

CLIMATE CHANGE AND THE NEW SILK ROAD

Central Asia, which includes Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan, and Uzbekistan, is regionally rich in natural resources such as oil, gas, and water. In Kyrgyzstan and Tajikistan, vast quantities of water exist in mountain glaciers, while significant oil and gas deposits are found largely in Kazakhstan, Turkmenistan, and Uzbekistan. The region is also topographically diverse with sandy deserts and green plains in the north and snow-capped mountain ranges in the south, which supports a diverse species of plants and animals. To secure a sustainable future for these resources and

the people dependent on them, Central Asian countries must address threats to the resilience and productivity of natural resources, socio-economic systems, and human health posed by the adverse effects of climate change. To ensure successful results in integrating local solutions, USAID is strategically aligning the New Silk Road initiative with the United Nations Framework Convention on Climate Change's (UNFCCC) country specific Intended Nationally Determined Contributions (INDC), which aim to address climate change concerns.^{1,2}

This analytical brief looks at 1) regional commitments to the UNFCCC, including specific mitigation and adaptation strategies, 2) Central Asia's CO₂ emission and key sectors, 3) vulnerabilities and risks and 4) official development assistance and activities supporting climate-related development strategies.

Figure 1: Central Asian Countries of Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan, and Uzbekistan



CENTRAL ASIA INTENDED NATIONALLY DETERMINED CONTRIBUTIONS

The INDC outlines each country's intended contributions to climate change adaptation and mitigation and greenhouse gas (GHG) emissions reductions. It cites national policies and initiatives supporting these efforts.³ Prior to the UNFCCC Conference of Parties (COP) 21 held in 2015, the UNFCCC invited all parties to "initiate or intensify domestic preparations" for their respective INDC. To date, UNFCCC records indicate INDC submissions from Kazakhstan (September 28, 2015), Kyrgyzstan (September 29, 2015), Tajikistan (September 30, 2015), and Turkmenistan (September 30, 2015).

Though each country has specific climate change adaptation and mitigation focus areas, interest in addressing climate change concerns and GHG emissions overlap across the region. Energy, water, and land use are highlighted across INDCs for Kazakhstan, Kyrgyzstan, Tajikistan, and Turkmenistan regarding GHG emissions, adaptation, and mitigation.⁴ Uzbekistan has no reported INDC submission.

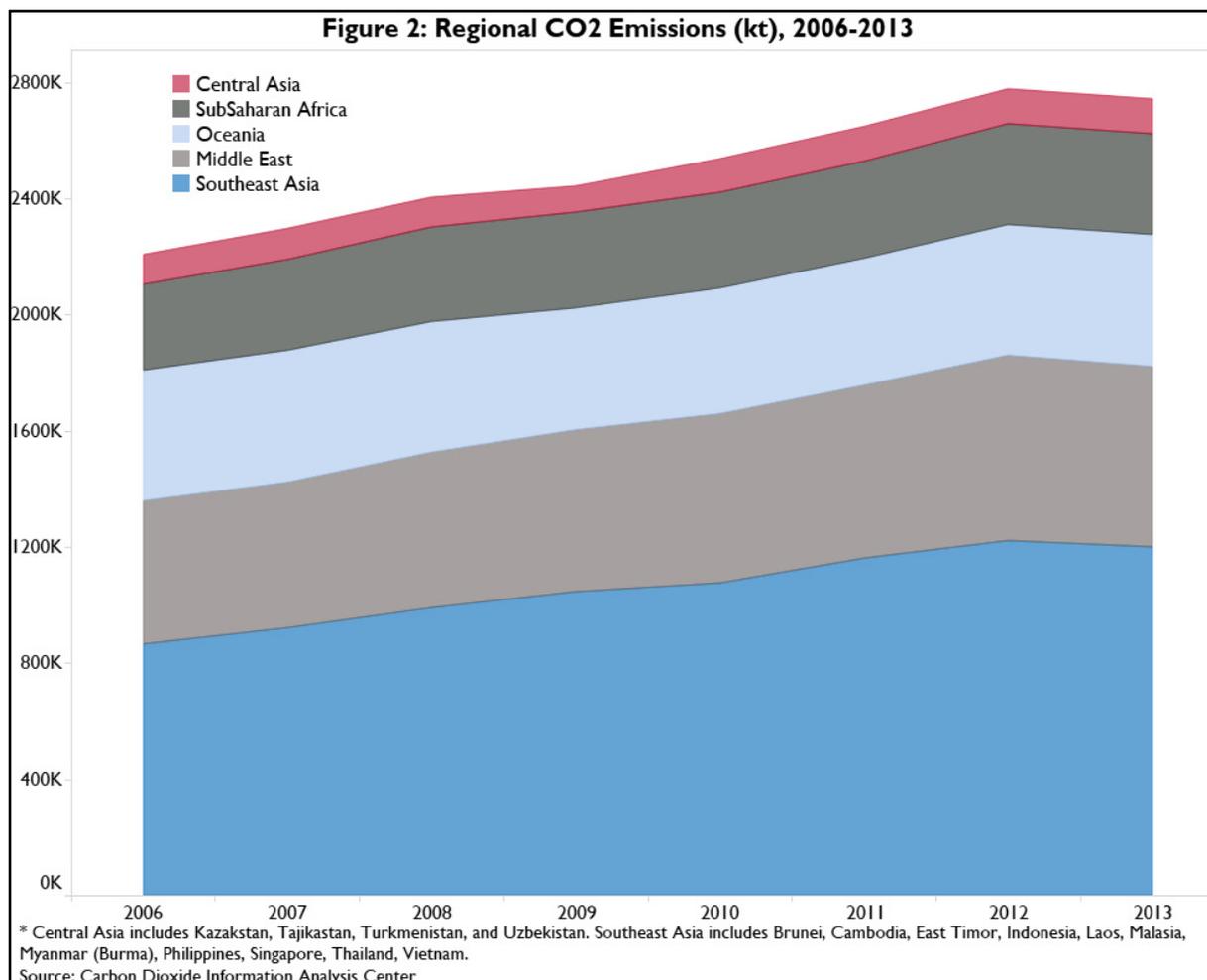


The Kazakhstan INDC indicates a focus on reducing fossil fuel gas emissions and increasing exploration in the wind, solar, and hydropower sectors to reduce GHG emissions by 15-25 percent of 1990 values by 2030.⁵ High investment costs have restricted progress in the wind energy sector. Hydropower potential is available; however, resources for hydro-energy are unevenly distributed across the country and concentrated in Eastern and Southeastern zones. State initiatives supporting Kazakhstan's contribution to decreasing GHG emissions include the Concept on Transition to a Green Economy (including related legislation and acts) and the Program for Energy Industry Development 2030. Uzbekistan, though the largest CO₂ emitter in the region in 2013 from gas fuel consumption, does not have a submitted INDC indicating its contributions to reducing GHG emissions.

The Turkmenistan INDC indicates intentions to stabilize GHG emissions by 2030 with no specified target percentage or baseline. The National Climate Change Strategy of Turkmenistan, approved on June 15, 2012, notes that the country is taking "specific measures on improving the energy efficiency of industrial subsectors," including developing energy savings programs, improving energy consumption accounting, promoting technology modernization, and energy saving training. Kazakhstan, Kyrgyzstan, and Tajikistan have expressed intentions to explore or expand energy from sources such as wind, solar, and hydropower to reduce GHG emissions from energy production.

CARBON DIOXIDE EMISSIONS IN CENTRAL ASIA

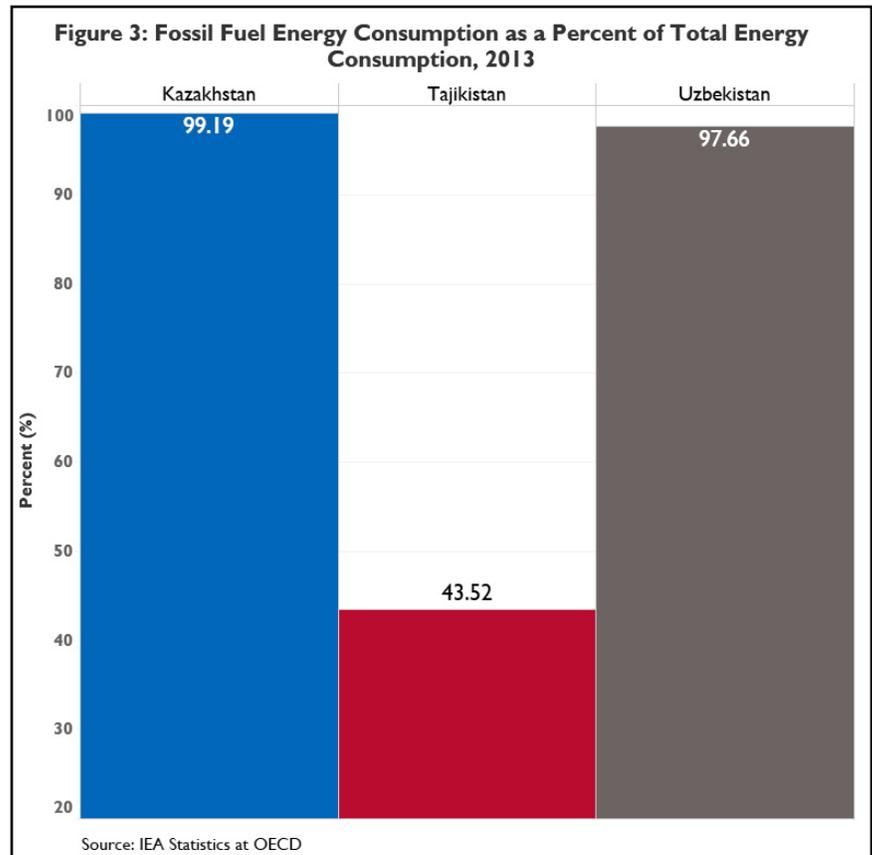
Carbon dioxide, noted in the Intergovernmental Panel on Climate Change (IPCC) Climate Change 2007: Synthesis Report as the "most important anthropogenic GHG," grew by about 24 percent globally between 2006 and 2013. CO₂ emissions follow a similar increasing trend in Central Asia growing by 22 percent within the same time period.



ENERGY AND INDUSTRY

Regionally, the largest amount of CO₂ emissions stems from gas, solid, and liquid fuels. Gas fuels mainly consist of natural gas, liquid fuels from petroleum, and solid fuels from wood and coal. From 2000 to 2008, CO₂ emissions from gas, solid, and liquid fuels and cement production increased in the region. Uzbekistan emits CO₂ mainly from gas and liquid fuels, while Kazakhstan and Kyrgyzstan from solid and liquid fuels and Turkmenistan from gas fuels.

From 2008 to 2013 in Kazakhstan, CO₂ emissions from solid fuels increased by 8 percent, gas fuels by 42 percent, and liquid fuels by 1,954 percent, while fossil fuel energy consumption also increased by 0.2 percent. Since 2008, over 98.9 percent of Kazakhstan's energy consumption has derived from fossil fuels. Unlike Kazakhstan, from 2008 to 2013, Uzbekistan fossil fuel energy consumption decreased by 0.4 percent, while CO₂ emissions from liquid fuels decreased by 38 percent and gas fuels by 12 percent. However, CO₂ emissions increased from solid fuels by 13 percent and from cement production by 6 percent in Uzbekistan from 2008 to 2013. Still, since 2008, over 98 percent of Uzbekistan's energy consumption has derived from fossil fuels. Solid fuels and liquid fuels CO₂ emissions increased by 144 percent and 34 percent respectively in Tajikistan from 2008 to 2013. CO₂ emissions from fossil fuel energy consumption, less than 50 percent of total energy consumption, increased slightly by 5 percent. In Kyrgyzstan, CO₂ emissions from liquid fuel consumption and solid fuel consumption increased by 41 percent and 12 percent respectively from 2008 to 2013. No data are available for Turkmenistan.



Globally, since 2000, CO₂ emissions from manufacturing and construction industries as a percent of total fuel combustion increased from 18 percent to 20 percent despite a constant decrease from previous years. Kazakhstan and Turkmenistan experienced a similar increase in CO₂ emissions from manufacturing and construction, 51 percent and 27 percent respectively, from 2000 to 2013, although industrial value added as a percent of GDP simultaneously decreased for both countries. Uzbekistan, on the other hand, had a slight decrease in CO₂ emissions from manufacturing and construction within the same time span, despite the increase in CO₂ emissions from cement production and a simultaneous increase in industrial value added to GDP. Kyrgyzstan also experienced a 56 percent decrease in CO₂ emissions from manufacturing and construction from 2000 to 2013.

Significant CO₂ emissions are caused by the burning of biomass largely for energy or industrial consumption. Regionally, Central Asia boasts diverse natural resources for industrial consumption including minerals and metals like copper, lead, gold, silver, and uranium. Yet, value added to GDP from industry decreased from 2008 to 2013 in Kazakhstan by 15 percent and from 2008 to 2010 in Turkmenistan by 10 percent. However, it increased in Uzbekistan

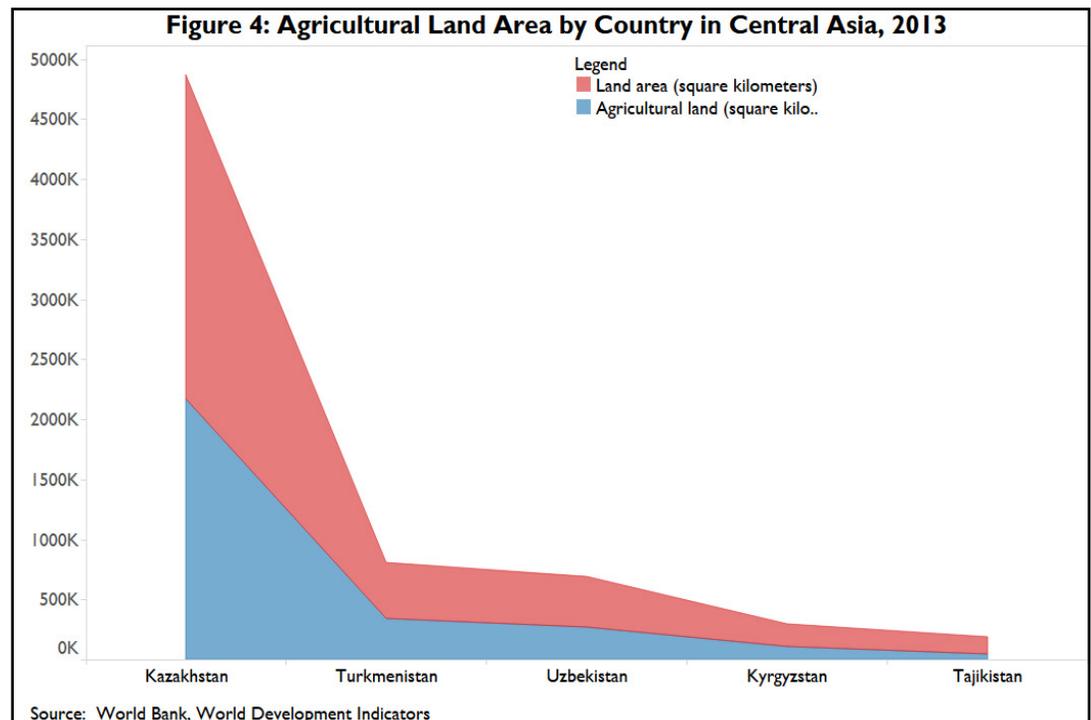
by 8 percent and in Kyrgyzstan by 23 percent from 2008 to 2013. Currently, Kazakhstan's industrial sector is driven largely by mineral and fossil fuel extraction, while Turkmenistan's is driven by the fuel and cotton processing sectors, Uzbekistan's by agriculture and manufacturing, and Kyrgyzstan's by mineral extraction agriculture.

LAND USE

Other sources of CO₂ emissions can result from land use changes. Though significant changes in agricultural land use are not evident from 2000 to 2013 in Central Asia, in 2013, agricultural land accounted for 75 percent of the regional land area, totaling 2,930,629 square kilometers. Cotton and grain remain key agricultural crops and their cultivation for trade and market delivery is highly dependent on access to energy and water. These crops are also susceptible to threats of natural disasters, such as flooding and desertification.

Changes in net GHG emissions from land use can indicate a loss or gain of ecosystem resources available for carbon sequestration, such as forests. Uzbekistan reports negative net values in GHG emissions from land use, indicating CO₂ removal from 2000 to 2012. Land attributed CO₂ removal in Uzbekistan increases by 623 percent between 2000 and 2012. Kazakhstan reports 291 gigagrams of CO₂ emissions from land use in 2000 and 132 gigagrams of CO₂ removal in 2004, indicating a 145 percent

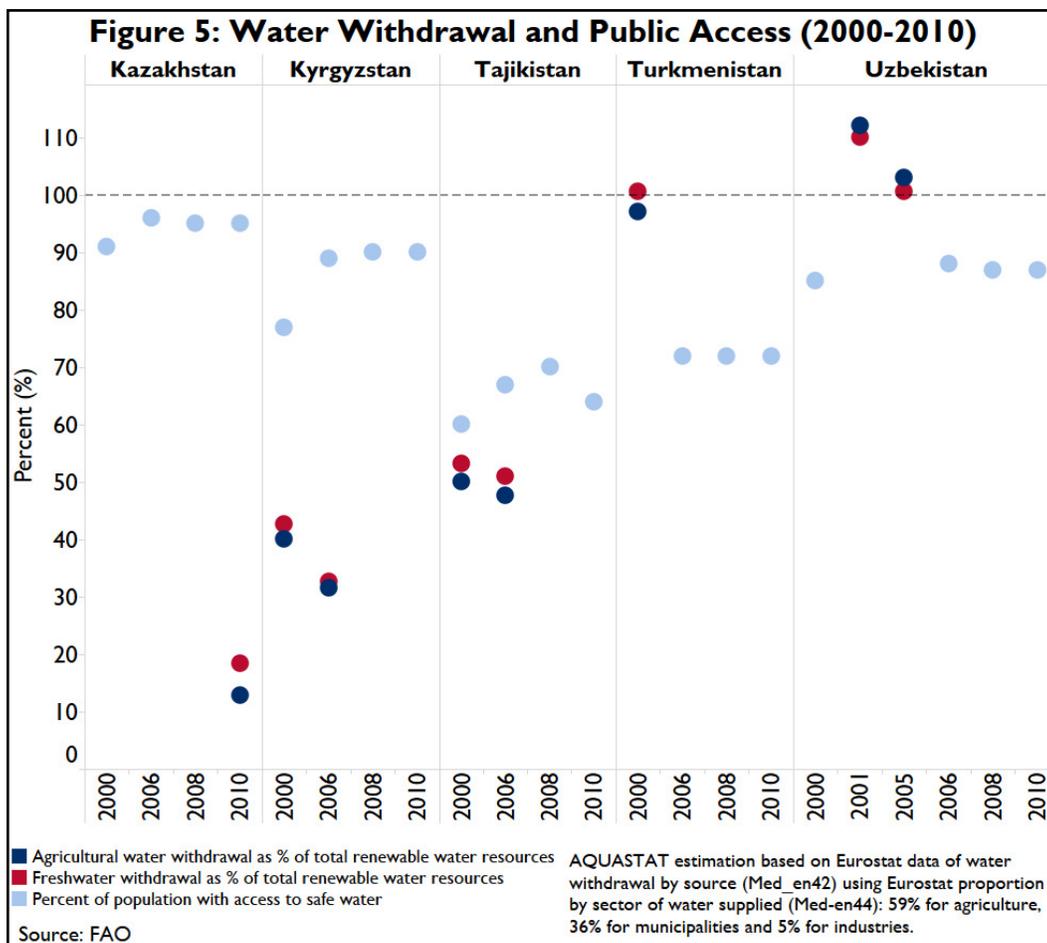
increase in CO₂ removals between 2000 and 2004. Tajikistan reports 92 gigagrams of CO₂ emissions from land use in 2000 but does not report data for 2004, 2006, 2008, or 2012. Turkmenistan also reports 293 gigagrams of net CO₂ removal from land use in 2004. Kyrgyzstan reports a 68 percent decrease in CO₂ removal from land use change from 2004 to 2012. Regionally, total net values in CO₂ emission from land use by year do not significantly offset industrial CO₂ emissions for the corresponding year and actually contribute to industrial CO₂ gas emissions in 2004.



WATER

Water is a fluctuating cross-cutting resource across Central Asia. Water availability and quality impacts energy, agriculture, and public health, and are INDC focus areas for climate change adaptation or mitigation in Kazakhstan, the Kyrgyz Republic, Tajikistan, and Turkmenistan.

Turkmenistan and Uzbekistan either nearly reached or exceeded 100 percent of their renewable freshwater withdrawals between 2000 and 2006, largely for agriculture. Freshwater withdrawals exceed those needed for agriculture



between 2000 and 2011 for Kazakhstan, Kyrgyzstan, and Tajikistan, which indicate increasing hydropower developments to reduce GHG emissions from energy production in either an INDC or INDC referenced document. Safe access to drinking water, an indicator of public health, is at or above 90 percent in 2010 for Kazakhstan and Kyrgyzstan, 62 percent in Tajikistan, 70 percent in Turkmenistan, and 80 percent in Uzbekistan.

Energy generation and water resources play key roles in the development of the industrial, agricultural, and public health sectors of each country in Central Asia. For in-depth information on energy production and the New Silk Road, see M/CIO

EADS’s Analytical Brief on Energy on the New Silk Road.⁶ For in-depth information on water in Central Asia see M/CIO EADS’s Analytical Brief on Water and the New Silk Road.⁷

USAID’s Central Asia Regional mission works closely with Central Asian governments through the “New Silk Road” initiative to improve the economic and transit connections for resources like energy and water, as well as those supporting adaptation to and mitigation of natural disasters such as floods and desertification (including human resources).

VULNERABILITIES AND RISKS

Meteorological and geological changes pose risks to water quality and availability, soil quality, and human health and impact social and economic development.

Figure 6: Risks to Water Quality and Availability, Soil Quality, Human Health and Development (per INDC)

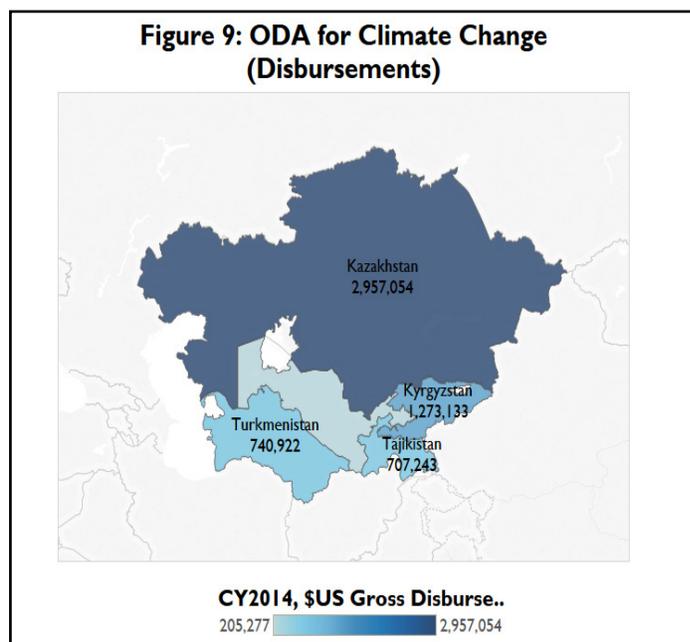
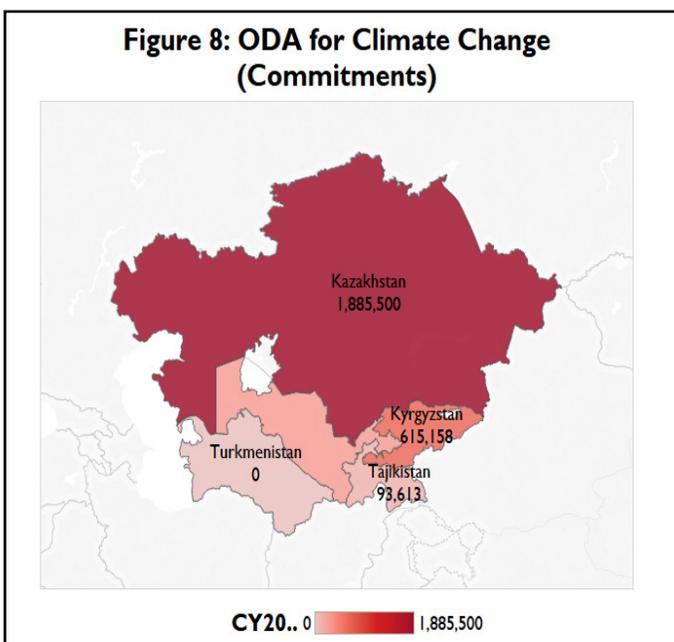
Kazakhstan	Kyrgyzstan	Tajikistan	Turkmenistan
water flow reductions	groundwater	droughts	floods and mudflows
decreased holding capacity	water balance and geomorphologic fluctuations	floods	droughts
		landslides	duststorms

Tajikistan reports, per million, 480,000 people in 2000 and 108,489 people in 2008 affected by droughts, 271,223 people in 2008 affected by extreme temperatures and 58,997 people affected by floods in 2005. Uzbekistan reports, also per million, 24,089 people in 2000 impacted by droughts. Most recent 2015 data show natural disaster impacts on humans from earthquakes and floods in Kazakhstan and Tajikistan. Trends in the number of humans affected by natural disasters in Central Asia are difficult to determine due to a lack of publically available data.

In extreme cases, meteorological and geological changes can cause death. Though data are sparse between 2000 and 2015, Tajikistan reports deaths by percent population from flood disasters, landslides, earthquakes, extreme temperatures and biological disasters over 11 years; Kazakhstan reports deaths from flood disasters, landslides, extreme temperatures, and earthquakes also over seven years. Turkmenistan and Uzbekistan both report on deaths from earthquake disasters for one year from 2000 to 2015. Kyrgyzstan reports deaths from landslides, floods, earthquakes, extreme temperatures, and earthquakes over seven years. Deaths across these countries due to extreme meteorological or geological changes do not exceed 0.20 percent of the population for any country in any year. Kazakhstan, Kyrgyzstan, Tajikistan, and Turkmenistan indicate possessing climate change mitigation policies or procedures (including those related to human safety) in an INDC or INDC referenced document.

OFFICIAL DEVELOPMENT ASSISTANCE IN CENTRAL ASIA

Official development assistance (ODA) is available for Central Asia from both bilateral and multi-lateral donors and provides financing for key development issues such as climate change adaptation and mitigation and the reduction of GHG emissions. The most recent 2014 ODA data are from the Organisation for Economic Co-operation and Development (OECD). In 2014, regional bilateral assistance to South and Central Asia, including Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan, and Uzbekistan, averaged 16.1 percent of total ODA (\$137, 222.1 US million). Total ODA from multilateral agencies and major OECD donor countries for Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan, and Uzbekistan is around \$2174.76 US million. The US government provides \$127.6 US million of this funding.



The US government's commitment to addressing climate change is evident through the financing of activities having components in biodiversity, climate change mitigation, and adaptation, and general environment activities. United States ODA activities with climate change related components totaled \$3,117.72 US million – \$856.22 US million

in biodiversity, \$605.02 US million in climate change mitigation, \$388.33 US million in climate change adaptation, and \$1,267.25 US million in general environment areas in 2014.⁸ USAID supported government efforts to tackle climate change in 2014 with \$1.1 US billion in funding. In Central Asia, USAID implements ODA projects in key sectors at risk to address climate change in the areas of energy, agriculture, environment, health and trade totaling \$2,832,504 in commitments for the calendar year 2014, plus \$5,883,629 in disbursements from the calendar year 2014 or earlier.

CONCLUSION

Central Asia boasts diversity in topography, extractable energy and water sources, plants, and animals. To preserve these resources and the livelihoods of people that depend on them, particularly during disastrous climate impacts, USAID's Central Asia Regional mission is focusing on improving regional trade and markets in energy and water, secured by effective governance and INDC implementation. Regionally targeted activities include reducing emissions via land use and industrial output changes, exploring clean and renewable energies, and identifying and implementing appropriate adaptation and mitigation strategies for improved, uncontaminated agricultural and water outputs. Through accurate identification of risks, vulnerabilities, and opportunities, USAID assists the governments of Central Asia in achieving improvements in the application of local solutions and development assistance in addressing climate change.

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To access the data, please visit the EADS International Data & Economic Analysis (IDEA) website at idea.usaid.gov.

DISCLAIMER: The author's views expressed in this publication do not necessarily reflect the views of the United States Agency for International Development (USAID) or the United States Government

ENDNOTES

1 United Nations. United Nations Framework Convention on Climate Change (1992)

2 United States Agency for International Development. USAID 2012-2019 Climate Change & Development Strategy (January 2012)

3 UNFCCC Intended Nationally Determined Contributions. http://unfccc.int/focus/indc_portal/items/8766.php, accessed November 2016.

4 UNFCCC Intended Nationally Determined Contributions - Kazakhstan INDC, http://www4.unfccc.int/Submissions/INDC/Published20Documents/Kazakhstan/1/INDC20Kz_eng.pdf; Tajikistan INDC, <http://www4.unfccc.int/Submissions/INDC/Published20Documents/Tajikistan/1/INDC-TJK20final20ENG.pdf>; Turkmenistan INDC, http://www4.unfccc.int/Submissions/INDC/Published20Documents/Turkmenistan/1/INDC_Turkmenistan.pdf, accessed November 2016.

5 Kazakhstan's Second National Communication to the Conference of the Parties of the United Nations Framework Convention on Climate Change, Astana, 2009.

6 United States Agency for International Development. USAID/M/CIO/EADS, Analytical Brief: Energy on the New Silk Road (August, 2016)

7 United States Agency for International Development. USAID/M/CIO/EADS, Analytical Brief: Water Along the New Silk Road, August, 2016

8 http://www.fao.org/fileadmin/templates/lead/pdf/cis_donors_en.pdf