Review of Current and Planned Adaptation Action: Central Asia

Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan and Uzbekistan

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Contributing Authors:

Livia Bizikova, Hilary Hove, Jo-Ellen Parry

International Institute for Sustainable Development

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/

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. Focusing on Central Asia, it first provides an overview of adaptation action at the regional level, highlighting commonalities and differences between the following countries: Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan and Uzbekistan. The appendices that follow discuss adaptation action taking place in each of these countries.

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Abbreviations and Acronyms

ADB	Asian Development Bank
AIT	Asian Institute of Technology
APN	Asia-Pacific Network for Global Change Research
AP-Net	Asia-Pacific Network on Climate Change
APCCAN	Asia Pacific Climate Change Adaptation Network
CAREC	Central Asian Regional Economic Cooperation program
CAWA	Central Asian Water Project
CliNCA	Climate Change Network for Central Asia
FAO	Food and Agriculture Organization
GCM	Global Circulation Models
GEF	Global Environment Facility
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit
ICARDA	International Center for Agricultural Research in the Dry Areas
ICWC	Interstate Commission for Water Coordination
IFAD	International Fund for Agricultural Development
IGES	Institute for Global Environmental Strategies
IWRM	Integrated Water Resources Management
OECD	Organisation for Economic Co-operation and Development
OSCE	Organization for Security and Cooperation in Europe
ROU	Republic of Uzbekistan
SEI	Stockholm Environment Institute
SCCF	Special Climate Change Fund
UNDP	United Nations Development Program
UNECE	United Nations Economic Cooperation for Europe
UNEP	United Nations Environment Programme
UNFCCC	United Nations Framework Convention on Climate Change
UNSD	United Nations Statistics Division
WHO	World Health Organization

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 Central 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 Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan and Uzbekistan, the rapid review examined: 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. This review of adaptation action in Central Asia is one of 12 profiles covering the regions of Africa, Asia-Pacific, and Latin America and the Caribbean completed by the Adaptation Partnership.

To assess the level of adaptation action in Central 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 action, 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 change. In particular, it does not capture the broader array of development activities that are increasing the adaptive capacity of communities and countries. As well, within the review, adaptation action 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 adaptive capacity. The review 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. 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

In recent decades, the climate of Central Asia has begun to change. Mean annual temperatures have risen at a rate of 1 to 2°C per century, with warming being greater in the winter than in the summer. This trend has contributed to a rapid retreat of glaciers and warming of permafrost (Cruz et al., 2007). These observed trends are likely to continue in the future; climate projections anticipate a

[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.

continued increase in mean annual temperatures of between 2.6 and 5.2°C, with a median projection of 3.7°C, by the period 2080–2099[2] (Christensen et al., 2007). While no clear trend has been noted regarding observed changes in precipitation patterns (Cruz et al., 2007), a median decrease in average rainfall of three per cent by the period 2080–2099 is projected. This change will not be uniform across all seasons; rather, median precipitation is projected to increase of four per cent levels during the winter (December to February) but decline by a median amount of 13 per cent during the summer (June to August) (Christensen et al., 2007). However, uncertainty remains regarding projected changes in temperature and, especially, precipitation in Central Asia; Global Circulation Models typically have difficulty capturing potential climatic changes in the region given its complex topography and associated weather systems in high-altitude and arid areas.

Rising temperatures, more variable precipitation patterns, continued melting of glaciers, and a potentially greater risk of extreme weather events such as floods and droughts are likely to significantly affect the region's water resources, agriculture, natural resources, public health and, ultimately, its long-term prospects for sustainable development. The impact of projected climatic changes on the follow sectors could include (Akmuradov, 2006; International Fund for Agricultural Development [IFAD], 2009; Kayumov, 2008; Kyrgyzstan, 2010; Kazakhstan, 2009; Republic of Uzbekistan [ROU], 2008; United Nations Development Program [UNDP], 2009):

- *Water resources:* greater number of people experiencing water stress; reduced water quality; lower groundwater levels; reduced irrigation potential; and lower hydroelectric power production (a significant source of energy and economic development)
- *Agriculture:* reduced food production; increased drought risk in rain-fed farmlands; greater demand for irrigation while water flows decline; decreased availability of pasture lands; lower quality of fodder; increase in heat stress of animals; increased exposure to pests and diseases; and greater salinization of land
- *Natural resources:* decline in biodiversity (particularly endemic species) due to pests, invasive species and habitat loss; increased fragmentation of arid forest ecosystems; loss of forest cover could exacerbate risk of mudslides and soil erosion; and greater risk of forest fires
- *Public health:* increased occurrence of asthma and other respiratory diseases; potential change in patterns of malaria and other disease vectors; increase in heat-related cardiovascular disease; and greater risk of acute intestinal infections, parasitic diseases and of heat- and cold-related morbidity

[2] This projection for the period 2080 to 2099 is based on averages generated by 21 global models in the multi-model data set for the A1B scenario (a medium-high emissions scenario) and assessed in comparison to a base time period of 1980 to 1999 (Christensen, *et al.*, 2007, p. 855).

Identified Adaptation Needs and Priorities

In light of these projected climatic changes and understood vulnerabilities, Central Asian countries have identified a number of adaptation priorities—many of which they share in common. Sectors identified by all Central Asian countries as being priority areas for adaptation action are agriculture and food security, water resources, human health, and biodiversity and forestry. Additional priority areas for adaptation include: reducing risks associated with extreme weather events (identified by Kyrgyzstan, Tajikistan and Uzbekistan); pastoralism and livestock production (identified by Kazakhstan); and management of coastal areas along the Caspian Sea (identified by Turkmenistan). Various adaptation actions have been identified by national governments to reduce vulnerability within these sectors, including (Akmuradov, 2006; Kayumov et al., 2008; Kazakhstan, 2009; Kyrgyzstan, 2009; ROU, 2008):

- *Agriculture*: soil conservation efforts; improving forecasting and early warning systems; crop and livestock diversification; crop insurance; increased use of organic fertilizers; minimizing water resource consumption; and planting woody plants to protect grasslands
- *Water resources:* development of arid and mini-water technologies; reconstruction of water supply systems and reservoirs; increased use of groundwater; construction of dams and diametrical dikes to regulate river flows; channel dredging and flow straightening measures; increasing efficiency; water recycling; and stabilizing watershed management
- *Health*: improving access to safe drinking water; implementing food safety measures; increasing awareness of climate change and health linkages by health personnel and the public; establishing indicators to measure impacts on health; and identifying population groups that are more vulnerable to climate change
- *Forests and biodiversity:* integrating climate change impact considerations into national forestry strategies; supporting and expanding networks of protected areas and ecological corridors; establishing an integrated system of plant protection and pest control; forest fire management measures; stabilizing slopes by developing alpine terraces and through selective reforestation; and selection of trees resistant to pests and disease as well as heat and drought
- *Extreme weather events:* spatial planning of emergency situations, including the identification of danger zones; engineering actions to eliminate and prevent hazards; development of insurance systems; and developing flood and drought monitoring and control systems

Policy-Level Actions

To meet their adaptation needs, Central Asian countries are engaged in policy- and project-based initiatives at the national and regional levels. At the regional level, the engagement of inter-governmental bodies on climate change appears limited. Individually, however, each of the five countries of Central Asia has submitted their Second National Communication to the United Nations Framework Convention on Climate Change, which includes assessments of vulnerabilities to climate change and identification of adaptation measures. Beyond this initial assessment, Kyrgyzstan, Turkmenistan and Uzbekistan are developing national adaptation strategies and beginning to mainstream climate change adaptation into their sectoral policies (Akmuradov, 2006; Kyrgyzstan, 2009; ROU, 2008). For example, Kyrgyzstan is developing a national climate change

adaptation strategy and an adaptation plan specifically for its health sector; Uzbekistan is striving to integrate adaptation into its sustainable development policy and planning.

Projects and Programs that Support Adaptation

At least six current projects and programs aim exclusively to address adaptation needs in Central Asia. Four of these projects focus on transboundary water issues,[3] reflecting current water scarcity concerns, the recognized need to improve water management capacities and the potential need to avoid future disputes over scarce water resources. The other regional projects focus on sustainable land-use management and agriculture. One or more Central Asian countries are also participating in at least 10 current projects involving other Asian, Eastern European and developing countries. Through these projects, they are addressing human health and climate change concerns, as well as agriculture, water, energy, and policy development and formation. Most of the multi-country projects aim to promote knowledge sharing, capacity building, policy development and risk-based planning and mainstreaming; few support community-based adaptation and infrastructure development. A couple of proposed regional projects have been identified that focus on expansion of irrigation and sustainable land management to promote adaptation and resiliency.

Participation in regional climate change adaptation initiatives significantly outweighs implementation of projects unique to an individual country; only a handful of these projects are being implemented in Kazakhstan, Tajikistan and Turkmenistan. These projects focus primarily on sustainable land management (including biodiversity conservation), agriculture, and rural and urban water management. These current initiatives are generally focused on capacity development for professionals, government officers, and researchers—and are largely disconnected from small-scale development projects undertaken by local organizations that are building climate resilience.

Funders active in supporting adaptation in Central Asian countries include the Asian Development Bank, European Commission, Food and Agriculture Organization, the Global Environment Facility, the Special Climate Change Fund, the United Nations Development Progamme and the World Bank, as well as the governments of Finland, Germany, Norway and Switzerland.

Adaptation Communities of Practice in Central Asia

Information exchange on climate change adaptation through networks is limited in Central Asia. The few formal networks identified are the Climate Change Network for Central Asia, the Central Asian Water Project of the Regional Research Network and the Asia-Pacific Network on Climate Change. While the first two networks appear to focus on information exchange within the academic community, the Asia-Pacific Network aims to bring together policy-makers in Central Asian and other Asia-Pacific countries.

[3] These projects include: Water and Adaptation Intervention in Central and West Asia, focused on the Amu Darya and Syr Darya River Basins; Transboundary Water Management in Central Asia; Promoting Integrated Water Resources Management and Fostering Transboundary Dialogue in Central Asia; and Promoting Cooperation to Adapt to Climate Change in the Chu-Talas Transboundary Basin.

Needs and Gaps

Although Central Asian countries are addressing adaptation concerns, the extent of government-related policy action is generally limited at the moment. Only three countries have initiated the development of national adaptation plans and strategies; none of these processes appears to be complete. Even more limited attention is being given to adaptation through regional political processes.

Of the priority sectors identified by Central Asian countries, attention is being given to water resource management (particularly transboundary- and energy-related issues), agriculture, public health and biodiversity. Adaptation projects specifically targeting the additional priority sectors of forestry and management of extreme weather events appear to be lacking. As well, in all sectors, the level of existing activity does not reflect the breadth of needs identified by national governments.

The review suggests that the following major gaps in adaptation action in Central Asia are present:

- There is a need to improve collaboration, data collection, assessments, management and knowledge sharing on issues related to climate change impacts and adaptation among countries in the region, particularly in the area of water and agriculture.
- There is limited integration of adaptation into public infrastructure development, including in the areas of transportation and hydropower development, as well as in understanding the risks and adaptation needs associated with major industrial infrastructure such as tailings ponds.
- Greater linkage between on-the-ground development work and national-level adaptation focused initiatives is needed, as well as more adaptation pilot projects that build on local experiences, especially in sectors such agriculture and water.
- There is a need for stronger focus on assessing the gender implications of climate change impacts and designing gender-sensitive measures, especially in areas where most projects will be implemented and/or used by women.
- Greater attention needs to be given to the potentially adverse impacts of climate change on biodiversity, given that the region is a major storehouse of globally important agro-biodiversity.

Review of Existing and Planned Adaptation Action: Central Asia

1.0 Introduction

The countries of Central Asia—Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan and Uzbekistan—are undergoing significant transformations in response to the collapse of the former Soviet Union. Most of these countries have challenging geographies, including sparse populations over large areas, mountainous and desert regions, and limited water resources. The terrain makes it challenging to: develop and maintain infrastructure; access clean water and health care; and bring to markets the agricultural products that are the region's main sources of revenue (particularly cotton production and sheep ranching) (United Nations Development Programme [UNDP], 2009). Within this context, Central Asian countries have achieved different levels of economic development and institutional transformation. These differences, in turn, influence the countries' individual and collective capacities to adapt to the impacts of climate change.

Figure 1: Map of Central Asia

Source: University of Texas Libraries (2002)

To better understand the efforts underway in Central 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 commonalities and differences between Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan and Uzbekistan. 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 Central 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 to the short-, medium- and long-term impacts of climate change. 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."[4] 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 et al. (2007) that led to 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 et al., 2007, p. 13). This type of adaptation reflects the widely acknowledged intimate linkage between sustainable development and building capacity in adaptation 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 et al., 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 et al, 2007, p. 13).

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*

[4] UNFCCC glossary of climate change acronyms: http://unfccc.int/essential_background/glossary/items/3666.php

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[5]) 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 understanding 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 capacities. 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 Least Developed Countries Fund has risen from nearly US$24 million in 2008 to US$177 million as of mid-2011[6]
- Adaptation financing through the Special Climate Change Fund has increased from 22 projects worth nearly US$90.73 million in 2009 (Global Environment Facility [GEF], 2009) to 31 projects approved for financing in the amount of US$128 million as of mid-2011[7]
- 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 (Stockholm Environment Institute [SEI] and UNEP, 2010).

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

[5] In 2010, official development assistance totaled US$128.7 billion[5] (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, SEI and UNEP (2010).

[6] Source: Global Environment Facility, Least Developed Countries Fund website: http://www.thegef.org/gef/ldcf. Accessed September 2011.

[7] Source: Global Environment Facility, Special Climate Change Fund website: http://www.thegef.org/gef/sccf. Accessed September 2011.

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. Reflecting the desire for a rapid review, a comprehensive examination of all of these organizations was not undertaken; rather, an 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.

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 labelled 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.[8] 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 project and programs it includes. The review therefore does not provide a basis upon which to 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).

[8] 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.

Scientific Information

Synopsis of projected changes in climate 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 both 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,[9] 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, level of development and other factors that may affect its level of adaptation activity. These contextual influences are therefore discussed within individual country profiles and regional comparisons.

[9] 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.

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 OECD'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 non-governmental organizations 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

Situated in the Asian interior, the mountains, steppes and deserts of Central Asia are characterized by a variable, continental climate with hot summers and mild to cold winters (United States Department of State [USDS], 2011). The region has experienced an increase in mean annual temperatures at a rate of 1 to 2°C per century. This trend is consistent with an observed increase in surface air temperatures across all of Asia during this time period, with warming being greater in the winter than in the summer (Cruz et al., 2007). However, while greater variability in interseasonal, interannual and spatial rainfall patterns has been experienced in many parts of Asia over the past few decades, no clear trend has emerged in Central Asia[10] (Cruz et al, 2007).

This rise in temperatures within Central Asia is already influencing the landscape and economies of Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan and Uzbekistan. Perhaps the clearest indication of change has been the more rapid retreat of glaciers, such as the Zerafshan Glacier in Tajikistan and Abramov Glacier in Kyrgystan (Cruz et al., 2007). Breaches of lakes in the high-mountain zone because of snow accumulation and specific snow thawing patterns already are significant factors in causing floods, mudflows and landslides that destroy downstream and nearby houses and infrastructure (Kyrgyzstan, 2010; Kazakhstan, 2009). Permafrost is also warming,[11] potentially leading to disruptions in infrastructure and drainage patterns. Other recently observed indications of climatic changes in the Asia region as a whole include: greater frequency and intensity of extreme weather events, including droughts and significantly longer heat waves; changes in agricultural productivity; and the transition of plant and animal species to higher latitudes and altitudes (Cruz et al., 2007).

Box 1: *The Aral Sea: Coping with multiple stresses*
In Uzbekistan and Kazakhstan, the Aral Sea is known for being significantly affected by environmental and societal changes. Starting in 1961, a sharp increase of irrecoverable runoff withdrawals, evaporation growth due to the climate warming and low water in certain years led to a disturbance of the water and salt balance that consequently dried out the Aral Sea. By 2007, when the water level dropped to the 30-metre mark, the sea practically split into three parts and the volume of water further decreased by 10 times (Kazakhstan, 2009; Uzbekistan, 2008). The long-term health of the Aral Sea will be further challenged by climate change, as rising temperatures and declining precipitation could accelerate ongoing desertification processes—with profound implications for the future of agriculture, ranching and forestry activities in the region.

These observed trends are likely to continue in the future as climate projections anticipate a continued increase in temperatures and a decline in precipitation. Global Circulation Models (GCM) suggest that Central Asia will experience a n increase in mean annual temperatures of between 2.6 and 5.2°C, with a median projection of 3.7°C, by the period 2080–2099.[12] Warming is expected to be greatest during the summer months of June, July and August, although the degree of change between seasons is expected to be modest

[10] This observation is for the period of 1900–1996 (Cruz et al., 2007, and citations therein).
[11] In the Northern Tian Shan region of Kazakhstan, for example, permafrost temperatures rose by 2 to 6°C between 1993 and 2003 (Marchenko, 2002, cited in Cruz et al., 2007).
[12] This projection for the period 2080–2099 is based on averages generated by 21 global models in the multi-model data set for the A1B scenario (a medium-high emissions scenario) and assessed in comparison to a base time period of 1980–1999 (Christensen et al., 2007, p. 855).

Table 1: Key vulnerabilities related to climate change in Central Asia

Sectors	Consequences	Specific vulnerabilities prioritized by the countries of Central Asia
Water resources	• Changes in precipitation frequency • Glaciers melting	• Negative impacts on water quality • Negative impacts of hydropower production affecting the country and the region • Reduction of underground water reserves • Impacts on water supply, specifically on drinking water, water for irrigation and other uses • Flood risks associated with melting glaciers
Natural resources	• Vulnerability of natural ecosystems and forest resources	• Negative impacts of pests, invasive species, habitat on biodiversity, especially on endemic species—mammals, fish and insects • Impacts by increasing timber, pests and grazing on forest resources • Increased fragmentation of arid forest ecosystems
Agriculture	• Impacts on lands and crop production	• Increase in loss during irrigation • Increase in occurrence extreme floods and drought • Salinization • Increase in recurrence of extreme weather conditions • Decrease in crop yields and pastures • Increase in fodder deficiency, increase in heat stress of animals
Public health	• Increased temperature, changes in humidity	• Increase in acute intestinal infections • Increase in risk of parasitic disease and malaria • Increased heat- and cold-related morbidity
Extreme weather events	• High temperatures, dust storms, avalanches, heavy rainfalls, hails	• Increase in mudflow risk and occurrence • Growth of risks of mountain lake overflow • Overtopping and other negative consequences of industrial facilities including tailings ponds, hydropower facilities, distribution lines

Source: Akmuradov (2006); Kayumov et al. (2008); Kyrgyzstan (2010); Kazakhstan (2009); and ROU (2008)

(Christensen et al., 2007). Accompanying this increase in temperature, there is a projected median decrease in average rainfall of three per cent by the period 2080–2099. However, this expected change in the annual average disguises variations between seasons, as precipitation levels during the winter (December to February) are projected to experience a median increase of four per cent while rainfall during the summer (June to August) could decline by a median amount of 13 per cent (Christensen et al., 2007).[13]

In considering these projected changes in temperature and, especially, precipitation, the uncertainty associated with current climate modeling should be kept in mind. GCMs typically perform poorly with respect to capturing potential climatic changes in the region given its complex topography and associated weather systems in high-altitude and arid areas. In particular, GCMs tend to over-estimate the amount of precipitation that will fall in the arid and semi-arid areas of northern Central Asia (Christensen et al., 2007). Moreover, the extent and quality of data on the impacts of current climate variability and potential future climate change varies across Central Asia. Countries such as Kazakhstan, Kyrgyzstan and Uzbekistan have developed detailed assessments of current impacts and related vulnerabilities, as well as information about future impacts and adaptation needs. Meanwhile, countries such as Tajikistan and Turkmenistan have very limited information about

[13] Projections are based on the use of 21 global models in the multi-model data set for the A1B scenario (a medium-high emissions scenario) and assessed in comparison to a base time period of 1980–1999 (Christensen et al., 2007, p. 855)

climate projections, the potential vulnerabilities of socioeconomic and natural systems, and specific adaptation needs.

Although uncertainty remains, current trends suggest that Central Asia will continue to experience an increase in temperatures, more variable precipitation patterns, continued melting of glaciers and permafrost, and likely greater risk of extreme weather events such as floods and droughts. As summarized in Table 1, these changes are likely to significantly affect the region's water resources, natural resources, agriculture and public health. Given their high poverty levels and poor response capacities, the people and governments of Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan and Uzbekistan are vulnerable to the impact of these changes (UNDP, 2009). The extent to which these countries are able to adapt to these impacts will significantly influence the degree to which they are able to achieve their sustainable development objectives.

4.0 Needs and Priorities within Central Asia

Through their National Communications to the UNFCCC, the governments of Central Asia have identified agriculture and food security, water resources, human health, and biodiversity and forestry as being priority sectors for action to reduce vulnerabilities and enable adaptation to climate change. As presented in Table 2, certain countries have also identified extreme weather events, pastoralism and the livestock sector as areas of particular concern. Turkmenistan has also highlighted the vulnerability of its coastal areas along the Caspian Sea. For each of these vulnerable sectors, Central Asian countries have also identified their priority needs and potential response strategies.

Agriculture

The higher temperatures and greater aridity resulting from climate change will likely translate into reduced food production in Central Asia if adaptation measures do not take place (UNDP, 2009). Although few projections have been undertaken regarding the implications of climate change for agricultural production in the region, some studies suggest that wheat yields in Kazakhstan will decrease and that cereals production as a whole could change by -8.0 to +4.3 per cent should temperatures increase by 2 to 4 per cent (International Fund for Agricultural Development [IFAD], 2009). Higher temperatures, increased variability in precipitation and more frequent heavy rainfalls during short wet seasons—with consequent erosion of topsoil—are also expected to contribute to further land degradation and pose significant threats to local vegetation and settlements (Kayumov et al., 2008; Kyrgyzstan, 2010).

Recognizing these potential challenges, Central Asian countries have identified agriculture and food security as key areas of vulnerability. They have identified the following additional climate risks within the agriculture sector: increased drought risk in rain-fed farmlands; impacts on crop production; salinization of land; less water availability for irrigation combined with increased need for irrigation; changes in species structure; reduction in snow and ice in mountains and river water flow; and increased occurrence of extreme floods and droughts (Akmuradov, 2006; Kayumov *et al.*,

Table 2: Comparison of priority sectors for adaptation as identified by Central Asian countries through their National Communications and other strategic documents

	Agriculture and food security	Freshwater resources	Human health	Forestry & biodiversity	Extreme weather events	Other priorities
Kazakhstan	✓	✓	✓	✓		Pastoralism/livestock production
Kyrgyzstan	✓	✓	✓		✓	
Tajikistan	✓	✓	✓	✓	✓	
Turkmenistan	✓	✓	✓	✓		Coastal zone along Caspian Sea
Uzbekistan	✓		✓	✓	✓	

*Sources: Kayumov *et al.* (2008); Kazakhstan (2009); Kyrgyzstan (2009); ROU (2008); Turkmenistan (2006)

2008; Kazakhstan, 2009; Kyrgyzstan, 2009; ROU, 2008). Insect pests may also become more of a problem as warmer winters allow for greater numbers to overwinter (Cruz et al., 2007). This vulnerability extends to the livestock sector, which may be affected by erosion risks on rangelands, declining rangeland water resources and heat stress (Kazakhstan, 2009; ROU, 2008).

Adaptation options to address these vulnerabilities are outlined in countries' National Communications and include the following: short-term measures to combat soil erosion; minimizing anthropogenic impacts on soil; improving forecasting systems and early information around emergency hydro-meteorological phenomena; diversification of crop and cattle livestock to incorporate varieties that are more resilient to climate change; innovative studies in the field of irrigation; crop insurance and investment into agricultural equities; increased use of organic fertilizers; minimizing water resource consumption in agricultural production; planting woody plants to protect grasslands; introduction of accurate grassland rotation; and development and introduction of flood and drought monitoring and control systems (Akmuradov, 2006; Kayumov et al., 2008; Kazakhstan, 2009; Kyrgyzstan, 2009; ROU, 2008).

Water

As reflected in the concerns expressed by Central Asian governments regarding the vulnerability of their agriculture sectors to climate change, the risk of greater water scarcity is a concern for many countries. Within this predominantly arid region, water stress is already a problem—particularly in areas in which rapid development and population growth are leading to salinization, pollution and greater demand (IFAD, 2009). The accelerated melting of glaciers, increased variability in river flow, periods of drought and flood, and increased variability in seasonal precipitation anticipated to occur due to climate change will only aggravate this existing situation. Should temperatures increase by 2 to 4°C, studies suggest that the number of people in the region experiencing water stress could increase by up to 137 million (IFAD, 2009).

Central Asian countries identify the following vulnerabilities to climate change in the water sector: changes in precipitation, frequency of melting glaciers, changes in inter-annual distribution of river flows, reduction in lake levels, flood risks and less water available for irrigation (Akmuradov, 2006;

Kayumov et al., 2008; Kazakhstan, 2009; Kyrgyzstan, 2009). Uzbekistan, for example, is highly reliant on irrigation for food and cotton production (Peyrouse, 2007; UNDP, 2010). Climate change may also adversely impact local fisheries, which some models suggest could have significant adverse economic impacts (Easterling et al., 2007).

Of particular concern is the potentially negative impact of climate change on hydropower production, which meets 27.3 per cent of the region's energy needs. Tajikistan and Kyrgyzstan are major producers of hydroelectric power.[14] In fact, Tajikistan is the third highest producer of hydroelectric energy in the world (Cruz et al., 2007; UNDP, 2010).[15] Both of these countries are also highly dependent on the consumption of hydropower; Tajikistan derives 98 per cent of its energy from hydroelectric power, while in Kyrgyzstan this figure stands at 75 per cent (UNDP, 2010, p. 20). Presently, foreign investors—mainly from China, Iran and Russia—are working with Tajikistan and Kyrgyzstan governments in building and maintaining dams to increase hydroelectric production for export purposes (Peyrouse, 2007; UNDP, 2010).

This concern links to the broader need to ensure improved access to energy, especially in rural areas, in order to improve capacity to adapt to the impacts of climate change (UNDP, 2009; World Bank, 2011). Many rural communities use wood from forests for home heating and cooking, which has negative impacts on biodiversity and increases the potential for soil erosion. Greater access could be provided through improving existing hydropower facilities and promoting small-scale renewable energy production.[16]

An additional consideration is that many of Central Asia's water resources traverse political borders, establishing a direct link between changes in hydrological regimes, water availability and regional security. This could have significant political and economic implications. For example, choices may need to be made between the retention of water for hydropower production or its use for irrigated agriculture. The transboundary nature of water resources in Central Asia also means that risks and challenges are shared between countries, and suggests the need for coordinated solutions. Ideally, transboundary cooperation could ensure that adaptation measures implemented by one country do not have unintended effects in neighboring countries, thereby increasing their vulnerability and causing controversy over water use (Interstate Commission for Water Coordination [ICWC], 2009). However, achievement of this ideal could be challenging given the complex history and relationships between Central Asian countries.[17]

[14] Collectively, these two countries have a generating capacity of 7,009 megawatts out of the total of 10,719 megawatts in the Aral Sea Basin area (UNDP, 2010, p. 10).
[15] The Aral Sea Basin's (including Afghanistan) hydroelectric capacity has only reached 8 per cent of its capacity (UNDP, 2010).
[16] Personal communication, local NGO representative, Dushanbe, July 25, 2011
[17] Prior to the collapse of the Soviet Union in 1991, the transboundary water systems of Central Asia were centrally controlled with specific quotas for each country. With the rupture of regional relations, energy exchanges within Central Asia fell drastically between 1990 and 2000 (Peyrouse, 2007). A lack of trust among countries (coupled with high levels of corruption within countries) has since made it difficult for agreements on shared water sources to occur. Tensions remain regarding water use by upstream and downstream countries, particularly in light of greater foreign investment

At a national level, identified adaptation options to address anticipated impact on water resources include: development of arid and mini-water technologies; reconstruction of water systems and water supply systems; increased proportion of groundwater usage; regulation of river flow through construction of dams and diametrical dikes; channel dredging and flow straightening measures; protection of settlements; increased water supply through building reservoirs, increasing efficiency, water recycling, stabilizing watershed management and other measures; and developing and introducing flood and drought monitoring and control systems (Akmuradov, 2006; Kayumov et al., 2008; Kazakhstan, 2009; Kyrgyzstan, 2009).

Human Health

Climate change is expected to impact human health within Central Asian countries through: extreme weather events, such as floods and droughts; higher temperatures and longer heat waves; changes in humidity; increased occurrence of asthma and other respiratory diseases; the potential occurrence of malaria and changing patterns of other disease vectors; and increases in heat-related cardiovascular disease (Akmuradov, 2006; Kazakhstan, 2009; Kyrgyzstan, 2009; ROU, 2008).

To address these potential risks, Central Asian governments have identified options such as: investing in sustainable building solutions; improving the provision of safe drinking water; implementing food safety measures; installing energy saving technologies in the health sector; building the capacity of health personnel to understand the linkages between climate change and health; increasing public awareness on the issue of climate change and health; conducting vulnerability assessments and indicators to measure health impacts; preparing national reports on human health; and identifying population groups that are more vulnerable to climate change (Akmuradov, 2006; Kazakhstan, 2009; Kyrgyzstan, 2009; ROU, 2008).

Forestry and Biodiversity

Although they cover only a small area, forests and woodlands are an important resource in Central Asia (IFAD, 2009). As such, the implications of climate change for their future development and use is of concern to a number of governments in the region. Climate change may result in: the disappearance of forest cover, thereby exacerbating risk of mudslide and soil erosion; increased overall vulnerability to forest fires; the possibility of negative impacts of increased pests and invasive species on forestry resources; increased fragmentation of arid forest ecosystems; and decreases in desert forest productivity (Akmuradov, 2006; Kayumov et al., 2008; Kazakhstan, 2009; ROU, 2008). The degradation of forested lands could also lead to greater desertification and reduced food security (IFAD, 2009).

from Iran, China and Russia in hydroelectric stations in Tajikistan and Kyrgyzstan (Peyrose, 2007). For example, Uzbekistan's water use for cotton irrigation can be affected if Tajikistan constrains water flow in the winter for power production; in addition, Tajikistan's increase in hydroelectric production will affect Uzbekistan's market share in Tajikistan's energy imports (Stern, 2008).

Central Asia contains a number of biodiversity hotspots, including the Pamir and the Tien Shan mountain ranges that are home to six endemic mammals, about 1,500 endemic plant species, and the walnut-fruit forest unique to Central Asia (Conservation International, undated). Climate change could decrease the habitat available to native fauna. As well, increased occurrence of drought and changes in habitat could potentially have negative impacts on vulnerable ecosystems.

Regional adaptation options identified for these areas include: the preparation of national strategies that consider the impacts of climate change on the forestry sector; support for and expansion of the network of protected areas and ecological corridors; the establishment of an integrated system of plant protection and pest control; forest fire management measures; development of alpine terraces to stabilize slopes, as well as the promotion of selective reforestation to increase slope stability; and selection of trees resistant to pests and disease as well as heat and drought (Akmuradov, 2006; Kayumov et al., 2008; Kazakhstan, 2009; ROU, 2008).

Extreme Weather Events

While extreme weather events—droughts, floods, heavy rains, wildfires, etc.—will exacerbate the adverse impact of climate change on agriculture, water, health, forestry and biodiversity, they have also been identified as a separate concern by national governments. Many countries in the region are already vulnerable to extreme weather events; for example, more than 95 per cent of settlements in Kyrgyzstan are located near water bodies, primarily along riverbeds that are susceptible to landslides, mudflows and floods, which it is anticipated will increase with the impacts of climate change (Kyrgyzstan, 2009). Central Asian governments have discussed a number of adaptation measures that could minimize the threat of extreme weather in the region. These options include: spatial planning of emergency situations, including the identification of danger zones; engineering actions aimed at the elimination and prevention of sources of hazards; legislative measures prescribing standards and rules; insurance system development; and improvement of early warning systems (Kazakhstan, 2009; Kyrgyzstan, 2009; ROU, 2008).

5.0 Assessment of Adaptation Action within Central Asia

To meet their adaptation needs, Central Asian countries are engaged in action at the national and regional levels through both policy- and project-based initiatives. The level of engagement in these activities differs among countries, reflecting their individual capacities, vulnerabilities and interests.

5.1 Regional-Level Action

The countries of Central Asia face many similar challenges, including water resource management, agro-biodiversity, agriculture, hydropower and health issues. In response, they are engaged in several common initiatives that strive to address shared concerns and collectively reduce vulnerability to climate change.

Regional Policy Actions

Although a number of joint initiatives supported by international donors are underway in Central Asia (as presented in Table 3), the engagement of regional governance bodies on climate change appears limited. Currently, it seems that none of Central Asia's regional organizations are taking a leadership role in promoting adaptation to climate change as part of their mandated activities.

There are, however, few intraregional organizations that, in the future, could play a role in promoting adaptation across all the countries in Central Asia. One of these organizations is the ICWC of Central Asia. Formed in 1992 as a response to the drying out of the Aral Sea, the ICWC brings together all five countries in the region. Its current focus is on determining annual volumes of water supply to river deltas and the Aral Sea, estimating sanitation releases into rivers and canals, and dealing with water conflicts.

A second organization is the Central Asia Regional Economic Cooperation (CAREC) Program, which is a partnership of nine countries and six multilateral institutions[18] working to promote development through cooperation, leading to accelerated economic growth and poverty reduction. Member countries of CAREC are Afghanistan, Azerbaijan, China, Kyrgyzstan, Mongolia, Pakistan, Tajikistan, Turkmenistan and Uzbekistan. Current priority areas are transport, trade facilitation, trade policy and energy; at present, it does not appear that there is a significant focus on climate change.

As well, the Regional Environmental Centre for Central Asia also might play a larger role in supporting adaptation in the future. Founded by the five countries of Central Asia along with the UNDP and the European Commission, the Centre's mission is to "promote multi-stakeholder cooperation in addressing environmental problems in Central Asia at the local, national and regional levels."[19] The center's work in the area of climate change has historically focused on greenhouse gas mitigation efforts, but it has begun to look at adaptation concerns.

Regional Projects and Programs

While cooperation at the policy level is limited, a number of ongoing projects and programs involve some or all of the five Central Asian countries. As well, several countries also are part of broader projects involving countries from Central and Eastern Europe, the rest of the Asia-Pacific region (to a lesser degree), and around the globe. As presented in Table 3, the majority of the projects that exclusively bring together countries from Central Asia focus on transboundary water issues. These include the following projects: Water and Adaptation Intervention in Central and West Asia, which focuses on the Amu Darya and Syr Darya River Basins; Transboundary Water Management in Central Asia; Promoting Integrated Water Resources Management (IWRM) and Fostering Transboundary Dialogue in Central Asia; and Promoting Cooperation to Adapt to Climate Change

[18] The program's six multilateral partners are the Asian Development Bank, European Bank for Reconstruction and Development, International Monetary Fund, Islamic Development Bank, United Nations Development Programme and the World Bank.

[19] See: http://www.carec.kz/en

in the Chu-Talas Transboundary Basin. This focus on transboundary water issues likely reflects the current water scarcity concerns within the region, a recognized need to improve water management capacities and the potential need to avoid future disputes over scarce water resources. Other areas of focus for regional projects include sustainable land-use management and agriculture.

Through their participation in projects that involve countries from outside of their region, Central Asian countries are addressing concerns within a broader array of sectors. In particular, all five countries are engaged in at least one project focused on addressing human health and climate change concerns. Agriculture, water, energy and policy development and formation are other areas in which adaptation action is currently taking place. At all levels of collective action, most of the projects aim to promote knowledge sharing, capacity building, policy development and risk-based planning and mainstreaming. The number of projects with community-based adaptation and infrastructure development components is limited.

Funders active in supporting adaptation in Central Asian countries include the Asian Development Bank, European Commission, Food and Agriculture Organisation (FAO), the Global Environment Facility (GEF), UNDP and the World Bank, as well as the governments of Finland, Germany, and Norway.

In addition, two projects in the Special Climate Change Fund funding pipeline specifically focus on the Central Asian region (GEF, 2009):

- "Central Asian Countries Initiative for Land Management (CACILM): Incorporating climate change adaptation and resiliency into sustainable land management in Central Asia." Building upon the existing CACILM project, this proposed extension would involve all five Central Asia countries and focus on the promotion of local actions and knowledge sharing.
- "Building Climate Resiliency for Irrigation Infrastructure and Agro-business." This proposed project would involve Pakistan, Tajikistan and Uzbekistan, with a focus on agricultural development, water resources management and the development of markets.

Table 3: Current regional adaptation action in Central Asia

Name		Objectives	Participating Countries	Project Details	
Participation in Regional Projects					
1.	Programme for the Sustainable Use of Natural Resources in Central Asia[20]	The objective of the program is to ensure that national, regional and local strategies to fight desertification are being effectively implemented throughout the whole region. Conditions are in place in Central	Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan, Uzbekistan	**Funder(s)**	German Federal Ministry for Economic Cooperation and Development
				Total Budget	
				Implementing Agency(s)	Deutsche Gesellschaft für Internationale

[20] GIZ, http://www.gtz.de/en/weltweit/europa-kaukasus-zentralasien/13434.htm

Name		Objectives	Participating Countries	Project Details	
		Asia that enable adaptation to climate change and the protection of habitats and natural resources for future generations.			Zusammenarbeit (GIZ)
				Duration	2002–2013
				Project Type	Knowledge communication; Research; Policy formation and integration; Field implementation
				Focus Area	Agriculture; Forestry; Biodiversity
2.	Transboundary Water Management in Central Asia[21]	The goal of the project is to help enable the relevant institutions in the region to create sustainable regional water management structures, which take account of issues relating to water use as well as energy and climate. The Central Asian states are jointly developing practical approaches to sustainable regional water management, for which they are implementing selected measures. GIZ is training the personnel of these institutions on specifically requested issues, such as irrigation, dam security, adapting to climate change and water use and reuse.	Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan, Uzbekistan	**Funder(s)**	German Federal Foreign Office
				Total Budget	
				Implementing Agency(s)	GIZ
				Duration	2009–2011
				Project Type	Policy formation and integration; Knowledge communication; Research; Capacity building
				Focus Area	Watershed management
3.	Promoting Integrated Water Resources Management (IWRM) and Fostering Transboundary Dialogue in Central Asia[22]	Through interventions at the national and local transboundary levels, the project aims to provide a platform for regional dialogue on IWRM in order to support adaptation to climate change. It is implementing concrete capacity-building measures. Planned actions include: concrete interventions targeted towards rural drinking water supply, capacity building towards agricultural water efficiency, small-scale hydropower solutions, or mainstreaming of climate change resilience, water-health	Kazakhstan, Kyrgyzstan, Tajikistan	**Funder(s)**	European Commission, Norway, UNDP, and Governments of Kazakhstan, Kyrgyzstan, Tajikistan (in-kind)
				Total Budget	US$5.4 million
				Implementing Agency(s)	UNDP Bratislava Regional Centre
				Duration	2009–2012
				Project Type	Policy formation and integration; Knowledge communication; Capacity building

[21] GIZ, http://www.gtz.de/en/weltweit/europa-kaukasus-zentralasien/tadschikistan/29994.htm
[22] UNDP, http://europeandcis.undp.org/environment/wg/show/213FA609-F203-1EE9-B6CFDBE3DDC27A6D

Name		Objectives	Participating Countries	Project Details	
		and sanitation aspects into community development programs.		**Focus Area**	Watershed management; Agriculture; Energy; Human health
4.	Climate Change and Drought in Central Asia and China[23]	This project aims to increase knowledge related to climate change and drought management, especially on how different ecosystems can adapt to climate variability and extreme climate events to achieve sustainable, equitable, and productive use and conservation of natural resources—including water, soils and biodiversity—within an ecosystem approach.	Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan Uzbekistan *Plus:* China	**Funder(s)**	Asian Development Bank (ADB)
				Total Budget	US$775,000
				Implementing Agency(s)	International Center for Agricultural Research in the Dry Areas (ICARDA)
				Duration	2009– ?
				Project Type	Research
				Focus Area(s)	Agriculture
5.	Promoting Cooperation to Adapt to Climate Change in the Chu-Talas Transboundary Basin[24]	This project will increase the adaptive capacity of Kazakhstan, Kyrgyzstan and the Chu-Talas Commission for ongoing and future climate change impacts, ensure coordination of adaptation actions in the Chu-Talas Basin and thereby help to prevent possible negative effects on regional security.	Kazakhstan, Kyrgyzstan	**Funder(s)**	Finland (Environment and Security Initiative)
				Total Budget	US$225,000
				Implementing Agency(s)	UNDP, United Nations Economic Cooperation for Europe (UNECE), Organization for Security and Cooperation in Europe (OSCE)
				Duration	2010–2012
				Project Type	Research; Knowledge communication; Capacity building
				Focus Area	Watershed management; Disaster risk management; Security
6.	Water and Adaptation Intervention in Central and West Asia[25]	Project will "develop and introduce measures to adapt to changing hydrological regimes.	*Amu Darya and Syr Darya River Basins:*	**Funder(s)**	ADB
				Total Budget	US$1 million
				Implementing	ADB

[23] ICARDA, http://www.icarda.org/cac/cac_news/en/cac39e.pdf and http://www.icarda.org/RestrictedProject/Project8.pdf

[24] WaterWiki, http://waterwiki.net/index.php/Promoting_Cooperation_to_Adapt_to_Climate_Change_in_the_Chu-Talas_Transboundary_Basin; UNDP, http://www.undp.kz/projects/start.html?type=interne and ALM, http://www.adaptationlearning.net/project/pilot-project-water-and-climate-change-adaptation-chu-talas-river

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

Name		Objectives	Participating Countries	Project Details	
		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.	Kazakhstan, Kyrgystan, Tajikistan, Turkmenistan and Uzbekistan *Plus:* Afghanistan	**Agency(s)**	
				Duration	2010– ?
				Project Type	Research; policy formation and integration; Knowledge communication; Capacity building
				Focus Area	Watershed management; Disaster risk management; Agriculture; Climate information services
Participation in Asia-Pacific Regional Projects					
7.	Scientific capacity development of trainers and policy-makers for climate change adaptation planning in Asia and the Pacific[26]	Building capacity of the trainers and policy-makers in Asia-Pacific in order to mainstream climate change adaptation principles and practices in some of the Asia-Pacific member countries of the UNEP's Global Climate Change Adaptation Network.	Australia, China, India, Japan, **Kazakhstan**, Philippines, Republic of Korea and Thailand	**Funder(s)**	Asia-Pacific Network for Global Change Research (APN)
				Total Budget	US$30,000
				Implementing Agency(s)	Institute for Global Environmental Strategies (IGES), Asia Institute of Technology (AIT) and the AIT/UNEP Regional Resource Center in Asia and the Pacific
				Duration	2010–2011
				Project Type	Capacity building; Policy formation and integration
				Focus Area	Government
Participation in West Asian and European Regional Projects					
8.	Health from Climate Change in Southeast Europe, Central Asia and the Northern Russian Federation: Seven Country Initiative[27]	The specific objectives were to: 1. Develop national environment and health adaptation plans or integrating health into existing plans 2. Strengthen health systems and build institutional capacity on climate change in relation to	Albania, **Kazakhstan**, **Kyrgyzstan**, the Russian Federation, **Tajikistan**, the former Yugoslav Republic of	**Funder(s)**	Germany (the Federal Ministry of Environment, Nature Conservation and Nuclear Safety)
				Total Budget	
				Implementing Agency(s)	WHO Regional Office for Europe

[26] APN, http://www.apn-gcr.org/newAPN/resources/proceedingsAndMeetingReports/proceedings/igm-spg15.pdf
[27] UN, http://www.un.org/climatechange/projectsearch/proj_details.asp?projID=148&ck=rR9SooKQz1KvPFE

Name		Objectives	Participating Countries	Project Details	
		extreme weather events preparedness and response; infectious and respiratory disease; surveillance and response; and water management and malnutrition 3. Foster innovation in energy efficiency and the use of renewable energy for health services 4. Provide intelligence and facilitate the exchange of knowledge and experiences on effective adaptation and mitigation measures	Macedonia and **Uzbekistan**	**Duration**	2008–2010
				Project Type	Knowledge communication; Research; Policy formation and integration
				Focus Area	Health; Energy
9.	Vulnerability to Climate Change in Agricultural Systems in Europe and Central Asia[28]	The objective of the program is to mainstream climate change adaptation into agricultural policies, programs and investments. The project's goal will be achieved by: "raising awareness of the threat, analyzing potential impacts and adaptation responses, and building capacity among national and local stakeholders with respect to assessing the impacts of climate change and developing adaptation measures in the agricultural sector, narrowly defined to encompass crop (including cereals, vegetables, fruits, and forage) and livestock production."[29]	Albania, Moldova, Macedonia, **Uzbekistan**	**Funder(s)**	World Bank
				Total Budget	
				Implementing Agency(s)	Future Water
				Duration	2010–2011
				Project Type	Research; Policy formation and integration; Knowledge communication
				Focus Area	Agriculture
Participation in Global Projects					
10.	Preparedness for Climate Change[30]	The aim of this program was for the Red Cross and Red Crescent National Societies in countries particularly vulnerable to climate change to gain a better understanding of climate change and its impacts, and to identify country-specific adaptation	39 countries *Central Asia participants in Phase 1:* **Kyrgyzstan, Uzbekistan**	**Funder(s)**	Red Cross/Red Crescent Climate Centre
				Total Budget	
				Implementing Agency(s)	National Red Cross/Red Crescent Societies
				Duration	Phase 1: 2006–2009 Phase 2: ongoing

[28] Future Water, http://www.futurewater.nl/uk/projects/cc-eca/
[29] Future Water, http://www.futurewater.nl/uk/projects/cc-eca/
[30] IFRC, http://www.climatecentre.org/site/preparedness-for-climate-change-programme

Name		Objectives	Participating Countries	Project Details	
		measures in line with risks. Activities could include organizing a workshop on risks, assessment of risks through preparation of a background document, capacity-building programs, and developing climate change resilient plans.		**Project Type**	Capacity building; Policy formation and integration
				Focus Area	Disaster risk management
11.	Health Vulnerability and Climate Change Adaptation Assessments[31]	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.	Bolivia, Brazil, Cambodia, Costa Rica, Ghana, India, **Kyrgyzstan**, Macedonia, Mongolia, Russia, Tunisia	**Funder(s)**	World Health organization (WHO)
				Total Budget	
				Implementing Agency(s)	National Ministries
				Duration	2008–2010 (Closed)
				Project Type	Assessment
				Focus Area	Human health
12.	Capacity Development for Policy Makers: Addressing climate change in key sectors[32]	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 and policy implications within the context of the Convention will be enhanced.	Algeria, Bangladesh, Bolivia, Colombia, Costa Rica, Dominican Republic, Ecuador, Gambia, Honduras, Liberia, Namibia, Nepal, Nicaragua, Niger, Paraguay, Peru, Saint Lucia, Togo, **Turkmenistan**, Uruguay	**Funder(s)**	UNDP, UN Foundation, Government of Norway, Government of Finland, and Government of Switzerland
				Total Budget	US$6,953,413
				Implementing Agency(s)	UNDP
				Duration	2008–2010
				Project Type	Capacity building; Policy formation and integration
				Focus Area	Government
13.	Pilot Program for Climate Resilience (PPCR)[33]	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	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

[31] WHO, http://www.who.int/globalchange/mediacentre/events/2010/costa_rica_consultation_200710/en/index.html
[32] UNDP, http://www.undpcc.org/content/project-en.aspx
[33] CIF, http://www.climatefundsupdate.org/listing/pilot-program-for-climate-resilience

Name		Objectives	Participating Countries	Project Details	
		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.	*Regional Programs:* Caribbean and Pacific (includes Papua New Guinea, Samoa, Tonga)	**Duration**	2008–ongoing
				Project Type	Policy formation and integration
				Focus Area	Multi-sectoral
14.	Community-based Adaptation Programme[34]	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 community-based adaptation priorities to promote replication, up-scaling and integration of best practices derived from community-based adaptation projects • Cooperation among member countries promotes global innovation in adaptation to climate change including variability	Bangladesh, Bolivia, Guatemala, Jamaica, **Kazakhstan**, Morocco, Namibia, Niger, Samoa, Viet Nam	**Funder(s)**	GEF (Strategic Priority on Adaptation), co-financing
				Total Budget	US$6.7 million
				Implementing Agency(s)	UNDP
				Duration	2009–2011
				Project Type	Knowledge communication; Capacity building; Community- based adaptation
				Focus Area	Multi-sectoral
15.	Piloting Climate Change Adaptation to Protect Human Health[35]	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	Barba dos, Bhutan, China, Fiji, Jordan, Kenya, **Uzbekistan**	**Funder(s)**	Special Climate Change Fund (SCCF), WHO, UNDP, National governments
				Total Budget	US$22,055,213
				Implementing Agency(s)	UNDP, WHO, Ministries of Health in the pilot

[34] GEF, http://www.gefonline.org/projectDetailsSQL.cfm?projID=2774 and UNDP, http://www.undp-adaptation.org/projects/websites/index.php?option=com_content&task=view&id=203

[35] ALM, http://www.adaptationlearning.net/project/piloting-climate-change-adaptation-protect-human-health

Name		Objectives	Participating Countries	Project Details	
		project focuses on: (1) enhancing early warning systems; (2) improving capacity of health sector institutions; (3) piloting prevention measures; and (4) promoting innovation through cooperation among participating countries.			countries
				Duration	2009–2014
				Project Type	Capacity building; Field implementation
				Focus Area	Human health; Disaster risk management
16.	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[36]	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. Capacity building of governments and civil societies will optimize natural resource management.	30 countries including: Afghanistan, Algeria, Djibouti, Egypt, **Kazakhstan**, **Kyrgyzstan**, Libya, Mauritania, Morocco, Pakistan, Somalia, Sudan, **Tajikistan**, Tunisia, **Turkmenistan**, **Uzbekistan**, and Yemen	**Funder(s)**	FAO
				Total Budget	US$436,000
				Implementing Agency(s)	FAO, Organisation of the Islamic Conference
				Duration	2010–2011
				Project Type	Capacity building; Policy formation and integration; Research
				Focus Area	Freshwater supply; Energy; Agriculture

5.2 National-Level Action

Within Central Asia, adaptation action is taking place at the policy level and, to a limited extent, through country-specific adaptation projects and programs.

Policy Actions

As presented in Table 4, each of the five countries in Central Asia have prepared and submitted their Second National Communication to the UNFCCC. The preparation of these documents provides an opportunity for countries to assess their vulnerabilities and suggest measures to improve adaptive capacity.

Furthermore, some of the countries in the region—namely Kyrgyzstan, Turkmenistan and Uzbekistan—are becoming increasingly focused on developing national adaptation strategies and mainstreaming climate change adaptation into their sectoral policies (Akmuradov, 2006; Kyrgyzstan, 2009; ROU, 2008). For example, Kyrgyzstan is developing a national climate change adaptation

[36] ALM, http://www.adaptationlearning.net/program/support-policy-consultation-and-actions-boost-sustainable-use-water-and-energy-resources-agr and SESRIC, http://www.sesric.org/activities-oicfao.php

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

	Population (est.)[1]	*Policy Action*			*Participation in Projects/Programs*		
		1st National Communication	2nd National Communication	National Strategy/Plan	National	Multi-country	Total
Kazakhstan	15.6 million	1998	2009		2	10	12
Kyrgyzstan	5.4 million	2003	2009	In development	0	10	10
Tajikistan	7.35 million	2002	2008		2	8	10
Turkmenistan	4.88 million	2000	2010		1	6	7
Uzbekistan	28.1 million	1999	2008	In development	0	9	9

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

[1] *Source: USDS (2011)*

strategy and an adaptation plan specifically for its health sector; Uzbekistan is striving to integrate adaptation into its sustainable development policy and planning.

Projects and Programs

While there are a number of identified adaptation needs in all of the countries of Central Asia, relatively few projects being implemented in the region solely address national interests (see Table 4). Participation in regional climate change adaptation initiatives significantly outweighs implementation of nationally focused projects. The lowest number of projects is being implemented in Turkmenistan, but the level of action is relatively consistent across Central Asia.

The country-specific projects underway in Central Asia—in Kazakhstan, Tajikistan and Turkmenistan—are focused primarily on sustainable land management, water management, and agriculture. Tajikistan is also undertaking a project focused on improving drinking water supplies in seven urban municipalities. Activities being implemented in these projects include: improving pasture management and the productivity of pastoral livestock; increasing the efficiency of water usage and reforming water utility management; and strengthening capacity to integrate climate change impacts into national and sectoral policies and practices.

Central Asia is a major storehouse of globally important agro-biodiversity and represents one of the centers of origin for cultivated plants worldwide. The richness of the agro-ecosystems is complemented by a large concentration of wild relatives of agricultural plants in mountainous ecosystems (including barley, almonds, pomegranate, grapes, apples, pears, cherries and plums) (GEF, 2009). Although few current adaptation projects focus on agro-biodiversity, Tajikistan is presently implementing the project, Sustaining Agricultural Biodiversity in the Face of Climate Change, financed in part by the GEF.

A major challenge for current adaptation initiatives and projects in the region is the strong focus at present on capacity development for professionals, governments officers, researchers involved in climate modeling, and in the UNFCCC process—without linking these efforts to small-scale local projects undertaken by local organizations (with international financing) focused on land management, water storage and testing new species that better suited the new climatic conditions. Due to this situation, there is a disconnect between the information that is being generated and the adaptation projects directly implemented on the ground in areas such as water management, agriculture and forestry.[37] Similarly, the considerable knowledge and experience available at the local level regarding coping with climatic variability and extremes, especially in the agricultural and water sectors, very often is not connected with the approaches and measures prioritized in regional and national projects. For example, there are many ongoing agricultural activities that are not necessarily linked directly to adaptation, but they could be used to inform future adaptation strategies. Ensuring that some of the support for regional and national projects is allocated to on-the-ground adaptation work, including creating adaptation pilot projects, perhaps would provide better benefits to climate change adaptation efforts.[38]

The international donors principally engaged in supporting the limited number of national-level adaptation projects in Central Asia are the GEF, SCCF, UNDP, the World Bank and the bilateral donors of Germany and Switzerland. Additional adaptation projects and initiatives may be underway within the Central Asian region but were not identified through this rapid review.

It should be noted that a number of development projects are being implemented throughout Central Asia in parallel with these adaptation-driven projects that could contribute to reducing vulnerability to the impacts of climate change. These development projects focused on infrastructure development, water management and institutional development, among other areas of need. The degree to which the implications of climate change have been mainstreamed into the design and implementation of these projects is unclear, but this process will likely be important in fostering long-term, climate-resilient development in the region.

5.3 Communities of Practice

A few knowledge-sharing networks are facilitating information exchange around climate change adaptation within Central Asia and between the region and other Asian countries. These networks include:

- Climate Change Network for Central Asia (CliNCA), which encourages cooperation and networking amongst young scientists in the area of water resource research and climate change.[39]

[37] Personal communication: international agency representative, February 9, 2011.
[38] Personal communication: two international agency representatives, February 9, 2011; and two graduate students, February 7, 2011.
[39] See: http://www.uni-giessen.de/cms/fbz/zentren/zeu/Forsch/forschungsprojekte/ClinCA

- Central Asian Water Project (CAWA) of the Regional Research Network, which endeavors to understand how water scarcity in Central Asia may be aggravated by climate change, and aims to contribute to a sound scientific and regional database for the development of sustainable water management strategies in the region.[40]
- Asia-Pacific Network on Climate Change (AP-Net), which includes Central Asia. It serves as a knowledge-based online clearing house for the Asia-Pacific region on climate change issues, promotes a platform for policy dialogues within the broader Asia-Pacific region and supports capacity building for developing countries.[41]

While CliNCA and CAWA appear to focus on information exchange amongst the academic community; AP-Net appears to be the only network that facilitates the exchange of information among policy-makers from the Central Asian region, as well as other Asia-Pacific countries.

6.0 Conclusions

The National Communications of most Central Asian countries provide a fairly detailed review of potential climatic changes, their anticipated consequences and needed adaptation actions. Some of these actions, especially those focused on water management and health, are being addressed through diverse regional projects supported mostly by international organizations. Regional initiatives are the major form of adaptation action in Central Asia, compared to a fairly limited number of country-specific projects. Current information suggests that projects focused on agriculture and livestock production are typically national initiatives, while activities focused on water and health care issues are usually addressed regionally. Given current tensions surrounding the management of water resources in Central Asia, a greater focus on health concerns may provide a window for furthering regional collaboration in the area of climate change adaptation. Looking forward, a couple of proposed regional projects have been identified that focus on expansion of irrigation and sustainable land management to promote adaptation and resiliency.

At the policy level, progress towards the development of adaptation strategies and plans is limited—having only been initiated by Kyrgyzstan, Turkmenistan and Uzbekistan[42]—and integration of adaptation into policy and planning is nascent. There is also very limited engagement on the issue of adaptation by interregional governmental organizations, limiting the potential for regional coordination and the sharing of information, knowledge and capacity. In general, there is a concern

[40] See: http://www.cawa-project.net/
[41] APN, http://www.climateanddevelopment.org/ap-net/index.html
[42] Kyrgyzstan established an Inter-agency Group in 2009 that was tasked with the development of the National Strategy and Climate Change Adaptation Plan and has also initiated development of a Climate Change Adaptation Plan for the Health Sector led by the Ministry of Health. Uzbekistan is developing its strategy focused on Integration of Vulnerability and Adaptation to Climate Change into Sustainable Development Policy Planning and Implementation with specific attention on the country's most vulnerable social and economic sectors.

that adaptation action in Central Asia is primarily donor-driven[43] and has not yet become a significant priority for national governments.

Major gaps in the region's adaptation activities could be identified as follows:

1. Countries identified a need to improve collaboration, data collection, assessments, management and knowledge sharing on issues related to climate change impacts and adaptation. Knowledge sharing would also increase the effectiveness of adaptation actions. However, so far no strong leadership by existing regional organizations in the area of adaptation has been documented.
2. There is currently limited sharing of knowledge about adaptation actions appropriate for the agricultural sector that are relevant for all the countries in the region, even though most Central Asian countries have significant experience in managing climate variability given the region's continental climate.
3. Given the transboundary nature of much of the region's water resources, as well as concerns over existing and future water scarcity, there is a need to ensure that adaptation within the water sector is coordinated more meaningfully at a regional scale.
4. There is limited integration of adaptation into public infrastructure development and capacity building conducted through development assistance. These initiatives include efforts to enhance transportation infrastructure and increase investment in hydropower development. These investments, particularly those in hydroelectric development, may become vulnerable as climate change progresses.
5. There is a lack of risk assessments and identification of needed adaptation actions for major industrial infrastructure facilities such as tailings ponds and the chemical industry's ageing storage facilities. These facilities could be severely affected by climate change, potentially causing major damage to natural and human environments.
6. There needs to be a stronger focus on assessing the gender implications of climate change impacts and designing measures that are gender-sensitive, especially in areas where most projects will be implemented and/or used by women. Adaptation projects with a specific focus on the differential gender-based implications of climate change were identified neither at the regional nor national levels. This absence is of particular concern given that significant migration by men out of rural areas is occurring in many Central Asian countries, leaving women responsible for climate-sensitive activities such as farming and water collection. Adaptation options could benefit from greater attention to the specific situation of women, including their limited access to decision-making and credit (Oxfam, 2011).
7. As much of the adaptation efforts to date in Central Asia have focused on research and capacity building, there appears to be a need to promote the design and implementation of projects that allocate support to on-the-ground adaptation work—including adaptation pilot projects that build on local experiences, especially in sectors such as agriculture and water.
8. Reflecting the observed disconnect between adaptation action being taken at the national and local levels, there is a need for improved coordination between implementing organizations and

[43] Personal communication, representative of international development organization, August 2011.

donors operating in the same country and/or areas within the country.[44] This need will only grow as further investments are made in adaptation projects throughout the region.

9. Finally, the region is a major storehouse of globally important agro-biodiversity and represents one of the centers of origin for cultivated plants worldwide. International donors are starting to support projects to protect agro-biodiversity, but perhaps further efforts are needed, including policy frameworks and options that could address conservation of the biodiversity in the context of other activities such as agriculture, ranching and reforestation.

[44] Inception Workshop, Pilot Program for Climate Resilience, Tajikistan, August 2011.

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Appendices: Country Profiles

Within this review of current and planned adaptation action, the Central Asia is defined as the following: Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan and Uzbekistan.

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.[45] 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.[46] 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.

[45] Derived from: http://www.joss.ucar.edu/cscc/climate-service-definition-condensed.pdf
[46] 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 Kazakhstan

ADB	Asian Development Bank
AIT	Asia Institute of Technology
APN	Asia-Pacific Network for Global Change Research
CBA	Community based adaptation
CACILM	Central Asian Countries Initiative for Land Management
GEF	Global Environment Facility
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit
ICARDA	International Center for Agricultural Research in the Dry Areas
IGES	Institute for Global Environmental Strategies
IWRM	Integrated Water Resources Management
NGO	Non-governmental organization
OSCE	Organization for Security and Cooperation in Europe
SCCF	Special Climate Change Fund
UNDP	United Nations Development Programme
UNECE	United Nations Economic Commission for Europe
UNEP	United Nations Environment Programme
UNFCCC	United Nations Framework Convention on Climate Change
WHO	World Health Organization

Since independence in 1991, Kazakhstan has maintained a strategic vision for economic development based on integration into the global economy. Kazakhstan is making progress in its nation building efforts, having achieved macroeconomic and fiscal stability, and recently embarked upon an ambitious reform of its public administration. With time, its development programs have become increasingly focused on competitiveness issues, such as the investment climate, institutions, human capital, basic infrastructure and the environment (UNDP, 2008; World Bank, 2010).

While Kazakhstan has a rapidly growing economy, rural population, farmers and pastoralists outside of the main urban centers face significant climate change risks to their livelihoods stemming from increased aridity, water management challenges and extreme weather

events. The average annual air temperature increased by 0.31°C in the 10 years since 2000, with the most rapid warming was taking place in winter. The main shift that has occurred due to this rise in temperatures is the increasingly arid climate of Kazakhstan's desert and semi-desert areas, as well as locations adjacent to them. Degradation of glaciers has been recorded. There was also an increasing number of forest fires detected between 2000 and 2006, wherein there were 6,415 forest fire cases recorded, resulting in 160,000 hectares being burnt (Kazakhstan, 2009).

A. Adaptation Needs and Priorities

Based on the projected impacts of climate change to 2100, a combination of rising temperatures, declining average rainfall, and regional deglaciation are projected to cause (Kazakhstan, 2009):

- Increased drought risk in rain fed farmlands (especially for wheat) and pastures;
- Changes in seasonality in sheep pastures' availability (earlier spring season);
- Increased salinization risk in irrigated farmlands;
- Increased erosion risks in both farmlands and rangelands;
- Declining rangeland water resources, leading to overstocking and erosion around remaining water resources;
- Decreased habitat for native fauna;
- Significant changes in the intra–annual distribution of the river flows, with average water flow expected to increase by 20 per cent in the third quarter of the year, and also to increase in the first and fourth quarters; water flows are expected to decline in the second quarter;
- Total disappearance of forest cover, potentially leading to practically all rainfall resulting in mudflow formation, the deposit of which on the piedmont plains would harm Kazakhstan's most productive lands;
- Reduced precipitation and the drying out of the Aral Sea could provoke a drop in ground water levels and change conditions in the forests of the Kyzylkum desert, making it unfit for growing the region's main forest species;
- Increased overall vulnerability of forests to fires because of the observed and predicted climate conditions, especially in areas with coniferous species—pine, fir, larch and cedar—in the South and the juniper growing in the North; and
- Extreme weather impacts on human health including infant mortality.

Kazakhstan's Second National Communication (2009) presents extensive lists of adaptation needs by sector, as demonstrated in Table 1; no prioritization between these adaptation needs appears to have been completed.

Table 1: Overview of proposed adaptation responses in Kazakhstan's Second National Communication (2009)

Sector	Proposed responses
Pastoralism and livestock	• Establish measures to restore state level pasture management with the legal acknowledgment of pasturage users; • Put into use remote pastures with partly restored plants; • Restore water wells and watering places; • Regulate the load on cattle pastures through different seasonal grazing, first by reducing the cattle grazing load on the pastures immediately near settlements and with the strong expressed pasture digression; • Increase production of coarse fodder by sowing perennial grass species on tilled lands and conserving the productivity of available hayfields; • Research the identifying grade level of the adaptability of sheep and find stress resistant sheep for each natural climate area of Kazakhstan; • Restore the pasturage system for sheep farming through wider use of high mountain pastures; • Introduce a regulated animal pasturage system; • Improve surface soil through vegetation of degraded pastures, including planting saxaul in desert and semi-desert pastures; • Take into consideration the recommendations provided by farmers, agricultural experts and experts from hydrometeorological stations to identify insemination, lambing, shearing, sanitary supervision, migration to summer pastures and fodder needs due to increasing weather instability.
Agriculture	• Short term measures to: combat soil erosion, including introducing soil protection and moisture conservation technologies; minimize the anthropogenic impact to the soil; use organic fertilizers effectively; selection of new agricultural seeds and hybrids; and special educational and training programs for workers; • Improve the network of systematic surveys, forecasting system, modeling and early warning information about emergency hydrometeorological phenomena to promote timely decision making, correction of adaptive steps and dissemination of results among the users; and • Long-term measures including selection of grains resistant to climate stress, diversification of crop production (including high yielding crops), and advanced land tenure and management to prevent soil degradation.
Water	• Develop arid and mini-water technologies; • Reconstruct watering systems and water supply systems to minimize water loss; • Increase the proportion of groundwater usage; • Transfer some part of the river flow inside and outside the regions; • Replace water-resistant agricultural plants on irrigable lands with the less water–resistant cultures; • Reconsider the functioning regimes of hydroelectric stations; • Limit economic activity in the most water deficit regions and transfer economic activity to other regions; • Meet requirements for establishing sanitary protective zones near surface water reservoirs and underground water wells, and mandatory ecological review for new water resource use projects; • Set up a water heat thermal regime for existing and regeneration of fish and other live organisms.
Forestry	• Consider the impacts of climate change impact on the forestry sector in the national strategy and programs; • Select species and types of wood in light of projected climate change impacts and assess capacity for providing raw wood to meet the population's

Sector	Proposed responses
	needs; • Amend the normative legal base and reference literature; • Justify budget financing for securing the forestry function in present and future climate conditions; and • Advance and update education and training courses.
Human health	• Invest in sustainable building solutions in response to changing climatic conditions and in measures to control infectious and non-infectious population diseases.

B. National Level Policies and Strategic Documents

It seems that Kazakhstan has not yet initiated the development of policies directly focused on climate change adaptation. However, the country developed a Kazakhstan desertification prevention program for 2005 to 2015 that suggests changes in vegetation plantation that were applied in other arid zones and also outlines restrictions on animal grazing to limit desertification. For future activities, a Government Commission on Climate Change is being established to address impacts and adaptation needs, including impacts on water resources, agriculture and public health.

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.	Kazakhstan's First National Communication	Government of Kazakhstan	1998	Agriculture; Watershed management	This document provides an overview of Kazakhstan's national circumstances, discusses its greenhouse gas emissions profile, identifies options for reducing greenhouse gas emissions and conducts a limited vulnerability assessment.
2.	Kazakhstan's Second National Communication	Ministry of Environment Protection	Released in 2009	Multi-sectoral	The document provides a detailed review of climate change impacts related to water, health, agriculture, forestry and extreme events. It also provides a detailed review of needed adaptation actions.

C. Current Adaptation Action

Kazakhstan is implementing a few nationally-focused adaptation projects in the agriculture and water sectors, both of which are priorities for national level adaptation. There are also projects underway in the country focused on reducing desertification, especially around the area of the Aral Sea, which could have adaptation co-benefit although this is not their stated objective.

Kazakhstan is also active in several regional cooperation and adaptation initiatives, the latter of which are mostly focused on water, land and human health impacts. The country is also participating in the global program on community-based adaptation (CBA) in which projects on water management, cattle ranging and forestry are mostly being implemented.

There are also a few small-scale projects being implemented by local non-governmental organizations. Most of the funding for these initiatives is being provided through the CBA project, which is supported by the Global Environment Facility (GEF) and other funders such as Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) and the United Nations Development Programme (UNDP). Most of these activities are focused on agriculture and try to assist farmers to better anticipate seasonal weather changes and diversify their production. As well, there are many on-going agricultural activities that are not necessarily linked directly to adaptation, but they could be used to inform future adaptation strategies. There is quite a strong focus on regional cooperation in water management and agriculture that are important for increasing capacities at the administration and government level. However these actions often have limited involvement of the people at the local level and have limited impact on the ground.[47]

Table 2: Current Adaptation Projects and Programs active in Kazakhstan

Name		Objectives	Funder(s)	Implementing Agency(s)	Type of project	Duration	Priority Sector(s)	Geographic focus (if any)
National Action								
1.	Sustainable Pasture Management in Kazakhstan[48]	Recognizing that Kazakhstan is threatened by desertification as a result of climate change, the project aims to: • establish a state framework that favors sustainable pasture management; • introduce a sustainable system for the use of pastures; • reduce desertification and improve the ecological integrity of the steppe; and • improve the productivity of pastoral livestock and thereby increase the income security and living standards of those who use the land.	German Federal Ministry for Economic Cooperation and Development	GIZ, Ministry of the Republic of Kazakhstan, UNDP	Knowledge communication; Research; Policy formation and integration	2008 – 2011	Pastoralism; Agriculture	

[47] Personal communication, graduate student, February 1, 2011,
[48] GIZ, http://www.GIZ.de/en/weltweit/europa-kaukasus-zentralasien/kasachstan/27838.htm

Name		Objectives	Funder(s)	Implementing Agency(s)	Type of project	Duration	Priority Sector(s)	Geographic focus (if any)
2.	Strengthening Capacity in the Field of Sustainable Development through integration of Climate Change Issues into Strategic Planning in the Republic of Kazakhstan[49]	The goal of the project is to strengthen the capacity of the Ministry of Natural Resources and Environmental Protection to promote low-carbon development and actively participate in the processes related to implementation of the commitments under the UNFCCC. The project will also "contribute to the development of the policy on adaptation to climate change."	GEF, UNDP *Budget:* US$600,000	Ministry of Natural Resources & Environmental Protection	Capacity building; Policy formation and integration	2009 – 2011	Government; Climate information services	
Participation in Regional and Global Actions								
3.	Climate Change and Drought in Central Asia and China[50]	This project aims to increase knowledge related to climate change and drought management, especially on how different ecosystems can adapt to climate variability and extreme climate events to achieve sustainable, equitable, and productive use and conservation of natural resources—including water, soils and biodiversity—within an ecosystem approach.	ADB *Budget:* US$$775,000	ICARDA	Research	2009 - ?	Agriculture	*Regional:* China, Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan Uzbekistan
			In Kazakhstan: To be identified.					
4.	Community-based Adaptation (CBA) Programme[51]	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 community-based adaptation priorities to promote replication, up-scaling and	GEF (Strategic Priority on Adaptation), co-financing *Budget:* US$6.7 million	UNDP	Knowledge communication; Capacity Building; Community-based adaptation	2009 – 2011	Multi-sectoral	*Global:* Bangladesh, Bolivia, Guatemala, Jamaica, Kazakhstan, Morocco, Namibia, Niger, Samoa,

[49] UNDP, http://www.undp.kz/projects/start.html?type=interne
[50] ICARDA, http://www.icarda.org/cac/cac_news/en/cac39e.pdf and http://www.icarda.org/RestrictedProject/Project8.pdf
[51] 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)
		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.						Viet Nam
			In Kazakhstan: CBA in Kazakhstan will work with communities to integrate climate change concerns into sustainable rangeland and agricultural management practices, and work with local water managers to integrate climate change concerns into irrigation regimes for climate-resilient and sustainable agriculture. Specific projects underway in the country as part of this project include: • Autumn/winter irrigation as an adaptive mechanism for efficient use of water resources in Southern Kazakhstan (March 2009 - February 2011) • Adaptation of farming practices to increasing temperatures and aridity in Akmola Oblast (March 2009 - February 2011) • Adaptation of Grazing Stock-Raising of Lepsy Local Community to the Climate Change Kazakhstan Farmer Foundation (March 2009 - February 2011) • Adaptation to increased aridity through climate resilient agro-silvo-pastoralism using Sauxal Vidergeburt PO (March 2009 - February 2011) • Forest Protection Belts to Combat Increasing Aridity in Shyrkyn Village SKO Farmer and Entrepreneur Support Fund Public Foundation (March 2009 - February 2011) • Climate-Resilient Livestock and Pasture Management in Zhangeldy Village Zhuldyz Public Association (under development) • Climate-Resilient Horse Production in Kargaly Village Local Community of Kargaly Village (under development) • Reducing Vulnerability to Declining Water Supplies in Burevestnik Rural Community Water Users' Initiative Group (under development) • Demonstration of Adaptive Land Management under Climate Change Conditions Association of Landscape Planning Development (under development)[52]					
5.	Promoting Cooperation to Adapt to Climate Change in the Chu-Talas Transboundary Basin[53]	This project will increase the adaptive capacity of Kazakhstan, Kyrgyzstan and the Chu-Talas Commission to ongoing and future climate change impacts, ensure coordination	Finland (Environment and Security	UNDP, UNECE, OSCE	Research; Knowledge communication;	2010 – 2012	Watershed management; Disaster risk management;	*Regional:* Kazakhstan, Kyrgyzstan

[52] CBA, http://www.undp-adaptation.org/projects/websites/index.php?option=com_content&task=view&id=259&sub=1

[53] WaterWiki, http://waterwiki.net/index.php/Promoting_Cooperation_to_Adapt_to_Climate_Change_in_the_Chu-Talas_Transboundary_Basin; UNDP, http://www.undp.kz/projects/start.html?type=interne and ALM, http://www.adaptationlearning.net/project/pilot-project-water-and-climate-change-adaptation-chu-talas-river

Name		Objectives	Funder(s)	Implementing Agency(s)	Type of project	Duration	Priority Sector(s)	Geographic focus (if any)
		of adaptation actions in the Chu-Talas basin and thereby help to prevent possible negative effects on regional security. The specific objectives of the project are: "(1) Modelling of the possible changes in water resources of the Chu-Talas basin associated with climate conditions and elaboration of joint scenarios; (2) Preparation of joint vulnerability assessment, focusing on selected areas/ sectors of importance for the work of the Commission; and (3) Development of a package of possible adaptation measures and relevant procedures for the Commission."	Initiative) *Budget:* US$225,000		Capacity building		Security	
			In Kazakhstan: National Water Committee of Kazakhstan is leading the work in the country with focus on developing assessments of ongoing and future climate change impacts, ensure coordination of adaptation actions in the Chu-Talas basin					
6.	Health from Climate Change in Southeast Europe, Central Asia and the Northern Russian Federation: Seven Country Initiative[54]	The specific objectives were to: 1. Develop national environment and health adaptation plans or integrating health into existing plans; 2. Strengthen health systems and build institutional capacity on climate change in relation to: extreme weather events preparedness and response, infectious and respiratory disease surveillance and response, and water management and malnutrition; 3. Foster innovation in energy efficiency and the use of renewable energy for health services; 4. Provide intelligence and facilitate the exchange of knowledge and experiences on effective adaptation and mitigation measures	Germany (the Federal Ministry of Environment, Nature Conservation and Nuclear Safety)	WHO Regional Office for Europe	Knowledge communication; Research; Policy formation and integration	2008 – 2010	Health; Energy	*Global:* Albania, Kazakhstan, Kyrgyzstan, the Russian Federation, Tajikistan, the former Yugoslav Republic of Macedonia and Uzbekistan
			In Kazakhstan: Further information required.					
7.	Promoting Integrated Water Resources Management	Through interventions at the national and local transboundary levels, the project aims to	European Commission,	UNDP Bratislava	Policy formation and	2009 – 2012	Watershed management;	*Regional:* Kazakhstan,

[54] UN, http://www.un.org/climatechange/projectsearch/proj_details.asp?projID=148&ck=rR9SooKQz1KvPFE

Name		Objectives	Funder(s)	Implementing Agency(s)	Type of project	Duration	Priority Sector(s)	Geographic focus (if any)
	(IWRM) and Fostering Transboundary Dialogue in Central Asia[55]	provide a platform for regional dialogue on IWRM in order to support adaptation to climate change. It is implementing concrete capacity-building measures. Planned actions include: concrete interventions targeted towards rural drinking water supply, capacity building towards agricultural water efficiency, small-scale hydropower solutions, or mainstreaming of climate change resilience, water-health and sanitation aspects into community development programs.	Norway, UNDP, and (in-kind) Governments of Kazakhstan, Kyrgyzstan, Tajikistan, others *Budget:* US$5.4 million	Regional Centre	integration; Knowledge communicatio n; Capacity building		Agriculture; Energy; Human health	Kyrgyzstan, Tajikistan
			In Kazakhstan: In the Ili-Balkash River Basin, the main focus lies on transboundary dialogue and enhanced cooperation between Kazakhstan and the People's Republic of China. Aiming at improved management of the shared River Basin system and its resources – and based on established transboundary cooperation and to the implementation of IWRM principles in the shared basin.					
8.	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[56]	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	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,

[55] UNDP, http://europeandcis.undp.org/environment/wg/show/213FA609-F203-1EE9-B6CFDBE3DDC27A6D

[56] ALM, http://www.adaptationlearning.net/program/support-policy-consultation-and-actions-boost-sustainable-use-water-and-energy-resources-agr 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)
		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.						Pakistan, Somalia, Sudan, Tajikistan, Tunisia, Turkmenistan Uzbekistan, Yemen
			In Kazakhstan: Further information required.					
9.	Programme for the Sustainable Use of Natural Resources in Central Asia[57]	The objective of the program is to ensure that national, regional and local strategies to fight desertification are being effectively implemented throughout the whole region. Conditions are in place in Central Asia that enable adaptation to climate change and the protection of habitats and natural resources for future generations.	German Federal Ministry for Economic Cooperation and Development	GIZ	Knowledge communication; Research; Policy formation and integration; Field implementation	2002 – 2013	Agriculture; Forestry; Biodiversity	*Regional:* Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan Uzbekistan
			In Kazakhstan: Further information required.					
10.	Transboundary Water Management in Central Asia[58]	The goal of the project is to help enable the relevant institutions in the region to create sustainable regional water management structures, which take account of issues relating to water use as well as energy and	German Federal Foreign Office	GIZ	Policy formation and integration; Knowledge communicatio	2009 – 2011	Watershed management	*Regional:* Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan

[57] GIZ, http://www.gtz.de/en/weltweit/europa-kaukasus-zentralasien/13434.htm
[58] GIZ, http://www.gtz.de/en/weltweit/europa-kaukasus-zentralasien/tadschikistan/29994.htm

Name		Objectives	Funder(s)	Implementing Agency(s)	Type of project	Duration	Priority Sector(s)	Geographic focus (if any)
		climate. The Central Asian states are jointly developing practical approaches to sustainable regional water management, for which they are implementing selected measures. GIZ is training the personnel of these institutions on specifically requested issues, such as irrigation, dam security, adapting to climate change and water use and reuse.			n; Research; Capacity building			Uzbekistan
			In Kazakhstan: the focus in on the Aral-Syrdarya basin that connects Kazakhstan and Uzbekistan; the project is focused on promoting sustainable water resource management					
11.	Water and Adaptation Intervention in Central and West Asia[59]	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 communicatio n; 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 Kazakhstan: To be identified					
12.	Scientific capacity development of trainers and policy-makers for climate change adaptation planning in Asia and the Pacific[60]	Building capacity of the trainers and policy-makers in the Asia-Pacific in order to mainstream climate change adaptation principles and practices in some of the member countries in Asia-Pacific of the 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	Capacity building; Policy formation and integration	2010 – 2011	Government	*Asia Region:* Australia, China, India, Japan, Kazakhstan, Philippines, Republic of Korea, and

[59] ADB, http://pid.adb.org/pid/TaView.htm?projNo=44066&seqNo=01&typeCd=2
[60] APN, http://www.apn-gcr.org/newAPN/resources/proceedingsAndMeetingReports/proceedings/igm-spg15.pdf

Name		Objectives	Funder(s)	Implementing Agency(s)	Type of project	Duration	Priority Sector(s)	Geographic focus (if any)
				Asia and the Pacific				Thailand
			In Kazakhstan: To be identified					

D. Proposed Adaptation Action

As noted in Table 3, Kazakhstan is proposed to be part of a project submitted to the Special Climate Change Fund (SCCF) for consideration.

Table 3: Proposed Adaptation Projects and Programs in Kazakhstan

Name		Objectives	Type of project	Priority Sector(s)	Geographic focus (if any)
1.	Central Asian Countries Initiative for Land Management (CACILM): Incorporating climate change adaptation and resiliency into sustainable land management in Central Asia[61]	The project will incorporate climate change adaptation considerations into the existing 10 year (2005 – 2015) CACILM project.[62]	Capacity building; Field implementation	Agriculture	*Regional:* Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan, Uzbekistan
			Notes: Proposed to the Special Climate Change Fund. Request to the SCCF: $20million. Planned co-financing: to be confirmed.		

E. Assessment

In Kazakhstan, understanding of adaptation needs and possible adaptation measures varies across sectors. For example, impacts of climate variability and the management of agriculture, including pastures, have held the interest of farmers for many years, and therefore a number of adaptation options were identified in Kazakhstan's Second National Communication (2009). The government has already implemented programs to reconstruct and restore natural pastures in arid climate conditions, which has created relevant experiences to address future impacts and needed adaptation requirements. Similarly, with increasing desertification and precipitation variability, small-scale adaptation measures in water management have been developed.

On the other hand, there is relatively limited knowledge about the potential impacts of climate change on the occurrence of forest fires, which seem to have increased during the last decade, and potential adaptation measures.

[61] GEF, http://www.thegef.org/gef/sites/thegef.org/files/publication/adaptation-actions_0.pdf
[62] For more information about the CACILM project, see: http://www.adb.org/projects/CACILM/

The public health sector is in a similar situation; climate change is expected to cause negative impacts, but so far there is little information on what type of impacts and the adaptation measures that might be possible. The necessity exists to strengthen Kazakhstan's attention on the impact of climate change and population health. Current government programs in particular do not include measures for reducing negative climate impacts on the population's health. As well, Kazakhstan is engaged in only one (regional) project is focused on health related climate change impacts and adaptation needs.

Finally, further efforts, including projects and programs, to address the impacts of climate change on economic sectors and development policies could explicitly consider the involvement of diverse groups of stakeholders. At present, often only a small number of organizations, agencies and government departments are actually participating in the development of plans and programs. As well, greater consideration could be given to the gender implications of climate change for Kazakhstan; none of the current or proposed projects identified specifically seek to address gender-based concerns.

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United Nations Development Programme (UNDP) (2008). Kazakhstan, Country Analysis. United Nations.

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2.0 Kyrgyzstan

ADB	Asian Development Bank
CDM	Clean Development Mechanism
GEF	Global Environment Facility
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit
ICARDA	International Center for Agricultural Research in the Dry Areas
IWRM	Integrated Water Resources Management
NGO	Non-governmental organization
OSCE	Organization for Security and Cooperation in Europe
SGP	Special Grant Program
UNECE	United Nations Economic Commission for Europe
UNFCCC	United Nations Framework Convention on Climate Change
WHO	World Health Organization

Few economies face initial conditions as challenging as the Kyrgyzstan, with its small population (just over five million) and status as one of the least accessible locations in the world. Its isolation is a significant barrier to international trade and transport, which is further hampered by inadequate physical infrastructure and protectionist policies in neighboring countries. The country's economy relies on the sale of hydropower and gold, and only about seven per cent of the country's land is arable (World Bank, 2010).

A. Adaptation Needs and Priorities

In terms of current vulnerabilities, more than 95 per cent of settlements in Kyrgyzstan are located in the direct vicinity of water sources, mainly along river beds that are extremely sensitive to landslides, mudflow and floods. Landslides destroy houses and the infrastructure of settlements located nearby, and remote landslides can block riverbeds and their inflows. Mud-flows turn catastrophic due to mountain lakes and man-made reservoir breaches typically caused by the melting of snow in the high mountainous zone; every summer a catastrophic breach of the Mertsbaher lake glacial dam occurs and water is released into the Sary-Jaz River. The number of households moved out of landslide zones since 1992 has reached 7,873 (i.e., 656 houses annually).

Using the results of 17 global climatic models, Kyrgyzstan's Second National Communication (2009) projects that the country will experience increases in temperatures of approximately 1.6° Celsius over the 21st century. As well, it is projected to experience increased precipitation during winter months and decreased precipitation during the summer. The country has identified water, health, agriculture and extreme weather events as the areas most vulnerable to climate change, as summarized in Table 1.

Table 1: Key Vulnerabilities to climate change impacts in the Kyrgyzstan

Climate change impacts			Examples of specific vulnerabilities
1.	Extreme Weather Events	High temperatures, avalanches heavy rainfalls, hail	• Impacts on agricultural production • Land and mudslides on unstable slopes and flooding from reservoirs and mountain-lakes • Increased erosion and loss of agricultural land • Human health impacts
2.	Water Resources	Changes in precipitation frequency, melting glaciers	• Changes in river flows, intra-annual distribution and overall environment quality • Reduced water availability for agriculture • Reduction in lake levels (Issyk-Kul, Chatyr-Kul)
3.	Agriculture	Impacts on lands and crop production	• Reduction in pasture productivity • Negative impacts on agricultural crops (wheat, barley and corn) • Potential opportunity for new locations for grapes and cotton cultivations
4.	Public health	Increased temperature and changes in humidity	• Increased heat- and cold-related morbidity • Increased occurrence of asthma and other respiratory diseases due the cumulative effect of climate change and local air pollution

The country's Second National Communication (2009) outlines its overall priority adaptation actions as follows:

- Improvement of legislation (beginning with the development of a national adaptation strategy to climate change that includes sectoral development plans);
- Improvement of institutional structure (creation of permanent structures and strengthening of communications between individual departments);
- Increase of knowledge; and
- Economic incentives of adaptation actions.

To address the identified vulnerabilities related to agriculture, water and on the consequences of extreme weather events, the following specific actions have been identified (Sharshenova, 2010; Kyrgyzstan, 2009):

Adaptation in agriculture and water:

- Diversification of crop and cattle livestock to better incorporate varieties tolerant to expected climate change;
- Alter plant cultivation and cattle breeding priorities at the regional level; implementation of alternative cultivation approaches, including change of land topography and timing of planting;
- Innovative studies in the field of irrigation to solve the problem of a projected increase in the moisture deficit and the frequency of drought periods; and implementation of efficient irrigation practice;
- Development of new varieties of cultures, including hybrids, for improvement of endurance and suitability to temperature, humidity and other varying agro-climatic conditions;
- Crop insurance and investment in agricultural equities; diversification of farmers' income sources to reduce the risk of income loss caused climate change;
- Development and implementation of modern systems of early notification and prevention of natural and temperature anomalies; provision of daily and seasonal weather forecasts;
- Development of incentive programs for farmers to enable the provision of agricultural grants able to finance actions such as improvements in equipment and the availability of fertilizers for peasants and farms; and
- Development and implementation of state policy and programs that will influence water and land use by peasants and farmers in view of varying climate conditions.

Adaptation to extreme weather events:

- Spatial planning of all emergency situations including identification of danger zones and requirements for use of these zones;
- Engineering actions aimed at the elimination and prevention of sources of hazards;
- Legislative measures prescribing standards and rules to provide the basis for carrying out of all spatial planning and engineering actions; and
- Emergency management training and information provision to avoid inaccurate decisions.

Public health (Prevention of infectious diseases):

- Provision of safe drinking water for the population;
- Implementation of food safety measures;

- Implementation of energy saving technologies in the health sector;
- Capacity building of health personnel on climate change and health;
- Increasing public awareness on the issue of climate change and health;
- Carrying out of scientific researches on climate change and health; and
- Improving of monitoring and information systems related to climate change and health.

B. National Level Policies and Strategic Documents

In its Second National Communication (Kyrgyzstan, 2009), Kyrgyzstan identifies a few national-level policy actions specifically focused on adaptation to climate change. It was indicated that the country is developing a Climate Change Adaptation Plan for the Health Sector led by the Ministry of Health. The country also created an Inter-agency Group tasked with the development of a National Strategy and Climate Change Adaptation Plan. The group was created by the State Agency for Environmental Protection and Forestry under the Government of the Kyrgyzstan. Both of these initiatives were started in 2009.

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	Ministry of Ecology and Emergencies	Released in 2003	Watershed management; Energy; Human health; Biodiversity; Forestry	This document provides an overview of the country's national circumstances, greenhouse gas emissions profile, vulnerability to climate change, and suggested measures to address climate change.
2.	Second National Communication	Ministry of Ecology and Emergencies	Released in 2009	Watershed management; Agriculture; Human health	This document provides an overview of the country's national circumstances, greenhouse gas emissions profile, vulnerability to climate change, and suggested measures to address climate change.
3.	Climate Change Adaptation Plan for the Health Sector	Ministry of Health of the Kyrgyzstan	In development since 2009	Human health	To address observed and expected impacts of climate change on human health
4.	National Strategy and Climate Change Adaptation Plan		In development since 2009	Multi-sectoral	The Inter-agency Group was tasked with the development of a National Strategy and Climate Change Adaptation Plan for the Kyrgyzstan. The group was created by the State Agency for

Name of Policy Action		Government Division Responsible	Status	Sector(s) of Focus	Summary description
					Environmental Protection and Forestry under the Government of the Kyrgyzstan. The development process began in 2009 and no draft documents are yet available.

C. Current Adaptation Action

Overall, current programs underway in Kyrgyzstan are focusing on sectors that are relevant for adaptation, including water management, agro-biodiversity and land-related issues, but so far they do not specifically include an adaptation component. One of these programs is the Global Environmental Facility/Small Grant Programme (GEF/SGP) launched by UNDP in Kyrgyzstan in 2001. The UNDP/GEF SGP in Kyrgyzstan is supporting activity related to four thematic directions: biodiversity conservation, which is of global significance; mitigation of the consequences of climate change; quality protection of international waters; and combating land degradation.[63]

There are also a few Clean Development Mechanism projects being implemented in Kyrgyzstan that could provide adaptation co-benefits, including increasing the resilience of ecosystems by promoting sustainable forest management and biodiversity conservation and diversifying local income. The most advanced of these projects is the Tien Shan Biodiversity Project that aims to reforest an area of 18 thousand hectares, reduce greenhouse gases emissions and increase income through the further sale of certified carbon emission reductions to biocarbon funds. A second component of the project is aimed at capacity building in special protected areas and reducing anthropogenic pressure on natural resources by means of sustainable forestry management and eco-tourism development (Kyrgyzstan, 2009).

Major challenges associated with implementing adaptation projects in Kyrgyzstan include a strong focus at present on capacity development for professionals, government officers, and researchers involved in climate modeling and in the UNFCCC process without linking these efforts to community-level activities. As well, there is comparatively less information provision and implementation of projects that focus on adaptation at the local level in areas such as water management, agriculture and forestry.[64] While there is considerable knowledge and experience available at the local level, especially in the listed sectors, these are very often not connected with

[63] Source: UNDP, http://europeandcis.undp.org/environment/wg/show/3D267D03-F203-1EE9-BA85A5A31F5168AE
[64] Personal communication, international agency representative, February 9, 2011.

the approaches and measures prioritized in regional and national projects. Ensuring that some of the project's support is allocated to on-the-ground adaptation work perhaps could provide higher benefits to climate change adaptation efforts.[65]

Table 3: Current Adaptation Projects and Programs in Kyrgyzstan

Name		Objectives	Funder(s)	Implementing Agency(s)	Type of project	Duration	Priority Sector(s)	Geographic focus (if any)
Participation in Regional and Global Actions								
1.	Programme for the Sustainable Use of Natural Resources in Central Asia[66]	The objective of the program is to ensure that national, regional and local strategies to fight desertification are being effectively implemented throughout the whole region. Conditions are in place in Central Asia that enable adaptation to climate change and the protection of habitats and natural resources for future generations.	German Federal Ministry for Economic Cooperation and Development	GIZ	Knowledge communication; Research; Policy formation and integration; Field implementation	2002 – 2013	Agriculture; Forestry; Biodiversity	*Regional:* Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan Uzbekistan
			In Kyrgyzstan: Gathering a growing number of successfully tested conservation approaches in the country, and providing this information during regional exchanges and learning platforms.					
2.	Preparedness for Climate Change[67]	The aim of this program was for the Red Cross and Red Crescent National Societies in countries particularly vulnerable to climate change to gain a better understanding of climate change and its impacts to identify country-specific adaptation measures in line with risks. Activities could include organizing a workshop on risks, assessment of risks through preparation of a background document, capacity building programs, and developing climate change resilient plans.	Red Cross/Red Crescent Climate Centre	National Red Cross/Red Crescent Societies	Capacity building; Policy formation and integration	Phase 1: 2006 – 2009 Phase 2: ongoing	Disaster risk management;	*Global:* 39 countries *Central Asian participants in Phase 1:* Kyrgyzstan, Uzbekistan
			In Kyrgyzstan: By the conclusion of the first phase of activity, the Kyrgyzstan Red Cross Society was engaged in capacity building for the climate resilient programs.					
3.	Health from Climate Change	The specific objectives were to:	Germany (the	WHO Regional	Knowledge	2008 – 2010	Health; Energy	*Global:*

[65] personal communication, graduate student, February 7, 2011.
[66] GIZ, http://www.gtz.de/en/weltweit/europa-kaukasus-zentralasien/13434.htm
[67] IFRC, http://www.climatecentre.org/site/preparedness-for-climate-change-programme

Name		Objectives	Funder(s)	Implementing Agency(s)	Type of project	Duration	Priority Sector(s)	Geographic focus (if any)
	in Southeast Europe, Central Asia and the Northern Russian Federation: Seven Country Initiative[68]	1. Develop national environment and health adaptation plans or integrating health into existing plans; 2. Strengthen health systems and build institutional capacity on climate change in relation to: extreme weather events preparedness and response, infectious and respiratory disease surveillance and response, and water management and malnutrition; 3. Foster innovation in energy efficiency and the use of renewable energy for health services; 4. Provide intelligence and facilitate the exchange of knowledge and experiences on effective adaptation and mitigation measures	Federal Ministry of Environment, Nature Conservation and Nuclear Safety)	Office for Europe	communication; Research; Policy formation and integration			Albania, Kazakhstan, Kyrgyzstan, the Russian Federation, Tajikistan, the former Yugoslav Republic of Macedonia and Uzbekistan
			In Kyrgyzstan: To be identified.					
4.	Promoting Integrated Water Resources Management (IWRM) and Fostering Transboundary Dialogue in Central Asia[69]	Through interventions at the national and local transboundary levels, the project aims to provide a platform for regional dialogue on IWRM in order to support adaptation to climate change. It is implementing concrete capacity-building measures. Planned actions include: concrete interventions targeted towards rural drinking water supply, capacity building towards agricultural water efficiency, small-scale hydropower solutions, or mainstreaming of climate change resilience, water-health and sanitation aspects into community development programs.	European Commission, Norway, UNDP, and (in-kind) Governments of Kazakhstan, Kyrgyzstan, Tajikistan, others *Budget:* US$5.4 million	UNDP Bratislava Regional Centre	Policy formation and integration; Knowledge communication; Capacity building	2009 – 2012	Watershed management; Agriculture; Energy; Human health	*Regional:* Kazakhstan, Kyrgyzstan, Tajikistan

[68] UN, http://www.un.org/climatechange/projectsearch/proj_details.asp?projID=148&ck=rR9SooKQz1KvPFE
[69] UNDP, http://europeandcis.undp.org/environment/wg/show/213FA609-F203-1EE9-B6CFDBE3DDC27A6D

Name		Objectives	Funder(s)	Implementing Agency(s)	Type of project	Duration	Priority Sector(s)	Geographic focus (if any)
			In Kyrgyzstan: In Kyrgyzstan and Tajikistan, the objective is mainly to develop and implement IWRM and Water Efficiency Strategies at the national and basin levels. Interventions will include cooperative activities in selected transboundary river basins (such as Zarafshan), aimed to demonstrate IWRM principles and their implementation at local and basin level. The project will be based on a participatory (IWRM) process in order to ensure involvement of all relevant stakeholders.					
5.	Climate Change and Drought in Central Asia and China[70]	This project aims to increase knowledge related to climate change and drought management, especially on how different ecosystems can adapt to climate variability and extreme climate events to achieve sustainable, equitable, and productive use and conservation of natural resources—including water, soils and biodiversity—within an ecosystem approach.	ADB *Budget:* US$775,000	ICARDA	Research	2009 - ?	Agriculture	*Regional:* China, Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan Uzbekistan
			In Kyrgyzstan: To be identified.					
6.	Promoting Cooperation to Adapt to Climate Change in the Chu-Talas Transboundary Basin[71]	This project will increase the adaptive capacity of Kazakhstan, Kyrgyzstan and the Chu-Talas Commission to ongoing and future climate change impacts, ensure coordination of adaptation actions in the Chu-Talas basin and thereby help to prevent possible negative effects on regional security. The specific objectives of the project are: "(1) Modelling of the possible changes in water resources of the Chu-Talas basin associated with climate conditions and elaboration of joint scenarios; (2) Preparation of joint vulnerability assessment, focusing on selected areas/ sectors of importance for the work of the	Finland (Environment and Security Initiative) *Budget:* US$225,000	UNDP, UNECE, OSCE	Research; Knowledge communication; Capacity building	2010 – 2012	Watershed management; Disaster risk management; Security	*Regional:* Kazakhstan, Kyrgyzstan
			In Kyrgyzstan: To be identified.					

[70] ICARDA, http://www.icarda.org/cac/cac_news/en/cac39e.pdf and http://www.icarda.org/RestrictedProject/Project8.pdf

[71] WaterWiki, http://waterwiki.net/index.php/Promoting_Cooperation_to_Adapt_to_Climate_Change_in_the_Chu-Talas_Transboundary_Basin; UNDP, http://www.undp.kz/projects/start.html?type=interne and ALM, http://www.adaptationlearning.net/project/pilot-project-water-and-climate-change-adaptation-chu-talas-river

Name		Objectives	Funder(s)	Implementing Agency(s)	Type of project	Duration	Priority Sector(s)	Geographic focus (if any)
		Commission; and (3) Development of a package of possible adaptation measures and relevant procedures for the Commission."						
7.	Transboundary Water Management in Central Asia[72]	The goal of the project is to help enable the relevant institutions in the region to create sustainable regional water management structures, which take account of issues relating to water use as well as energy and climate. The Central Asian states are jointly developing practical approaches to sustainable regional water management, for which they are implementing selected measures. GIZ is training the personnel of these institutions on specifically requested issues, such as irrigation, dam security, adapting to climate change and water use and reuse.	German Federal Foreign Office	GIZ	Policy formation and integration; Knowledge communication; Research; Capacity building	2009 – 2011	Watershed management	*Regional:* Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan Uzbekistan
			In Kyrgyzstan: The focus is on the smaller trans-boundary rivers of Isfara and Chadzhabarkan between Kyrgyzstan and Tajikistan. It aims to: develop the competence of national centers on water, climate change and energy; conduct vulnerability analysis and adaptation strategies for climate change; and develop criteria for hydropower utilization. Furthermore, in the country the focus is also on increasing safety and improvement of hydro-technical facilities and dams.					
8.	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[73]	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	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,

[72] GIZ, http://www.gtz.de/en/weltweit/europa-kaukasus-zentralasien/tadschikistan/29994.htm
[73] ALM, http://www.adaptationlearning.net/program/support-policy-consultation-and-actions-boost-sustainable-use-water-and-energy-resources-agr 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)
		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.						Pakistan, Somalia, Sudan, Tajikistan, Tunisia, Turkmenistan Uzbekistan, Yemen
			In Kyrgyzstan: To be identified.					
9.	Water and Adaptation Intervention in Central and West Asia[74]	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 Kyrgyzstan: Consultations were undertaken in the country to initiate preparation of climate impact assessments and to conduct fact-finding for regional adaptation capacity development. Stakeholders, including the UNFCCC focal points, relevant government agencies (e.g., for energy, transport, and agriculture), climate change research institutes, and nongovernment organizations, were consulted. The mission also consulted with Central Asian Countries Initiative for Land Management partners on climate change					

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

Name		Objectives	Funder(s)	Implementing Agency(s)	Type of project	Duration	Priority Sector(s)	Geographic focus (if any)
			adaptation opportunities.					
10.	Health Vulnerability and Climate Change Adaptation Assessments[75]	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, Kyrgyzstan, Macedonia, Mongolia, Russia, Tunisia
			In Kyrgyzstan: Assessment of climate change health impact in the population of the Kyrgyzstan with specific activities: developing a national adaptation plan of health system to climate change; carrying out communication activities according the Health Promotion Action Plan; training of public health and environmental health specialists; equipping five medical facilities with solar equipment to pilot energy efficiency and self-sustainability in areas vulnerable to interruption in the continuous energy supply.[76] Summary of assessment available.[77]					

D. Proposed Adaptation Action

Reference has been found to the following two proposed adaptation projects submitted to the Special Climate Change Fund (SCCF) for approval.

[75] WHO, http://www.who.int/globalchange/mediacentre/events/2010/costa_rica_consultation_200710/en/index.html
[76] From: http://www.who.int/globalchange/mediacentre/events/2010/costa_rica_consultation_200710/kyrgyz_Rep_va_Presentation.pdf
[77] Summary available at: http://www.who.int/entity/globalchange/mediacentre/events/2010/costa_rica_consultation_200710/SUMMARY_KRGYZ_VA.pdf

Table 4 Proposed Adaptation Projects and Programs in Kyrgyzstan

Name		Objectives	Type of project	Priority Sector(s)	Geographic focus (if any)
1.	Central Asian Countries Initiative for Land Management (CACILM): Incorporating climate change adaptation and resiliency into sustainable land management in Central Asia[78]	The project will incorporate climate change adaptation considerations into the existing 10 year (2005 – 2015) CACILM project.[79]	Capacity building; Field implementation	Agriculture	*Regional:* Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan, Uzbekistan
			Notes: Proposed to the Special Climate Change Fund. Request to the SCCF: US$20 million. Planned co-financing: to be confirmed.		
2.	Introducing Climate Risk Management to the Rural Communities of Issyk Kul Region of Kyrgyzstan[80]	To explore key sectors and activities at the local level which are at risk because of climate change, including water management, agriculture and health in the context of current seasonal variability of local climate and in the context of potential future changes.	Policy formation and integration; Capacity building; Community-based adaptation	Agriculture; Human health; Freshwater supply	Issyk Kul Region of Kyrgyzstan
			Notes: Proposed to the SCCF. Requested financing from the SCCF: US$1.0 million. Proposed co-financing: US$1.0 million.		

E. Assessment

Kyrgyzstan is unique because of its geography, socioeconomic conditions, and valuable biodiversity and ecosystems. All of these factors demand specific adaptation actions related to natural resource management, including water and agriculture, extreme weather events and human health. Kyrgyzstan's recently released Second National Communication (2009) provides a detailed review of the potential impacts of climate change, their consequences and needed adaptation actions in some key areas (e.g., agriculture and the impact of extreme weather events such as floods, landslides and mudslides). There remains very limited focus on climate change and adaptation at the national level, with initiation of adaptation plans in 2009. Major gaps in the country's adaptation activities could be listed as follows:

1. Specific technical and non-technical adaptation options are needed to address the consequences of extreme weather events often occurring in high-mountain regions; specific events include landslides and mudslides, seasonal flooding from lakes and dams, and overall slope instability.

[78] GEF, http://www.thegef.org/gef/sites/thegef.org/files/publication/adaptation-actions_0.pdf
[79] For more information about the CACILM project, see: http://www.adb.org/projects/CACILM/
[80] GEF, http://www.thegef.org/gef/sites/thegef.org/files/publication/adaptation-actions_0.pdf

2. Capacity-development support is needed to apply lessons learned from projects in health, water and extreme weather so they are effectively incorporated into national strategies and plans.
3. Because of the country's strongly dependency on hydropower, further exploration of the impacts of climate change and adaptation needs in this sector could increase the resilience of the current infrastructure and of potential future investments. These explorations could perhaps involve the country's key hydropower companies.
4. Similar to other Central Asian countries, the global significance of the country's biodiversity is acknowledged, but there seems to be fewer efforts underway to protect it when compared to other countries in the region, such as Tajikistan or Kazakhstan.
5. A number of development projects are being implemented in the country and supported by agencies such UNDP and the World Bank; exploring adaptation needs and incorporating adaptive responses to these activities would help in avoiding future impacts and damages.
6. None of the current and planned adaptation projects and programs in Kyrgyzstan have a specific objective of understanding and responding to the differential gender-based implications of climate change—a gap that should be filled the country is going to effectively engage in adaptation.
7. Because the country is in the very early stages of mainstreaming adaptation into their plans and strategies, specific capacity-development efforts would perhaps provide useful skills for application in this endeavor.

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3.0 Tajikistan

ADB	Asian Development Bank
CDM	Clean Development Mechanism
GEF	Global Environment Facility
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit
ICARDA	International Center for Agricultural Research in the Dry Areas
IWRM	Integrated Water Resources Management
SCCF	Special Climate Change Fund
SPA	Strategic Priority for Adaptation (GEF fund)
UNDP	United Nations Development Program
UNECE	United Nations Economic Commission for Europe
UNEP	United Nations Environment Program
UNFCCC	United Nations Framework Convention on Climate Change
WHO	World Health Organization

Tajikistan, a landlocked country located in Central Asia, is considered a low-income country; over two-thirds of the population lives on less than US$2.15 a day. Tajikistan's economy was seriously weakened by the civil war lasting from 1992 to 1997, but is now making a slow recovery. The main sectors of the economy are non-ferrous metallurgy (lead, zinc and aluminum), light industry and agriculture, with cotton being its most important export commodity (World Bank, 2010). Access to energy, especially in rural areas, is a significant challenge for Tajikistan (UNDP, 2009). Many rural communities use wood from forests for heating houses and cooking, which is negatively impacting biodiversity, increasing erosion and potentially augmenting vulnerability to the impacts of climate change (World Bank, 2011).

In general, Tajikistan's current climate is continental, subtropical and semiarid, with some desert areas. However, the climate changes drastically according to elevation. Tajikistan is considered the main glacial center of Central Asia, with glaciers occupying about six per cent of the country's total area. These glaciers perform an important function by retaining water, controlling flows and regulating the climate; along with permafrost, they are the main source of water recharging the Aral Sea river basins. Already, the country has lost more than 20 billion cubic meters of the glaciers' ice volume (i.e., about 2.5 percent, mostly affecting small glaciers) during the twentieth century; a further increase in temperature will accelerate glacial retreat. Rainfall tends to be sporadic and in recent years (e.g., from 1999 to 2002)

most precipitation has occurred in the winter and spring, causing droughts during main agricultural seasons (Kayumov et al, 2008). On the other hand, in 2007/2008, the area experienced extreme cold winter (the coldest since 1969) with increasing demand for electricity. This, coupled with high prices for food and fuel, led to the so-called 2008 Central Asia energy crisis (UNDP, 2009).

A. Adaptation Needs and Priorities

Tajikistan's Second National Communication (2008) projects that the country will experience increased temperatures of 0.2 to 0.4°C by 2030 compared to 1961 to 1990 temperature averages. Changes in precipitation, however, appear uncertain and depend greatly on the topographic characteristics of the country's various regions. Future climate change induced threats include increased aridity, seasonal and inter-seasonal alterations of droughts and floods. The effects of warmer temperatures on the country's water supply are of considerable concern given the importance of glaciers to replenishment of the country's waterways (Kayumov et al., 2008). Results of the current and potential future vulnerability to climate driven impacts include threats to the stability of the agro-ecosystems, crop failures and increased food insecurity. Expected key vulnerabilities related to climate change in diverse sectors, as identified in Tajikistan's Second National Communication, are presented in Table 1.

Table 1: Key vulnerabilities related to climate change in Tajikistan (Kayumov et al**., 2008)**

Impacts		Consequences	Examples of specific vulnerabilities
1.	Extreme Weather Events	• High temperatures, dust storms, avalanches, heavy rainfalls, hail	• Impacts on agriculture • Overtopping and other negative consequences for industrial facilities, including tailings ponds, hydropower facilities and distribution lines
2.	Freshwater Resources	• Changes in precipitation frequency • Melting of glaciers	• Negative impacts on hydropower production affecting the country and the region • Reduction of underground water reserves • Impacts on water supply—specifically on drinking water, water for irrigation and other uses • Flood risks associated with glacial melt
3.	Natural Resources	• Changes in climatic patterns, increased drought and changes in habitat	• Negative impacts of drought on valuable ecosystems • Negative impacts of pests, invasive species, changes in habitat on biodiversity, especially for endemic species of mammals, fish and insects (negative impacts on extensive timber should also be considered) • Impacts by increasing timber harvesting, pests and grazing on forest resources
4.	Agriculture	• Impacts on lands and crop production	• Salinization of land, significant erosion, limited nitrification of major soil types under elevated temperatures • Dynamics of aridity and droughts

5.	Public health	• Increased temperature, changes in humidity	• Potential occurrence of malaria with increasing temperatures (at a mean of 2 to 3˚C) • Increased heat-and cold related morbidity

Tajikistan is experiencing significant, on-going economic and institutional changes at the same time as it experiences the impacts of climate variability and climate change. Therefore, it is necessary to focus on adaptation responses that directly address the consequences of climate change, while also mainstreaming adaptation to climate change into on-going development programs. These programs include those focused on hydropower development, institution building, and improving community-based support of public infrastructure and services. The latter support should be directed to schools, health facilities and other services that most affect the lives of the poor and aim to reduce poverty (World Bank, 2010). Specific adaptation needs identified by Tajikistan in its Second National Communication are as follows (Kayumov et al., 2008):

Natural Resources

- Support and expand the network of protected areas, develop transborder ecological corridors and cooperate with neighboring countries in Central Asia;
- Regulation of alien fish species in water reservoirs;
- Integrated system of plant protection and pest control; and
- Forest fire management and protection of new plantations.

Agriculture and Food Security

- Breeding of crops resistant to drought and salinity;
- Soil protection by plowing across slopes;
- Introduce efficient irrigation systems (drip irrigation); and
- Increase use of organic fertilizers.

Public Health

- Raise awareness of the implications of heat waves for people's health;
- Conduct vulnerability assessments and identify indicators to measure impacts on health to improve existing programs on diseases prevention; and

- Possible establishment of a specialized area for medical check-ups of the state of health among mothers and children after pathological pregnancies and deliveries.

Freshwater Resources

- Regulate river flow through the construction of dams and diametrical dikes;
- Channel dredging and flow straightening works; and
- Protection of settlements, agricultural lands and communication infrastructure from washouts and floods.

B. National Level Policies and Strategic Documents

Policy development in the country is centered on climate change mitigation, water and energy efficiency. However, the developed *National Plan on Climate Change Mitigation* is also focused on exploring opportunities for Clean Development Mechanism (CDM) projects in the forestry and, potentially, agriculture sectors. There are also water tariffs being introduced with the aim of promoting efficient irrigation systems, thereby reducing the amount of water used for irrigation of agricultural land. None of these policies and plans were designed with a specific focus on adaptation to climate change; however, the consequences of such policies and the aforementioned CDM projects should account for the impacts of climate change and could also provide adaptation co-benefits.

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	Government of Tajikistan	Released in 2002	Watershed management, Agriculture, Biodiversity;, Transport, Health, etc.	This document reviews expected climate change trends/scenarios in Tajikistan, the country's greenhouse gas emissions profile, reviews key vulnerabilities to climate change, and discusses response measures including enhanced public awareness and education.
2.	Second National Communication	State Agency for Hydrometeorology of the Committee for Environmental Protection	Released in 2008	Multi-sectoral	Detailed overview of climate projections, climate change impacts on diverse sectors and adaptation needs.

C. Current Adaptation Action

Relative to other countries in Central Asia, Tajikistan (like Kazakhstan and Kyrgyzstan) has a very high level of engagement in projects related adaptation. A number of initiatives are underway in the country at both the national and regional levels. At the national level, the

projects are focused on water resource management, agriculture and disaster management. Funders of these projects include the Global Environment Facility (GEF) and Asian Development Bank, with implementing agencies including the World Health Organisation (WHO), United Nations Economic Commission for Europe (UNECE), and the United Nations Development Programme (UNDP).

At the regional level, the country is participating in projects on water resource management, human health and agriculture. Of these sectors, the most significant attention is devoted to water management. These activities seem to be better integrated with local communities compared to some other countries in the region; especially in the area of water management there is a higher number of projects that are involving local people and communities.[81] However, there remains considerable room for enhanced linkages between local and regional adaptation efforts, especially in the following areas: increasing involvement of agricultural producers; collaboration with local water managers; and involving remote and less developed areas in adaptation needs assessments and planning.[82] In addition, Tajikistan is the only Central Asian country participating in the Pilot Program for Climate Resilience, an initiative aiming to reduce vulnerability and build capacity to address climate change, especially through policy mainstreaming and integration. Funders of these regional projects include the Asian Development Bank, European Commission, Germany, the Special Climate Change Fund, and the World Bank.

Table 3: Current Adaptation Projects and Programs in Tajikistan

Name		Objectives	Funder(s)	Implementing Agency(s)	Type of project	Duration	Priority Sector(s)	Geographic focus (if any)
National Action								
1.	Sustaining Agricultural Biodiversity in the Face of Climate Change[83]	Globally significant agro-biodiversity conservation and adaptation to climate change are embedded in the national and local agricultural and rural development policies and practices of Tajikistan.	GEF Trust Fund, co-financing *Budget:* US$6.825 million	UNDP, National Biodiversity and Biosafety Center	Policy formation and integration; Knowledge communication; Community-based adaptation	2009 – 2014	Agriculture; Biodiversity	

[81] Personal communication, international agency representative, February 9, 2011.
[82] Personal communication, international agency representative, February 9, 2011.
[83] GEF, http://gefonline.org/projectDetailsSQL.cfm?projID=3129 and UNDP, http://www.undp.tj/index.php?option=com_content&task=view&id=412&Itemid=233

Name		Objectives	Funder(s)	Implementing Agency(s)	Type of project	Duration	Priority Sector(s)	Geographic focus (if any)
2.	Increasing Climate Resilience through Drinking Water Rehabilitation in North Tajikistan[84]	The objective of the project is to improve the climate resilience of drinking water supplies in seven cities in Northern Tajikistan by: "a) encouraging water use efficiency, b) more reliable and climate resilient water sources and rehabilitating water supply infrastructure, and c) reforming water utility management including tariff reform, leading to more sustainable supplies of safe drinking water that are resilient to the expected impacts of climate change, and are environmentally and financially sustainable."	SCCF, World Bank, Switzerland *Budget:* US$22.57 million	World Bank, Khojagii Manziliu Kommunali, water companies in each of the 7 participating cities	Capacity building; Field implementation	*GEF Council approval March 2011*	Watershed management; Urban areas	Karaikkum, Kanibaidam, Isfara, Gaufurov, Taboshar, Chkalovsk and Khorog
Participation in Regional and Global Projects								
3.	Health from Climate Change in Southeast Europe, Central Asia and the Northern Russian Federation: Seven Country Initiative[85]	The specific objectives were to: 1. Develop national environment and health adaptation plans or integrating health into existing plans; 2. Strengthen health systems and build institutional capacity on climate change in relation to: extreme weather events preparedness and response, infectious and respiratory disease surveillance and response, and water management and malnutrition; 3. Foster innovation in energy efficiency and the use of renewable energy for health services; 4. Provide intelligence and facilitate the exchange of knowledge and experiences on effective adaptation and mitigation measures	Germany (the Federal Ministry of Environment, Nature Conservation and Nuclear Safety)	WHO Regional Office for Europe	Knowledge communication; Research; Policy formation and integration	2008 – 2010	Health; Energy	*Global:* Albania, Kazakhstan, Kyrgyzstan, the Russian Federation, Tajikistan, the former Yugoslav Republic of Macedonia and Uzbekistan
			In Tajikistan: Further information required.					

[84] GEF, http://gefonline.org/projectDetailsSQL.cfm?projID=4422
[85] UN, http://www.un.org/climatechange/projectsearch/proj_details.asp?projID=148&ck=rR9SooKQz1KvPFE

Name		Objectives	Funder(s)	Implementing Agency(s)	Type of project	Duration	Priority Sector(s)	Geographic focus (if any)
4.	Programme for the Sustainable Use of Natural Resources in Central Asia[86]	The objective of the program is to ensure that national, regional and local strategies to fight desertification are being effectively implemented throughout the whole region. Conditions are in place in Central Asia that enable adaptation to climate change and the protection of habitats and natural resources for future generations.	German Federal Ministry for Economic Cooperation and Development	GIZ	Knowledge communication; Research; Policy formation and integration; Field implementation	2002 – 2013	Agriculture; Forestry; Biodiversity	*Regional:* Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan Uzbekistan
			In Tajikistan: Further information required.					
5.	Pilot Program for Climate Resilience (PPCR)[87]	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 US$971.75 million pledged as of February 2011	World Bank	Policy formation and integration	2008 – ongoing	Multi-sectoral	Bolivia, Cambodia, Mozambique, Nepal, Niger, Tajikistan, Yemen, Zambia *Regional Programs:* Caribbean and Pacific (includes Papua New Guinea, Samoa, Tonga)
			In Tajikistan: Technical assistance to start up PPCR in Tajikistan[88] *Objective:* Help the government of Tajikistan to make Pilot Program on Climate Resilience					

[86] GIZ, http://www.gtz.de/en/weltweit/europa-kaukasus-zentralasien/13434.htm
[87] CIF, http://www.climatefundsupdate.org/listing/pilot-program-for-climate-resilience
[88] CIF, http://www.climateinvestmentfunds.org/cif/sites/climateinvestmentfunds.org/files/PPCR%20JM%20Aide%20Memoire_Final_tajikistan_Oct25.pdf

Name		Objectives	Funder(s)	Implementing Agency(s)	Type of project	Duration	Priority Sector(s)	Geographic focus (if any)
			(PPRC) effective and ensure that climate change resilience is mainstreamed into policies and planning in the government. *Budget:* GBP 350 000 *Implementing agency(s):* Government of Tajikistan *Duration:* 2009 – 2010 *Type of project:* Policy formation and integration *Priority sectors:* Watershed management; Agriculture; Forestry; Energy					
6.	Climate Change and Drought in Central Asia and China[89]	This project aims to increase knowledge related to climate change and drought management, especially on how different ecosystems can adapt to climate variability and extreme climate events to achieve sustainable, equitable, and productive use and conservation of natural resources—including water, soils and biodiversity—within an ecosystem approach.	ADB *Budget:* US$775,000	ICARDA	Research	2009 – ?	Agriculture	*Regional:* China, Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan Uzbekistan
			In Tajikistan: Further information required.					
7.	Promoting Integrated Water Resources Management (IWRM) and Fostering Transboundary Dialogue in Central Asia[90]	Through interventions at the national and local transboundary levels, the project aims to provide a platform for regional dialogue on IWRM in order to support adaptation to climate change. It is implementing concrete capacity-building measures. Planned actions include: concrete interventions targeted towards rural drinking water supply, capacity building towards agricultural water efficiency, small-scale hydropower solutions, or mainstreaming of climate change resilience, water-health and sanitation aspects into community development programs.	European Commission, Norway, UNDP, and (in-kind) Governments of Kazakhstan, Kyrgyzstan, Tajikistan, others *Budget:* US$5.4	UNDP Bratislava Regional Centre	Policy formation and integration; Knowledge communication; Capacity building	2009 – 2012	Watershed management; Agriculture; Energy; Human health	*Regional:* Kazakhstan, Kyrgyzstan, Tajikistan

[89] ICARDA, http://www.icarda.org/cac/cac_news/en/cac39e.pdf and http://www.icarda.org/RestrictedProject/Project8.pdf
[90] UNDP, http://europeandcis.undp.org/environment/wg/show/213FA609-F203-1EE9-B6CFDBE3DDC27A6D

Name		Objectives	Funder(s)	Implementing Agency(s)	Type of project	Duration	Priority Sector(s)	Geographic focus (if any)
			million					
			In Tajikistan: The objective is mainly to develop and implement IWRM and Water Efficiency Strategies at national and basin level. The projects will focus in parallel on IWRM governance and institutional reform processes, as well as on concrete interventions to improve the situation of irrigated agriculture and living conditions of people in rural areas, with special attention to water supply, sanitation, and energy service delivery (through small-scale hydropower).					
8.	Transboundary Water Management in Central Asia[91]	The goal of the project is to help enable the relevant institutions in the region to create sustainable regional water management structures, which take account of issues relating to water use as well as energy and climate. The Central Asian states are jointly developing practical approaches to sustainable regional water management, for which they are implementing selected measures. GIZ is training the personnel of these institutions on specifically requested issues, such as irrigation, dam security, adapting to climate change and water use and reuse.	German Federal Foreign Office	GIZ	Policy formation and integration; Knowledge communication; Research; Capacity building	2009 – 2011	Watershed management	*Regional:* Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan Uzbekistan
			In Tajikistan: The focus is on on Isfara and Chadzhabarkan river basin in Tajikistan and Kyrgyzstan and Serafshan river basin in Uzbekistan and Tajikistan, supporting to solutions and action plans for Garauti irrigation area and exploring the opportunities of the country in participating in hydropower generation in collaboration with the neighboring countries; it also focusing.					
9.	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	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,	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,

[91] GIZ, http://www.gtz.de/en/weltweit/europa-kaukasus-zentralasien/tadschikistan/29994.htm

Name		Objectives	Funder(s)	Implementing Agency(s)	Type of project	Duration	Priority Sector(s)	Geographic focus (if any)
	Africa Region in the context of Climate Change[92]	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.						Kazakhstan, Kyrgyzstan, Libya, Mauritania, Morocco, Pakistan, Somalia, Sudan, Tajikistan, Tunisia, Turkmenistan Uzbekistan, Yemen
			In Tajikistan: Further information required.					
10.	Water and Adaptation Intervention in Central and West Asia[93]	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	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 Tajikistan: Participated in Joint MDG mission for Special Program for Climate Resilience					

[92] ALM, http://www.adaptationlearning.net/program/support-policy-consultation-and-actions-boost-sustainable-use-water-and-energy-resources-agr and SESRIC, http://www.sesric.org/activities-oicfao.php

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

Name		Objectives	Funder(s)	Implementing Agency(s)	Type of project	Duration	Priority Sector(s)	Geographic focus (if any)
		develop adaptation strategies. The focus area of the study is the Amu Darya and Syr Darya river basins.	in Tajikistan which discussed the government's need to finalize a plan of investments to pilot new approaches to integrate climate risk management in Tajikistan's development and poverty reduction strategies.					

D. Proposed Adaptation Action

The regional projects presented in Table 4 have been proposed to the SCCF; each has a component involving Tajikistan.

Table 4: Proposed Adaptations Projects and Programs in Tajikistan

Name		Objectives	Type of project	Priority Sector(s)	Geographic focus (if any)
1.	Building Climate Resiliency for Irrigation Infrastructure and Agro-Business[94]		Policy formation and integration; Field implementation	Watershed management; Agriculture	*Regional:* Pakistan, Tajikistan, Uzbekistan
			Notes: Proposed to the Special Climate Change Fund. Funding requested from SCCF: $20 million. Planned co-financing: to be confirmed.		
2.	Central Asian Countries Initiative for Land Management (CACILM): Incorporating climate change adaptation and resiliency into sustainable land management in Central Asia[95]	The project will incorporate climate change adaptation considerations into the existing 10 year (2005 – 2015) CACILM project.[96]	Capacity building; Field implementation	Agriculture	*Regional:* Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan, Uzbekistan
			Notes: Proposed to the Special Climate Change Fund. Request to the SCCF: $20million. Planned co-financing: to be confirmed.		
3.	Up-scaling and Replicating Successful Approaches to Adaptation at the Local Level (additional 10 countries)[97]		Field implementation	Multi-sectoral	*Indicative 10 countries:* Barbados, China, Indonesia, Mali, Nicaragua, Peru, Sri Lanka, Tanzania, Tajikistan and Tunisia
			Notes: Project being considered by the SCCF. Requested from the SCCF: $5.0 million. Planned co-financing: to be confirmed.		

[94] GEF, http://www.thegef.org/gef/sites/thegef.org/files/publication/adaptation-actions_0.pdf
[95] GEF, http://www.thegef.org/gef/sites/thegef.org/files/publication/adaptation-actions_0.pdf
[96] For more information about the CACILM project, see: http://www.adb.org/projects/CACILM/
[97] GEF, http://www.thegef.org/gef/sites/thegef.org/files/publication/adaptation-actions_0.pdf

E. Assessment

The Second National Communication submitted by Tajikistan in 2008 provides a detailed review of potential impacts of climate change, their consequences and needed adaptation actions. Some of these actions, especially those focused on water management and agriculture, are being addressed through diverse projects supported mostly by international organizations. Parallel to these initiatives, there are number of development projects also focused on infrastructure development, water management and institutional development implemented by international organizations such as World Bank and UNDP that might also support vulnerability reduction efforts.

Major gaps in the country's adaptation activities could be listed as follows:

1. There is limited integration of adaptation into public infrastructure development and capacity building conducted through development assistance (transportation, energy).
2. There is a lack of risk assessments and identification of needed adaptation actions at major industrial infrastructure facilities. For instance, tailings' ponds and the chemical industry's ageing storage facilities could be severely affected by climate change, potentially causing major damage to natural and human environments.
3. There are a limited number of programs aiming to mainstream adaptation into ongoing institutional reforms, especially in industry and natural resource management. The Pilot Program on Climate Resilience is one exception.
4. There is limited emphasis on exploring linkages between poverty and the environment in the context of the need to identify adaptation measures that could improve the well-being of people while managing their ecosystems in a more resilient manner.
5. Managing land is a strong priority in the country's recent National Communication; the focus includes both agricultural production and forestry. While potential adaptation measures related to agricultural production are increasingly being addressed by national actions and participation in regional initiatives, climate change impacts on the forestry sector and required adaptation actions have not yet been addressed to a larger extent.
6. Consider improving access to energy especially in rural areas as an important precondition in increasing adaptive capacities at the household level and thus adaptive actions need to account for the lack of energy in these areas.
7. Assessments of the gender dimensions of climate change impacts appears to be limited, reflected in the absence of any current or planned adaptation projects in Tajikistan that specifically seek to address gender issues. This understanding would promote the design of adaptation options that could be more effectively implement as they better reflect the needs and circumstances of communities.
8. Finally, Tajikistan is a major storehouse of globally important agro-biodiversity and represents one of the centers of origin for cultivated plants worldwide. The richness of the agro-ecosystems is complemented by a large concentration of wild relatives of agricultural plants present in Tajikistan's mountain ecosystems (including barley, almonds, pomegranates, grapes, apples, pears,

cherries and plums) (GEF, 2009). International donors are engaged in supporting projects that protect agro-biodiversity, but perhaps further efforts are needed, including policy frameworks and options that could address biodiversity conservation in the context of other activities such as agriculture, ranging and reforestation.

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4.0 Turkmenistan

ADB	Asian Development Bank
GEF	Global Environment Facility
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit
ICARDA	International Center for Agricultural Research in the Dry Areas
MNPT	Ministry of Nature Protection of Turkmenistan
SCCF	Special Climate Change Fund
UNDP	United Nations Development Program
UNFCCC	United Nations Framework Convention on Climate Change

Turkmenistan lies in the southern part of Central Asia. Its diverse natural conditions include three main types of landscape: deserts, oases and mountains. Of these, desert dominates; the Karakum desert occupies approximately 80 per cent of the whole country (World Bank, 2010). The country is richly endowed with hydrocarbons; its recoverable natural gas reserves rank fourth in the world. It also has substantial proven oil reserves and an extensive irrigation system for cotton and wheat, the country's principal crops. Its main exports include natural gas, oil and oil products, electricity and textile products. The rivers of the country are very important for irrigation; however, their uneven distribution over the country causes a shortage of water available for this purpose, especially in the south and west (Akmuradov, 2006; UNDP, 2009).

Overall, Turkmenistan faces significant challenges in improving living standards by addressing poverty and current environmental stresses, including water availability. It is vulnerable to current climatic conditions due to frequent droughts and extreme weather conditions. As well, it has limited capacity to forecast weather and to manage and adapt to the climatic changes (Akmuradov, 2006). Furthermore, as agriculture accounts for about 22 per cent of Turkmenistan's Gross Domestic Product and is a source of livelihood for more than half of the population, the consequences of climate change for this sector could significantly affect the development of the country and its people (UNDP, 2009).

A. Adaptation Needs and Priorities

The climate of Turkmenistan is sharply continental and nearly completely dry. A small quantity of atmospheric precipitation and high evaporating capacity are typical of its climate (Akmuradov, 2006). As a result of expected increases in air temperatures and decreases in

precipitation, climate change is expected to significantly affect the socioeconomic development of the country, especially in the areas of human health, water and agriculture, as well as coastal zones along the Caspian Sea. Table 1 summarizes key vulnerabilities to climate change and recommended adaptation actions as discussed in the country's First and Second National Communications.

Table 1: Key Vulnerabilities to Climate Change and Proposed Adaptation Actions (Akmuradov, 2006; MNPT, 2010)

Vulnerable sectors		Specific vulnerabilities	Suggested adaptation options
1.	Freshwater Resources	• Decrease in precipitation and increase in evaporation • Negative impacts on hydropower production affecting the country and the region • Reduction of groundwater reserves • Reduced water supply for drinking, irrigation and other uses • Flood risks associated with melting glaciers and greater risk of glacial lake outburst floods	• Increase water supply, such as by using groundwater, building reservoirs, improving or stabilizing watershed management, and installation of desalination facilities; • Decrease water demands, such as by increasing efficiency, reducing water losses, water recycling, and changing irrigation practices; • Develop and introduce flood and drought monitoring and control systems; • Improve or develop water management systems in the context of planted crops and irritation systems; and • Realization of selective works on developing drought tolerant crops.
2.	Agriculture and pastures	• Less water available for irrigation, possible impact on agricultural crop yields • Salinization of land • Dynamics of aridity and droughts • Changes in species structure and density of pasture plants with impacts on crop volume and the qualitative structure of forage • Expected increased need for irrigation of (net) 30-40%.	• Identification of drought resistant and high-yielding crop varieties; • Minimizing water resource consumption in agricultural production; • Developing ways to increase the efficiency ratio of irrigation systems; • Introduction of advanced irrigation techniques; • Improving economic interrelations between the state and water consumers; • Usage of low-mineralized collector-drainage water; • Planting forage woody-bushed plants to protect grasslands; • Introduction of accurate grassland rotation.
3.	Human health	• Direct impacts: heat stress, injuries/death during floods and storms • Indirect impacts: changing of disease vectors • Expected increase in days with abnormally high temperatures	• Preparation of the national report on climate change impact on human health assessment; • Assessment of high temperature in the human health in different country regions; • Defining population groups that are likely more vulnerable to climate change; • Developing prevention programs, new treatment methods, and development of concrete recommendations of population adaptation to extreme changes of weather conditions.
4.	Coastal zones along Caspian Sea	• Changes to river inflow into the Caspian Sea • Changes to fish populations within Caspian Sea, including sturgeon • Possible flooding • Impact on surrounding biodiversity	• Further studies of the impact of climate change on this important region; and • Protection of the most coastal facilities and coastal infrastructure, including highways and roads and the sea port of Turkmenbashi
5.	Natural resources	• Negative impacts on vulnerable ecosystems	• Develop alpine terraces to stabilize slopes; and

	and forestry		• Promote selective forest operations and reforestation to increase slope stability.

B. National Level Policies and Strategic Documents

Turkmenistan has initiated a few policy actions that aim to change its agrarian policy, identify socio-economic reforms and also improve policies guiding monitoring and management of the country's hydrometeorological organizations. These policies include (Akmuradov, 2006):

- National Agrarian Policy. The objective of this policy is to provide a stable, high growth of agricultural production;[98]
- Strategy for the Socio-economic Reform of Turkmenistan.
- Regulation and management of hydro-meteorological activity. Under the direction of the Cabinet of Ministers, this initiative is monitoring the condition of the atmosphere, sea environment, surface water, agricultural plants and pastures, and radiation at the earth surface.
- Water Management Development Conception: Turkmenistan's Second National Communication (2010) also refers to a water policy which addresses water use within the country until 2030, and incorporates the anticipated impacts of climate change.

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.	First National communication	National Institute of Desert Flora and Fauna Research Production Centre of Ecological Monitoring	Submitted in 2006	Multi-sectoral	This document provides an overview of Turkmenistan's national circumstances, its greenhouse gas emissions profile, its vulnerability to climate change, as well as key measures to address climate change.
2.	Second National Communication	Ministry of Nature Protection of Turkmenistan	Submitted in 2010	Freshwater supply; Agriculture; Human health; Coastal zone management	This document provides an overview of the country's national circumstances, its greenhouse gas mitigation profile, key vulnerabilities to the future effects of climate change, and proposed adaptation and mitigation measures.

[98] To achieve this objective, the policy calls for: more effective development of agricultural branches owing to selection and seed-growing development, increase of crop yield and cattle productivity; improvement of agriculture structure and bringing it closer to the consumer market, introduction of science-based crop rotation for a stable increase of land fertility; deepening of degree and quality of agricultural products processing; priority development of export-oriented production in agriculture; and improvement of specialization and territorial location of agricultural production.

C. Current Adaptation Action

Turkmenistan's participation in adaptation projects both nationally and regionally is moderate in comparison to other Central Asian countries. At the national level, the focus is on protecting a natural reserve with significant biodiversity. Regionally, the country participates in projects on trans-boundary water management and sustainable land management. Main funders supporting this work include the Asian Development Bank (ADB), the Global Environment Facility (GEF), Germany and the United Nations Development Programme (UNDP).

Adaptation action in the country is only at a very preliminary stage. Most of the local NGOs are involved in development-type work without an explicit focus on adaptation. Similarly to other countries, there are perhaps quite a number of autonomous adaptation actions occurring in the country. These observations suggest that Turkmenistan could need to both significantly advance the capacity of personnel in government offices and other agencies to be able to include adaptation into planning and also to develop projects that could be used to support relevant on the ground actions.[99]

Table 3: Current Adaptation Projects and Programs in Turkmenistan

Name		Objectives	Funder(s)	Implementing Agency(s)	Type of project	Duration	Priority Sector(s)	Geographic focus (if any)
National Action								
1.	Conservation and Sustainable Use of Globally Significant Biological Diversity in Hazar Nature Reserve on the Caspian Sea Coast[100]	The project assists the Government of Turkmenistan to: i) Secure management capacity and conservation effectiveness of the Reserve; ii) Build cross-sector capacity for integrated coastal management and mainstream biodiversity conservation objectives into productive coastal sectors surrounding Hazar Reserve; iii) Build trust and goodwill between Hazar Reserve and local communities, strengthening environmental governance over wildlife resources; and	GEF, UNDP *Budget:* US$1.7 million	UNDP, Ministry of Nature Protection of Turkmenistan	Capacity-building; Knowledge communication; Field implementation; Policy formation and integration	2006 – ongoing	Watershed management; Agriculture; Biodiversity	Hazar Nature Reserve, Caspian Sea Coast of Turkmenistan

[99] Personal communication, international agency representative, February 7, 2011; and graduate student, February 9, 2011.
[100] See: http://www.hazarwetlands.com/

Name		Objectives	Funder(s)	Implementing Agency(s)	Type of project	Duration	Priority Sector(s)	Geographic focus (if any)
		iv) Mainstream adaptation practices from the project into the National System of Protected Areas of Turkmenistan. The project has begun to "map the effects of climate change, including rapid change of the shoreline, the emergence of new islands, the disappearance of existing landscapes, and biodiversity loss."[101]						
Participation in Regional and Global Actions								
2.	Water and Adaptation Intervention in Central and West Asia[102]	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 Turkmenistan: To be identified					
3.	Programme for the Sustainable Use of Natural Resources in Central Asia[103]	The objective of the program is to ensure that national, regional and local strategies to fight desertification are being effectively implemented throughout the whole region. Conditions are in place in Central Asia that enable adaptation to climate change and the	German Federal Ministry for Economic Cooperation and	GIZ	Knowledge communication; Research; Policy formation and integration;	2002 – 2013	Agriculture; Forestry; Biodiversity	*Regional:* Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan Uzbekistan

[101] UNDP, http://content.undp.org/go/newsroom/2010/june/saving-nesting-and-wintering-spots-on-caspian-coast.en
[102] ADB, http://pid.adb.org/pid/TaView.htm?projNo=44066&seqNo=01&typeCd=2
[103] GIZ, http://www.gtz.de/en/weltweit/europa-kaukasus-zentralasien/13434.htm

Name		Objectives	Funder(s)	Implementing Agency(s)	Type of project	Duration	Priority Sector(s)	Geographic focus (if any)
		protection of habitats and natural resources for future generations.	Development		Field implementation			
			In Turkmenistan: To be identified					
4.	Capacity Development for Policy Makers: Addressing climate change in key sectors[104]	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:* Algeria, Bangladesh, Bolivia, Colombia, Costa Rica, Dominican Republic, Ecuador, Gambia, Honduras, Liberia, Namibia, Nepal, Nicaragua, Niger, Paraguay, Peru, Saint Lucia, Togo, Turkmenistan, Uruguay
			In Turkmenistan: Turkmenistan focused its study on investment and financial flows on electricity production and consumption (mitigation) and water (adaptation). The project's final Inter-Ministerial Dialogue was held in September 2010.[105]					
5.	Climate Change and Drought in Central Asia and China[106]	This project aims to increase knowledge related to climate change and drought management, especially on how different ecosystems can adapt to climate variability	ADB *Budget:* US$775,000	ICARDA	Research	2009 – ?	Agriculture	*Regional:* China, Kazakhstan, Kyrgyzstan,

[104] UNDP, http://www.undpcc.org/content/project-en.aspx
[105] UNDP-CC, http://www.undpcc.org/content/turkmenistan-en.aspx
[106] ICARDA, http://www.icarda.org/cac/cac_news/en/cac39e.pdf and http://www.icarda.org/RestrictedProject/Project8.pdf

Name		Objectives	Funder(s)	Implementing Agency(s)	Type of project	Duration	Priority Sector(s)	Geographic focus (if any)
		and extreme climate events to achieve sustainable, equitable, and productive use and conservation of natural resources—including water, soils and biodiversity—within an ecosystem approach.						Tajikistan, Turkmenistan Uzbekistan
			In Turkmenistan: To be identified					
6.	Transboundary Water Management in Central Asia[107]	The goal of the project is to help enable the relevant institutions in the region to create sustainable regional water management structures, which take account of issues relating to water use as well as energy and climate. The Central Asian states are jointly developing practical approaches to sustainable regional water management, for which they are implementing selected measures. GIZ is training the personnel of these institutions on specifically requested issues, such as irrigation, dam security, adapting to climate change and water use and reuse.	German Federal Foreign Office	GIZ	Policy formation and integration; Knowledge communication; Research; Capacity building	2009 – 2011	Watershed management	*Regional:* Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan Uzbekistan
			In Turkmenistan: The project in the country is focused Murghab river Basin in the area Turkmenistan and Afghanistan; the project is focusing on supporting solutions and action plans for safe use and reuse of water and improvement of water quality.					
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[108]	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:	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,

[107] GIZ, http://www.gtz.de/en/weltweit/europa-kaukasus-zentralasien/tadschikistan/29994.htm
[108] ALM, http://www.adaptationlearning.net/program/support-policy-consultation-and-actions-boost-sustainable-use-water-and-energy-resources-agr 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)
		• 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.						Pakistan, Somalia, Sudan, Tajikistan, Tunisia, Turkmenistan Uzbekistan, Yemen
			In Turkmenistan: To be identified					

D. Proposed Adaptation Action

The following projects have been submitted for funding to the Special Climate Change Fund (SCCF) and the Adaptation Fund.

Table 4: Proposed Adaptation Projects and Programs in Turkmenistan

Name		Objectives	Type of project	Priority Sector(s)	Geographic focus (if any)
1.	Central Asian Countries Initiative for Land Management (CACILM): Incorporating climate change adaptation and resiliency into sustainable land management in Central Asia[109]	The project will incorporate climate change adaptation considerations into the existing 10 year (2005 – 2015) CACILM project.[110]	Capacity building; Field implementation	Agriculture	*Regional:* Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan, Uzbekistan
			Notes: Proposed to the Special Climate Change Fund. Request to the SCCF: US$20 million. Planned co-financing: to be confirmed.		

[109] GEF, http://www.thegef.org/gef/sites/thegef.org/files/publication/adaptation-actions_0.pdf
[110] For more information about the CACILM project, see: http://www.adb.org/projects/CACILM/

Name		Objectives	Type of project	Priority Sector(s)	Geographic focus (if any)
2.	Addressing Climate Change Risks to farming Systems in Turkmenistan at National and Community Levels[111]	To strengthen water management practices at the national and local levels in the context of climate change risks anticipated to result in water-scarcity for farming systems.	Capacity building	Agriculture	
			Notes: Approved by the Board of the Adaptation Fund during its August 2011 meeting. *Planned Implementing Agency:*UNDP *Planned Budget:* US$2,929,500		

E. Assessment

Compared to the other countries in the Central Asia, Turkmenistan seems to be least advanced with respect to gathering information about potential impacts of climate change and identifying adaptation options, as reflected by the fact that its First National Communication was only released in 2006. Turkmenistan also seems to have the least number of adaptation projects supported by international donors and agencies. Development activities are focused on economic development, and institutional and educational reforms, with very limited attention devoted to climate change so far.

Major gaps in the country's adaptation activities could be listed as follows:

1. Lack of comprehensive data sets on meteorological observations and other measures needed to validate climate projections, downscale data and estimate impacts of climate change beyond basic climatic variables.
2. There is a lack of comprehensive risks and vulnerability assessments that would provide a good basis for adaptation planning and help guide project prioritization and development.
3. There is limited expertise and skills, including developing climate projections and impact assessments that could identify the impacts of climate change on natural resources and society.
4. It would be crucial to explore opportunities to mainstream adaptation into ongoing institutional reform, especially in economic development and natural resource management.
5. There is currently limited involvement in regional cooperation. There are a lot of opportunities for knowledge exchange, as many of the countries are facing similar challenges in the context of climate change (e.g., recurring droughts, impacts on agriculture, ranging, and overall socioeconomic and institutional transformations).

[111] Adaptation Fund, http://www.adaptation-fund.org/sites/default/files/AFB14_Report_0.pdf

6. None of the current and planned adaptation projects and programs in Turkmenistan include a specific objective of understanding and responding to the differential gender-based implications of climate change—a gap that should be filled if it is going to effectively reduce its vulnerability.

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5.0 Uzbekistan

ADB	Asian Development Bank
GEF	Global Environment Facility
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit
ICARDA	International Center for Agricultural Research in the Dry Areas
ROU	Republic of Uzbekistan
UNDP	United Nations Development Program
UNFCCC	United Nations Framework Convention on Climate Change
WHO	World Health Organization

Uzbekistan is an upper low income country that is resource rich, doubly-landlocked and strategically located in the heart of Central Asia. Uzbekistan accounts for one-third of the region's population, and is the world's fifth largest cotton producer and second-largest cotton exporter. Major raw materials exported include gold, natural gas, copper and other non-ferrous metals and construction materials. The country possesses a young and educated labor force, rich agricultural resources and has significant economic potential (World Bank, 2010; UNDP, 2009).

A. Adaptation Needs and Priorities

The country's Second National Communication to the UNFCCC provides a detailed assessment of observed climate impacts, potential future impacts of climate change, anticipated vulnerabilities and needed adaptation measures. Compared to other countries in the region, Uzbekistan has provided detailed assessments of impacts on a number of key sectors such as agriculture, water and forestry, as well as impacts on human health and key industries (see Table 1). These impacts are a result of anticipated climatic changes in the country, which include increased temperatures and greater evapotranspiration, as well as increased precipitation—particularly in winter (ROU, 2008).

The National Communication also identifies major barriers to implementation of the listed adaptation measures. These barriers include: lack of financial resources across all the sectors; lack of technical expertise and skills at the scale needed to address these actions; and lack of applied research and developments that could connect climate change impact assessments with other environmental and societal challenges. Based on conducted impact assessments and experiences with adaptation options, Uzbekistan also stresses the necessity to review national frameworks and legislation—such as those related to natural resource management, agricultural development and health

issues. Finally, the need to extend the dialogue among the countries of Central Asia is emphasized in order to explore opportunities for transboundary watershed management, biodiversity conservation, share experiences with impacts and adaptations, and develop shared monitoring and early warning systems (ROU, 2008).

Table 1: Key Consequences of Climate Change and Adaptation Options for Uzbekistan (ROU, 2008)

Risk	Projected impacts	Adaptation strategies and measures proposed
Extreme weather events	• Increase in mudflow risk and occurrence • Growth of risks of mountain lake overflow • High risk of avalanche • Increase in occurrence and depth of drought • Heavy precipitation, hail	• Insurance system development • Expansion of the spectrum and the service quality • Improvement of the legal framework, increase of transparency • Increase public's insurance-related knowledge • Improvement of notification systems • Protection of housing and objects from mudflow and avalanches in high-risk areas • Mapping of risk zones • Improvement of methods for forecasts and hydrometeorological monitoring • Expansion of terrestrial network of observation stations • Development of drought early warning system • Development of criteria of hazardous phenomena for economic sectors with an account of geographical area • Development and application of methods of distance monitoring • Restoration of top atmospheric layer observations
Agriculture	• Reduction in snow and ice in mountains and subsequently of river flows • Deterioration of water quality • Increase in water consumption in all sectors • Increase in loss during irrigation • Increase in occurrence extreme floods and drought • Salinization • Increase in recurrence of extreme weather conditions	• Improvement of land and water resources management at national and transboundary level • Improvement of legal mechanisms • Introduction of Integrated Water Resource Management • Increase of the role of land users and water consumers • Development of programs and action plans for melioration of irrigated land • Water saving and rational water use in irrigated land • Introduction of economical irrigation methods (short furrows, through furrows, night-time irrigation, field leveling and others). • Reconstruction and maintenance of channels and drainage • Broader introduction of irrigation technologies • Improvement of water resources monitoring system • Improvement of harvesting, processing and exchange of information in the region • Improvement of transboundary monitoring of water resources • Increase in plant growing productivity

Risk	Projected impacts	Adaptation strategies and measures proposed
		• Introduction of high-yield and salinity- and drought-resistant crops • Introduction of cotton and lucerne crop rotation • Water saving in industry and households • Introduction of advanced water-saving technologies • Record of water consumption and tariff policy • Increase animal husbandry productivity • Setting load norms for pastures and rehabilitation of degraded pastures • Stabilizing sands, forest plantation on dried part of the Aral Sea
Public health	• Increase in duration of heat waves • Increase in heat-related and cardiovascular disease • Increase in acute intestinal infections • Increase in risk of parasitic disease and malaria	• Conservation of environment • Improvement of legislative framework to reduce environment-related health risks Improvement of sanitary and epidemiological services • Increase responsibility of economic entities • Improvement of water resources monitoring and protection • Provision of sufficient drinking water; construction of new and repair of old water pipes and drainage • Improvement and introduction of water treatment technologies • Creation of local sources of water supply for rural populations • Organization of prevention and prophylaxis • Determination of cardiovascular disease risk groups • Improvement of the system for prevention of acute intestinal infections and transmissible diseases • Development of an early warning system for heat waves, including regional criteria • Development of action plan against heat waves, including instructions for medical personnel • Maintenance of heating facilities; and research and public awareness • Public awareness of disease risk • Complementing research and educational programs with sections on climate and health • Improvement of forms of medical accountability and provision of data access • Reduction of heat islands
Forestry	• Increased fragmentation of arid forest ecosystems • Reduction of juniper ranges • Disappearance of *tugai* forests and field-protective forestation • Decrease in desert forest productivity	• Improvement of legislation and the system of forestry management • Development and adoption of a Forestry Code and National programs for field-protective forestation • Setting quota for forestry • Enhancement of forestry activity effectiveness • Use of scientific recommendations and international experience • Consideration of climatic changes in the planning of new planting areas • Increase of personnel potential

Risk	Projected impacts	Adaptation strategies and measures proposed
		• Obligatory forestry education for supervising officials of the branch • System of continuous upgrade of personnel qualifications • Development of applied research on demand of production and close correlation between forestry and production • Selection of forest trees resistant to pests and disease, heat and drought

B. National Level Policies and Strategic Documents

In Uzbekistan, a number of government initiatives are being developed that have relevance for climate change adaptation; however, adaptation has not been integrated into their design. For example, the Rational Use and Preservation of Land and Water Resource Program focuses on issues relevant for adaptation like the creation of efficient and environmentally sound technologies in irrigated land improvement, environment protection, nature use, environmental safety and protection from stress factors program. Another example is the Development of New Methods for Prevention, Diagnostics, Treatment and Rehabilitation of Human Diseases that also addresses impacts from heat-waves.

Other strategies such as the National Strategy of Sustainable Development aims to promote sustainable development resource management, agriculture and increase overall human well-being, and also includes adaptation and mitigation to climate change. Finally, Uzbekistan is developing its strategy focused on Integration of Vulnerability and Adaptation to Climate Change into Sustainable Development Policy Planning and Implementation with specific attention being given to the country's most vulnerable social and economic sectors.

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.	First National Communication of the Republic of Uzbekistan under the United Nations Framework Convention on Climate Change	Main Administration of Hydro Meteorology	Published in 1999	Multi-sectoral	The document provides an overview of the country's national circumstances, discusses its greenhouse gas emissions profile, and identifies key climate change vulnerabilities.
2.	Second National Communication of the Republic of Uzbekistan under the United Nations Framework Convention on Climate Change	Centre of Hydrometeorological Service under the Cabinet of Ministers of the	Published in 2008	Multi-sectoral	The documents provide a detailed overview of identified impacts and needed adaptation options in key sectors such as agriculture, forestry, ranging and health.

Name of Policy Action		Government Division Responsible	Status	Sector(s) of Focus	Summary description
		Republic of Uzbekistan			
3.	Integration of Vulnerability and Adaptation to Climate Change into Sustainable Development Policy Planning and Implementation	Government	Under development since 2008	Multi-sectoral	Specifically to focus on the country's most vulnerable social and economic sectors.
4.	National Strategy of Sustainable Development	Various	Under development	Multi-sectoral	Promoting sustainable development resource management, agriculture and increasing overall human well-being. It also includes addressing adaptation and mitigation of climate change.

C. Current Adaptation Action

Uzbekistan is involved in a few regional initiatives that dominate the country's adaptation efforts. Within the regional adaptation initiatives involving Uzbekistan, the focus is on health, transboundary watershed management and sustainable land management. Funders of these projects include the Asian Development Bank, Germany, the Special Climate Change Fund (SCCF) and World Bank; implementation agencies including the World Health Organisation (WHO) and the United Nations Development Programme (UNDP).

Although no nationally focused adaptation initiatives were identified through the review, a few local, small-scale projects have recently begun to be implemented in the areas of agriculture, land and water management. The current focus of these projects remain more on development assistance with limited integration of climate change adaptation. Adaptation projects in Uzbekistan thus are often separate initiatives without explicit links to ongoing development projects.[112]

Table 3: Current Adaptation Projects and Programs in Uzbekistan

Name		Objectives	Funder(s)	Implementing Agency(s)	Type of project	Duration	Priority Sector(s)	Geographic focus (if any)
Participation in Regional and Global Projects								
1.	Preparedness for Climate Change[113]	The aim of this program was for the Red Cross and Red Crescent National Societies in countries particularly vulnerable to climate	Red Cross/Red Crescent	National Red Cross/Red Crescent	Capacity building; Policy	Phase 1: 2006 – 2009 Phase 2:	Disaster risk management	Global project: 39 countries

[112] Personal communication, international agency representative, February 9, 2011.
[113] IFRC, http://www.climatecentre.org/site/preparedness-for-climate-change-programme

Name		Objectives	Funder(s)	Implementing Agency(s)	Type of project	Duration	Priority Sector(s)	Geographic focus (if any)
		change to gain a better understanding of climate change and its impacts to identify country-specific adaptation measures in line with risks. Activities could include organizing a workshop on risks, assessment of risks through preparation of a background document, capacity building programs, and developing climate change resilient plans.	Climate Centre	Societies	formation and integration	ongoing		*Central Asian participants in Phase 1:* Kyrgyzstan, Uzbekistan
			In Uzbekistan: By the conclusion of the first phase of activity, the national Red Cross Society was engaged in capacity building for the climate resilient programs.					
2.	Piloting Climate Change Adaptation to Protect Human Health[114]	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) promoting innovation through cooperation among participating countries.	SCCF, WHO, UNDP, National governments *Budget:* US$21,269,685	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
			In Uzbekistan: The objective of the project in Uzbekistan is to "pilot adaptation measures in Tashkent and Syrdarya provinces that will increase adaptation capacity of health care system in these provinces to cope with climate induced diseases."[115] *Funder:* Swiss Agency for Development and Cooperation					
3.	Health from Climate Change in Southeast Europe, Central Asia and the Northern Russian Federation: Seven Country Initiative[116]	The specific objectives were to: 1. Develop national environment and health adaptation plans or integrating health into existing plans; 2. Strengthen health systems and build institutional capacity on climate change in relation to: extreme weather events preparedness and response, infectious and respiratory disease surveillance and response,	Germany (the Federal Ministry of Environment, Nature Conservation and Nuclear Safety)	WHO Regional Office for Europe	Knowledge communication; Research; Policy formation and integration	2008 – 2010	Health; Energy	*Global:* Albania, Kazakhstan, Kyrgyzstan, the Russian Federation, Tajikistan, the former Yugoslav

[114] ALM, http://www.adaptationlearning.net/project/piloting-climate-change-adaptation-protect-human-health
[115] ALM, http://www.adaptationlearning.net/experience/piloting-climate-change-adaptation-protect-human-health-uzbekistan
[116] UN, http://www.un.org/climatechange/projectsearch/proj_details.asp?projID=148&ck=rR9SooKQz1KvPFE

Name		Objectives	Funder(s)	Implementing Agency(s)	Type of project	Duration	Priority Sector(s)	Geographic focus (if any)
		and water management and malnutrition; 3. Foster innovation in energy efficiency and the use of renewable energy for health services; 4. Provide intelligence and facilitate the exchange of knowledge and experiences on effective adaptation and mitigation measures						Republic of Macedonia and Uzbekistan
			In Uzbekistan: Further information required.					
4.	Water and Adaptation Intervention in Central and West Asia[117]	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 Uzbekistan: Country preventatives are participating in capacity-building trainings and workshop focused on water and disaster management					
5.	Programme for the Sustainable Use of Natural Resources in Central Asia[118]	The objective of the program is to ensure that national, regional and local strategies to fight desertification are being effectively implemented throughout the whole region. Conditions are in place in Central Asia that enable adaptation to climate change and the protection of habitats and natural resources for future generations.	German Federal Ministry for Economic Cooperation and Development	GIZ	Knowledge communication; Research; Policy formation and integration; Field implementation	2002 – 2013	Agriculture; Forestry; Biodiversity	*Regional:* Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan Uzbekistan

[117] ADB, http://pid.adb.org/pid/TaView.htm?projNo=44066&seqNo=01&typeCd=2
[118] GIZ, http://www.gtz.de/en/weltweit/europa-kaukasus-zentralasien/13434.htm

Name		Objectives	Funder(s)	Implementing Agency(s)	Type of project	Duration	Priority Sector(s)	Geographic focus (if any)
			In Uzbekistan: Further information required.					
6.	Climate Change and Drought in Central Asia and China[119]	This project aims to increase knowledge related to climate change and drought management, especially on how different ecosystems can adapt to climate variability and extreme climate events to achieve sustainable, equitable, and productive use and conservation of natural resources—including water, soils and biodiversity—within an ecosystem approach.	ADB *Budget:* US$775,000	ICARDA	Research	2009 – ?	Agriculture	*Regional:* China, Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan Uzbekistan
			In Uzbekistan: Further information required.					
7.	Transboundary Water Management in Central Asia[120]	The goal of the project is to help enable the relevant institutions in the region to create sustainable regional water management structures, which take account of issues relating to water use as well as energy and climate. The Central Asian states are jointly developing practical approaches to sustainable regional water management, for which they are implementing selected measures. GIZ is training the personnel of these institutions on specifically requested issues, such as irrigation, dam security, adapting to climate change and water use and reuse.	German Federal Foreign Office	GIZ	Policy formation and integration; Knowledge communication; Research; Capacity building	2009 – 2011	Watershed management	*Regional:* Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan Uzbekistan
			In Uzbekistan: The project is focused on two river basins Serafshan basin between Uzbekistan and Tajikistan and Aral-Syrdarya basin between Kazakhstan and Uzbekistan.					
8.	Support to Policy Consultation and Actions to boost Sustainable Use of Water and Energy Resources for Agricultural Production and Livelihood Improvement	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	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,

[119] ICARDA, http://www.icarda.org/cac/cac_news/en/cac39e.pdf and http://www.icarda.org/RestrictedProject/Project8.pdf
[120] GIZ, http://www.gtz.de/en/weltweit/europa-kaukasus-zentralasien/tadschikistan/29994.htm

Name		Objectives	Funder(s)	Implementing Agency(s)	Type of project	Duration	Priority Sector(s)	Geographic focus (if any)
	in the Near East and North Africa Region in the context of Climate Change[121]	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.						Egypt, Kazakhstan, Kyrgyzstan, Libya, Mauritania, Morocco, Pakistan, Somalia, Sudan, Tajikistan, Tunisia, Turkmenistan Uzbekistan, Yemen
			In Uzbekistan: Further information required.					
9.	Vulnerability to Climate Change in Agricultural Systems in Europe and Central Asia[122]	The objective of the program is to mainstream climate change adaptation into agricultural policies, programs, and investments. The project's goal will be achieved by: "raising awareness of the threat, analyzing potential impacts and adaptation responses, and building capacity among national and local stakeholders with respect to assessing the impacts of climate change and developing adaptation measures in the	World Bank	Future Water	Research; Policy formation and integration; Knowledge communicatio n	2010 – 2011	Agriculture	*Regional:* Albania, Moldova, Macedonia, Uzbekistan
			In Uzbekistan: Further information required.					

[121] ALM, http://www.adaptationlearning.net/program/support-policy-consultation-and-actions-boost-sustainable-use-water-and-energy-resources-agr and SESRIC, http://www.sesric.org/activities-oicfao.php

[122] Future Water, http://www.futurewater.nl/uk/projects/cc-eca/

Name		Objectives	Funder(s)	Implementing Agency(s)	Type of project	Duration	Priority Sector(s)	Geographic focus (if any)
		agricultural sector, narrowly defined to encompass crop (including cereals, vegetables, fruits, and forage) and livestock production."[123]						

D. Proposed Adaptation Action

The following proposed adaptation activities for Uzbekistan have been identified, of which two are seeking funding from the Special Climate Change Fund (SCCF).

Table 4: Proposed Adaptation Projects and Programs in Uzbekistan

Name		Objectives	Type of project	Priority Sector(s)	Geographic focus (if any)
1.	Assessment of Climate Change Impact on Social and Economic Situation[124]	To address the necessity for designing a project on adaptation capacity building with final/fundamental goal being to establish the Expert Unit for development of adaptation measures.	Policy formation and integration Capacity-building	Multi-sectoral; Trade; Energy; Transportation; Freshwater supply; Agriculture;	
			Notes: Planned by the Government		
2.	Building Climate Resiliency for Irrigation Infrastructure and Agro-Business[125]		Policy formation and integration; Field implementation	Watershed management; Agriculture	*Regional:* Pakistan, Tajikistan, Uzbekistan
			Notes: Proposed to the Special Climate Change Fund. Funding requested from SCCF: US$20 million. Planned co-financing: to be confirmed.		
3.	Central Asian Countries Initiative for Land Management (CACILM): Incorporating climate change adaptation and resiliency into	The project will incorporate climate change adaptation considerations into the existing 10	Capacity building; Field implementation	Agriculture	*Regional:* Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan,

[123] Future Water, http://www.futurewater.nl/uk/projects/cc-eca/
[124] In: ROU (2008)
[125] 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)
	sustainable land management in Central Asia[126]	year (2005 – 2015) CACILM project.[127]			Uzbekistan
			Notes: Proposed to the Special Climate Change Fund. Request to the SCCF: US$20 million. Planned co-financing: to be confirmed.		

E. Assessment

Uzbekistan's Second National Communication provides a detailed review of potential impacts of climate change, their consequences and needed adaptation actions. In most of the priority sectors it identifies, detailed lists of adaptation measures are provided. Through its participation in several ongoing regional projects, some of these adaptation needs are being met, particularly in the areas of agriculture, water, land management and health.

Major gaps in the country's adaptation activities could be listed as follows:

1. While widely recognizing the overall need to increase the education of people and professionals about adaptation actions, currently no such projects are being conducted in the country.
2. There is limited availability of experts with the knowledge and skills required to assess the impacts of climate change, determine appropriate adaptation measures and mainstreaming them into frameworks, programs and policies aiming to improve Uzbekistan's economic situation and sustainable development. Country report identifies a need to improve collaboration, data collection, assessments, management and knowledge sharing on issues related to climate change impacts and adaptation, and in this way to also increase the effectiveness of adaptation actions.
3. There is a particular need to mainstream adaptation into the country's ongoing institutional reforms, especially in industry and natural resource management.
4. The adaptation projects currently implemented in the country are largely focused on research and climate modeling with less attention on social issues and practical actions.
5. None of the adaptation initiatives being implemented within Uzbekistan specifically seeks to understand and ameliorate the gender-based differences of climate change.

[126] GEF, http://www.thegef.org/gef/sites/thegef.org/files/publication/adaptation-actions_0.pdf
[127] For more information about the CACILM project, see: http://www.adb.org/projects/CACILM/

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