatives. Based on priorities identified in the country's NAPA and National Communication, adaptation actions in the areas of risk reduction, coastal zones, infrastructure, water, and tourism are viewed as top priorities for the government. Although ongoing actions do touch on the areas of risk reduction costal zones, and water, there are few initiatives in each category and generally focus on policy formulation efforts rather than the concrete infrastructure projects identified as urgent priorities by the country's government. Greater attention could also be given to tourism, fisheries and gender-focused adaptation project as these do not seem to be addressed as yet through current efforts. Going forward it will be important to ensure that these highest priority NAPA projects are the ones that receive funding (as with the ongoing project funded in part by the LCDF). Of all the on-going climate change projects in Maldives, the Climate Change Trust Fund of Maldives is probably the most strategic. Development partners can harmonize their support for Maldives through this instrument, and it may allow for enhanced funding of initiatives identified in the country's NAPA.

It is worth noting that it is the Maldives' prioritized infrastructure projects that will require the most resources; the project on protecting human settlements in select islands through coastal protection measures is the most capital intensive (requiring an estimated cost US$60.6 million). However, if implemented properly, it will generate tangible benefits for a large number of people; these infrastructure-related projects could be piloted first and then could be scaled up in major islands.

Maldives also has a number of ongoing climate change mitigation projects in areas such as energy efficiency and renewable energy. It may be worthwhile to look for potential synergy between adaptation and mitigation projects (e.g. the development of sustainable building designs that increase resilience to climate change while also reducing greenhouse gas emissions). These synergistic projects would offer a more integrated package of help to affected communities.

[157] GEF, http://www.thegef.org/gef/sites/thegef.org/files/publication/adaptation-actions_0.pdf

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Ministry of Home Affairs, Housing and Environment [MHAHE] (2001). *First National Communication of the Republic of Maldives*. Retrieved from http://unfccc.int/resource/docs/natc/maldnc1.pdf

6.0 Nepal

ADB	Asian Development Bank
BMZ	German Federal Ministry for Economic Cooperation and Development
DFID	Department for International Development (United Kingdom)
GLOF	Glacial lake outburst flood
FAO	Food and Agriculture Organisation
LAPA	Local Adaptation Plans of Action
NAPA	National Adaptation Programme of Action
NCVST	Nepal Climate Vulnerability Study Team
MFA	Ministry of Foreign Affairs
MOE	Ministry of Environment
MOEST	Ministry of Science and Technology
PPCR	Pilot Program on Climate Resilience
SPCR	Strategic Program on Climate Resilience
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UNFCCC	United Nations Framework Convention on Climate Change
UNITAR	United Nations Institute for Training and Research
USAID	United States Agency for International Development
WWF	World Wildlife Fund

Nepal is a land-locked country located in the central Himalayas and has a lateral span of less than 200 kilometers. Nepal is one of the poorest countries in the world, with nearly 70 per cent of the population living on less than US$2 per day (MOE, 2010). Approximately 85 per cent of Nepalese depend on agriculture for their livelihoods, and agriculture is the largest contributor to Gross Domestic Product. The country also benefits from a large tourism sector.

A. Adaptation Needs and Priorities

Nepal's current climate varies along with its topography, ranging from tropical to alpine conditions, and is shaped by the Himalayan mountain range as well as the South Asian monsoon. The country experiences four seasons: pre-monsoon from March to May; monsoon season from June to September; post-monsoon from October to November; and winter from December to February (MOE, 2010). Because of its geographic location and topographic variability (from plains of the Terai to the high peaks of the Himalayas), it is difficult to predict how climate change will unveil itself in Nepal. The challenge posed by these physical features is made more complex by a lack of sound scientific data. Like its neighbor Bhutan, Nepal has few weather stations and a shorter duration of reliable records in comparison to other countries (the upper Himalaya region is essentially a data white-spot). As a result, it is difficult to set a baseline and predict how basic climatic parameters such as temperature and precipitation will change over time.

With these caveats in mind, the general conclusion based on Global Circulation Models as well as Regional Circulation Models is that average temperatures will increase over all of Nepal and that monsoon precipitation will increase. The pattern of increase will vary significantly across the country and local level predictions available now are not very reliable.[158] Nepal's recently prepared National Adaptation Programme of Action (NAPA) notes that a recent study employing Global and Regional Circulation Models projects that mean annual temperatures in Nepal will increase by 1.4°C by 2030, 2.8°C by 2060, and 4.7°C by 2090 (MOE, 2010). Precipitation projections foresee no change in westerns areas of the country, but up to a 5 to 10 per cent increase in eastern Nepal during winter months. In the summer months, precipitation is projected to increase for the entire country by 15 to 20 per cent (MOE, 2010).

This high level of uncertainly in and of itself is a strong reason for Nepal to act now to increase its adaptive capacity. As it faces many risks similar to those that need to be addressed by northern Indian states (Himachal for example) as well as Bhutan, there are also opportunities for regional cooperation. Common areas of concern include unpredictable monsoons, more extreme wet and dry spells, GLOFs, and more severe floods and droughts. Being a mountainous country, the risk of landslides and loss of top soil (especially from hill slopes) will also increase due to degradation of forests and faster surface runoff. Experiences from the recent past corroborate these predictions (NCVST, 2009b).

Nepal's NAPA discusses the following vulnerabilities to climate change by priority sector (MOE, 2010):

- *Agriculture and food security*: Nepal's subsistence farming economy is at considerable risk to changes in precipitation, rising temperatures, flooding and erratic monsoon rainfall;

[158] Technical details and summaries can be found in NCVST (2009a).

- *Water resources and energy*: climate-related water stress directly impacts agricultural productivity, malnutrition, human health and sanitation, and changes in river flow may directly impact micro-hydro projects in the hills and mountains;[159]
- *Climate-induced disasters*: Nepal is currently exposed to a number of hydro-meteorological disasters, and this may be exacerbated in the future with climate change;
- *Forests and biodiversity*: increased temperatures and rainfall variability may lead to shifts in agro-ecological zones;
- *Public health*: possible increase in vector-borne and water-borne infectious diseases, including an increased risk of malaria and kala-azar;
- *Urban settlements and infrastructure*: climate change is anticipated to impact infrastructure including roads, bridges, community and public buildings, and schools. Impacts are expected to be concentrated around urban water and energy resources, and may also affect human health.

B. National Level Policies and Strategic Documents

The Initial National Communication to the United Nations Framework Convention on Climate Change (UNFCCC) completed by Nepal in 2004 set the context for its future adaptation efforts, highlighting its vulnerability and indicating the need for a comprehensive response plan. In 2008, it launched its NAPA development process, which was completed in 2010.

Nepal was one of the last countries to develop its NAPA, and as such has been able to learn lessons from processes in other countries. It has sought to establish a vertical linkage between the national-scale, top-down assessments of current and future climate risks, with bottom-up assessments from community members themselves—informed by local knowledge and geographical specificity. In particular, community level feedback were collected in the form of Local Adaptation Plans of Action (LAPAs), which will inform local and regional sector policies as well as the national level NAPA. Given Nepal's geographic and ethnic diversity, such a grassroots approach appears to be a pre-requisite for ensuring not only sufficient ownership and engagement but also flow of resources from the center to the communities who are at the front line of climate change.

[159] Approximately 90 per cent of Nepal's electricity production is derived from hydropower, with over 85 per cent of the population relying on traditional biomass (MOE, 2010).

Table 2: Key Government Policies and Reports reflecting Adaptation Needs, Priorities and Planned Actions

Name of Policy Action		Government Division Responsible	Status	Sector(s) of Focus	Summary description
1.	Initial National Communication to the UNFCCC	Ministry of Population and Environment	Released in 2004	Agriculture, freshwater supply, forestry, human health	Presents Nepal's greenhouse gas emission inventory, discusses mitigation options, identifies key vulnerabilities and adaptation options, and policies and measures to address climate change.
2.	National Adaptation Programme of Action[160]	Ministry of Environment	Released in 2010	Agriculture, freshwater supply, disaster risk management, forestry, human health, urban areas	Provides: an introduction to the country's national circumstances, geography, and national development; impacts of climate change by key area; NAPA preparation process; and identifies key needs, existing practices, and options.

C. Current Adaptation Action

There are a moderate number of ongoing adaptation projects and programs in Nepal compared to other South Asian countries, including nationally focused activities as well as those involving countries from within and outside of the Asia region. These activities are primarily focused on the areas of water, policy formulation, and risk reduction, with certain initiatives addressing the need for improved meteorological information, as well as the fields of communication, agriculture and nature. Main funders in Nepal are the Asian Development Bank, European Commission, World Bank, the World Wildlife Fund (WWF) and the Governments of Norway, Switzerland, the United Kingdom and the United States Agency for International Development.[161]

Table 3: Current Adaptation Projects and Programs active in Nepal

Name		Objectives	Funder(s)	Implementing Agency(s)	Type of project	Duration	Priority Sector(s)	Geographic focus (if any)
National Action								
1.	Strengthening Climate Network in Nepal[162]	This project is tended to strengthen the institutional capacity of NGOs and to build a climate network at the national level for raising awareness and advocacy on climate	Development Fund, Norway	Local Initiatives for Biodiversity, Research and	Capacity building; Knowledge sharing	2008 – 2010	Civil society	Nepal

[160] UNFCCC, http://unfccc.int/resource/docs/napa/npl01.pdf

[161] The United States has announced plans to invest USD 3 million in Nepal's capacity to adapt to the impacts of climate change, but the specific of this investment are not yet clear. Further information available here: http://www.state.gov/documents/organization/151761.pdf

[162] Local Initiatives for Biodiversity, Research and Development, http://www.libird.org/index.php?option=com_content&task=view&id=330&Itemid=39

Name		Objectives	Funder(s)	Implementing Agency(s)	Type of project	Duration	Priority Sector(s)	Geographic focus (if any)
		change. Activities include: support development of Nepal's NAPA; establish Climate Change Information Resource Centre; and build an information database management system to establish information on climate scenarios, impacts, vulnerable sectors, communities and priorities for community based actions.		Development				
2.	Strengthening Capacity for Managing Climate Change and Environment: Nepal[163]	A new and improved, institutional framework for managing climate change and the environment with sustainable finance agreed upon by the Government. This will involve establishing a new organizational framework, creating a sustainable funding mechanism, and heightening awareness among stakeholders. This project will call for local government units to assess vulnerability, map the risks, and plan adaptation interventions.	ADB, Gov't of Nepal *Budget:* US$1.28 million	Ministry of Environment, Science and Technology (MOEST)	Research; Assessment; Policy formation and integration; Capacity building	2008 – 2010	Government	Nepal
3.	Strengthening Capacities for Disaster Preparedness and Climate Risk Management in the Nepalese Agriculture Sector[164]	The project aims to: 1) Enhancing technical capacity within the Department of Agriculture for climate change adaptation and disaster risk management in agriculture; 2) Strengthen basic support services for climate change adaptation and disaster risk management in agriculture sector in two selected pilot districts; 3) Demonstration of prioritized location specific technologies for climate change adaptation and disaster risk management	FAO	Ministry of Agriculture and Cooperatives, Department of Agriculture, Nepal Agriculture Research Council	Capacity building; Field implementation	2008 – 2010	Disaster risk management; Agriculture	Rural areas, Nepal

[163] ADB, http://www.adb.org/climate-change/strengthening-capacity-for-managing-cc.asp
[164] ALM, http://www.adaptationlearning.net/project/strengthening-capacities-disaster-preparedness-and-climate-risk-management-nepalese-agricult

Name		Objectives	Funder(s)	Implementing Agency(s)	Type of project	Duration	Priority Sector(s)	Geographic focus (if any)
		within the agriculture sector through a participatory learning by doing process at district and community levels. 4) Economic impact analysis of adaptation interventions, lessons learned and policy implications.						
4.	Implementing Climate Change Adaptation in Nepal[165]	This project aims to increase resilience of communities vulnerable to climate change, by combining local indigenous knowledge and scientific knowledge of people living inside and around the protected areas in Nepal.	WWF-Nepal	WWF	Capacity building; Knowledge communicatio n	2009 – 2011	Rural areas	Langtang National Park and Buffer Zone, Nepal
5.	Nepal Climate Change Support Programme[166]	Develop a strategic framework of action on climate change behind which stakeholders can align response (with a focus on biodiversity)	UK *Budget:* GBP 10,891,256	Government	Policy formation and integration	2009 – 2015	Government; Biodiversity	Nepal
6.	Community Based Vulnerability Assessment , Risk Mapping, and Adaptation Planning[167]	This project will fund a study to complement Nepal's ongoing NAPA projects. The impact of the study will be to strengthen the capacity of Nepal to manage its environment and climate change through an improved institutional framework. The study will develop local models through in-country assessments of downscaled national climate change projections, and develop tools for community-based vulnerability assessment. Planning tools for District Development Committees and Village Development Committees to assess climate change	ADB *Budget:* US$267,000	Ministry of Environment, Science and Technology, Practical Action, WWF-Nepal, International Union for Conservation of Nature and National Association of	Research; Assessment; Policy formation and integration; Capacity building	2010 – 2011	Rural areas	Rasuwa in Mountain eco-zone, Dhanakuta in Hill Eco-zone, Nawalparasi in Foothill eco-zone, & Dhanusha in Terai eco-zone

[165] WWF, http://www.wwfnepal.org/our_solutions/projects/index.cfm?uProjectID=NP0909
[166] DFID, http://projects.dfid.gov.uk/project.aspx?Project=201129
[167] http://www.ceci.ca/en/where-we-work/asia/nepal/community-based-vulnerability-risk-mapping-and-adapatation-planning/

Name		Objectives	Funder(s)	Implementing Agency(s)	Type of project	Duration	Priority Sector(s)	Geographic focus (if any)
		vulnerability, map the risks, and plan for adaptation interventions also were designed.		VDCs in Nepal				
7.	Supporting Government Planning in Building Climate Resilience[168]	Documentation of a national program and priorities for enhancing climate resilience, building on the work done on the NAPA and during previous PPCR-related missions.	ADB / World Bank (Strategic Climate Fund) *Budget:* US$225,000	MOEST	Policy formation and integration	2010 – ?	Government	Nepal
Participation in Regional and Global Projects								
8.	Floods from the Roof of the World: Protection thanks to applied research[169]	The project seeks to protect people and infrastructure from the hazards of GLOFs. Based on previous fundamental research, the countries of Nepal, Bhutan, India, Pakistan and China/Tibet now have an inventory of glaciers and glacier lakes as well as a GLOF monitoring system. The data gathered is used as the basis for early-warning systems. This enables priorities to be set and corresponding action to be taken. The database is also used to determine the amount of total available water resources the region will have in the future.	Swiss Development Corporation	ICIMOD	Community based adaptation; Research	Phase One: 1999 – 2007 Phase Two: 2008 – 2012	Disaster risk management	*Regional:* China/Tibet, Bhutan, India, Nepal, Pakistan
			In Nepal: Further information required.					
9.	Monitoring the Glaciers of the Himalayas[170]	Glacier retreat has been a major indicator of climate change impacts in the Himalayas. This project aims to support biodiversity conservation and livelihoods of people affected by glacier retreat. The main	WWF		Research; Community based adaptation	2005 – 2009	Biodiversity; Ecosystem conservation	*Regional:* Eastern Himalayas, Nepal and India

[168] ADB, http://pid.adb.org/pid/TaView.htm?projNo=44117&seqNo=01&typeCd=2
[169] SDC, http://www.sdc.admin.ch/en/Home/Projects/Floods_from_the_Roof_of_the_World
[170] WWF, http://www.wwfnepal.org/our_solutions/projects/index.cfm?uProjectID=NP0898

Name		Objectives	Funder(s)	Implementing Agency(s)	Type of project	Duration	Priority Sector(s)	Geographic focus (if any)
		objectives of the project are documentation of threats posed due to glacier retreat as well as development of community driven programs for improving their resilience.	*In Nepal*: Further information required.					
10.	Management of Flash Floods: Capacity building and awareness raising in the Hindu Kush Himalayas[171]	Flash floods have caused huge loss of lives and properties of people in the Hindu-Kush Himalayan region. This project aims to improve the capacity of stakeholders of the region to cope with flash floods.	USAID	ICMOD	Capacity building	*Phase I:* 2006 – 2007 *Phase II:* 2008 – 2010	Disaster risk management	*Asia Region:* China, Nepal, Pakistan
			In Nepal: Further information required.					
11.	Advancing Capacity for Climate Change Adaptation (ACCCA)[172]	The rational for this project is that countries lack scientific knowledge and understanding of climate risks, and that this is an impediment to addressing climate variability. Activities include the following: identify and prioritize climate risks; assess available knowledge about risks and adaptation opportunities; develop, test, and disseminate risk communication materials that are designed to assist adaptation decisions; and identify critical knowledge gaps that impede effective adaptation decisions.	IDRC, DEFRA, Switzerland, NCAP, European Commission	UNITAR	Assessment; Capacity building; Policy formation and integration	2007 – 2010	Multi-sectoral	*Global:* 17 countries[173] including: Bangladesh, India, Nepal
			In Nepal: The ACCCA program funded a project entitled "Application of Community Based Adaptation Measures to Weather Related Disasters in Western Nepal: Preparation for the potential climate change signal." The project aimed to implement the concept of collective disaster insurance as a loss sharing measure for adaptation and to establish communication about weather forecasts to minimize losses through Community Based Disaster Preparedness Units. The project strengthened communication between national weather forecast systems and local communities in the units.					
12.	Adaptation to Climate Change in the Hindu Kush Himalayas and Central Asia[174]	This project is addressing how to adapt to too much and too little water in the Hindu Kush Himalayas and Central Asia, covering the following activities:	Norway (through UNEP) *Budget:*	Center for International Climate and Environmental Research,	Research; Policy formation and integration	2007 – 2011	Climate information services; Biodiversity; Agriculture	*Asia Region*: China, India, Nepal, Pakistan

[171] ICIMOD, http://www.icimod.org/?q=258
[172] Further information available here: http://www.acccaproject.org/accca/files/ACCCA_Brochure_19pilotactions.pdf
[173] These countries are: Bangladesh, Burkina Faso, Cameroon, Ethiopia, Ghana, Kenya, India, Malawi, Mali, Mongolia, Nepal, Niger, Nigeria, Philippines, South Africa, Tanzania and Tunisia.
[174] ALM, http://www.adaptationlearning.net/reasearch/too-much-too-little-water-adaptation-climate-change-hindu-kush-himalayas-and-central-asia

Name		Objectives	Funder(s)	Implementing Agency(s)	Type of project	Duration	Priority Sector(s)	Geographic focus (if any)
		• Improved scenarios for climate change variation and impacts; • Scenarios for water demand and availability; • Improved knowledge on climate change effects on biodiversity and ecosystem services; • Improved understanding of impacts on agro-ecology and food production systems and food security; • Critical factors for achieving sustainable adaptation.	US$62 million	UNEP, International Centre for Integrated Mountain Development, national governments				
			In Nepal: Further information required.					
13.	Capacity Development for Policy Makers: Addressing climate change in key sectors[175]	The project is a targeted capacity development initiative that supports two goals: 1. To increase national capacity to co-ordinate Ministerial views for more effective participation in the UNFCCC process; and 2. To assess investment and financial flows to address climate change for selected key sectors. As a result of this project, both the technical understanding of key climate change issues and their economic and policy implications within the context of the Convention will be enhanced.	UNDP, UN Foundation, Government of Norway, Government of Finland, and Government of Switzerland *Budget:* US$6,953,413	UNDP	Capacity building; Policy formation and integration	2008 – 2010	Government	*Global:* 19 countries[176] including: Bangladesh and Nepal
			In Nepal: Further information required.					
14.	Protection of Sustainable Policy Initiatives in the Management of Natural	The program strengthens the role of International Centre for Integrated Mountain Development (ICIMOD) as an organization	BMZ	GIZ, ICIMOD	Capacity building	2008 – 2012	Government	*Asia Region:* Afghanistan, Bangladesh,

[175] UNDP, http://www.undp.org/climatechange/capacity-development.html

[176] These countries are: Algeria, Bangladesh, Colombia, Costa Rica, Dominican Republic, Ecuador, Gambia, Honduras, Liberia, Namibia, Nepal, Nicaragua, Niger, Paraguay, Peru, Saint Lucia, Togo, Turkmenistan and Uruguay.

Name		Objectives	Funder(s)	Implementing Agency(s)	Type of project	Duration	Priority Sector(s)	Geographic focus (if any)
	Resources in the Hindu Kush Himalayas[177]	and service provider in the region, and increases the accountability of the eight member countries. It helps develop and implement regionally agreed concepts and strategies to facilitate adaptation to climate change and sustainable resource management. This is realized by institutional strengthening of ICIMOD in areas such as data collection related to climatic changes and forests. GIZ further promotes the ICIMOD priority program Environmental Change and Ecosystem Services.						Bhutan, China, India, Myanmar, Nepal, Pakistan
			In Nepal: Further information required.					
15.	Pilot Program for Climate Resilience[178]	PPCR aims to pilot and demonstrate ways in which climate risk and resilience may be integrated into core development planning and implementation in a way that is consistent with poverty reduction and sustainable development goals. In this way, the PPCR provides incentives for scaled-up action and initiates transformational change. The pilot programs and projects implemented under the PPCR are country-led, build on NAPAs and other relevant country studies and strategies.	World Bank's Strategic Climate Fund *Budget:* $971.75 million pledged as of February 2011	World Bank	Policy formation and integration	2008 – present	Multi-sectoral	*Global:* Regional Programs: Caribbean and Pacific Country programs: Bangladesh, Bolivia, Cambodia, Mozambique, Nepal, Niger, Tajikistan, Yemen, Zambia
			In Nepal: The PPCR has provided funding to Nepal to build climate resilience of watersheds in mountain regions, build resilience to climate related hazards, and build climate resilient communities through private sector participation.					

[177] GIZ, http://www.gtz.de/en/weltweit/asien-pazifik/33473.htm
[178] PPCR, http://www.climatefundsupdate.org/listing/pilot-program-for-climate-resilience

Name		Objectives	Funder(s)	Implementing Agency(s)	Type of project	Duration	Priority Sector(s)	Geographic focus (if any)
16.	Integrating Climate Change Mitigation and Adaptation into Development Planning (CCMAP) project[179]	START and its partners are engaging scientists and policy makers in West Africa, East Africa and South Asia in a range of activities that aim at raising awareness and improving access to scientific information, so that decision-makers can better integrate climate change issues in development planning and poverty reduction measures. The activities include national science-policy dialogues, regional knowledge assessments, regional knowledge sharing strategies, and regional trainings. It also includes assessments of climate change risk to agriculture in nine urban and peri-urban areas.	European Commission; UNEP; USAID	START with WMO, IPCC, UNEP, University of Dar es Salaam, University of Ghana, and the Bangladesh Centre for Advanced Studies	Capacity building; Assessment; Policy formation and integration	2009 – 2010	Government; Agriculture; Urban areas; Peri-urban areas	*Global:* Bangladesh, Bhutan, Burundi, Ghana, Nepal, Nigeria, Rwanda, Senegal, Tanzania
			In Nepal: Further information required.					
17.	Adaptation Knowledge Platform[180]	The goal of the Adaptation Knowledge Platform is to strengthen adaptive capacity and facilitate climate change adaptation in Asia at local, national and regional levels. Its specific purpose is to establish a regionally and nationally owned mechanism that facilitates the integration of climate change adaptation into national and regional economic and development policies, processes and plans, strengthen linkages between adaptation and the sustainable development agenda in the region and enhance institutional and research capacity, in collaboration with a wide range of national and regional partners.	SIDA	SEI, SENSA, UNEP, AIT and UNEP Regional Resource Centre for Asia and the Pacific	Capacity building; Policy formation and integration	2009 – 2012	Government	*Asia:* Bangladesh, Bhutan, Cambodia, China, Indonesia, Lao PDR, Malaysia, Myanmar, Nepal, the Philippines, Sri Lanka, Thailand, Viet Nam
			In Nepal: Further information required.					

[179] START, http://start.org/programs/ccmap
[180] AKP, http://www.climateadapt.asia/

Name		Objectives	Funder(s)	Implementing Agency(s)	Type of project	Duration	Priority Sector(s)	Geographic focus (if any)
18.	South Asia Water Initiative[181]	Working with DFID and the World Bank, the South Asia Water Initiative is building capacity for water resource management to address serious water availability issues in Himalayan watershed countries of Afghanistan, Bangladesh, Bhutan, India, Nepal and Pakistan.	DFID, Australia, Norway *Budget:* US$9.6 million	World Bank (lead); regional and national bodies	Capacity building; Policy formation and integration	2009 – 2013	Freshwater supply	*Regional:* Afghanistan, Bangladesh, Bhutan, India, Nepal and Pakistan
			In Nepal: Further information required.					
19.	Cities and Climate Change Initiative Asia Pacific[182]	This initiative aims to strengthen the climate change response of cities and local governments. The main objectives are to: promote active climate change collaboration between local governments and associations; to enhance policy dialogue on climate change; to support local governments in preparing climate action plans; and to foster awareness, education and capacity building. The regional strategy in Asia-Pacific aims to support city level climate change adaptation and mitigation action with support for revised urban plans; support for a national climate change and urban policy review; and support the setting up of Asia-Pacific-wide advocacy, knowledge management and capacity development institutions.	UN-Habitat *Budget:* US$10 million	Local governments, universities	Capacity building; Knowledge communication; Policy formation and integration	2010 – ?	Urban areas	*Asia Region:* China, Fiji, Indonesia, Mongolia, Nepal, Papua New Guinea, Samoa, Sri Lanka, Vanuatu, Viet Nam
			In Nepal: In Kathmandu, this project is enabling an urban vulnerability assessment, planned with a particular emphasis on water security and hydrological systems.					
20.	Climate Risk Management Technical Assistance Support Project: Phase II[183]	Building capacities for climate risk management among national stakeholders.	Sweden and SIDA through UNDP, UNDP	ADPC, International Institute for Sustainable	Research; Policy formation and integration	2010 – 2011	Multi-sectoral	*Global:* Bangladesh, Bhutan, Dominican

[181] UN, http://www.un.org/climatechange/projectsearch/proj_details.asp?projID=182&ck=aVmfG453KHSJI81
[182] CCCI, http://www.fukuoka.unhabitat.org/programmes/ccci/index_en.html
[183] UNFCCC, http://unfccc.int/files/adaptation/nairobi_workprogramme/partners_and_action_pledges/application/pdf/iisd_furtherinfo_water_190411.pdf

Name		Objectives	Funder(s)	Implementing Agency(s)	Type of project	Duration	Priority Sector(s)	Geographic focus (if any)
			core finance	Development				Republic, Honduras, India, Kenya, Maldives, Mongolia, Nepal, Nicaragua, Niger, Pakistan, Papua New Guinea, Peru, Timor-Leste and Uganda
			In Nepal: to be determined					
21.	Global Climate Change Alliance[184]	The Global Climate Change Alliance seeks to deepen the policy dialogue between the European Union and developing countries on climate change; and to increase support to target countries to implement priority adaptation and mitigation measures, and integration climate change into their development strategies. The program's five priority areas for funding are: improving the knowledge base of developing countries to the effects of climate change; promoting disaster risk reduction; mainstreaming climate change into poverty reduction development strategies; reducing emissions from deforestation and degradation; and enhancing participation in the Clean	European Commission, Czech Republic, Sweden, 10th European Development Fund *Budget:* € 140 million	National Governments	Policy formation and implementation; Knowledge communication	2008 – ongoing	Disaster risk management; Government	*Global:* 17 countries and the Pacific region,[185] including: Bangladesh, Maldives and Nepal
			In Nepal: Further information required.					

[184] GCCA, http://www.gcca.eu/pages/1_2-Home.html

[185] These countries are: Bangladesh, Belize, Cambodia, Ethiopia, Guyana, Jamaica, Maldives, Mali, Mozambique, Mauritius, Nepal, the Pacific Region, Rwanda, Senegal, Seychelles, Solomon Islands, Tanzania and Vanuatu.

Name		Objectives	Funder(s)	Implementing Agency(s)	Type of project	Duration	Priority Sector(s)	Geographic focus (if any)
		Development Mechanism.						
22.	Asia Pacific Climate Change Adaptation Project Preparation Facility (ADAPT)[186]	Increase access to financial resources for climate change adaptation investment projects; strengthen national human and institutional capacity in preparation of financing proposals; and strengthen regional knowledge platform to share information and processes on climate change projects, funds and best practices to promote replication and scaling up.	USAID *Budget:* US$18.0 million	WWF, Conservation International, the Nature Conservancy, ARD Inc., NOAA	Capacity building; Knowledge communication	2011 – 2016	Government	*Asia Region:* Bangladesh Cambodia Federated States of Micronesia, Fiji, Indonesia, Lao PDR, Malaysia, Nepal, Palau, Philippines, Solomon Islands, Sri Lanka, Thailand, Viet Nam
			In Nepal: Further information required.					

D. Proposed Adaptation Action

Nepal's proposed adaptation actions, listed in Table 3, focus on the areas of water, agriculture, risk reduction, policy formulation, nature, infrastructure, health and urban areas. Given that the country's NAPA was released in December 2010, the majority of these projects have not yet received funding. An exception is the Asian Development Bank funded project "Community Based Vulnerability Assessment, Risk Mapping, and Adaptation Planning," which was designed to address NAPA priorities. However, certain ongoing adaptation projects address key objectives identified through the NAPA, as noted in the table below.

[186] USDS, http://www.state.gov/documents/organization/151686.pdf

Table 3: Proposed Adaptation Actions as identified in Nepal's NAPA (MOE, 2010)

	Name	Objectives	Type of project	Priority Sector(s)	Geographic focus (if any)
1.	Promoting community-based adaptation through integrated management of agriculture, water, forest and biodiversity sector	The goal of this project is to increase communities' resilience in order to enable them to better adapt to climate change by creating livelihoods opportunities through integrated resource management at the watershed level. This would include providing technology, skills and services for increased production and productivity of natural and human capital, promoting sustainable farming practices, promoting community based risk reduction schemes, etc.	Community based adaptation; Policy formation and integration	Agriculture; Freshwater supply; Forestry; Biodiversity	
			Notes: It appears that objectives of this project are being addressed through the DFID funded "Mainstreaming Livelihood Approaches into Disaster Management" project.[187]		
2.	Building and enhancing adaptive capacity of vulnerable communities through improved system and access to services related to agricultural development	The goal of this project is to develop climate change adaptation capacity of vulnerable farmer communities by developing climate resilient agricultural practices. This would include promoting technologies for crop and livestock that address climate risks and uncertainty, and enhance the adaptive capacity of poor communities.	Community based adaptation; Capacity building	Agriculture	
			Notes: The FAO-funded project "Strengthening Capacities for Disaster Preparedness and Climate Risk Management in the Nepalese Agriculture Sector" may address some of these objectives.		
3.	Community-based disaster management for facilitating climate adaptation	The objective of this project is to manage disasters at the community level in order to facilitate climate adaptation. This would include capacity building for climatic hazards, development of infrastructure to minimize hazards and risks, and development of safety nets.	Capacity building; Community based adaptation	Disaster risk management	
			Notes:		
4.	GLOF monitoring and disaster risk reduction	This project is focused on the monitoring of GLOF events to reduce disaster risk. This includes monitoring glacial lakes to reduce potential hazards, and developing appropriate infrastructure and early-warning systems for downstream communities.	Research; Assessment	Disaster risk management	
			Notes:		
5.	Forest and ecosystem management for supporting climate-led adaptation innovations	The goal of this project is to develop community-based innovations to adapt with changing climate and conserve ecosystem services. The project components are capacity	Community based adaptation; Capacity building	Forestry; Ecosystem conservation	

[187] Information about this project being implemented by Practical Action may be found here: http://practicalaction.org/mainstreaming-livelihood-centred-approaches-to-disaster-mana

	Name	Objectives	Type of project	Priority Sector(s)	Geographic focus (if any)
		building of forest dependent communities, farmers, and rural populations; assessment of sites for tree plantations; generation of biomass energy; and research and extension of adaptation priorities.	**Notes:**		
6.	Adapting to climate challenges in public health	This project would focus on climate change adaptation in the public health sector in Nepal, with major components including mapping major communicable diseases and water and food-borne diseases, exploring indigenous knowledge and community practices for health adaptation, and to reduce the impacts of climate change on human health through research and development programs.	Research; Capacity building	Human health	
			Notes:		
7.	Ecosystem management for climate adaptation	The goal of this project is to conserve the ecosystem and promote the ecosystem-based livelihoods of the people living in Western Nepal. This would include rehabilitating degraded areas through improved pasture and rangeland management, conservation of local ecological resources, and enhancing the capacity of communities for sustainable management of resources. This would include the development and implementation of Local Adaptation Plans.	Community based adaptation; Policy formation and integration	Ecosystem restoration	Western Nepal
			Notes: The Norwegian funded project "Adaptation to climate change in the Hindu Kush Himalayas and Central Asia" may address some of the objectives of this project.		
8.	Empowering vulnerable communities through sustainable management of water resource and clean energy supply	The goal of this project is sustainable management of water resources and supply of clean energy, involving the following tasks: monitoring of water resources using a combination of climate proofing, climate risk management, and water use technologies; ensuring the supply of clean energy through developing related technologies and schemes, and enforcing regulatory mechanisms for the sustainable harvesting of water resources.	Assessment; Field implementation	Freshwater supply; Energy	
			Notes: The DFID-funded project "Mainstreaming livelihood centered approaches to disaster management" appears to address some of the objectives of this project.		
9.	Promoting climate smart urban settlements	The objective of this project is to promote climate smart urbanization processes in Nepal through national and local capacity building. This would include developing mechanisms for incorporating climate change into building codes, managing municipal waste and linking it with the clean development mechanism, and enhancing the capacity of related stakeholders	Capacity building; Policy formation and integration	Urban areas	Urban areas, Nepal
			Notes:		

	Name	Objectives	Type of project	Priority Sector(s)	Geographic focus (if any)
		and institutions.			

E. Assessment

Nepal's NAPA provides an up-to-date overview of the country's priority adaptation needs. Encouragingly, many ongoing adaptation activities in Nepal are supporting the NAPA's priorities, as identified in Table 3, primarily in the areas of water, risk reduction, agriculture, nature, and policy formulation. However, gaps in current adaptation action persist. Ongoing activities do not appear to address the issue of vulnerability to climate change in the energy sector, which in Nepal is inextricably linked to the water sector. Opportunities exist for integration of energy considerations into ongoing and future water initiatives. In addition, current adaptation actions do not appear to address the priority needs of forestry, health, infrastructure, and gender implications.

Of the ongoing adaptation activities in Nepal, the Pilot Program on Climate Resilience (PPCR) is anticipated to significantly contribute towards building national capacity and institution, and help develop and implement a Strategic Program for Climate Resilience (SPCR) for Nepal. It will be interesting to note to what extent the PPCR, which has been criticized by civil society in Nepal as a top-down global initiative, manages to achieve its objective vis-à-vis LAPAs driven by the NAPA process. Regardless, as the PPCR generally focuses on identifying more high-priority interventions than what can be supported through country specific allocations, it is therefore possible to piggyback on the SPCR and co-finance projects which can only be partly supported through the PPCR to have large-scale impact. The primary challenge will be to align the SPCR with the NAPA or to demonstrate PPCR's value addition to Nepal's nationally-driven process for adaptation.

References:

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7.0 Pakistan

ADB	Asian Development Bank
BMZ	German Federal Ministry for Economic Cooperation and Development
DFID	Department for International Development (United Kingdom)
FAO	Food and Agriculture Organization
GOP	Government of Pakistan
ICIMOD	International Centre for Integrated Mountain Development
ICRISAT	International Crop Research Institute for the Semi-Arid Tropics
IFAD	International Fund for Agricultural Development
IUCN	International Conservation Union
MMF	Mangroves for the Future
MOE	Ministry of Environment
SCCF	Special Climate Change Fund
UNEP	United Nations Environment Program
UNFCCC	United Nations Framework Convention on Climate Change
UNDP	United Nations Development Program
USAID	United States Agency for International Development

Pakistan has a diverse topography includes permafrost and alpine regions, temperate, topical and sub-tropical ecosystems, and coastal areas. This diversity is reflected in the country's eleven distinct climatic zones, ranging from areas characterized by mild, moist winters and hot, dry summers in the north to semi-arid and arid zones in the west. Pakistan's socioeconomic and environmental characteristics also differ considerably from region to region (MOE, 2003).

A. Adaptation Needs and Priorities

Pakistan's climate change concerns include increased variability of monsoons, the likely impact of receding Himalayan glaciers on the Indus River system, decreased capacity of water reservoirs, reduced hydropower during drought years, and extreme events including floods and droughts. Other potential climate change induced impacts include: severe water stress; food insecurity due to decreasing

agricultural and livestock production;[188] more prevalent pests and weeds; degradation of ecosystems; biodiversity loss; and northward shifting of some biomes. As well, higher temperatures may affect the composition, distribution and productivity of mangroves, while lower precipitation could contribute to salt stress.

Pakistan's Initial National Communication to the United Nations Framework Convention on Climate Change (UNFCCC) reports on climate projections generated using the Model for Assessment of Greenhouse Gas Induced Climate Change software. The National Communication notes that the impact of climate change on Pakistan's water supply is likely to be significant, which would also have an impact on the country's energy supply; 34 per cent of Pakistan's electricity generation is based on hydropower (MOE, 2003). Climate change is also anticipated to have a considerable impact on the country's agricultural system, with possible impacts including vulnerability to heat stress, shifts in the spatial boundaries of crops, changes in productivity, and changes in water availability and use (MOE, 2003). Climate change may also impact forestry through changes in forest area, productivity changes, and changes in species composition and distribution. As well as Pakistan's coastal zones, particularly the city of Karachi, could be affected by coastal erosion and inundation through sea level rise. The country's National Communication also notes the potential impact of climate change on the livestock sector and biodiversity, as well as socioeconomic impacts on health and food security.

Pakistan is also likely to experience frequent occurrence of severe cyclones and storm surges due to rising atmospheric and sea temperatures. These events, accompanied by rising sea levels, could threaten coastal cities such as Karachi, Thatta and Badin. Combined with decreased river flow and sediments dispersal, sea level rise would mean a landward penetration of the salt water wedge within the groundwater column. This process of salt water intrusion would significantly influence access to water resources in Pakistan's coastal communities. As well, coastal infrastructure will be especially affected. Key assets like Gwader Port and the Coastal Highway could need extra protection.

Given these concerns, Pakistan outlined a number of possible adaptation options by key socioeconomic category in its Initial National Communication; additional recommendations were put forward in 2010 by Pakistan's Task Force on Climate Change. These options are summarized in Table 1.

[188] In Pakistan, the prevailing maximum temperature for 14 selected crops is 10°C higher than the optimal levels. Thus, any increase in temperature will have an impact on yield as well as water requirements. Growing season length will become shorter too but more time may be available for land preparation (Pakistan [2003]).

Table 1: Possible adaptation actions by sector, identified in Pakistan's National Communication and Task Force on Climate Change

Key sector	Possible adaptation actions
Freshwater resources	• Development of adaptation strategy in the water resources sector; • Implementation of strict demand management and efficiency improvements in all water use-sectors, including supply, distribution and irrigation water; • Watershed management practices, including the construction of dams for new storage, watershed protection, and flood protection works; • Development of policies—both economic and structural—to practice water conservation in urban areas; • Engage in risk and vulnerability analyses for flood prone areas in Pakistan, including the construction of bunds and spurs and other hydrological solutions; • Establishment of enhanced weather forecasting and information networks for farmers; • Integrating adaptation in water resource planning, development, and management on the Indus River; • Creation of additional reservoirs to prevent excess water flows down Kotri; • Usage of local rain harvesting; and • Reuse of marginal quality irrigation effluent.
Agriculture	• Changes in cropping patterns to adjust to rising temperatures and reduced rainfall; • Adjust crop patterns with water availability; • Improved crop productivity and production management of water use; • Sustainable land use management including increased use of organic composts and integrated pest management; • Development and use of appropriate seed breed that are resistant to pests/insects and climate variability and shocks, and • Introduction of modern agriculture techniques including laser land leveling, crop diversification and optimized planting dates.
Livestock	• Farmers alter the location, timing and duration of grazing of their animals; • Use of feed conservation techniques and fodder banks in arable areas, and haymaking in the rangelands; • Improving the nutritional value of feed; • Restoration of degraded land areas; and • Development and integration of improved varieties of livestock that produce more milk, are less vulnerable to heat stress and more drought tolerant.
Forestry	• Control of forest pests via viable predatory birds and insects and restricted use of chemical insecticide; • Changes in tree species and varieties, including those tree species with poor seed production and dispersal; • Preservation of watersheds and rangelands; • Control of wastage, including more production and use of composite wood products based on wood waste and undersized pieces; • Energy efficiency measures in fuelwood use, especially with regard to improved efficiency of fuelwood use in household energy; • Implementation of climate change appropriate afforestation and reforestation strategies; and • Preservation of grasslands in saline and waterlogged zones through the introduction of grass varieties.
Coastal zones	• Proper engineering works, such as groynes, dikes and seawalls, should be constructed to protect beaches from excessive erosion of sediment; • Existing defenses should be tested to ensure that they can withstand the possible effects of sea level rise in the medium and long term; • Plans for coastal defense systems along vulnerable regions should be finalized, including protection and restoration coastal mangrove

Key sector	Possible adaptation actions
	forests; • Regulated flows down Kotri for minimum necessary environmental flows; and • Capacity building for natural disaster response such as cyclones and floods.
Biodiversity	• Protected area management, including ex-situ conservation to preserve genetic diversity, including gene banks, seed banks, zoos and botanical gardens; and • Provide natural migration corridors and assisted migration to genetically improved species or those with important ecosystem functions.
Energy and Industry	• Detailed mapping of areas at risk from natural disasters should be undertaken in the medium- to long-term, in order to avoid the building of major infrastructure in these locations.

Sources: MOE, 2003; GOP, 2010.

B. National Level Policies and Strategic Documents

Over the past several years, Pakistan has undertaken several policy and planning initiatives with respect to climate change, and is preparing a formal climate change strategy. In 2003, it submitted its National Communication to the UNFCCC, and in 2005 it established the Prime Minister's Committee on Climate Change, an overarching body that meets annually to monitor climate change trends and provide policy guidance. In addition, in October 2008, the Planning Commission—the body responsible for preparing the National Plans for the country's main economic sectors—established a Task Force on Climate Change that was given responsibility for preparing the country's climate change policy. The Task Force released its Final Report in 2010, which outlines the country's current approach to addressing climate change from both a mitigation and adaptation perspective, including key recommended adaptation measures in priority socioeconomic areas (GOP, 2010). In addition, various sectoral strategies, including the National Conservation Strategy, National Environmental Policy, National Water Policy, and National Forest Policy (draft), also make mention of the potential impacts of climate change.

In the international arena, Pakistan has endorsed all of the South Asian Association for Regional Cooperation's declarations on climate change, including the 2010 Thimphu Declaration. As well, it is possible that the 2010 floods in Pakistan (the most severe in its history) have prompted the Pakistani policy makers to accelerate the process of drafting a national policy and action plan on climate change. Pakistan has already stepped up its effort to claim its due share of support from global sources, particularly from those available through the United Nations. For example, at the September 2010 General Assembly of the UN, Pakistan's Foreign Minister remarked, "Climate change, with all its severity and unpredictability, has become a reality for 170 million Pakistanis. The present situation in Pakistan

reconfirms our extreme vulnerability to the adverse impacts of climate change." Pakistan is lobbying to clarify and broaden understanding of the phrase "particularly vulnerable developing countries" in future UN agreements (Khan, 2010).

Table 2: Key Government Policies and Reports reflecting Adaptation Needs, Priorities and Planned Actions

Name of Policy Action		Government Division Responsible	Status	Sector(s) of Focus	Summary description
1.	Initial National Communication on Climate Change	Ministry of Environment	Released in 2003	Freshwater supply, agriculture, forestry; biodiversity, energy	This document reviews the country's national circumstances, greenhouse gas emissions profile, vulnerabilities to climate change, as well as the ways that the country may adapt to and mitigate climate change.
2.	Report of the Task Force on Climate Change	Planning Commission, Government of Pakistan	Released in 2010	Freshwater supply, agriculture, energy, coastal area management, forestry, ecosystem conservation, human health	This report outlines Pakistan's approach to addressing climate change – both mitigation and adaptation. The report identifies the country's main climate change related concerns as pertaining to water security, food security, energy security, coastal areas, forests and vulnerable ecosystems, health, extreme events, and economic impacts. The document describes the country's ongoing and planned actions within the following priority areas: water resources; agriculture and livestock; coastal areas and Indus Deltaic Region; forests and other vulnerable ecosystems; health; and extreme events.
3.	National Climate Change Strategy		In development		

C. Current Adaptation Action

The number of adaption focused projects and programs underway in Pakistan (as presented in Table 3) is moderate in comparison to other South Asian countries. The majority of these projects involve countries in Asia, the Pacific, Africa and/or Latin America and the Caribbean. Water is the sector most represented in Pakistan's current adaptation initiatives, followed by risk reduction, policy formulation, agriculture, energy, forestry, coastal zones, and nature. Donors of these projects include the Adaptation Fund, Asian Development Bank (ADB), the Department for International Development (DFID), the Food and Agriculture Organisation (FAO), Italy, the Netherlands and World Bank with implementation organizations including the International Centre for Integrated Mountain Development (ICIMOD), International Crop Research Institute for the Semi-Arid Tropics (ICRISAT), International Fund for Agricultural Development (IFAD), International Union for the Conservation of Nature (IUCN), and United Nations Environment

Programme. The Special Climate Change Fund (SCCF) is currently considering funding two regional projects in Pakistan and other Asian countries, both of which focus on agriculture and water considerations.

Table 3: Current Adaptation Projects and Programs active in Pakistan

Name		Objectives	Funder(s)	Implementing Agency(s)	Type of project	Duration	Priority Sector(s)	Geographic focus (if any)
National Action								
1.	Promotion of Rural Livelihoods through Adaptation Support Programme[189]	Reduce stresses and associated costs posed by climate change to Pakistani irrigated agricultural by improving efficiency, piloting resistant varieties of crops and introducing basic weather forecasting in extension services. This project will work to promote promotion of agricultural adaptation and capacity building for climate change mainstreaming.	SCCF *Budget:* US$16.46 million	IFAD, Ministry of Environment	Capacity building; Policy formation and integration; Community based adaptation	2011 – 2014	Agriculture; Freshwater supply	Pakistan
2.	Integration and Harmonization of Sustainable Development Interventions in the Central Karakorum National Park, Pakistan[190]	To promote sustainable development through better coordination of ongoing efforts and initiatives, development of integrated management plan supported by knowledgebase and environmental monitoring program. Key activities include: improving the knowledge base on ecosystems, including "local capacity to deal with likely impacts of climate change;" and identifying and assessing "appropriate alternative mitigation and adaptation scenarios, and prioritize suitable mitigation and adaptation measures according to their effectiveness in terms of reducing vulnerability to threat from climate change and variability, associated cost, and	Italy	UNEP with the Ministry of Environment, IUCN-Pakistan, WWF-Pakistan, ICIMOD, Sustainable Development Policy Institute, Karakorum International University & Pakistan Meteorological Department	Research; Assessment	Ongoing	Ecosystem conservation	Karakorum Park, Pakistan

[189] ALM, http://www.adaptationlearning.net/project/rural-livelihoods-climate-change-adaptation-support-programme
[190] Karakorum Trust, http://www.evk2cnr.org/cms/en/research/integrated_programs/karakorum_trust

Name		Objectives	Funder(s)	Implementing Agency(s)	Type of project	Duration	Priority Sector(s)	Geographic focus (if any)
		implementation potential."						
3.	Reducing Risks and Vulnerabilities from Glacier Lake Outburst Floods in Northern Pakistan[191]	This project will reduce risks and vulnerabilities from GLOFs and snow-melt flash floods in Northern Pakistan. The main objectives of the project are as follows: (1) To develop the human and technical capacity of public institutions to understand and address immediate GLOF risks for vulnerable communities in Northern Pakistan; (2) To enable vulnerable local communities in northern areas of Pakistan to better understand and respond to GLOF risks and thereby adapt to growing climate change pressures.	Adaptation Fund	UNDP	Capacity building; Community based adaptation	2011 – 2015	Disaster risk reduction	Northern Pakistan
Participation in Regional and Global Projects								
4.	Floods from the Roof of the World: Protection thanks to applied research[192]	The project seeks to protect people and infrastructure from the hazards of GLOFs. Based on previous fundamental research, the countries of Nepal, Bhutan, India, Pakistan and China/Tibet now have an inventory of glaciers and glacier lakes as well as a GLOF monitoring system. The data gathered is used as the basis for early-warning systems. This enables priorities to be set and corresponding action to be taken. The database is also used to determine the amount of total available water resources the region will have in the future.	Swiss Development Corporation	ICIMOD	Community based adaptation; Research	Phase One: 1999 – 2007 Phase Two: 2008 – 2012	Disaster risk management	*Regional:* China/Tibet, Bhutan, India, Nepal, Pakistan
			In Pakistan: Further information required.					
5.	Mangroves for the Future (MFF)[193]	The project has two main objectives: to strengthen the environmental sustainability	2007 – 2009: Australia,	National governments	Research; Knowledge	2006 – present	Coastal zone management	*Asia Region:* India,

[191] UNDP, http://www.undp-adaptation.org/projects/websites/index.php?option=com_content&task=view&id=477
[192] SDC, http://www.sdc.admin.ch/en/Home/Projects/Floods_from_the_Roof_of_the_World

Name		Objectives	Funder(s)	Implementing Agency(s)	Type of project	Duration	Priority Sector(s)	Geographic focus (if any)
		of coastal development; and to promote the investment of funds and efforts in coastal ecosystem management. MFF re-orients the current focus of coastal investment by moving from a reactive response to disasters, to progressive activities that address long-term sustainable management needs. These include building awareness and capacity for improved food and livelihood security, disaster preparedness, and climate change adaptation. Initially focused on countries that were highly affected by the 2004 tsunami—India, Indonesia, Maldives, Seychelles, Sri Lanka and Thailand—the project has expanded to include Pakistan and Viet Nam.	Germany, Norway, Sweden, UNDP, UNEP 2010 to now: Norway and Sweden	with CARE International, FAO, IUCN, UNDP, UNEP and Wetlands International with NGOs and CBOs	communication; Policy formation and implementation			Indonesia Maldives, Pakistan, Seychelles, Sri Lanka, Thailand, and Viet Nam
			In Pakistan: Further information required.					
6.	Management of Flash Floods: Capacity building and awareness raising in the Hindu Kush Himalayas[194]	Flash floods have caused huge loss of lives and properties of people in the Hindu-Kush Himalayan region. This project aims to improve the capacity of stakeholders of the region to cope with flash floods.	USAID	ICMOD	Capacity building	*Phase I:* 2006 – 2007 *Phase II:* 2008 – 2010	Disaster risk management	*Asia Region:* China, Nepal, Pakistan
			In Pakistan: Further information required.					
7.	Glacial Melt and Downstream Impacts on Indus-dependent Water Resources and Energy[195]	Glacier-fed river basins are a major source of irrigation and hydropower in Himalayan countries, with the Indus river basin of major importance for the economy of several countries in South Asia. This project will develop climate adaptive measures to reduce some of the adverse climate impacts on environmental degradation, building a level of climate resilience at the target	ADB Small Grant for Adaptation Project *Budget:* US$200,000	ICIMOD, UNEP-GA, CICERO	Community based adaptation; Policy formation and integration	2007 – 2009	Freshwater supply; Energy	Regional: Pakistan, Central and East Afghanistan, North India
			In Pakistan: Further information required.					

[193] MFF, http://www.mangrovesforthefuture.org/ and http://www.mangrovesforthefuture.org/Assets/documents/IUCN-MFF-Brochure-Web.pdf
[194] ICIMOD, http://www.icimod.org/?q=258
[195] ADB, http://www.adb.org/climate-change/afg-ind-downstream.asp

Name		Objectives	Funder(s)	Implementing Agency(s)	Type of project	Duration	Priority Sector(s)	Geographic focus (if any)
		watersheds. The project will support the mainstreaming of climate adaptation activities into ADBs projects and programs in the water and hydro-energy sector in these countries.						
8.	Adaptation to Climate Change in the Hindu Kush Himalayas and Central Asia[196]	This project is addressing how to adapt to too much and too little water in the Hindu Kush Himalayas and Central Asia, covering the following activities: • Improved scenarios for climate change variation and impacts; • Scenarios for water demand and availability; • Improved knowledge on climate change effects on biodiversity and ecosystem services; • Improved understanding of impacts on agro-ecology and food production systems and food security; • Critical factors for achieving sustainable adaptation.	Norway (through UNEP) *Budget:* US$62 million	Center for International Climate and Environmental Research, UNEP, International Centre for Integrated Mountain Development, national governments	Research; Policy formation and integration	2007 – 2011	Climate information services; Biodiversity; Agriculture	*Asia Region*: China, India, Nepal, Pakistan
			In Pakistan: Further information required.					
9.	Protection of Sustainable Policy Initiatives in the Management of Natural Resources in the Hindu Kush Himalayas[197]	The program strengthens the role of International Centre for Integrated Mountain Development (ICIMOD) as an organization and service provider in the region, and increases the accountability of the eight member countries. It helps develop and implement regionally agreed concepts and strategies to facilitate adaptation to climate change and sustainable resource	BMZ	GIZ, ICIMOD	Capacity building	2008 – 2012	Government	*Asia Region:* Afghanistan, Bangladesh, Bhutan, China, India, Myanmar, Nepal, Pakistan
			In Pakistan: To be determined					

[196] ALM, http://www.adaptationlearning.net/reasearch/too-much-too-little-water-adaptation-climate-change-hindu-kush-himalayas-and-central-asia
[197] GIZ, http://www.gtz.de/en/weltweit/asien-pazifik/33473.htm

Name		Objectives	Funder(s)	Implementing Agency(s)	Type of project	Duration	Priority Sector(s)	Geographic focus (if any)
		management. This is realized by institutional strengthening of ICIMOD in areas such as data collection related to climatic changes and forests. GIZ further promotes the ICIMOD priority program Environmental Change and Ecosystem Services.						
10.	South Asia Water Initiative[198]	Working with DFID and the World Bank, the South Asia Water Initiative is building capacity for water resource management to address serious water availability issues in Himalayan watershed countries of Afghanistan, Bangladesh, Bhutan, India, Nepal and Pakistan.	DFID, Australia, Norway *Budget:* US$9.6 million	World Bank (lead); regional and national bodies	Capacity building; Policy formation and integration	2009 – 2013	Freshwater supply	*Regional:* Afghanistan, Bangladesh, Bhutan, India, Nepal and Pakistan
			In Pakistan: Further information required.					
11.	Climate Risk Management Technical Assistance Support Project: Phase II[199]	Building capacities for climate risk management among national stakeholders.	Sweden and SIDA through UNDP, UNDP core finance	ADPC, International Institute for Sustainable Development	Research; Policy formation and integration	2010 – 2011	Multi-sectoral	*Global:* Bangladesh, Bhutan, Dominican Republic, Honduras, India, Kenya, Maldives, Mongolia, Nepal, Nicaragua, Niger, Pakistan, Papua New Guinea, Peru, Timor-Leste

[198] UN, http://www.un.org/climatechange/projectsearch/proj_details.asp?projID=182&ck=aVmfG453KHSJI81
[199] UNFCCC, http://unfccc.int/files/adaptation/nairobi_workprogramme/partners_and_action_pledges/application/pdf/iisd_furtherinfo_water_190411.pdf

Name		Objectives	Funder(s)	Implementing Agency(s)	Type of project	Duration	Priority Sector(s)	Geographic focus (if any)
								and Uganda
			In Pakistan: Further information required.					
12.	Support to Policy Consultation and Actions to boost Sustainable Use of Water and Energy Resources for Agricultural Production and Livelihood Improvement in the Near East and North Africa Region in the context of Climate Change[200]	The project will assist in building the capacity of governments and civil society to prepare national reviews, analyze the current national policies for water development, examine cooperation on transboundary water management, and identify the investment needs and investment strategies for food, water and energy security to be adopted on a national and regional basis in the context of climate change. Its main objectives are: • Carry out studies and workshops to increase awareness of water-energy-food interrelation and their sustainable use. • Address food and energy security in the Near East and North Africa region through a convergent approach which integrates four critical resource factors - water, energy, technology, and knowledge under the stress of climate change. • Carry out studies on the use of water resources, on the management strategies and on the investment needs at national level. • Capacity-building of governments and civil societies for optimal natural resource management.	FAO Budget: $436,000	FAO; Organisation of the Islamic Conference	Capacity building; Policy formation and integration; Research	2010 – 2011	Freshwater supply; Energy; Agriculture	*Global:* 30 countries including: Afghanistan, Algeria, Djibouti, Egypt, Kazakhstan, Kyrgyzstan, Libya, Mauritania, Morocco, Pakistan, Somalia, Sudan, Tajikistan, Tunisia, Turkmenistan, Uzbekistan, and Yemen
			In Pakistan: To be determined					
13.	Vulnerability to Climate Change: Adaptation	Provide science-based solutions and pro-poor approaches for adaptation of	ADB	International Crops Research	Research; Field	2010 – 2012	Agriculture	*Asia Region:* Bangladesh,

[200] FAO, https://extranet.fao.org/fpmis/FPMISReportServlet.jsp?div=&type=countryprofileopen&language=EN&countryId=SD and SESRIC, http://www.sesric.org/activities-oicfao.php

Name		Objectives	Funder(s)	Implementing Agency(s)	Type of project	Duration	Priority Sector(s)	Geographic focus (if any)
	strategies and layers of resilience[201]	agricultural systems to climate change for the rural poor and most vulnerable farmers in semi-arid regions of Asia, specifically India, Peoples' Republic of China, Sri Lanka, Bangladesh, and Pakistan.		Institute for the Semi-Arid Tropics	implementation			China, India, Pakistan, Sri Lanka
			In Pakistan: Further information required.					

D. Proposed Adaptation Action

Pakistan is expected to participate in a few national and regional projects that are presently being developed, as described in Table 4.

Table 4: Proposed Adaptation Projects and Programs in Pakistan

Name		Objectives	Type of project	Priority Sector(s)	Geographic focus (if any)
1.	Technical Assistance Loan for the Implementation of the National Environment Policy	Multi-sector project with opportunities for climate resilient agriculture, drinking water and sanitation, water and disaster management, better governance.	Policy formation and integration	Agriculture; Freshwater supply; Disaster risk management	
			Notes: The World Bank and the Ministry of Environment are developing this project. *Proposed budget:* US$28 million		
2.	Information Sharing System to Enhance Coping Capacities of Farming Communities in Dealing Effectively with Climate Variability and Climate Change		Knowledge communication	Agriculture	*Regional:* India and Pakistan
			Notes: Funding for this project is currently being considered by the GEF SCCF *Proposed budget:* Proposed from SCCF = US$550,000; proposed co-financing = US$500,000		
3.	Building Climate Resiliency for Irrigation Infrastructure and Agro-Business			Agriculture; Freshwater supply	*Regional:* Pakistan, Tajikistan, Uzbekistan
			Notes: This project is currently being considered by the GEF SCCF. *Proposed Budget:* Proposed from SCCF = US$20million; proposed co-financing = to be determined		

[201] ICRISAT, http://ongoing-research.cgiar.org/factsheets/vulnerability-to-climate-change-adaptation-strategies-and-layers-of-resilience/

E. Assessment

Given the nature of Pakistan's vulnerability and the size of its population, it is safe to say that Pakistan will require a considerable amount of resources to climate proof its development investments. However, Pakistan has not been very active in prioritizing adaptation to climate change as a development concern, and this is reflected in its moderate number of current adaptation activities compared to other South Asian countries—and in particular the small number of projects designed specifically to meet its needs. However, the 2010 floods appear to have served as a warning for its policy makers, and there are indications that they are beginning to take notice of the importance of risk reduction and addressing the potential impacts of climate change. This is evidenced by the country's current development of a national climate change strategy. Pakistan's national climate change strategy, when ready, will provide guidance on country priorities and investment requirements. Once this strategy is in place, it will be important to sustain the political support necessary to keep climate change at the top of Pakistan's development agenda.

Current adaptation actions in Pakistan, although moderate, are addressing a number of key adaptation priorities and concerns as outlined in Pakistan's 2003 National Communication. These include agriculture, risk reduction, policy formulation, as well as a smaller number of initiatives in the areas of energy, forestry, coastal zones and nature. However, there is a need for future activities to diversify and enhance adaptation action in currently underrepresented areas, including forestry, coastal zones, infrastructure, gender as well as greater attention to the areas of energy and nature.

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8.0 Sri Lanka

ADB	Asian Development Bank
GEF	Global Environment Facility
ICRISAT	International Crop Research Institute for the Semi-Arid Tropics
IFAD	International Fund for Agriculture and Development
IPCC	Intergovernmental Panel on Climate Change
IUCN	International Union for the Conservation of Nature
MENR	Ministry of Environment and Natural Resources
MFF	Mangroves for the Future
MOE	Ministry of Environment
NCCAS	National Climate Change Adaptation Strategy
NSAP	National Strategy and Action Plan
SCCF	Special Climate Change Fund
UNFCCC	United Nations Framework Convention on Climate Change

A. Adaptation Needs and Priorities

As a small island nation, Sri Lanka falls into the Intergovernmental Panel on Climate Change (IPCC) and UNFCCC's category of "vulnerable" small island nations under serious threat from various climate change impacts, such as sea level rise, floods and droughts, and variability and unpredictability of rainfall patterns (IPCC, 2001; MOE, 2010). Specific climatic changes projected for Sri Lanka include: a faster increase in mean monthly and annual temperatures compared to the average global rate of warming; winter temperatures increasing more than summer temperatures; decrease in winter rainfall, whilst summer rainfall increases; and more frequent extreme weather events such as heat waves and very high intensity rainfalls (MOE, 2010). As well, cyclones are anticipated to increase in strength.[202] Moreover, being an island country, sea level rise will affect's Sri Lanka's infrastructure, tourism, fresh water availability, coastal wetlands and the livelihoods of people in low-lying coastal areas.

[202] Based on IPCC's Fourth Assessment Report (2007) and the Proceedings of the National Conference on Climate Change, Kukuleganga, Sri Lanka, March 2007.

Sri Lanka is already experiencing many of these anticipated impacts. Rainfall variability has increased both in summer and winter, making it extremely difficult for farmers to carry out traditional cultivation practices. Many hilly areas are also losing fertile top soil due to intense rainfall events. Higher temperatures have reduced crop yield due to heat and water stress. Sri Lanka may also face significant health impacts due to warmer temperatures, more frequent floods, rainfall and droughts in combination with poverty, poor access to safe water and poor sanitation (Practical Action, n.d.).

Sri Lanka's Initial National Communication under the United Nations Framework Convention on Climate Change (UNFCCC) identified sectors most affected by climate change and proposed a number of counter-measures, as summarized in Table 1. These sectors are agriculture, coastal zone resources, forestry, health, human settlements, water resources, transportation and energy supply.

Table 1: Sectors affected by climate change in Sri Lanka and suggested countermeasures (MFE, 2000)

Sector		Proposed adaptation measures
1.	Agriculture	1) Develop tree crop agriculture; 2) develop drought resistant rice varieties; 3) change land use patterns in landslide prone areas; 4) make farmers aware of climate change; and 5) change irrigation methods.
2.	Coastal zone management	1) Monitor sea level rise in critical regions; 2) identify most vulnerable areas and prepare management plans; 3) evaluate engineering interventions; 4) promote sustainable use of fishery resources.
3.	Forestry	1) Identify critical regions; 2) promote use of alternative timber species; 3) ensure conservation of natural forests and ban the clearing of natural forests for commercial purposes.
4.	Human health	1) Prepare baseline maps of disaster risk areas and develop early-warning systems for monitoring of natural disasters; 2) develop early-warning systems; 3) develop institutional facilities and provide the financial inputs; 4) upgrade health facilities in vulnerable areas.
5.	Human settlements	1) Develop and establish remote sensing/geographical information system early-warning systems; 2) integrate suitable adaptation in urban development; 3) update national disaster management plan; 4) integrate climate change concerns in national policies; 5) relocate people from vulnerable locations.
6.	Freshwater resources	1) Encourage minor storage water reservoirs; 2) investigate feasibility of trans-basin diversions; 3) conserve seasonal water; 4) rehabilitate irrigation water tanks networks; 5) promote micro-watershed management; 6) prepare groundwater extraction regulation policy; 7) introduce permit/monitoring systems for ground water quality assessment in vulnerable areas.
7.	Transportation	Improve road/railway infrastructure design standards to incorporate climate change.
8.	Energy	

B. National Level Policies and Strategic Documents

Of all the South Asian countries, Sri Lanka was the first to prepare its Initial National Communication for the UNFCCC. Completed in 2000, the National Communication identifies several sectors as most affected by climate change (specifically due to a projected rise in temperature and sea level, heavy rainfall and floods, droughts, and thunder activity) and suggested counter measures to deal with these impacts (presented in Table 1).

In 2010, the country released its National Climate Change Adaptation Strategy (NCCAS), which covers the period of 2011 to 2016 and is meant to complement existing national development priorities and sectoral development plans. The document provides a thorough overview of the country's adaptation priorities and suggested actions. The document identifies the following sectors as the most vulnerable to the effects of climate change: agriculture and fisheries; water; health; urban development, human settlements; economic infrastructure; and biodiversity and ecosystem services. The NCCAS is organized around five strategic areas, under which priority adaptation measures are identified (see Table 4).

- Mainstreaming climate change adaptation into national planning and development;
- Enabling climate resilient and healthy human settlements;
- Minimizing climate change impacts on food security;
- Improving climate resilience of key economic drivers; and
- Safeguarding natural resources and biodiversity from climate change impacts.

Table 2: Key Government Policies and Reports reflecting Adaptation Needs, Priorities and Planned Actions

Name of Policy Action		Government Division Responsible	Status	Sector(s) of Focus	Summary description
1.	Initial National Communication under the United Nations Framework Convention on Climate Change	Ministry of Environment	Released in 2000	Agriculture, freshwater supply, forestry	This document reviews the country's national circumstances, greenhouse gas emissions inventory, impacts and vulnerabilities, as well as possible mitigation and adaptation responses.
2.	National Climate Change Adaptation Strategy for Sri Lanka, 2011-2016	Ministry of Environment	Released in 2010	Multi-sectoral	This document outlines a comprehensive national climate change adaptation strategy for Sri Lanka, including a prioritized framework for action and investment during the 2011 to 2016 period aimed at moving Sri Lanka towards a climate-resilient future.

C. Current Adaptation Action

Compared to it exposed sectors and adaptation needs, and relative to other South Asian countries, a low number of adaptation projects and programs have been identified as underway in Sri Lanka. These projects are focused on coastal zones, water, forestry, policy formulation, agriculture and urban sectors, with donors comprised of the Asian Development Bank (ADB), Global Environment Facility (GEF), International Fund for Agriculture and Development (IFAD), International Union for the Conservation of Nature (IUCN), and the Governments of Australia, Norway and Sweden. This limited number of projects is consistent with the country's apparent lack of progress on the policy side with respect to developing a national framework to deal with climate change adaptation.

Table 3: Current Adaptation Projects and Programs active in Sri Lanka

Name		Objectives	Funder(s)	Implementing Agency(s)	Type of project	Duration	Priority Sector(s)	Geographic focus (if any)
National Action								
1.	Strengthening Capacity for Climate Change Adaptation[203]	Prepare a climate change adaptation strategy, conduct workshops, identify adaptation projects, provide training for risk management and undertake actions.	ADB *Budget:* US$611,351	Ministry of Environment and Natural Resources	Knowledge communication; Capacity building	2009 – 2010	Government	
2.	Participatory Coastal Zone Restoration and Sustainable Management of in the Eastern Province of Post-tsunami Sri Lanka[204]	The long-term goal of the project is that tsunami-affected ecosystems in Sri Lanka are rehabilitated to provide full ecosystem services including adaptation against extreme climatic events. The project development objective is restoration and conservation management of globally important ecosystems affected by the tsunami is demonstrated for, and mainstreamed effectively into, the reconstruction process to support sustainable livelihoods and reduce vulnerability to climate change along the East Coast of Sri Lanka.	GEF Trust Fund, Government of Sri Lanka, IFAD, IUCN	IFAD, IUCN	Capacity building; Field implementation	2007 – 2012	Coastal zone management	Coastal zones, Eastern province of Sri Lanka
Participation in Regional and Global Projects								

[203] ADB, http://pid.adb.org/pid/TaView.htm?projNo=43173&seqNo=01&typeCd=2
[204] ALM, http://www.adaptationlearning.net/project/participatory-coastal-zone-restoration-and-sustainable-management-eastern-province-post-tsun

Name		Objectives	Funder(s)	Implementing Agency(s)	Type of project	Duration	Priority Sector(s)	Geographic focus (if any)
3.	Mangroves for the Future (MFF)[205]	The project has two main objectives: to strengthen the environmental sustainability of coastal development; and to promote the investment of funds and efforts in coastal ecosystem management. MFF re-orients the current focus of coastal investment by moving from a reactive response to disasters, to progressive activities that address long-term sustainable management needs. These include building awareness and capacity for improved food and livelihood security, disaster preparedness, and climate change adaptation. Initially focused on countries that were highly affected by the 2004 tsunami—India, Indonesia, Maldives, Seychelles, Sri Lanka and Thailand—the project has expanded to include Pakistan and Viet Nam.	2007 – 2009: Australia, Germany, Norway, Sweden, UNDP, UNEP 2010 to now: Norway and Sweden	National governments with CARE International, FAO, IUCN, UNDP, UNEP and Wetlands International with NGOs and CBOs	Research; Knowledge communication; Policy formation and implementation	2006 – present	Coastal zone management	*Asia Region:* India, Indonesia Maldives, Pakistan, Seychelles, Sri Lanka, Thailand, and Viet Nam
			In Sri Lanka: The program's priorities in Sri Lanka include: training on social mobilization and applying ecosystem approaches and vulnerability mapping to coastal areas; improving communication, awareness and education; and developing standard valuation tools to apply to the Sri Lanka context; priority actions on improving governance. The Sri Lanka National Strategy Action Plan, developed through MFF, has integrated climate change adaptation into its plans for coastal zone management.					
4.	Strengthening Adaptive Capacities to the Impacts of Climate Change in Small-scale Aquaculture[206]	The project (also known as "Aqua Climate") aims to strengthen the adaptive capacities of rural farming communities to the impacts of climate change. It is strengthening adaptive capacities to the impacts of climate change in resource-poor small-scale aquaculture and aquatic resources-dependent sectors in the south and south east Asian region. The project will: (1) map farmers' perceptions and attitudes towards prospective climate change impacts and their adaptive capacities to address these impacts; (2) develop future scenarios based on the current trends; (3)	NORAD	NACA	Capacity building; Assessment	2009 – 2011	Freshwater fisheries	*Asia Region:* India, Philippines, Sri Lanka, Viet Nam
			In Sri Lanka: Further information required.					

[205] MFF, http://www.mangrovesforthefuture.org/ and http://www.mangrovesforthefuture.org/Assets/documents/IUCN-MFF-Brochure-Web.pdf
[206] NACA, http://www.enaca.org/modules/inlandprojects/index.php?content_id=10

Name		Objectives	Funder(s)	Implementing Agency(s)	Type of project	Duration	Priority Sector(s)	Geographic focus (if any)
		assess the potential adaptive measures for different aquatic farming systems and prioritise better management practices; and (4) suggest Codes of Practices and improved methodologies for such systems.						
5.	Adaptation Knowledge Platform[207]	The goal of the Adaptation Knowledge Platform is to strengthen adaptive capacity and facilitate climate change adaptation in Asia at local, national and regional levels. Its specific purpose is to establish a regionally and nationally owned mechanism that facilitates the integration of climate change adaptation into national and regional economic and development policies, processes and plans, strengthen linkages between adaptation and the sustainable development agenda in the region and enhance institutional and research capacity, in collaboration with a wide range of national and regional partners.	SIDA	SEI, SENSA, UNEP, AIT and UNEP Regional Resource Centre for Asia and the Pacific	Capacity building; Policy formation and integration	2009 – 2012	Government	*Asia:* Bangladesh, Bhutan, Cambodia, China, Indonesia, Lao PDR, Malaysia, Myanmar, Nepal, the Philippines, Sri Lanka, Thailand, Viet Nam
			In Sri Lanka: Further information required.					
6.	Asia–Pacific Community–based Adaptation Small Grants Program[208]	This program is providing funds to implement priority adaptation measures at the local level in 14 Pacific island countries, the Mekong sub-region, East Timor and Sri Lanka.	Australian Development Agency *Budget:* US$6 million	National Governments	General	2009 – 2013	General	*Asia Region:* 14 Pacific Island countries, East Timor & Sri Lanka
			In Sri Lanka: Further information required.					
7.	Cities and Climate Change Initiative Asia Pacific[209]	This initiative aims to strengthen the climate change response of cities and local	UN-Habitat	Local governments,	Capacity building;	2010 – ?	Urban areas	*Asia Region:* China, Fiji,

[207] AKP, http://www.climateadapt.asia/
[208] AusAID, http://www.ausaid.gov.au/keyaid/adaptation_initiative.cfm

Name		Objectives	Funder(s)	Implementing Agency(s)	Type of project	Duration	Priority Sector(s)	Geographic focus (if any)
		governments. The main objectives are to: promote active climate change collaboration between local governments and associations; to enhance policy dialogue on climate change; to support local governments in preparing climate action plans; and to foster awareness, education and capacity building. The regional strategy in Asia-Pacific aims to support city level climate change adaptation and mitigation action with support for revised urban plans; support for a national climate change and urban policy review; and support the setting up of Asia-Pacific-wide advocacy, knowledge management and capacity development institutions.	*Budget:* US$10 million	universities	Knowledge communication; Policy formation and integration			Indonesia, Mongolia, Nepal, Papua New Guinea, Samoa, Sri Lanka, Vanuatu, Viet Nam
			In Sri Lanka: In each of the cities of Batticaloa and Negombo, the project is enabling an initial comprehensive vulnerability and greenhouse gas assessment. A National Study on Cities and Climate Change is underway, and the National Climate Change Policy is to include urban issues.					
8.	Vulnerability to Climate Change: Adaptation strategies and layers of resilience[210]	Provide science-based solutions and pro-poor approaches for adaptation of agricultural systems to climate change for the rural poor and most vulnerable farmers in semi-arid regions of Asia, specifically India, Peoples' Republic of China, Sri Lanka, Bangladesh, and Pakistan.	ADB	International Crops Research Institute for the Semi-Arid Tropics	Research; Field implementation	2010 – 2012	Agriculture	*Asia Region:* Bangladesh, China, India, Pakistan, Sri Lanka
			In Sri Lanka: Further information required.					
9.	Asia Pacific Climate Change Adaptation Project Preparation Facility (ADAPT)[211]	Increase access to financial resources for climate change adaptation investment projects; strengthen national human and institutional capacity in preparation of financing proposals; and strengthen regional knowledge platform to share information and processes on climate change projects,	USAID *Budget:* US$18 million	WWF, Conservation International, the Nature Conservancy, ARD Inc., NOAA	Capacity building; Knowledge communication	2011 – 2016	Government	*Asia Region:* Bangladesh Cambodia Federated States of Micronesia, Fiji,

[209] CCCI, http://www.fukuoka.unhabitat.org/programmes/ccci/index_en.html
[210] ICRISAT, http://ongoing-research.cgiar.org/factsheets/vulnerability-to-climate-change-adaptation-strategies-and-layers-of-resilience/
[211] USDS, http://www.state.gov/documents/organization/151686.pdf

Name		Objectives	Funder(s)	Implementing Agency(s)	Type of project	Duration	Priority Sector(s)	Geographic focus (if any)
		funds and best practices to promote replication and scaling up.						Indonesia, Lao PDR, Malaysia, Nepal, Palau, Philippines, Solomon Islands, Sri Lanka, Thailand, Viet Nam
			In Sri Lanka: Further information required.					

D. Proposed Adaptation Action

Sri Lanka's recently released NCCAS identifies key adaptation priorities by thematic area, as shown in Table 4. Within these areas it identifies a number of priority adaptation measures for the country, which touch upon the areas of water, agriculture, policy formulation, health human settlements, infrastructure and biodiversity. This list of activities identifies a need for improved policy integration, awareness raising, communication, and community-based adaptation initiatives.

Table 4: Overview of Sri Lanka's priority adaptation measures by strategic area, as identified in the NCCAS (2010)

Strategic area	Priority adaptation measures.
Mainstreaming climate change adaptation into national planning and development	• *Strengthen national level climate-adaptation planning and implementation capacity*, including: restructuring the Climate Change Secretariat; developing sector specific training programs on climate change adaptation; and introducing climate change studies at university level. • *Ensure future investments/economic plans are climate resilient, including the following activities*: Integrate climate change concerns into the Strategic Environmental Assessment process; increase awareness of climate change issues across all levels of government; and quantify economic costs of climate change on specific sectors. • *Systematically research climate change adaptation options and disseminate knowledge*, including the following activities: establish coordinated research program with widespread dissemination; model possible future climate scenarios; conduct regular national forums on climate impacts on various sectors; and capture, evaluate and disseminate traditional knowledge on adaptive measures. • *Increase financing for climate change adaptation measures*, including the following: establish climate change adaptation small grant facility; establish multi-sectoral climate negotiation team for Sri Lanka; and support climate change adaptation regulations with incentives, where possible. • *Inform and mobilize stakeholders at multiple levels in support of climate adaptation*, including the following: effectively engage

	education system, media, and other information 'multipliers'; make information about adaptation options available at community level; promote policy change for climate change adaptation through small group engagement; engage existing institutional community-based mechanisms for coordination; and combat negative anthropogenic activity (such as sand mining).
Enabling climate resilient and healthy human settlements	• *Mobilize stakeholders for climate change adaptation of settlements*: establish coordination body/mechanism for climate change adaptation of settlements; promote improved climate resilient construction methods; and support climate change adaptation interventions with incentives. • *Improve planning to include climate change considerations:* develop detailed local-level hazard maps for key settlements; stimulate greening of settlements and presentation of natural ecosystems; promote land use planning and monitoring for both urban and rural areas; and research climate change impacts on human settlements and link to planning. • *Ensuring adequate quality and quantity of water for settlements*: promote water saving technologies including rainwater harvesting; improve monitoring/surveillance and sharing of data across sectors; promote integrated water resources and watershed management; and research climate impacts on water availability and develop scalable adaptation models. • *Combat climate change-related health concerns in settlements*: monitor and control vector borne diseases; facilitate data sharing and compatibility between Ministry of Health and other sectors; engage health sector experts in local level planning; and research health impacts of climate change in Sri Lankan context. • *Increase awareness on vulnerabilities and adaptation of settlements*: improve the gathering, processing and dissemination of information related to human settlements; enhance awareness and demand for climate resilient construction; improve coordination/dissemination through existing institutional mechanisms; and engage media more proactively with messaging tailored for stakeholders.
Minimizing climate change impacts on food security	• *Ensure ability to meet food production and nutrition demand*: increase awareness on alternative options to meet nutrition requirements; improve weather forecasting and information dissemination; ensure easy access to seed stock alternatives to counter rainfall variability; research climate impacts/adaptive measures for agriculture, livestock, and fisheries sectors; and conserve genetic resources for future crop and livestock improvement. • *Ensure adequate water availability for agriculture:* promote water-efficient farming methods and crops to improve water productivity; improve maintenance of existing tanks and reservoirs including their watersheds and catchments; adopt and promote the principles of integrated water resources management; and construct new reservoirs and trans-basin diversions to meet demand. • *Mitigate food security-related socioeconomic impacts*: encourage risk transfer methods such as insurance; research climate impacts on long-term food security and agriculture value chains; and identify and help vulnerable communities for climate change adaptation. • *Increase awareness and mobilize communities for climate change adaptation*: increase awareness on climate impacts on food security and on the potential adaptive measures; pilot test and scale up community level agriculture/livestock/fisheries adaptation models; improve utilization of field level coordination mechanisms and civil society organizations; promote risk transfer initiatives.
Improving climate resilience of key economic drivers	• *Minimize impacts of climate change on infrastructure*: identify climate change risks on transport infrastructure, and investment in adaptive measures; update standards/guidelines for infrastructure design and development; and include climate change adaptations in tourism planning guidelines. • *Minimize impacts of climate change on plantation sector*: research climate impacts and adaptive measures in plantation sub-sectors; pilot test and scale-up sub-sector specific adaptation measures; and evaluate and exploit potential productivity benefits due to climate change. • *Assist key industries in coping with climate change impacts*: make sector-specific vulnerability information available to investors/regulators; encourage climate change risk transfer options for key industries; research potential climate change impacts/adaptive measures for key industries; and offer incentives for industrial energy saving practices and renewable energy usage.

	• *Raise awareness about climate vulnerability in key economic sectors*: increase climate change awareness at all levels; build capacity for climate change adaptation in key economic sectors; and engage wider stakeholders in dialogue on climate adaptation.
Safeguarding natural resources and biodiversity from climate change impacts	• *Ensure adequate quality and quantity of water for human wellbeing and ecosystem services*: promote efficient water resource use and development using integrated water resources management; promote research partnerships on good practices for varied water uses; and strengthen/establish an institution to coordinate management of water resources. • *Enhance climate change resilient of terrestrial ecosystems and their services:* link/restore/conserve, forests and other habitat refugia to increase resilience of ecosystems and species; convert monoculture forest plantations into mixed species plantations; promote land use planning for biodiversity conservation and limit inappropriate vegetation conversion; establish and/or effectively manage Protected Areas and other important wildlife refuges in all climatic zones. • *Enhance the resilience of coastal and marine ecosystems and associated vulnerable species*: promote integrated coastal resource management, particularly at Special Area Management sites; and restore and rehabilitate degraded coastal ecosystems and depleted coastal species. • *Enhance climate change resilient of natural inland wetlands and associated species*: protect marshes/flood retention areas in urban areas and limit land conversion; prevent the discharge of industrial effluents and solid waste into inland wetlands; control and manage salt water intrusion into coastal freshwater wetlands; and strengthen coordination and streamline management of wetland across relevant agencies. • *Address socioeconomic concerns resulting from climate change impacts on biodiversity*: identify and address climate change impacts on biodiversity that affect local communities; and help communities to adapt to changes in livelihoods or to relocate when necessary. • *Research, monitor and address impacts of climate change on biodiversity*: establish research and monitoring programs to strengthen knowledge base on climate change and terrestrial biodiversity; research and monitor programs to strengthen knowledge base on climate change and aquatic biodiversity; minimize entry, establishment and spread of invasive alien species. • *Raise awareness and mobilize stakeholders for conservation of biodiversity and ecosystem services:* focus on minimizing current stresses on ecosystems; promote training and awareness on use of the ecosystem approach for conservation; build capacity for climate adaptation research among students and staff of conservation agencies; increase public awareness about the value of aquatic and marine ecosystems; and engage in dialogue with wider stakeholders.

In addition, the Special Climate Change Fund (SCCF) is considering funding two regional projects that would benefit Sri Lanka, as noted in Table 5.

Table 5: Proposed Adaptation Projects and Programs in Sri Lanka

Name		Objectives	Type of project	Priority Sector(s)	Geographic focus (if any)
1.	Supporting Sub-National Level Decision Makers to Prioritize Adaptation Initiatives within Development Planning Frameworks[212]		Capacity building; Policy formation and integration	Government	*Indicative 10 countries:* Albania, Cambodia, Ghana, Peru, Philippines, Senegal, Sri Lanka, Tanzania, Tunisia and Uruguay
			Notes: Project being considered by the SCCF.		

[212] GEF, http://www.thegef.org/gef/sites/thegef.org/files/publication/adaptation-actions_0.pdf

Name		Objectives	Type of project	Priority Sector(s)	Geographic focus (if any)
			Proposed budget: proposed SCCF = $10 million; proposed co-financing = to be confirmed		
2.	Up-scaling and Replicating Successful Approaches to Adaptation at the Local Level (additional 10 countries)[213]				*Indicative 10 countries:* Barbados, China, Indonesia, Mali, Nicaragua, Peru, Sri Lanka, Tanzania, Tajikistan and Tunisia
			Notes: Project being considered by the SCCF. *Proposed budget:* proposed SCCF = $5 million; proposed co-financing = to be confirmed		

E. Assessment

Although is a low number of adaptation projects and programs underway in Sri Lanka, the 2010 NCCAS provides a solid framework for moving forward. The on-going projects in Sri Lanka cover certain priority sectors—including coastal zones, water, forestry, agriculture, urban and policy formulation—however, there is a need for expanded initiatives in these areas and to address other key priorities, including fisheries, health, economic infrastructure, biodiversity and gender. There is a noticeable dearth of agriculture and water resources related projects, which could contribute significantly towards making Sri Lanka's economy more climate-resilient

In regards to scaling up, the post-tsunami coastal zone project has elements that could be replicated in other vulnerable areas (disaster preparedness, sustainable management of natural resources, community involvement). In this regard, Sri Lanka's participation in the regional-level Mangroves for the Future program has been quite successful so far. Through the MFF, a National Strategy and Action Plan (NSAP) has been developed to introduce ecosystem-based coastal zone management along Sri Lanka's 1,600 km long coastline. The Sri Lanka NSAP provides an opportunity to begin addressing adaptation to climate change in the coastal zone, especially in areas which are particularly vulnerable to sea level rise and other climate change impacts. The NSAP also reflects climate change priorities in its 14 sub-policies, which represent the principles by which the implementation of the NSAP should abide.

For many years, Sri Lanka could not make regular development investments in the northern part of the country due to armed conflicts. It would now be prudent to specifically identify and address the climate risks in this area, without which new sources of vulnerability may destabilize rehabilitation and peace-building efforts.

[213] GEF, http://www.thegef.org/gef/sites/thegef.org/files/publication/adaptation-actions_0.pdf

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