



# Turkmenistan

## Overview of Climate Change Activities



October 2013

This **Overview of Climate Change Activities in Turkmenistan\*** is part of a series of country notes for five Central Asian countries that summarize climate portfolio in a number of sectors, namely agriculture, forestry, water, health, energy, and transport. This note further provides a brief overview of Turkmenistan’s climate context in terms of observed impacts and historical trends as well as climate projections specific to sectors that are considered to be essential to the country’s economic development. Finally, the note assesses national policy and institutional context related to climate change as well as suggests potential ways forward that could help Turkmenistan mainstream climate considerations into development activities and planning and create public demand for climate actions.

*\*This note draws upon publicly available Web information and publications, including the World Bank Climate Change Knowledge Portal, and is intended to provide an overview of development partners’ climate portfolio over the past five years.*

### Fact Sheet: Climate Change Exposure in Turkmenistan

- Over 80 percent of Turkmenistan’s territory is covered by deserts and semideserts and 20 percent by mountains.
- Turkmenistan has a continental and extremely dry and hot climate.
- Meteorological data series show a steady increase in average mean temperature of 1.4°C since the 1950s.
- Trends show that the amount of precipitation during recent years has slightly increased, particularly in spring months, with the lowest precipitation values being observed in summer.
- By 2040, atmospheric air temperature is expected to increase by 2°C across the entire territory of Turkmenistan. By 2100, projections suggest that the rate of temperature increase could intensify even further.
- By 2040, the precipitation is expected to slightly increase, whereas between 2040 and 2100, the precipitation is expected to decrease by 8–17 percent, which, coupled with the increase in temperature increase, will lead to a decrease in total volume of water availability.
- Extreme climate events in Turkmenistan may manifest themselves in the increase in number of flash runoffs and mudflows (10 percent annually), heavy rains (5 percent annually) and intense heat periods (1.6 percent annually).

### Looking Ahead

Based on the review of national climate context, related challenges, and existing programs and policies, the following areas have been identified for urgent initial actions:

- **Improve** science-based understanding of the nature and magnitude of physical and biophysical climate change impacts under differing scenarios. This will be important in order to gain a better understanding of the timing and magnitude of incidence of several important indicators of climate change in the future as well as of the key vulnerabilities, development impact, and possible adaptation responses.
- **Estimate** cost of inaction as well as key actions across water resources, energy, agriculture, forestry, transport, and health sectors to provide compelling economic arguments and a broad-brush “road map” and the next steps for climate-smart actions.
- **Design** and implement climate-smart solutions across sectors in the country as well as for the regional-scale cooperation among countries of the Central Asia region and emphasize the benefits of collaboration and institution building in the region.
- **Reinforce** the mission and strengthen the capacity of the existing State Commission on Climate Change by establishing a cross-sectoral technical working group that would ensure the implementation of policies and actions on the ground.
- **Establish** (or use an existing mechanism) a Regional Central Asian Steering Committee on Climate Change, comprising high-level representatives from the five Central Asian countries. The committee’s main responsibilities would be to provide overall guidance, political support, and leadership and to serve as a platform for continuous coordination of regional efforts to address and adapt to climate change.

### Turkmenistan at a Glance\*\*

Population (million): 5.173 (2012)  
 GDP (current US\$ billion): 33.68 (2012)  
 GDP per capita (current US\$) / GDP growth (%): 6,510 / 11 (2012)  
 CO<sub>2</sub> emissions (kt): 53,054.2 (2010)  
 CO<sub>2</sub> emissions (% of world CO<sub>2</sub> emissions): 0.16 (2010)

\*\*Based on World Development Indicators, World Bank (<http://data.worldbank.org>)

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## **I Climate Context: Understanding the Implications**

### ***Overview and Historical Trends***

Turkmenistan is located in the west of Central Asia between the Caspian Sea and the Amudarya River. Turkmenistan borders Kazakhstan to the north, Uzbekistan to the northeast and east, Afghanistan to the southeast, and Iran to the south. Approximately 80 percent of its territory is covered by deserts and semideserts and 20 percent by mountains.

Turkmenistan has a sharply continental and extremely dry and hot climate.<sup>1</sup> Despite the desert nature that is distinctive for most of Turkmenistan, there are significant differences in

average temperature in the northern and southern parts of the country. The northern part, located in the Siberian anticyclone area, is characterized by severe and long winters with continuous snow cover and average yearly temperatures fluctuating between 13°C and 16°C. The southern part of the country, on the other hand, is characterized by mild winters with only occasional snow cover and average yearly temperatures ranging between 18°C and 22°C.<sup>2</sup> In the warm period of the year (from May to September), the daily air temperature often exceeds 40°C, and has occasionally even surpassed 50°C (in Repetek, southeast Garagum Desert). Meanwhile, during the coldest part of the year, temperatures are usually below zero °C and have even been recorded at levels as low as -36°C (in Dashoguz velayat).<sup>3</sup> In terms of the historical trends related to the average mean temperature, meteorological data series show a steady increase of 1.4°C since the 1950s.<sup>4</sup>

As is the case for the average mean temperature, the annual precipitation across Turkmenistan also varies greatly, ranging from 76 millimeters to 380 millimeters. In the northern part of the country, most of the precipitation occurs in the periods from March to May and from October to February, with the summer months experiencing quite low levels of precipitation, accounting for only 8.4 percent of the total annual amount.<sup>5</sup> In the southern parts of Turkmenistan, much of the precipitation falls between December and April (87.8 percent of the total annual amount), with quite low levels seen during the summer months (only 1.9 percent of the total amount). In addition, while in desert areas experience precipitation only in the winter, the mountainous areas are characterized by a high frequency of

<sup>1</sup> Second National Communication of Turkmenistan to the United Nations Framework Convention on Climate Change (UNFCCC), 2010.

<sup>2</sup> Ibid.

<sup>3</sup> Ibid.

<sup>4</sup> Turkmenistan Climate Adaptation Profile, Climate Change Knowledge Portal.

[http://sdwebx.worldbank.org/climateportalb/home.cfm?page=country\\_profile&CCCode=TKM](http://sdwebx.worldbank.org/climateportalb/home.cfm?page=country_profile&CCCode=TKM).

<sup>5</sup> Second National Communication of Turkmenistan to the UNFCCC.

precipitation throughout the year, often causing flash floods and mudflows.<sup>6</sup> Trends show that variability in monthly precipitation has been growing and that the amount of precipitation during recent years has slightly increased, particularly in spring months, with the lowest precipitation values being observed in summer.<sup>7</sup>

### ***Climate Projections***

According to the National Climate Change Strategy of Turkmenistan, published in 2012, climate change is expected to result in an increase in air temperature, a reduction in the amount of precipitation, and an increase in the frequency and magnitude of natural hydrometeorological phenomena. The summary of climate projections for Turkmenistan is as follows:

- By 2040, atmospheric air temperature is expected to increase by 2°C across the entire country. The rate of temperature increase could possibly intensify even further after 2040.<sup>8</sup> Such a rise in temperature is expected to have significant impacts on the socioeconomic development of the country by affecting its priority sectors, such as agriculture, water, and health.
- Precipitation is expected to increase (somewhat insignificantly) by 2040. However, between 2040 and 2100, precipitation is expected to decrease by 8–17 percent, which, coupled with the increase in temperature, will lead to a decrease in total volume of water availability. The Amudarya River runoff (the main source of Turkmenistan’s surface water) is expected to decline by 10–15 percent by 2050. Other rivers’ (Murgab, Tedjen, and Etrek) runoff is expected to decline by 5–8 percent by 2030. Climate change is therefore likely to reduce the volume of water available for irrigation, and consequently limit the amount of crops produced.<sup>9</sup>
- Extreme weather events are expected to increase in their frequency and magnitude. In particular, climate change in Turkmenistan will manifest itself in the increase in number of flash floods and mudflows (10 percent annually), heavy rains (5 percent annually), and intense heat periods (1.6 percent annually).<sup>10</sup>

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<sup>6</sup> Ibid.

<sup>7</sup> Turkmenistan Climate Adaptation Profile, Climate Change Knowledge Portal.  
[http://sdwebx.worldbank.org/climateportalb/home.cfm?page=country\\_profile&CCCode=TKM](http://sdwebx.worldbank.org/climateportalb/home.cfm?page=country_profile&CCCode=TKM).

<sup>8</sup> Ibid.

<sup>9</sup> Second National Communication of Turkmenistan to the UNFCCC.

<sup>10</sup> Turkmenistan Climate Adaptation Profile, Climate Change Knowledge Portal.  
[http://sdwebx.worldbank.org/climateportalb/home.cfm?page=country\\_profile&CCCode=TKM](http://sdwebx.worldbank.org/climateportalb/home.cfm?page=country_profile&CCCode=TKM).

## II National Policy and Institutional Context for Addressing and Adapting to Climate Change

### *Policies*

There are several important legal documents and recent policy developments that form a good basis for Turkmenistan’s aspiration to mainstream low-carbon, climate-resilient considerations into its broader sustainable development objectives.

The government of Turkmenistan approved the **National Climate Change Strategy** in 2012 that lays out the policy framework for building climate resilience and low-emission economy in Turkmenistan. The strategy prioritizes a number of sector-tailored measures to ensure mitigation and adaptation responses from key economic areas—such as oil and gas, power engineering, construction, water, agriculture, and the like—with the key objective to improve the identification and assessment of climate change impacts, with a focus on development, infrastructure, and economic security.

Turkmenistan signed and ratified the **United Nations Framework Convention on Climate Change** (UNFCCC) in 1995. In order to meet its commitments under the Convention, the following activities have been carried out: national inventory of greenhouse gas (GHG) emissions and removals by sinks, vulnerability analysis of the ecosystems and the economy, adaptation recommendations, and mitigation analysis (assessed potential measures in various sectors of the economy), to name a few. The First and Second National Communications on climate change were submitted in 2006 and 2010, respectively.

#### **Legal Basis for Implementation of the United Nations Framework Convention on Climate Change (UNFCCC) and the Kyoto Protocol in Turkmenistan**

Turkmenistan ratified the UNFCCC in 1995 and the Kyoto Protocol in 1998, following which a State Commission on Climate Change was created to ensure the implementation of the country’s obligations under the Convention. In addition, Turkmenistan established a designated national authority (DNA) for clean development mechanism (CDM) under the Ministry of Nature Protection.

After the ratification of the Convention, Turkmenistan produced two national communications (in 2000 and 2010 respectively). The Third National Communication to the UNFCCC is under preparation.

*Source:* Second National Communication of Turkmenistan to the UNFCCC, 2010.

The **Second National Communication of Turkmenistan to the UNFCCC** was prepared by the Ministry of Nature Protection, which is responsible for implementing international environmental programs and

conventions in the country, in close collaboration with other ministries and departments and with the active involvement of the National Hydrometeorology Committee under Turkmenistan's Cabinet of Ministers. The Second National Communication outlines expected climatic change impacts for the country until 2100. It also provides sector-specific implications of climate change and prioritizes the country's policy measures and actions, mostly related to climate change mitigation in a number of sectors.

Furthermore, the government of Turkmenistan has invested significant efforts in reducing GHG emissions by adopting **several mitigation policies** and committing itself to (a) increase the efficiency of fuel utilization at power plants by means of modernizing the fossil combustion systems, (b) increase the share of natural gas in the energy balance, (c) increase renewable non-fossil sources of energy in the energy balance, (d) improve the energy efficiency in municipal services, (e) modernize heating systems in the industry sector, and (f) carry out measures on energy saving in the residential sector and industry.

In terms of the **policy framework related to climate change adaptation**, Turkmenistan has initiated a few policy documents that aim to improve its agricultural and forest management practices, advance socioeconomic reforms, and enhance policies related to monitoring and management of the hydromet services.

Despite the policy developments that have taken place in Turkmenistan regarding its efforts to have a solid legislative basis for climate change mitigation and adaptation actions, there are several challenges in this area, namely insufficient coordination and harmonization among existing and forthcoming legislative documents as well as the lack of implementation and enforcement of policies and secondary legislation.

### ***Institutions***

The institutional framework for addressing climate change in Turkmenistan consists of a number of ministries and agencies, each focusing on different aspects of this complex and multisectoral issue. Among others, they include the Ministry of Nature Protection, Ministry of Agriculture, Ministry of Water Management, Ministry of Energy and Industry, and National Hydrometeorology Committee. With quite a number of policies and institutions and ministries involved, however, there is some interministerial collaboration on climate change that needs further strengthening.

The **Ministry of Nature Protection** is responsible for coordination of the Convention-based environmental activities of various ministries and departments, implementation of environmental programs and projects and preparation of materials to be considered at the meetings of the State Commission. The **National Institute of Deserts, Flora and Fauna (NIDFF)**, under the Ministry of Nature Protection, conducts and coordinates fundamental and applied research work in the area of flora and fauna preservation as well as on the issues of combating desertification, environmental protection, and monitoring and rational management of natural resources. The **Center of Ecological Monitoring**, within the NIDFF structure, functions to conduct observations of environmental pollution and implement a complex of measures directed on environmental conservation and rational use of its resources. In 1997,

the **Center to Combat Desertification** was established at the NIDFF to coordinate and carry out the measures required for implementation of the Convention to Combat Desertification.

The **State Commission on Climate Change** is an interagency structure that coordinates and controls activities of all concerned ministries, departments, and organizations in regard to climate change policies development and implementation. The commission is also the focal point for the implementation of activities under the UNFCCC and other international conventions.<sup>11</sup> The State Commission's specific roles are to

- Organize development of national programs and action plans on environmental protection and rational nature use issues, in compliance with UN environmental conventions and programs;
- Participate in development of legal and regulatory acts on nature use and environmental protection;
- Draft national reports on implementation of commitments arising from UN environmental conventions and programs;
- Prepare proposals to reflect Turkmenistan's position at conference sessions of UN environmental conventions parties and international programs related to environmental protection and rational nature use; and
- Coordinate activities of ministries and departments within the framework of UN conventions and programs on rational nature use and environmental protection.<sup>12</sup>

The **National Hydrometeorology Committee** conducts meteorological, hydrological, and agrometeorological monitoring through lake and sea analyses, ozone and radiation measuring activities, and pollution monitoring.

Even though there is a formal institutional structure in support of the country's actions aimed at achieving low-carbon, climate-resilient development, the roles of the Ministry of Nature Protection and the State Commission are limited and are not clearly defined. In order to enhance collaboration among the relevant ministries and agencies dealing with climate change issues and for ensuring effective implementation of priority measures and to monitor results, there is a need to improve and clarify the roles and responsibilities of the interdepartmental State Commission, as well as clarify its legal status, its mandate, and the rules for its operation.

### **III Overview of Development Partners' Engagement in Climate-Sensitive Sectors**

According to the Second National Communication of Turkmenistan to the UNFCCC, the main climate change risks for the country are those related to human health, agriculture, and water resource management.

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<sup>11</sup> Ministry of Nature Protection of Turkmenistan, "Turkmenistan: Capacity Building Strategy to Implement the UN Global Environmental Conventions" (Ashgabat, 2007).

<sup>12</sup> Ibid.

International development partners are implementing several adaptation and mitigation projects in a number of climate-sensitive sectors. These, to some extent uncoordinated efforts, do not necessarily address all the challenges that the country is facing on its path to low-carbon, climate-resilient development. In this regard, an additional level of screening of climate portfolio, which will include the identification of gaps, outline future national and regional actions, and estimate the investment resources, is needed.

In the following sections, a brief overview of the development partners' major projects and activities is presented.<sup>13</sup>

## **Energy**

Turkmenistan has the largest proven gas reserves of any of the former Soviet republics, apart from the Russian Federation, with gas resources being estimated at 22.9 trillion cubic meters.<sup>14</sup> The energy sector accounts for a significant percentage (87 percent in 2004) of total GHG emissions in the country, with the following distribution within the sector: oil and natural gas complex (51.8 percent), population (19.4 percent), electric power industry (15.4 percent), residential and municipal sector (5.3 percent), and transport (4.5 percent).<sup>15</sup> Turkmenistan uses 3,933 kilograms of oil equivalent per capita, making per capita energy use significantly higher than that of the Kyrgyz Republic, Tajikistan, and Uzbekistan, although slightly lower than Kazakhstan. Overall, Turkmenistan ranks sixth highest in energy intensity in all of Europe and Central Asia.<sup>16</sup> Because Turkmenistan is rich in energy sources, the focus of the country's energy policies and measures related to climate change is on mitigation. The main challenge is to overcome the lack of incentives for improvements in energy efficiency and scale-up of renewable energy sources given the high volume of energy subsidies (which are equal to approximately US\$5 billion).<sup>17</sup> Reducing subsidies to the energy sector and incorporating renewable energies into its energy mix would reduce not only GHG emissions but also volatility and risk in Turkmenistan's energy sector.<sup>18</sup>

The **Asian Development Bank** (ADB) has provided technical assistance to prepare feasibility studies and a master plan for the Afghanistan and Turkmenistan: Regional Power Interconnection Project. The Regional Power Interconnection Project is expected to address electric supply needs in Afghanistan and electric infrastructure development and export plans in Turkmenistan. The **United Nations Development Programme** (UNDP) is implementing the project Improving Energy Efficiency in the Residential Buildings Sector of Turkmenistan. This project will help reduce GHG emissions by improving energy management and reducing energy consumption in the residential sector. The project aims at strengthening incentives and capacity to build highly energy efficient buildings, develop capacity at Turkmenogas to identify end-use energy savings in its housing stock and implement investments to reduce end-use energy consumption, introduce improved highly efficient design measures to major

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<sup>13</sup> The overview of development partners' climate portfolio in Turkmenistan is based on publicly available Web information and is not meant to be comprehensive.. It is intended to provide an overview of the main climate-related activities that have been supported by the development partners over the past five years. For more information on the specific projects, refer to respective institutional websites.

<sup>14</sup> Second National Communication of Turkmenistan to the UNFCCC.

<sup>15</sup> Ibid.

<sup>16</sup> Uwe Deichmann and Fan Zhang, *Growing Green: The Economic Benefits of Climate Action* (Washington, DC: World Bank, 2013).

<sup>17</sup> Ibid.

<sup>18</sup> Ibid.

housing designers and developers, and replicate these measures through protocols for energy-saving measures in prototype buildings and through mainstreaming energy-efficiency issues into policies and programs.

## **Agriculture**

Agricultural production generates about 20 percent of Turkmenistan's gross domestic product (GDP); therefore, it is a basis for the country's food security and an important supplier of raw materials for the processing industry. The main agricultural products are cotton and wheat, followed by vegetables and fruit. Pastures also occupy a quite large territory of the country, accounting for 78 percent of soil reserves. Since the agriculture sector is heavily dependent on irrigation (with 1.7 million hectares being irrigated), increasing temperatures, a decrease in precipitation, and the probable reduction in surface water are all likely to lead to an increase in aridity and accelerate desertification. Due to expected water scarcity, a decrease and degradation of natural grasslands is also expected, ultimately leading to a decline in sheep-breeding production.<sup>19</sup>

The main international organizations involved in sustainable agricultural development in Turkmenistan are the Food and Agriculture Organization and the United Nations Development Programme. The **Food and Agriculture Organization** (FAO) is mostly implementing regional projects aimed at improving irrigation, planting techniques, and capacity, to which Turkmenistan is one of the beneficiaries. Examples of such projects include improving management of migratory and other locusts in the Caucasus and Central Asia through national and regional locust management in the Caucasus and Central Asia through regional cooperation; Conservation Agriculture and Resource Conserving Technologies for Irrigated areas in Azerbaijan, Kazakhstan, Uzbekistan, and Turkmenistan; Central Asia Regional Programme for Fisheries and Aquaculture Development; and the Initiative for Pesticides and Pest Management in Central Asia and Turkey, to name a few.

## **Forestry**

An area of 8.8 percent (approximately 4,127,000 hectares) of Turkmenistan is forested, containing 12 million metric tons of carbon in living forest biomass. Forests, in the arid climate of Turkmenistan, are of particular ecological importance. All forests are classified as primary, and the removal of timber only takes place in the context of sanitary felling, amounting to no more than 30,000 to 50,000 cubic meters per year. Natural gas is provided to the population free of charge, which resulted in a significant decrease in unauthorized felling. Cattle grazing is also restricted in areas where it could damage forest growth and development, particularly in young forest areas.<sup>20</sup> Climate change is projected to significantly affect forests in Turkmenistan and increase the risk of forest fires, pests, and diseases. Almost all climate change models predict that the dry season will become longer and dryer, creating the conditions for more forest fires.<sup>21</sup> Changing temperature and precipitation patterns may also change

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<sup>19</sup> Second National Communication of Turkmenistan to the UNFCCC).

<sup>20</sup> FAO report on Turkmenistan. <http://www.fao.org/docrep/014/k9589e/k9589e15.pdf>.

<sup>21</sup> Turkmenistan Climate Adaptation Profile, Climate Change Knowledge Portal. [http://sdwebx.worldbank.org/climateportalb/home.cfm?page=country\\_profile&CCCode=TKM](http://sdwebx.worldbank.org/climateportalb/home.cfm?page=country_profile&CCCode=TKM).



forest growth rates and impact the carbon storage capacity of forests in the country.<sup>22</sup>

Following through on the ambitious National Forest Program, Turkmenistan has begun a large project involving planting 3 million trees in 2013. Half of that number will span the 100-kilometer stretch between the towns of Anau and Baharly in the country's south, while the other 1.5 million saplings are to be planted by local authorities across the republic's five regions. The planting will comprise unspecified deciduous, coniferous, and fruit trees, as well as grapevine, all of which are to be provided with sufficient irrigation, and will help address desertification, which remains a pressing issue for the country in which more than 70 percent is occupied by the Karakum Desert.<sup>23</sup> The most active international development partners in forestry-related activities in Turkmenistan are the **FAO** and the **German Federal Enterprise for International Cooperation (GIZ)**. Since 2002, GIZ has been implementing a project for the sustainable management of pasture and forest resources in Turkmenistan commissioned by the German Federal Ministry for Economic Cooperation and Development (BMZ) and recently co-funded by the European Union. This project, scheduled to end in September 2015, aims to enhance the sustainable management of pasture, forest, and wildlife resources in an economically viable, socially acceptable, and ecologically sustainable way.

## **Water**

The total volume of water resources in Turkmenistan is 25 cubic kilometers per average annual water content, with the Amudarya River providing approximately 90 percent of the total surface water resources. The flow of Turkmenistan's main rivers is formed in neighboring countries and, as such, is subject to international water allocation agreements. Due to inefficient use of water resources, Turkmenistan is already facing water shortages that are only expected to be exacerbated by the impacts of climate change, namely increased temperatures and decreased precipitation that will result in increased water demand (mostly for irrigation) and decreased water supply.<sup>24</sup> Estimates suggest that the Amudarya River is likely to decrease by 10–15 percent, whereas expected reductions in flow for the Tejen, Murgab, and Etrek Rivers is 8–10 percent. Since the water is mostly being used for the agriculture sector (91.2 percent)—followed by industry (6.3 percent), domestic needs (1.9 percent), fish industry (0.1 percent), and other (0.6 percent)—a reduction in water flows will in turn have severe impacts on the agriculture sector, especially the country's cotton production.

There is significant overlap between international development partners' agriculture-related activities and water-related activities. One example is the **UNDP's** project Addressing Climate Change Risks to Farming Systems in Turkmenistan at the National and Community Level, with the main objective to strengthen water management practices at both local and national levels in response to climate change-induced water scarcity risks that are increasingly affecting farming systems in Turkmenistan. This project is expected to assess and deliver concrete water adaptation measures to local vulnerable communities in the three typical agroecological regions, while also strengthening national-level water legislation and pricing to ensure water availability for the non-state sector farmers.

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<sup>22</sup> Deichmann, Uwe, and Fan Zhang. *Growing Green: The Economic Benefits of Climate Action*.

<sup>23</sup> "Desert Turkmenistan to Plant 3 Mln Trees." <http://en.ria.ru/world/20130223/179642056.html>.

<sup>24</sup> Second National Communication of Turkmenistan to the UNFCCC.

## **Transport**

The transport sector in Turkmenistan involves the automobile, railway, air, river, sea, and pipeline transport networks. As such, the sector is seen to be an integral part of the economic development. The particular development challenges and goals in the transport sector outlined in the Turkmenistan state development programs include a significant planned increase in the contribution of the transport sector to the GDP, the provision of access to domestic and world markets through a modern and well-managed transport infrastructure, and the accession and implementation of international conventions in the field of transport and trade facilitation.<sup>25</sup> Climate change could have severe impacts on transport infrastructure in Turkmenistan due to more frequent heat waves and floods, extreme weather events, and changes in water levels in the Caspian Sea.<sup>26</sup> In the Cheleken Peninsula, seawater from the Caspian Sea has already submerged roads as well as some industrial infrastructure.<sup>27</sup>

The **ADB** is implementing the North-South Railway Project, which is expected to improve Turkmenistan's accessibility to Kazakhstan, the Persian Gulf countries, the Russian Federation, and South Asia. It will also increase regional trade. The project will contribute to sustainable economic growth in Turkmenistan and the development of an integrated and efficient railway system in the region. The project will reduce transport costs, cut travel times and improve accessibility to rural areas of the country, and ultimately generate benefits beyond savings in railway transport costs and time.

## **Health**

According to the Second National Communication of Turkmenistan to the UNFCCC, health is one of the key sectors that will be most impacted by climate change. Overall, it is expected that human health in the country will be affected by an increasing number and magnitude of extreme weather events, air pollution, water shortages, and increasing temperatures.<sup>28</sup> Main manifestations in the degradation of human health are expected to include an increasing threat of heat stroke, cardiovascular and respiratory system diseases, water-borne diseases, renal diseases, nervous system diseases, diabetes, and epilepsy.<sup>29</sup>

The **World Bank Group** actively engaged with the government of Turkmenistan on a project focused on avian influenza preparedness and control. The project was successful in establishing mechanisms for intersectoral coordination between the ministries and agencies responsible for zoonotic diseases, increasing associated public awareness and mitigation measures, strengthening institutional as well as disease monitoring, and improving the diagnostic/containment capacity of the country's veterinary and health sectors.

Among other development partners, the **World Health Organization** (WHO) is implementing several projects, including one on the elimination of malaria—with the objective to support intensification of

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<sup>25</sup> World Bank Group – Turkmenistan Partnership Program Snapshot, 2013.

<sup>26</sup> Second National Communication of Turkmenistan to the UNFCCC.

<sup>27</sup> Climate Change in Central Asia, Zoi Environment Network, 2009.

<sup>28</sup> Second National Communication of Turkmenistan to the UNFCCC.

<sup>29</sup> Turkmenistan Climate Adaptation Profile, Climate Change Knowledge Portal.

[http://sdwebx.worldbank.org/climateportalb/home.cfm?page=country\\_profile&CCCode=TKM](http://sdwebx.worldbank.org/climateportalb/home.cfm?page=country_profile&CCCode=TKM).

malaria elimination as an important step in achieving international malaria targets—and another on the ambulatory treatment of tuberculosis. The **U.S. Agency for International Development (USAID)** is also active in this sector, with projects on maternal and child health, training for nurses, and so on.

### ***Disaster Risk Reduction***

Turkmenistan is vulnerable to a number of disasters due to both natural hazards (including floods, earthquakes, and landslides) and technological hazards, such as transportation accidents. Floods and mudslides have often impacted downstream areas. For instance, the Terghap and Tedjen Rivers crested at three times their normal level during 1991–93 and inundated adjacent villages in the floodplain.<sup>30</sup> The eastern and central sections of the Kopet Dagh and Kugitangau Mountains contain around 180 channels where mudslides occur, and catastrophic mudflows were registered in this area in 1963, 1968, 1972, 1981, and 1986.<sup>31</sup> Climate change will likely increase disaster risk, as it may increase the frequency of extreme and hazardous hydrometeorological phenomena.

Turkmenistan is part of the Disaster Risk Reduction in Education (DRR) initiative, coordinated by **UNICEF** in partnership with Turkmenistan’s Ministry of Education and Ministry of Defense, and supported by the European Commission Directorate-General for Humanitarian Aid and Civil Protection.

## **IV Conclusions**

Turkmenistan is significantly threatened by climate change, with serious risks already in evidence. Meteorological data series show that there has been a steady increase in temperature of 1.4°C since the 1950s. By 2100, the rate of atmospheric air temperature increase could possibly increase even further. By the same token, climate projections suggest that precipitation is likely to decrease by 8–17 percent, which, coupled with the temperature increase, will reduce the total volume of water availability. Given the importance of irrigation for the country’s agricultural production, without adaptation, climate change will likely adversely impact agricultural production and have significant impacts on the socioeconomic development of the country by affecting other priority sectors too.

Currently, several important legal documents and recent policy developments form a good basis for Turkmenistan’s aspiration to mainstream low-carbon, climate-resilient considerations into its broader sustainable development objectives. The National Climate Change Strategy lays out an important policy framework for building climate resilience and low-emission economy in Turkmenistan by specifying a number of sector-tailored measures to ensure mitigation and adaptation responses from key economic areas. Other important documents include the Second National Communication of Turkmenistan to the United Nations Framework Convention on Climate Change and a number of sector-specific policies and measures. Despite these policy developments, there are still several challenges related to Turkmenistan’s efforts to have a solid legislative basis for climate change mitigation and adaptation

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<sup>30</sup> Ibid.

<sup>31</sup> Cabinet of Ministers of Turkmenistan, Department for the Turkmenistan State Commission for Emergency Situations, 1994, National Report: Work and Research in Turkmenistan in Connection with the International Decade for Natural Disaster Reduction 1990-2000.

actions. Among others, they include the insufficient coordination and harmonization among existing and forthcoming legislative documents as well as the lack of effective implementation and enforcement of policies, programs, investments, and results monitoring.

The institutional framework for addressing climate change in Turkmenistan consists of a number of ministries and agencies, each focusing on a different aspect of this complex and multisectoral issue. With many policies in place, there is significant interministerial collaboration on climate change. Despite the existence of a formal institutional structure in support of the country's actions aimed at achieving low-carbon, climate-resilient development, an effective and efficient collaboration among the relevant ministries and agencies could be further enhanced. In particular, there is a need to improve and clarify the roles and responsibilities of the interdepartmental State Commission related to the coordination of climate change mitigation and adaptation actions, priority setting and resource allocation across concerned ministries, and scaling-up of implementation efforts—as well as clarify the commission's legal status, its mandate, and the rules for its operation.

### ***Looking Ahead***

Turkmenistan, in collaboration with international development partners, is implementing several adaptation and mitigation projects in a number of climate-sensitive sectors. These, to some extent piecemeal efforts, do not necessarily address all the challenges that the country is facing on its path to low-carbon, climate-resilient development. In this regard, an additional level of screening of climate portfolio, which will include the identification of gaps, outlining future national and regional actions, and estimating the investment resources, is needed.

Based on the review of national climate context, related challenges, and existing programs and policies, several areas have been identified for urgent initial actions that could help Turkmenistan mainstream climate considerations into development activities and planning, as well as create public demand for climate actions.

### **Improving Science-Based Understanding of Climate Change Impacts**

In order to initiate and strengthen an evidence-based dialogue on climate action among key stakeholders, further science-based analysis of the nature and magnitude of physical and biophysical climate change impacts under different scenarios is needed. Such analysis will provide a better understanding of the timing and magnitude of incidence of several important indicators of climate change in the future, as well as identify the key vulnerabilities, development impacts, and possible adaptation responses. Finally, the scientific analysis will also serve as a basis for further identification of development responses at the national and regional levels as well as for institution building, priority setting, implementation, and results monitoring.

## **Estimating Cost of Inaction**

The analysis of climate change impacts and associated economic costs across water, energy, agriculture, forestry, transport, and health sectors is necessary in order to provide compelling economic arguments in favor of climate action. Furthermore, such analysis is needed to inform the national and regional planning on appropriate policy responses that are likely to reduce GHG emissions as well as strengthen local adaptive capacity needed to improve climate resilience. Finally, the economic analysis of cost of inaction is also needed to form a basis for a broad-brush “road map” and the next steps for climate-smart actions.

## **Designing and Implementing Climate-Smart Solutions**

Meeting the challenges of climate change offers numerous “no regrets” sectoral, climate-conscious strategies that can enhance climate resilience while generating immediate development benefits. An identification and effective implementation of climate-smart solutions (such as those related to improved disaster risk management, hydromet services, climate risk assessments, water resource management, climate resilient agriculture, performance of water utilities and energy systems, and others) also have significant global co-benefits, such as contributing to global efforts to reduce GHG emissions. Finally, such solutions form a necessary basis for enhanced regional collaboration and a foundation for national and regional institution building.

## **Enhancing National Coordination Mechanism on Climate Change**

The emerging climate change impacts in Turkmenistan are well recognized and the country is implementing a number of activities aimed at reducing vulnerability and mitigating climate change impacts. In order to integrate and effectively implement low-carbon, climate-resilient considerations into development planning, national coalition building efforts and cross-sectoral participation among relevant stakeholders would need to be strengthened and scaled up. Such efforts would in turn improve the country’s institution readiness and associated capacity.

To support and facilitate such process, there is a need to reinforce the mission and strengthen capacity of the existing **State Commission on Climate Change**. The commission’s role of ensuring the integration of low-carbon, climate-resilient considerations into development planning by providing overall guidance, political support, and leadership is an important first step in the process. However, further enhancements are needed. First, the mandates and the roles of the Ministry of Nature Protection and of the State Commission would need to be clarified. Second, the commission’s role in coordinating climate change mitigation and adaptation actions across concerned ministries, priority setting, allocating resources, and monitoring results would need to be improved. Finally, the commission’s legal status and rules of operation would also need to be clarified.

In order to ensure its operationalization, the commission would need to be supported by a **technical working group** that would comply with its strategic guidance and execute its decisions. The technical working group would be empowered by the commission’s decisions, comprise technical staff from the line ministries and agencies, and ensure the implementation of policies and actions on the ground.

## Enhancing Regional Coordination Mechanism on Climate Change

Climate change poses a common challenge to all countries in Central Asia, making regional and international collaboration essential to achieving low-carbon, climate-resilient growth in each of them. Despite a number of important national-level adaptation and mitigation actions that Turkmenistan is undertaking, the country will be better equipped to address climate change impacts within a framework for scaled-up regional collaboration on climate-related data sharing, disaster risk management system and crisis responses, development of climate-resilient infrastructure, technology transfer, and others. As a result, regional programs would be leveraged for effective implementation of national actions.

In order to enable such processes, a **Regional Central Asian Steering Committee on Climate Change** would need to be established. The committee would comprise high-level representatives from the five Central Asian countries and international development partners as its members. The committee's main responsibilities would be to provide overall guidance, political support, and leadership and to serve as a vehicle for continuous coordination of regional efforts to address and adapt to climate change.

In order for the broad policy directions to be implemented, such regional committee would need to be supported by a **Regional Central Asian Secretariat on Climate Change**, which would be jointly established by the five Central Asian countries and international development partners. The secretariat would be headquartered in a given Central Asian country (to be determined by the countries themselves) and function either as an independent unit or within an existing regional institution. It would serve as a facilitation unit and support governance bodies of the committee, carry out regional communication and resource mobilization efforts, help establish or host regional centers of excellence, and work with the national-level committees.

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