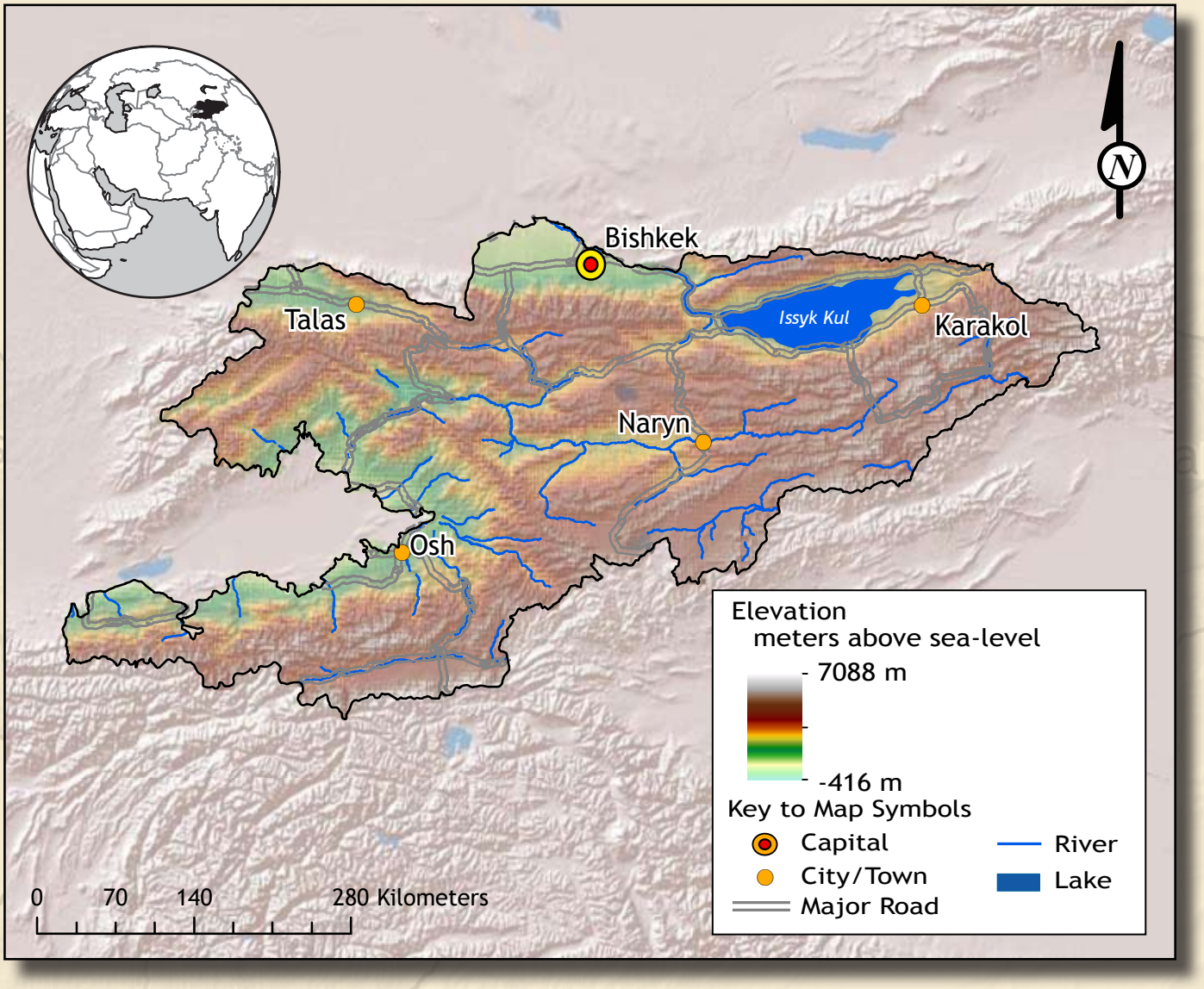

Vulnerability, Risk Reduction, and Adaptation to Climate Change

CLIMATE
DISASTER RISK REDUCTION
ADAPTATION

KYRGYZ REPUBLIC

GFDRR
Global Facility for Disaster Reduction and Recovery

Climate Change Team ENV

COUNTRY OVERVIEW

The Kyrgyz Republic is a landlocked country located in north-eastern Central Asia between two major mountain systems, the Tien Shan and the Pamirs. Spanning a total landmass of 187.5 thousand square kilometers (km^2), it runs from 39° and 44°N latitude and 69° and 81°E longitude. The Kyrgyz Republic is bordered by Kazakhstan to the north, Uzbekistan to the west, Tajikistan to the south-west, and China to the east. Approximately 94% of the country is located at more than 1,000 meters (m) above sea level, and 40% is above 3,000 m. Over 80% of the country is within the Tian Shan mountain chain and 4% is permanently under ice and snow[1].

Key Sectors
Water Resources
Agriculture and Livestock
Energy

Source: Kyrgyz Republic's National Communication to the UNFCCC.

Of a total population of 5,321,355 in Kyrgyz Republic, the majority live in the foothills of the mountains, where they are most vulnerable to climate hazards. Forty-three percent of the population lives below the poverty line and 50% are rural dwellers. Average Gross National Income (GNI), a measure of relative wealth, is US$870 per capita[2]. Agriculture is by far the most important livelihood activity, contributing to one-third of GDP and employing 65% of the population[3]. Industrial processing, the second most productive sector in Kyrgyz Republic, also highly depends on the agricultural sector for provision of raw goods.

Over half of Kyrgyz Republic's GDP is derived from climate and weather-sensitive activities. Drought is a common occurrence in the country as are land and mudslides, avalanches, squalls, downpours, icing, frosts, breakthrough of glacial lakes, floods, rise of sub-soil waters, epidemics, pests, crop diseases, and river erosion, and earthquakes[4]. Notably, Kyrgyz Republic experiences between 3,000 and 5,000 earthquakes every year, with large-scale catastrophes taking place every 5-10 years. On average, destruction and loss from natural disasters totals up to USD$30-35 million per year.[5]

According to the Food and Agriculture Organization, climate change will adversely impact agricultural productivity in the Kyrgz Republic and is likely to lead to decreased water supply, increase the frequency, magnitude, and intensity of extreme weather events, damage ecosystems, and jeopardize the health of the local populations[6]. Mountainous regions, lowlands, glacier areas, and the country's limited arable lands are all going to be impacted significantly[7]. Understanding these dynamics in the future will be instrumental to supporting the country's adaptation strategies.

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[1] UNISDR, 2007. In-depth Review of Disaster Risk Reduction in the Kyrgyz Republic.
[2] World Bank, 2010. Country Data for Kyrgyz Republic. Available at http://data.worldbank.org/country/kyrgyzrepublic.
[3] United Nations Country Team, 2007. United Nations Development Assistance Framework (UNDAF) of the Kyrgyz Republic 2005-2010.
[4] GFDRR Disaster Risk Management Programs for Priority Countries. Kyrgyz Republic Case Study.
[5] Ibid.
[6] Zholdosheva, Elnura. Review of the existing information, policies and proposed or implemented climate change measures in Kyrgyzstan. Food and Agriculture Organization (FAO).
[7] United Nations Economic Commission for Europe and the World Health Organization, 2008. Adaptation to Climate Change in Easter Europe, Caucasus and Central Asia and South-Eastern Europe.

PRIORITY ADAPTATION MEASURES

According to the Second National Communication of the Kyrgyz Republic, adaptation measures required for building the resilience of people and sectors are classified under several key categories, including: technological improvements, economic mechanisms, and state support. Some examples of these initiatives are listed below[8].

- **Technological improvements:**
  - Alteration of plant cultivation and cattle-breeding regional priorities;
  - Implementation of alternative approach to land cultivation in order to reduce the shortfall of water and mineral substances;
  - Implementation of more efficient irrigation practices;
  - Diversification of seed and cattle livestock varieties tolerant to expected impacts of climate change.
- **Economic mechanisms:**
  - Development of a crop insurance program to reduce the risk of income loss caused by increased climate variability;
  - Investment in agricultural equities and futures in order to reduce risk of income loss;
  - Participation in income stabilization programs;
  - Diversification of income sources in order to reduce the risk of income loss caused by climate change.
- **State support:**
  - Development and implementation of early warning systems as well as of improved daily and seasonal weather forecasts;
  - Adjustment of crop insurance programs in order to influence the strategy of risk management regarding crop losses caused by climate variability;
  - Development of incentive programs to support peasants and farmers and implementation of agricultural grants.

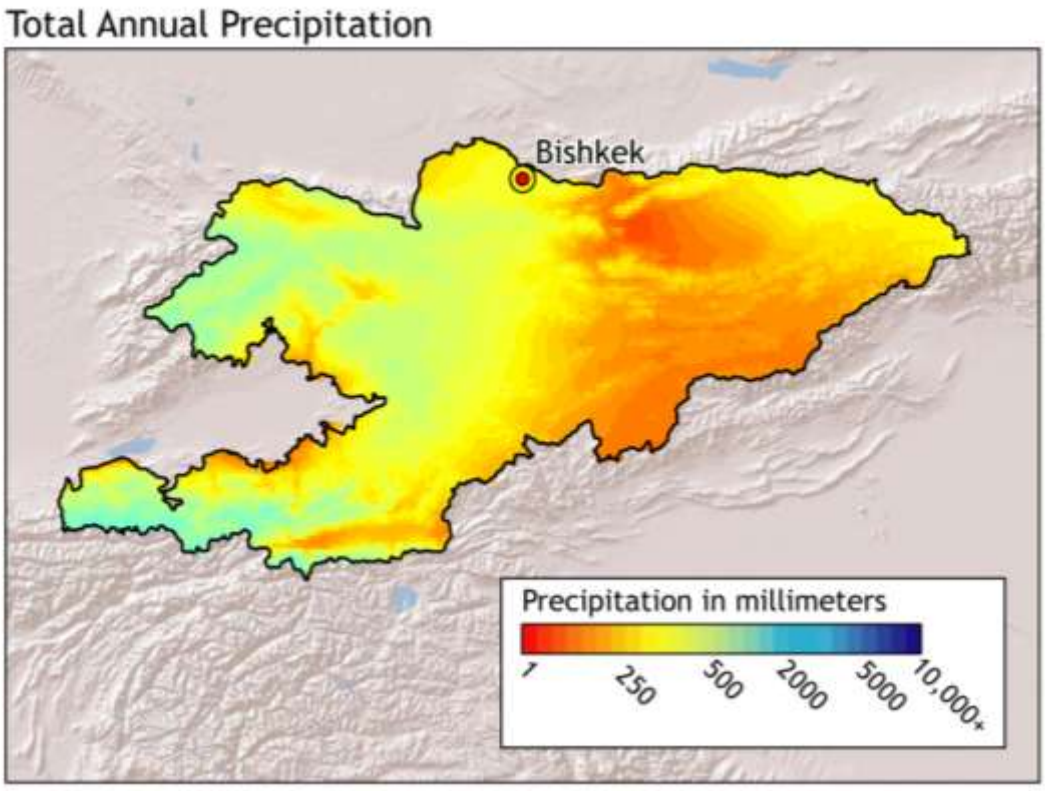
[8] Second National Communication of the Kyrgyz Republic to the UN Framework Convention on Climate Change, 2009.

CLIMATE BASELINE AND CLIMATE FUTURE

CLIMATE BASELINE

The climate in the Kyrgyz Republic is as varied as the country's topography and can be classified into four major zones, each with distinctive characteristics:

- The **valley-sub-mountain zone** (from 900-1,200 m) experiences hot summers, snowless and temperate winters, and almost zero precipitation.
- The **mountain zone** (from 900–1,200 to 2,000–2,200 m) is characterized by a temperate climate, which has warm summers and cold, snowy winters.
- The **high-mountain zone** (from 2,000–2,200 to 3,000–3,500 m) is cooler in the summer and has relatively cold, snowless winters, with temperatures ranging from well below zero to 16°C.
- Finally, the **nival belt zone** (from 3,500 m and higher) has a polar climate and is covered by numerous snowfields and glaciers[9].



[9] GFDRR Disaster Risk Management Programs for Priority Countries. Kyrgyz Republic Case Study. Worldclim 1960-1990 Averages. Robert J. Hijmans, Susan Cameron, and Juan Parra, at the Museum of Vertebrate Zoology, University of California, Berkeley, in collaboration with Peter Jones and Andrew Jarvis (Ciat), and with Karen Richardson (Rainforest Crc). www.worldclim.org/current.

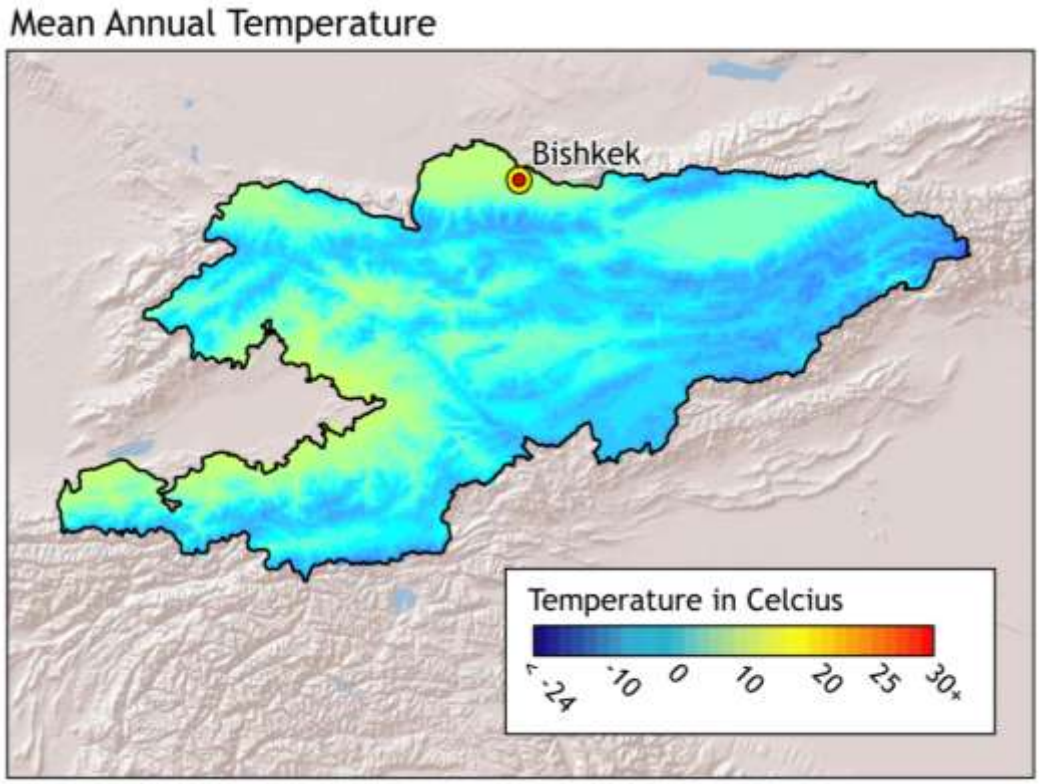


Figure 1: Annual climate baseline for the Kyrgyz Republic[10]

According its own Second National Communication to the UNFCCC, only 20% of the country is considered habitable year round, and it is in these regions (the western border with Uzbekistan, particularly around Jalal-Abad, and the northern border with Kazakhstan) where most of the population and its economic activity take place.

RECENT CLIMATE TRENDS

- Research conducted during the preparation of the First and Second National Commitments showed that over the last century the air temperature on the territory of Kyrgyz Republic increased by 0.8°C.

[10] Worldclim 1960-1990 Averages. Robert J. Hijmans, Susan Cameron, and Juan Parra, at the Museum of Vertebrate Zoology, University of California, Berkeley, in collaboration with Peter Jones and Andrew Jarvis (Ciat), and with Karen Richardson (Rainforest Crc). www.worldclim.org/current.

- According to the United Nations Development Programme (UNDP), nearly 1/3 of the glacial area of central Asia has disappeared since 1930. Because glaciers provide a large proportion of the water flow to the major rivers of Central Asia, the loss of these glaciers has severe consequences for the future of the Kyrgyz Republic[11].

CLIMATE FUTURE

The climate science community sources a suite of models to inform decision makers on future climate. Among the most widely used are GCMs (Global Climate Models), RCMs (Regional Climate Models), and downscaling techniques (both empirical and statistical), and several comprehensive reviews are available on the subject. Global Climate Models (GCMs) are our primary source of information about future climate. GCMs comprise of simplified but systematically rigorous interacting mathematical descriptions of important physical and chemical processes governing climate, including the role of the atmosphere, land, oceans, and biological processes. The following insights into a changing climate are from a suite of GCMs used by the Intergovernmental Panel on Climate Change (IPCC).

- Central Asia is expected to experience an increase in mean annual temperature on average of 2°C by 2020 and between 4°C and 5°C by 2100. A decrease in annual runoff of 12% is also projected by 2020, with a potential three-fold increase by 2050. These changes will result in increased incidence of drought, heat waves, and eventual crop losses.
- According to the Kyrgyz Republic's Second National Communication to the United Nations Framework Convention on Climate Change (UNFCCC), a significant reduction in the country's glaciers and snowfields is projected, with major implications for the country's water resources[12]. As glaciers shrink, floods will ensue with greater intensity in some areas while water scarcity will become more acute in others[13].
- Summertime diurnal temperature ranges are projected to increase, suggesting a pronounced increase in maximum temperatures relative to minimum temperatures.
- According to the IPCC's 4th Assessment Report, an increase in winter precipitation and a decrease in summer precipitation are projected for Central Asia. The low resolution of available Global Circulation Models (GCMs), however, inadequately captures the topographic diversity and resulting precipitation dynamics across the Kyrgyz Republic and renders available projections of precipitation change unreliable, with a considerable amount of disagreement existing on how precipitation may behave in the future. This information is particularly important as destructive storms are locally developed. Therefore, the general perception within the Kyrgz Republic, that water resources for agricultural areas are at high risk to suffer from droughts, requires authentication.

[11] http://www.grid.unep.ch/activities/global_change/central_asia_glacier.php.
[12] National Communication of the Kyrgyz Republic to the UN Framework Convention on Climate Change, 2009.
[13] GFDRR and the World Bank. Disaster Risk Management and Climate Change Adaptation in Europe and Central Asia.

- Low and mid-lying parts of central Asia are likely to gradually change into more arid, interior deserts with reduced glacial runoff.

CLIMATE CHANGE IMPACTS ON NATURAL HAZARD VULNERABILITY

AT A GLANCE

The geography and topography of the Kyrgyz Republic makes it one of the most hazard-prone countries in Central Asia. Available data suggest that natural hazards incur major economic losses on these countries, with costs between 0.5 and 1.3% of annual GDP. Rising temperatures, changing hydrology conditions, and frequency of extreme weather events associated with climate change will exacerbate the Kyrgyz Republic's vulnerability and reduce ability to manage extreme events unless the appropriate adaptation measures are put in place[14].

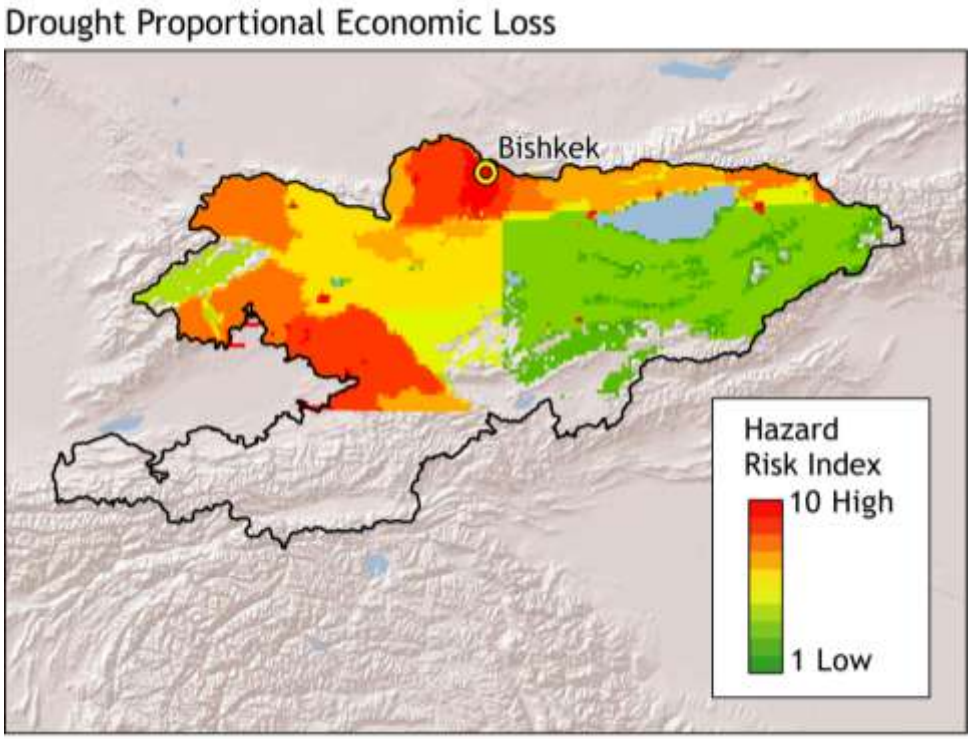


Figure 2: Drought proportional economic Loss

[14] UNISDR, 2007. In-depth Review of Disaster Risk Reduction in the Kyrgyz Republic.

➡ ***Floods and mudflows***—Nearly all of Kyrgyz Republic is vulnerable to floods and mudflow hazards, which occur frequently across the country. As glaciers continue to melt due to rising temperatures, more intense flooding events in the wintertime (and reduced water flow in the summer) are expected. Over the past 50 years, warmer temperatures have resulted in loss of glacier cover. The country has more than 8500 glaciers, which span an area of 8000 km. At the same time, a total 3103 rivers and 800 lakes in the high mountains are considered at risk for flooding from heavy rains and snowmelt. Between 1990 and 2008, more than 850 incidents of floods and mudslides were registered, 92 of which occurred during the first nine months of 2009. The Jalal-Abad, Osh, Batken, Chui, Issyk-Kul, and Talas regions face the highest risk of floods and mudflows.

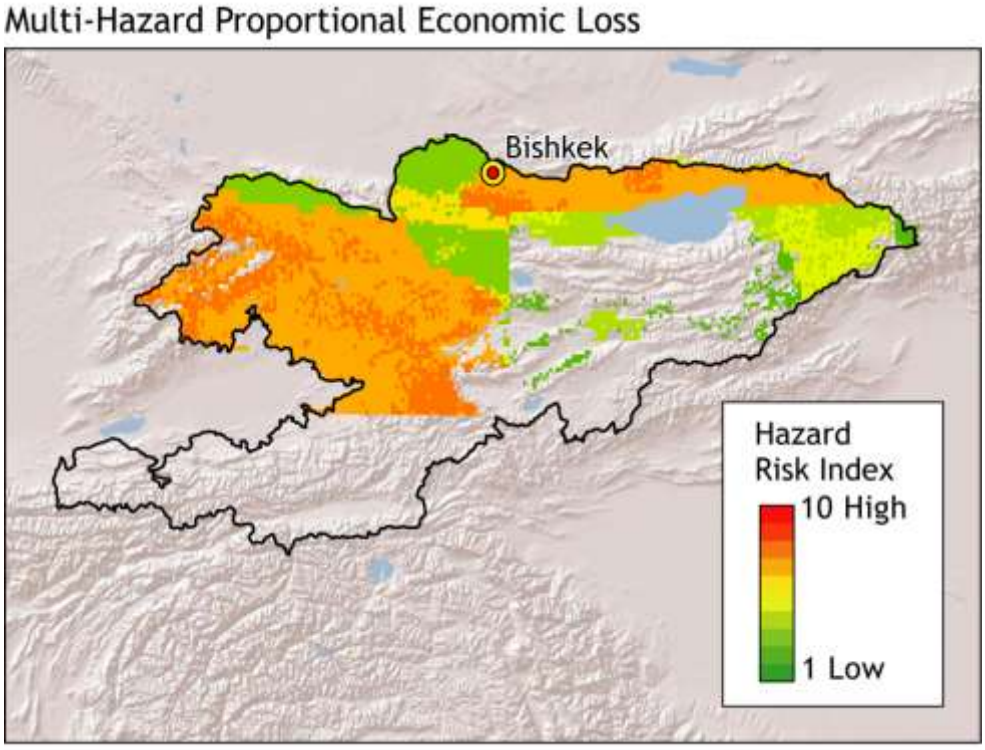


Figure 3: Multi-hazard proportional economic Loss

➡ ***Landslides*** **–** Kyrgyz Republic has 5,000 potentially active landslide sites, the majority of which are found in the south. Intense rainstorms trigger landslides within minutes, as do snowmelts. More than 10,000 homes are located in landslide prone areas; of all natural hazards, landslides cause the most deaths. According to the GFDRR country profile:

"Extensive areas of the Kyrgyz Republic are characterized by the presence of very large landslide hazards. There are about **5,000 potentially active landslide sites**, about 3,500 of which are in the southern part of the country. Stability of most landslides is satisfactory in dry conditions. Landslides are typically activated due to temporary development of significant ground water pressures along the slip planes, with actual mass displacement sometimes initiated within minutes or hours of activation. Such conditions are likely to occur following significant rainstorms and snowmelt. Furthermore, seismic forces large enough to displace landslides may develop during strong motion earthquakes that are rather common in the country. None of the major landslide areas that threaten villages are equipped with monitoring and warning instrumentation, leaving their populations vulnerable to landslide hazards. Every year landslides cause damage to buildings, roads, power lines, and water supply, heating supply, and sewerage systems, as well as the death of tens of people. On average, about 700 houses are damaged or destroyed per year. The last major landslide disaster occurred on April 20, 2003 when a landslide near Uzgen in Osh Oblast killed 38 people, while 84 families lost their houses."

SECTORAL CLIMATE RISK REDUCTION RECOMMENDATIONS

AGRICULTURE

The agriculture sector is the mainstay of Kyrgyz Republic's economy, contributing to up to one-third of GDP; crop cultivation comprises more than half of this figure and cattle breeding accounts for the remainder[15]. Sixty-five percent of the population is engaged in agriculture-related activities[16]. The agriculture sector is extremely vulnerable to climate change and variability. Major weather events that threaten to reduce productivity include drought, hailstorms, windstorms, late spring and early fall frosts, and winter thaws[17]. Drought has the potential to compound scarcity of irrigation water and accelerate soil degradation; this in turn would lead to decreased production, and local climate feedback effects could result in less precipitation and worsened drought[18].

Partly due to its mountainous topography and harsh weather conditions, only 7% (about 1.4 million hectares) of Kyrgyz Republic's land is arable[19]. Agricultural production is highly diversified and includes cotton, rice, wheat, corn, a variety of fruits, vegetables, livestock, poultry, sheep, and pasture[20]. While most of this land has been privatized, productivity remains low due to a lack of

[15] National Communication of the Kyrgyz Republic to the UN Framework Convention on Climate Change, 2009.
[16] United Nations Country Team, 2007. United Nations Development Assistance Framework (UNDAF) of the Kyrgyz Republic, 2005-2010.
[17] GFDRR Disaster Risk Management Programs for Priority Countries. Kyrgyz Republic Case Study.
[18] World Bank, 2009. Adapting to Climate Change in Europe and Central Asia.
[19] UNISDR, 2007. In-depth Review of Disaster Risk Reduction in the Kyrgyz Republic.
[20] World Bank.,2009. Adapting to Climate Change in Europe and Central Asia.

investment and widespread environmental degradation. Kyrgyz Republic does not produce enough food to sustain its population, and, as a result, the country imports 43% of its wheat, 44% of its vegetable oil, and 66% of its sugar[21].

Studies show that overall livestock production may not suffer major losses due to climate change. Forage production may rise, feed requirements may lower, and extreme cold may become less of a problem under projected future changes in climate. However, changing rainfall patterns and rising temperatures occurring in the southern, warmer and drier areas of Kyrgyzstan could present problems for livestock, as heat waves, insufficient drinking water, and reduced forage become more commonplace. This will adversely affect livestock reproductive cycles. Moreover, higher temperatures may herald the arrival of new infectious diseases, such as rabies[22].

Studies also show that agricultural productivity can be improved relatively swiftly with improved provision of credit, improved seed, and equipment[23]. Over the long-term, farmers would greatly benefit from extensive capacity-building measures and improved water management schemes. Additional measures, identified in the Country's National Communication, are presented in the initial sections of this document. It should, however, be noted that no significant research has been undertaken to link climate change with regional/local climate drivers to establish attribution of detection of observable trends to climate change. Prescriptive adaptation measures have no salience as of yet in the Kyrgyz Republic.

WATER RESOURCES

The Kyrgyz Republic possesses 30% of the total water resources in Central Asia[24] region, which are largely stored in glaciers, lakes, rivers, and underground. Notably, the country only exploits 12-17% of its surface water runoff, of which 90% is used for agriculture (UNPEI). The majority of water resources are used for irrigation, provision of water for industrial and residential uses, and for power generation[25]. Largely due to the rapid melting of glaciers, while the country will have enough water for its own needs in the future, it may not be able to meet demand in its role as a critical supplier of water to the Central Asia region[26]. The majority of irrigation systems have been either inefficient or of poor quality, which limits production on arable land. Over the past decade, about a third of irrigation systems in the country have undergone any significant restoration[27].

To build resilience of this sector, a water users association has been formed to manage demand and maintain irrigation networks. In addition, investments have been made in irrigation networks to better manage supply. The government has also developed emergency response measures and

[21] UNISDR, 2007. In-depth Review of Disaster Risk Reduction in the Kyrgyz Republic.
[22] World Bank, 2009. Adapting to Climate Change in Europe and Central Asia.
[23] UNISDR, 2007. In-depth Review of Disaster Risk Reduction in the Kyrgyz Republic.
[24] Central Asia is defined as comprising Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan, and Uzbekistan.
[25] UNISDR, 2007. In-depth Review of Disaster Risk Reduction in the Kyrgyz Republic.
[26] World Bank, 2007. Adapting to Climate Change in Europe and Central Asia.
[27] State Agency on Environment Protection and Forestry Under the Government of the Kyrgyz Republic and the United Nations Development Program in the Kyrgyz Republic, 2007. Kyrgyzstan: Environment and Natural Resources for Sustainable Development.

begun to issue licenses to regulate water use and manage pollution[28] (to discharge pollutants, a license is first needed)[29].

Adaptation options aimed at reducing water use include[30]:

- Lining more irrigation canals to reduce seepage losses (up to 40% of diverted water is lost in arterial channels);
- Reducing the area of crop and pasture irrigated by inefficient flooding methods; and
- Increasing the area of lucrative fruit and vegetable crops irrigated by efficient drip and below-ground irrigation systems.

See Priority Adaptation Measures for more examples of detection of observable trends to climate change.

EXISTING ADAPTATION FRAMEWORK/STRATEGY/POLICY AND INSTITUTIONAL SETUP

The Kyrgyz Republic is highly prone to large-scale natural disasters and extreme weather events. Poverty, environmental degradation, inadequate infrastructure, and a large agricultural sector exacerbate this vulnerability. Droughts and storm frequency have already forced farmers to change their methods, but more is required. The vast majority of disaster risk reduction and development efforts will be more sustainable in the long term if they take into account and mainstream climate change considerations. In 2001-2010 **Comprehensive Development Framework** established strategic socio-economic development goals and focused on the following aspects related to sustainable management of natural resources and environment[31]:

- Improve the national environmental policy;
- Reduce anthropogenic impact on the environment;
- Improve rational and efficient use of water and energy resources and strengthen agricultural land reclamation measures; and
- Conserve and reproduce of biological diversity.

[28] United Nations Economic Commission for Europe and the World Health Organization, 2008. Adaptation to Climate Change in Easter Europe, Caucasus and Central Asia and South-Eastern Europe.

[29] United Nations Economic Commission for Europe and the World Health Organization, 2008. Adaptation to Climate Change in Easter Europe, Caucasus and Central Asia and South-Eastern Europe.

[30] Perelet, Renat, 2007. Human Development Report 2007/2008. Fighting climate change: Human solidarity in a divided world Human Development Report Office OCCASIONAL PAPER: Central Asia: Background Paper on Climate Change. UNDP.

[31] State Agency on Environment Protection and Forestry under the Government of the Kyrgyz Republic and the United Nations Development Program in the Kyrgyz Republic, 2007. Kyrgyzstan: Environment and Natural Resources for Sustainable Development.

More recently, the **National Framework Program on Land Resources Management for 2006-2016 (NFP)** was drafted under the Central Asian Countries Initiative on Sustainable Land Management (CACILM). This Program, focused on land degradation and sustainable land and water resource management, aims to improve coordination between local authorities and donors. The Framework Program has the following objectives:

- Integrate a policy favorable to the environment and its protection;
- Build institutional capacity to support a system of sustainable land resources management;
- Establish a favorable legal and regulatory system;
- Integrate sustainable land resources management in national planning, budgeting, and strategy on poverty reduction and improved welfare; and
- Implement the UN Environmental Conventions (UNCCD, UNCBD, and UNFCCC).

The Kyrgyz Republic published its *First National Communication of the Kyrgyz Republic to the UN Framework Convention on Climate Change* in 2003. In 2009, the country published its Second National Communication, which reflects development priorities and commitment to address climate change at the country and global level. Additional guiding principles in the Second National Communication demonstrate support for no-regrets measures, participatory approaches for establishing an adaptation agenda, reevaluating existing initiatives and integrating adaptation measures as necessary, and expanding and entrenching knowledge base on climate change to better manage current and future risks. While the occurrence of natural hazards may be unpredictable, the impact of these events can be managed through sound adaptation policy that builds socio-ecological resilience. The State Agency for the Protection of the Environment and Forestry of the Kyrgyz Republic is the responsible executive organ that implements the obligations of the Kyrgyz Republic under UNFCCC and the Kyoto Protocol. For effective, efficient, and equitable adaptation to be possible in the country, access to technology that can monitor and measure changes in climate will have to expand; institutions able to enforce adaptation measures and improve public service delivery—especially in rural areas—will have to be fostered, and appropriate policies to underpin reform will need to be developed. In addition, infrastructure will need to be modernized in order to facilitate production and market activity[32].

Ongoing Efforts—At a Glance

Vulnerability Reduction Projects

UNDP Program Environment protection for sustainable development—the project's main objectives are to:

(i) enhance national capacity of environmental management;

(ii) perform obligations under the global environmental conventions, including the UNFCCC and Kyoto Protocol, in the area of sustainable development and environment protection;

[32] World Bank, 2009. Adapting to Climate Change in Europe and Central Asia.

(iii) Integrate the ideology and sustainable development procedures into the national strategies and programs at the national and local levels.

UNDP/GEF Project capacity building for improved national financing of global environmental management in the Kyrgyz Republic will assist the country in terms of conservation of its natural resources and prevention of further degradation through initiation of fiscal reform processes in the area of environmental protection. At the international level this project will also assist in achieving the global objectives in the spheres of biodiversity preservation, climate change mitigation and adaptation, and reduction of land degradation.

World Bank Central Asia Hydrometeorology Modernization Project (CAHMP) will assist Kyrgyz Republic in strengthening the capacity of the national hydrometeorological service (Kyrgyzhydromet) to improve the delivery of weather, water, and climate services.

GFDRR Interventions

Hydrometeorological Services Modernization/Partners include: the Government, WMO, IFAS, Switzerland, Germany, Finland, UNISDR, and World Bank.

INSTITUTIONAL AND POLICY GAPS

While Kyrgyz Republic has made progress in transitioning from a centrally planned economy, associated changes in social, policy, and administrative functions have left several gaps that will need to be filled so that future services are both effective and sustainable. More specifically, additional resources—human, financial, technical, and administrative—are required to enable implementation of national and institutional plans targeted at building climate resilience. These plans may include improving disaster preparedness, awareness, conducting risk assessments, and enforcing existing environmental, demographic, and developmental norms and standards[33]. The following recommendations target the development and implementation of more robust natural resources and environmental management policies[34] that contribute to strengthening climate resilience:

- Increase enforcement of the legislation through the development of by-laws, resolutions, decisions, and directives, including maximum orientation of the policy towards executing supervisory functions;
- Improve and encourage interagency interaction in the process of forming and implementing the policy (if it exists, it is caused by external factors), and support interagency coordination in natural resources and environmental management; likewise, improve decision-making processes by focusing on a program-based approach to planning that includes appropriate assessment mechanisms to allow for full understanding of the issues at hand before decisions are made.

[33] UNISDR, 2007. In-depth Review of Disaster Risk Reduction in the Kyrgyz Republic.

[34] State Agency on Environment Protection and Forestry Under the Government of the Kyrgyz Republic and the United Nations Development Program in the Kyrgyz Republic, 2007. Kyrgyzstan: Environment and Natural Resources for Sustainable Development.

- Improve the political and socio-economic climate for attracting, adapting, and developing procedures and mechanisms for efficient natural resources use and environmental management;
- Improve environmental management practices to conserve the natural resource base of the Kyrgyz Republic. Specifically, this entails renewed institutional and policy support for addressing shortcomings in soil fertility management, water use, pest control, nutrient conservation, forest health, and illegal logging.

RESEARCH, DATA, AND INFORMATION GAPS

The Kyrgyz Republic's status as a developing country dependent mainly on agriculture makes it particularly susceptible to the effects of climate change. In addition, like most other developing countries, the country does not have adequate monitoring systems for predicting the likelihood of extreme events or for assessing possible changes in weather patterns, thus making the task of developing short-term responses or disaster reduction strategies extremely difficult. Adaptation strategies are likewise difficult to formulate unless detailed vulnerability and impact assessment studies are undertaken. Some of the prevailing shortcomings in research, data, and information that could promote adaptive action are outlined below.

RESEARCH GAPS

- Increased capacity and understanding of the role of catastrophe risk management finance tools could greatly strengthen the country's ability to manage costs brought on by climate hazards, as well as reduce climate risks by building resilience to weather-induced disasters. By extension, more knowledge on how to budget for, facilitate, and access insurance protection will be necessary to buffer against future climate-related risks. Multilateral development banks can support the government to fill this knowledge gap.

- Weak capacity to collect, interpret and communicate important early warning information leaves the Kyrgyz Republic highly vulnerable to emergency situations. These problems largely stem from a persistent lack of funding to hydromet systems during and since the collapse of the Soviet Union. Many data collection stations are old or have closed completely. Other communications equipment is now obsolete, labor-intensive, or expensive. While more funding for these systems is vital, training of current and incoming staff is necessary to ensure that they have the skills needed to operate existing equipment.

- Adequate safety net programs will support those who are hardest hit by devastating climate-related disasters. To improve existing safety-net programs and develop new ones, a rigorous analysis of the advantages and disadvantages of existing programs will be required in order to make practical recommendations to address existing shortcomings.

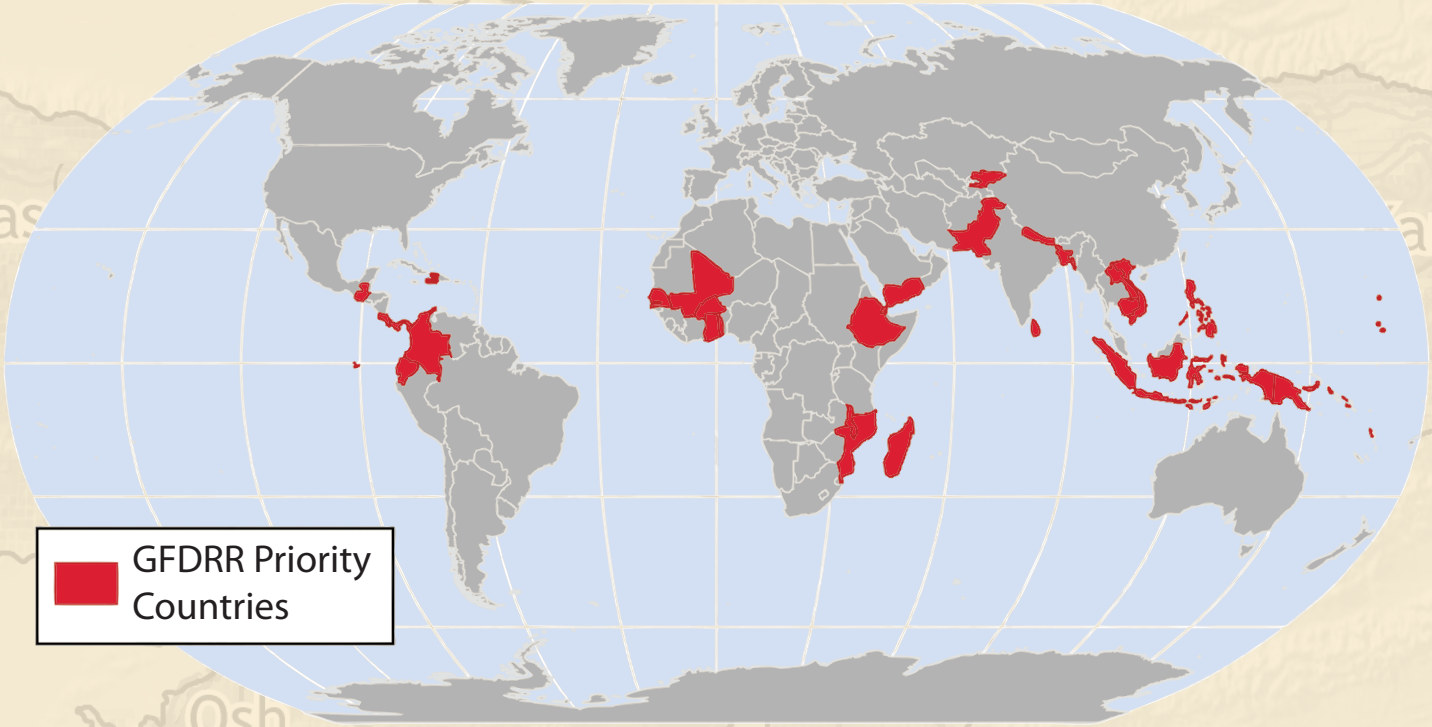
DATA AND INFORMATION GAPS

- Studies of climate change impacts on forests and wooded areas of Kyrgyzstan are needed. This includes improved understanding for forest functions such as productivity, survival ability, or loss of plantations, all of which are critical to the country's important forestry sector.

- Improving weather and climate information systems in the country is essential for stable social and economic development, as well as a way to provide critical early warning information to support disaster reduction strategies across all sectors (transport, agriculture, and water resources management). Forecasting and monitoring equipment in the Kyrgyz Republic is dated and often not functional. There is an urgent need to update and increase the spatial coverage of these systems to move the country's weather services away from low-resolution hydro-meteorological systems, which are less precise and consequently more likely to miss important data on local hazards such as floods, frosts, and storms.

- Farmers will need to transition from the emphasis on inputs, entrenched during the Communist-era (more seeds, more irrigation, and more fertilizer) to a system that is more adept at managing resources in the resource-constrained reality of today. This includes having access to and ability to make use of knowledge on new farming techniques and on using new farming technologies.

This Country Profile *(**http://countryadaptationprofiles.gfdrr.org**) is part of a series of 31 priority country briefs developed by the Global Facility for Disaster Reduction and Recovery (GFDRR) as part of its Disaster Risk Management Plans. The profile synthesizes most relevant data and information for Disaster Risk Reduction and Adaptation to Climate Change and is designed as a quick reference source for development practitioners to better integrate climate resilience in development planning and operations. Sources on climate and climate-related information are linked through the country profile's online dashboard, which is periodically updated to reflect the most recent publicly available climate analysis.*



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KYRGYZ REPUBLIC