TURKMENISTAN

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General observations

The independent and neutral State of Turkmenistan is situated in the western part of Central Asia, bordered by Kazakhstan, Uzbekistan, the Islamic Republic of Iran and Afghanistan. The country covers an area of 491 200 km^2. The capital city is Ashgabat.

Climate

Turkmenistan has an extreme continental climate, except for in the coastal areas of the Caspian Sea and in the mountains. The average annual air temperature ranges from 12° to 17°C in the north, to 15° to 18°C in the southeast. The coldest month is January, with average temperatures ranging from -6°C in the northeast to +4°C in the southeast, and +5°C in the far west. The average temperature during the hottest month, July, is from 27 to 30°C. The absolute maximum temperature reaches 48 to 50°C in the Central and South-East Karakum Desert, and a little lower in the north of Turkmenistan, on the Caspian Sea coast and in the mountain regions. The highest rainfall occurs in the mountains and foothills, averaging up to 398 mm, and the lowest rainfall occurs in the Kara-Bogaz-Gol Bay, averaging 95 mm. Rainfall in the northeast averages 105 mm.

A total of 80% of the territory of Turkmenistan is desert, which has a significant impact on the climate of the country as a whole. The Karakum Desert is one of the largest deserts in the world, and occupies the whole central part of the country. Four fifths of the territory of Turkmenistan is flat. Mountains and hills are mostly in the south and southwest of the country.

Land use

Of the total land area of Turkmenistan, 282 420 km^2 is desert (ca 80%). Since independence, Turkmenistan has developed a specialized form of agriculture: cotton and wheat cultivation, breeding karakul sheep, and silk production. The main land users are agricultural peasant associations, which account for over 70% of land use in the country. Of the total land area, 17 million hectares are suitable for agricultural cultivation, of which over 10% is currently being used. Irrigation is used for over 70% of agricultural production.

Water resources are extremely unequal in distribution: 95% comes from the Amu Darya river, and the remaining 5% from all other rivers, streams and springs. The southern Murghab, Tedzhen and Sumbar rivers, and the smaller rivers of the foothills of the Kopet Dag, are fully exploited for irrigation. The building of the Karakum Canal has changed the redistribution of water resources across Turkmenistan. It has removed imbalance in the distribution of water between the large areas of cotton growing land in one part of the country and the water resources in the other.

Forestry

Owing to Turkmenistan's specific natural and climatic features, over 4 126 000 ha of land are covered in forest, which is why all forests are classified as primary, by order of the Government, and why final felling is not carried out and not planned for the future. Forest, in the arid climate of Turkmenistan, is of particular ecological importance. In the new economic circumstances, the importance of forestry is increasing continuously, which requires specific activities in that sector to be defined in order to ensure genuine accountability and in order to guarantee access to full information. The removal of timber only takes place in the context of sanitary felling, amounting to no more than 30 000 to 50 000 m^3 per year. Natural gas is provided to the population free of charge, which means that over recent years there has been a reduction in unauthorized felling. In 2004, a paper factory began operation, producing around 50 000 t of paper per year, using cotton

plant material and corn chaff as raw materials. Cattle grazing is restricted in areas where it could damage forest growth and development, particularly in young forest areas.

Of all the countries in Central Asia, which have many similarities, Turkmenistan differs in the uniqueness of its forest coverage. The unique natural and climatic conditions are conducive to the growth of a range of plants, particularly trees and shrubs, from the Caucasus and Mediterranean regions, as well as from the western Tien Shan, with the extreme continental climate leading to a range in diversity between the forests of the mountains and foothills, and those of the sandy desert areas, particularly with respect to their ability to store water internally.

Throughout their history, the forests of Turkmenistan have been subjected to various negative impacts, since the early development of human society. Efforts to conserve and protect the forests only began within the last 100 years. Forest conservation in natural areas has been made possible by limiting human use of forest resources and some national traditions, but most importantly, by the miraculous capacity of the plants to grow in such severe conditions.

National climate change situation

The conclusion of the group of experts in a climate change report published in 2007 states that climate change is already happening, and even if counter measures are taken immediately, the consequences cannot immediately be reversed. However, the most promising measures for reducing CO_2 emissions in the atmosphere for the non-energy sector are to increase carbon sequestration while expanding the area of forest plantations and the restoration of perennial shrubs and herbaceous plants on lands that are deteriorating or being withdrawn from arable farming use. Forest carbon sequestration is directly related to temperature, which means that the absorption rate increases at high temperatures. At the same time, the carbon sequestration rate of coniferous and deciduous forests growing in warm and temperate climates is higher than of those growing in northern latitudes.

In recent years, Turkmenistan has gained experience in forest cultivation using introduced species of trees and shrubs. Eldar pine (*Pinus eldarica*) is very hardy in adverse climatic conditions and continues to grow year by year. It should be noted that forest conditions in Turkmenistan are very harsh, and therefore significantly limit the range of species suitable for silvicultural activities.

In Turkmenistan, considerable work is being carried out on the planting of perennial tree plantations, mostly using coniferous seedlings. A number of government decrees have been issued on the subject, including:

- On the development of horticulture and landscape gardening in Turkmenistan, 1992.
- On the creation of parklands in the foothills of the Kopet Dag, 1998.

Each year the need for recreational forest land is increasing. This raises the issue of needing to revise the designation of forests by categories of protection, and the possibility of setting aside parts of protected forests as forest land for recreational use.

The forest park areas around the capital and in the foothills of the Kopet Dag are particularly noteworthy. Work on the establishment of this unique forest began in 1998, pursuant to Presidential Decree No. 3784 of 22 July 1998 on the creation of parklands in the foothills of the Kopet Dag. This measure is a logical continuation of the Presidential Decree on the development of horticulture and landscape gardening in Turkmenistan, which provides for the renewal of good traditions for further development, which have been lagging behind in recent years in this important sector. Almost all sectors of the economy were mobilized to establish the forest parklands in the foothills of the Kopet Dag. All ministries and departments are mobilizing their own forces and resources to purchase planting materials and to organize planting according to the

recommendations made by the Ministry of Nature Protection. Further cultivation activities have also been organized using their own resources. Forest parkland areas currently cover over 30 000 ha. In total, over 30 million saplings and seedlings of around 100 species of evergreen and deciduous trees and shrubs have been used.

Analysis of the growth and development of plantations shows that the range of species corresponds with forest conditions, and that forest reclamation has a positive effect on the environment and the climate. At the same time, in planting forest parklands, innovative agro-technological practices have been developed. In this regard, there has been large-scale introduction of drip irrigation, which allows irrigation water to be used economically. Methods for organizing forest fire prevention and tackling diseases and pests have also been developed.

As a result of the alleviation of climatic conditions and the establishment of forests, there has already been an increase in the number of wild animals and birds in forest parkland areas. As a result of regular irrigation, drinking and foraging sources for wild animals have increased. This is an additional factor in preserving biodiversity in forest ecosystems.

By ratifying United Nations instruments on conservation, Turkmenistan is actively participating in international cooperation for the implementation of joint projects to overcome the ecological problems that are giving cause for concern the world over, such as the sensible use of natural resources, in particular water resources, and for their protection and restoration, efforts to combat desertification, combating the exhaustion of land resources, and climate change and global warming. In this regard, Turkmenistan is actively cooperating with neighbouring countries and competent international organizations, including UN, EU, GEF and many others. A good example of this cooperation is the project for sustainable management of forest resources in Turkmenistan, which is being implemented with support from the German Agency for Technical Cooperation (GTZ).

The following measures have been taken to address climate change in Turkmenistan:

- Turkmenistan ratified the UNFCCC in 1995 and the Kyoto Protocol in 1998. As part of its obligations under the Convention, Turkmenistan has conducted an inventory of its GHG emissions since 1994.
- The First National Communication (FNC) on climate change was drafted and published in 1999, based on materials from studies conducted between 1997 and 1999. This communication presented information on the country's GHG emissions and Turkmenistan's measures to meet its obligations under the UNFCCC, as well as to adapt to predicted changes in climate and proposed measures for the reduction of GHG emissions.
- The second phase, an integral part of the FNC, continues. This phase includes capacity building in priority areas of the national economy in connection with climate change. Specific objectives of the project include bridging gaps and identifying and evaluating the technological requirements for fulfilling the fundamental objectives of the UNFCCC.

On 15 August 2009, the Ozone Layer Protection Act was adopted. The Act sets out the legal, economic and organizational aspects of protecting the ozone layer, as well as State governance and monitoring of the handling of ozone depleting substances, and aims to protect and restore the ozone layer in order to protect human health and the environment from the negative consequences of ozone layer destruction. The Act clearly defines offences in respect of the protection of the ozone layer and liability for committing such offences. It also provides for State regulation of activities for the protection of the ozone layer.

- The forests and pastures laboratory of the National Institute of Deserts, Flora and Fauna of the Ministry of Nature Protection conducted scientific research in 2009 on the influence of drought on pastures.

- In 2003, the Ministry of Nature Protection drafted and published a brochure on climate change and sustainable development. This publication presents, in an accessible format, information on the earth's atmosphere, weather and climate, natural variations and the anthropology of climate change, the main cause of which is the increase in the concentration of GHGs.
- An article written by specialists from the Ministry of Nature Protection, entitled "Turkmenistan's contribution to overcoming global climate change" was published in the journal "Problems of desert reclamation". The article describes specific steps being taken in Turkmenistan, supported by the global community, to prevent environmental degradation.

In the long term, freshwater resources in Central Asia are expected to decrease by 20 to 30%, which could result in a reduction in crop yields and the yield of pasture lands. In this regard, Turkmenistan is taking measures to ensure sensible use of secondary water resources. In 2009, the Altyn Asyr Lake was constructed in the Karakum Desert to collect all drainage water from across the country.

Improving the water supply in the new territories will enable desert pasture areas to be enlarged for livestock rearing, and to increase the resultant plant reclamation activities. The seeding and planting of sand-tolerant species —white and black saxaul trees, saltwort, ephedra, desert acacia and many other species—will create conditions for year-round pasture for cattle, which will improve the conditions of their winter grazing. All these efforts will enable the further development of livestock rearing in Turkmenistan and will improve the social and living conditions of workers in that sector.

Activities of research institutes and other institutes and organizations

In Turkmenistan, meteorological, hydrological and agro-meteorological monitoring are conducted by the National Committee for Hydrometeorology of the Cabinet of Ministers, which conducts lake and sea analyses and ozone and radiation measuring activities, as well as monitoring pollution. The collection and storage of climate-related information is conducted by the State hydrometeorological data fund. Computerized databases and data banks of climate data are being established and used in operational and scientific work. This data enables evaluations to be made of climatic anomalies, through scientific research. All information is studied by the State Commission for the fulfilment of Turkmenistan's obligations under the United Nations environment conventions and programmes, established with a view to coordinating the activities of ministries and departments dealing with environmental issues, as well as for the development of national policies for reducing negative anthropological effects on the climate, and ensuring that the concentration of GHGs in the atmosphere is reduced to a safe level. Forest adaptation and climate change issues in Central Asia are addressed by the Uzbek Institute for Forest Research (formerly the Central Asian Institute for Forest Research). In Turkmenistan, the National Institute for Deserts, Flora and Fauna of the Ministry of Nature Protection is the main scientific research centre. Pilot activities for the development and introduction of innovative technologies and agro-technology in forest management are being conducted by the Turkmen forest experiment station and the Inspectorate for forest planting and the protection of natural parks of the Ministry of Nature Protection.

Work is also being conducted by the Magtymguly Turkmen State University, the Turkmen Polytechnic Institute and the agricultural research institute of the Ministry of Agriculture, as well as other interested institutions and organizations.

Cooperation with FAO

Given that the rate of climate change and its effects on forest management differ between countries, Turkmenistan considers it would be appropriate to develop the following activities in collaboration with FAO:

- Establish a unified definition of climate change and its impact on forest management at the regional and national levels.
- Develop a national forestry programme.
- Conduct forest inventories.
- Organize international and regional exchanges of experience and new practices and technologies in forest management and other organizational issues.