



CARIAA
*Collaborative Adaptation Research
Initiative in Africa and Asia*

Review of Current and Planned Adaptation Action in Tajikistan

CARIAA Working Paper #13

Angie Dazé



Dazé, A. 2016. Review of current and planned adaptation action in Tajikistan. CARIAA Working Paper no. 13. International Development Research Centre, Ottawa, Canada and UK Aid, London, United Kingdom. Available online at: www.idrc.ca/cariaa.

ISSN: 2292-6798

This CARIAA working paper has been prepared by the International Institute for Sustainable Development (IISD).

About CARIAA Working Papers

This series is based on work funded by Canada's International Development Research Centre (IDRC) and the UK's Department for International Development (DFID) through the **Collaborative Adaptation Research Initiative in Africa and Asia (CARIAA)**. CARIAA aims to build the resilience of vulnerable populations and their livelihoods in three climate change hot spots in Africa and Asia. The program supports collaborative research to inform adaptation policy and practice.

Titles in this series are intended to share initial findings and lessons from research and background studies commissioned by the program. Papers are intended to foster exchange and dialogue within science and policy circles concerned with climate change adaptation in vulnerability hotspots. As an interim output of the CARIAA program, they have not undergone an external review process. Opinions stated are those of the author(s) and do not necessarily reflect the policies or opinions of IDRC, DFID, or partners. Feedback is welcomed as a means to strengthen these works: some may later be revised for peer-reviewed publication.

Contact

Collaborative Adaptation Research Initiative in Africa and Asia
c/o International Development Research Centre
PO Box 8500, Ottawa, ON
Canada K1G 3H9
Tel: (+1) 613-236-6163; Email: cariaa@idrc.ca

Creative Commons License

This Working Paper is licensed under a Creative Commons Attribution-NonCommercial-ShareAlike 4.0 International License. Articles appearing in this publication may be freely quoted and reproduced provided that i) the source is acknowledged, ii) the material is not used for commercial purposes, and iii) any adaptations of the material are distributed under the same license.

© 2016 International Development Research Centre

Cover photos:

Top: © PANOS/Jean-Leo Dugast
Bottom: © PANOS/Abbie Trayler-Smith
Left: © Blane Harvey



IDRC | CRDI

International Development Research Centre
Centre de recherches pour le développement international

Canada



Abstract

Tajikistan is one of the most vulnerable countries in Central Asia to climate change due to its high sensitivity to climate risks and its low adaptive capacity stemming from high levels of income inequality and a range of other social and biophysical challenges characteristic of this mountainous country. This country is affected by floods, droughts, hailstorms, avalanches, mudflows, and landslides, which negatively impact economic development and the livelihoods of people in rural areas. Climate researchers expect that in the future temperatures will continue to rise, leading to further melting of the country's glaciers, and that rainfall variability and intensity will increase. Rural areas are expected to be most significantly affected, with women and children recognized as particularly vulnerable. The Government of Tajikistan has identified reduced water quality and availability (and its consequences for agriculture, energy, and health) and increased frequency and severity of natural disasters as its most critical climate change concerns. However, capacity limitations have inhibited progress on integrating climate change into development policies and programs. The ongoing Strategic Program for Climate Resilience aims to address this, with a strong focus on enhancing institutional and technical capacities in climate change and related fields. The ongoing process of developing a national adaptation strategy and action plan will provide further direction on adaptation priorities for government, civil society, and private sector actors. This report is one in a series of country reviews prepared to provide the Collaborative Adaptation Research Initiative in Africa and Asia with a snapshot of adaptation action in its countries of engagement.

Résumé

Examen des mesures d'adaptation actuelles et prévues au Tadjikistan

Le Tadjikistan est l'un des pays les plus vulnérables aux changements climatiques en Asie centrale en raison de sa forte sensibilité aux risques climatiques et de sa faible capacité d'adaptation liée à des niveaux très élevés d'inégalités en matière de revenus, ainsi qu'une gamme d'autres défis d'ordre social et biophysique qui caractérisent ce pays montagneux. Ce dernier est touché par les inondations, la sécheresse, les tempêtes de grêle, les avalanches, les coulées de boue et les glissements de terrain, ce qui nuit au développement économique et aux conditions de vie des populations des zones rurales. Les chercheurs sur le climat s'attendent à ce que les températures continuent à augmenter à l'avenir, ce qui entraînera la fonte accrue des glaciers du pays. Ils s'attendent également à ce que la variabilité et l'intensité des précipitations augmentent. On s'attend à ce que les zones rurales soient les plus touchées, et les femmes et les enfants sont considérés comme particulièrement vulnérables. Le gouvernement du Tadjikistan a déterminé que la baisse de la qualité et de la disponibilité de l'eau (et les conséquences sur l'agriculture, l'énergie et la santé en découlant) et l'augmentation de la fréquence et de l'intensité des catastrophes naturelles constituaient les préoccupations les plus importantes du pays en matière de changements climatiques. Cependant, la limitation des capacités a freiné les progrès liés à l'intégration des changements climatiques aux politiques et programmes de développement. Le programme stratégique actuel pour la résilience climatique vise à traiter ces enjeux et s'attache à accroître les capacités institutionnelles et techniques en matière de changements climatiques et dans des domaines connexes. Le processus continu d'élaboration d'une stratégie d'adaptation nationale et d'un plan d'action fournira une orientation supplémentaire sur les priorités d'adaptation au gouvernement, à la société civile et aux acteurs du secteur privé. Ce rapport fait partie d'une série d'examen des pays préparés dans le cadre de l'Initiative de recherche concertée sur l'adaptation en Afrique et en Asie qui donnent un aperçu des mesures d'adaptation dans les pays où elle est déployée.

Acronyms

ADB	Asian Development Bank
CARIAA	Collaborative Adaptation Research Initiative in Africa and Asia
CDKN	Climate and Development Knowledge Network
DFID	Department for International Development (UK Government)
GEF	Global Environment Fund
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit
GoT	Government of the Republic of Tajikistan
IDRC	International Development Research Centre
IPCC	Intergovernmental Panel on Climate Change
ND-GAIN	Notre Dame Global Adaptation Index
OECD	Organisation for Economic Co-operation and Development
PPCR	Pilot Program on Climate Resilience
SPCR	Strategic Program for Climate Resilience
TajCN	Tajik NGO Climate Change Network
UNDP	United Nations Development Programme
UNFCCC	United Nations Framework Convention on Climate Change
UNICEF	United Nations Children's Fund

About the authors

Angie Dazé

Associate, International Institute for Sustainable Development

Geneva, Switzerland

Angie Dazé is a researcher with the CARIAA-supported review of current and planned adaptation in the CARIAA program's countries of focus. As an associate with IISD, her research focuses on integrating climate risk management in policy and practice in areas such as food security and peacebuilding.

Contact: angie.daze@iisd.org

Acknowledgements

The author is grateful to Jo-Ellen Parry for her leadership and guidance in the development of this report, and to Ms. Nailya Mustaeva for her helpful insights and feedback.

Contents

Abstract.....	iii
Résumé.....	iv
Synopsis.....	ix
Introduction.....	1
1. Current climate and projected changes	2
1.1 Current climate	2
1.2 Observed climate trends.....	3
1.3 Climate projections	4
2. Tajikistan’s vulnerability to climate change	4
2.1 Current drivers of vulnerability.....	4
2.2 Vulnerability of key sectors.....	8
2.3 Vulnerable regions and groups	10
3. Adaptation planning context	11
3.1 National-level development policy context	11
3.2 National-level climate policy context	12
3.3 Institutional structure for climate governance	14
3.4 National-level sectoral policies	15
4. Current and planned adaptation programs and projects.....	16
4.1 Adaptation projects and programs.....	17
4.2 Climate finance	20
5. Networks and communities of practice	22
6. Conclusions.....	23
7. Annexes	24
8. References.....	40

Synopsis

Climate risks	<ul style="list-style-type: none"> • Floods, droughts, hailstorms, avalanches, mudflows, and landslides • Rising temperatures • Glacial melt • Increased variability and intensity of rainfall 	Key sources of vulnerability	<ul style="list-style-type: none"> • Achieving poverty reduction and gender equality in a complex natural and social environment • High reliance on climate-sensitive natural resources • Poor governance and institutional capacity
Vulnerable sectors	Illustrative potential impacts on vulnerable sector	Illustrative adaptation priority adaptation measures in each sector	Projects in sector¹
Water	<ul style="list-style-type: none"> • Reduced glacier stock, especially in high-altitude areas, initially causing an increase in river flows, followed by a dramatic decrease • Increased risk of glacial lake outburst flooding • Variability in river flows • Fluctuations in water availability and quality • Increased frequency of floods and mudflows 	<ul style="list-style-type: none"> • Improve hydrological observation, monitoring, and forecasting systems • Implement water-use efficiency and conservation measures in irrigation systems • Protect against floods, mudflows, and landslides, through measures including channel dredging, construction of dams and dikes, reforestation and other slope protection measures, and development of escape routes • Construct reservoirs • Monitor glacial melt and downstream water flows • Carry out adaptive redesign and operations and maintenance protocols • Increase public awareness and capacity building on water management 	12%
Agriculture	<ul style="list-style-type: none"> • Reduced availability of water for agriculture • Changes in forage availability and quality • Intensified desertification and reduced soil fertility • Changes in the timing and length of growing seasons • Changing patterns in pest outbreaks (locusts, cotton worms) 	<ul style="list-style-type: none"> • Shift to drought- and pest-resistant and salinity-tolerant crop varieties • Introduce practices to reduce erosion and increase soil fertility • Implement small-scale irrigation for crop and pasture lands • Improve rangeland monitoring and management • Establish fodder and grain stocks 	18%

¹ Percentage of total identified discrete adaptation projects and programs based upon research undertaken as part of this review. Note that individual projects may address more than one sector.

	<ul style="list-style-type: none"> • Damage and destruction of crops by droughts, storms, floods, mudflows, and extreme temperatures • Decline in agricultural productivity, leading to reduced incomes and rising food prices 	<ul style="list-style-type: none"> • Rehabilitate forests in areas prone to drought and wind erosion • Provide financial services for households dependent on agriculture 	
Energy	<ul style="list-style-type: none"> • Fluctuations in river discharge causing fluctuations in hydropower generation • Damage to power infrastructure and reservoirs caused by extreme weather events and increased river flows 	<ul style="list-style-type: none"> • Carry out new construction/modifications to hydropower plants to address changes in river flows • Introduce measures to protect power lines and other infrastructure from floods and mudflows, address sedimentation in facilities, and protect facilities and downstream communities from floods and mudflows • Institutional strengthening for hydropower plant management to anticipate and respond to climate risks 	12%
Health	<ul style="list-style-type: none"> • Increased thermal stress due to higher incidence of heat waves • Increased malnutrition resulting from food insecurity caused by climate shocks and stresses • Increased incidence of water-borne diseases • Physical injury and death caused by extreme weather events • Increase in incidence of malaria 	<ul style="list-style-type: none"> • Improve public awareness on climate change impacts on health • Establish a research centre on climate change and health • Introduce hydro-technical, physical, and biological methods to protect against mosquitoes • Improve maternal and infant health services, taking climate risks into account • Improve access to safe sources of water 	0%
Particularly vulnerable regions		Particularly vulnerable groups	
<ul style="list-style-type: none"> • Rural areas of the eastern part of the Region of Republican Subordination, the southern part of the Sughd hills in the north and the Khatlon hills and lowlands in the southwest 		<ul style="list-style-type: none"> • Women and children 	
Status of climate governance (policies, institutions)	<ul style="list-style-type: none"> • Climate Change Centre has been established, hosted by the State Agency for Hydrometeorology • National Action Plan for Climate Change Mitigation, including some adaptation priorities, developed in 2003 • National Climate Change Adaptation Strategy and Action Plan under development 		

Introduction

Tajikistan is a landlocked country in Central Asia, bordering Uzbekistan to the west, Kyrgyzstan to the north, China to the east and Afghanistan to the south, as shown in Figure 1. Its independence in 1991 was followed by a civil war, leaving the country with crumbling infrastructure, weak institutions, and a significant proportion of the population living in poverty. Tajikistan is striving to improve the well-being of its people through efforts to promote political stability, social inclusion, and economic development. However, the country has a long way to go to realize its vision of a prosperous state with equitable benefits for all members of society.

Tajikistan is one of the most vulnerable countries to climate change in the Central Asian region, based on its high sensitivity to climate risks and low adaptive capacity (Notre Dame Global Adaptation Index [ND-GAIN], 2013; World Bank, 2009). The mountainous topography of Tajikistan creates complexity in its climatic systems, with average temperatures in different parts of the country differing by more than 20°C. The country is prone to floods, droughts, hailstorms, avalanches, mudflows, and landslides. Its glaciers, which are important for the hydrology of the entire Central Asia region, feeding the river basins and replenishing the Aral Sea, have reduced in area by approximately one-third since the 1930s. The projected impacts of climate change in the country include rising temperatures and increased variability in rainfall along with continued melting of the glaciers (Government of the Republic of Tajikistan [GoT], 2014). If Tajikistan is to achieve its long-term vision of prosperity and equality of opportunity, it will need to ensure that it has the capacity to respond to current and projected climate risks.

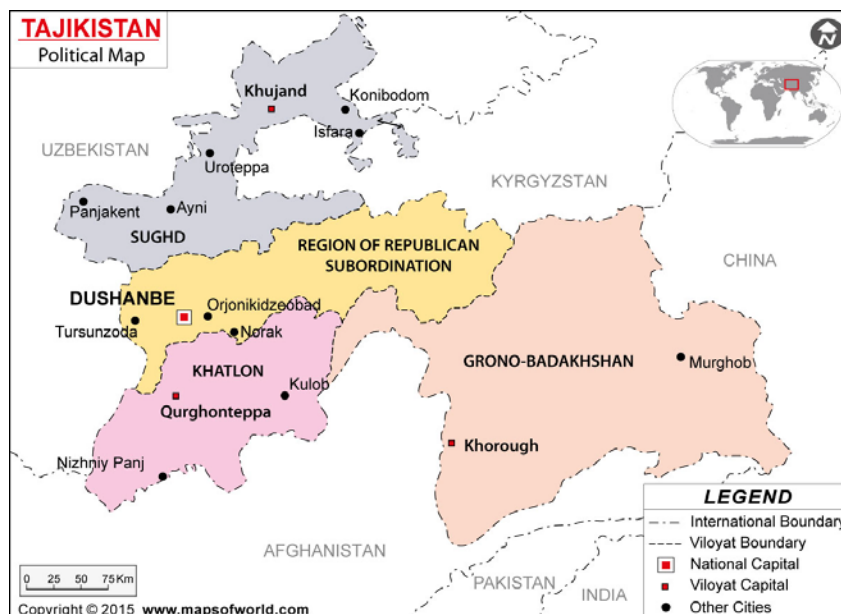


Figure 1 – Map of Tajikistan (reprinted with permission)

This paper provides a snapshot of current and planned efforts in Tajikistan to advance action on climate change adaptation. Drawing upon available literature and key informant interviews, it has been prepared to support the contribution of the Collaborative Adaptation Research Initiative in Africa and Asia (CARIAA) to adaptation policy and practice. CARIAA is jointly funded by the United Kingdom's Department for International Development (DFID) and the International Development Research Centre (IDRC), with the aim of building the resilience of vulnerable people and their livelihoods in three "hot spots" of climate change vulnerability in Africa and Asia: semi-arid areas, deltas in Africa and South Asia, and glacier- and snow-fed river basins in the Himalayas. To achieve this goal, CARIAA is supporting four consortia to conduct high-calibre research and policy engagement activities that will inform national and sub-national planning processes in 17 countries.

This report is one in a series of country reviews prepared to provide CARIAA with a picture of the policies, programs, and projects designed and implemented specifically to address the current and projected impacts of climate change in its countries of engagement. The paper begins by summarizing current understanding of existing and projected climate risks in Tajikistan, then discusses the factors that contribute to its vulnerability to climate change and its most vulnerable sectors, regions, and groups. Section 4 provides an overview of the critical policies and plans shaping the country's efforts to address climate change adaptation at the national and sub-national levels. To assess the extent to which efforts are presently under way to address the country's critical adaptation priorities, Section 5 paints a general picture of the scale, type, and focus of current and planned adaptation-focused programs and projects under way in Tajikistan as well as the level of climate finance flowing into the country to support this work. This is followed by a profile of in-country efforts to advance adaptation learning and knowledge-sharing through active networks and communities of practice. The paper concludes with an assessment of the general status of adaptation action in Tajikistan.

1. Current climate and projected changes

This section provides an overview of Tajikistan's exposure to climate risks, beginning with a general description of the country's current climate, followed by discussion of observed trends and projected changes to its climate over the remainder of this century.

1.1 Current climate

The climate in Tajikistan is characterized by its spatial and temporal variability, which is influenced by its mountainous terrain (see Figure 2 for a map of the country's agro-climatic zones). The average annual temperature ranges from -6°C in parts of the Pamir mountains to 17°C in the southern lowlands. Maximum temperatures, usually reached in July, have risen to as high as 47°C, while the minimum temperature in the eastern Pamirs has been known to drop as low as -63°C in January. Precipitation is also highly variable across the country, with the eastern part of the Pamirs receiving less than 100 millimetres per year

and central Tajikistan receiving 1,000 millimetres to 1,800 millimetres on average (GoT, 2014). Tajikistan is exposed to a range of climate-related hazards, including floods, droughts, hailstorms, avalanches, mudflows, and landslides. Data from 1997 to 2007 show that drought and heavy snowfalls caused the most damage in economic terms, while the most frequently occurring climate-related disasters were avalanches, mudflows, and floods (GoT, 2010).

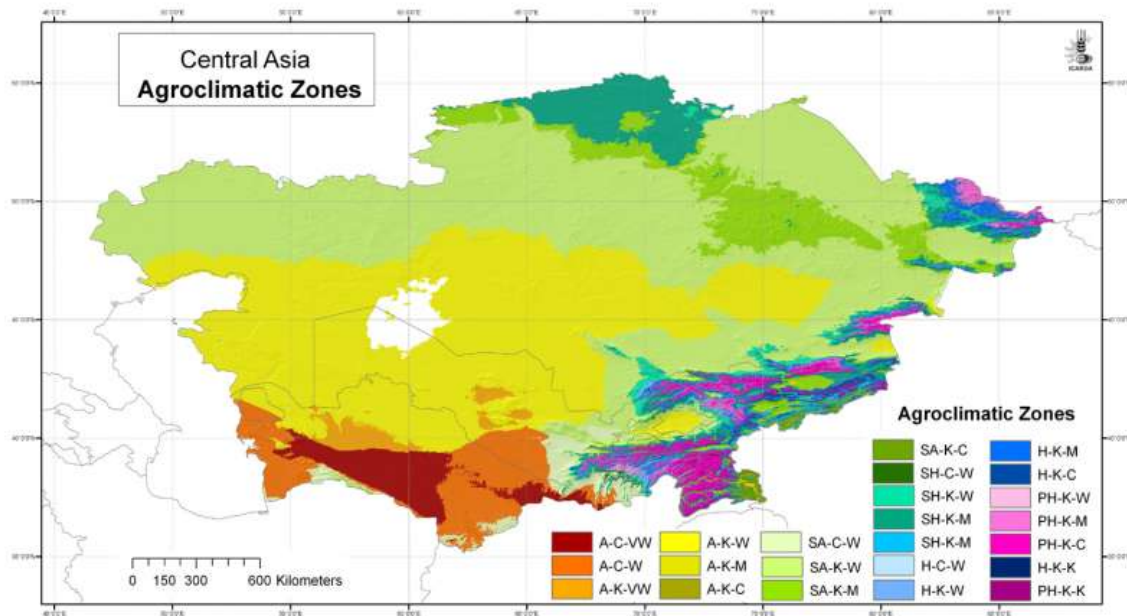


Figure 2 – Agro-climatic zones of Central Asia (De Pauw, 2008)

1.2 Observed climate trends

Data from 25 weather stations across the country show that between 1940 and 2012, mean annual temperatures increased in most areas of the country, rising an average of 0.1°C to 0.2°C per decade in the lowlands, 0.3°C to 0.5°C per decade over most of the mountainous regions (1,000 to 2,500 metres above sea level), and 0.2°C to 0.4°C per decade in the highlands (over 2,500 metres above sea level); the warmest decade on record was 2001 to 2010. The changes in temperature were most prominent in the winter, spring, and fall seasons, with no significant change during the summer. Mean maximum and minimum temperatures have also increased. A decrease in the area covered by glaciers by approximately one-third since the 1930s has been attributed to this general warming trend (GoT, 2014).

Changes in precipitation have also been observed. Mean annual rainfall increased by 5% to 10% between 1940 and 2012 (GoT, 2014), and the rains have been more variable and more intense (GoT, 2008). The number of days with precipitation decreased between 1940 and 2000, except in the Fergana Valley, where rainfall patterns have likely been influenced by

the presence of the Kairakkum water reservoir. However, the number of days with heavy rainfall (5 millimetres or more) increased in most areas (GoT, 2008).

1.3 Climate projections

Climate change projections for Tajikistan suggest that temperatures will continue to increase, rising by up to 5°C in some parts of the country by 2100 (GoT, 2014).² The Intergovernmental Panel on Climate Change (IPCC)'s projections for the Central Asia region suggest an increase of 1.0°C to 6.3°C by 2100, depending on the emissions scenario used³ (Christensen et al., 2013). There is a great deal of uncertainty in projections for precipitation, but recent scenarios developed by the Government of Tajikistan (GoT) suggest that the southern parts of the country will experience decreases, while the mountainous areas will receive more precipitation. Seasonally, more precipitation is expected during the summer and winter seasons, and less in the spring and fall. In general it is expected that variability and intensity will continue to increase, with heavy rainfall and floods occurring more frequently (GoT, 2014). Projections show that the glaciers that presently occupy about 6% of the country's total area will continue to melt; if the present rate of degradation is sustained, the area covered by glaciers is expected to decrease by 15% to 20%, and many smaller glaciers may disappear completely in the next 30 to 40 years. This has implications for river flows, which will initially increase due to glacial melt and then decrease as the glaciers disappear. It also increases the risk of glacial lake outbursts and associated downstream floods and mudflows (GoT, 2008).

2. Tajikistan's vulnerability to climate change

This section provides an overview of Tajikistan's vulnerability to climate change. It begins with a discussion of the country's development profile, highlighting issues that represent drivers of vulnerability. This is followed by a discussion of the vulnerability of different sectors, regions, and groups to the impacts of climate change.

2.1 Current drivers of vulnerability

The key development challenges that exacerbate Tajikistan's vulnerability to climate change include achieving poverty reduction and gender equality in a complex natural and social environment; the country's reliance on climate-sensitive natural resources; and its poor governance profile, which limits progress in other areas that would contribute to climate resilience.

² The Government of Tajikistan used three climatic models (CCSM3, ECHAM5, and CSIRO) based on three emission scenarios (A1B, A2, B1) for its latest projections.

³ Projections use the CMIP5 global models. The figures are averages over the region for the projections using a set of 32 global models. The range given is based on the figures for the 25th to 75th percentile for three scenarios: RCP2.6 at 1.0°C to 1.8°C, RCP6.0 at 2.7°C to 3.9°C, and RCP8.5 at 4.6°C to 6.3°C.

Tajikistan's multidimensional poverty rate, which takes into account health, education, and living conditions, is 7.9%, with a further 23.4% of the population living in near-multidimensional poverty, based on 2012 data (United Nations Development Programme [UNDP], 2014). However, when the national poverty line of purchasing power parity at US\$2.15 per day is used, the proportion of the population living under the poverty line was almost 40% in 2009, when the last published data is available (GoT, 2009). Notably, this level was down from 83% in 1999 (GoT & UNDP Tajikistan, 2012). The country's GDP grew at a rate of approximately 7% between 2010 and 2013 (World Bank, 2015). Despite this progress, Tajikistan is one of the poorest countries in Central Asia, with a lower Human Development Index than all of its neighbours in the region. Table 1 provides an overview of other key development indicators for Tajikistan.

Table 1 – Key indicators of development progress for Tajikistan				
Category	Indicator	Year	Value	Source
Human development	Human Development Index (score ^d /rank ^d out of 187 countries)	2013	0.607/133	UNDP (2014)
	Population in multidimensional poverty (%)	2013	7.9%	
	Under-five mortality rate (per 1,000 live births)	2013	58	
	Adult literacy rate (15 years of age and above)	2013	99.7 ^c	
	Improved water source, rural (% of population with access)	2012	64%	World Bank (2015)
	Improved sanitation facilities (% of population with access)	2012	94%	
	Access to electricity (% of population)	2010	100%	
Gender	Gender Inequality Index (value ^e /rank ^d out of 187 countries)	2013	.383/133	UNDP (2014)
Demographics	Total population (in millions)	2013	8.207 ^a	UNDP (2014)
	Average annual population growth rate	2010	2.3%	
	Population, urban (% of population)	2011	26.6% ^b	
Economic development	GDP (in current USD, millions)	2013	8,508.10	World Bank (2015)
	GDP growth (annual %) (average of period of 2010 to 2013)		7.2%	
	Agricultural land (% of land area)	2012	34.8%	

Governance	Corruption Perceptions Index (score ^f /rank ^d of 174 countries)	2014	23/152	Transparency International (2014)
	Fragile States Index (score out of 120 points ^g /status)	2014	84.6/Very High Warning	Fund for Peace (2014)
	Expenditure on education, public (% of GDP)	2012	3.9% ^c	UNDP (2014)
	Expenditure on health (% of GDP)	2011	5.8%	
Environment	Population living on degraded land (%)	2010	10.5%	UNDP (2014)
	Change in forest area, 1990/2011	2013	0.5%	

^a Projections based on medium-fertility variant
^b Because data are based on national definitions of what constitutes a city or metropolitan area, cross-country comparison should be made with caution
^c Data refer to the most recent year available during the period specified
^d Where 1 or first is best
^e Where 0 is best
^f Where 0 is highly corrupt and 100 is very clean
^g Where 120 is very high alert, and 0 very sustainable

Mountainous terrain covers approximately 93% of Tajikistan's land area, with about half of the country located more than 3,000 metres above sea level. Altitudes vary from 300 metres above sea level in the western lowlands to over 7,000 metres above sea level in the Pamir mountains in the east of the country. As noted in the previous section, the mountainous terrain yields considerable complexity in the climate system, creating challenges in forecasting and longer-term climate projections and consequently in planning for adaptation. The difficult terrain also complicates the delivery of basic services such as education and health, especially for the 73% of the population that lives in rural areas of the country (UNDP, 2014). In urban areas, including Dushanbe, the capital city, and Khujand, in the Sughd Region in the northwest of the country, the major drivers of poverty are unemployment and low salaries (GoT & UNDP Tajikistan, 2012).

Migration to find work, primarily to Russia, is a major livelihood strategy, with almost 30% of families having members who are temporary migrant workers (Oxford Policy Management & United Nations Children's Fund (UNICEF), 2011). Remittances received by Tajik households accounted for 47.5% of GDP in 2012 (World Bank, 2015). With men most likely to migrate, women are left behind to run the household, care for children and elderly, and take on new roles as the head of the household. With increasing involvement of women in economic activities, traditional gender roles are changing, but significant progress remains to be made for women's contributions to be appreciated in the same way as men's. While their responsibilities and workloads have increased, women still face constraints in

terms of access to education, services, and opportunities that would enable them to improve their well-being. Consequently, women-headed households tend to be more economically and socially vulnerable (Oxford Policy Management & UNICEF, 2011; World Bank, 2014).

Natural resources are essential to Tajikistan's development progress. Agriculture employs almost half of the country's labour force, with key products including cotton, grain, fruits, grapes, vegetables, and livestock (Central Intelligence Agency, 2015). Export products include aluminum, cotton, electric power, and precious and semi-precious rare-earth metals and stones. In addition to its glaciers, the country is rich in other water resources, including an abundance of rivers and lakes. There is significant potential for both irrigation and hydropower production, but large natural fluctuations in river runoff lead to power shortages in the winter, resulting in the closure of small industries and limitations on services, including schools and hospitals. Sustainable and integrated management of water resources and management of climate-related natural disasters, notably droughts, floods, and mudflows, have been identified as key challenges to be addressed for Tajikistan to reduce poverty and continue its economic development (GoT & UNDP Tajikistan, 2012).

After the fall of the Soviet Union and Tajikistan's subsequent independence in 1991, the GoT's immediate focus was on building political stability and establishing basic market mechanisms. This transition, however, was challenged by a civil war that erupted shortly after the first multi-party elections as a result of tensions between government supporters and opposition parties (Akiner & Barnes, 2001). After the conflict ended in 1997, the focus shifted to recovery and expansion of economic reforms that generated economic growth from this time onwards (GoT, 2007). Going forward, Tajikistan's best prospects for economic development lie in its hydropower resources, agricultural potential, mineral resources, and the potential for development of tourism and recreation (GoT & UNDP Tajikistan, 2012). However, progress is threatened by the country's poor governance status, driven by high levels of corruption, centralization of governance, and weaknesses in the rule of law and public sector administration (Asian Development Bank [ADB], n.d; World Bank, 2014). The country has a very high warning level on the Fragile States Index, with high scores in the areas of poverty and economic decline, state legitimacy, human rights, and the rule of law and factionalized elites (Fund for Peace, 2014). For Tajikistan to realize its potential, current reform efforts must be continued alongside measures to reduce inequality, improve basic services, strengthen and create opportunities for the private sector, and develop and maintain infrastructure (GoT, 2011; World Bank, 2014). Progress in these areas is critical to building climate resilience as well.

In 2009, the World Bank identified Tajikistan as the country in Central Asia that is most vulnerable to climate change based on an assessment of proxy indicators of exposure, sensitivity, and adaptive capacity (World Bank, 2009). More recent analysis using the University of Notre Dame Global Adaptation Index (ND-GAIN) places Tajikistan at 121st out of 180 countries in terms of vulnerability to climate change and readiness to adapt. This overall ranking is based on a vulnerability index, which incorporates indicators of exposure

and sensitivity to climate risks, as well as adaptive capacity, determined based on the availability of social resources for adaptation. Assessment of these factors places Tajikistan as the 79th most vulnerable country, with a similar level of vulnerability to Belize, Jordan, and its neighbour Turkmenistan. The overall ranking also comprises a preparedness index, which is based on economic, governance and social factors that influence the effectiveness of adaptation investments. On this scale, Tajikistan is in the bottom 40 countries in terms of readiness to adapt, alongside countries such as Bangladesh and Mozambique (ND-GAIN, 2013). Table 2 provides an overview of vulnerability and readiness scores and rankings for Tajikistan and other Central Asian countries, as well as their overall ND-GAIN rankings.

Table 2 – Comparison of Global Adaptation Index scores for Tajikistan and neighbouring countries (ND-GAIN, 2013)						
Country	Vulnerability		Readiness		Overall	
	World rank	Score*	World rank	Score**	World rank	Score**
Tajikistan	102	0.398	143	0.345	121	47.4
Kazakhstan	30	0.295	65	0.552	48	62.8
Kyrgyzstan	73	0.355	100	0.443	88	54.4
Turkmenistan	103	0.399	176	0.284	132	44.3
Uzbekistan	62	0.335	156	0.322	115	49.4
<p>* Lower score indicates lower vulnerability. The vulnerability score is determined based on indicators of exposure, sensitivity, and adaptive capacity, taking into consideration indicators related to six life-supporting sectors: food, water, health, ecosystem service, human habitat, and infrastructure.</p> <p>** Higher score indicates higher degree of preparedness. The readiness score takes into account measures of economic readiness, governance readiness, and social readiness to pursue adaptation actions.</p>						

2.2 Vulnerability of key sectors

Tajikistan's most critical concerns in relation to climate change are reduced water quality and availability, and increased frequency and severity of natural disasters, notably mudflows, droughts, and floods (GoT, 2014). These risks and their impacts on sensitive sectors have the potential to exacerbate existing development challenges and set back progress in poverty reduction. Further, Tajikistan faces considerable capacity limitations to address climate risks alongside other development priorities (GoT, 2011). Key sectors of concern for Tajikistan are water, agriculture, energy, and health, as shown in Table 3.

Table 3 – Key vulnerable sectors in Tajikistan (GoT, 2011; 2014; World Bank, 2010)	
Sector	Likely impacts of climate change
Water	<ul style="list-style-type: none"> • Reduced glacier stock, especially in high-altitude areas, causing an initial increase in river flows, followed by a dramatic decrease • Increased risk of glacial lake outburst flooding • Variability in river flows • Fluctuations in water availability and quality • Increased frequency of floods and mudflows
Agriculture	<ul style="list-style-type: none"> • Reduced availability of water for agriculture • Changes in forage availability and quality • Intensified desertification and reduced soil fertility • Changes in the timing and length of growing seasons • Changing patterns in pest outbreaks (locusts, cotton worms) • Damage and destruction of crops by droughts, storms, floods, mudflows, and extreme temperatures • Decline in agricultural productivity, leading to reduced incomes and rising food prices
Energy	<ul style="list-style-type: none"> • Fluctuations in river discharge, causing fluctuations in hydropower generation • Damage to power infrastructure caused by extreme weather events • Silting of reservoirs due to increased river flows
Health	<ul style="list-style-type: none"> • Increased thermal stress due to greater incidence of heat waves • Increased malnutrition resulting from food insecurity caused by climate shocks and stresses • Increased incidence of water-borne diseases • Physical injury and death caused by extreme weather events • Increase in incidence of malaria

Climate change is projected to significantly affect Tajikistan's water resources, with implications for other sectors, including agriculture and energy. Tajikistan's agricultural sector is highly vulnerable due to its high dependence on water-intensive crops such as cotton, as well as environmental degradation and capacity challenges in terms of access to markets and the management and maintenance of irrigation systems (GoT, 2011; World Bank, 2010). Data from the Ministry of Agriculture indicate that extreme weather events caused losses of over US\$3.4 million in cotton and over US\$12 million in cereal crops between 1999 and 2005 (GoT, 2008). Recent years have seen an increase in damage caused by pest infestations, with areas infected by locust outbreaks increasing from 16,000 hectares in 2007 to 85,000 hectares in the southern part of the country, and this trend is expected to continue (GoT, 2008). Agricultural production is largely for household consumption, particularly for poorer households, meaning that crop losses directly affect food security as well as incomes for agricultural labourers. Wealthier households tend to

have more diversified sources of income, so they are less sensitive to climate impacts on agriculture (World Bank, 2010). The energy sector is vulnerable due to the country's high dependence on hydropower, which is already affected by seasonal fluctuations in river flows.

2.3 Vulnerable regions and groups

The implications of climate change differ for urban and rural areas of Tajikistan. Urban areas are considered less vulnerable, while more severe consequences are expected in rural areas, where the proportion of people living near the poverty line is higher and the population is more directly dependent on agriculture for income and food security. Modelling of the effects of a 20% decline in agricultural production on household incomes due to climate change found that people living in rural areas will suffer a decline in income of 9.6%, while for urban areas it will be only 5.4%. Although the proportion of households with migrants is higher in rural areas, this does not reduce dependence on agriculture and as such does not reduce household sensitivity to climate impacts. Consequently, key actors such as the World Bank and the Government of Tajikistan (in its Strategic Program on Climate Resilience) have emphasized the need to focus adaptation efforts in rural areas (World Bank, 2010; GoT, 2011).

The relative vulnerability of rural areas varies considerably across Tajikistan, influenced more by socio-economic and institutional development than by geography, elevation, or exposure to climate hazards. World Bank analysis found that the most vulnerable parts of the country are the rural areas of the eastern part of the Region of Republican Subordination, the southern part of the Sughd hills in the north, and the Khatlon hills and lowlands in the southwest. These areas are characterized by high sensitivity to climate variability and extremes, food insecurity, and dependence on agriculture for livelihoods (World Bank, 2010). They are also affected by over-grazing, poor land use management, and poorly maintained irrigation infrastructure, which exacerbate the effects of climate risks (Mustaeva, Wyes, Mohr, & Kayumov, forthcoming). The Gorno Badakshan Autonomous Oblast has the highest exposure to climate change and variability, but it is also considered to have high adaptive capacity because of its higher education levels and greater degree of income diversification compared to other parts of the country (World Bank, 2010).

Within these vulnerable regions, people dependent on rain-fed subsistence agriculture and pastoralism will likely feel the effects of climate change most acutely. Women and children are particularly vulnerable because they represent the majority of Tajikistan's poor population and because of the nature of their roles and responsibilities in the household. Women and children tend to be responsible for securing water, food, and fuel for household consumption, and all these resources will be negatively affected by climate change. As previously noted, women in Tajikistan face social, economic, and political barriers that limit their decision-making power, despite the fact that many women act as the head of the

household when their male relatives migrate to find work. This limits their adaptive capacity and undermines the resilience of their families (GoT, 2011).

3. Adaptation planning context

This section provides an overview of the policies, plans, and strategies that have the potential to advance adaptation efforts in Tajikistan. This includes development policies and plans as well as adaptation-specific plans and strategies at the national and sectoral levels. Table 4 provides a general assessment of the country's progress in establishing a comprehensive and effective system for adaptation planning and action.

Table 4 – National adaptation planning context: Summary of progress as of May 2015	
Indicator	Progress
Climate change recognized in Tajikistan's guiding development vision/plan	Not recognized in the current National Development Strategy, which ends in 2015
National-level coordinating entity for climate change established and active	Yes, the Climate Change Centre, which is hosted by the State Agency for Hydrometeorology
Climate change policy and/or law in place	Not present
Climate change strategy published	Not present
Climate change action plan published	Yes, the National Action Plan for Climate Change Mitigation developed in 2003
Adaptation plan published	The National Climate Change Adaptation Strategy and Action Plan is under development
Climate change fund or adaptation fund operational	Not present
Climate change units established in key ministries	Not present, but they are engaged in inter-ministerial processes for adaptation planning
Climate change integrated into national sectoral policies	Some; for example, recent policies such as the Agriculture Reform Programme (2012) and the National Disaster Risk Management Strategy (2010)

3.1 National-level development policy context

Tajikistan's development vision for the future is "a prosperous state in which all members of society will have equal opportunity to enjoy the fruits of political, social and economic development" (GoT, 2007, p. 9). The current National Development Strategy, which ends in

2015, aims to enable achievement of this vision by strengthening social and political stability and economic prosperity and by ensuring the social well-being of Tajikistan's people. The priorities for achieving this goal are reforming public administration (with a particular focus on combating corruption); developing the private sector and increasing investment in the country; and developing human potential, which includes achieving the Millennium Development Goals. Activities are divided into three "blocks" that align with these priorities: a functional block focused on strengthening the institutional environment for development; a production block, which aims to enable economic growth; and a social block, which focuses on enhancing social services, including education, health care, and social welfare systems. The strategy recognizes environmental sustainability and management of natural disasters as important, but it does not mention climate change (GoT, 2007).

In 2012, the GoT conducted a review of progress on sustainable development in preparation for the United Nations International Conference on Sustainable Development (RIO+20). This process yielded a number of priorities for Tajikistan to transition to a "green" economy. These priorities include developing a market economy that provides social benefits, improving efficient and sustainable use and management of natural resources, and establishing an active civil society. The key enabling factor for these changes to occur is institutional reform within the GoT to ensure efficient management of economic and social development (GoT & UNDP Tajikistan, 2012).

3.2 National-level climate policy context

In 2003, Tajikistan developed its National Action Plan for Climate Change Mitigation, which presents some priorities for adaptation alongside measures for reducing greenhouse gas emissions and maximizing carbon sinks. The priorities are broken down by sector, as presented in Table 5: water, agriculture, health, energy, and climate information and disaster risk management. The action plan also identifies the need for enabling activities that will support action in multiple sectors. It emphasizes the need for systematic observation and monitoring, and for improvements in capacity for data collection, analysis, modelling, and forecasting to enable development and adjustment of adaptation measures. It also notes the need to strengthen institutional and technical capacities in climate change and related fields, including hydrology, agriculture, water resource management, and ecosystem conservation (GoT, 2003).

Tajikistan is a target country for the Pilot Program on Climate Resilience (PPCR), which is currently in its second phase. The first phase, which began in 2010, focused on technical assistance to the GoT to enhance analytical and planning capacity for climate change adaptation. In preparation for the second phase, the GoT prepared the Strategic Program for Climate Resilience (SPCR), which outlines key priorities for building climate resilience over the coming three to five years. The SPCR aims to "promote sustainable and resilient growth ensuring more sustainable livelihood development, water and energy security, health and

social equity in the long term” (GoT, 2011, p. 14). In addition to a strong emphasis on building the technical, institutional, and organizational capacities needed to make progress on integrating resilience building and climate change adaptation in development policies and programs, the SPCR identifies a number of priority actions in particular sectors, as shown in Table 5. The SPCR document also states the government’s intention to develop a National Climate Change Adaptation Strategy and Action Plan, which will be a long-term and strategic plan of action for addressing the impacts of climate change (GoT, 2011). This process is ongoing, through a series of workshops facilitated by a working group (PPCR, 2015a). The plan, which should be finalized by the end of 2015, will include priority adaptation actions for climate-sensitive sectors such as water (N. Mustaeva, personal communication, May 14, 2015).

The country is also in the process of developing its Third National Communication to the United Nations Framework Convention on Climate Change (UNFCCC), including an assessment of the potential impacts of climate change on natural resources, the economy, and human health (UNDP, n.d.-a). Based on available information, it is unclear to what extent planning for adaptation is occurring at the sub-national level, although civil society organizations have identified this as a priority (N. Mustaeva, personal communication, 2015). The critical role played by jamoats (local-level administrative structures) and the need for capacity development and improved linkages between local- and national-level structures involved in adaptation have also been highlighted in relation to implementing the SPCR (UNDP Tajikistan, 2012).

Table 5 – Priority adaptation actions by sector in Tajikistan as identified in its SPCR, Third National Communication to the UNFCCC, and National Action Plan for Climate Change Mitigation (GoT, 2003; 2011; 2014)

Sector	Adaptation priorities
Water	<ul style="list-style-type: none"> • Improve hydrological observation, monitoring, and forecasting systems • Implement water use efficiency and conservation measures in irrigation systems • Implement measures to protect against floods, mudflows, and landslides; measures should include channel dredging, construction of dams and dikes, reforestation and other slope protection measures, and development of escape routes • Construct reservoirs • Monitor glacial melt and downstream water flows • Carry out adaptive redesign and operations and maintenance protocols • Increase public awareness and capacity building on water management
Agriculture	<ul style="list-style-type: none"> • Shift to drought- and pest-resistant and salinity-tolerant crop varieties • Introduce practices to reduce erosion and salinization and to increase soil fertility • Implement small-scale irrigation for crop and pasture lands

	<ul style="list-style-type: none"> • Introduce community-based agro-forestry • Improve rangeland monitoring and management • Establish/improve fodder and grain stocks • Rehabilitate forests in areas prone to drought and wind erosion • Provide financial services, including insurance, for households dependent on agriculture • Increase access to climate information for actors in the agricultural sector
Health	<ul style="list-style-type: none"> • Increase public awareness of climate change impacts on health • Establish a research centre on climate change and health • Introduce hydrotechnical, physical, and biological methods to protect against mosquitoes • Improve maternal and infant health services, taking climate risks into account • Improve access to safe sources of water • Improve nutrition, particularly for pregnant women
Energy	<ul style="list-style-type: none"> • Construct or modify hydropower plants to address changes in river flows • Adjust dams and channels to protect facilities and downstream communities from floods and mudflows • Protect power lines and other infrastructure from floods and mudflows • Address sedimentation in facilities • Improve hydropower plant management to anticipate and respond to climate risks
Climate information and disaster risk management	<ul style="list-style-type: none"> • Improve the hydrometeorological monitoring system • Strengthen forecasting and early warning systems • Strengthen emergency response systems • Continue institutional strengthening for hydrometeorological services

3.3 Institutional structure for climate governance

Climate change action in Tajikistan is led by the Department of Ecological and Emergency Situations of the Executive Administration of the President, which is under the responsibility of the deputy prime minister. Key structures engaged in adaptation-related policy development and implementation include the Committee for Environmental Protection, which is an inter-ministerial body; line ministries such as the Ministry of Land Reclamation and Water Resources, the Ministry of Agriculture, and the Ministry of Energy and Industry; and the Climate Change Centre, which is hosted by the State Agency for Hydrometeorology. The latter serves as Tajikistan's focal point to the UNFCCC and is leading the effort to elaborate the country's climate change adaptation strategy and action plan. The PPCR Secretariat also currently plays a key role in engaging stakeholders and providing technical assistance on adaptation issues; however, this entity does not currently have a legal status or official mandate within the government (Mustaeva et al., forthcoming).

Within these structures, capacity to address climate change remains low and is hindered by several key challenges: weak systems for accessing and managing hydrometeorological data and generating weather forecasts and climate projections; gaps in the knowledge base on the implications of climate change in mountain environments; low awareness of climate risks and responses; lack of expertise in climate science and related disciplines; and limitations in understanding the socio-economic dimensions of climate change vulnerability and adaptation (GoT, 2011). Government actors struggle to draw the links between their sectoral mandates and climate change policies and programs, viewing climate change as an environmental issue rather than a sustainable development issue (Mustaeva et al., forthcoming).

3.4 National-level sectoral policies

This section examines current policies and strategies for those sectors considered to be particularly vulnerable to the impacts of climate change and/or important in preparing for these consequences. These include the Water Sector Development Strategy, the Agriculture Reform Programme, and the National Disaster Risk Management Strategy. Table 6 provides a summary assessment of how these policies and programs have integrated considerations of climate change. Policies for the energy and health sectors are not available in English and therefore we did not assess them.

The Water Sector Development Strategy, developed in 2006, outlines Tajikistan's priorities for the water sector. It aims to promote integrated water resource management in order to encourage economic and social development and protect the environment. The strategy has several key action areas: developing new reservoirs, increasing access to safe drinking water and sanitation, developing hydropower and industrial water supply, controlling pollution from industry, improving irrigation and drainage, and implementing legal and institutional measures. The strategy recognizes climate change as a risk, providing a further motivation for integrated water resource management; however, it is not explicitly addressed in the actions identified (GoT, 2006).

In 2012, the GoT developed the Agriculture Reform Programme for 2012–2020. This program has two key aims: to develop productive and profitable agriculture on the basis of sustainable use and management of natural resources, and to achieve agricultural reform, including structural and institutional reforms at national and sub-national levels. Changing climate risks are an important theme in the program document, which identifies a number of adaptation measures specifically for the agricultural sector, including joint pasture and forest management, sustainable cultivation practices, low-cost water conservation technologies, diversification within agriculture, and introduction of drought- and pest-resilient crop varieties. It also notes the need to create an enabling environment for adaptation in the agricultural sector through technical and institutional capacity development, integration of climate change into policies and programs across sectors, public awareness raising, and development of climate monitoring and information

management systems. The program highlights the particular vulnerability of women-headed households, the aged, and people with disabilities as a cross-cutting theme (GoT, 2012).

Tajikistan's National Disaster Risk Management Strategy (2010–2015) identifies climate change as a factor increasing disaster risk. It aims to support adaptation to changing risks associated with climate change by integrating disaster risk reduction across all development activities while also improving disaster preparedness and response. The strategy includes five major components: institutional mandates and legal issues; disaster risk assessment; risk management and development; disaster preparedness and response; and knowledge management, education, training, and public awareness. Climate change is explicitly recognized as a consideration in both the disaster risk assessment component and the risk management and development component. The latter aims to enhance people's adaptive capacity by integrating disaster risk reduction in development processes, taking into account future changes in climate. Efforts to strengthen early warning systems under the disaster preparedness and response component will also support the adaptive efforts of communities and local institutions (GoT, 2010). Consultations are ongoing to determine the way forward when the current strategy ends (Mustaeva, personal communication, 2015).

Table 6 – Integration of climate change into national sectoral strategies, policies and plans: An assessment of progress				
	Absent	Climate change mentioned as potential risk	Possible actions for reducing risk identified	Targets identified for specific adaptation measures
Water Sector Development Strategy (2006)		✓		
Agriculture Reform Programme (2012)		✓	✓	✓
National Disaster Risk Management Strategy (2010)		✓	✓	

4. Current and planned adaptation programs and projects

This section provides a snapshot of the adaptation projects and programs under way in Tajikistan, including an overview of ongoing projects and a brief analysis of the climate finance flowing into the country.

4.1 Adaptation projects and programs

We conducted a review of adaptation programs and projects in Tajikistan using online resources. We captured projects with a specific focus on supporting climate change adaptation, as reflected in their title and/or objectives, in a database and classified them by their type and area of focus. For details on the methodology used within this component of the review, please see Annex A. The review process yielded nine significant initiatives that are currently under implementation or recently completed, as well as five that are planned, most of which are under the SPCR. Table 7 presents an overview of these ongoing and planned projects. The projects are spread across the country and address a wide range of sectors, but they are generally aligned to some extent with the priorities the government has identified. More details on the individual projects identified can be found in Annex B.

Table 7 – Sectors of focus of current adaptation projects and programs identified in Tajikistan					
Sector of focus	Priority sectors for adaptation	Number of projects active in sector*	Percentage of total projects identified**	Geographical Scale	
Freshwater supply	✓	2	12%	National projects	10
Agriculture	✓	3	18%	Regional projects	3
Forestry		2	12%	Global projects	1
Ecosystem restoration		1	6%	Total	14
Energy	✓	2	12%		
Disaster risk management	✓	2	12%		
Gender		1	6%		
Climate information	✓	4	24%		
Education		1	6%		
Government		2	12%		
Urban areas		1	6%		
Rural areas		2	12%		
Multi-sectoral		2	12%		

*Individual projects may address one or more sectors.

**Calculated by the number of projects active in this sector relative to the total number of projects identified, reflecting the potential for a single project to be addressing adaptation needs in more than one sector.

The projects currently under implementation span a number of sectors that the GoT has identified as priorities. This includes two major initiatives in the water resources sector, both of which aim to build climate resilience through the improvement of water infrastructure and institutional capacities. The Building Climate Resilience in the Pyanj River Basin project is a PPCR initiative that aims to reduce poverty and build climate resilience for over 100,000 people through rehabilitation of community infrastructure for drinking water, irrigation, and flood protection (GoT, 2011). Ensuring that these structures and systems are “climate-proof” is a key focus of the project. Funded by the Special Climate Change Fund, the Increasing Climate Resilience through Drinking Water Rehabilitation in North Tajikistan project targets seven urban areas in the northern part of the country. The project will promote efficient use of water while also working to rehabilitate water supply infrastructure and reform water utility management, thereby increasing the sustainability and resilience of water supply systems (Global Environment Fund [GEF], n.d.).

In the agricultural sector, the Sustaining Agricultural Biodiversity in the Face of Climate Change project links efforts to develop capacity and strengthen policy frameworks for agriculture, increase implementation of agro-biodiversity conservation measures, and develop markets. Through these approaches, the project aims to increase socio-ecological resilience for agricultural ecosystems and the farmers that depend on them (UNDP, n.d.-b). A regional initiative, Strengthening of Livelihoods through Climate Change Adaptation in Kyrgyzstan and Tajikistan, works directly with rural communities to implement adaptation and risk reduction strategies, including water-saving irrigation methods and drought-resilient crop varieties, as well as erosion and flood-control measures (Deutsche Gesellschaft für Internationale Zusammenarbeit [GIZ], n.d.-b). A planned PPCR project on Agriculture and Sustainable Land Management will support pilot adaptation initiatives in agricultural livelihoods and rangeland management, with particular attention to the gender dimensions of climate change vulnerability and adaptation (GoT, 2011).

The vulnerability of Tajikistan’s energy sector will be addressed by a planned PPCR initiative, Enhancing the Climate Resilience of the Energy Sector, which aims to incorporate climate change into planning and investment in the hydropower sector. Using the Kairakkum hydropower plant as a pilot, the project will involve design modifications that address the projected changes in river flows and other climatic variables, as well as measures to protect the facility and neighbouring communities from floods and mudslides. It will also strengthen the capacity of hydropower plant management to manage climate risks in plant operations (GoT, 2011). The project will build on a recently completed initiative funded by the Climate and Development Knowledge Network (CDKN), Addressing the Vulnerability of the Energy Sector to the Impacts of Climate Change in Central Asia. This

project involved completion of two energy sector vulnerability assessments, one in Tajikistan and one at the regional level, which explored the likely impacts of climate change on the energy sector in Central Asia (CDKN, n.d.).

Although the GoT has not explicitly prioritized the forest sector in its adaptation plans, it has identified reforestation as an important adaptation activity in the water and agriculture sectors, and two initiatives are focused in this area. The Agency of Forestry runs the Adaptation to Climate Change through Sustainable Forest Management project, which involves joint forest management, a mechanism for rehabilitating degraded forests through long-term leases of forest lands to communities. The project also integrates good practices for climate change adaptation in land and forest management in vocational training and university curricula (GIZ, n.d.-a). The Climate Risk Management project promotes productive agro-forestry as a response to climate risks, exploring the links between agro-forestry and disaster risk reduction, improved water management, and livestock management. The experiences from the forestry sector are expected to inform climate risk management decisions in other sectors.

A number of initiatives aim to build Tajikistan's capacity to address climate risks to its economic and social development. The Building Capacity for Climate Resilience project under the PPCR aims to provide increased awareness and capacity on climate change to various stakeholders, including policy- and decision-makers, educational institutions, media, civil society, and the general public, particularly women and youth. In addition to public education and outreach, dissemination of knowledge products, and establishment of knowledge platforms, the project will support the development of Tajikistan's National Climate Change Adaptation Strategy and Action Plan (GoT, 2011).

Two of the planned PPCR initiatives focus on building capacity for adaptation within the government. The first of these, the Climate Science and Modelling Programme, aims to strengthen scientific and technical capacity in the areas of climate science, glaciology, modelling, and interpretation of scientific climate information for decision-making. This will be complemented by Improvement of Weather, Climate and Hydrological Service Delivery, a project that aims to improve hydrometeorological monitoring and research capacities; strengthen systems for delivery of services, including early warnings, forecasts, and emergency response; and improve the institutional capacities of the hydrometeorological service (GoT, 2011). Tajikistan will also be a target of the planned Climate Adaptation and Mitigation Program for Central Asia, to be funded by the World Bank. The program is designed to support development of climate-smart information, institutions, and investment capacities across the region. This will include developing the regional climate strategy and establishing regional coordination mechanisms and climate information services (Armstrong, 2014).

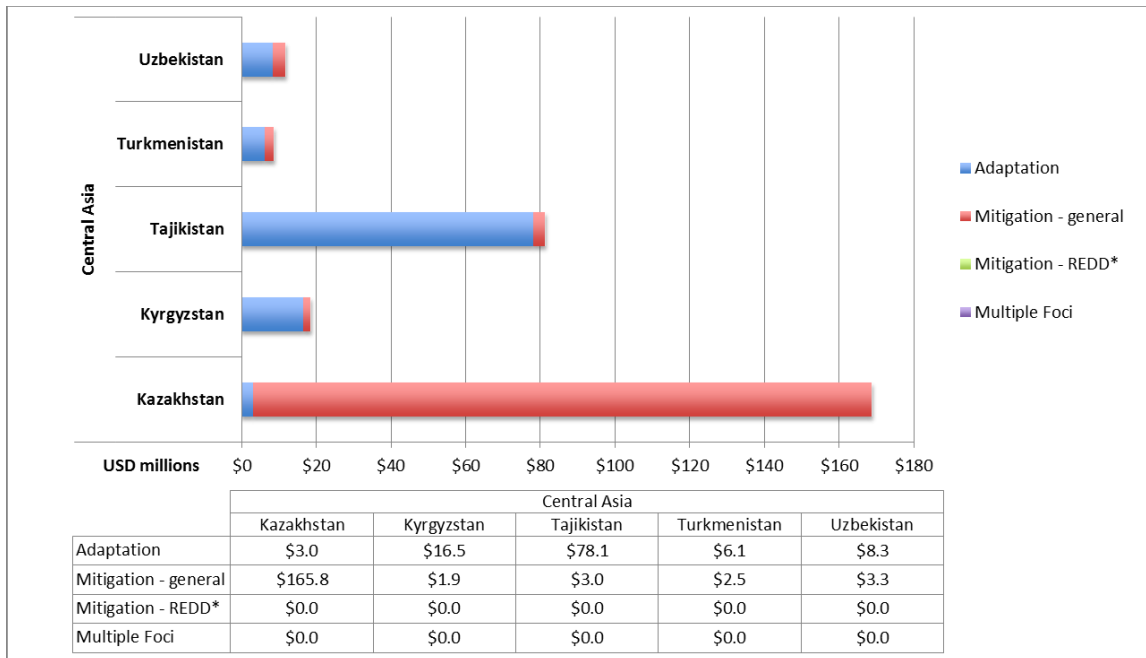
The recently launched Pathways to Resilience in Semi-Arid Economies research initiative aims to identify economic threats and opportunities arising from climate change in semi-

arid lands in Africa and Asia, including Tajikistan. The research is intended to promote climate-resilient development by engaging different stakeholders in the development of better-informed policies and investments for climate resilience (CARIAA, n.d.).

The above analysis clearly shows that action on adaptation in Tajikistan is rapidly expanding. The PPCR is a major driver for this, addressing capacity gaps in government institutions and promoting concrete actions in key sectors such as water, agriculture, and energy. However, other climate-sensitive sectors such as health are receiving less attention, despite the government identifying them as priorities. Support for adaptation planning and development of adaptive capacity at local government and community levels is also limited. The capacity and learning emerging from ongoing and planned initiatives will provide an important foundation for further expansion into these and other relevant areas, and will engage a wider range of actors in advancing the country's adaptation priorities.

4.2 Climate finance

According to the Climate Funds Update, which tracks funding from designated multilateral and bilateral climate funds such as the Special Climate Change Fund, Tajikistan has received approval for approximately US\$78 million in climate finance since 2003, with \$75 million of this allocated for adaptation-focused initiatives. Of this, the majority is allocated to the PPCR to fund the ongoing and planned projects described in the previous section. Being a PPCR target country has provided Tajikistan with the opportunity to access considerably more funding for adaptation than its neighbouring countries in Central Asia, as shown in Figure 3. However, it must be noted that the amount actually disbursed is significantly lower than the amount approved, likely due to delays in delivery of pledged funds (Climate Funds Update, 2015).



*Reducing emissions from deforestation and forest degradation

Figure 3 – Comparison of approved funding from designated multilateral and bilateral climate funds to countries in Central Asia from 2003 to April 30, 2015 (based on Climate Funds Update, 2015)

Based on its climate change marker system, which tracks the amount of official development assistance allocated to support objectives related to climate change adaptation and mitigation, the Organisation for Economic Co-operation and Development (OECD) indicates that Tajikistan was approved to receive almost US\$111 million in “climate-related” aid between 2010 and 2013. Of this, approximately 34% is tagged as adaptation funding, with the remainder focused on mitigation or on both adaptation and mitigation. The biggest donors for adaptation-related action were Germany, Switzerland, Finland, the United Kingdom, and the European Union. As shown in Figure 4, the amount of approved aid tagged as contributing to adaptation has varied from less than US\$1 million in 2010 to over \$35 million in 2011. However, the funds with adaptation as their principal objective represent a small proportion of the total, from less than 1% in 2011 to a maximum of 25% in 2013. Donor-funded projects that the OECD counts as contributing to adaptation include ones focused on disaster risk management, water supply, and sanitation, as well as an initiative addressing mineral and mining policy development. The greatest investment by bilateral donors has been in the business and water sectors (OECD, 2015). More information would be needed to determine the extent to which these initiatives have contributed to the government’s priority adaptation objectives.

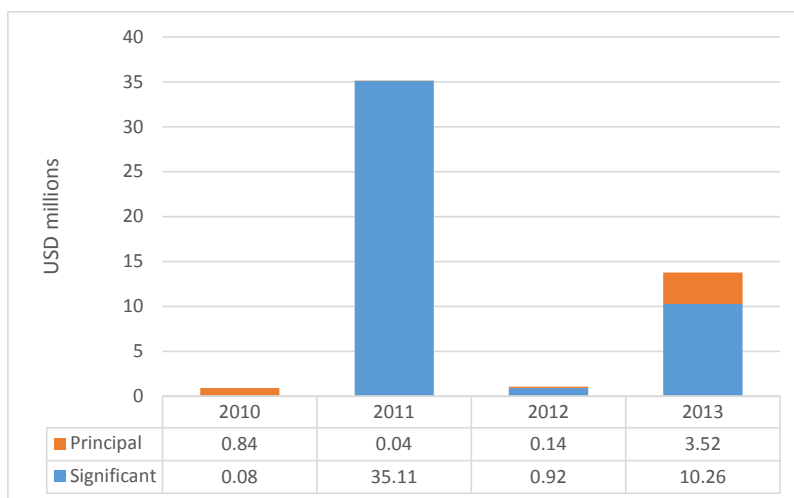


Figure 4 – Bilateral development aid in Tajikistan identified as having adaptation support as its principal or significant objective,⁴ 2010 and 2013, constant 2012 prices (based on OECD, 2015)

5. Networks and communities of practice

The main community of practice on climate change in Tajikistan is the Tajik NGO Climate Change Network (TajCN). Its stated purpose is to develop awareness and potential action by civil society action on climate change, to elaborate a common position on climate change adaptation, and to engage with international climate change negotiations (Christian Aid, 2009). TajCN is a platform for exchanging information on environment and climate change issues and sharing progress updates on adaptation projects and programs. The network participated as an observer in the assessment and planning stages of the PPCR and keeps members updated on developments in the program. The network's members are involved in policy development at the national level, including the National Climate Change Adaptation Strategy and Action Plan process, as well as at the international level, where they develop common positions in preparation for key UNFCCC meetings (Mustaeva, personal communication, 2015). TajCN is a positive example of civil society engagement and influence on climate change planning; however, a recent climate change capacity assessment for Tajikistan noted the need for improved collaboration among local, national, and international organizations working on adaptation in the country (Bizikova, 2012).

⁴ Based on the definitions used by the OECD Rio Markers system, activities are considered to have supporting adaptation as their "principal" objective "when promoting the objectives of the UNFCCC is stated in the activity documentation to be one of the principal reasons for undertaking the activity. In other words, the activity would not have been funded but for that objective. Activities marked 'significant' have other prime objectives, but have been formulated or adjusted to help meet climate concerns" (OECD, 2011, p. 3).

6. Conclusions

Tajikistan is highly vulnerable to the impacts of climate change. The mountainous nature of the country creates complexities in both the manifestations of climate change and in the potential responses. Rural communities already face high inequality and considerable challenges in accessing basic services and securing their livelihoods, placing them in a situation of high vulnerability when faced with rising temperatures, increasingly erratic rainfall, and the risks associated with droughts, floods, and mudflows. Tajikistan's future prosperity and social development will depend on its ability to manage these and other climate risks, particularly in the water, agriculture, and energy sectors.

The GoT has taken some initial steps in integrating consideration of climate change into policy-making. However, there is still progress to be made, notably completing a national climate change adaptation strategy and action plan. The National Adaptation Plan process under the UNFCCC may provide an additional incentive to move this process forward. To support these efforts, a considerable amount of analysis and planning has been undertaken through the SPCR, providing a framework of broad directions for adaptation action in the country. The challenge now is to ensure that the approved funds are effectively and efficiently allocated to enable implementation of this ambitious program.

The most urgent priority in relation to adaptation in Tajikistan seems to be developing the capacity of the government and other relevant institutions, at both central and local levels, to generate, analyze, interpret, and communicate climate-related information that can be used for decision-making and risk management. Several of the ongoing and planned initiatives address this, aiming to develop key capacities in hydrometeorological monitoring, forecasting, and modelling that will inform planning and policy development to ensure that they take climate change into account. These capacities will inform planning and policy development to ensure that they take climate change into account. These efforts are critical to creating an enabling environment for adaptation and management of climate-related risks. However, application of this capacity will also depend on further awareness-raising for key decision-makers to better understand how necessary adaptation is for sustainable development in Tajikistan.

At the same time, there is a need to address the vulnerability of rural communities—particularly of women-headed households in these communities—to climate risks and changes. Community-based adaptation, which aims to empower vulnerable women and men and promote local action on adaptation, seems to have limited traction in Tajikistan. Civil society organizations that are engaged at the community level are active in dialogue and learning on climate change through TajCN, but they have limited resources to undertake adaptation work. The government and donors must recognize, value, and support the critical role that NGOs and community-based organizations play in enabling adaptation, and ensure that adaptation measures are inclusive of the most vulnerable people and communities. This includes preparedness for and response to climate-related

hazards such as floods and mudflows, but also support for climate-resilient livelihoods and development of adaptive capacity at the local level.

7. Annexes

Annex A: Methodology

This section presents the research parameters established to guide development of the standardized reviews of current adaptation action in the CARIAA program's countries of engagement. It sets forward definitions used in this study, particularly with respect to the identification, selection, and classification of programs and projects considered in the review. This methodology was previously developed by the International Institute for Sustainable Development to support a review of current and planned adaptation action in 12 regions, which was completed in 2011 for the Adaptation Partnership. Modest updates to this original methodology were made to support the current review undertaken for the CARIAA program. For more information, see Adaptation Partnership (2015).

A.1 Adaptation actions included in the review

Within the review, adaptation action was defined as “policies, programs, and projects designed and implemented specifically to address the current and projected impacts of climate change.” Therefore, the review focused on examining policies, programs, and projects in which specific reference has been made to supporting adaptation to climate change or climate risk reduction.

Consistent with this definition, the review gave attention to discrete, time-bounded programs and projects designed and implemented specifically to support preparation for or implementation of practical adaptation actions within the broader context of achieving development objectives. Therefore, at least one of the following terms appeared in the title, goals statement, or objectives statement of each program or project included in the review: “adaptation,” “climate change adaptation (CCA),” “climate risk management,” or “climate vulnerability reduction.”

Based upon these parameters, the following types of programs and projects were not included in the review: disaster risk reduction, prevention, or management projects, unless they specifically reference that this activity is being undertaken in support of CCA; primary scientific research studies (for example agronomy, botany, or meteorology) on the potential impacts of climate change (for example on changes in crop production, glacial melt rates, or typhoon patterns); long-term monitoring efforts (whether climatic or socioeconomic) needed to inform decision-making; stand-alone workshops, conferences, and training programs; and capacity building to support participation in processes related to the UNFCCC (such as training for negotiators, enabling activities to prepare reports).

The following additional parameters were established to guide the selection of programs and projects incorporated in the study:

- *Official start date.* To ensure that only “current” projects were included in review, selected projects needed to have begun on or after January 1, 2012, with the exception of projects that began before this date but were still ongoing as of January 1, 2015.
- *Official end date.* Ongoing projects are those who official completion day is on or after January 1, 2015. Projects completed after January 1, 2012, were classified as completed.
- *Funding characteristics.* Projects with a value of US\$100,000 or more were included in the study. However, reflecting the greater level of adaptation action underway in Bangladesh and India, the minimum value of projects included in the reviews for these two countries was raised to US\$250,000. Projects financed by international and domestic sources of funding were considered.

Additionally, identified projects were classified by geographical scale in accordance with the following definitions:

- **Global:** Projects involving countries throughout the world, including the profiled country.
- **Regional:** Multi-country projects within a particular subregion, be it a continent or subcontinental area (such as South Asia or West Africa), that includes the profiled country.
- **National:** Projects occurring within one country.

A.2 Type of project being undertaken

To better understand the orientation of the projects underway in the countries examined as part of the review, projects were classified by type using the following definitions:

- *Research.* Encompassing efforts to develop new knowledge or organize existing information so as to increase understanding of the links among 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 CCA, including awareness raising and engagement of media.
- *Policy formation and integration.* Encompassing efforts to inform, develop, and implement CCA plans, strategies, frameworks, and policies at the local, subnational, 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 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.

A.3 Sector or area of focus

To further inform analysis of the range of adaptation action taking place in each country reviewed, programs and projects examined in the study were classified by sector using the following definitions:

1. **Food, fibre, and forests.** Defined as the management and use of terrestrial natural resources to directly improve human well-being. Its subcategories 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.
 - *Aquaculture.* Food production through the rearing of aquatic animals, such as fish, crustaceans, and molluscs, or the cultivation of aquatic plants in natural or controlled marine or freshwater environments.
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, 2001). Its subcategories are:
 - *Biodiversity protection.* Encompassing activities related to the maintenance of living organisms at various spatial scales, including the establishment and protection of parks and bioserves.
 - *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, and watersheds, among others. Its subcategories are:

- *Freshwater fisheries*. Encompassing 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 subcategories 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 offshore 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 by the United Nations International Strategy for Disaster Reduction (2009) 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” (p. 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*. Relating to personal security and freedom from violence, crime, and war due to natural and human-induced disasters (UNEP, 2007) and encompassing peace building, conflict reduction, and conflict avoidance.
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 among women and among men. These attributes, opportunities, and relationships are socially constructed and are learned through socialization processes

(United Nations Entity for Gender Equality and the Empowerment of Women, n.d.). This category 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 subcategories 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 subcategories 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 impacts 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 subcategories are:
 - *Peri-urban areas.* Encompassing the outskirts of urban centres and the transition zones between rural and urban areas.
 - *Urban areas.* Encompassing municipalities, towns, and cities, as well as areas in these centres (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, n.d.). 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 subcategories 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, subnational, national, regional, and global levels. It includes efforts to develop, adjust, and provide short- and long-term climate forecasts, including climate change projections, to different audiences. No subcategories 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 (UNEP, 2007). Its subcategories are:
 - *Government*. Encompassing efforts to build the capacity of government officials, either at the national or subnational 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 NGOs, to understand, prepare for, and respond to climate change.
 14. **Social protection**. Based on DFID's definition of social protection, projects within this category focus on three sets of instruments to address chronic poverty and vulnerability:
 - *Social insurance*. Referring to "the pooling of contributions by individuals in state or private organizations so that, if they suffer a shock or change in circumstances, they receive financial support."
 - *Social assistance*. Encompasses "non-contributory transfers that are given to those deemed vulnerable by society on the basis of their vulnerability or poverty."
 - *Workplace safety*. Involves the "setting and enforcing of minimum standards to protect citizens within the workplace" (DFID, 2006, p. 1).
 Adaptation projects that focus on labour market interventions and social assistance would be included in this category. No subcategories were established in relation to this macro project category.

15. **Multisectoral.** Defined as actions that simultaneously address more than one sector in one 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 subcategories were established in relation to this macro project category.
16. **Other.** To capture areas of focus not clearly identified in the previous categories.

Annex B: Projects and programs

Projects working to address vulnerability to the impacts of climate change in Tajikistan are presented alphabetically in the table below.

Name of project	Objectives	Funder(s) and budget	Implementing agencies	Type of project	Sectors	Duration	Scale and location(s)
Adaptation to Climate Change through Sustainable Forest Management	Building on past experience with joint forest management in the Pamir region of Tajikistan, forest agencies, local forestry offices, and forest users are rehabilitating degraded forests in the project areas in coordination with other land users. They are also taking into consideration climate change and the protection of biodiversity. In addition to working with communities and other stakeholders on joint forest management, the project also supports the development and implementation of vocational training courses for foresters. Best practices for climate change adaptation in land and forest management are being integrated into university curricula, and university graduates are encouraged to work in forest enterprises.	German Federal Ministry for Economic Cooperation and Development	Forestry Agency of the Government of Tajikistan; GIZ	Capacity building; field implementation	Forestry; ecosystem rehabilitation; government; other: post-secondary education	2013–2018	National
Addressing the Vulnerability of the Energy	To ensure climate-resilient energy infrastructure and continued provision of basic	CDKN £350,000	World Bank Energy Sector Management	Research; assessment	Energy	2012–2015	Regional

Sector to the Impacts of Climate Change in Central Asia	services to the public and industry, the first study will explore the vulnerability of Tajikistan's energy sector to climate change impacts. The second study will take a regional approach and will highlight the likely impacts of climate change on Central Asia's energy sector. The work will primarily focus on three major tasks: climate risk assessment of energy infrastructure, climate risk mitigation and adaptation, and cost-benefit analysis of the climate risk mitigation and adaptation strategies.	Assistance Program		Tajikistan, Central Asia			
Agriculture and Sustainable Land Management	The project will support pilot activities with a focus on agricultural livelihoods and rangeland management. The investments will help farmers and communities adapt and become more resilient to climate change by improving local livelihoods, reducing hunger, and restoring productive natural resources. It will target gender-specific vulnerabilities in rural areas, particularly with respect to female-headed households and youth. This would include an understanding of gender-based variation in access to productive assets, tools, and resources. Assessments will identify certain strategies and practices that are	PPCR US\$9.45 million	World Bank; Tajikistan Ministry of Agriculture and/or Ministry of Land Reclamation and Water Resources	Field implementation	Agriculture; gender	Planned	National

	conducive to livelihood benefits for women and youth.						
Building Capacity for Climate Resilience	The project aims to build stronger institutional capacity and enhance awareness of climate change amongst a variety of stakeholder groups, including policy- and decision-makers, highly vulnerable groups such as women and children, youth, educational institutions, media, and civil society. Activities will include public education and outreach; support for national efforts to develop a National Climate Change Adaptation Strategy and Action Plan; seminars, workshops and training modules; training of trainers on tools and methodologies to assess climate risks and vulnerability; establishment of knowledge management platforms; and development and dissemination of targeted knowledge products.	PPCR US\$ 3 million	ADB; Office of the Deputy Prime Minister of Tajikistan	Capacity building; knowledge communication; policy formation and integration	Climate information; multisectoral	2012– Unknown	National
Building Climate Resilience in the Pyanj River Basin	The project aims to reduce poverty and increase resilience to climate vulnerability and change of communities in the Pyanj River Basin. The project will improve the livelihoods of over 100,000 climate-vulnerable households in the Pyanj River Basin and reduce adverse impacts of climate change in the	PPCR US\$21.5 million	ADB; Ministry of Land Reclamation and Water Resources; State Unitary Enterprise for Housing and Communal Services; Ministry of Finance	Community-based adaptation	Freshwater supply; rural areas	2015– 2019	National

	<p>project areas. In addition, the project will increase access to water for communities by upgrading and climate-proofing small-scale community infrastructure for flood protection, irrigation and drinking water supply, while also strengthening the ability of individuals, especially women, to respond to climate change by building capacity of community groups and providing access to affordable loans for agribusiness and economic diversification.</p>						
Climate Adaptation and Mitigation Program for Central Asia	<p>The objective of the project is to support the integrated development of climate-smart information, institutions, and investment capacities throughout the countries of Central Asia. This will be achieved through strengthened coordination mechanisms; improved information gathering, sharing, and analysis for decision support; and incubation of innovative climate-smart action for potential scale-up.</p>	World Bank US\$60 million	Not identified yet	Capacity building; policy formation and integration	Climate information; government	Planned	Regional Tajikistan, Uzbekistan, Kyrgyzstan, Kazakhstan
Climate risk management	<p>This project seeks to build coordinated capacity at a national, sub-national, and local level to respond to climate risks. It seeks to synthesize the technical and economic basis for climate risk management</p>	UNDP Bureau for Crisis Prevention and Recovery US\$630,000	UNDP; Government of the Republic of Tajikistan: Committee of Environmental Protection,	Capacity building; field implementation	Forestry	2010–2014	National

	<p>interventions, demonstrate their efficacy, identify potential funding routes for scaling up, deliver capacity building for organizations and individuals, and catalyze learning for larger-scale climate risk management development. Consideration will be given to gender issues and to local knowledge. As a thematic focus, this project explores the important linkages between agro-forestry and disaster risk reduction (land stabilization and river bank management), improved water management in agriculture (water rights, water conservation techniques), and livestock management (land access and grazing rights).</p>		<p>Ministry of Agriculture; Committee of Emergency Situations</p>				
Climate Science and Modelling Programme	<p>The aim of the project is to build in-country capacity to conduct climate science and glaciology research, develop climate change models, and interpret the outputs to provide policy-makers and sector specialists with the information they need to plan for climate change. Specific objectives include establishing dynamic downscaled modelling capacity within the hydrometeorological agency, strengthening climate science and glaciology research, developing capacity to analyze and interpret outputs from</p>	PPCR	ADB; Tajikistan State Agency for Hydrometeorology	Capacity building	Climate information	Planned	National

	climate models and science, and mainstreaming climate modelling outputs in development planning and capital investment decisions.						
Enhancing the Climate Resilience of the Energy Sector	The project will pilot the incorporation of climate change analysis and climate resilience measures into planning and investment in the hydropower sector using the rehabilitation of the Kairakkum hydropower plant as a pilot project. Activities may include modifying installed capacity in light of projected changes to river inflows and other climatic variables over the lifespan of the facility; modifying spillway capacity to ensure the safe operation of the facility and the safety of downstream communities; addressing sedimentation in light of altered hydrology due to climate change; addressing changing risks of extreme events such as floods and mudslides that may affect operations and dam safety; and improving the management of hydropower plants.	PPCR US\$75 million	European Bank for Reconstruction and Development; Tajikistan Ministry of Energy and Industry	Field implementation	Energy	Planned	National
Improvement of Weather, Climate and Hydrological Service Delivery	The project includes three components: improving the national hydrometeorological monitoring system to provide timely warnings on dangerous events, support water management, and build the	PPCR US\$14 million	World Bank; Tajikistan State Agency for Hydrometeorology	Capacity building; field implementation	Disaster risk management; climate information	Planned	National

	<p>evidentiary basis for climate variability and change; strengthening the system of service delivery through expanded provision of hydrometeorological service products to consumers and bolstering the forecasting, warning, and response system of the Committee for Emergency Situations; and strengthening hydrometeorological services to improve personnel and financial sustainability.</p>						
<p>Increasing Climate Resilience through Drinking Water Rehabilitation in North Tajikistan</p>	<p>The project will improve the climate resilience of drinking water supplies in seven cities in Northern Tajikistan (Karaikkum, Kanibaidam, Isfara, Gaufurov, Taboshar, Chkalovsk, and Khorog) by a) encouraging water use efficiency, b) establishing more reliable and climate resilient water sources and rehabilitating water supply infrastructure, and c) reforming water utility management, including tariff reform. The outcome will be more sustainable supplies of safe drinking water that are resilient to the expected impacts of climate change, and that are environmentally and financially sustainable.</p>	<p>Special Climate Change Fund US\$26.8 million</p>	<p>European Bank for Reconstruction and Development; State Unitary Enterprise Khojagii Manziliyu Kommunalii; water companies in each of the seven participating cities</p>	<p>Field implementation</p>	<p>Fresh water supply; urban areas</p>	<p>2012–2015</p>	<p>National</p>

Pathways to Resilience in Semi-Arid Economies (PRISE)	The project aims to spur climate-resilient development in African and Asian semi-arid lands by identifying economic threats and opportunities resulting from climate change. PRISE will work with stakeholders in government, business, civil society, and regional economic organizations, conducting research in five areas: climate risk, institutional and regulatory frameworks, markets, and natural and human capital. Focusing on practical needs, the project will reveal climate risks and opportunities, leading to better informed policies and investments for climate resilience.	DFID and IDRC through CARIAA CA\$13.5 million	Overseas Development Institute (UK); Innovation, Environnement, Développement Afrique (Senegal); Centre for Climate Change Studies, University of Dar es Salaam (Tanzania); Grantham Research Institute, London School of Economics (UK); Sustainable Development Policy Institute (Pakistan)	Research; capacity building; knowledge communication; policy formation and integration	Multisectoral	2014–2019	Global Pakistan, Tajikistan, Kenya, Tanzania, Burkina Faso, Senegal
Strengthening of Livelihoods through Climate Change Adaptation in Kyrgyzstan and Tajikistan	The project aims to strengthen the livelihoods of vulnerable rural communities in Kyrgyzstan and Tajikistan through climate change adaptation measures. The project supports adaptation measures in agriculture, while strengthening people's resilience in the face of severe natural events. Measures to support agriculture include the introduction of water-saving irrigation methods and water-efficient crops, the use of quality seed and the rehabilitation of water reservoirs. The disaster risk reduction measures include the	German Federal Ministry for Economic Cooperation and Development	GIZ, in partnership with the local and regional units of the two countries' ministries of agriculture and of emergency situations, as well as local administrations, agricultural service providers and international organizations	Community-based adaptation	Agriculture; disaster risk management; rural areas	2014–2018	Regional Kyrgyzstan, Tajikistan

	construction of dams and riverbank reinforcement and, in particular, erosion control.						
Sustaining agricultural biodiversity in the face of climate change in Tajikistan	The project aims to ensure that globally significant agro-biodiversity conservation and adaptation to climate change are embedded in agricultural and rural development policies and practices at national and local levels in Tajikistan. The project will demonstrate three interlinked processes that focus on the following: capacity development at system, institutional, and individual levels, through strengthening policy and regulatory frameworks; in situ and ex situ agro-biodiversity conservation measures; and market development. All processes are targeted in conjunction with socio-ecological adaptation to climate change.	GEF and UNDP US\$540,401	National Biodiversity and Biosafety Centre; UNDP Communities Programme; GEF Small Grants Programme	Capacity building; field implementation	Agriculture	2009–2015	National

8. References

- Adaptation Partnership. (2015). Activities. Retrieved from <https://sites.google.com/a/ccrdproject.com/adaptation-partnership2/activities>
- Akiner, S., & Barnes, C. (2001). The Tajik civil war: Causes and dynamics. *Accord 10: Politics of compromise: The Tajikistan peace process*. Retrieved from Conciliation Resources website: <http://www.c-r.org/accord-article/tajik-civil-war-causes-and-dynamics>
- Armstrong, A. G. (2014). Climate adaptation & mitigation program for Central Asia (CAMP4CA) - P151363 [Project information document (concept stage)]. Retrieved from World Bank website: <http://documents.worldbank.org/curated/en/2014/08/20129706/project-information-document-concept-stage-climate-adaptation-mitigation-program-central-asia-camp4ca-p151363>
- Asian Development Bank (ADB) (n.d.). ADB support for governance in Tajikistan. Country assistance program evaluation linked document 7. Retrieved from <http://www.adb.org/sites/default/files/linked-documents/7-Governance.pdf>
- Asian Development Bank (ADB) (2006). Tajikistan country gender assessment. Retrieved from <http://www.adb.org/documents/tajikistan-country-gender-assessment>
- Bizikova, L. (2012). Capacity assessment and awareness raising on climate change in Tajikistan. World Bank and UNDP Tajikistan. Retrieved from International Institute for Sustainable Development website: <https://www.iisd.org/publications/capacity-assessment-and-awareness-raising-climate-change-tajikistan>
- Collaborative Adaptation Research Initiative in Africa and Asia (CARIAA). (n.d.). Targeting climate change hot spots: Introducing the Collaborative Adaptation Research Initiative in Africa and Asia (CARIAA). Retrieved from IDRC website: <http://www.idrc.ca/EN/Documents/CARIAA-ENG-4pp-A4-WEB.pdf>
- Central Intelligence Agency. (2015). The world factbook: Tajikistan. Retrieved from <https://www.cia.gov/library/publications/the-world-factbook/geos/ti.html>
- Climate and Development Knowledge Network (CDKN). (n.d.). Addressing the vulnerability of the energy sector to the impacts of climate change in Central Asia. Retrieved from http://cdkn.org/project/addressing-the-vulnerability-of-energy-sectors-to-the-impacts-of-climate-change-in-tajikistan-and-central-asia-region-energy-sector-management-assistance-program-esmap-co-funded-project/?loclang=en_gb
- Christensen, J.H., Krishna Kumar, K., Aldrian, E., An, S.-I., Cavalcanti, I.F.A. de Castro, M.,...Zhou, T. (2013). Climate phenomena and their relevance for future regional climate

change supplementary material. In T.F. Stocker, D. Qin, G.-K. Plattner, M. Tignor, S.K. Allen, J. Boschung, ...P.M. Midgley (Eds.), *Climate change 2013: The physical science basis. Contribution of Working Group I to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change* (Chapter 14). Cambridge University Press, UK: IPCC.

Christian Aid. (2009). *Climate change effort in Tajikistan: What worked well. Case study for ACT toolkit on best practice*. Retrieved from UNFCCC website:
https://unfccc.int/files/adaptation/application/pdf/christianaid_ap_update_sep_09_case_study_2_sp.pdf

Climate Funds Update. (2015). *The data: Recipients of the funds*. Retrieved from
<http://www.climatefundsupdate.org/data>

Department for International Development (DFID). (2006). *Social protection in poor countries. Social protection briefing note series, number 1*. Retrieved from GSDRC website:
<http://www.gsdrc.org/docs/open/SP17.pdf>

De Pauw, E. (2008). *ICARDA regional GIS datasets for Central Asia: Explanatory notes [GIS unit technical bulletin]*. Retrieved from International Center for Agricultural Research in the Dry Areas website:
<http://geoagro.icarda.org/en/cms/metadata/index/16/Central%25252BAsia%25253A%25252BAgroclimatic%25252BZones>

Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ). (n.d.-a). *Adaptation to climate change through sustainable forest management*. Retrieved from
<http://www.giz.de/en/worldwide/29916.html>

Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ). (n.d.-b). *Strengthening of livelihoods through climate change adaptation in Kyrgyzstan and Tajikistan*. Retrieved from
<https://www.giz.de/en/worldwide/28804.html>

Fund for Peace. (2014). *Fragile states index 2014*. Retrieved from
<http://ffp.statesindex.org/>

Global Environment Fund (GEF). (n.d.). *Detail of GEF project #4422*. Retrieved from
http://www.thegef.org/gef/project_detail?projID=4422

Government of the Republic of Tajikistan (GoT). (2003). *National action plan for climate change mitigation. Main Administration on Hydrometeorology and Environmental Pollution Monitoring, Ministry for Nature Protection of the Republic of Tajikistan*. Retrieved from UNFCCC website: <http://unfccc.int/resource/docs/nap/tainap01e.pdf>

Government of the Republic of Tajikistan (GoT). (2007). *National development strategy of the Republic of Tajikistan for the period to 2015*. Retrieved from CAREC website:
<http://www.carecprogram.org/uploads/docs/TAJ-National-Development-Strategy-en.pdf>

Government of the Republic of Tajikistan (GoT). (2008). The second national communication of the Republic of Tajikistan under the United Nations Framework Convention on Climate Change. State Agency for Hydrometeorology Committee for Environmental Protection. Retrieved from UNFCCC website:
<http://unfccc.int/resource/docs/natc/tainc2.pdf>

Government of the Republic of Tajikistan (GoT). (2009). Tajikistan living standards survey. Retrieved from World Bank website: <http://go.worldbank.org/CF14WXA9N0>

Government of the Republic of Tajikistan (GoT). (2010). National disaster risk management strategy for 2010–2015. Retrieved from PreventionWeb website:
<http://www.preventionweb.net/english/professional/policies/v.php?id=27582>

Government of the Republic of Tajikistan (GoT). (2011). Tajikistan: Strategic programme for climate resilience. Prepared under the Pilot Program for Climate Resilience. Retrieved from Climate Investment Funds Website:
https://www.climateinvestmentfunds.org/cif/sites/climateinvestmentfunds.org/files/SPC_R_Tajikistan_revised_012511.pdf

Government of the Republic of Tajikistan (GoT). (2012). The agriculture reform programme of the Republic of Tajikistan for 2012–2020. Retrieved from http://moa.tj/wp-content/Program_Taj_Rus_Eng_ready.pdf

Government of the Republic of Tajikistan (GoT). (2014). Third national communication of the Republic of Tajikistan under the United Nations Framework Convention on Climate Change. State Agency for Hydrometeorology Committee for Environmental Protection. Retrieved from UNFCCC website: http://unfccc.int/resource/docs/natc/tjknc3_eng.pdf

Government of the Republic of Tajikistan (GoT), & UNDP Tajikistan. (2012). National review: Towards a green economy in Tajikistan. Elaborated in preparation for the UN International Conference on Sustainable Development (Rio+20). Retrieved from <https://sustainabledevelopment.un.org/content/documents/1021tajikistan.pdf>

Intergovernmental Panel on Climate Change (IPCC). (2001). Annex B. Glossary of terms. In *Climate change 2001: Impacts, adaptation and vulnerability*. Retrieved from <http://www.ipcc.ch/pdf/glossary/tar-ipcc-terms-en.pdf>

Mustaeva, N., Wyes, H., Mohr, B. & Kayumov, A. (forthcoming). Country situation assessment report: Tajikistan. CAREC. Prepared within the framework of the Collaborative Adaptation Research Initiative in Africa and Asia (CARIAA).

Notre Dame Global Adaptation Index (ND-GAIN). (2013). Tajikistan country profile. Retrieved from <http://index.gain.org/country/ghana>

Organisation for Economic Co-operation and Development (OECD). (2015). Rio markers: Integrated bilateral and multilateral climate-related flows in 2013. Retrieved from https://public.tableausoftware.com/views/Climate-Related-Aid/IntegratedBi-multi?:embed=y&:display_count=no?&:showVizHome=no#1

Organisation for Economic Co-operation and Development (OECD). (2011). Handbook on the OECD-DAC climate markers. Retrieved from <http://www.oecd.org/dac/stats/48785310.pdf>

Oxford Policy Management & UNICEF (2011). Impact of labour migration on children left behind in Tajikistan. Retrieved from UNICEF website: http://www.unicef.org/tajikistan/Web_Migration_Report_Eng_light.pdf

Pilot Program on Climate Resilience (PPCR). (2015a). Second workshop on developing the national strategy for adaptation to climate change in Tajikistan. Retrieved from <http://www.ppcr.tj/index.php/en/implementation-progress-project-reports/phase-i/67-second-workshop-on-developing-the-national-strategy-for-adaptation-to-climate-change-in-tajikistan->

Transparency International. (2014). Corruption perceptions index 2014: Results. Retrieved from <http://www.transparency.org/cpi2014/results>

United Nations Development Programme (UNDP). (2014). Human development index 2014: Sustaining human progress: Reducing vulnerabilities and building resilience. Retrieved from <http://hdr.undp.org/en/2014-report>

United Nations Development Programme (UNDP). (n.d.-a). Enabling activities for the preparation of Tajikistan's third national communication to the UNFCCC. Retrieved from http://www.tj.undp.org/content/tajikistan/en/home/operations/projects/environment_and_energy/tnc.html

United Nations Development Programme (UNDP). (n.d.-b). Sustaining agricultural biodiversity in the face of climate change in Tajikistan. Retrieved from http://www.tj.undp.org/content/tajikistan/en/home/operations/projects/environment_and_energy/agrobiodiversity.html

United Nations Development Programme (UNDP), & Government of the Republic of Tajikistan (GoT). (2012). Tajikistan: Poverty in the context of climate change. Human Development Report 2012. Retrieved from http://hdr.undp.org/sites/default/files/tajikistan_2013.pdf

United Nations Entity for Gender Equality and the Empowerment of Women. (n.d.). Gender mainstreaming: Concepts and definitions. Retrieved from <http://www.un.org/womenwatch/osagi/conceptsanddefinitions.htm>

United Nations Environment Programme (UNEP). (2007). Glossary. In Global environment outlook 4. Retrieved from <http://www.unep.org/geo/geo4/report/Glossary.pdf>

United Nations International Strategy for Disaster Reduction (UNISDR). (2009). 2009 UNISDR terminology on disaster risk reduction. Retrieved from http://unisdr.org/files/7817_UNISDRTerminologyEnglish.pdf

World Bank. (2009). Adapting to climate change in Europe and Central Asia. Retrieved from http://www.worldbank.org/eca/climate/ECA_CCA_Full_Report.pdf

World Bank. (2010). Tajikistan: Economic and distributional impact of climate change. Poverty Reduction and Economic Management Unit, Europe and Central Asia Region. Retrieved from http://www-wds.worldbank.org/external/default/WDSContentServer/WDSP/IB/2011/08/09/000386194_20110809011655/Rendered/PDF/637180WP0Tajik00Box0361520B0PUBLIC0.pdf

World Bank. (2014). Country partnership strategy for Tajikistan for the period FY15-18. Retrieved from <http://documents.worldbank.org/curated/en/2014/05/19538359/tajikistan-country-partnership-strategy-period-fy2015-2018>

World Bank (2015). Databank: Indicators. Retrieved from <http://data.worldbank.org/indicator>

World Health Organization (WHO). (n.d.). Frequently asked questions. Retrieved from <http://www.who.int/suggestions/faq/en/index.html>



IDRC | CRDI

International Development Research Centre
Centre de recherches pour le développement international

Canada



International Institute for
Sustainable Development

