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# Uzbekistan

## Country Forest Note

The State of Forests and  
Forest Landscapes in Uzbekistan

June 2022

Europe and Central Asia Region  
Environment, Natural Resources and Blue Economy  
Global Practice





# Uzbekistan Country Forest Note

The State of Forests and Forest Landscapes in Uzbekistan

World Bank Europe and Central Asia Region  
World Bank Uzbekistan

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# ABBREVIATIONS AND ACRONYMS

<b>AAC</b>	Annual Allowable Cut
<b>AEWA</b>	Convention Migratory Species of Wild Animals, Water Bird Agreement
<b>ASA</b>	Advisory Services and Analytics
<b>BCEF</b>	Biomass Conversion & Expansion Factor
<b>CADI</b>	Central Asian Desert Initiative
<b>CAREC</b>	Regional Environmental Center for Central Asia
<b>CBD</b>	UN Convention on Biological Diversity
<b>CITES</b>	Convention on International Trade in Endangered Species of Wild Fauna and Flora
<b>DLDD</b>	Desertification, Land Degradation and Drought
<b>DPL</b>	Development Policy Loan
<b>ECCA</b>	European Climate Change Adaptation
<b>EIA</b>	Environment Impact Assessment
<b>ELD</b>	Economics of Land Degradation
<b>EU</b>	European Union
<b>ES</b>	Ecosystem Services
<b>FAO</b>	Food and Agricultural Organization of the United Nations
<b>FLR</b>	Forest Landscape Restoration
<b>FOLU</b>	Forestry and Other Land Use Sector
<b>FPN</b>	Forest Policy Note
<b>FRA</b>	Forest Resources Assessment
<b>GDP</b>	Gross Domestic Product
<b>GEF</b>	Global Environment Facility
<b>GHG</b>	Greenhouse Gas
<b>GIS</b>	Geographic Information System
<b>GIZ</b>	German Corporation for International Cooperation

<b>GNI</b>	Gross National Income
<b>GoU</b>	Government of Uzbekistan
<b>HAFL</b>	Bern University of Applied Sciences, School of Agricultural, Forest and Food Sciences
<b>HDI</b>	Human Development Index
<b>ICT</b>	Information and Communication Technology
<b>IFAS</b>	International Fund for Saving the Aral Sea
<b>IPC</b>	International Poplar Commission
<b>IPCC</b>	Intergovernmental Panel on Climate Change
<b>IPPU</b>	Industrial Processes and Product Use
<b>IUCN</b>	International Union for Conservation of Nature
<b>IUFRO</b>	International Union of Forest Research Organizations
<b>LDN</b>	Land Degradation Neutrality
<b>LESKHOZ</b>	Local Forest Enterprise under the State Committee on Forests
<b>LFCC</b>	Low Forest Cover Country
<b>MAF</b>	Main Administration on Forestry
<b>MAWR</b>	Ministry of Agriculture and Water Resources of Uzbekistan
<b>NAMA</b>	Nationally Appropriate Mitigation Action
<b>NAP</b>	National Adaptation Plan
<b>NBSAP</b>	National Biodiversity Strategy and Action Plan
<b>NBS</b>	Nature-Based Solution(s)
<b>NDC</b>	Nationally Determined Contribution
<b>NDVI</b>	Normalized Difference Vegetation Index
<b>NFI</b>	National Forest Inventory
<b>NFP</b>	National Forest Programme
<b>NGO</b>	Nongovernmental Organization
<b>NM</b>	Natural Monument
<b>NNP</b>	National Nature Park
<b>NTFP</b>	Non-Timber Forest Product

<b>NWFP</b>	Non-Wood Forest Product
<b>PD</b>	Presidential Decree
<b>PES</b>	Payment for Ecosystem Services
<b>PNA</b>	Protected Natural Area
<b>SBR</b>	State Biosphere Reserve
<b>SCEEP</b>	State Committee of the Republic of Uzbekistan for Ecology and Environment Protection
<b>SCF</b>	State Committee on Forestry of the Republic of Uzbekistan
<b>SCGM</b>	State Committee for Geology and Mineral Resources
<b>SDGs</b>	Sustainable Development Goals
<b>SFF</b>	State Forest Fund
<b>SFM</b>	Sustainable Forest Management
<b>SLM</b>	Sustainable Land Management
<b>SC</b>	State Committee
<b>SMEs</b>	Small and Medium Enterprises
<b>SNR</b>	State Nature Reserve
<b>SOC</b>	Soil Organic Carbon
<b>TCP</b>	Technical Cooperation Program
<b>TSAU</b>	Tashkent State Agrarian University
<b>UNCCD</b>	United Nations Convention to Combat Desertification
<b>UNDA</b>	United Nations Development Account
<b>UNDP</b>	United Nations Development Programme
<b>UNECE</b>	United Nations Economic Commission for Europe
<b>UNEP</b>	United Nations Environment Programme
<b>UNESCO</b>	United Nations Educational, Scientific and Cultural Organization
<b>UNFCCC</b>	United National Framework Convention on Climate Change
<b>UNFF</b>	United Nations Forum on Forests
<b>WCMC</b>	World Conservation Monitoring Centre

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# ABSTRACT

This Country Forest Note offers an in-depth picture of the forest sector of Uzbekistan, viewed through a forest landscape lens, and provides guidance to help define goals and identify opportunities for the continued development of the sector. Despite a large number of current challenges, forest landscape management presents opportunities for sustainable development: increasing the forest area will provide additional benefits in terms of climate change. A holistic approach to soil degradation is required that includes improved livestock husbandry, soil management, and agricultural practices, all of which have a role to play. Leskhozses have a central role in transforming the forest sector and augmenting their capacity and skills needs to be an important consideration. Equally important is to encourage community participation through mahallas and create favorable conditions for private sector involvement. Strong government commitment and institutional and stakeholder buy-in and ownership are required to support the transition to more adaptive management in forestry. This transition is critical to address climate change issues, increased threats to forests, soil and water conservation, economic management of wood and non-wood forest products (NWFPs) from forested landscapes, and improvement of livelihoods of rural households.

# EXECUTIVE SUMMARY

This Country Forest Note ('Note') offers an in-depth picture of the forest sector of Uzbekistan, viewed through a forest landscape lens, and provides some advice to help define sector goals and identify opportunities for the continued development of the sector. The Note was prepared between July 2020 and March 2022.

## **Salient facts about the state of forests<sup>1</sup> and forestry landscapes in Uzbekistan**

Due mainly to its specific geographic and climatic situation, **Uzbekistan is a low forest cover country (LFCC), with an estimated 3.9 million ha of land covered with forests** ('forested land'), corresponding to 8.7 percent of the land area. This is comparable to other Central Asian countries, where forest cover is between 4 percent (Tajikistan) and 8.7 percent (Turkmenistan). The main function of nearly the entire forest estate is protection of soil and water; the wood production function is negligible. The largest forest areas (estimated at more than 3 million ha) are located in cold desert areas and consist mainly of saxaul forests, which have the characteristics of woodlands rather than forests. Submontane and mountain forests account for more than 300,000 ha of the total forest area and include broadleaf forests (for example, pistachio, walnut-fruit forests) and juniper (locally known as archa) forests. In addition, there are around 95,000 ha of riparian forests (so-called tugai forests) distributed in patches along the larger river belts of the country.

**The total land area classified as State Forest Fund (SFF) land in 2021 was approximately 12 million ha.** However, only about one-third of these lands is actually covered with forests ('forested land'), as large parts of the SFF land are pasture and open lands. Almost the entire estimated 3.9 million ha of forested land is classified as SFF land, which is managed by the State Committee on Forestry of the Republic of Uzbekistan (SCF) and its subsidiaries. Forests also grow on other (non-SFF) land and might be significant in extent, but information and data on such forests are almost completely lacking. This Note focuses on management of lands under the SFF, which is land managed by the SCF and it includes forest, agricultural, and grazing land.

**Significant areas of forest and woodlands throughout the country suffer from degradation. Overgrazing**, which can make tree regeneration next to impossible, is a major cause of degradation. This is particularly the case in the eastern mountainous areas, where trees need many years to regenerate but provide important protective functions. Local forest enterprise under the SCF (leskhoz) generate significant shares of their revenues from grazing leases. Overall, weak awareness of the long-term impacts of grazing is of concern, particularly when considering the effects of climate change. Besides intensive grazing/overgrazing, land degradation can be significant due to unsustainable agricultural practices and/or poor management of (irrigation) waters and the degradation of shelterbelts and riparian strips.

**Biodiversity is an important asset for social and economic development in the country.** Forestry has a strong influence on protection of soil and water, and conservation of fauna and flora is intrinsic in management objectives. In certain biomes in the country, particularly tugai and mountain forest areas, close-to-nature silviculture that promotes natural regeneration could well complement biodiversity goals.

**Generally, reliable data on the extent and state of the forest and woodland resources are not available.** Estimates suggest that Uzbekistan's total forested area that corresponds to international definitions of forests extends over approximately 0.5 million ha, including both natural and planted forests. This is less than 1 percent of the total land area of Uzbekistan. By contrast, the extent of low saxaul and other woodlands

<sup>1</sup> When using the term 'forest,' this Note refers to land that is covered with trees according to the national definition ('forested land').



might reach 9 million ha or more, about 21 percent of the total land area. These are located mainly in the western steppes and Kyzylkum Desert. While biomass and carbon stock of these woodlands are low, their importance is high because of their large extent and protective, ecological, and socioeconomic functions.

**Forest management is focused on protection and conservation.** About 69 percent of the state forest land area is managed for the protection of soil and water (2.5 million ha) and an additional 31 percent for the protection and conservation of biodiversity (1.1 million ha). These are therefore restricted use forests, mainly for non-wood forest products (NWFPs). Only 6,000 ha are considered as production forests for timber and service wood, mainly poplars and other fast-growing species (0.2 percent). The SCF and its local forest enterprises (leskhozes) have significant skills and knowledge about the management of forests in all biomes of the country, including in plantation forestry and the development of peri-urban and urban forestry.

**A majority of the country's poor population lives in rural areas, close to forests.** While Uzbekistan's recent economic performance has helped reduce poverty, 11.4 percent of the population still lives below the national poverty line, earning less than US\$5 per day and 75 percent of this low-income population is in rural areas. The current COVID-19 pandemic has had an additional negative effect on the economic situation. Data on the contribution of forests to local livelihoods do not exist. It is clear, however, that forests do contribute to livelihoods as rural households depend on forests as an important source of fuel for heating and cooking and NWFPs (for example, berries, nuts, mushrooms, pasture for grazing, and fodder) for subsistence and income. Almost all forests supply fuelwood for local communities, which is often extracted at unsustainable rates. Also, forest land is an important grazing ground for local livestock.

**The forest sector's direct economic contribution is small, contributing less than 1 percent of gross domestic product (GDP) in 2019; however, its indirect contribution—the protection of soil and water—is large but unmeasured.** The forests also provide critical habitats for biodiversity and other essential environmental benefits such as soil protection, water regulation, and carbon sequestration. According to national statistics, only 0.2 percent of the area (around 6,900 ha) is used for timber and sawn wood production. Thus, a wood industry at larger scale has not been developed. Forest ecosystem services—for example, carbon sequestration, water/soil erosion regulation, and biological diversity—along with NWFPs and nature-based tourism are potentially important assets that contribute to the economy of the country, but their value has not been estimated in monetary terms. It will be crucial that forest management focuses on maintaining capacity of ecosystems and avoiding loss of their functions due to climate change or forest degradation because of economic activities.

**The knowledge base on the current state of forests falls short and hampers the development of a long-term forest sector development strategy.** The scope of data currently collected on the state of the forests is insufficient to meet the information needs for policy decisions and the many international reporting requirements on forests. To fulfil data requirements, Uzbekistan will need to institute a national forest inventory (NFI) and a reliable forest monitoring system that includes forest and land carbon accounting. Also, it would need to implement the land registration provisions of the current legislation, which would afford policy makers and other relevant stakeholders the information required to develop an adequate, long-term forest development strategy for the country that serves the purposes of sustainable development.

**Restoring degraded lands and forests is the ultimate overall task of forestry institutions in Uzbekistan.** Concrete implementation of landscape restoration includes stabilizing soils and mitigating sand and dust storms in the Aral Sea area and the cold desert area overall; protecting river banks and water flow

and restoring tugai (riparian) forests along the main rivers; establishing and restoring shelterbelts in the wider landscape to help protect agricultural soils; reducing erosion and preventing further land degradation; and conserving and sustainably developing the unique mountain forests covered with junipers and some broadleaved species, walnut fruit, and pistachio forests. Also, there is an immediate need to model further the potential impact of climate change on forest resources; develop integrated management plans locally, at the forest landscape level based on an inventory/modern mapping; and ensure zoning of lands for protection of water sources, the use of firewood and NWFPs, biodiversity, and so on.

**Contributing to afforestation of exposed dry seabed and upstream areas of the Aral Sea is a unique challenge for the forestry sector.** Once the world's fourth largest lake and a major source of income from fisheries and tourism, it has been drying up since the 1960s due to irrational withdrawal of water for irrigated agriculture. The Aral Sea has now shrunk to one-quarter of its original surface area. Forestry can contribute to addressing the challenges of the long-term impacts on the environment, including salinization, water pollution, biodiversity loss, destabilization of the microclimate and reduction in air quality, as well as on the livelihoods of the people living there.

**Forests are likely to be significantly affected by climate change but can contribute to increasing resilience and reducing vulnerability of social systems and ecosystems in the country.** Researchers expect that even small changes in temperature and precipitation could greatly affect future forest growth and survival in Uzbekistan. Within the 2010–2030 period, the phytosanitary conditions will change significantly. A combined research agenda linking forestry, ecological, and biological questions with climate change is needed if future challenges are to be faced successfully.

**Helping improve forest sector performance and increasing the sustainability of landscapes will also contribute to reducing poverty and increasing the wealth of the bottom 40 percent of the population by creating and sustaining rural-based jobs from forest development activities.** These include forest landscape restoration (FLR), afforestation, agroforestry, NWFPs, firewood management, and nature-based tourism. The establishment of private small and medium enterprises (SMEs) to support such processes will provide subsistence products such as fuelwood and NWFPs, improve agricultural productivity and address land degradation, and improve pasture productivity. Improving the holistic management of landscapes can help reduce the incidence and scale of damage from extreme events such as landslides, flooding, and forest and landscape fires.

**Forest research currently relies on relatively short-term limited funding.** Important research work is being developed in the areas of climate change, biodiversity conservation, and forest landscape restoration, including by the Forest Research Institute under the SCF. Research outcomes should be coordinated and better integrated into forest policy development and include research in sustainable management of forests; techniques of forest and land restoration, afforestation, and agroforestry; monitoring and management of forest and landscape fires, pests, and diseases; and disaster risk reduction overall.

**A modern information and communication platform for forest planning and development (information and communication technology [ICT] platform),** built on and complementing the results from the NFI can address the lack of updated and consistent data on the current state of the forests, including integrity of forests and the threats it faces, in particular forest and landscape fire, erosion control, and loss of biodiversity. The ICT and NFI together will underpin forest management planning and identify afforestation and forest restoration potential. They will also provide those responsible for the management, protection, and expansion of trees and forests with accurate information to identify needs, priority intervention areas, and approaches as well as up-to-date information on their progress.

## Recommendations and suggested next steps

The detailed review of the background on the state of forests and forest landscapes in Uzbekistan and of the current forest policy can be found in Chapters 1 to 6. Based on the analysis, Chapter 7 presents the key recommendations and a set of identified actions. The recommendations below (drawn from the long list in Chapter 7) are suggested for the highest consideration by the country. The recommendations are organized into five categories and the actions are listed in order of priority within each category. The SCF is seen as the lead agency responsible for implementing all actions. It should consider crafting a time-bound action plan to implement the recommendations.

## I. Actions required to address knowledge and research gaps

### ■ Conduct an NFI

Conduct an NFI to meet the information needs for policy decisions, management planning, forward projections of production, and the many international reporting requirements on forests and tree cover.

### ■ Develop a state-of-the-art ICT platform

Create and manage a modern information and communication platform for forest planning and development (ICT platform) to address the lack of updated and consistent data on the current state of the forests and promote its use in forest landscape management.

### ■ Value ecosystem services from forest landscapes

Undertake detailed studies and analysis to make values of all ecosystem services (to forests and trees) explicit so that they are recognized fully and to ensure that they are adequately reflected in the laws, regulations, and decision-making processes, relating to forest landscape management.

### ■ Undertake research and promote awareness and education about forest landscape approaches

Finance and support increased investment in both research and education in forest landscape management, to make that a central focus for the country. Rural schools can become an anchor for developing awareness and entrepreneurial skills to implement forest and landscape restoration and climate change adaptation activities.

## II. Actions required to address capacity gaps

### ■ Strengthen community organizations

Support organizational reforms within mahallas (including making them more gender and youth balanced), encourage their participation in forest-based SMEs, through the provision of entrepreneurship training and finance, and increase their capacity in participatory land use planning.

### ■ Improve the efficiency of Leskhozes

Augment the skills of leskhoz officials on participatory planning, business plan development, co-management of forests, resilience and adaptation, tourism activities, and so on, so that leskhozes can become effective enterprises and lead on sustainable forest landscape management activities.

### ■ Strengthen forest institutions

Strengthen and build the human and knowledge capacity of all forest institutions (including on FLR approaches) so that they can fulfil a broadened mandate of forest landscape management and

can respond to the global Sustainable Development Goals (SDGs) and international environmental commitments.

### III. Actions to improve policies, institutions, and governance

- **Promote stakeholder participation**

Establish mechanisms (such as stakeholder platforms and forums, public access to information, people's reception mechanism) to ensure adequate representation and inputs of all relevant stakeholders in participatory land use planning, integrated landscape approaches, review of policies, legislation, management, and program implementation.

- **Encourage cross-sectoral coordination**

Introduce integrated landscape approaches and participatory land use planning to foster cross-sectoral coordination. Encourage participation by representatives from other sectors influencing forestry (agriculture, environment, infrastructure, mining, water, and so on), in landscape planning and program development and implementation.

- **Develop a forest landscape policy and strategy**

As the pivotal agency for forest landscape management, expand the mandate of the SCF to include the monitoring and control of all forested land in the country, irrespective of the departmental affiliation. Building on the resolution of the President of the Republic of Uzbekistan (PP-4850), the SCF should develop a long-term strategy that includes the value of trees for timber and non-timber (NWFP) production, landscape restoration (FLR), provision of ecosystem services (nature-based solutions [NBS]) and conservation, in coordination with other sectors of the economy, such as, agriculture, water, and tourism.

- **Systematize the legal framework and address the gaps**

Drawing on the findings of the gap analysis undertaken by the SCF, develop an adequate legal and institutional framework (while ensuring consistency and cross-sectoral coherence and minimizing overlaps) at the national, regional, and state forest enterprise (leskhoz) level to restore and sustainably monitor and manage forest landscapes in Uzbekistan.

- **Foster transboundary and regional collaboration**

Promote transboundary and regional collaboration for landscape management and restoration, given the critical need to address emerging threats at the regional level, such as impacts of climate change.

### IV. Actions required on economics and finance

- **Improve incentives for leskhoz, for sustainable forest landscape management**

Resolve the excessive dependence of leskhoz on grazing permit fees to meet their revenue needs by providing them with payments for environmental services for restoration activities in grazing lands and support for haymaking and development of 'protein banks' to compensate for loss of grazing lands.

- **Ensure continuing replenishment of the Forest Development Fund**

Support a revision of the public finance system of the country to ensure that revenues from fees and other sources such as fines are clearly plowed back into the Forest Development Fund and not dispersed as general government revenue.

- **Encourage private sector participation in forest landscape management**

Improve the regulatory environment and availability of financial instruments to encourage private sector engagement in forest landscape restoration through the development of SMEs and provide training and incentives for the adoption of competitive market principles in its operations. Attractive activities for SME development include fast-growing energy/fuelwood plantations; NWFP value chains with a focus on fruits, nuts, and honey; improved livestock value chains; and expansion of nature-based tourism.

- **Pilot a payment for ecosystem services (PES) system**

Develop and operationalize a PES scheme for forest landscapes to protect agricultural and grazing land and build resilience by contributing to increased productivity, ecosystem services, and disaster risk reduction.

## V. Actions to address technical issues

- **Build resilience to climate change**

Consider the projections from climate change models to identify areas vulnerable to rapid changes in temperature, precipitation, water availability, risks of forest fires, pests, and so on and reduce risks through appropriate selection of sites, tree species, silviculture practices, and fire and pest control measures, for forest landscape activities, to adapt and build resilience to climate change.

- **Focus on FLR**

Reverse deforestation and degradation and promote afforestation in FLR processes appropriately, including industrial plantations with fast-growing tree species (for example, Paulownia) on irrigated lands; saxaul afforestation in the dry western and central part of the country, with emphasis on the Aral Seabed; agroforestry in the walnut-fruit forest belt and in the agricultural zones; and restoration of riparian forest areas (tugai) with native poplar, willow, and other species.

- **Harness NBS**

Harness forests for the protection and restoration of fragile ecosystems (for example, prevention of soil erosion, slope stabilization, waterflow regulation), notably in the upstream areas of watercourses toward the Aral Sea and in the dry seabed and area surrounding the Aral Sea. Additionally, and to the extent possible, promote awareness and develop a national consensus on the role of forests and forestry for NBS.

Despite the large number of current challenges, forest landscape management presents opportunities for sustainable development: increasing the forest area will provide additional benefits in terms of climate change. A holistic approach to soil degradation is required that includes improved livestock husbandry, soil management, and agricultural practices, all of which have a role to play. Leskhozoes have a central role in transforming the forest sector and augmenting their capacity and skills needs to be an important consideration. Equally important is to encourage community participation through the mahallas and to create favorable conditions for private sector involvement. Strong government commitment and institutional and stakeholder buy-in and ownership are required to support the transition to more adaptive management in forestry. This transition is critical to face climate change issues, increased threats to forests, soil and water conservation, economic management of wood and NWFPs from forested landscapes, and improvement of the livelihoods of rural households.

**Figure 1. Map of Uzbekistan**



**Land area:** 425,400 km<sup>2</sup> land area (United Nations Development Programme [UNDP]); total: 444,103 km<sup>2</sup> (Food and Agricultural Organization of the United Nations [FAO] 2015)

**SFF land:** 11,975,200 ha (latest estimate, July 2021, based on information from the SCF)

**Forested area:** 3.68 million ha (Forest Resources Assessment [FRA] 2020 estimate), 3.89 million ha (SCF, July 2021)

**Forest cover:** 8.8 percent

**Steppes and deserts:** 80 percent

**Population:** 34.6 million

**Share of rural residents:** 49 percent

**Poverty rate:** 14.1 percent (UNDP)

**Gross national income (GNI) per capita:** US\$1561 in 2018 (2016: US\$2568 [World Bank])

**Human Development Index:** 0.661 (UNDP)

**Exchange rate November 2021:** US\$1 = UZS 10,770 (OANDA currency converter)

# 1. INTRODUCTION

This Country Forest Policy Note (“Note”) was prepared as a desk review in mid-2020 and since then updated throughout 2021 via virtual exchanges with stakeholders in Uzbekistan and the World Bank. The Note offers a first independent view of the forestry sector of Uzbekistan. It summarizes background information about the forests and forest landscapes<sup>2</sup> and the forestry sector in the country. It also builds on some initial strategic guidance to help define forest sector goals and identifies opportunities for consideration in the continued development of the sector and for the implementation of longer-term cooperation in forestry between the Republic of Uzbekistan and the World Bank.

## 1.1. Uzbekistan Country Overview

Uzbekistan is a lower-middle-income, natural resource, mineral rich, and landlocked country. It has the largest population in Central Asia—35 million as of 2021.<sup>3</sup> With a total area of about 44 million ha,<sup>4</sup> approximately 49 percent of the population is concentrated in rural areas. Population density in rural areas is low except for the fertile and irrigated Fergana Valley.

Uzbekistan is situated in Central Asia, between Kazakhstan in the north, Kyrgyz Republic and Tajikistan in the east, Afghanistan in the south, and Turkmenistan in the west. Most of the country is in lowlands on plain terrain, including the Aral Sea basin in the northern and western parts and Kyzylkum, the largest desert of Central Asia, that covers particularly the southern part of Uzbekistan. Besides cold desert plain regions, Uzbekistan is characterized by mountainous regions in the east with elevations up to 4,600 m asl in the Gissar Mountain Range. Uzbekistan’s most fertile part is the Fergana Valley, which is in the central eastern part of the country and surrounded by mountain ranges.

Uzbekistan has a continental climate, ranging from warm continental (Fergana Valley) to cold semi-arid, while the western part of the country is dominated by a cold desert climate.<sup>5</sup> Average January temperatures range from +4°C in the south to -10°C in the north, July temperatures range from +27°C in the north to +37°C in the south. The lowest temperature is -38°C. The summers are long, extremely dry, and hot. Precipitation increases to the east and southeast as the relief rises. In the desert part, yearly precipitation ranges from 100 to 200 mm, in the foothills area of Uzbekistan the average is 300–550 mm, while on the slopes of the Western Tian Shan and Pamir-Alai it is 800–900 mm. Due to the irregular nature of the terrain, heavy and short summer rains can occasionally cause soil erosion and substantial river silting. Rising temperature, droughts, and extreme weather conditions have been observed due to climate change and, similar to other Central Asian countries, climate change is considered a major threat to sustainable development.

Uzbekistan has an average population density of 74 persons per square kilometer.<sup>6</sup> During 1990–2018, the population had an annual growth rate between 1.4 and 2.9 percent.<sup>7</sup> Temporary and permanent labor

2 This Note mainly refers to land under the Forest Fund, which is land managed by the SCF; it includes forest, agriculture, and grazing land. When using the term forest, the Note refers to land that is covered with trees (‘forested land’). The term ‘forest landscapes’ is used to refer to forest and non-forested land that can be potentially used for reforestation and agroforestry purposes, on SFF land and land under other state jurisdiction.

3 Uzbekistan official statistics (<https://stat.uz/en/official-statistics/demography>).

4 ADB (Asian Development Bank). 2020. Basic Statistics 2020.

5 Peel, MC, B. L. Finlayson, and T. A. McMahon, 2007. “Updated World Map of the Köppen-Geiger Climate Classification.”

6 ADB. 2020. Basic Statistics 2020. Manila, Philippines: ADB.

7 World Bank. 2019. Uzbekistan Country Profile.

migration is common, especially among males, and remittances are an important contribution to the livelihoods of many. In 2019 alone, US\$7.6 billion worth of remittances was received, approximately 13 percent of the gross domestic product (GDP).<sup>8</sup> Growth in urban population (currently 51 percent) has slowed down since 1990 and is now at 1.6 percent.

The capital city, Tashkent, is located in the northeast, near the border with Kazakhstan. The country is administratively divided into one autonomous republic (Karakalpakstan), one independent city (Tashkent), and 12 provinces (viloyat/viloyatar) containing a number of districts (tuman) and cities of regional subordination. The districts are further divided into cities, urban type settlements, and a citizen assembly of villages. Each viloyat has a council of people's deputies and a mayor. Local public authorities consist of the mayors of provinces (viloyatar), districts, and towns, who lead both legislative and executive branches of power. These local governments lead local state, economic, social, and cultural affairs and approve plans and budgets for economic and social development and enterprises.<sup>9</sup>

Annual GDP growth averaged 6.5 percent in the last two decades<sup>10</sup> but 2020 and 2021 were affected by the global pandemic. National economic growth has been increasing more slowly in the past 10 years and has been volatile, reflecting vulnerability to climatic and global economic conditions. Uzbekistan is classified as 'middle income' by the World Bank. There are no recent data on extreme poverty in Uzbekistan, but according to the Asian Development Bank, in 2016, 12.3 percent of the population lived below the national poverty line. Based on the World Bank's recommended 2,100 kcal per day, 11 percent of the population was classified as low income.<sup>11</sup> The country produces cotton, gold, copper, uranium, and natural gas. Real GDP grew by 7.6 percent in 2010 and 5.6 percent in 2019 and is now at US\$58 billion. Agriculture, forestry, and fisheries together contribute 29 percent to the GDP.

Uzbekistan has 25.5 million ha of agricultural land, out of which 4 million ha are arable land, 21 million ha are pasture, and 0.4 million ha are cultivated with permanent crops.<sup>12</sup> The main agricultural product is cotton, followed by wheat and other cereals (maize, rice, and so on). Around 10 percent of the surface is intensively cultivated, mostly in river valleys and oases with extensive irrigation systems (82 percent of arable land is irrigated). Part of the land in the foothills with precipitation above 350 mm a year is used for non-irrigated farming (cereals, wine, gourds, oil crops) and agroforestry. Horticulture generates about 50 percent of the value of crop production and 40 percent of gross agricultural output from only 10 percent of the land and has the largest job creation potential. Although smallholder (dehkan) farms only occupy 13 percent of irrigated arable land, they contribute 70 percent of the national agricultural output (mainly meat, milk, eggs, fruit, and vegetables).<sup>13</sup> Overall, livestock production accounts for 40 percent of gross agricultural production. Uzbekistan's agriculture faces several challenges including high water use (90 percent of total water use in Uzbekistan) and inefficiency of irrigation systems, declining soil fertility, and salinization (65 percent of irrigated area in 2000). The sown area of agricultural crops has decreased from 3.7 million ha in 2000 to 3.3 million ha in 2019.<sup>14</sup>

Uzbekistan's recent economic performance has reduced poverty and promoted shared prosperity. Over the past decade, Uzbekistan has gradually diversified its economy, and official poverty estimates have

<sup>8</sup> Same as n. 4

<sup>9</sup> Same as n. 7

<sup>10</sup> Nagaraj, Vinayak, and William Seitz. 2020. Towards a Better Future: Uzbekistan Second Systematic Country Diagnostic (SCD). Concept Note.

<sup>11</sup> Uzbekistan official statistics (<https://stat.uz/en/official-statistics/living-standards>)

<sup>12</sup> FAOSTAT 2019 - Uzbekistan.

<sup>13</sup> FAO. 2019. Gender, Agriculture and Rural Development in Uzbekistan. Country Gender Assessment Series. Budapest, Hungary. <http://www.fao.org/3/ca4628en/ca4628en.pdf>.

<sup>14</sup> Uzbekistan official statistics (<https://stat.uz/en/official-statistics/agriculture>).



declined from 27.5 percent in 2001 to 11.4 percent in 2018.<sup>15</sup> Uzbekistan is ranked 108 out of 189 countries in the Human Development Index (HDI) with an HDI value of 0.710 for 2018, which has increased by 19.2 percent since 2000.<sup>16</sup> However, the income share held by the poorest 20 percent of the population was only 7.1 percent in 2000. Consumption growth among the bottom 40 percent of the population outpaced average consumption growth. Despite a slow and steady decline in poverty, Uzbekistan still has a high number of poor, especially among the rural population. About 79 percent of poor people live in rural areas.<sup>17</sup> The unemployment rate is 5.9 percent. Among the employed population, 19.7 percent live below US\$1.9 (purchasing power parity) per day. The most vulnerable groups at risk of poverty remain those with low education levels, households with three or more children, families in rural areas relying on self-employment, and the elderly. Rural poverty persists due to low agricultural productivity, limited access to productive assets, and the informality of rural labor markets.

Since 2017, Uzbekistan's economic policy has been reoriented toward a competitive, market-led, private sector economy. Simultaneously, a series of social and political reforms have focused on reorienting the public sector to be responsive and citizen centric and deliver high-quality public services for all citizens. In mid-2017, with advisory support from the World Bank Group, the Government of Uzbekistan (GoU) launched economic reforms and has since enacted notable structural reforms.

Increased regional and international cooperation and integration have become core elements of this new paradigm shift in Uzbekistan, with Central Asian countries assumed as the main priority in its foreign policy. In the last two years, the intensification of regional integration efforts by Uzbekistan has been unquestionable. For example, border demarcation issues have been overcome, and checkpoints reopened, regional trade has been scaled up, power lines have been reconnected, regional visas are being considered, and the GoU has expressed willingness and interest in regional cooperation in infrastructural development.

Compared with other Central Asian countries, Uzbekistan performs less well in some areas of gender equality, with only 16 percent of national parliament seats held by women and labor force participation rates by women and men at 53 percent and 78 percent, respectively.<sup>18</sup> Disparities thus persist mainly in economic opportunities (gross national income [GNI] per capita is US\$4,656 for females and US\$8,277 for males), health (higher under-five mortality rate), and education.

In February 2017, by the Decree of the President of the Republic of Uzbekistan, the Strategy of Actions on Five Priority Directions of Development of the Republic of Uzbekistan for 2017–2021 was approved. The Strategy of Actions includes improving the state structure and the judicial and legal systems, liberalizing the economy, developing the social sphere, and strengthening inter-ethnic friendship and harmony in the country.

The outbreak of the coronavirus disease (COVID-19) pandemic is seriously affecting Uzbekistan's growth and poverty reduction trajectory. Despite measures taken by the GoU to mitigate the economic, social, and health consequences of the pandemic, persistent COVID-19 disruptions at the local and international levels have tempered prospects for a quick recovery in 2021. Nevertheless, Uzbekistan's outlook remains positive as reforms continue to shift the economy toward greater resource efficiency, private sector growth, and enhanced collaboration at regional level.

<sup>15</sup> In 2018, 11.4 percent of Uzbekistan's population was living below the national poverty line. The World Bank notes that the methodology for measuring poverty needs to be brought to international standards. The official poverty estimate does not consider non-food items and the use value of assets. World Bank data sources suggest that the poverty rate at the lower-middle-income country line was approximately 9.6 percent in 2018.

<sup>16</sup> UNDP. 2019. Human Development Report 2019: Uzbekistan.

<sup>17</sup> Nagaraj, and Seitz. 2020. Towards a Better Future (above, n. 9).

<sup>18</sup> World Bank. 2019. The Little Data Book on Gender.

## 1.2. Forests in the Wider Context

Uzbekistan is a low forest cover country (LFCC) with an effective forest cover of about 3.7 million ha in 2020, as reported to Food and Agricultural Organization of the United Nations (FAO)/Forest Resources Assessment (FRA) (2020). Most of the forest (3.3 million ha according to the State Committee on Forestry [SCF]) is part of the State Forest Fund (SFF) that comprises 12.2 million ha of land (11.3 million ha based on former statistics).<sup>19</sup> Across Uzbekistan, forests cover 7.2 percent of the land area.<sup>20</sup> Other Central Asian countries have a forest cover between 4 percent (Tajikistan) and 8.7 percent (Turkmenistan).<sup>21</sup> According to official statistics, 1,423,000 ha are naturally regenerated forests (39 percent) and 2,267,000 ha are planted forests in different categories (61 percent). According to FRA 2020, an area of 210,300 ha is classified as primary forest (although it is assumed these forests will be in protected areas). The few remaining natural forests are under pressure from several drivers. While in the past land conversion to commercial agriculture was a major threat, nowadays the main pressures in desert areas, river valleys, and mountain areas are overgrazing, increasing demand for fuelwood and other forest products, impacts from unsustainable land use, forest and landscape fire effects, and climate hazards.

Forest management is focused on protection and conservation. Two-thirds of the SFF land mainly has a protective role as it lies in critical areas—extreme dry zones, mountainous areas, or along waterways (riparian forests). Forests play a protective role to preserve the long-term productivity of agricultural lands, guard settlements from water and wind erosion, prevent the occurrence of mudflows, and restrict the movement of sand. One-third of the SFF land is also used for protected areas/biodiversity conservation, with use restricted mainly to non-wood forest products (NWFPs), and only 0.2 percent (6,000ha) of the land area is considered as production forest for timber and fuelwood production.

Despite the low forest cover and the pressures on forests, the sector presents opportunities for future sustainable development in areas such as (a) extension of tree planting (afforestation, shelterbelts, and so on) to help combat soil erosion and mitigate against climate change; (b) extension of forest management plans to local public administration forests to support sustainably managed community-based resources; (c) planting of fast-growing tree species and woody energy crops to relieve the pressure on natural forests and woodland and support emissions targets; (d) increased production and trade of NWFPs; (e) improved management of protected areas; and (g) ecosystem and ecotourism development. These rural-based opportunities would provide much needed rural employment and contribute to poverty alleviation.

The SFF is managed by decentralized state forest enterprises (leskhoz), strategically guided and administered since May 2017 by the SCF. Since then, an institutional reform process has been started, including through a series of Presidential Decrees (PDs) that are further described in this report. The institutional reform process includes, among others, (a) separation of the regulatory and administrative roles of the various institutions involved in forestry; (b) need for more transparent, effective, and efficient administration of the SFF and forest areas outside the SFF land; (c) need to further develop investment in forestry; (d) need for a comprehensive national assessment of forests and woodlands through a national forest inventory (NFI) and monitoring of change in forest quantity and quality; (e) modern forest management planning at forest enterprise level; and (f) increasing involvement of local communities and the private

<sup>19</sup> The area of the SFF varies according to the sources and the date of reference. Of 12.21 million ha indicated by FAO-UNECE (2019), 11.4 million ha was the official figure up to 2017: before 2017 an area of 9.6 million ha was indicated by the Ministry of Agriculture and Water.

<sup>20</sup> Due to the lack of an NFI, data on the extent of forests and woodlands are approximate.

<sup>21</sup> FAO. 2019. State of Forests of the Caucasus and Central Asia: Overview of Forests and Sustainable Forest Management in the Caucasus and Central Asia Region. UNECE, New York and Geneva.

sector in forest resource use and conservation, including through long-term leases and fuller valuation of the potential of the SFF land.

Finally, it needs to be stressed that while forests and woodlands in Uzbekistan are likely to be significantly affected by climate change, they also can contribute to increased resilience and reduced vulnerability of social systems and ecosystems. The IPCC/AR6 Climate Change 2021 Physical Science Basis report of August 2021<sup>22</sup> expects that for the Central Asia region, even small changes in temperature and precipitation could alter ecosystems, including the sparse forests and woodlands and the resulting reduced productivity of land, pasture, and forests is expected to worsen living conditions. Ecosystem vulnerability increases significantly when anthropogenic factors overlap with the impact of adverse climate events. Consequently, environmental activities aimed at sustainable management and landscape restoration will need to be planned early on, so that they can contribute to the preservation of their biospheric and socially useful functions. Thus, the restoration and preservation of forests and associated biodiversity is a rational way to ensure environmental stability and sustainable development, and for adaptation to ongoing climate change trends. With this in mind, forests and forestry will have to play an expanded role in the development of Uzbekistan in the coming decades.

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22 [https://www.ipcc.ch/report/ar6/wg1/downloads/factsheets/IPCC\\_AR6\\_WGI\\_Regional\\_Fact\\_Sheet\\_Asia.pdf](https://www.ipcc.ch/report/ar6/wg1/downloads/factsheets/IPCC_AR6_WGI_Regional_Fact_Sheet_Asia.pdf).



# 2. FORESTS AND FORESTRY IN UZBEKISTAN

## 2.1. Forest Resources

### 2.1.1. Forest cover and forest dynamics

The territory of Uzbekistan is divided into a large, flat northwestern and central part and a smaller submontane and mountainous southeastern part. Deserts and semideserts (including the Kyzylkum Desert and southeastern part of the Ustyurt Plateau) cover almost 85 percent of the country's land area, mostly in the northwestern, northern, and central parts of Uzbekistan. About 2 percent of the area of the country is occupied by alluvial valleys. Mountains and submontane areas occupy about 13 percent of the territory of the country in the east and southeast. The mountainous part includes the western spurs of the Tian Shan, Pamir-Alai high mountains, and their submontane areas. The highest point is the mountain Khazret Sultan at 4,643 m above sea level in the Gissar Range. The lowest point is in the Kyzylkum Desert at 12.8 m below sea level.

Considering the specifics of its geography and climatic conditions, Uzbekistan is a forest-poor country. While the SFF land officially occupies nearly 22 percent of the total land area of Uzbekistan, corresponding to approximately 9.6 million ha, only about 3.69 million ha are covered by forests.<sup>23</sup> Thus, the forest cover of Uzbekistan is, depending on the source, between 7.2 percent and 7.5 percent. Forests are defined in Uzbekistan, according to FRA reporting, as land spanning more than 0.5 ha with trees higher than 5 m and a canopy cover of more than 10 percent of trees able to reach these thresholds in situ. It does not include land that is predominantly under agricultural or urban land use. Also, as a country with a dry climate, the category of other wooded land<sup>24</sup> is important. Table 1 shows the forested area and other wooded land, as reported by the GoU to FAO-FRA since 1990.

**Table 1. Area Covered by Forests and Other Wooded Land, as Reported to FAO-FRA (ha, thousands)**

	1990	2000	2005	2010	2015	2020
<b>Forest</b>	3,045	3,212	3,295	3,275	3,220	3,689
<b>Other wooded land</b>	1,306	1,595	904	874	1,154	1,175

**NOTE:** a. Data made public in June 2020 (FAO/FRA 2020).

The latest available data (2020) give the extent of forests at 3,688,700 ha, which is considerably higher than reported in the years before, for example, 14 percent higher compared with 2015. This is also the case for 'other wooded land'. This significant change in forest area can also be partly explained by the fact that forested land under different state ownership was set under the SCF or that areas without vegetation cover were allocated for forest reclamation/restoration and thus put under the SFF.

<sup>23</sup> The 3.69 million ha is an estimated figure of the total forested area; about 3.3 million ha are under SFF land. Figures need to be considered cautiously in the absence of an NFI. The FAO project TCP/UZB/3503 through a Collect Earth report shows different figures on the forest area. (Pulatov B., Kholova Sh., Adolt R., Shukurov A., Embergenov M., Shozhalilov M. 2016. Monitoring and Assessment of Land Use, Classification of Works of Ground Centers of Trial Plots in the Territory of the Republic of Uzbekistan Using Software Collect Earth. FAO: Tashkent City).

<sup>24</sup> Other wooded land means land not classified as 'forest' spanning more than 0.5 ha with trees higher than 5 m and a canopy cover of 5–10 percent of trees able to reach these thresholds or with a combined cover of shrubs and bushes and trees above 10 percent. It does not include land that is predominantly under agricultural or urban land use.

The most important reason for changes in the SFF land and forested areas was the inclusion of agricultural lands in the SFF since the 1990s as well as inclusion of reserved lands to prevent land degradation in mountain and piedmont areas and desertification in desert and sandy territories. Changes also took place in forested areas due to transfer of lands with forested plots and lands characterized by gradual increase in forest regeneration area, as well as consistent transfer of the pledged forestry crops into the 'forested area' category of the SFF where sowing and planting of arenaceous hardy shrub species such as saxaul account for more than 90 percent of the forest planting areas.

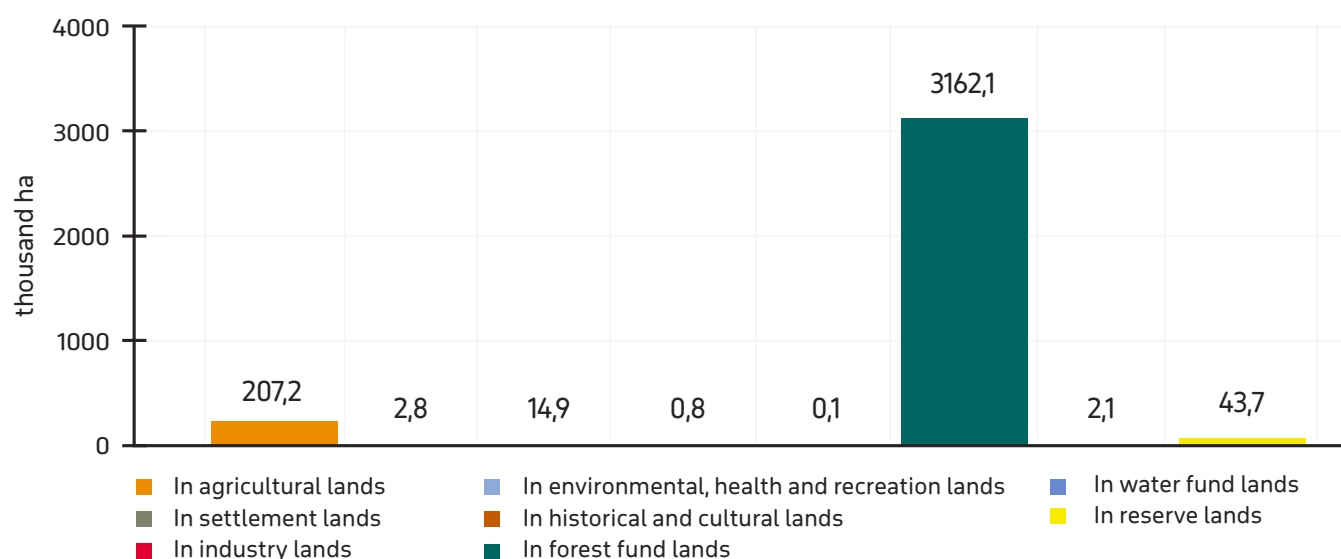
In 2021, the SFF area is 11,975,200 ha (2020: 11.5 million ha) as indicated by the SCF, which is a considerable increase compared to figures from 25 years ago. Thus, the area of the SFF is different according to the source. Since 1998, the area classified as Forest Fund land has grown; hence, official figures differ from year to year.

Based on FRA (2020), 69 percent of the total forested area is managed for soil and water protection (2.5 million ha) and 31 percent for biodiversity conservation (1.1 million ha) with restricted use only allowing NWFPs. Only 6,000 ha are considered as production forests for timber and wood, mainly poplars and other fast-growing species (0.2 percent).

From here onward, forest land refers to the land of the 'State Forest Fund' overall and includes forest lands covered with forest ('forested'), forest lands not covered with forest, and non-forest lands such as sand dunes or mountain rocks on a total area of 12.2 million ha. In addition to the area under the SFF, there are still some forests that are not managed by the SCF and are located either on agricultural land or in protected areas. According to data received by the SCF, the forested area outside SFF is estimated at 352,300 ha (see also Figure 2).

Table 2 shows the distribution of land types under the main categories of agricultural lands, forest lands (SFF), and reserved lands. In addition, there are uneconomic lands, which are not included in the table. Data in the table are of 2012 and are similar to the figures in Pulatov et al. (2016) that report 20,388,000 ha of agricultural lands (0.4 percent forested) and 12,678,800 ha reserved lands (0.09 percent forested).

**Figure 2. Forested Area in Uzbekistan by Land Category**



SOURCE: Pulatov et al. 2016.

**Table 2. Distribution of Land Types in Agricultural, Forest, and Reserved Lands in 2012**  
[numbers based on APFNet report<sup>25</sup>]

Land Type	Area (ha)	% of Category	% of Total Lands
<b>Agricultural lands</b>			
Arable lands	4,045,600	19.7	9.5
Perennial plantings (fruit, vineyards, and so on)	343,000	1.6	0.8
Household plots	616,200	3.0	1.5
Hayfields	104,900	0.5	0.2
Pastures	11,018,800	53.8	26.0
Forested (forest belts, poplars, and so on)	210,200	1.0	0.5
Shrubs	31,100	0.2	0.1
Lands under reclamation and amelioration	70,700	0.4	0.2
Fallow lands	78,400	0.4	0.2
Unused lands	3,954,600	19.3	9.3
<b>Total</b>	<b>20,473,500</b>	<b>100.0</b>	<b>48.3</b>
<b>Forest lands (SFF)</b>			
Forested (natural forests and plantations)	2,945,500	30.6	7.0
Pastures	3,109,100	32.3	7.3
Unused lands	3,471,900	36.0	8.2
Other	109,400	1.1	0.3
<b>Total</b>	<b>9,635,900</b>	<b>100.0</b>	<b>22.7</b>
<b>Reserved lands</b>			
Pastures	6,319,600	51.5	13.1
Forested	43,600	0.4	0.1
Unused lands	5,896,200	48.1	15.8
<b>Total</b>	<b>12,262,700</b>	<b>100.0</b>	<b>28.9</b>
<b>Total</b>	<b>42,372,100</b>		<b>100.0</b>

Note that the absolute figures have changed, the state forest land has been increased to nearly 12 million ha in 2021; it is assumed that this increase is based on reducing the extent of reserved lands. The largest areas of the SFF are in the Republic of Karakalpakstan and the provinces of Bukhara, Navoiy, and Kashkadarya, while the smallest areas are in the Samarkand and Syr Darya provinces and the Fergana Valley. Table 3 summarizes the data on annual forest expansion, deforestation, and net change, as reported to FRA 2020.

<sup>25</sup> APFNet (Asia-Pacific Network for Sustainable Forest Management and Rehabilitation). 2017. Forest Development and Best Practices of Forest Management in Uzbekistan.

**Table 3. Forest Dynamics 2010–2020 (in ha)**

FRA Categories	2010–2015	2015–2020
Forest expansion	41,000	42,200
- of which afforestation	23,100	26,900
- registered natural expansion	3,700	4,400
- other (for example, reclamation)	14,200	10,900
Deforestation	10,040	14,150
Forest area net change	+39,960	+28,050

Table 4 gives an overview of the total area of the SFF and the share in the different regions, including the approximate share of forested versus unforested land. Data are updated from documentation dated 2018.

The Land Code (1998) classifies all land in Uzbekistan into eight categories: state forest land (11.2 million ha<sup>26</sup>), agricultural land (approximately 20 million ha), reserve land (approximately 12.6 million ha), private land, industrial land, recreational land, heritage and architectural land, and water bodies. It is important to note that agricultural land and reserve land contain significant areas with tree and forest cover. Figures for the forested areas in these land categories could not be found.

**Table 4. Overview of the SFF Land, Forested and Non-Forested Land, Including Share of Pasture Land**

Administrative Regions	SFF Area	Part of Total SFF	Covered by Forests (forest definition)		Not Forested (not covered by forests)	
	(ha, thousands)	(%)	(ha, thousands)	(%)	(ha, thousands)	Of which Grazing Land (ha, thousands)
Republic of Karakalpakstan	5,752.7	51.0	1,100.7	6.6	4,133.1	689.3
Andijan province	8.0	0.1	1.7	0.3	6.0	2.0
Bukhara province	623.9	5.5	335.8	8.3	223.8	165.2
Jizzakh province	291.0	2.6	117.8	5.6	112.5	82.9
Kashkadarya province	330.2	2.9	132.0	4.6	160.7	114.0
Navoiy province	3,098.2	27.5	1,293.9	11.7	1,549.8	1,500.0
Namangan province	126.7	1.1	16.0	2.2	108.8	87.3
Samarkand province	57.9	0.5	9.9	0.6	43.2	28.3

<sup>26</sup> Note that the area of the SFF is different according to the source. Since 1998, the amount of land classified as Forest Fund has grown, hence official figures differ from year to year.



Administrative Regions	SFF Area	Part of Total SFF	Covered by Forests (forest definition)		Not Forested (not covered by forests)	
	(ha, thousands)	(%)	(ha, thousands)	(%)	(ha, thousands)	Of which Grazing Land (ha, thousands)
Surkhandarya province	325.0	2.9	140.4	7.0	141.3	69.0
Syr Darya province	8.8	0.1	0.3	0.1	6.5	1.2
Tashkent province	538.0	4.8	81.8	5.4	419.9	188.7
Fergana province	15.9	0.1	5.6	0.8	8.0	1.1
Khorezm province	87.9	0.8	31.6	5.2	55.0	50.9
<b>Total</b>	<b>11,264.2</b>	<b>100</b>	<b>3,267.5</b>	<b>7.3</b>	<b>6,968.2</b>	<b>2,979.9</b>

**NOTE:** a. Figures on the distribution of SFF into use areas do not fully add up as infrastructure area is not included. Figures based on data available before 2017. The area of the SFF, however, has been reported to have changed in late 2021 (12.21 million ha).

## 2.1.2. Forest types and forest management

Four different major forest types can be found in Uzbekistan: (a) forests in the dry areas, (b) broadleaf mountain forests with mosaic distribution, (c) juniper forests in higher mountain areas, and (d) tugai forests distributed as riparian forests along permanent and semipermanent water courses. Table 5 gives an overview of the major forest types, related tree species, and their approximate extent.

**Table 5. Forest Types of Uzbekistan and Extent of Forested Area<sup>27</sup>**

Location	Forest Type	Main Tree Species	Extent (ha)
Dry, desertic regions, in large patches in cold deserts (Karakalpakstan, Bukhara, and Navoi regions)	Saxaul trees and shrubs woodlands	Haloxylon ammodendron (common saxaul), H. persicum (white saxaul), H. aphyllum (black saxaul), Tamarix spp; Calligonum caput-medusae (kandym shrub), Salsola richteri	2,533,200
Mountains 800–2700 m asl, mosaic distribution including Tian Shan mountains	Walnut-fruit forests	Juglans regia, Prunus spp., Ulmus spp., Acer spp., Malus spp., Pirus spp., Pistachia	298,400
Pamir–Alai mountains 2,000–3,000 m asl intersected by Festuca steppes	Juniper forests (Archa)	Juniperus turkestanica, J. semiglobosa, J. seravshanica	
Azonal, riparian forests along rivers; in patches (Amu Darya and Syr Darya river deltas)	Tugai forests with poplars, willow, and black saxaul	Populus euphratica, P. diversifolia, P. pruinosa, P. alba, P. nigra, Salix spp., Tamarix spp., Haloxylon aphyllum	93,600

**NOTE:** a. Area figures are from prior estimates (2008). Forested area should have increased, but data are not available.

<sup>27</sup> Zakhadullaev, A. 2017. Criteria and Indicators for Forest Reporting in Uzbekistan: Report on the National Coaching Workshop. <https://www.unece.org/fileadmin/DAM/timber/meetings/20170802/UZB-Tashkent-Aug2017-report.pdf>.

In many parts of the country, forests have a protective role to preserve the long-term productivity of agricultural lands, guard settlements from water and wind erosion, prevent the occurrence of mudflows, and fix moving sands, depending on their location in extreme dry zones, in mountainous areas, or along waterways. They contribute to combating desertification and preventing natural disasters (for example, mudflows, floods, droughts). In general terms, they crucially support and sustain the environment, with mountain forests being particularly important for water supply. Thus, natural forests are not managed primarily for timber production but for a variety of goods and, particularly, for ecosystem services.

Figure 3 shows the prevalent forest types across Central Asia<sup>28</sup> whereas Figure 4 shows the distribution of different forest types within the SFF.

**Figure 3. Forest Resources in Central Asia**



SOURCE: FLERMONECA 2015.

28 FLERMONECA. 2015. "The State of the Environment in Central Asia: Illustrations of Selected Environmental Themes and Indicators." <https://zoinet.org/wp-content/uploads/2018/02/SOE-regional-eng.pdf>.

Saxaul trees and shrub woodlands in desert-like plains cover nearly four-fifths of the country, *Haloxylon* spp. and *Tamarix* spp. making up 66 percent and 5 percent, respectively, of all trees in Uzbekistan.<sup>29</sup> They are, however, in various stages of degradation due to intensive use and changing environmental conditions. Climate change is expected to make these areas even more arid, further worsening growing conditions and reducing productivity. The soils have low levels of humus (1 percent in the upper soil layer), inhibiting water absorption and making it difficult for them to support trees and other plant species. The primary canopy forming species in desert areas are saxaul (*Haloxylon* spp., see Box 1). Other common species are shrubs, particularly saltwort (*Salsola richteri*, *S. paletzkiana*), kandym (*Calligonum* spp.), and several species of tamarisk (*Tamarix* spp.). Most desert forest stands are low density<sup>30</sup> (10–20 percent canopy cover), producing low standing volumes of up to 20–40 m<sup>3</sup>/ha for best saxaul stands, up to 10–20 m<sup>3</sup>/ha for saltwort, and less than 10 m<sup>3</sup>/ha for tamarisk.

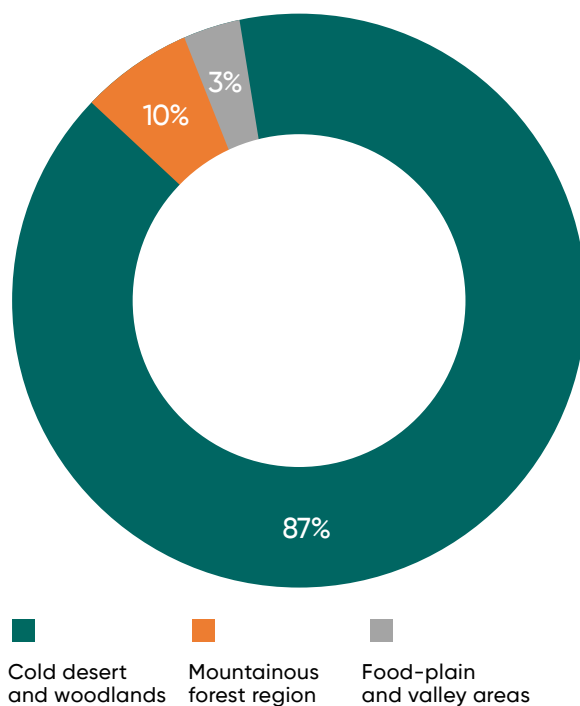
The main focus of forestry activities in the desert zone, including the Aral Sea area, is afforestation to prevent or reduce salt and dust erosion from the soil surface as well as to stabilize shifting sands.

A particular situation is found in the former Aral Sea-bed. Diversion of significant parts of the runoff of Amu Darya and Syr Darya Rivers for the irrigation of cotton and wheat fields has distorted the natural water balance of the Aral Sea, resulting in a catastrophic reduction of the water volume in the sea and its surrounding area.<sup>31</sup> The basin has changed from freshwater to a strongly mineralized water body. Simultaneously, the area of the drained bottom has increased to cover more than 4 million ha, with significant parts of this drained area becoming saline. The intensive wind activity in this region transports salt and dust, considerably worsening the ecological situation in adjoining woodlands (see also Chapter 3.2). The only realistic means of preventing this negative process is woody plant-based rehabilitation of the dried seabed.<sup>32</sup> Therefore, significant areas of the drained bottom were placed under the authority of the SFF.

Desert-like ecosystems are the main habitat of rare and endangered animal species such as Indian honey badger, caracal, Persian gazelle, marble teal, serpent eagle, and others. About 50 species of birds are adapted for living under conditions of sandy deserts with saxaul tangles and shrubs serving as nesting places.

Mountain forests with two distinguished types, walnut-fruit forests and juniper forests, can be found in areas between 800 and 2,800 m asl in the far eastern part of the country. They have a zonal character

**Figure 4. Relative Distribution of SFF on the Major Forest Types**



**SOURCE:** Based on Pulatov et al. 2016.

29 Pulatov B., Kholova Sh., Adolt R., Shukurov A., Embergenov M., Shozhalilov M. 2016. Monitoring and Assessment of Land Use, Classification of Works of Ground Centers of Trial Plots in the Territory of the Republic of Uzbekistan Using Software Collect Earth. FAO: Tashkent City.

30 Density is a quantitative measure of canopy closure where 1 is 100% closed and 0 is open.

31 Micklin, Philip. 2010. "The Past, Present, and Future Aral Sea." *Lakes & Reservoirs: Research & Management* 15 (3):193–213. doi:10.1111/j.1440-1770.2010.00437.x.

32 Botman, E., A. Kalachev, Y. Borissova, et al. 2020. "Dryland Forest Restoration under a Changing Climate in Central Asia and Mongolia." *Journal of Biological Sciences* 18:3–18.

with distinctions between dry-bare areas and dry steppes, meadow steppes, bushes, deciduous and coniferous (juniper) forests, and subalpine and alpine meadows.

Juniper forests, with trees that can reach 20 m and more, are found at higher elevations, extending over an area of about 193,000 ha along the slopes of the Alay, Turkestan, Zeravshan, Ferghana, Chatkal, and Kuramin ridges and along the southwestern branches of the Gissar and Babatag ridges. Due to intense grazing pressure, juniper forests appear today as open stands with tree and canopy densities of 20 to 50 percent.<sup>33</sup> They are typically distributed in alpine meadow lands, often as widely dispersed single trees in the landscape.

**Figure 5.**  
**Degraded Walnut-Fruit**  
**Forests in Lower Mountain**  
**Areas**



SOURCE: Nikolai Lyutsian.

**Figure 6.**  
**Juniper Forests in High**  
**Mountain Areas**



SOURCE: Nikolai Lyutsian.

<sup>33</sup> Botman, E. 2008. Report to IUFRO.

Walnut-fruit tree forests are unique and relict. They encompass both pure walnut stands and mixed stands and are concentrated on north-facing slopes and lower watersheds. Pure walnut forests grow commonly at the valley bottom and on the gentle northern slopes of the Fergana and Chatkal ridges. Mixed maple-walnut or walnut-fruit tree (apple, wild cherries) forests develop under poor site conditions on more exposed southern slopes with shallow soils, forming sparse, stunted stands with densities of 30–40 percent or less. Mature walnut forests have an average timber stock of 60 m<sup>3</sup>/ha.<sup>34</sup> Walnut-fruit forests are important for their NWFPs and as a gene pool at the level of species biodiversity of fruit and nut trees (see also Chapter 2.6.4 and Box 7).

Pistachio forests, mainly concentrated on the ranges of the Babatag mountains, are the second most extensive forest type in submontane areas. These trees can live for 300 years or more, forming drought-resistant, open stands with an average wood stock of less than 5 m<sup>3</sup>/ha. Stocking density and natural regeneration of pistachio is poor due to grazing and intensive fruit harvesting. Their overall area in the country totals 39,000 ha.

Tugai forests (riparian forests) develop in specific ecological conditions: a high-water table and periodic floods combined with a hot dry climate in summer, low air humidity, and an absence of summer precipitation. Primary forest-forming tugai species are native poplar species (*Populus diversifolia*, *Populus pruinosa*), Russian olive (*Elaeagnus angustifolia* L.), willow (*Salix songarica*) and tamarix. In total there are about 40 species of typical tugai plants. Tugai vegetation supports reptiles such as the lidless skink and grass snake, birds such as pheasant species and herons, mammals (jungle cat, jackal, fox, wolf, and badger), rodents, and ungulates (boar, Bukhara deer). However, the biodiversity in these mosaic forested landscapes is highly threatened.

Tugai forests were once widespread and played a major function in protecting waterflow and low-lying soils. The largest dispersed areas of tugai forest ecosystems occupy some 30,000 ha in the Republic of Karakalpakstan in the western part of the country, comprising about 10 percent of the initial tugai forests in the delta of the Amu Darya River. These areas also account for 75 percent of all remaining tugai forests in Uzbekistan and 20 percent of tugai forests of Central Asia. Significant forest areas, although partly heavily degraded, are located along the Syr Darya River (in the Fergana Valley), the Chirchik River (Tashkent region), and the Zerafshan River (near Samarkand). The shrinking of the tugai forest areas reduces the number of rare and endangered species that depend on those ecosystems.

At present, there remain small narrow strips of tugai forests as well as individual tugai forest areas along river valleys, which are important ecological corridors for wildlife. Today, forest stands along the rivers mainly consist of planted tree stands, often with introduced species, such as poplars. Present-day tugai forests are low productivity stands with a total stand volume of 44–46 m<sup>3</sup>/ha; however, there are exceptions such as in Khorezm and Karakalpakstan where tugai stands are reported as more productive. Tugai forests stabilize embankments and purify waters flowing into the rivers, including water originating from irrigated arable land, in addition to their role providing timber and fuelwood. The area of tugai forests is potentially of high interest for forest landscape restoration (FLR), including the planting of native and introduced poplars and native willow species.

<sup>34</sup> Blaser, J., J. Carter, and D. Gilmour. 1998. Biodiversity and Sustainable Use of Kyrgyzstan's Walnut-Fruit Forests: Proceedings. IUCN Technical Series, Arslanbob, Kyrgyzstan.

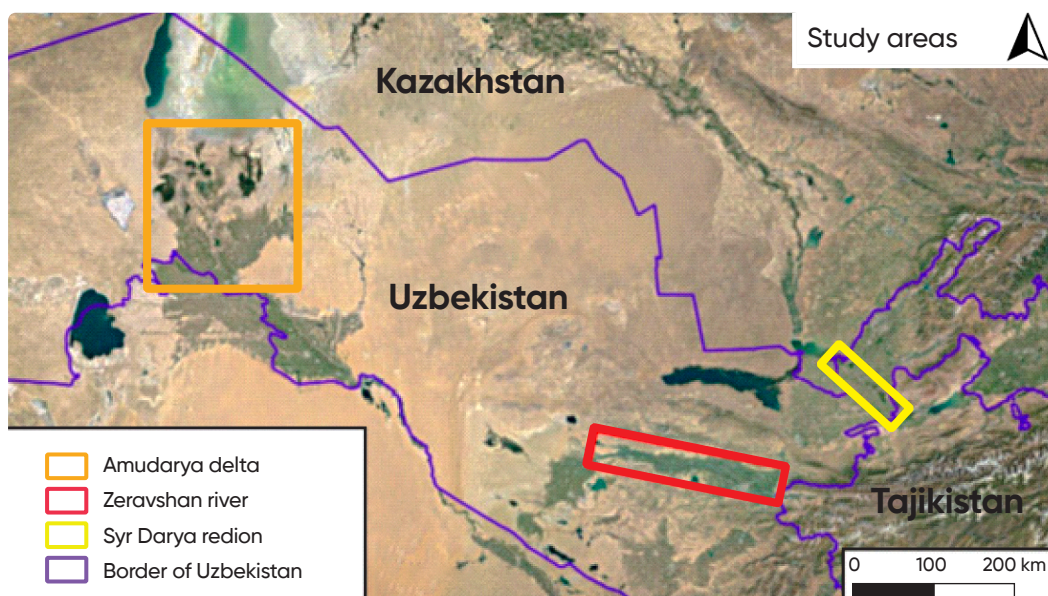
**Figure 7.**  
**Tugai Forest in**  
**Uzbekistan**



**SOURCE:** Natalya Akinshina

A remote sensing study conducted in July 2021,<sup>35</sup> comparing the situation of three different sites in the Amu Darya delta, Zeravshan River, and Syr Darya region, revealed that there has been a continuous loss of tugai forest area since 1987 in all three regions (with a high uncertainty range). Field assessments are needed to determine the status of remaining tugai forests and to define the areas that can potentially be integrated into a forest restoration program.

**Figure 8.**  
**Study Area of a**  
**Remote Sensing**  
**Analysis of Tugai**  
**Forests**



**SOURCE:** Langwieser 2021a.

<sup>35</sup> Langwieser, Y. 2021a. "State and Evolution of Tugai Forests in the Amu Darya Delta, the Zeravshan Region, and the Uzbek Part of the Syr Darya, Uzbekistan." Bach Thesis, Bern University of Applied Sciences.

### Box 1. Saxaul *Haloxylon* spp. (Amaranthaceae)

The saxaul genus comprises three closely related species, *Haloxylon ammodendron* (common saxaul), *H. aphyllum* (black saxaul), and *H. persicum* (white saxaul). All three species have developed considerable tolerance for aridity, wind, salinity, and limited nitrogen and have the ability to grow in harsh conditions, including a hot desert climate and a dry continental climate with extreme differences between summer and winter.

The various saxaul species have a wide natural distribution range encompassing Egypt, Saudi Arabia, the United Arab Emirates, Iraq, central Iran, Pakistan, and western Afghanistan, with a particular dominance in the continental deserts in all Central Asian countries, including Uzbekistan and Kazakhstan, and extending further east to Mongolia and China (Xinjiang, Gansu).

They grow to the size of large shrubs or a small tree, 2–8 m, sometimes up to 12 m tall with stem diameters between 4 and 15 cm, but up to more than 25 cm when older. If not disturbed, saxaul are able to form pure stands with up to 500 trees per ha. White saxaul is a robust tree that can grow in nutritionally poor soil and can tolerate drought.

Saxaul has multiple uses, the largest and most unsustainable being firewood and charcoal. The wood is heavy and produces an excellent charcoal, particularly for the preparation of shashlik (grilled meat). Saxaul is harvested for fodder and serves as forage for wild mammals and birds. The wood yields a green dye used by weavers and more recently, some medicinal uses have been detected. Saxaul roots host the parasitic plant *cistanche* (*Cistanche* spp.), also known as 'ginseng of the desert,' which traditional herbalists use to produce a medicinal component for treating various illnesses.

The extent of saxaul across its natural distribution range has shrunk considerably, in both area and quality of the trees. This is due partly to changing climatic conditions, particularly the absence of rain and long periods of drought that are not conducive to saxaul growth. A main reason of the decline is also human activities, for example, the uncontrolled use for firewood and charcoal.

For broader landscape protection, saxaul are today planted in Central Asian countries, China, and Mongolia to serve as shelterbelts to impede wind erosion and stabilize sand dunes, helping counter the process of desertification. Saxaul is one of the few species that have been well researched for artificial regeneration in nurseries. Also, planting techniques have been developed that improve survival rates up to 40 percent after the first year of planting (generally by sprouts). Specific planting techniques have been developed based on many stories of successful planting and restoring degraded saxaul woodlands from neighboring Kazakhstan, China, and Mongolia. Useful experience includes partnerships between the State Forest Authority and local communities. Activities, however, need to be planned as a multi-year process. Seed trees and high-quality seeds are critical for success, as are specific protective measures that need to be installed on planting sites. Small-scale planting with involvement of local people has generally shown better results than mechanized, large-scale afforestation.

In economic terms, there is potential for the silvicultural management of planted saxaul woodlands in selected coppice-under-standard systems for the sustainable production of high-priced charcoal. Also, the management of saxaul as an NWFP seems to have some potential, including the management of cistanche that appears to have promising value in the medicinal market. Cistanche species are listed in Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), App. 2 as the demand of cistanche is increasing considerably.

**Figure 9. Saxaul in Gosudarstvenniji, Uzbekistan**



**Figure 10. Degraded Saxaul Near Aral Sea**



SOURCE: SCF Abduvokhid Zakhadullaev

### 2.1.3. Planted forests

Based on the FRA 2020 reporting, out of the 3,689,000 ha of forests in Uzbekistan, 61 percent (2,267,000 ha) are classified as forest plantations in two different categories:<sup>36</sup>

- **Lesnyye nasazhdeniya** consisting of low forests with small trees and bushes (type saxaul, which cover about 808,000 ha in 2018, compared to 570,000 ha in 2000)
- **Lesnyye plantatsii**, consisting of forest land on which trees and shrubs are grown to obtain valuable assortments such as poplars, willows, mulberries, and pistachio (cover in 2020 about 1,459,000 ha compared with 975,000 ha in 2000).

As there is a wide variety of ways to plant trees (reclamation with shrubs, shelterbelts, agroforestry, protective woodlots, enrichment planting and industrial plantation to name a few), it is difficult to give an accurate figure for the overall extent of planted forests. The FRA figures<sup>37</sup> over the past 20 years are consistent and indicate a steady growth in area of planted forests that corresponds to the active afforestation policy of the country. There are considerable new planted areas in dry saxaul forests on state forest land; however, there are also large tracts of protective plantations of saxaul and other shrub/small

<sup>36</sup> FRA. 2020. Uzbekistan National Report; FAO. 2020. Global Forest Resources Assessment (FRA) 2020 Uzbekistan – Report (fao.org).

<sup>37</sup> FRA 2020; FAO 2020.



tree species (for example, mulberry and pistachio) on agricultural lands that might not be reflected in the figures above.

The main focus of forestry activities is protection of soil and water in the desert zone with afforestation in the dry bed of the Aral Sea and adjacent areas to prevent or reduce salt and dust erosion from the soil surface as well as to stabilize shifting sand. The intensive wind activity in this region transports salt and dust, considerably worsening the ecological situation in adjoining areas, in particular also the deposit of seabed salt on arable land. The only realistic means of preventing such land degradation process in extreme cold dry climate is planting resilient trees and shrubs in shelterbelt or adapted woodlots in specially designed planting schemes. Therefore, significant areas of degraded land were placed under the authority of the SFF over the years for afforestation purposes. Today, more than 80 percent of sowing and planting activities performed in Uzbekistan occur in the desert zones of the Republic of Karakalpakstan that encompass the dry bed of the Aral Sea and the Bukhara, Navoi, and Khorezm provinces. Annually in these areas, about 30,000–40,000 ha have been afforested with sand-tolerant shrub and small tree species, as listed in Table 5 and Box 1.

In summary, the reclamation of land by shrub and tree planting (commonly known as protective afforestation) has led to a modest but steady increase in forest cover. Yet detailed data on planted areas, survival rates of seedlings and young trees, effects on soil, and costs are not readily available. However, there is evidence that some of these investments have been unsuccessful, due to both the technical challenges they face, and the sometimes inadequate institutional capacities of the local forestry units engaged in these activities. National afforestation data may not reflect the area where afforestation has failed.

In the central and eastern parts of the country, mainly in valley areas, small lots of agricultural fields are surrounded by protective forest plantations such as shelterbelts, which provide important ecosystem services particularly in the still extensive irrigated lands in the arid zone used mainly for cotton and wheat. Forests stabilize this fragile landscape by improving the microclimate, controlling soil erosion, and promoting drainage. Forest plantations at the margin of irrigated lands have higher productivity. Consequently, agroforestry on irrigated arable lands in the desert zone could be useful for increasing climate resilience in these ecosystems.

New forests are also planted to enrich grazing areas. Flat lands are used as natural, low-productive pastures for sheep, goats, and cattle due to their extreme aridity. In the sand and semi-desert zone, protective forest strips increase pasture productivity. At the same time, however, trees and shrubs are threatened by overgrazing.

Forests further serve to provide protection along the borders of oases located in the Bukhara, Navoi, Samarkand, Jizzakh, and Syr Darya provinces to prevent the impact of dust storms, dry winds, and other negative natural phenomena. Protective forest belts are also created around industrial sites (for example, Bukhara refinery plant, Shurtan gas and chemical plant, and Kungrad soda plant) and along railways, roads, and pipelines.

In the early years after independence of Uzbekistan, the planting of fast-growing tree stands in alluvial and riparian forest areas and urban lots was encouraged. The main species used were local poplar (Table 5); introduced poplars, such as *Populus alba*, *P. nigra*; and poplar hybrids (see also Box 6, on *Paulownia*).

Due to the difficult ecological condition and lack of water for irrigation of agricultural crops, usually marginal lands and wastelands were allocated for the creation of such fast-growing forest plantations.

This resulted in a low survival rate of planted trees and combined with the destruction of existing plantations, in a rapid decline of poplar plantation area. The total area of poplar plantations decreased from about 7,500 ha in 1994 to less than 3,300 ha in 2010. The existing industrial plantations of poplar were made mainly from the French hybrids of poplars and due to improper care, they were strongly affected by trunk canker caused by fungi. Nonetheless, it is worth reconsidering planting more poplars. The experience of the International Poplar Commission (IPC), a statutory body of the FAO, could help in this regard.

### Box 2. Private Planting of Poplar Trees<sup>a</sup>

The Uzbek people have had a tradition since ancient times of planting poplars. When a male child is born, the father plants 20 poplars within the family yard. Poplars, both native and introduced, are usually grown in the private yard. Planting outside the yard is risky partly because of tree theft but also because cutting trees outside the yard requires a state-issued permit and a cutting fee. When the son reaches marrying age, the poplar trees are cut down and often used as construction wood for housing. The amount of wood that can be produced in such a way could be important, for example, assuming that 10 trees reach 20 years of age when cut, it may be as much as 10 m<sup>3</sup>.

**NOTE:** a. Amended from SAVCOR/Indufor Oy. 2005. Ensuring Sustainability of Forests and Livelihoods for Economies in Transition Working Document Uzbekistan. World Bank, unpublished.

## 2.1.4. Forest protected areas and other special conservation zones

The primary function of forests in Uzbekistan, besides preserving biodiversity and wildlife, is combating desertification and helping reduce other risks, such as floods and soil erosion. Natural ecosystems are characterized by a high level of biological diversity, which reflects a complex history of development of local flora and fauna and geographic location of the country.<sup>38</sup>

The establishment, maintenance, protection, and use of wood and bush plantings not included in the SFF are regulated in accordance with the Law on Protection and Use of Flora (December 1997) and the Law on Protected National Territories (2004, No. 710-II, amended in January 2019). Reserves and national nature parks are administered by various authorities, in particular the State Committee of the Republic of Uzbekistan for Ecology and Environment Protection (SCEEP) and partly by the SCF and the State Committee dealing with Geology (SCGM). The distribution of responsibilities is complex regarding management and control and there is a risk that different authorities with different goals and objectives may create different conservation policies across protected territories.

According to Article 4 of the Law on the Protected Natural Territories, protected natural territories are understood as "the land areas and (or) water space (water area) having priority ecological, scientific, cultural, esthetic, recreational and sanitary and improving value, fully or partially, constantly or which are temporarily withdrawn from economic operation." They constitute a single ecological system intended for ensuring biological, landscape diversity and maintenance of ecological equilibrium.

<sup>38</sup> Kuchkarov 2018. (n. 39)

Article 5 of the same law defines the categories of the protected natural territories. Depending on their purpose and the mode, protected areas are subdivided into the following categories<sup>39</sup>

- National parks
- Complex (landscape) wildlife areas
- Natural parks
- State nature sanctuaries
- Territories for preserving, reproduction, and recovery of separate natural objects and complexes
- Protected landscapes
- Territories for management of separate natural resources.

The legislation can also provide for the creation of additional state ‘biospheric’ wildlife reserves, national parks, interstate protected natural territories, and other protected natural territories.

At present, Uzbekistan has an area of 25,976 km<sup>2</sup> or 5.77 percent covered with protected territories based on the monitoring work of International Union for Conservation of Nature (IUCN)/United Nations Environment Programme (UNEP)/World Conservation Monitoring Centre (WCMC), recorded on the [protectedplanet.net](https://www.protectedplanet.net) website, checked in August 2021.<sup>40</sup> Data of 2020 indicate 2,079,728 ha or 4.7 percent of the country’s total land area under a protected area status. Nature reserves cover 885,710 ha, national nature parks cover 591,458 ha, and wildlife sanctuaries cover 602,560 ha (Table 6). SCEEP oversees most of the nature reserves (with one exception) as well as one wildlife sanctuary. These total an area of nearly 900,000 ha.

The SCF oversees 1,093,690 ha of protected territories, consisting mostly of national nature parks and wildlife sanctuaries as well as one nature reserve (Zerafshan Nature Reserve). Finally, the SCGM manages two national nature parks with a total area of 36,158 ha. Two national parks covering 531,040 ha currently support nature-based tourism (Zamin and Ugam-Chatkal). Under IUCN category III, there are additionally a number of state natural monuments, see Table 6.

In addition, under IUCN category VI, protected areas<sup>41</sup> include water protection zones (155,416 ha) along eight major river flows. The total area of the zone of formation of fresh groundwater deposits is 269,949 ha.

Table 6 also reveals that 98 percent of protected areas are in mountain regions, covering 72 percent of the forested territory. Protected area management is therefore central to developing mountain forest regions, including particularly through nature-based tourism.

According to SCF statistics, there are 13 forestry enterprises under IUCN category VI with a total area of 6,759,110 ha for the management of selected natural resources under the SCF. But this figure is higher than the total of forested areas on SFF, so it remains difficult to interpret.

39 Categories are not fully congruent with the IUCN protected area categories as outlined in <https://www.iucn.org/theme/protected-areas/about/protected-area-categories>: Ia Strict Nature Reserve; Ib Wilderness Area; II National Park; III Natural Monument or Feature; IV Habitat/Species Management Area; V Protected Landscape/Seascape; and VI Protected area with sustainable use of natural resources.

40 <https://www.protectedplanet.net/country/UZB>.

41 The primary objective of IUCN Category VI areas is “to protect natural ecosystems and use natural resources sustainably, when conservation and sustainable use can be mutually beneficial.”

**Table 6. Protected Territories of Uzbekistan**  
**(based on the World Database of Protected Areas<sup>42</sup> and SCEEP data)<sup>43</sup>**

Name	Province	Forest Region	Year Status	Area (ha)	Unit	IUCN Category	Remarks
<b>State Nature Reserve (SNR)</b>							
<b>Chatkal State Biosphere Nature Reserve<sup>a</sup></b>	Tashkent	Mountain forest	1947	24,710	SCEEP	Ia	United Nations Educational, Scientific and Cultural Organization (UNESCO) World Heritage site
<b>Zaamin State Reserve</b>	Jizzakh	Mountain forest	1959	26,840	SCEEP	Ia	Oldest reserve, already 1926
<b>Kyzylkum SNR</b>	Bukhara / Khorezm	Tugai-sandy	1971	10,310	SCEEP	Ia	Man and the Biosphere (UNESCO Program) and World Heritage site
<b>Nuratin SNR</b>	Jizzakh	Walnut-fruit forest	1973	17,750	SCEEP	Ia	Genetic conservation
<b>Kitab Geological Reserve<sup>a</sup></b>	Kashkadarya	Mountain forest	1979	3,940	SCEEP	Ia	International Status Geological Sciences
<b>Zarafshan State Reserve</b>	Samarkand	Tugai-valley	1975	2,350	SCF	n.a.	Riparian strip, Birdlife: critical
<b>Hissar SNR</b>	Kashkadarya	Mountain-juniper	1971	78,990	SCEEP	Ia	World Heritage listed
<b>Surkhan State Reserve</b>	Kashkadarya	Mountain forest	1986	23,800	SCEEP	Ia	Including Bactrian deer protection
<b>Saigachiy Complex (landscape) Reserve</b>	Karalpakstan		2016	628,300	SCEEP	Ib	
<b>State National Natural Park (NNP)</b>							
<b>Zaamin NNP</b>	Jizzakh	Mountain-juniper	1976	24,110	SCF	II	Also a part of Zamin natural reserve
<b>Zarafshan NNP</b>	Samarkand	Tugai-valley	2018	24,260	SCF	II	No updated management plan
<b>Khorezm NNP</b>	Khorezm		2019	21,687	SCGM	II	
<b>South Ustyurt NNP</b>	Kungrad		2020	14,471	SCGM	n.a.	
<b>Priaralye NNP</b>	Karalpakstan		n.a.	n.a.	SCF	n.a.	

<sup>42</sup> UNEP-WCMC. 2021. "World Database of Protected Areas, August 2021." [www.protectedplanet.net](http://www.protectedplanet.net).

<sup>43</sup> Internal statistics of The State Committee on Ecology of the Republic of Uzbekistan on Ecology and Environment.

Name	Province	Forest Region	Year Status	Area (ha)	Unit	IUCN Category	Remarks
<b>State Biosphere Reserve (SBR)</b>							
<b>Lower Amu Darya Biosphere Reserve</b>	Karalpakstan	Tugai-plains	2011	68,720	SCEEP	-	Natural poplar and Bactrian deer
<b>Ugam-Chatkal SBR*</b>	Tashkent region	Mountain forest	1990	506,930	SCF	II	Nature-based tourism
<b>State National Park</b>							
<b>Durman National Park</b>	Tashkent		2014	32	Khok.	n.a.	Khokimiyat
<b>Wildlife Sanctuaries</b>							
<b>Karnabchul</b>	Navoi		1998	25,000	Khok.	IV	Navoi regional Khokimiyat
<b>Koshrabad</b>	Samarkand		1992	16,500	Khok.		Samarkand regional Khokimiyat
<b>Khadicha</b>	Bukhara		2010	11,300	Khok.	IV	
<b>Qumsulton</b>	Bukhara		2010	4,900	Khok.	IV	
<b>Nurobod</b>	Samarkand		1992	40,000	Khok.	IV	
<b>Mubarak</b>	Kashkadarya		1998	264,470	Khok.	IV	
<b>Arnasay</b>	Jizzakh		1983	63,300	Khok.	IV	Ornithological
<b>Kara-Kir</b>	Bukhara		1992	30,000	Khok.	IV	
<b>Aktau</b>	Navoi		1997	15,420	Khok.	IV	
<b>Sudochie</b>	Karakalpakstan		1991	50,000	other	IV	Cabinet of Ministers
<b>Dengizkul</b>	Bukhara		1973	50,000	Khok.	IV	Ornithological
<b>Omonkuton</b>	Samarkand		2011	15,150	Khok.	IV	
<b>Jayron</b>	Bukhara		1976	16,520	SCEEP	IV	Specialized natural nursery
<b>Six State Natural Monument (NM)</b>							
<b>Varakhsha NM</b>	Bukhara		2010	7	Khok	III	Bukhara Khokimiyat
<b>Vardanzi NM</b>	Bukhara		2013	1,240	Khok	III	Bukhara Khokimiyat
<b>Mingbulak NM</b>	Namangan		1991	1,000	Khok	III	Khokimiyat
<b>Paykent NM</b>	Bukhara		2010	30	Khok	III	Khokimiyat
<b>Chust NM</b>	Namangan		1990	96	Khok	III	Khokimiyat
<b>Yazyavan</b>	Fergana		1994	19,230	SCF	III	Fergana regional

**NOTE:** Khok. = Khokimiyat. a. Protected natural areas (PNAs) with international status.

According to the concept for the development of the forest sector in the Republic of Uzbekistan until 2030 (PD PP-4850), 1.5 million ha of land is planned to be transferred from the district-level natural forest reserves to the forest category between 2021 and 2030. Most of this will be in the Republic of Karakalpakstan, Bukhara province, and Navoi province, with a planned 500,000 ha each. In addition, potential protected areas were proposed for the Baysun state forestry, Bobotag state forestry, Kitab state forestry, and Uzun state forestry.

The categorization of protected areas is not fully clear and might need to be further aligned with the provisions of the law and the international commitment undertaken by the GoU within the UN Convention on Biological Diversity (CBD), the Aichi Targets, and the 2030 biodiversity targets defined in the agenda for Sustainable Development 2030.<sup>44</sup> Figure 11 shows the protected area network within Uzbekistan by 2015.<sup>45</sup>

**Figure 11. Map of Protected Areas in Uzbekistan<sup>46</sup>**



Kuchkarov et al 2018

<sup>44</sup> See <https://www.cbd.int/development/doc/biodiversity-2030-agenda-technical-note-en.pdf>.

<sup>45</sup> FLERMONECA 2015.

<sup>46</sup> Kuchkarov, B. T. 2018. Sixth National Report of the Republic of Uzbekistan on the Conservation of Biological Diversity. Tashkent, Uzbekistan: CBD

Management and law enforcement in protected areas seem to be weak, although limited information is available in this regard. For example, in Zerafshan NNP, there are accusations of mismanagement and law violations that have resulted in the degradation of the territory in the previous years. This has been fueled by the downgrading of its status from nature reserve (IUCN category Ia) to national nature park (IUCN category II) in 2018.<sup>47</sup> The major issues reported relate to either resource extraction and agricultural activities or to negative impacts of tourism. There seems to be limited capacity among management staff and generally a low understanding of the necessary measures and controls to safeguard the environment, even in strictly protected zones of the park. Commercial activities, including tourism, are favored. In addition, it was mentioned that proper Social and Environmental Impact Assessments are usually absent for activities related to protected areas.

The PNA system itself has some limitations in terms of the overall size, representativeness, conceptual approach, and sustainability of its funding. Until recently, the basis for biodiversity conservation in Uzbekistan was a system of PNAs categorized as 'reserves' and 'natural parks'. However, the more intense the socio-economic development of territories the more the 'PNA system' turns into a multitude of small, isolated islands. They do not ensure sustainable conservation and functioning of ecosystems on the whole and therefore cannot maintain the optimal condition of the environment. Thus, a broader approach is needed.

Improvement of the PNA system, including its environmental sustainability and versatility along with incorporating at least 10 percent of the country's surface of 450,555 sq. Km, was one of the targets of the first National Biodiversity Strategy and Action Plan (NBSAP) (1998). However, the tasks were not fully completed; the ones implemented mostly concerned improvement of the legal basis and some expansion of the total area of PNAs. Therefore, improvement of the PNA system and creation of a representative PNA network remain relevant tasks to fulfil national needs and Aichi targets. In this respect, IUCN Category VI areas are an essential element. They are broadly defined as "generally large, with most of the area in a natural condition, where a proportion is under sustainable natural resource management."<sup>48</sup>

## 2.1.5. Pastures on state forest land

Forest management and animal husbandry are closely linked in most forested areas of Uzbekistan and together form the major land uses in the SFF. Uzbekistan has 23.4 million ha of pastures,<sup>49</sup> which belong to agricultural, forest, or reserved lands and are thus either under the SCGM, SCEEP, or SCF. According to Article 13 of the Law on Pastures (2019),<sup>50</sup> local government bodies can grant permission to legal entities and individuals to possess, rent, or temporarily use pastures. Rangelands, pastures, and forage (haymaking) account for 3 million ha or 26 percent of the land under the SFF. Furthermore, grazing is carried out within several forested and other wooded lands, in particular in semi-arid and mountain regions. Overall, most pasture lands are concentrated in Navoi as well as Bukhara, Karalpakstan, and Kashkadarya.

In these regions, sheep breeding for wool and hides is most common. Specialized cattle farms are usually located in lowland irrigated areas, whereas (informal) hay collection is done in the steppe and foothill regions. Alpine pastures are only used at certain times of the year. From the private farms registered as 'livestock breeding farms,' only 70 percent grow feed on their own land and only 50 percent have a grazing area on their plot. One reason is that the land code allocates each farm 0.3 ha of land per nominal livestock

47 See <http://sreda.uz/rubriki/voda/chto-proishodit-v-zarafshanskoy-natsionalnoy-parke/>.

48 <https://www.iucn.org/theme/protected-areas/about/protected-areas-categories/category-vi-protected-area-sustainable-use-natural-resources>.

49 Yuldashev, Mirzokhid and Hijaba, Ykhanbai. 2019. "New Law 'on pastures' in the Republic of Uzbekistan." International Land Coalition. <https://www.landcoalition.org/en/newsroom/new-law-on-pastures-in-the-republic-of-uzbekistan/>.

50 Law of the Republic of Uzbekistan 'About pastures' No. ZRU-538, <https://cis-legislation.com/document.fwx?rgn=115786>

head, which is insufficient to provide enough grass and other feed, especially if soil conditions are poor.

Between 1992 and 2016, fodder area per livestock unit has declined from 0.15 ha to 0.05 ha.<sup>39</sup> Consequently, a large share of livestock breeders is engaged in the collection of feeds including grass, which is one of the drivers of forest degradation besides direct grazing pressure. In areas with many rangelands, livestock breeders hire shepherds to graze their animals on community pastures, which are generally located outside the SFF. Overgrazing and unsustainable pasture management practices are particularly prominent in mountain foothills and initiate soil erosion leading to mudslides, reduced river discharges, and long-term loss of soil fertility. It is estimated that degradation of these lands can cause a decline in pasture productivity of up to 1.5 percent annually.

While the arid zones are traditional pastures for Karakul sheep, horses, and camels, mountainous regions and river valleys are commonly used for grazing cattle, sheep, and goats. Total livestock composition is 50 percent sheep, 37 percent cattle (including buffalos), 11 percent goats, 2 percent horses, and a limited number of camels and pigs.<sup>51</sup> Due to increasing livestock numbers and overgrazing, pastures and feed for the animals (especially during the winter months) are getting scarce. In 2016, 4.7 million households had a total of 12 million cattle head.<sup>52</sup> Between 1991 and 2007 alone, cattle numbers increased by 46 percent and small ruminants by 25 percent. During the same period, pastures and hayfields on agricultural lands (under the Goscomcadastre) have decreased by approximately 40 percent as a result of low land productivity.<sup>53</sup> These degraded pasture lands were then transferred either to the State Reserve or Forest Fund for restoration.

The major management challenges of rangeland and pasture include the availability of fodder (especially during the winter months) and the poor service infrastructure for small-scale (dekhan) farmers to maintain sustainability and fertility of existing pastures. Based on information received from the SCF, on lands of the SFF, haymaking provides an economic opportunity; however, leskhozoes lack financial and material resources, as well as technical capacity, to increase these activities.

The PD No. PP-4850 on the development of the forest sector until 2030 sets a target of increasing livestock population from 28,832 heads in 2020 to 250,000 heads by 2030 on SFF lands. If this target is reached, it will have an enormous impact on the quality of pasture lands within the SFF and may negatively affect restoration efforts in certain areas if pastures and forests are not clearly distinguished.

## 2.2. Institutional Framework

### 2.2.1. State Committee on Forestry

At the highest level, the President of Uzbekistan has the power to issue decrees directing the Cabinet of Ministers to take actions affecting the forest sector. With the PD UP-5041 of May 11, 2017, the SCF was re-installed, on the basis of the Main Administration on Forestry (MAF),<sup>54</sup> which was established in 2000 and organized as a subdivision of the Ministry of Agriculture and Water Resources (MAWR). SCF<sup>55</sup> is the apex organization responsible for oversight of implementation of forest and hunting policy. It has an expanded mandate over that of the former MAF and is the responsible state agency for managing the SFF and the

51 FAOSTAT (<http://www.fao.org/faostat/en>)

52 World Bank Group, SDC, and IAMO. 2019. "Farm Restructuring in Uzbekistan: How Did It Go and What Is Next?" <http://documents1.worldbank.org/curated/en/686761549308557243/pdf/134322-wp-p162303-public-report-Farm-Restructuring-in-Uzbekistan-eng.pdf>.

53 Yusupov, Yu, Z., Lerman, A., Chertovitskiy, O.M. and Akbarov, I. 2010. Livestock Production in Uzbekistan: Current State, Issues and Prospects. Tashkent, Uzbekistan, accessed June 3, 2020.

54 Also named 'General Directorate of Forestry under the Ministry of Agriculture and Water Resources'.

55 <http://urmon.uz/site/index/> The website of the SCF is only in the Uzbek language and cannot be read by the author.

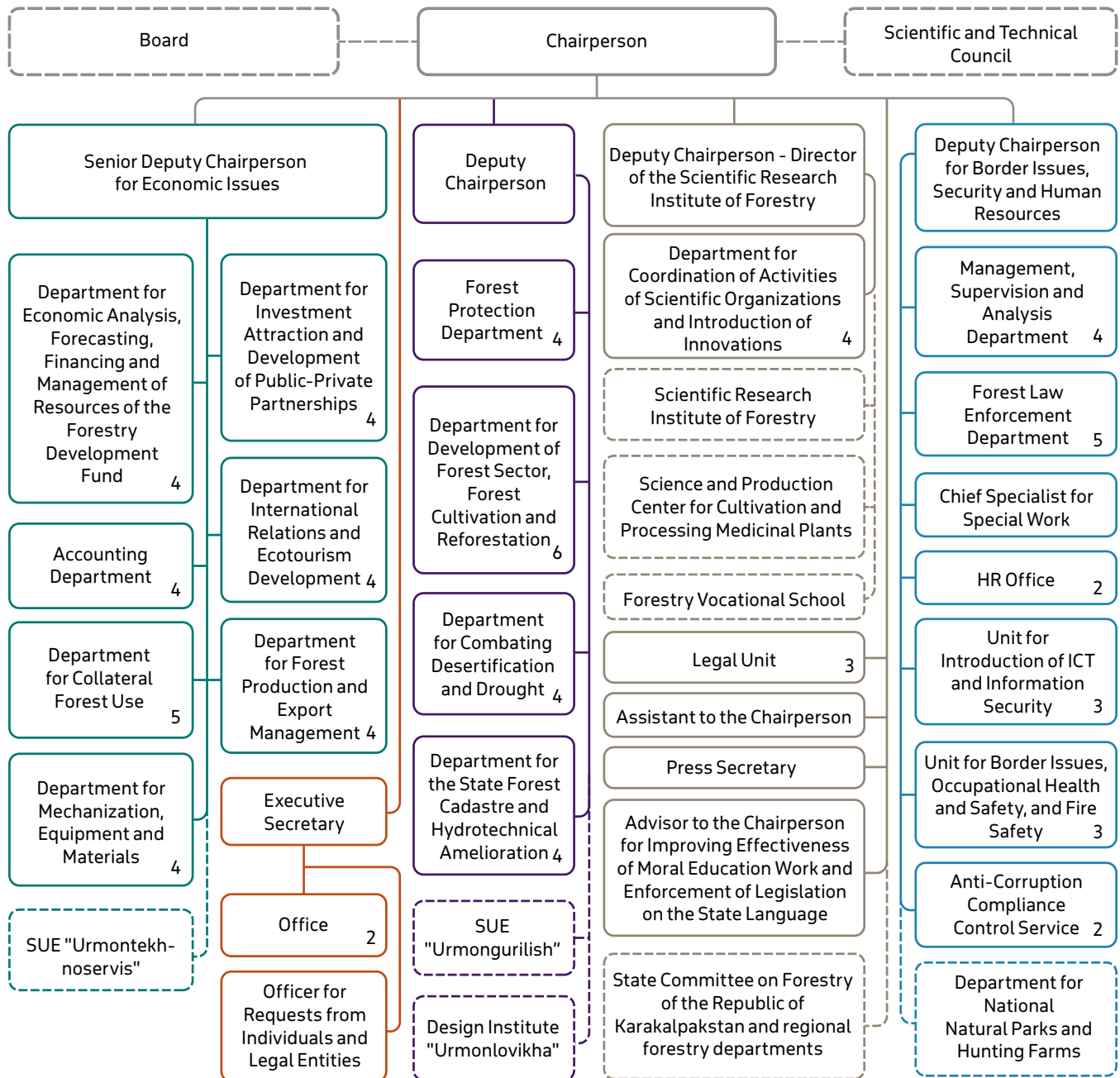


forested areas within it. The SCF is one of 11 state committees (SCs)<sup>56</sup> in the country.

The main goal of the SCF is “the comprehensive and rational use of forests and forest restoration and protection, effective management of forest resources and protected areas, expansion of the cultural heritage, research and protection of flora and fauna, innovation of scientific achievements and best practices.”

Figure 12 presents the current (2021) organigram of the central office of SCF (see also Annex 5).

**Figure 12. Organizational Structure of the State Committee of Forestry (PD-4960, January 2021)**



<sup>56</sup> <https://www.nyulawglobal.org/globalex/Uzbekistan1.html>.

The SCF work is closely linked to the work of the Ministry of Agriculture and the Ministry of Water Economy. Of importance is the coordinated work with other SCs, particularly with

- The State Committee for Ecology and Environmental Protection (SCEEP);
- The State Committee on Land Resources, Geodesy, Cartography and State Cadaster;
- The State Committee for Geology and Mineral Resources (SCGM); and
- The State Committee for Tourism Development.

PD No. PP-4960 of January 2021 also defines the organization and work of the SCF.

The SCF implements activities in conjunction with local government at provincial and district levels and jointly with its subordinated state forest enterprises (leskhozes). The SCF oversees 10 regional departments and the following 7 national organizations:

- Forest Design Institute 'O'rmonloyikha,' also spelled 'Urmonloyikha'
- Scientific Research Institute of Forestry
- Department for NNP and Hunting Farms
- Science and Production Center for Cultivation and Processing of Medicinal Plants
- State Unitary Enterprise "Urmonqurilish"
- State Unitary Enterprise "Urmontekhnoservis"
- Forestry Vocational School.

The SCF's main policy functions include the following:

- Institutional control of security, protection, cultivation, reproduction, recovery, productivity improvement, and use of forests is provided by the SCF. This covers the entire SFF, including protected areas<sup>57</sup>
- Management and control of security, protection, cultivation, reproduction, recovery, productivity improvement, and use of forests through the state forestry enterprises and forest hunting facilities in their respective territories
- Public control of security, protection, cultivation, reproduction, recovery, productivity improvement, and use of forests provided by citizens' self-government bodies, nongovernmental organizations (NGOs), and private persons
- Creation, reproduction, security, and protection of forests from fire, pests and disease, illegal harvesting of timber, fuelwood and NWFPs, and other violations of forest law
- Development of standards and time limits for the use of grazing land of the state forest

In the overall jurisdictional structure of the SCF, there are more than 100 business entities<sup>58</sup> which are based in Tashkent and in all other major localities in the country. They include (see also Annex 3) the following:

- 66 state forest enterprises (leskhozes), with territorial responsibilities on the SFF land
- 13 state forest enterprises producing medicinal plants
- 10 state forest hunting facilities

<sup>57</sup> Information to be verified.

<sup>58</sup> The exact number varies according to the sources, between 101 and 109.

- 5 scientific experimental stations
- 4 NNP
- 1 state natural reserve (strictly protected area)
- 1 Forestry Research Institute that includes the Andijan research branch, 1 Center for Forestry Development in Desert Areas, and 1 Innovation Center for Development of the Forest Sector.

The central office of the SCF includes a Department for International Relations and Nature-based Tourism Development with four staff, which is in charge of international forest-related policy, international development cooperation, and tourism as it relates to forests and forestry.

The SCF supervises the Forestry Research Institute, the Forest Design Institute, the Department of Reserves, National Parks and Hunting Enterprises, Survey and Production Center for Non-wood Forest Products ('Shifobakhsh'), the Production Forest Seeds Center, and the Republican Training and Production Center on Upgrading Skills and guides and supervises the state-run enterprise 'Uzgirolesproject' (Water and Forest).

The **Forest Design Institute "O'rmonloyikha"**<sup>59</sup> was established with PD-4960 in January 2021 to improve the quality and effectiveness of design and survey work in the forestry sector. Its main tasks are preparing inventories on the SFF, designing production plans for forest enterprises, designing and estimating costs for restoration and planting activities, building an electronic database on land categories, introducing geographic information system (GIS) into forest management activities, and monitoring. If the NFI is conducted in Uzbekistan, a special unit would need to be created in O'rmonloyikha to plan, implement, and sustain the NFI work in the long term.

The State Unitary Enterprises 'Urmonqurilish' and 'Urmontekhnoservis' and the Design Institute are financed by extra-budgetary funds according to the changes to the Resolution PP-2966 from May 2017, stated in PD-4960, January 2021.

## 2.2.2. Leskhozes [state forest enterprises]

Based on official figures, about 89 percent of Uzbekistan's forests (3.28 million ha of 3.68 million ha)<sup>60</sup> are managed by more than 100 state business entities,<sup>61</sup> including 66 state forest enterprises (leskhozes). Leskhozes have a clear mandate to manage the SFF land. Forest Fund corresponds to a legally determined territory but not an actual physiognomic and usage status of a piece of land as forests. Leskhozes have territorial responsibilities on the SFF land, generally at the district level.<sup>62</sup> The current extent of Forest Fund land is about 11.2 million ha. Besides the 66 leskhozes, there are a number of differentiated enterprises, including 13 specialized state forest enterprises producing medicinal plants, 10 specialized forestry stations, 5 state forest hunting facilities, and 8 stations managing protected areas that are under the jurisdiction of the SCF with different legal status (national reserves, NNP, biosphere reserve).

The SCF is responsible for the implementation of forest policy and oversees the leskhozes. The territorial units are coordinated by the central office of the SCF in Tashkent, which has 11 regional/province-level

<sup>59</sup> Formerly known as 'Lesproyekt,' also known under the term Urmonloyika.

<sup>60</sup> Data estimated in the absence of an NFI. A considerable area of forest fund land does not correspond to actual forests or woodlands (shrubland). And vice versa, an even bigger share of the actual forests and shrublands is not included in the forest fund. This is confirmed by initial analysis with Collect Earth ® assessment in FAP TCP/UZB/3503, which has been endorsed by the SCF.

<sup>61</sup> The exact number varies according to the sources, between 101 and 109.

<sup>62</sup> See details in the Resolution of the President of the Republic of Uzbekistan dated May 11, 2017, No. PP-2966.

forestry departments (the Republic of Karakalpakstan has its own Forestry Committee<sup>63</sup>). Leskhozes are organized under these regional forestry departments. The Chairman of the SCF in Tashkent, jointly with the heads of regional forestry departments and in agreement with the Khokims of the respective regions (Khokimiyat – district local government), can establish or dissolve leskhozes and appoint their directors. The SCF approves the annual plans of the leskhozes and monitors performance.

Each leskhoz is well equipped with technical staff and responsible for a full range of forestry activities: protection including sanitary cuts;<sup>64</sup> managing and harvesting of NWFPs such as nuts, fruits, medicinal herbs, and so on; and reforestation, afforestation, prevention of fires, pests and diseases, hunting and preservation of nature reserve areas, and infrastructural development including road construction. Some also have processing units (for example, NWFPs). Currently, there is no unified policy in place for the rational planning of forest management, reforestation, biodiversity, and conservation of genetic resources. There is no 'typical' leskhoz in the country, as the size of managed forests and the type of economic activities are distinct. The jurisdictional area of the leskhozes is changing relatively frequently and varies hugely according to the specific location, with the smallest leskhoz managing about 800 ha of state forest land and the largest more than 250,000 ha. A leskhoz employs its own staff in various numbers; it also takes care of pensions for retirees.

Leskhozes finance their activities mostly from 'own revenues,' defined in a business plan. They also prepare a development plan and submit this to the SCF one year in advance of implementation to realize forest development activities, based on the PD PP-4850 on the concept for the development of the forest sector, dated October 2020. The renting out ('ticketing') of land for various economic activities, for example, forest use and grazing, is an important income source. The enterprise sets prices for works, services, and products independently. Plots of the SFF can be provided for use by legal entities and individuals that can be permanent or temporary and are subject to a fee.

The income generated by the leskhozes is shared with the SCF. Currently, 50 percent of the revenue from land rented out for pastures is used at leskhoz level and 50 percent goes to the SCF. The same share (50/50) is applied for revenues from fines and income generated through non-timber forest products (NTFPs), such as medicinal plants. The SCF gets 100 percent of the fees for land that is leased out for forest-based development.<sup>65</sup> Other income generated is used 10 percent for the SCF and 90 percent for leskhozes.<sup>66</sup> This covers all forest-related expenses as well as all non-profit activities and investments. Data on the earning of individual leskhozes (for example, in US\$ per ha and year) are not available, but it can be presumed that there is wide variation in economic performance, linked to the kind of business at disposal (for example, timber and NTFP harvesting, nature-based tourism, or fees for land lease) and the environmental conditions prevalent in the specific ecoregions. There is also a financing flow from the state budget to the leskhozes through a number of special programs for the development of forestry, protection, reproduction, and restoration of flora and fauna on the lands of the Forest Fund.

The GoU view is that leskhozes are a key tool to support forest development and FLR. The question remains, however, if this role is limited to the land of state forests or is also extended to forests and lands which are outside the SFF. Considering the current practices, there is considerable room for improvement in addressing the present policy and legal and institutional framework and to develop efficient

<sup>63</sup> The exact role and responsibilities of the specific SCF for the Republic of Karakalpakstan are yet not fully clear.

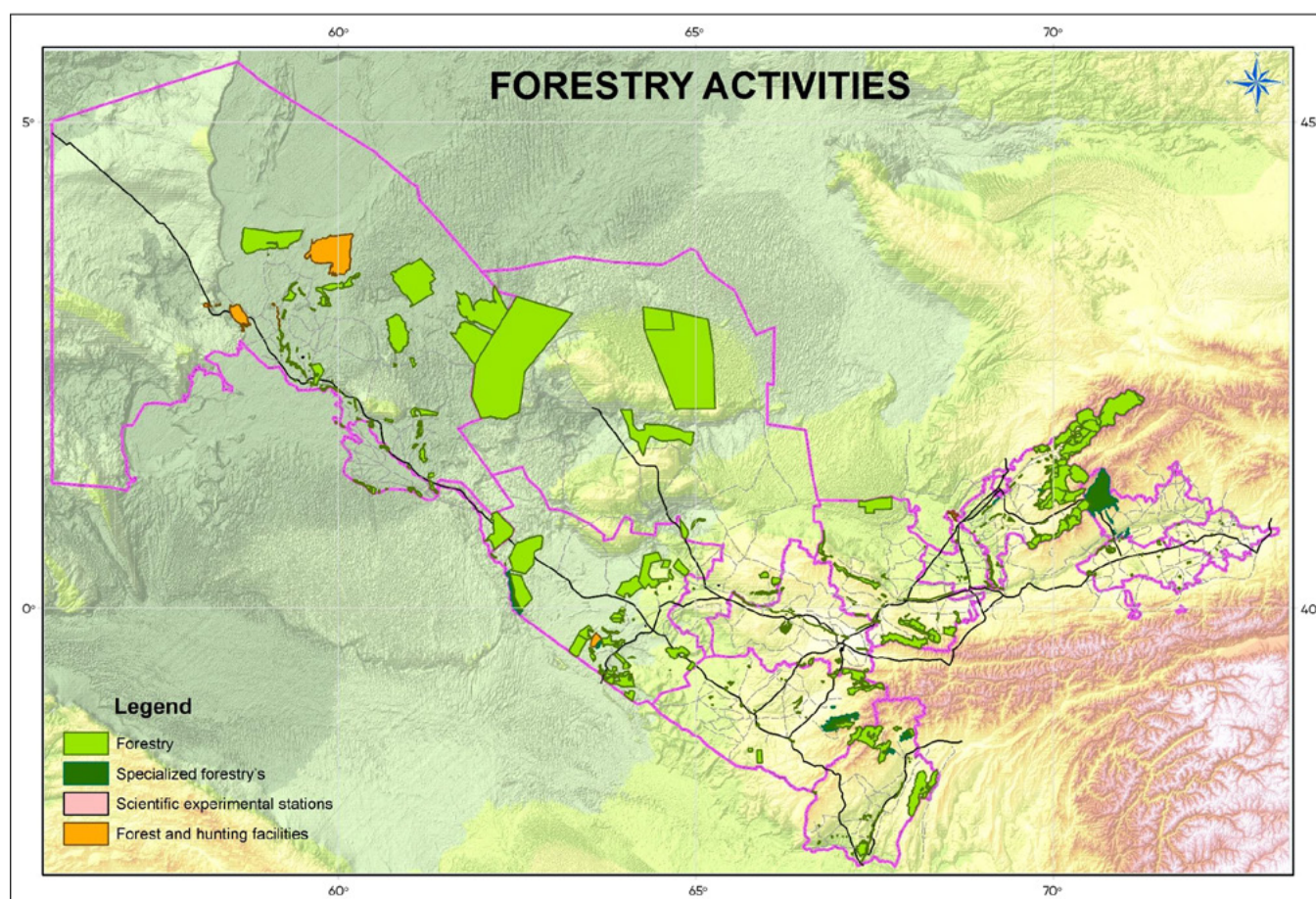
<sup>64</sup> Sanitary cuts relate to cutting of trees affected by pest and diseases and other calamities. Wood harvesting is officially banned in Uzbekistan.

<sup>65</sup> There is a specific regulation on land lease (Nr. 993 of December 2019), issued by the Cabinet of Ministers of the Republic of Uzbekistan on approval of the regulations on the procedure for the rental of a lot for SFF. The text of the act is written in Uzbek.

<sup>66</sup> These figures need to be considered carefully and need confirmation.

approaches in FLR. Any reform process will need to be done cautiously and in a gradual way, considering the countries' legal, socio-political, and cultural realities. Development project will need to work in a collaborative manner with local communities in FLR on territories of communal or state land, seeking and using technical support from the leskhoz.

**Figure 13. Distribution of Forest Land Under the State Forestry Agency**



**SOURCE:** The Sixth National Report of the Republic of Uzbekistan on the Conservation of Biological Diversity, <https://www.cbd.int/doc/nr/nr-06/uz-nr-06-en.pdf>

### 2.2.3. Research and education in forestry

Uzbekistan's **Scientific Research Institute of Forestry** was established on May 11, 2017, in the framework of the PD on forests. It is under the jurisdiction of the SCF and has been transformed from the former Scientific Production Center for Decorative Gardening and Forestry. The new PD-4960 of January 2021 includes elements for strengthening research work in the forestry sector. Importantly, several new scientific entities were added to the SCF structure (Figure 12). The Department for Coordination of Activities of Scientific Organizations and Introduction of Innovations with four staff now coordinates scientific work of the Scientific Research Institute of Forestry, the Science and Production Center for Cultivation

and Processing Medicinal Plants, and the Forestry Vocational School. Further new entities are the Scientific Experimental Pistachio Farming Station as additional research station of the Scientific Research Institute of Forestry and the project institute 'Urmonloyikha' (translated as forestry project) as a state entity replacing the state unitary enterprise O'rmonloyikha.

The Scientific Research Institute of Forestry has five research and experimental stations and includes, in the new organizational structure established under PD-4960, the Andijan Branch, the Scientific Center for Forestry Development in Desert Areas, and the Innovation Center for Development of the Forest Sector. It counts on more than 30 researchers, including more than a dozen PhD and higher-level Doctor of Philosophy. The institute is conducting an important research portfolio. It breeds new varieties of nut trees (pistachios, walnuts) and develops technologies for control of pests and diseases of forest species, technologies for growing seedlings in forest nurseries, afforestation technologies for shelterbelts on irrigated lands, reforestation technologies for high mountain slopes, and dry desert/sandy lands in dry bed of the Aral Sea and Kyzylkum Desert. The institute co-organized in Tashkent<sup>67</sup> in October 2018 a well-attended International Workshop on Nursery, Silviculture, Forest Restoration, and Sustainable Management in Central Asia and Northeast Asia.<sup>68</sup>

The Tashkent Forest Training College was in operation until 2003 and trained 45–60 forestry technicians annually.<sup>69</sup> Due to lack of qualified teachers, material, and technical difficulties, this institution was restructured. The Sariassiya Professional College operating in the Surkhandarya Region also trained a limited number of field foresters.

**Higher forestry education** is conducted by the **Tashkent State Agrarian University (TSAU)** since 1944. The number of graduates up to 2020 exceeds 2,000 including a number of doctors and 50 candidates of science. Up to the end of the Soviet era, TSAU was considered to be the main educational institution for Central Asian countries, including a forestry faculty.

Up to 2010, forestry education was structured under the Department of Forestry of the Agronomy Faculty of TSAU with a specialization in forest management. In 2021, today, there is a structure under the '**Faculty of Forestry and Design**' of TSAU<sup>70</sup> with three departments: (a) Forestry, (b) Harvesting and processing of medicinal plants, and (c) Decorative gardening and landscape design. This structure is based upon the Decree No. 311 of the Cabinet of Ministers of the Republic of Uzbekistan dated November 3, 2015. Detailed information on the curricula and the research work of the faculty could not be obtained.

In 2020, 723 students are enrolled in four courses: 155 at the expense of a state grant and 568 are on a contract basis. The department employs 80 teachers, including 6 professors and 15 associate professors. There are 20 students enrolled in the master's program. A total of 175 people are enrolled in full-time education per year, according to the quota: 75 people in forestry, 50 people for medicinal plants, and 50 people for decorative gardening. Every year, 25 people enroll in distance learning. The Departments of Forestry and Landscape Design also conduct advanced training for staff of the SCF. About 80 employees of the SCF have been trained between 2018 and 2020 under this program.

<sup>67</sup> <http://apafri.org/activities/2018/nurserysilviculture/nursery2018.htm>.

<sup>68</sup> Batkhuu, Nyam-Osor. 2018. "International Workshop on Nursery, Silviculture, Forest Restoration and Sustainable Management in Central Asia and Northeast Asia." Tashkent, Uzbekistan. [http://apafri.org/activities/2018/nurserysilviculture/kfs\\_final\\_2018.10.07\\_final.pdf](http://apafri.org/activities/2018/nurserysilviculture/kfs_final_2018.10.07_final.pdf), accessed June 19, 2020.

<sup>69</sup> Botman, Evgeniy. 2008. Forest Rehabilitation in the Republic of Uzbekistan: Report.

<sup>70</sup> <https://tdau.uz/site/faculty?id=6>, also called Faculty of Forestry and Ornamental Design.

### **Box 3. Faculty of Forestry as a Partner in the FAO/GEF Project on Sustainable Forest Management (SFM) of Mountain and Valley Forests**

The Faculty of Forestry of the TSAU benefits from support of Global Environment Facility (GEF) project 9190 through various activities.

In 2018–2020, about 400 students and 12 teachers took part in the project activities. More than 120 FAO certificates on training and capacity building were issued to students. More than 25 joint training events were held. International experts and specialists (Turkish Forestry Administration; University of Freiburg in Germany; US Forest Service; and specialists from the Republic of Korea, Finland, the Czech Republic, and India) contributed to training in modern methods of forest management and training programs.

Together with the US Forest Service, a ‘flight school’ for students to manage drones in the field of forest management and ecotourism was organized in the Tashkent region. About 50 people took part in this event; 20 students and 5 teachers passed the flight school. On the part of the US Forest Service, five forest scientists came to Uzbekistan, who for 15 days taught the basic methods of nature protection, the principles of safety in forests, the creation of ecological routes, and practical skills in organizing ecological trails.

It is important to note that, based on the PD from October 2020 (PD-4850), there is a call for revision of curricula according to the needs and developments in the forest sector in Uzbekistan.

With the PD No. PP-4960, it was decided that from the 2021/2022 academic year, a Forestry Vocational School will be created within the system of the SCF and on the basis of the Forestry College of Tashkent region. The vocational school as a basic secondary specialized professional educational institution will be responsible for the technical training of specialists in the field of forestry.

Based on interviews, a number of issues were identified including the resource base and pedagogical capacity for forestry education, which are inadequate. Various difficulties are encountered in forestry education, including problems with specialized educational literature in the Uzbek language, translation of forest terms and application under specific conditions of the country, and insufficient prior knowledge of the students. Many of the graduates are working in areas other than those they are specialized in.

In terms of financing, PD-4960 from January 2021 provided that 5 percent of the Forestry Development Fund of the SCF must be assigned to scientific institutions and research.

## **2.2.4. Employment in the forest sector**

Data on employment in the SCF and related institutions are not readily available. Historic data as of 2008 indicate that public forest institutions employed 7,102 staff, of which 15 percent were female (Table 7).<sup>71</sup> The SCF indicates that 8,050 people were engaged in forestry in October 2018.

<sup>71</sup> FAO. 2010. Forest Resources Assessment

**Table 7. Human Resources, Education, and Research [data from 2008]**

FRA 2010/2015 Assessment	Number	Female (%)
Total staff within public forest institutions	7,102	15
Graduated from forest-related education (both technical and BSc equivalent)	259	18
Professionals in research and educational centers	212	9

The forest sector employs only a small number of people. As wood processing employment is small, the additional people employed per year might not exceed 10,000 (own estimates). It may be safe to assume that this figure would be much higher if employment in nature-based tourism, hunting, and associated branches was also counted. Globally, each job in the forest sector is estimated to generate 1.5 to 2.5 additional jobs in the wider economy,<sup>72</sup> indicating the multiplier effect of forestry jobs on the economy as a whole. On an area basis (FRA 2020), the number of employees in forestry and associated areas is 2.4 per 1,000 ha of forested land, which is a fair number (for example, European average is 1.6). It is important to reflect on the number of people employed to chart the sector's trajectory for the next 15–20 years, looking at a possible increased role in fulfilling the overall development goals of the country and on how its workforce profile may need to change into the future and what training and skills will be in greater demand.

## 2.3. Forest Policy

### 2.3.1. National forest policy, target and sector planning

Based on PD-2966, in May 2017, a forestry program was adopted for 2017–2021.<sup>73</sup> The program foresees the planting of 42,000 ha of forests annually on State Forest Land throughout the country, including 18,000 ha of saxaul in the dry areas and Aral Sea. In addition, the program contains measures to encourage natural regeneration of 10,000 ha of saxaul and other desert plants, as well as plantations for the protection of soil and water in forested areas of over 2.53 million ha and the conservation of biodiversity of over 1.16 million ha. A national forest program (NFP) of international standards (for example, on the model of the FAO) does not exist.

The SCF's overall forest policy goal is to ensure efficient implementation of state policy, improvement of public administration system in the sphere of forestry, and the rational use of forest resources. It also realizes other tasks stipulated in National Action Strategy on five priority areas of development of the Republic of Uzbekistan formulated for 2017–2021<sup>74</sup> and for elimination of existing challenges and further development of forestry throughout the country.

Since the PD in 2017, three additional resolutions related to the forest sector development were issued. Table 8 gives an overview of these (for more details, see Annex 4).

<sup>72</sup> Nair, C.T.S., and R. Rutt. 2009. "Creating Forestry Jobs to Boost the Economy and Build a Green Future." <http://www.fao.org/3/i1025e/i1025e02.htm>, accessed June 19, 2020.

<sup>73</sup> The program could not be consulted in the preparation of this Note.

<sup>74</sup> <https://strategy.uz/files/news/45467/eng.pdf>.



**Table 8. Overview of PDs Related to Forest Sector Development in 2019, 2020, and 2021**

PD	PP-4424	PP-4850	PP-4960
Date	August 2019	October 2020	January 2021
Title	'Development of forestry system until 2030'	'Development of the forest sector until 2030'	'Measures to develop science in the forest sector'
Aim	More effective forest use	More efficient forest use	Enhanced scientific research in forest sector
What is new?	Zero-rent leasing system for non-forested lands of the SFF	New forms of support for SFF land users (based on zero-rent leasing system)	Restructuring of scientific institutions in the forest sector under a new coordinating department
Annex		Concept for forest sector development in Uzbekistan (including figures by region)	Organizing structure of the SCF and list of organizations and agencies within the SCF

The two related PDs from 2019 (PP-4424) and 2020 (PP-4850) provided the context to further develop the forest sector and increase its efficiency and effectiveness. The zero-rent leasing system for non-forested lands was introduced in 2019 and applies to plantations in deserts (10 years), orchards and tree plantations (5 years), medicinal plants production (3 years), and agricultural crops (1 year). PP-4424, together with PP-4850, further supports users of SFF lands through the provisioning of labor wages and contributions to (irrigation) infrastructures for orchards and agricultural crops as well as free soil and water information services by the SCGM. According to the concept presented in October 2020 (PD-4850), the aim is to increase by 2030 the area under the SFF to 14 million ha, of which 6 million ha should be covered with forests and orchard stands. In addition, the SCF aims for an annual seed production of 840 tons, agricultural production of 32,000 tons, medicinal plant production of 11,600 tons, and production of 300,000 bee colonies.

**Box 4. Proposed Directions for Forest Policy [summary based on FAO-United Nations Economic Commission for Europe (UNECE) 2019]**

A National 'Action Plan on Combating Desertification, Degradation and Droughts' and 'Concept for Forestry Development up to 2030' has been drafted.

The main goal of the concept is the determination of the key development priorities for the forestry sector. The priorities are focused on implementation of more efficient and effective measures aimed at conservation and accelerated reproduction of forest resources, strengthening of environmental and protective functions of forests, resource-saving utilization of the SFF lands and forests, development of the corresponding social aspects of forestry with consideration of best practices and gained experience; and consideration of changing regional and global development environments.

The concept envisages supporting institutional development in the SCF, the further development and adoption of the Forestry Code, and key principles of forestry management along with the long-term forestry development scheme for next 50 years. Till date, this concept has not been finalized.

The PD from January 2021 (PP-4960) aimed to promote research work in the forest sector and initiated a restructuring of scientific institutions as well as the entire SCF organizational structure. It also proposes to update curricula in forest education to adapt to new challenges in the forest sector. PP-4960 also made some changes to the previous resolutions.

Long-term planning for managing forests and the SFF in general is still in some way linked to the former targeted economic planning modified from the Soviet system, with defined quantity indicators of the various economic activities specified to manage the forests and lands, including sowing, planting, and supporting measures. Adaptive management and planning approaches, including rapid appraisals supported by modern monitoring instruments, are lacking and need to be introduced and further developed.

Various attempts have been undertaken over the past 10 years to launch a process to develop a broader forest development program. This includes work technically supported through international cooperation, including the FAO, German Corporation for International Cooperation (GIZ), and Turkey. The FAO has supported the forest sector in Uzbekistan since 2001 with a number of technical cooperation programs (TCPs), including facilitating preparation of the NFP that involved all main stakeholders in a participatory manner. While the preparation work has been conducted, the NFP itself has not been realized.

More recently, based on an initiative by the SCF together with the FAO/UNECE and financed by United Nations Development Account (UNDA), a workshop was organized in 2017 to develop a national criteria and indicator set for sustainable forest management. The SCF and FAO have started a participatory process to develop a national set of criteria and indicators for sustainable forest management. This set will be beneficial for monitoring, assessing, and reporting on the state of the country's forests; strengthening national forest policy; and promoting sustainable forest management. An assessment of the results still needs to be done. The basic conditions for successful implementation of an NFP include (a) improving forest legislation, (b) improving dialogue and partnership between forestry organizations and other stakeholders, (c) enhancing institutional potential, and (d) organizing an effective system of monitoring and evaluation.

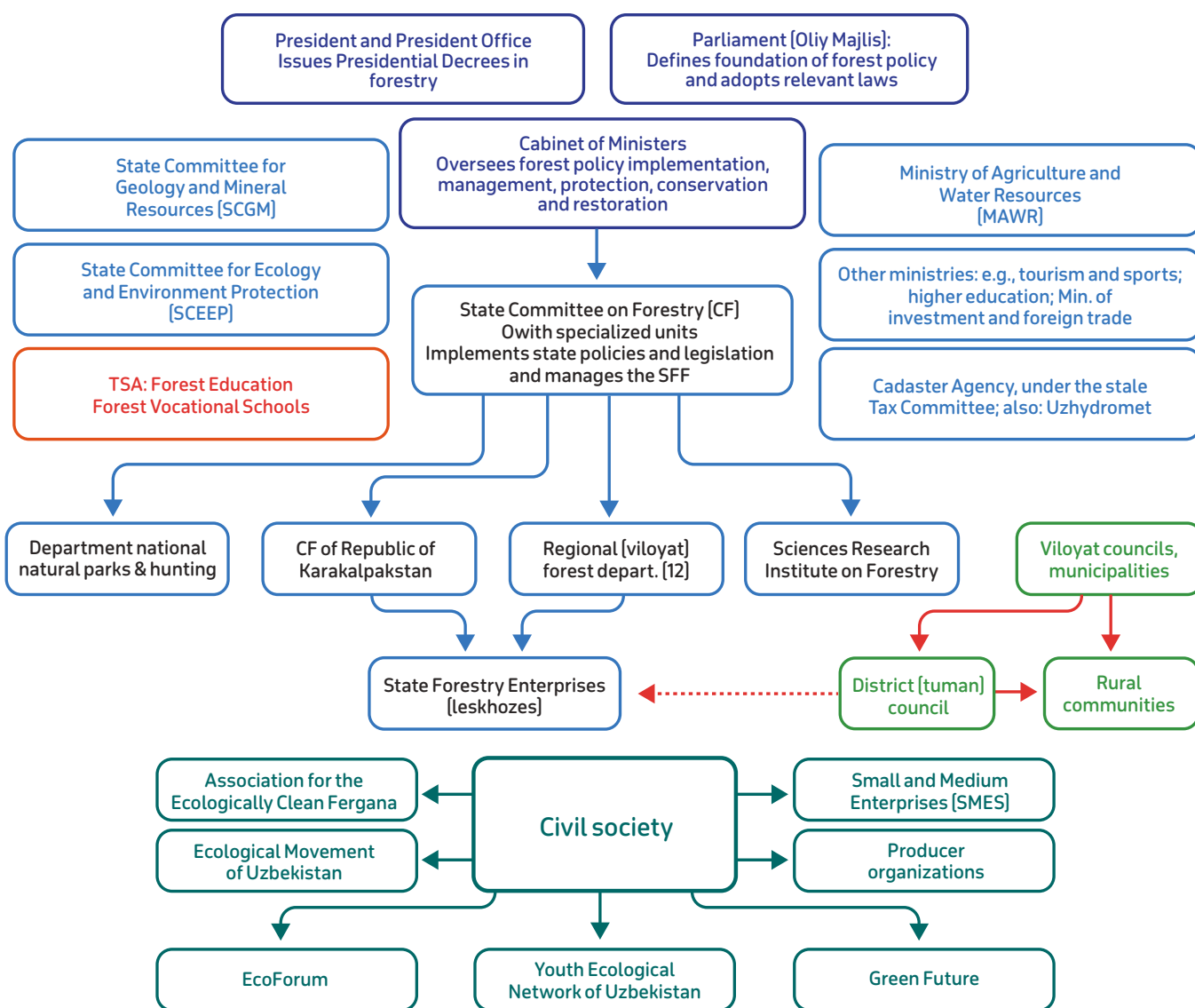
### 2.3.2. Key stakeholders in the forestry sector

The key stakeholder in forestry in Uzbekistan is the SCF with its associated regional SCF at the level of viloyats (provinces), overseeing state forest enterprises (leskhozes) and the SCF of the Republic (Karakalpakstan). Local authorities at viloyat (province) and district (tuman) level are important partners. Other key stakeholders and targeted beneficiaries involved in activities related to forestry are primarily, at the national level, government organizations, including particularly SCEEP and SCGM. The Tashkent Province Khokimiyat (municipality) has a special status in the management of its forests. Authorities at district and province levels coordinate activities of leskhozes in integrating forestry management plans into viloyat programs.

There are several civil society stakeholders involved in forestry, including rural communities, farmer pro-

ducer associations, small and medium enterprises (SMEs) (mainly related to nature-based tourism and NWFPs), rural communities, and educational and research institutions. There are several dozen NGOs active in the areas of environmental protection in Uzbekistan. They include, among others, EcoForum ([www.ecoforum.uz](http://www.ecoforum.uz)), an association of several environmental organizations. Another organization, also listed in the United Nations Convention to Combat Desertification (UNCCD) knowledge hub, is the 'Ecological Movement of Uzbekistan' (<http://www.eco.uz>), which deals with issues relating to the forestry sector such as afforestation, landscape gardening, and ecology. Based on the same source, there is the 'Association for the Ecologically Clean Fergana' and the 'Youth Ecological Network of Uzbekistan' that have some stake in forest themes. No information could be found regarding private sector involvement in forest management. Figure 14 reflects an institutional relationship chart as a first attempt of a stakeholder map.

**Figure 14. Institutional Relationship Chart in Forestry [indicative stakeholder map]**



### 2.3.3. Forest-related regional policy collaboration: International Fund for Saving the Aral Sea (IFAS) and Astana Declaration

Regional collaboration in forestry, climate change, and the environment are important for all Central Asian states. Many of the international development projects and programs that have a regional focus particularly include Kazakhstan, Kyrgyz Republic, Turkmenistan, Tajikistan, and Uzbekistan (see also Chapter 7 and Annex 2). All such programs strongly support regional collaborations between the countries and lessons learned from others can be adapted to national circumstances.

Among the various initiatives, two particular initiatives are worth mentioning in the current context:

#### (a) The International Fund for Saving the Aral Sea (IFAS)

IFAS was established in 1992 on the initiative of the Heads of the Central Asian States for improving the social, economic, and ecological situation in the basin of the Aral Sea. It includes all five nations in Central Asia: Kyrgyz Republic and Tajikistan in the upstream and Kazakhstan, Turkmenistan, and Uzbekistan<sup>75</sup> in the downstream. Uzbekistan is deeply engaged in the work with IFAS, including in forestry.

The SCF also has a particular mandate from IFAS to work with the tools that forestry can offer to stop sandstorms from the dried bottom of the Aral Sea, combat salinization, and ensure stabilization of soils and regulation of water flows. In the framework of IFAS, in a 2019 report of the SCF, the following achievements have been listed: (a) direct seeding of trees, about 500,000 ha, mainly by saxaul; (b) preparing of more than 1 million ha of land (furrows) for saxaul seedlings for sand and water accumulation; and (c) collection of 1,500 tons of seeds with the help of the local population in provinces neighboring the Aral Sea. The work includes reforestation and afforestation in the Aral Sea basin and in the areas that feed the remaining water body with freshwater.

IFAS maintains an active policy agenda till date and involves particularly UN organizations. It attracts considerable international attention and funding.

#### (b) The Astana Declaration in the framework of the Bonn Challenge/ECCA 3076

Uzbekistan's SCF participated in the first Bonn Challenge Regional Ministerial Roundtable for the Caucasus and Central Asia held in Astana, Kazakhstan, in June 2018. It endorsed the so-called **Astana Resolution**,<sup>77</sup> which called for reinforced cooperation on FLR, with policy dialogues playing a key role. The resolution intends to (a) identify degraded lands and work to restore and afforest them by 2030, considering existing national efforts as well as initiatives already outlined in the relevant policy documents and (b) assess the national potential for FLR to enhance expressed voluntary regional targets. The resolution also calls on development partners, international finance institutions, and the private sector to support efforts and investment at the national and regional level in FLR and for the development of a strategy to scale up and finance FLR efforts.<sup>78</sup>

As announced in Astana in June 2018 by Mr. Abdushukur Hamzaev, Deputy Chairman of the SCF and Director of the Forestry Research Institute, Uzbekistan committed 500,000 ha to the Bonn Challenge<sup>79</sup> by 2030 and called for international financing to support an additional 500,000 ha.<sup>80</sup> The country also

75 <https://germanwaterpartnership.de/wp-content/uploads/2019/06/20190518-Aral-Presentation-May-23-2019.pdf>

76 ECCA = European Climate Change Adaptation.

77 [http://www.unece.org/fileadmin/DAM/timber/meetings/2018/20180621/Resolution\\_ENG.pdf](http://www.unece.org/fileadmin/DAM/timber/meetings/2018/20180621/Resolution_ENG.pdf). In the Astana resolution, Armenia, Georgia, Kazakhstan, Kyrgyzstan, Tajikistan, and Uzbekistan pledged to restore 2.5 million ha under the Bonn Challenge. Azerbaijan joined the Bonn Challenge in 2019 and brought regional commitment to 3 million ha.

78 See also <https://www.decadeonrestoration.org/> and <http://www.unece.org/index.php?id=51124>.

79 <https://www.bonnchallenge.org/commitments#region-36>.

80 <https://www.iucn.org/news/forests/201807/caucasus-and-central-asia-demonstrate-impressive-political-will-restoration-and-bonn-challenge>.

expressed its restoration needs, including tugai forests and followed by saxaul woodland and forest, particularly on the dry bed of the Aral Sea. It presented its restoration potential (preliminary estimate) as follows: saxaul woodland and forest (up to 9.7 million ha, if all original natural saxaul lands were restored) and mountain forests, in particular pistachio.

## 2.4. Legislative Framework

### 2.4.1. Laws related to forests and forestry

Eight land administration categories are considered by the law on land of the Republic of Uzbekistan:

- Agricultural land
- Settlements
- Land of industry, transportation, communication, military defense, and other purposes
- Nature conservation land and recreational land
- State Forest Fund
- Historical and cultural heritage
- Water State Fund
- State reserve land

Forests are mainly under the category of the SFF (with an estimated forest area of 3.3 million ha), although forests can also grow on land under other categories (estimated to 0.4 million ha of forested area). Under a reform in 2017, part of the forested land from other land categories and reserve land has been entrusted to the SFF. As already mentioned, the forest sector development concept from 2020 further aims to increase the area under the SFF to 14 million ha including 6 million ha of forested lands. It projects the expansion of forest and shrublands by transferring 1,531,980 ha district-level natural forest reserves to the forest category between 2021 and 2030. With combined land transfers and the planting and restoration on existing SFF land, net forested area is expected to reach 6.1 million ha (15 percent) by 2030. Such ambitious plans will also require developing a solid legal basis regarding land allocation and land use in the long term.

Table 9 lays out the main legislative texts that directly or indirectly regulate forestry as per end of 2021.

**Table 9. List of Legislative Texts Concerned with Forest Regulation**

Law	Year	Remarks
Constitution of the Republic of Uzbekistan	1992	December 1992; no specific provisions on forests
Laws and Regulations on Nature Protection	1993	Conserve national environment and rational use of natural resources
Decree on Industrial Plantations on Poplars	1994	Decree no. 62, industrial plantations of poplars and other fast-growing species
Creation State Committee on Nature Protection	1996	

Law	Year	Remarks
Law on the Protection and Use of Flora	1997	Includes regulations on logging/sanitary felling
Land Code of the Republic of Uzbekistan	1998	
Law on Forest	1999	Regulating all matters concerning the management, protection, and restoration of forests
Law on Protected Natural Territories	2004	Amended on January 8, 2019
Creation of the State Forestry Committee, Forestry Program 2018–2021	2017	PD-5041 SCF reinstated, on the basis of the Main Administration on Forestry (MAF).
'Revised Law on Forests'	2018	Updated on forest production, protection, breeding, reproduction, and restoration, increase of productivity and use of forests and forest land
Presidential Decree on the Development of a Forestry System until 2030	2019	PD-4425 New zero rent for SFF non-forested land leases in 2020–2022
Presidential Decree on the Development of the Forest Sector until 2030	2020	PD-4850 Concept for the development of the forest sector until 2030
Presidential Decree on the Development of Science in the Forest Sector	2021	PD-4960 New organization of the SCF including restructured science institutions in the forest sector under a coordinating department

The main legal document concerning the forestry sector in Uzbekistan is the 'Law on Forest,' enacted on April 15, 1999, and reviewed and approved by the Senate on March 29, 2018.<sup>81</sup> The general regulations concerning the forestry sector and bodies responsible for forest management are stipulated in that law. Under the law, the role of managing, protecting, using, and restoring of the forests is entrusted to the SCF. It gives a description of forest protection and the duties of guards-inspectors, forest use rights and types, logging of shrub and tree stands, and the confiscation of illegally obtained forest products (fuelwood, timber, NWFP, game).

The legal framework referring to forests or affecting forestry in some way is sometimes characterized by inconsistencies and overlapping between different regulations. This adds a layer of complexity and creates barriers to implementation and to even understanding the institutional framework.

The law document of 2018 is aimed at further improving the norms of the 1999 forest law; creating an effective system of protection, rational use, restoration, and reproduction of forests; increasing the responsibility of state bodies; strengthening the role of institutions of civil society; and monitoring of forest and tree resources.

For uniform application and elimination of different interpretations of terms and definitions, first attempt of defining terms such as 'forest,' 'forest protection,' 'spurious forest use,' 'forest reproduction,' 'reforesta-

<sup>81</sup> <https://www.uzdaily.uz/en/post/43563>.

tion,' 'afforestation,' 'permanent forest users,' and others had been made. For a broader mandate in FLR, terms and definitions might need to be further reviewed in the immediate future.

The law sets the main directions of state policy and determines the powers of the SCF and the SCGM in this area. It envisages new legal mechanisms for participation of self-governing bodies of society, NGOs, and citizens in ensuring protection and use of forests. In particular, the law provides for the participation of civil society in implementing programs and activities, conducting explanatory work among the population on the rational use of forests, carrying out public control, and providing assistance and necessary support to state bodies in this area. In addition, the law defines measures for forests protection, for example, the establishment of rules, norms and regulations, restrictions and prohibitions, prevention of violations of forest use, harmful effects on forests, their destruction, biotechnical activities, and others.

It is expected that the new amended law will significantly improve the basic rules of forest management. Thus, new types of forest management are being introduced, such as "harvesting twigs and brushwood without cutting trees and shrubs, development of nature-based tourism, and NWFPs." For forest protection, the SCF may establish restrictions or prohibitions on forest use.

Another important legislative act is the 'Law on especially protected natural territories' 1993. The identification of recreation zones, regime of the state national parks and reserves, and other protective zones is given in the law with special emphasis on the prohibition of any logging except sanitary cutting and thinning of forests in those zones. The 'Law on Protection and Use of Flora' was accepted on December 26, 1997. The procedure for logging with the special permission, documents, and issues concerning the protection of flora are all stipulated in the law.

For industrial wood plantations, Decree No. 62 of February 1994, issued by the Cabinet of Ministers, regulates and promotes the creation of industrial plantations of poplars and other fast-growing species to meet the need of wood processing industry and pulp and paper industry and for construction purposes.

## 2.4.2. Legal issues relating to the SFF

The forests ('forested' area) that are an integral part of the SFF include the following:

- Forests of state importance, which are all forests under the authority of the SCF
- Forests being used by other establishments and legal entities.

### Box 5. Role of the Cabinet of Ministries in Forest Policy and Legislation

- Ensures the implementation of a unified state policy
- Adopts regulatory legal acts
- Approves and ensures the implementation of state programs
- Coordinates the activities of state and economic management bodies
- Makes decisions on the formation of PNAs of national importance
- Supervises the management of the SFF

- Establishes the procedure for determining forest protection categories
- Establishes the procedure and amount of collection of fees for forest use
- Organizes and exercises state control
- Establishes the procedure for monitoring, state registration of forests and the state forest cadaster
- The Cabinet of Ministers may exercise other powers in accordance with the law.

**SOURCE:** Information base: SCF.

The SFF does not include the following:

- Trees and groups of trees, tree-shelterbelts, and tree and bush vegetation on agricultural lands
- Protective plantings on the strips along railways, highways, channels, and other water bodies
- Trees and groups of trees as well as greening in cities and other habitations
- Trees and groups of trees on private farmlands and gardens.

The establishment, maintenance, protection, and use of wood and bush plantings not included in the SFF are regulated in accordance with the Law on Protection and Use of Flora.

Special administrative rules have been developed for issuing permits for cutting trees and shrubs that are not part of the SFF. New rules have been approved by a resolution of the Cabinet of Ministers, dated March 31, 2018. In the process of issuing permits ('tickets'), the SCEEP takes the decision and sends its conclusions to the district (city) administrations, and in the case of a positive conclusion, the district (city) administration issues an appropriate permit. Cutting of trees outside the SFF has become a particular issue in urban areas and has been subject to a great deal of media attention over the past year (for example, in Tashkent).

The system of 'tickets' is also used for grazing of livestock, and this has increased the risk that forests and woodlands become degraded. A known problem is that leskhozoes/forest guards are often not aware where Forest Fund boundaries are in the field, which makes the control of permits difficult. As a result, grazing can happen anywhere, irrespective of Forest Fund or even forest/bushland presence or absence. The cattle and pastoralists choose their own way to find grass and herbs. Only in protected areas, such as natural parks this does not happen. Other exceptions exist, for example, lands used for agricultural production, afforestation, and orchards within leskhozoes. The rest of forest land is grazed without any actual control. The tickets work as a sort of tax, legalizing the grazing damage to ecosystems from the cattle holder's viewpoint. Leskhozoes are requested to generate income from tickets, as they have few other sources of revenue.

Legally, land of the SFF can be given for use by legal and private entities through long-term leasing contracts. Such use of the SFF land can be permanent or temporary. Permanent forest users are forestry enterprises, establishments, and organizations, which are provided with lands of the SFF under a permanent tenure agreement. Temporary forest use can be short term (that is, up to 3 years) or longer term



(that is, up to 10 years). The use of (non-forested) state forest land is regulated through grazing tickets which can be negotiated between rural households and forest enterprises and are purchased seasonally or annually.

### 2.4.3. Forest and land use rights on the SFF tree ownership

According to Article 4 of the 'Law on Forest' (1999), forests are state property and a national asset, subject to rational use and protection by the state. Thus, 100 percent of the forests are under public ownership, entirely at national scale; no subnational entities, communities, or private persons currently own forests in Uzbekistan. The principal manager of the SFF<sup>82</sup> is the SCF. As mentioned earlier, the total SFF has changed over the years, from 8 million ha in 1990 to more than 12 million ha in 2020 (figures indicative). Based on information from 2015, the remaining SFF area not managed by the SCF is owned by Tashkent Regional Khokimiyat (about 7 percent), the SCEEP (estimated 3 percent), or controlled by agricultural enterprises (0.2 percent).

As the 2018 amended law proposes a wider participation of civil society and local communities in the management of the SFF, provisions for long-term leases in forest-related investments will potentially provide some changes in the access to forest use and tenure.

Such changes were introduced with the PD from August 2019 (PP-4424) and started on January 1, 2020. It enabled the establishment of a zero-rent leasing system for non-forested SFF lands, which applies to 2020–2022. Specifically, it introduced zero rent for 10 years for plantations (Haloxylon, Sisola, Calligonum, Halostachys) established in previously unforested desert areas, for 5 years for newly occupied and leased orchards (pistachios, almonds, walnuts in particular) and plantations of fast-growing timber trees (paulownia, poplar), 3 years for medicinal plants, and 1 year for agricultural food crops (legumes, oilseeds, cereals, vegetables, and melons). From January to September 2020, the zero-rent system had already served 1,561 individuals and legal entities that had rented 29,000 ha of unforested SFF lands. Related investments were over US\$7 million, and 4,300 jobs were created.

Further support, from January 1, 2021 onward, includes reimbursement of labor costs (by the State Fund for Employment Promotion) and contributions to the construction of irrigation and land reclamation infrastructure for utilizing unused agricultural lands of the SFF, as well as the free provision of information on the zones of groundwater deposits formation within 15 days by the SCGM.

## 2.5. Governance Challenges

### 2.5.1. Institutional, legal, and regulatory frameworks in the forest sector<sup>83</sup>

Since its creation, the SCF has worked to fulfil its four-year programs and gradually reviewed its institutional setting. It identified a number of policy and legality issues to be addressed in a five-year plan until 2021. A number of governance issues related to forestry planning, NFP, and institutional cooperation are addressed with support from the international community, in particular the FAO that worked closely with the SCF through its own TCP in partnership with other donors (see Annex 2).

Based on a presentation of this report in December 2019, the SCF has defined a number of governance

<sup>82</sup> SFF: land under control of an entity that manages the land. Only a part of the total SFF is forested, meaning reaching the definition of a forest is complex.

<sup>83</sup> This chapter is based on a presentation prepared by the SCF in December 2019 and subsequent discussions with the SCF. It constitutes input for a future broader forest policy reform process.

issues as being central in its current work program and that are important to be built into a future mid-term work program and future work program. The forest governance challenges include the following:

- **Institutional responsibilities, capacities, and coordination mechanisms**

A clear objective at the institutional level of the SCF is to improve its business processes, both at the level of developing value chains for forest products (timber and NWFPs) and forest services ('the fulfillment of service functions for the sustainable development in the country'). The SCF also favors coordination with other SCs, in particular the SCEEP and the State Committee on Land Resources, Geodesy, Cartography and State Cadaster.

It is also recognized that there is a need to develop adequate education curricula common to forestry, protection of soil and water, and conservation of biodiversity.

- **Harmonization of existing policies, laws, regulations**

Attempts have been made in the past (for example, including the support by a number of FAO's TCPs) to review forest policy; develop an NFP as a basis for the involvement of all interested stakeholders; and work on the harmonization of existing policies, laws and regulations, focusing on issues relating to forest management, agricultural development and livestock management, environmental management, water management, and mining (minerals, oil, and gas). Such harmonization processes are considered important and would need to be further strengthened over the coming years.

Also, it is proposed to review policies and provisions on landscape and forest fire, forest management (particularly on sanitary cuts), pasture management, and production of forage.

- **Implementation/enforcement of policies, laws, and regulations**

There is need to improve legislative text and apply it to forest law enforcement. This applies to the framework of managing the revenues received by the SCF from its police function, land use fees, and control of hunting and illegal activities. Income from forest law enforcement is also important for the functioning of the recently created Forest Development Fund.

- **Management of protected areas**

There is an ambition to manage protected areas with particular emphasis on national parks containing large natural forest tracts. Transboundary communication should be improved with respect to the restoration of tugai forests along the river Zarafshan and length of the Amu Darya.

- **Rights and secure access to forested lands and resources**

The forest law allows long-term lease (up to 50 years) for valuating land of the SFF for long-term investments. However, till date, this provision has not been implemented to the extent possible. Currently, non-state forest users are limited to a 10-year lease (for example, for hunting or NWFPs). This acts as a barrier to non-state investors who intend to invest in any forestry activity that requires more than 10 years to be profitable, for example, investing in carbon sequestration on forest land. The SCF intends to regulate the land categorization for long-term leases and allow the development of contracts between the SCF and land users.

- **Land use and/or regional planning**

The lack of accurate information about the effective situation of lands and forests in the SFF and other forested land is due to weak institutional capacity for carrying out inventory, monitoring, and evaluation of forest resources. Data on the state of the forest cover are inconsistent, unre-

liable, incomplete, and generally out of date. There are also no reliable data on forests outside the Forest Fund. This is a major barrier to effective national-level planning and management, as well as to local-level planning and management. This also strongly undermines adequate international reporting, for example, to FRA, United Nations Forum on Forests (UNFF), UNECE, or CBD, to name the most important ones.

The lack of accurate data is a severe barrier for planning and carrying out all types of activities in the forestry sector. The lack of adequate information has been identified by the SCF as a major governance challenge.

The SCF intends to rework its procedures and provisions for the assessment of the country's forest resources and forest inventories and to improve the monitoring of forested land and land use in the SFF. An NFI based on long-term monitoring should be considered. Efforts are needed to develop an easily accessible and reliable forest monitoring system, a forest information system, and a system allowing forest product tracking, in particular woodfuel, along the value chain.

- **Development of capacities for FLR**

As already outlined, Uzbekistan signed and endorsed the Astana Declaration (2018) of the Ministers and committed itself to the Bonn Challenge in the framework of ECCA 30. The modalities of how the commitment of 500,000 ha of FLR will be fulfilled and with what tools and means is yet to be decided.

Afforestation and restoration programs with communities need to be developed, including a special shelterbelt program against sand, wind, and dust in southern Uzbekistan together with neighboring countries. The SCF also intends to plant 500,000 ha of protective plantations in the dry bed of the Aral Sea in the framework of wider development programs (for example, IFAS).

- **Stakeholder participation platforms for decision-making**

There is not much information available about participation by broader groups of stakeholders. The FRA 2015 report mentions that "There is no special platform which involves all forest related stakeholders and promotes stakeholder participation in forest policy development. But there are some general platforms under the Parliament and some ministries which promote exchange of information between ministries, agencies and NGOs. These platforms do not influence forest policy development significantly."

In a recent declaration, the SCF proposed to accelerate the work with local people in developing nature/forest-based recreation facilities and approaches, based on experiences in the United States<sup>84</sup> and Germany.

This list of governance challenges in the forest sector is a good basis for further discussions and exchanges as a foundation for initiatives to strengthen the role of forests and forestry in the sustainable development of the country.

## 2.5.2. Illegal activities in forests, illegal logging and trade

Although there are limited forest and tree resources in the country, illegal cutting of trees is common,<sup>85</sup> mainly for firewood and locally used construction wood. The problem of illegal cutting is primarily in desert areas where natural saxaul woodlands are gradually degraded by continuous firewood extraction

<sup>84</sup> <https://www.fs.usda.gov/inside-fs/delivering-mission/apply/support-uzbekistan-recreation-planning>.

<sup>85</sup> There is no recent analysis on illegal wood cutting in the country. The only known specific analysis is from SAVCOR in 2005–15 years ago.

and second in the tugai areas where poplar forests of natural origin have been illegally cut over the past 20 years or so. The problem seems to be less prominent in the eastern mountain areas of the country, although there are reports of natural juniper forests being affected by unregulated charcoal making and illegal logging and trade of forest products. But illegal cutting is far from the level that can be found in forest-rich countries. It could be controlled by a combination of regular and fair law enforcement, alternative activities for producing sustainable firewood and charcoal making, and alternative energy sources.

There is no realistic estimate of unrecorded wood harvesting to quantify possible major degradation damages in the forests. Besides timber theft by outsiders, a possible source of illegal timber might be the felling of valuable and healthy walnut, poplar or juniper trees that are downgraded and declared as sanitary cuts, so that they can be legally felled. However, there is no reporting on such issues. Also, illegal cutting of walnut burls might still happen. Overall, however, there is no evidence of any major illegal logging of timber.

Harvesting of NWFPs including grass production/haymaking near forests, resulting in the destruction of natural regeneration and undergrowth, is possibly a problem in some leskhozes. Excessive collection of medicinal plants and full harvesting of tree fruits, walnuts, and pistachio also happen. However, these problems do not seem to be widespread. Poaching of wildlife is said to be widespread. It includes various national and foreign actors<sup>86</sup> and is of concern.

The most crucial factor affecting the integrity of forests and woodlands in the drylands and mountain areas of Uzbekistan is not illegal tree cutting but excessive and unregulated grazing that affects forest and woodland regeneration. There is no clear separation of forested land and grassland and in many parts of the country natural forests are on a slow but steady degradation trajectory. Often, as a secondary effect of livestock, the human component is more prominent because herders move together with livestock. Ultimately, there is a combined impact on forests from overgrazing and from the cutting of trees and bushes by the herders for firewood.

Data on illegality in the forest sector are not available, but it can be assumed that irregular activities in the forest sector lead to continuous degradation rather than to direct deforestation. Fuelwood cutting for charcoal making, however, remains an issue that needs attention.

### 2.5.3. Identification of major cross-sectoral policy issues impacting forests

Direct deforestation, meaning the transformation of forest to another land use, including agriculture, mining, or industrial/infrastructural development, is not widespread in Uzbekistan. There is currently no other sector of the economy that drives deforestation or forest degradation in a way that would be a major threat to the integrity of forested areas overall in Uzbekistan, with the exception of hydropower management.

Industrial development, including mining and oil and gas exploration can be an important issue locally. The rapid infrastructural development (including in the framework of the Belt and Silk Road<sup>87</sup>) and operations of industrial facilities, such as mines, oil and gas exploration and pipelines, factories, highways, negatively affect the area where such facilities are located and also the surrounding environment. In such cases, they threaten forest areas, including planted forests often developed with considerable state financing. Such issues need to be reported and registered and a compensation mechanism for de-

<sup>86</sup> GIZ. 2015. The Current Situation of Wildlife Management in Central Asian Countries. Bishkek, Kyrgyzstan.

<sup>87</sup> Qoraboyev, Ikboljon. 2018. The Belt & Road Initiative and Uzbekistan's New Strategy of Development: Sustainability of Mutual Relevance and Positive Dynamics.

forestation and degradation should be considered, for example, to replace destroyed or damaged forest stands, as is already the case in other countries.

An issue of great concern is the integrity of large tugai forest stands that are threatened by the withdrawal of water from the rivers for artificial irrigation and also power generation through the construction of large dams and the management of water storage reservoirs (that is, water discharge during winter-time to cover power shortage). This completely changes the water regime of rivers.<sup>88</sup> Forest research has shown that regeneration of tugai forests, in particular natural poplars, depends on the availability of summer floods. As Botman (2008) reported, water flows often no longer reach the Amu Darya, where the largest remaining areas of native poplar forests are located. Thus, the future of natural poplar riparian forest is of great concern. Cross-sectoral collaboration in irrigation with agriculture and the hydroenergy sector is crucial, as tugai forests are of great ecological and social importance for the country.

Small-scale conversion of forested areas (including both natural and planted forests) is mainly localized in submontane and mountain districts of Tashkent, Surkhandarya, and Samarkand provinces and the Fergana Valley, mostly due to housing development and road construction without sufficiently considering the local geotechnical conditions. Such conversion can lead to undue erosion on forest land. In mountainous areas, agriculture, for example, through ploughing and excessive grazing by livestock, can lead to the rapid degradation of forests and ultimately to complete deforestation. This is also of concern and should be monitored.

Major issues related to the incongruity between industrial/production forestry versus forests protecting soil and water or logging versus biodiversity conservation do not occur in Uzbekistan. As forestry is oriented mainly to protection and restoration, intersectoral collaborations with agriculture, water, soil protection and conservation are mainly positive, and they are currently not considered a major problem for forest integrity. Deforestation and large-scale degradation of natural forest and shrub stands are historical. Conflicts arise, as underlined before, mainly due to excessive grazing by sheep, goats, and cattle. Today, the main problem is rather the fact that many lands are highly degraded, and an integrated landscape approach is needed, encompassing a variety of land uses. This is new for the country as it requires cross-sectoral collaboration at all levels, top-down and bottom-up.

#### 2.5.4. Financial challenges in the forest sector

In 2015, the public expenditures in forestry amounted to about UZS 11.5 billion, about US\$7 million. Newer figures were not yet available for this report.

Financing forestry sector activities comprises mainly targeted funding allocated from the central government budget and local administration budgets. In addition, on a case-by-case basis funding is provided by the relevant ministries, other government agencies, and eventually other organizations as forest users. This is supplemented by the revenues of forestry institutions, for example, through the sale of forest products (including timber from sanitary cuts and NWFPs), fees, and rendering payable services to legal entities and individuals. Targeted funding for implementing projects offered by international donor grants is another source of income.

Leskhozoes should look for new approaches and mechanisms to achieve their goals, and this includes finding opportunities for collaboration with other stakeholders, such as co-management of forests with local households, and the benefits will be mutual for both leskhoz and the local population. Opportunities for such joint approaches potentially exist in all forest biomes (for example, fuelwood management in

<sup>88</sup> Botman, Forest Rehabilitation in the Republic of Uzbekistan (above, n. 68).

saxaul forests, NWFP in walnut-fruit forests), joint management of tugai forest rehabilitation, and so on. In 2015, the provisions on regulation procedure and payment for utilization of forest resources were adopted in accordance with the government resolution on measures aimed at further improving utilization of flora objects (Res. 278 of 30.09.2015). This legislation regulates utilization of forest resources, promotes development of domestic pharmaceutical industries, enables increasing assortment of nationally produced drugs, and supports systematic growing and harvesting of wild plants as well as their processing and production.<sup>89</sup> It also provides grounds for ensuring a favorable environment for entrepreneurs that are interested in exporting NWFPs and contributes to further liberalization of external economic activities by entrepreneurs and private business.

Leasing out land of the SFF to long-term or temporary forest users<sup>90</sup> is on a payable basis. This includes grazing, haymaking, apiary and placement of beehives, collection of twigs and brushwood without felling the trees and bushes, utilization of the land for cultural and educational events, nature-based tourism and its infrastructure, recreation in general recreation, aesthetic, scientific and other purposes.

Income received from rendered services and production activities of the leskhozoes is potentially an important source of funding for forestry.<sup>91</sup>

By Resolution #168 of the Cabinet of Ministers in June 2016 a Forestry Development Fund was established. The fund aims to finance forest-based investments on the SFF and to strengthen the material and technical bases of leskhozoes. The Forestry Development Fund should receive the payments from leasing contracts (forest products except timber, nature-based tourism, and so on), fines and compensation payments for damaging flora and fauna on the SFF land (excluding protected areas), and issuing permits for forest and land resource uses (except timber). The fund is also open for donations and voluntary contributions. The Forest Development Fund was functional by mid-2020.

Table 10 summarizes the main characteristics of the Forestry Development Fund of the SCF.

**Table 10. Main Characteristics of the Forest Development Fund**

Year	Endowment (UZS, millions)	Expenditures (UZS, millions)	Number of Projects	Examples of Projects
2018	1,30,466	2,588.5	18	Nursery development (6), UZS 556 millions Non-wood forest use (2), UZS 1,205 millions Aromatic plantations (2), 1,320 millions Strengthen material and technical base (8), UZS 592 millions
2019	1,56,163	1,823	12	Nursery development (2), UZS 643 millions Non-wood forest use (1), UZS 80 millions Aromatic plantations (1), UZS 100 millions Strengthen material and technical base (8), UZS 1,000 millions

**SOURCE:** Financial department of SCF, July 2, 2020.

<sup>89</sup> APFNet, Forest Development and Best Practices of Forest Management in Uzbekistan (above, n. 24).

<sup>90</sup> According to information received by the SCF, long-term means up to 50 years.

<sup>91</sup> Data on income, however, have not been made available yet. Also, the question if leskhozoes have to pay taxes for their economic activities and if yes, how much, is yet to be answered.

## 2.5.5. Forest and forest sector information base

If policies, legislation, and forward planning are to be effective and responsive to the needs identified in this analysis then there is urgent need for both an NFI and an up-to-date information and communication platform to provide accurate and objective information and data for forward planning. A modern, evidence based NFI has never been established in Uzbekistan. The last such inventory was conducted during Soviet times (1987–1988), when forestry metrics were based largely on ocular and subjective assessments. Reliable information only exists for SFF land. While other (non-SFF) lands may contain significant forested areas, data/information on these forestry resources and the state of their management are not available.

An NFI would be preceded by field and remote sensing surveys with the aim of having high precision and unbiased data, to be compiled into the NFI. In addition, a national forest monitoring system needs to be developed as a data platform on which the NFI would be presented, along with measurement, reporting, and verification functions that produce high-quality, reliable data on forests, including that necessary for FRAs, greenhouse gas (GHG)/land use, and land use changes and forestry inventories relevant for climate commitments and other internationally required reports and assessments.

There is also currently lack of a modern information and communication platform for forest planning and development (information and communication technology [ICT] platform). Such a platform is necessary to address the lack of updated and consistent data on the current state of the forests, including integrity of forests and threats, in particular forest and landscape fire, erosion control, forest management planning, afforestation, and forest restoration potential. With innovations in remote sensing and cloud computing, high-resolution global data are now available in user-friendly formats and at low cost, which would greatly aid informed policy making and planning of forest management and protection at both national and local (leskhov) levels.

## 2.6. Livelihoods and Dependence on Forests

### 2.6.1. GDP and untapped livelihood opportunities

Overall, the agriculture, forest, and fishery sectors contribute between 25 and 29 percent of Uzbekistan’s GDP, depending on the data. This has not changed much in 30 years. Table 11 highlights the contribution of the natural resources sectors to the GDP in direct comparison with other sectors, for 2015–2020.

**Table 11. GDP and Sector Contributions at Current Prices Calculated from the Production Side<sup>92</sup>**

US\$1 = UZS 10,770	Gross value 2019			Gross value 2020		
	UZS (billions)	US\$ (millions)	% GDP	UZS (billions)	US\$ (millions)	% GDP
<b>Total</b>	221,351	21,765	100	602,551	59,248	100
<b>Agriculture, forestry, and fisheries</b>	64,680	6,360	29	151,251	14,872	25

<sup>92</sup> Uzbekistan official statistics (<https://stat.uz/en/official-statistics/national-accounts>).

	Gross value 2019			Gross value 2020			
	US\$1 = UZS 10,770	UZS (billions)	US\$ (millions)	% GDP	UZS (billions)	US\$ (millions)	% GDP
<b>Industry</b>		38,467	3,782	17	152,728	15,018	25
<b>Construction</b>		11,383	1,119	5	37,489	3,686	6
<b>Trade, accommodation, food service</b>		16,145	1,588	7	37,194	3,657	6
<b>Transport, storage, communication</b>		19,158	1,884	9	38,531	3,789	6
<b>Other services</b>		51,371	5,051	23	140,986	13,863	23
<b>Net taxes on products</b>		20,147	1,981	9	44,372	4,363	7

As lesser aggregated data are not available, it is not known how much of the 25 percent comes from forestry. However, it is believed that like the negligible fishery sector, the contribution of the forestry sector is rather low, at less than 1 percent. Due to the mainly protective function of forests, official timber harvests are low and wood harvesting is in most cases only possible in the form of 'sanitary fellings'. Therefore, it can be assumed that the importance of forest landscapes for livelihoods is not represented in GDP figures but rather in informal uses.

Forests have a vital economic and social role, as many rural people live within the territory of the SFF, also in areas close to forests. Rural inhabitants have always benefited from various ecosystem goods and services. They are using wood for house construction and firewood for heating and cooking, harvesting herbs for medicinal purposes, collecting seeds, hunting for wildlife, making hay, grazing cattle on forest pastures and producing fodder, collecting mushrooms and berries for subsistence and nuts and fruits for subsistence and sale, and so on. Since independence, rural populations in Uzbekistan have become even more heavily reliant on forest resources for their livelihoods. In the parts of the country with easy access to forests and tree stands, the local population uses significant amounts of firewood and service wood for construction and manufacture of furniture. NWFPs also play an important role in rural livelihoods, particularly nuts, fruits, honey, medicinal plants, fodder, among others. The most common NWFPs are presented in more detail in Chapter 3.1.3.

Generally, it can be estimated that at least 17.1 million people (those living in rural areas in 2021<sup>93</sup>) depend on forests for subsistence and a majority of those for income generation as well. Rural households' uses of forestry products are, however, often informal and therefore not presented in official statistics. Forests and forest products also provide opportunities for rural households to establish small businesses. For the combined sectors of agriculture, forestry, and fisheries, there were 25,500 small businesses registered in 2019.<sup>94</sup> The number of small businesses has greatly increased, with 5,100 and 5,600 newly created enterprises in 2018 and 2019, respectively. Some of these small businesses could also be located in suburban areas.

Simultaneously, growing urban and suburban populations are increasingly using forests for recreational activities. In 2018, the Ministry of Foreign Affairs declared that 15.4 million people made domestic trips to recreational areas of Uzbekistan.<sup>95</sup> Tourism is further important for the national economy and can also benefit rural livelihoods if communities are integrated into nature-based tourism development (see Chapter 3.1.5).

93 Uzbekistan official statistics (<https://stat.uz/en/official-statistics/demography>).

94 [http://web.stat.uz/open\\_data/en/18.3%20Number%20of%20small%20businesses%20by%20types%20of%20economic%20activity.pdf](http://web.stat.uz/open_data/en/18.3%20Number%20of%20small%20businesses%20by%20types%20of%20economic%20activity.pdf).

95 MFA (Ministry of Foreign Affairs). 2018. "New Opportunities for Tourism, Presentation."



Formal employment in forestry is estimated at 8,000 people. But in a wider livelihood aspect, many more people are expected to get at least some income from formal or informal forestry-based activities. Over the past 10–15 years, various international initiatives and projects have introduced new approaches and technologies that require professionals with skills in forestry and nature protection but also awareness and collaboration of local inhabitants and communities.

Such new approaches introduced under different terms, such as joint forest management, community-based forestry, or agroforestry, also support people not directly employed in forestry. For example, local livelihoods can be directly enhanced with poplars in woodlots or as protective forest belts, in combination with growing cotton and/or wheat at irrigated lands<sup>96</sup> or forest-pasture systems focused on development of walnut plantations in combination with fodder plants and/or fruit berry shrubs.<sup>97</sup> Projects working in these areas demand that local communities play a key role in designing, planning, and implementing such approaches that are today known as forest landscape restoration. Local people contribute to forest conservation and creation of new forests and receive incomes and benefits from implementing these initiatives. Such large pilots, as applied recently through international programs, increase ownership by communities for the implemented activities and enable them to assess their own development capacities and opportunities. Thus, they have a direct and decisive role to play in improving local livelihoods. There are vast opportunities for direct livelihood improvement through forestry activities that are at present largely untapped.

## 2.6.2. Growing wood stock and timber production

Timber yields from Uzbekistan's forests are low, as over 83 percent of the forest area has a designated management objective to maintain and enhance protective functions.<sup>98</sup> Overall, Uzbekistan has only 2.6 percent self-sufficiency in forest products, and 75 percent of all imported products are from the Russian Federation.<sup>99</sup>

As forests are publicly owned, and overseen by leskhozoes, they are in principle managed through long-term forest management plans (96 percent according to FRA 2020), although it is not clear how detailed these plans are today and to what extent they are implemented. Overall, except for a few stands (less than 6,000 ha are considered as production forests according to the SCF), most forest management plans have provisions for protection and conservation measures and management of NWFPs. Considering the particular state of the forests in Uzbekistan, there is no certified forest management in place, not under the Forest Stewardship Council [FSC] nor under the Program for the Endorsement of Forest Certification [PEFC]). Indeed, certification as a market tool is not required considering the specific circumstances of forests in Uzbekistan. More useful would be the introduction of a wider set of criteria and indicators and the application of FLR guidelines applied for multiple-use forestry and forest landscape restoration adapted to the country context.

The wood growing stock data are not conclusive and have varied enormously since FRA 1990. Table 12 gives a rough overview of the situation of the growing stock, based on FRA 2020 data by main forest tree species.

96 Thevs, Niels, Strenge, Eva, Aliev, Kumar, and Eraaliev. Maksat. 2017. "Tree Shelterbelts as an Element to Improve Water Resource Management in Central Asia." *Water* 9 (11): 842, doi:10.3390/w9110842.

97 Djanibekov, U., Dzhakypbekova, K., Chamberlain, J., Weyerhaeuser, H., Zomer, R., Villamor, G., Xu, I., J. 2016. "Agroforestry for Landscape Restoration and Livelihood Development in Central Asia." CRAF Working Paper 186. World Agroforestry Centre East and Central Asia, Kunming, China.

98 FRA 2015 - Uzbekistan.

99 FAO, State of Forests of the Caucasus and Central Asia (above, n. 20).

**Table 12. Growing Stock Composition (based on FRA 2020 figures, and compared with FRA data since 1990)**

Species	Forest type	Growing stock (million m <sup>3</sup> )	Tendency
Saxaul ( <i>Haloxylon</i> spp.)	Desert, dryland	17.1	Increasing due to widespread afforestation/reclamation
Archa ( <i>Juniperus</i> spp.)	Mountain	8.3	Increasing, due to active protection
Terak ( <i>Populus densifolia</i> )	Riparian	2.8	Increasing due to active protection, and restoration of Tugai forests
<b>Populus alba, hybrids, fast-growing</b>	Riparian	0.9	Stable overall, slightly increasing
<b>Other broadleaved species: Ulmus, Acer, Robinia, Juglans, Salix, Fraxinus</b>	Pre-montane	0.4	Tendency not clear, slight loss of growing stock presumed

NOTE: a\* rounded; data from FRA 2020

There is no annual allowable cut (AAC) set for the production forests as all harvesting is solely sanitary<sup>100</sup>. The official annual harvested volumes are at 36,000 m<sup>3</sup> per year over the past years, the local production of sawn wood is about 26,000 m<sup>3</sup> annually.<sup>101</sup> The total growing stock of all forests and species combined is estimated at 30 million m<sup>3</sup> (FRA 2020). Other sources (FAO and UNECE 2019)<sup>102</sup> indicate up to 60 million m<sup>3</sup>. Figures on forest area, biomass, and growing stocks are all based on estimates and need to be carefully considered. Nonetheless, it can be concluded that the growing stock in all forest types is either increasing or relatively stable. It seems that the forests overall are not in a dramatic stage of degradation. Surprisingly, mountain archa forests and riparian forests stocked with terak (*Populus densifolia*) are relatively stable with respect to stocking.

Industrial products have overall increased in the past decade, although there is no information on the exact contribution of wood products. According to national statistics,<sup>103</sup> the total manufacture of wooden and cork products (except furniture), including straw and plaiting products, has increased from US\$7 million in 2010 to US\$151 million in 2019. Manufacture of furniture has increased from US\$16 million in 2010 to US\$218 million in 2019. Figures for paper are similar, with US\$12 million in 2010 and US\$184 million in 2019.

Wood for industrial purposes is almost exclusively imported from other countries. Domestic timber from state forests (broadleaf and junipers) can be harvested only through sanitary felling by the leskhozoes, which is about 5,000 m<sup>3</sup> per year based on official sources.<sup>104</sup> Leskhozoes also supply minor amounts of fuelwood; the official figure is about 18,000 m<sup>3</sup> which is clearly an underestimation of the demand for energy wood (fuelwood and charcoal). In rural areas, the need for service wood by local people obviously cannot be satisfied from official sources. Locally produced timber is generally of low quality and

100 Forest Europe Liaison Unit. 2011. State of Europe's Forests 2011. Oslo, Norway.

101 FAO, State of Forests of the Caucasus and Central Asia (above, n. 20).

102 FAO, and UNECE. 2019. "Forest Landscape Restoration in the Caucasus and Central Asia." Geneva Timber and Forest Discussion Paper 72, United Nations, New York, Geneva.

103 Uzbekistan statistics - industrial products ([http://web.stat.uz/open\\_data/en/9.2%20Manufacture%20of%20industrial%20products%20by%20type%20of%20economic%20activity\(billion%20soums\).pdf](http://web.stat.uz/open_data/en/9.2%20Manufacture%20of%20industrial%20products%20by%20type%20of%20economic%20activity(billion%20soums).pdf)).

104 The law on forests does not allow final felling of trees but allows sanitary cuts in all forest categories to maintain forest stands in a healthy stage. Regular statistics on the amount of sanitary cutting have not been available.

is used mainly as service wood, including sawn timber and hardboards, industrial wood, and firewood. Domestic timber at the market is predominantly poplar, which often originates from local farms and dehkans. The lion's share of timber, 90 percent of the demand, is imported from Russia and Kazakhstan (round wood, sawn wood, particle boards, and so on, out of pine, spruce, larch, birch, oak, and others). Consumption of wood is at a low level in Uzbekistan (0.2 m<sup>3</sup> roundwood equivalent per capita, as compared to 0.86 in Europe, according to FRA 2015).

### 2.6.3. Wood energy

Even though almost all households have access to the electricity grid, there is high risk that remote rural homes will suffer regular interruptions in electricity supply. Rural households thus depend on fuelwood for cooking and heating, at least partially. Charcoal is widely used in households and small businesses for baking bread and grilling shashlik; thus, it is an important raw material in the daily life of rural people and small food businesses.

Official figures indicate that 72 percent of total wood production (26,000 m<sup>3</sup>) serves as wood fuel. It is also estimated that the official sanitary cuttings only cover 0.1 percent of annual fuelwood demand in the country.<sup>105</sup> However, these figures are clearly underestimated, and the real demand and consumption of firewood and charcoal probably exceeds 1–2 million m<sup>3</sup>. Unrecorded wood cutting for fuelwood and charcoal making thus must be widespread in all biomes of the country (dry, riparian, and mountainous forests).

Within the European Union (EU), around 42 percent of harvested wood biomass is used for energy, accounting for about 5 percent of total EU energy consumption. There is clearly potential to structure and develop a woodfuel resource base and market in Uzbekistan. Woody biomass use for heating contributes to improving the energy security of the country as well as reducing the country's GHG emissions. However, the greater part of the demand for wood energy is met through illegally harvested material and is unsustainable in the medium to long term. Alternative sources of legally harvested fuelwood or woody biomass need to be identified if the forest resource is to be managed on a sustainable basis.

Uzbekistan's Third National Communication to the United National Framework Convention on Climate Change (UNFCCC), as part of its adaptation measures to reduce losses/risks in the biomass energy sector, advocates (a) introducing new crops with higher heat and water stress tolerance, (b) substituting fuel sources, and (c) supporting emergency harvesting of biomass.

Short rotation high-yielding forest energy crops are considered a potential source of fuelwood, particularly in degraded lands, where a number of studies have shown good fuelwood properties after four and more years of small-scale planting of *Elaeagnus angustifolia*, *Ulmus pumila*, and *Populus euphratica*.<sup>106</sup>

Short rotation forestry could pose a number of potential threats and benefits to water quality and quantity arising from harvesting operations, which can be controlled with good practices. Using fast-growing species in short rotation could also improve water quality compared to arable cropping; while conversion of only limited areas of more intensively farmed land may be appropriate, major opportunities for targeted plantings are expected. Thus, judicious planting of fast-growing tree species that could be used as fuelwood, such as *Populus* spp., *Salix* spp., *Robinia pseudoacacia*, and others, in riparian areas and selected saxaul species in dry areas could help tackle the major nutrient deposit and sediment pollution pressures associated with non-forest land uses.

<sup>105</sup> see reference in footnote 101.

<sup>106</sup> Lamers, J. P. A., and A. Khamzina. 2008. "Fuelwood Production in the Degraded Agricultural Areas of the Aral Sea Basin, Uzbekistan." *Bois et Forêts des Tropiques* 297:43–53. Lamers, John, P. A., Bobojonov, I., Khamzina, A., and Franz, J. 2008. "Financial Analysis of Small-Scale Forests in the Amu Darya Lowlands of Rural Uzbekistan." *Forests, Trees and Livelihoods* 18 (4): 373–386. doi:10.1080/14728028.2008.9752644.

When preparing this Note, there were several requests to assess the potential of Paulownia sp. as a main reforestation species for Uzbekistan, using them as service wood and potentially for bioenergy. The species can become invasive and should be carefully monitored.<sup>107</sup> Cloned Paulownia might have the potential to grow fast on specific sites; however, it would need considerable water resources for other land uses.

A term paper prepared in early 2021 summarizes the potentials and limitation of Paulownia as a reforestation species in Uzbekistan (Box 6).<sup>108</sup>

### **Box 6. A Glimpse on Paulownia for Soil Restoration, Afforestation, and Agroforestry in Uzbekistan - based on Langwieser 2021a**

Paulownia tomentosa is a multipurpose fast-growing tree appreciated, among others, for its timber, fuelwood, and fodder. It is suitable for large plantations as well as small-scale planting for domestic fuelwood needs and performs well in agroforestry. However, other members of the Paulownia genus have better potential. *P. elongate* is more appropriate for plantations or agroforestry due to its shape. Nowadays, other crossbred species are on the market and show better performances as well as higher frost tolerance. For soil restoration, *P. tomentosa* is suitable as it allows the absorption of heavy metals. It then improves soils through litter fall, which allows for more selective species to grow.

There are some concerns about the invasive character of Paulownia; however, this is linked to the nature of the soil, as it is unable to germinate and develop under a closed canopy forest where vegetation is already present. It will, therefore, not be very relevant in Uzbekistan, as areas not covered by vegetation do not generally receive sufficient precipitation. One solution to avoid this risk is the use of sterile varieties supplied by several Paulownia dealers. A careful selection of seeds or seedlings in terms of origin and quality is essential and strongly influences the success of restoration projects. In any case, it is necessary to test several varieties and origins before planting on a large scale.

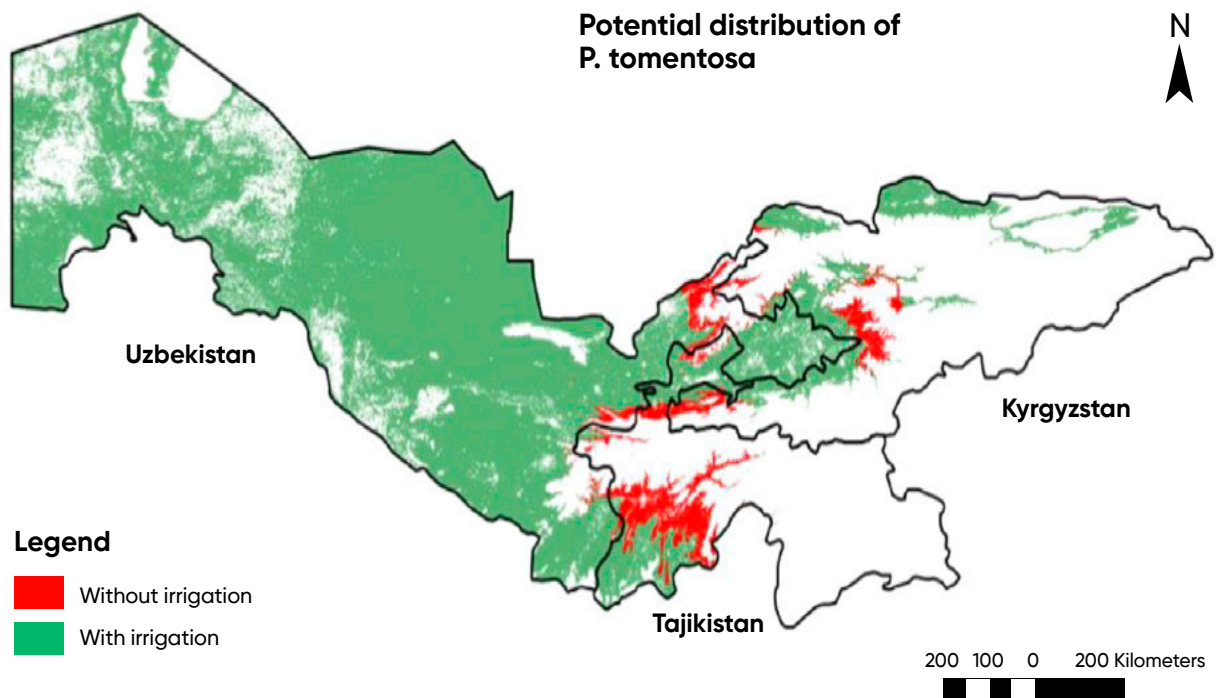
Unlike Tajikistan and Kyrgyz Republic, which have mostly mountainous areas, Uzbekistan could prove favorable for *P. tomentosa* plantations if irrigation schemes are put in place. Favorable areas for plantations are sometimes located far away from water points, necessitating expensive irrigation schemes. This should be analyzed in more detail to determine the profitability of such plantations.

The acquisition of machinery for tillage and fertilizers are additional cost factors to be considered because suitable areas on a map may not necessarily dispose of fertile soils. Another aspect to be examined is the larger effect of water consumption: irrigation may cause water levels, such as the Amu Darya, to drop and may lead to shortage for crop irrigation downstream.

<sup>107</sup> <https://www.cabi.org/isc/datasheet/39100>.

<sup>108</sup> Langwieser, Y. 2021b. "Potential of Paulownia tomentosa in afforestation projects in Central Asia Focus on Uzbekistan, Tajikistan and Kyrgyzstan." Term Paper, Bern University of Applied Sciences.

**Figure 15. Potential Distribution of *P. tomentosa* in Uzbekistan, Tajikistan, and Kyrgyz Republic**



SOURCE: Langwieser 2021b.

#### 2.6.4. Non-wood forest products

NWFPs<sup>109</sup> are defined in the Uzbek context as goods “derived from forests that are tangible and physical objects of biological origin other than wood.” Harvesting NWFPs is an important activity undertaken by many of the leskhozoes, particularly in higher valleys, mountainous forest regions, and riparian forests. Volumes of NWFPs harvested vary by year depending on environmental factors, access to resources, and market requirements. For the leskhozoes, the revenue from the sale of NWFPs can be far more important than timber from sanitary cuts and firewood sales. NWFPs clearly broaden the overall revenue base of leskhozoes. In some leskhozoes, up to 90 percent more of the forest output value is generated from NWFPs.

NWFPs are not only a commercial product managed in the leskhozoes but also an important source of livelihood for poor households among the rural communities, as they often own only a limited number of livestock and have few alternative income sources. According to the Forest Law of 1999, citizens have the right to access and harvest medicinal plants, food plants, berries, and mushrooms for their own needs. While it is usually the men who negotiate with the leskhozoes to use forest lands (for grazing or NWFP collection), it is often the women who are responsible for collecting and selling fruits, nuts, medicinal herbs, seedlings, and so on. The major types, species, and annual NWFP production are shown in Table 13.

<sup>109</sup> We use the term NWFP according to the FAO terminology and not the term NTFP (non-timber forest products) used otherwise in literature. NWFP specifies all products that are not used as timber or fuelwood.

**Table 13. Main NWFPs from Forest Land<sup>110</sup>**

Rank	Type of NWFP	Main Tree Species Concerned	Value in 2010 (US\$, thousands)
1	<b>Nuts</b>	Pistachio ( <i>Pistacia vera</i> ), walnut ( <i>Juglans</i> spp), hazelnut ( <i>Corylus</i> spp), almond ( <i>Amygdalus</i> spp)	740
2	<b>Medicinal and aromatic plants</b>	<i>Rosa canina</i> , <i>Leonurus turkestanica</i> , <i>Mentha piperita</i> , <i>Calendula officinalis</i> , <i>Lavandula vera</i> , <i>Crataegus turkestanica</i> , <i>Crocus sativos</i> , <i>Citrus</i> spp.	>500
3	<b>Honey</b>	Acacia, saffron, <i>Castanea sativa</i> , tamarisk, cotton, sunflower, <i>Alhagi</i> spp (in dry zones)	1,500
4	<b>Fruits</b>	Wild apple, wild cherry, <i>Crataegus</i> spp, <i>Hippophaë rhamnoides</i> (sea-buckhorn)	200
5	<b>Handicraft (wood)</b>	<i>Salix</i> , <i>Morus</i> (silk), <i>Ulmus</i> , <i>Platanus</i>	100

Table 14 gives an overview of some prices (US\$ per kg) on domestic farmers markets as per March 2020, for selected products, which can be partly seen as NWFP and partly as farmed products. Table 15 gives some examples of valuable agroforestry species and their site characteristics.

**Table 14. Average Prices of Some Products in Dehkans Markets<sup>111</sup> [currency exchange rate March 2020]**

Product	Price in March 2019 (UZS/kg)	US\$/kg	Price in March 2020 (UZS/kg)	US\$/kg
Apples	4,625	0.49	11,669	1.22
Pears	14,527	1.52	16,463	1.73
Dried apricots	17,533	1.84	17,340	1.82
Walnuts	16,885	1.77	18,752	1.97
Pistachios	85,879	9.01	99,996	10.49
Almonds	44,718	4.69	47,290	4.96
Fish	16,846	1.77	19,354	2.03
Honey	37,073	3.89	39,806	4.18
Animal feeds	1,940	0.20	2,095	0.22

<sup>110</sup> Based on FRA 2015 country report Uzbekistan and presentation of SFA, December 2020.

<sup>111</sup> Uzbekistan statistics - Prices ([http://web.stat.uz/open\\_data/en/4.21\\_Avarage\\_prices\\_eng.pdf](http://web.stat.uz/open_data/en/4.21_Avarage_prices_eng.pdf)).

**Table 15. Examples of Tree Species Usable in Agroforestry and Reforestation Schemes in Eastern Uzbekistan**

Species	Attributes					Comments
	DR	RS	SD	SS	FG	
<b>Pistacia spp., P. vera</b>	+	+	++	++		This species colonizes open areas well, with high resistance to drought. Useful fruit species for community-based NWFP production (for example, grafting of edible <i>Pistacia vera</i> ).
<b>Juglans regia</b>						This species is resistant to drought in areas with sufficient soil moisture. Useful fruit species for community-based NWFP production.
<b>Hippophae rhamnoides</b>	++	++	++	++		This species endures the summer drought and winter cold well and, at the same time, thrives well on dry soils, with minimal risks in the first years. Useful fruit species for NWFP production and for shelterbelt protection of restored communal land.
<b>Amygdalus bucharica, A. communis</b>	++	++	++	+		Local almond tree <i>A. bucharica</i> is a xerophyte and grows well in the hot summer conditions with precipitation of 300 to 700 mm. Managed in Chaktal State Reserve.
<b>Rhus coriaria</b>	++	++		++	++	This species endures the summer drought and winter cold, thrives well on dry and gravel soils, and is good for soil restoration. Useful fruit species for NWFP production.
<b>Pyrus korshinskyi * communis</b>	+	+	++			This species attracts seed-dispersal fauna and consequently seedling recruitment from other species. Useful fruit species for community-based NWFP production.
<b>Malus communis, M. sieversii</b>	+	+	++			This species attracts seed-dispersal fauna and consequently seedling recruitment from other species. Useful fruit species for community-based NWFP production.

**NOTE:** a: The species names are updated according to the most recent taxonomic updates: The Plant List (see theplantlist.org).

**ATTRIBUTES:** DR: Drought-resistant; RS: Re-sprouting after fire, browse and cutting; SD: fruit tree attracting seed-dispersal fauna; SS: instable soil stabilization; FG: colonizer of forest gaps and open areas. + well suited; ++ very well suited

Forest food species are an important part of local nutrition, with up to 1,500 tons consumed by the population of Uzbekistan. To match the demand, it is planned to actively enhance, through seeding and planting, the growth of wild foods on forest lands.

### Box 7. NWFPs from the Walnut-Fruit Forests

Natural walnut and fruit forests annually supply approximately 90 tons of walnuts, 35 tons of pistachios, 15 tons of almonds, and many fruit and berry products. Honey production is another important source of income from forests. In 2012, Uzbekistan produced 4,000 tons of honey from 3,069 beekeeping farms that provided 4,000 jobs. Forests further support valuable species of medicinal, technical, and nutritional plants. Annual production of these plants is 300 tons including over 30 species. Examples include *Rhus caritaria* whose leaves are used to extract tanning agents and *Glycyrrhiza glabra* whose roots are on par with ginseng in terms of value. Other nutritional and medicinal plants include *Rosa canina*, *Barberis oblonga*, *Hypericum perforatum*, *Hippophae rhamnoides*, *Origanum vulgare*, *Crataegus turkestanica*, and *Achillea millefolium*. Forests also support incomes and nutrition through opportunities for hunting and fishing. The unique walnut-fruit forests of Uzbekistan and neighboring Kyrgyz Republic are an important gene pool and it is of utmost importance that they are conserved and sustainably used.

### Treenuts

Nuts are mainly collected from natural forests but are increasingly also cultivated in tree plantations. The SFF has in the past few years increased its area under nut tree plantations. In 2020 alone, the SCF established a total of 11,000 ha of pistachio, almond, and walnut plantations in the mountainous and foothill lands of the Forest Fund, compared to 2,800 ha established in 2017.

The most important nut collected in Uzbekistan is pistachio (*Pistacia vera*), which grows in submontane areas with extremely dry conditions. Pistachio is found either as single trees or in separate pistachio forests of several thousand hectares. All in all, pistachio forests are believed to cover 39,000 ha of the country's surface. Official statistics of Uzbekistan show that the country produced 621 tons in 2018, presumably on agricultural land. Prices are high with US\$8.40 per kg compared to a number of agricultural crops in 2014<sup>112</sup> and increasing steadily. In March 2020, prices reached US\$10.50 per kg. Compared with the commercial species, wild pistachio is more resistant toward diseases and has good nutritional properties. Pistachio trees can live for 300 years or more and are highly drought resistant. Stocking density and natural regeneration is poor due to grazing and intensive fruit harvesting. There is an active breeding program for pistachio in Uzbekistan.<sup>113</sup>

Walnut (*Juglans regia*), the second most important nut, is found in areas with more moisture either in pure walnut forests or mixed with fruit trees. There are 30 traditional walnut varieties native to Uzbekistan. Walnut forests supply approximately 90 tons of walnuts each year. Although they are only harvested for one month, they contribute greatly to the annual income of rural communities. In 2020, farmers could sell walnuts for a price of US\$2 per kg.

The creation of walnut plantations with intensive management has been encouraged by the government,

112 Murzakhanov, R. and Wunderlich, J. 2014. Feasibility Study for the Establishment of Pistachio Growing Centers in Tashkent Province in Ugam Chatkal National Park Uzbekistan. Tashkent, Uzbekistan: GIZ.

113 Arpaci, S., Acar, I., Atli, H. S. and Uzunli, M. 2011. "Improving the Pistachio Growing in Turkmenistan and Uzbekistan." *Acta Horticulturae* 912:327–330.



and there is now an association of producers and exporters of walnuts. In addition, walnut trees provide valuable timber, and it is estimated that mature walnut stands have timber stocks of 60 m<sup>3</sup>/ha. However, illegal cutting and the use of burls have heavily degraded the initial natural walnut forests and only a fraction of the former richness of walnut timber remains intact.

Almond (*Amygdalus* spp) is another important nut supplied by Uzbekistan's forests, with an annual production of 15 tons. On the domestic market, farmers sell almonds for US\$5 per kg (March 2020). The price has remained stable over the past year.

### Honey

The production of natural honey has increased in recent years. In 2012, Uzbekistan produced 4,000 tons of honey from 3,069 beekeeping farms. By 2020, the production increased threefold to 13,520 tons.<sup>114</sup> With a price of US\$3.90 per kg (March 2019), that would imply a yearly income of US\$53 million, a much higher estimate than the 1.5 million reported in FRA 2015. However, it is probable that only a small percentage of all honey is produced on state forest land and therefore reported. There are, for example, many beekeeping farms in cotton producing areas. Beekeeping farms provide around 4,000 jobs. According to a study in the Republic of Karakalpakstan,<sup>115</sup> there are 206 species of wild vascular plants with commercial value for beekeeping. Honey is not only a source of income for rural people but also basis for traditional foods and medicinal uses. Due to its antibacterial properties, it can be used to preserve foods for a longer time.

### Fruits

Uzbekistan has 83 traditional apricot varieties and 43 grape, 40 apple, 21 pomegranate, and 15 pear varieties. A high number of wild fruit (and nut) tree species found in Uzbekistan are used for improving the qualities of existing crop species. They include species of walnut, almond, pistachio, plum, fig, pomegranate, pear, apple grape, jujube, and others.<sup>116</sup> Wild apple trees, mostly of the species *Malus sieversii*, are found in deciduous mountain forests (walnut-fruit forests) and sometimes in juniper forests. A great variety of berries are also collected from the wild. Horticulture is similarly important on agricultural lands, with Uzbekistan being among the top five producers of apricots, the sixth largest producer of cherries, and seventeenth in apple production worldwide. Export of horticultural products was liberalized in reforms between 2017 and 2019. The wood of pear and apricot trees can be further used for manufacturing musical instruments. A number of trees and shrubs, including pistachios, buckthorn, and barberries, are used to produce paint.

### Medicinal and aromatic plants

Medicinal and aromatic plants include those with essential oils, saponins, alkaloids, or dyes. Annual production of over 30 recorded plants is 300 tons. Examples include *Rhus carinaria* whose leaves are used to extract tanning agents and *Glycyrrhiza glabra* whose roots are on par with ginseng in terms of value. Other nutritional and medicinal plants include *Rosa canina*, *Berberis oblonga*, *Hypericum perforatum*, *Origanum vulgare*, *Crataegus turkestanica*, and *Achillea millefolium*. Some of the most common herbs and aromatic plants used by the local population are species of *Bunium*, *Berberis*, *Ziziphora*, *Origanum*, and *Mentha*. In some cases, local communities sell these wild plant materials to pharmaceutical companies. One important plant is wild liquorice (*Glycyrrhiza glabra*), which is harvested wild in arid and semi-arid areas.<sup>117</sup> After harvesting the roots, they are washed, dried, sliced, and sold on the market.

114 Uzbekistan official statistics (<https://stat.uz/en/official-statistics/agriculture>).

115 Abdiniyazova, G. J., Khojimatov, O.K., and Pak, V.V.. 2016. "Honey in Traditional Cuisine of Uzbekistan and Analysis of Melliferous Flora of Karakalpakstan." *Journal of Ethnic Foods* 3 (3): 222–227. doi:10.1016/j.jef.2016.07.002.

116 Kuchkarov, Sixth National Report of the Republic of Uzbekistan on the Conservation of Biological Diversity (above, n. 37).

117 FAO. 2014. "NWFP Update: Foraging for Wild Liquorice (*Glycyrrhiza glabra*) in Uzbekistan." <http://www.fao.org/forestry/nwfp/88024/en/>.

Currently, the international market price is US\$2 per kg. But rural communities foraging for liquorice have to compete with industrial production. Sustainable management of the liquorice plant requires that some rhizomes are left to regrow and that there is at least one-year pause between harvests.

Medicinal and aromatic plants were planted on more than 3,000 ha in 2019, which is a considerable increase since 2010. New plants have been introduced, for example, saffron (*Crocus sativus*), which has been expanded to 150 ha between 2017 and 2019 in selected leskhozoes. The plan is to develop this culture further in the leskhozoes of Samarkand, Balchmalkom, and Namanganzkom. Other medicinal plants that are promoted by the SCF are citrus and lavender. The plan of the SCF is to develop medicinal plants further, from 4,982,000 tons in 2019 to 9,040,000 tons in 2023. The center Shifobakhsh (Шифобахш) within the SCF is the key supplier of herbs and wild food plants to serve the pharmaceutical and food industries.

### Handicrafts

Traditional handicrafts, including wooden carvings, have recently received more support from the government (for example, tax exemption for artisans) and civil society and international organizations (training, and so on) to revive the country's cultural heritage. Handicraft making is important for rural livelihoods, especially for women. For NWFPs, the forests provide not only the wood for carving but also natural dyes from walnut shells, moraine roots, and barberry and pomegranate peels.<sup>118</sup> Products are exported or sold in the main cities for visitors and tourists. However, there are both marketing and quality constraints and there is limited information available on the actual share of handicrafts in the economy.

The main challenge in NWFP management is that collection is mostly uncontrolled and therefore the amount harvested will probably decrease over time. At the same time, habitats for some wild species are lost or degraded due to excessive livestock grazing and in other areas there is a genetic erosion.

## 2.6.5. Hunting and game management

In Uzbekistan, all wildlife is the property of the state and wildlife management is regulated by the 'Law on the Use and Conservation of Fauna 1997' and the 'Regulation on Hunting and Fishing in Uzbekistan 2006'. The hunting regulation details the status of wildlife ownership, species-specific hunting seasons, designated hunting areas, delegated authorities in government agencies, and rights and responsibilities of hunters. The regulation divides hunting into four categories: (1) commercial, (2) sport and leisure, (3) special purpose, and (4) scientific.

In July 2020, a new law on hunting and the hunting economy (No. ZRU-627)<sup>119</sup> was introduced. It stipulates that income from commercial hunting in designated territories should be used for the protection and rational use of fauna and wildlife monitoring. Hunting services can be rendered to legal entities and physical persons. According to the law, all wild animals are state-owned property and comprise the State Hunting Fund (not including wild animals raised on hunting farms).

There are currently 10 designated hunting areas:<sup>120</sup>

- Kungrad state hunting forestry (Karalpakstan) near Sudochie Wildlife Sanctuary
- Kazakhdarya state hunting forestry (Karalpakstan)
- Karakul state hunting forestry (Bukhara) near Dengizkul Wildlife Sanctuary

118 FAO. 2019. Catalogue of Rural Handicrafts from Local Raw Materials: Kyrgyzstan/Uzbekistan. Budapest, Hungary: Central Asia Crafts Support Association Resource Center in Kyrgyzstan. <http://www.fao.org/3/ca5011en/ca5011en.pdf>.

119 <https://cis-legislation.com/document.fwx?rgn=126271>.

120 Presidential Decree PP-4960 from January 2021.

- Kalgansyr state hunting forestry (Tashkent)
- Dalverzin state hunting forestry (Tashkent)
- Karaulbazar state hunting forestry (Bukhara) near Dengizkul Wildlife Sanctuary
- Forish state hunting forestry (Jizzakh) near Arnasay Wildlife Sanctuary
- Mubarek state hunting forestry (Kashkadarya) also Mubarak Wildlife Sanctuary
- Nurata hunting forestry (Jizzakh) also Nurata State Reserve
- Khorezm hunting forestry (Khorezm) near Kyzylkum State Reserve.

Some of the designated hunting areas overlap with protected areas (see above) or are close to official wildlife sanctuaries. These links should be investigated more closely. While different SCF bodies are responsible for both hunting forests and wildlife sanctuaries, the SCEEP is responsible for state reserves (Table 6).

Since 2015, hunting tourism reopened in Uzbekistan with a list of species and price tags. However, there have been reports that foreigners were also allowed to hunt rare and endangered species such as the snow leopard or the Bukhara deer. Known trophy hunting programs for ibex and wild boar take place, for example, in the territory of Ugam–Chatkal National Park.<sup>121</sup> But generally, trophy hunting tourism is not well developed in the country. The government is planning to diversify tourism services including hunting in Uzbekistan and proposals are being prepared currently, including a potential three-year moratorium on hunting permits, to transform the Kyzylkum SNR and the Gissar Mountain Sanctuary into national parks for hunting tourism.<sup>122</sup>

Trophy hunting, while not yet well developed in Uzbekistan, is potentially a major opportunity for nature-based tourism and increased incomes of the local population and can even contribute to conservation efforts under certain conditions, for example, if the income is used for wildlife and habitat conservation. Currently, the trophy fee is believed to go directly to government authorities who then spend it on wildlife management and conservation programs. Instead, trophy hunting could create jobs in rural areas by hiring local people as wildlife wardens or hunting guides.

In contrast to Uzbekistan, neighboring countries including Tajikistan and Kyrgyz Republic have introduced community-based wildlife management since 2008 with assigned game management areas for argali and urial sheep, ibex, and markhor. Similar arrangements could be envisioned for Uzbekistan, as management rights and responsibilities can be assigned to any legal entities including NGOs.

The various forests are also important for subsistence hunting and fishing, providing income opportunities and improving nutrition of the rural population. Since independence in 1991, many people in rural areas depended not only on forests but also on wildlife for subsistence. Furthermore, hunting is an old tradition in Central Asia and cultural heritage includes hunting with falcons, golden eagles, and dogs.

In the past, wildlife numbers have greatly decreased due to destructive and inefficient industrial hunting in Soviet times, illegal trade in meat and horns, and the destruction and fragmentation of habitats and competition with livestock. In 2015, poaching was still widespread.<sup>123</sup> Poaching has led to the decline in Central Asia, of the Asiatic ibex (*Capra sibirica*), argali (*Ovis ammon*), markhor (*Capra falconeri*), urial (*Ovis vignei*), saiga antelope (*Saiga tatarica*), goitered gazelle (*Gazella subgutturosa*), maral (*Cervus canadensis*), snow leopard (*Panthera uncia*), leopard (*Panthera pardus*), cheetah (*Acinonyx jubatus*).

<sup>121</sup> <http://shikor.uz/>.

<sup>122</sup> KUN. 2020. "Uzbekistan May Introduce a 3-Year Moratorium on Animal Hunting." <https://kun.uz/en/news/2020/02/13/uzbekistan-may-introduce-a-3-year-moratorium-on-animal-hunting>.

<sup>123</sup> GIZ, The Current Situation of Wildlife Management in Central Asian Countries (above, n. 85).

tus), and the brown bear (*Ursus arctos*).

The fauna of Uzbekistan includes 105 mammalian species, 464 bird species, 60 reptile species, and 76 fish species. The update of the Red Book is the responsibility of the Uzbek Academy of Sciences and the list is reviewed every 10 years. Protected areas (see Chapter 2.1.4) aim to conserve wild animal species, but wildlife management is often ineffective. The Law on Protected Areas from 2005 and 2014 addresses territorial protection of valuable natural landscapes, genetic diversity of animals and plants, and the prevention of negative human effects. Wildlife management includes measures to breed animals and release them to the wild. There is a 200 km<sup>2</sup> eco-center in Jeyran for semi-captive breeding of rare desert animal species such as the goitered gazelle, Turkmen kulan, and Przewalski's horse. MacQueen's bustards, which are an endangered species, are reared in nurseries in the Navoiy and Bukhara regions and released later in their life. They are popular prey for falconers from Arab countries.

Annual game quotas outside of protected areas are issued based on recommendations from the Institute of the Gene Pool of Flora and Fauna of the Academy of Sciences and a review through an interagency panel commission. For rare species, the quota recommendations need to be approved by the Cabinet of Ministers, whereas for all other species, the State Committee for Nature Protection gives the approval. Thus, primary wildlife management responsibilities are delegated to the 'State Inspection for the Protection of Wildlife and Plants (Gosbiokontrol),' the SCF 'Department of Protected Areas, National Parks and Hunting Management,' and the 'Institute of the Gene Pool and Flora and Fauna.'

Uzbekistan has an Association of Hunters and Fishers with around 38,000 members, which is the national NGO most relevant to wildlife management. Local branches are responsible for the issuance of hunting licenses, hunting permits, and the sale of firearms. Although the association does not own any land, the individual hunting societies have territories assigned as hunting grounds.<sup>124</sup>

Fishing in reservoirs and lakes (in particular in the Amu Darya delta and the Aydar Arnasay lake system) is carried out by fishery enterprises, which have rental agreements with local administrations for approximately 10 years. Capture fisheries employed 3,600 workers (15 percent women) in 2016.<sup>125</sup> In 2018, 90,984 tons of fish were caught, which is more or less distributed equally in the different regions.<sup>126</sup> However, nowadays, 58 percent of the production within the fisheries sector comes from aquaculture. Furthermore, fisheries are second in using water resources, as irrigation for agriculture is the major user. While fish capture is not very relevant for the country's economy (<0.1 percent of GDP) since the collapse of the Aral Sea, it is more important at the local level, particularly for communities in the Lower Amu Darya and Middle Syr Daria River basins. In the legislation, fish capture is considered a recreational activity rather than a commercial one, and there are no efforts to develop fish productivity.

### 2.6.6. Nature-based tourism

Uzbekistan has made considerable efforts on tourism development since gaining independence in 1991.<sup>127</sup> The development of this sector, with a particular focus on cultural heritage is central, and reconfirmed by two recent Presidential Resolutions, PP-5054 of April 2021<sup>128</sup> and subsequent PP-5150 of June 2021 on Tourism, including institutional arrangements<sup>129</sup> for the newly formed 'Ministry of Tourism and Sports'. The

<sup>124</sup> Ibid.

<sup>125</sup> FAO. 2018. "Fishery and Aquaculture Country Profiles: The Republic of Uzbekistan." <http://www.fao.org/fishery/facp/UZB/en#CountrySector-Overview>, accessed May 26, 2020.

<sup>126</sup> Uzbekistan statistics (<https://stat.uz/en/181-ofytsyalnaia-statystyka-en/6391-environment>).

<sup>127</sup> EM-TRCJ210011 1.17 ([emerald.com](http://emerald.com)).

<sup>128</sup> Resolution of the President of the Republic of Uzbekistan "About the organization of activities of the Ministry of tourism and sport" ([cis-legislation.com](http://cis-legislation.com))

<sup>129</sup> Resolution of the President of the Republic of Uzbekistan "About measures for the organization of activities of the Agency of cultural heritage under the Ministry of tourism" ([cis-legislation.com](http://cis-legislation.com)).

SCF is keen to develop a particular program on ‘Nature-based tourism’<sup>130</sup> in combination with the cultural heritage programs of the Ministry of Tourism. When writing this document, the procedural aspects between the SCF and the Ministry of Tourism were yet to be known. From the available information, it appears that the new resolution on tourism does not have a specific chapter on nature-based tourism.

In 2018, Uzbekistan welcomed 5.3 million foreign tourists, of which 4.6 million came from neighboring Central Asian countries.<sup>131</sup> In total, there were 502 tourist firms and organizations in 2018.<sup>132</sup> As for other countries, tourism, both international and national, was particularly affected by the COVID-19 pandemic since early 2020 and has not recovered by mid-2021.

While the tourism sector in Tashkent and various towns along the Silk Road is already quite well developed and known for its architecture, bazaars, and rich history, there are still challenges with poor transportation systems and tourist assistance (including language facilitation).

Nature-based tourism still has much potential for further development and would need particular attention in the near future. Uzbekistan has a lot to offer in terms of nature-related activities, including trekking, horseback riding, camel safaris, rafting, bird watching, hunting, and fishing, among others. However, not all of these activities are well developed for tourists, for example, hunting and fishing.

### Box 8. Definition and Principles of Nature-Based Tourism

Nature-based tourism (ecotourism) is commonly defined as “responsible travel to natural areas that conserves the environment, sustains the well-being of the local people, and involves interpretation and education of both staff and guests.” It has the following principles:

- Minimize physical, social, behavioral, and psychological impacts.
- Build environmental and cultural awareness and respect.
- Provide positive experiences for both visitors and hosts.
- Provide direct financial benefits for conservation.
- Generate financial benefits for both local people and private industry.
- Deliver memorable interpretative experiences to visitors that help raise sensitivity to host countries’ political, environmental, and social climates.
- Design, construct, and operate low-impact facilities.
- Recognize the rights and spiritual beliefs of the indigenous people in your community and work in partnership with them to create empowerment.

**SOURCE:** Summarized based on principles of the International Ecotourism Society, [www.ecotourism.org](http://www.ecotourism.org).

<sup>130</sup> The term ecotourism is used in this document, although in some literature, the type of tourism related to forests is described as ‘nature-based tourism’.

<sup>131</sup> Ministry of Foreign Affairs. 2019. “Tourism: New Opportunities, Presentation.” <https://mfa.uz/en/uzbekistan/330/>.

<sup>132</sup> Uzbekistan statistics – tourism. ([http://web.stat.uz/open\\_data/en/16.16%20Organizations%20Engaged%20in%20tourism%20activities.pdf](http://web.stat.uz/open_data/en/16.16%20Organizations%20Engaged%20in%20tourism%20activities.pdf)).

Uzbekistan's most important tourism and general recreation area is in the forest areas of the Western Tian Shan range. The Ugam-Chatkal National Nature Park, Uzbekistan's largest protected area (506,930 ha) under the SCF, lies between 900 and 4,216 m asl and consists of rocky slopes (58 percent), pastures (31 percent), mountain forests (10 percent), and some irrigated agricultural lands (1 percent). The park offers numerous recreational activities including hiking, climbing, water sports, horseback riding, and skiing.

In 2019, the 'Concept of Development of the Tourism Industry 2025' and a corresponding Action Plan were adopted to develop the tourism sector. According to the State Committee for Tourism Development, the number of tourists has increased by 31 percent from 2018 to 2019 owing to measures improving border proceedings and visa processes, transportation systems, availability of low-cost accommodation, overall infrastructure, and number of tour operators.<sup>133</sup> A particular focus of the concept is the regions and the countryside, for example, in rural areas of Khorezm, Kashkadarya, and Samarkand regions. There are plans to develop nature-based tourism around Lake Aidarkul, Tudakul, and Uchkizil and a total area of 80 ha of land has been allocated for organizing nature-based tourism zones. The Action Plan includes the zoning of ecological tourism areas within all state reserves with two exceptions. The United States Forest Service has supported Uzbekistan since 2015 to promote sustainable natural resources management and to provide technical support for the development of nature-based tourism.

It seems that there are two opposite directions of Uzbekistan tourism, one moving toward affordable and fast-tracked tourism and the other promoting high-quality nature recreation. Developing (nature-based) tourism in a sustainable way (see principles in Box 5) requires sensibly planning the touristic use of these natural resources, developing efficient but low-impact infrastructure, reducing negative effects on conservation areas and biodiversity, and involving the local population. For rural communities, nature-based tourism promises high potential to improve livelihoods, as it can provide jobs and a market for traditional products and handicrafts. Uzbekistan's tourism industry can also help empower women and promote gender equality in the country. Nature-based tourism is a major step toward the valorization of the natural environment and its services.

It is estimated that further promotion of nature-based tourism, agritourism, and hunting tourism can attract up to 1 million each of domestic and foreign tourists, which would translate into income generation of US\$0.5–4 billion annually.<sup>134</sup>

## 2.7. Social Accountability

Uzbekistan has a relatively well-established social protection system; however, around one-third of the poor are not included in any social protection scheme. This is particularly the case for poor rural households.

Social accountability refers to the capacity of citizens to hold the government and service providers accountable for their actions, decisions, and performance, and make them responsive to the needs and demands of citizens.<sup>135</sup> Transparency, accountability, and participation are the pillars of social accountability. Generally, centralized decision-making and implementation in Uzbekistan as well as limited citizen feedback loops generate low local accountability. However, several new feedback mechanisms have been introduced since 2017. For example, the people's reception mechanism provides a structured pro-

<sup>133</sup> State Committee of the Republic of Uzbekistan for Tourism Development (<https://uzbektourism.uz/en/opendata>)

<sup>134</sup> APFNet, Forest Development and Best Practices of Forest Management in Uzbekistan (above, n. 24).

<sup>135</sup> Malena, C., Forster, R., and Singh, J. 2004. "Social Accountability: An Introduction to the Concept and Emerging Practice." <http://documents.worldbank.org/curated/en/327691468779445304/Social-accountability-an-introduction-to-the-concept-and-emerging-practice>.

cess for citizens to give feedback on the performance of government agencies, officials, and service providers at national and local levels, and within the first year already 2 million complaints had been registered.<sup>136</sup>

There are also 'Republican Farmers' Council' and 'People's Self-governance Organizations' at the district level that have the potential to play a role in social accountability. There is nothing similar in the forest sector.

On agricultural land, land tenure is weak and farming contracts can be terminated for various reasons. Corresponding regulations are worded in broad terms (for example, irrational use including decreases in soil fertility and environmental degradation) and designed to limit legal recourse in favor of the state.<sup>137</sup> Possibly, the situation on forest state land is similar, but on agricultural lands, state control forms part of the strategy for economic growth.

## 2.8. Economic Impact of Forest Ecosystem Services

Uzbekistan's forests are mostly managed for protective functions, and a total area of 2.7 million ha or 83 percent of forests are managed specifically for the protection of soil and water. Additionally, the country has set aside specific forest areas for spiritual or cultural services (460,000 ha) and for public recreation (75,000 ha).<sup>138</sup> A total of 210,000 ha or 7 percent are designated for biodiversity conservation. It is estimated that the main functions of forests are soil and water protection (93 percent), biodiversity (6 percent), and others (1 percent).<sup>139</sup> Tree and woodlot planting can further contribute to the restoration of degraded agricultural areas.

The saxaul forests in desert areas are particularly important for combating desertification, stabilizing the landscape, and increasing resilience. They restrict sand movement, prevent soil erosion from strong winds, improve microclimate and control water levels through enhanced water infiltration into the soil, and reduce runoff and evaporation. All of these services improve not only resilience but also productivity of the arid landscapes and thus positively affect agricultural production and the quality of grazing land for livestock in these areas. Trees in deserts also reduce other risks, for example, by mitigating the impacts of dust storms, which are common in desert areas. Planting trees as buffers brings an important protection function for oases as well as industrial sites. Saxaul forests are also critical for biodiversity as they provide a main habitat of some rare and endangered animal species, for example, Indian honey badger, caracal, Persian gazelle, marble teal, serpent eagle, and approximately 50 different species of birds.

In mountain areas, broadleaf, walnut-fruit, and juniper forests also provide crucial protection functions and numerous other services, in addition to the NWFPs and their contribution to local livelihoods (nuts, fruits, honey, medicinal plants, and so on, see Chapter 3.1.4). They are particularly important for water regulation. Mountain forests have positive effects on river flow rates and seasonal water distribution by increasing water infiltration and preventing erosion. On sloped terrain, forests reduce surface water runoff and thus prevent erosion which can otherwise cause siltation and reduce water availability in the long term. Forests are also important for biodiversity. As one of the 32 global biodiversity hot-spots, mountain forests in Central Asia are home to over 100 tree and shrub species, numerous birds,

<sup>136</sup> Nagaraj and Seitz, *Towards a Better Future* (above, n. 9).

<sup>137</sup> Nagaraj and Seitz, *Towards a Better Future* (above, n. 9).

<sup>138</sup> FRA 2015 – Uzbekistan.

<sup>139</sup> FAO, *State of Forests of the Caucasus and Central Asia* (above, n. 20).

mammals, and other fauna. As previously described, biodiversity services also include several native varieties of cultivated fruit and nut trees, such as apple or fig varieties, which can be used to improve globally commercial varieties. In addition, biodiversity enhances pollination, which in turn supports agricultural production in these areas. In contrast to other areas, mountain landscapes, especially areas above 1,200 m asl, and corresponding forest complexes provide several cultural services such as aesthetic values, spirituality, recreation, and tourism.<sup>140</sup>

Tugai forests in the floodplains also provide some products (for example, timber with a stand volume of 44–46 m<sup>3</sup>/ha or more, fuelwood, various NWFPs) as well as ecosystem functions and services. Their main function is the stabilization of embankments along rivers, which prevents erosion into river systems and resulting siltation. Riverside forests are further a natural barrier for nearby agricultural areas, which are mostly irrigated and intensively managed. For a while, poplar trees had been planted to serve as windbreaks in irrigated agricultural areas, but they have decreased by half since the late 1990s due to their limited adaptability to saline conditions. But tugai forests still have a vital role for both the protection and the purification of water systems. Furthermore, trees in saline areas help keep water tables low, decreasing evaporation by 35 percent and increasing relative air humidity by 28 percent. This is especially important in intensively irrigated areas, where waterlogging and salinization are a main problem. The World Bank estimates salinization causes annual losses of US\$2 billion across Central Asia. Like the desert and mountain landscapes, the tugai forests in floodplains also contribute to biodiversity by providing a habitat for various species including reptiles (for example, lidless skink, grass snake), mammals (for example, jungle cat, jackal, fox, wolf, badger, rodents, boar, and ungulates such Bukhara deer), pheasants, and herons.

Table 16 lists the ecosystem services provided by the different forest types in desert areas, mountain areas, and the floodplains and gives estimates of their individual economic value, from FRA<sup>141</sup> unless stated otherwise.

**Table 16. Estimations of the Economic Value of Different Ecosystem Services Provided by Forest Lands**

Ecosystem Services	Forest Regions	Value Estimation	Economic Value (US\$)
<b>Provisioning</b>			
Timber	All, tugai	Timber sales	6,322,000
Fuelwood	All		
NWFPs (nuts, fruits, honey, medicinal and aromatic plants)	All (mostly mountain)	NWFP sales	3,000,000
Wildlife/hunting	Mountain	Fees, taxes	n.a.

140 Bekchanova, M., van Amstel, A., and Gerts, J. 2018. "Mapping Cultural Ecosystem Services in Different Landscapes through the Perception of Tourists in Ugam Cahtkal National Nature Park, Uzbekistan." *International Journal of Environment and Sustainability* 7 (2): 8–26.

141 FRA 2015 – Uzbekistan



Ecosystem Services	Forest Regions	Value Estimation	Economic Value (US\$)
<b>Regulating</b>			
Water regulation	All		
Prevention of soil erosion	Saxaul		
Stabilization of embankments	Tugai		
Sand stabilization	Saxaul	1 ha saxaul prevents 30 tons moving sand	
Reduction of salinity effects	Tugai, saxaul	Loss from salinization (30% of World Bank estimate for Central Asia)	600,000,000
Enhanced productivity of grasslands	Saxaul	Sales of livestock products	25,000
Microclimate	Saxaul		
Carbon sequestration (560 ktCO <sub>2</sub> e per year)	All	Based on EU ETS carbon pricing (US\$25 per tCO <sub>2</sub> e)	14,000,000
Mitigation of dust storms	Saxaul	Impact on agriculture and health	
<b>Cultural</b>			
Tourism	Mountain	Estimated income from foreign tourists if further developed	2,000,000,000
Recreational activities	Mountain	Domestic tourism	500,000,000
Aesthetic value	Mountain		
<b>Supporting</b>			
Biodiversity	All	Supporting other services	

Other studies also estimated that total forest services and products could generate US\$10 billion annually.<sup>142</sup> Although the presented estimates have a high uncertainty due to the limited studies done on the valuation of environmental services as well as limited data on forest products in Uzbekistan, it is clear that these services should not be neglected. Improving the database on forest services is one of the key tasks to enhance the development of sustainable forestry in Uzbekistan. Box 9 briefly refers to the relatively limited role of Uzbekistan's forests in the ecosystem service carbon.

<sup>142</sup> APFNet, Forest Development and Best Practices of Forest Management in Uzbekistan, 2010

### Box 9. SFM and Monetized Forest Services

The benefits from SFM in Uzbekistan will include a wide range of service values as well as increased quantities of some products. Conditions for tree growing across almost the whole country are challenging, with drought, fires, pests, diseases, and grazing, which is often poorly controlled, exacerbating these. Globally, forest service values, such as biodiversity and soil and water conservation, have seldom been recognized adequately and few have been adequately monetized; carbon has been part of the response to climate change.

However, the carbon stock of trees in forests and landscapes in Uzbekistan is quite low and it is split between the biomass and the soil. Exceptions could be block planting of shelterbelts, mainly poplar; in places where wood lots use species such as Paulownia; and in restored Tugai forest areas but the total area of these will, however, always be limited. Furthermore, the climatic conditions in the country cause periodic natural variation in forest cover, as in all dry regions, and it is hard to disentangle these from anthropogenic-induced changes. Consequently, the cost of verification of gains in sequestered carbon would likely only barely cover the cost of this and, in many cases, would not even do that.

Sources of carbon financing include the UNFCCC Green Climate Fund, World Bank programs (for example the BioCarbon Fund), or the voluntary carbon market (for smaller projects). In light of the issues noted above, this FCN does not go into the details of carbon markets. Even though not yet accurately valued, there is no doubt that the environmental values combined with the potential socioeconomic benefits from improved livelihoods through reducing both forest loss and forest and landscape degradation would be of substantial value in underpinning national sustainable development. Provided forest management is exercised within the criteria of SFM, all forest and tree-related interventions will contribute some carbon benefits albeit that it would not currently be cost-effective to monetize these at scale. There may be limited opportunity to do so with small community-based tree planting activities using the voluntary carbon market.

See also Chapter 5.3.

# 3. FOREST AND LAND RESOURCES

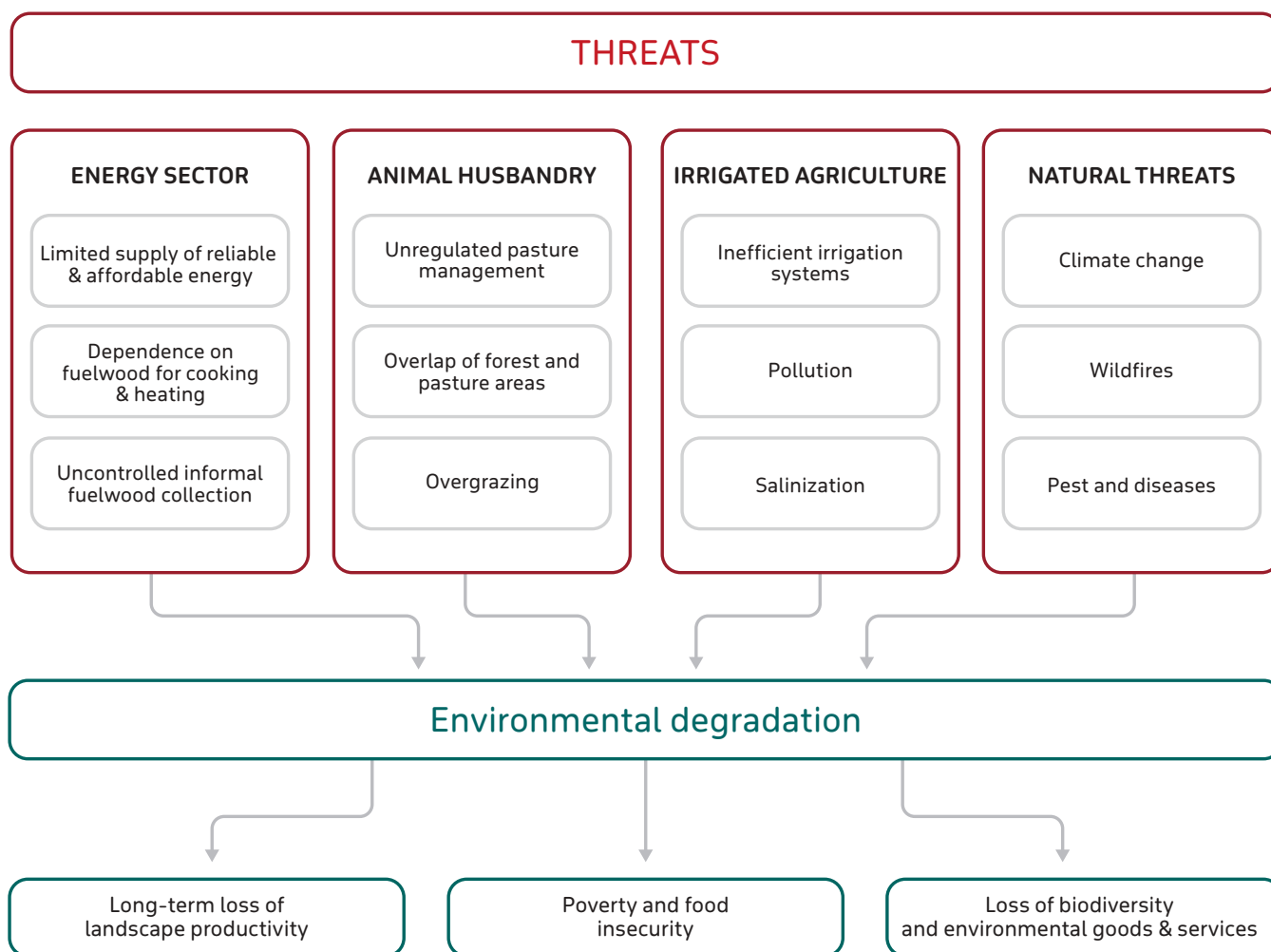
## 3.1. Competing Land Uses - Threats and Opportunities

In recent years, degradation and anthropogenic impact on forests in Uzbekistan have intensified due to continuous expansion of agricultural land, increase in livestock numbers, uncontrolled grazing, harvesting of fuelwood and NWFPs, formal and informal demand for service wood and fuelwood, and industrial development including mining and water withdrawal for agricultural irrigation.

### Threats

The most prevalent threats from competing land uses, which lead to the degradation of the forest landscape, are depicted in Figure 16.

Figure 16. Main Threats Leading to Environmental Degradation and Poverty



Environmental degradation trends are experienced mainly in arid (cold desert) areas. But also in other areas with more favorable climatic conditions, these trends have important and long-term implications for sustainable development in the country, particularly food security, social stability, long-term viability of forests and agro-economic land use, and resilience to forecasted climate change. For example, food security could be significantly affected by the loss of productive pasture. The reduced productivity of pasture and loss of crucial forest products, both fuelwood and NWFPs, will worsen rural livelihoods and aggravate the negative cycle of poverty leading to overexploitation of natural resources and further land degradation.

The most important direct causes of forest and land degradation are excessive firewood harvesting and overgrazing, the latter of which could lead to direct soil degradation.

Estimates suggest that over the past century, considerable man-made deforestation took place, leading to a substantial loss of Uzbekistan natural forest cover. Much of this direct loss initially occurred in the Tsarist and Soviet eras, mostly in lowland areas with conversion to agricultural land and easily accessible resources of firewood and timber in riparian tugai forests. More than 90 percent of the tugai forests that were present in the first half of the 20th century have been lost because of land clearance for agriculture, uncontrolled fuelwood removal and logging, and reduced river flows.<sup>143</sup>

Since independence, the limited availability of energy sources in rural areas and increased cost of energy and (imported) timber have negatively affected the forest estate, both on SFF land and land controlled by other agencies (for example, nature protection).

The level of degradation and deforestation is difficult to accurately assess. Proper inventories of forested land have not been undertaken over the past 30 years and most of the current data represent extrapolations of Soviet-era figures and cover only the territory of State Forestry Fund. All these figures are based on rough estimates. Obviously, the remaining natural forests are degraded to varying degrees through combined effects of overgrazing, fuelwood collection, wildfires, and, regionally, pest and disease outbreaks.

A significant impact on natural ecosystems, and in particular natural forests, is animal husbandry that plays an important role in the country's economy and accounts for 40 percent of gross agricultural production. Livestock husbandry is the major source of income and an important industry for investment in rural areas. The impeding factor is lack of a forage security mechanism for livestock owned by the population, low yield of pastures, and the increasing degradation thereof. Interesting to note here is the high share of actively used pasture/grazing land within the area of the land declared under the SFF. Indeed, 26 percent of the total area of the SFF is used for grazing (see Table 4). This share is high, in both relative and absolute terms, particularly in the Navoiy province in the central-north. High density of cattle, sheep, and goats risk degrading the pastures in forested areas.

Lands of the Forest Fund that are not covered by natural forests or plantations (most of them located in the deserts or submontane areas) are used as pastures, which causes a number of problems related to land degradation, such as the following:

- Widespread prevalence and acceleration of issues that add to erosion and soil nutrient loss in submontane and mountain areas and sand dune development in desert/semi-desert areas and sand/dust storms
- Decline of productivity and degradation of pastures caused by excessive grazing by livestock

143 United States Agency for International Development (2001). "Biodiversity Assessment for Uzbekistan." [http://pdf.usaid.gov/pdf\\_docs/Pnacn475.pdf](http://pdf.usaid.gov/pdf_docs/Pnacn475.pdf)

- Deforestation and deterioration of access to forest products caused by cutting of firewood often followed by clearing for pasture
- Contraction of habitats and decline of all wild animal populations that can threaten livestock (many of them being rare and endangered species)
- Hydrological changes that increase the drying up of sources and gravity of floods (see Chapter 4.2).

Afforestation and restoration of existing degraded forests has been hampered by a lack of resources, inappropriate approaches, and the impracticality of separating forest areas from livestock areas. Similarly, forested areas as well as rangelands are affected by overgrazing. The breakdown of Soviet-era pasture management systems and the fodder supply chain has resulted in a reduction in the mobility of grazing, which is a vital component of sustainable pasture use in mountain, semi-arid, and arid environments. Overall imbalances in pasture occupancy occur due to the underutilization of some areas and severe localized overgrazing of others. Poverty and reduced productivity of livestock (due to the absence of veterinary care and breed maintenance) are additional factors that have led to unsustainable land use. There is also a risk in imbalance between the availability of summer and winter forage, resulting in severe overgrazing of some winter pastures.

Considering these circumstances, the forest and the extensive rangeland sectors are competing for land use, particularly in areas where there are satisfactory soil and moisture conditions. Indeed, out of the 11.3 million ha of land classified as SFF (of which the majority is not forested, cold desert, dry steppe, or bare foothills) a considerable part is livestock pasture. A balanced approach between forest management and livestock husbandry is thus the greatest challenge in the land use sector of the country.

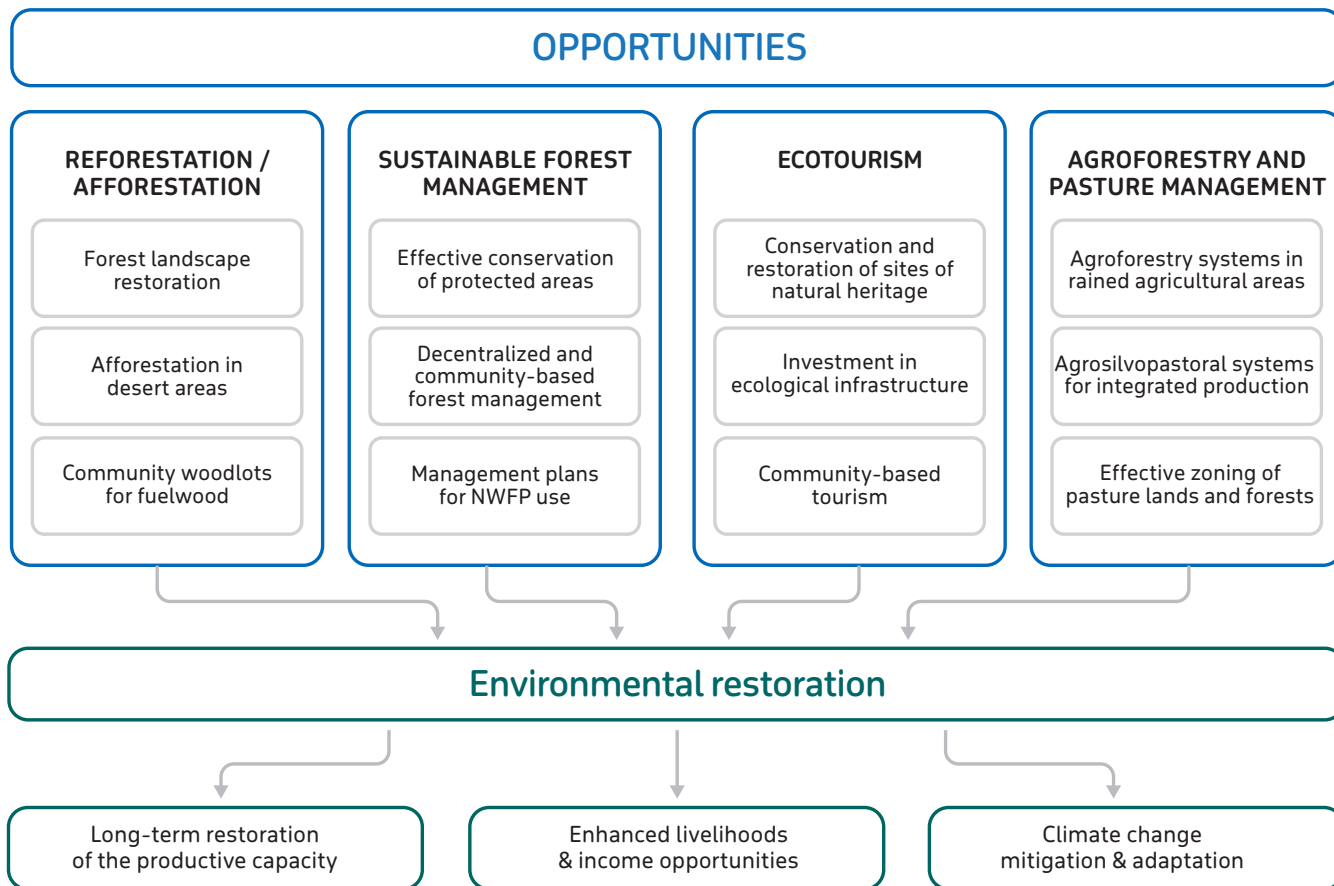
Forestry and rangelands are also closely linked with other sectors. For example, extensive rangelands depend on irrigated agriculture for fodder and its current lack is a major limiting factor that leads to overgrazing in forested areas, mainly in the winter months. Another example is the link between forestry and energy needs of the rural population, particularly in the arid areas for firewood, which is used for both heating and cooking. However, firewood use and production is not part of the country's energy policy and also not a stated management objective in the national forest policy.

In conclusion, large parts of the SFF land and other rural areas in Uzbekistan face a significant and growing threat of degradation of forests. Extensive pastures compete for land use, with serious direct implications for local rural populations and significant national implications for food security and long-term sustainable development. There are also global implications because of the impact on biodiversity and carbon emissions. In addition, the effects of climate change aggravate the current critical situation and accelerate the pathway of destruction, in particular in the few riparian forests remaining and also in the mountain areas (archa, tugai, and walnut-fruit forests alike).

## Opportunities

However, the problem has been recognized and the seriousness of the threats require harnessing the opportunities that yet to be tapped. Major opportunities from sustainable land management are illustrated in Figure 17.

**Figure 17. Major Opportunities from Sustainable Land Management**



Simple measures are part of the solution, such as zoning of forest and pasture, pasture management, well-defined afforestation and forest restoration efforts, linking of afforestation with direct local needs (for example, charcoal and firewood), and combining of tree planting with agricultural production (agri-silvo-pastoral systems). These opportunities are particularly present in salt-affected wastelands, where afforestation with multipurpose tree species, including for firewood and animal fodder, can make these lands productive again and at the same time contribute to the livelihoods of local people. Simultaneously, such conversions can contribute to climate mitigation.

Forestry and pasture lands are also closely connected to other sectors. For example, extensive pastures depend on irrigation-based agriculture in terms of fodder, and the current shortage thereof is the main limiting factor that leads to excessive grazing by livestock in autumn, winter, and early spring. There is a correlation between forestry and the energy needs of the rural population in arid areas with regard to firewood and charcoal production.

Also important to note is the significance of rainfed agriculture adjacent to the walnut-fruit forest areas on the moderate mountain slopes and on plateaus in the eastern part of the country. Intense agriculture in the broad Fergana Valley is famous, which is sometimes supplemented by irregular irrigation. The agro-climatic conditions here are extremely favorable, with Mediterranean-like climate, supporting internationally traded agricultural commodities. Uzbekistan is among the top 10 producers of apricots and

cherries in the world, and regionally also important for its pistachio and apple production. The potential for a combined landscape approach and addressing forest landscape restoration through agroforestry in this part of the country is palpable.

Since independence, Uzbekistan has made a sustained effort to reform its agriculture sector, based on a gradual process of transition from the Soviet model toward one based on a free market. Additionally, the GoU, with international support (see Chapter 7), has pursued various pilot efforts to test new approaches to land and forest management. What is needed now is a closer look at 'landscape management,' where from each sector of the economy the elements are combined to achieve the best use out of a scarce resource. In recent years, the government has been increasingly aware of the economic, food security, and environmental significance of increased land use and has committed to addressing these issues.

## 3.2. Contribution of Forests to Protect Water and Soils

As in other dry Central Asian countries, Uzbekistan faces increasing pressure on water provision to ecosystems, agricultural land, and local communities. FAO data indicate that on average Uzbekistan withdraws more water than it actually has, and 90 percent is for (mostly low efficiency) irrigation of which more than one-third is for cotton. Per capita Uzbekistan water withdrawals are fourth highest in the world and is most probably unsustainably high. Given such high levels of withdrawal relative to available water, any additional water use has the potential to affect existing water users.

Particularly through the changing runoff regime of river systems, a decrease in seasonal water availability is predicted in the main valleys, particularly the Amu Darya. Less water will be available for commercial agriculture that is connected to a drop in income and GDP. In Uzbekistan, the link between riparian forest and water is prominent, making both mountain and tugai forests important pillars in upstream water management. At the same time, the tugai riparian forests have diminished by nearly 90 percent over the past century. They are confronted in multifold ways by overuse and adverse impacts of climate change. In the broader water and soil management, it is important to recognize the crucial role of forested landscapes at the countrywide level. Clearly the largest part of the forest is used for soil and water protection to control desertification; based on FRA 2015, this is 83 percent of all forests (2,685,000 ha).

Riparian corridors and functioning tugai forest play a crucial role in the upstream provision of water to the dryer west and south, and the Aral Sea. Activities creating fast-growing forest plantations on degraded or low-potential land in the Amu Darya floodplain (Lower Amu Darya Biosphere Reserve, Kyzylkum Reserve) can become a powerful instrument for wider protection purposes, but they also fulfill the often-unregulated demand for wood. It is also important to save existing forest ranges while creating new shelterbelts by replenishing missing rows of trees. International projects that are interested in such a broader, multisectoral approach (for example in the framework of the IFAS) could also support new approaches, such as a leskhoz/community forestry model for creating forest plantations or shelterbelts. For a broader integrated water and soil management approach, it is important to address degraded forest zones in submontane and tugai forest areas. This can be done by supporting natural regeneration and enrichment planting and by minimizing livestock impact on specific natural regeneration areas by periodically separating tree seedlings from livestock, for example, by fencing.

The forest, soil, and water values of the wider Aral Basin are set within the context of the well-known Aral Sea disaster that has developed since the 1950s. Although the ecosystem services available today are much less than the previous condition of the Aral Sea, the wider Aral Sea region still supports the livelihoods of millions of people. In Uzbekistan, the Aral Basin is formed by a major part of the watershed of the Amu

Darya River. During Soviet times, the Amu Darya was heavily tapped for irrigation canals, which are still used to irrigate agricultural fields. The construction of hydraulic and irrigation facilities, along with significant population growth, urbanization without any environmental considerations caused the further drying up of the water resources throughout the basin, up to the mountain foothills. Tugai and submontane forests play an important role in regulating the streams, and tugai ecosystems have been deforested.

The regulating function of forests is also important for maintaining flows to streams and rivers when considering climate change and associated extreme weather events, see Chapter 3.3.

A recent study conducted by the World Bank<sup>144</sup> estimates the costs of impacts that salt and dust storms from the dried Aral Seabed have on people's health, livelihoods, and environment in Uzbekistan (Box 10). The study demonstrates that effectively implemented landscape restoration can provide benefits that far outweigh its direct economic and financial costs (Box 10).

### Box 10. World Bank Study to Reduce Dust Storms from Aral Seabed

The dry Aral Seabed spans an area of about 60,000 km<sup>2</sup> and is home to 1.8 million people. In the past few decades, this salt desert has become a source of sand and dust storms. Each year, the storms carry about 15–75 million tons of sand, dust, and salt from the dried Aral Seabed across Central Asia. The resulting soil erosion and air pollution negatively affect people's health, livelihoods, and environment.

A joint World Bank and Uzbekistan SCF study 'The Value of Landscape Restoration in Uzbekistan to Reduce Sand and Dust Storms from the Aral Seabed' estimates the economic losses caused by sand and dust storms and the local, regional, and global benefits that landscape restoration efforts generate. The study was completed as part of Resiland, a land restoration program in Central Asia with support from Wealth Accounting and the Valuation of Ecosystem Services (WAVES) and The Global Partnerships on Resilient Landscapes (PROGREEN).

The main findings of the study include the following:

- Every year, sand and dust storms from the Aral Seabed generate losses of over US\$44 million.
- Most of the dried Aral Seabed in Uzbekistan can be restored by planting an optimum combination of native drought- and salt-resistant trees, shrubs, and grasses.
- With careful planning, landscape restoration in the Aral Seabed can be economically viable and can significantly reduce air pollution as far as 100–200 km from the former Aral seashore resulting in improved health and livelihoods.
- Regenerating the Aral Seabed can contribute an additional US\$28–44 million in benefits every year and can provide mitigation benefits by preventing release of carbon from the soil and absorbing CO<sub>2</sub> from the atmosphere.

**SOURCE:** Akramkhanov et al. 2021.

144 Akramkhanov, A., S. Strohmeier, Y. A. Yigezu, M. Haddad, T. Smeets, G. Sterk, C. Zucca, A. Zakhadullaev, P. Agostini, E. S. Golub, N. Akhmedkhodjaeva, and C. S. Erencin. 2021. The Value of Landscape Restoration in Uzbekistan to Reduce Sand and Dust Storms from the Aral Seabed. Washington, DC: World Bank. <https://openknowledge.worldbank.org/handle/10986/36461>.



## 3.3. Forest and Land Degradation

### 3.3.1. Land degradation, desertification, UNCCD/land degradation neutrality (LDN) assessment

As outlined before, agricultural expansion is no longer a threat to the remaining natural forests. However, it does remain a barrier to natural regeneration of forests and to the successful design and implementation of restoration and afforestation schemes. According to the Economics of Land Degradation (ELD) Initiative, degradation in Central Asia ranges between 4 and 10 percent on croplands, 27–68 percent on pastures, and 1–8 percent of forested lands.<sup>145</sup> Based on a study of land cover changes between 2001 and 2009, annual costs of land degradation are particularly high in Navoi (US\$303 million) and the Republic of Karalpakstan (US\$160 million), followed by Bukhara, Kashkadarya, and Jizzakh.<sup>146</sup>

In the framework of the UNCCD, Uzbekistan considers the concept of LDN as a powerful tool aimed at preserving land productivity and ensuring economic sustainability and social stability of the population (LDN 2019).<sup>147</sup> In UNCCD's LDN target setting process, the three global indicators (net primary land productivity, soil organic carbon [SOC] stock, and land cover) were recently verified and adapted to the conditions of Uzbekistan, including determining the current state of land degradation. Also, in the framework of these activities, the priority measures and actions taken by Uzbekistan to improve the state of the land were analyzed. In addition to the three global indicators, a number of national indexes were considered as indicators: the salinity index (mainly for irrigated areas); normalized difference vegetation index (NDVI); and a comprehensive indicator on exposure to desertification, land degradation, and drought (DLDD) processes (average for the 10-year period). The main results of the assessment are as follows:

- **Land productivity** is the biological productivity of land defined as the constant energy of plants minus their respiration. Only limited data are available, but in general, and based on data of 2013 relative to 2000, 80 percent of the land is in a stable state, 15 percent in a state of deterioration, and 5 percent is improving.
- **The SOC stock** is an indicator of soil quality associated with nutrient cycles, water retention, and overall stability and structure. Based on the soil carbon indicator, 98 percent of the land is in a stable state, about 1 percent in a state of deterioration, and 1 percent is improving. Thus, there is a neutral balance of land degradation.
- **Land cover** is the visible physical shell of the Earth's surface. To date, there are some differences in areas according to land use classes, in particular 'forest' and 'pasture,' per global and national data. For instance, there is a discrepancy between the definitions of 'forest' by the Intergovernmental Panel on Climate Change (IPCC) and the definition used in Uzbekistan. According to national data (SCF) between 2000 and 2013, there was a 2.3-fold increase in forest areas and a reduction in areas under hayfields and pastures. These changes were most likely due to the increase in desert forest areas (saxaul and shrubs) and reforestation on desert lands (about 39 percent of total reforestation), while global data do not indicate such changes. It is clear that the use of this indicator will require significant, complementary studies with the efforts of the SCF, Goskomzemgeodezkadastre, Uzhydromet, and others.

<sup>145</sup> ELD. n.d. "Uzbekistan Case Study Policy Brief. The Economics of Land Degradation (ELD) Initiative and CGIAR Research Program on Dryland Systems." [www.eld-initiative.org/fileadmin/pdf/Country\\_Policy\\_Brief\\_-\\_Uzbekistan\\_WEB.pdf](http://www.eld-initiative.org/fileadmin/pdf/Country_Policy_Brief_-_Uzbekistan_WEB.pdf).

<sup>146</sup> Aw-Hassan, A., et al. 2016. "Economics of Land Degradation and Improvement in Uzbekistan." Chapter 21.

<sup>147</sup> LDN/Global Mechanism. 2019. Summary Report on the LDC Target Setting Programme in the Republic of Uzbekistan. UNCCD.int

The issues of DLDD are integrated into a number of national programs, strategies, and projects:

- Environmental Action Program of the Republic of Uzbekistan for 1999–2005, 2008–2012, 2013–2017
- State Program for Improvement of the Ameliorative State of Irrigated Land and Rational Use of Water Resources for 2008–2012, 2013–2017, 2018–2019
- National Action Program to Combat Desertification and Drought, 2015
- Comprehensive Program for Mitigating the Consequences of the Disaster, Rehabilitation, and Socio-Economic Development of the Aral Sea Basin Area for 2015–2018
- State Program for Development of the Aral Sea Basin Area for 2017–2021 – NBSAP of the Republic of Uzbekistan for 2016–2025.

The UNCCD assessment in 2019 concluded that “for Uzbekistan, which takes concrete and effective measures to improve the state of irrigated land, reduce pasture degradation, restore forest plantations, improve soil fertility, achieving the LDN by 2030 is quite feasible.” The realistic achievement of this goal is due to the fairly stable institutional structure of the country’s state institutions, which covers practically all sectors of the economy and the areas of action envisaged by the UNCCD and other global agreements.

Ecosystem and land degradation is a global phenomenon, and a number of lessons learned can be applied in the Uzbek context, for example, from the large and long-term restoration efforts undertaken in the China Loess Plateau<sup>148</sup> (Box 11).

### Box 11. Restoration Experience from the Loess Plateau in China

The Loess Plateau of China is known for its severe land degradation, soil erosion, and water scarcity problems. Located in central northern China, the Loess Plateau is a highland region of about 640,000 km<sup>2</sup>. It comprises a mix of arid, semi-arid, and semi-humid areas. The average annual rainfall is approximately 400 mm. It is the largest loess deposit region in the world. To support the increasing population, the forests have been gradually turned into farmland because loess soils are perfectly suitable for agriculture, although it is at the same time vulnerable to water and wind erosion. More than 60 percent of the plateau was severely affected by soil and wind erosion. The long history of degradation lowered agricultural productivity and led to poverty in many of the farming communities.

In the mid-1990s, China and the World Bank initiated the ‘Grain for Green Program’. This large-scale vegetation restoration and soil management program converted slope farmlands and overgrazed areas into forests or fertile grasslands to minimize soil water loss, mitigate flood risk, and improve livelihoods in the area. The program successfully converted 16,000 km<sup>2</sup> of rainfed cropland to non-crop vegetation, resulting in a visible ‘greening’ trend over a time span of 20 years. The project reduced soil erosion and water loss over the Loess Plateau and the sediment transported into the Yellow River. However, it needs to be mentioned that the speed and scale of rehabilitation might also be due to low crop diversity and limited use of local knowledge.

<sup>148</sup> See detailed references to restoration approaches in the Loess Plateau of China under Loess Plateau: From Degradation to Restoration - ScienceDirect

Though considerable achievements have been established, many tasks are still to be done. Considering the effects of large-scale ecological restoration, numerous long-term processes (for example, soil environment, hydrological cycle, nutrient storage, and regional ecosystem services) still need to be observed, monitored, and analyzed at different scales. The Loess Plateau of China turned green after extensive vegetation restoration, terracing, and other means, but the long-term work also showed that the benefits of restoration depend significantly on how the restored areas are managed and local communities are involved.

**SOURCE:** Loess Plateau: from degradation to restoration - ScienceDirect  
<https://www.eastasiaforum.org/2016/10/21/regreening-china-will-take-more-than-trees/>.

### 3.3.2. Forest and landscape fire

In spite of the low level of forest cover in Uzbekistan, prevention of landscape and forest fires is high on the agenda of the SCF. This is particularly important in planted forest area, as restoration of forestlands after wildfire requires tens of years and significant funding. Back in 1999, the Cabinet of Ministers issued the resolution 'Regulations on fire safety in forest of the Republic of Uzbekistan,' No. 506 of 22.11.1999 that mandated the former forest management authority with wildfire control and prevention. Fires often start outside of forested areas, particularly on pasture land; such fires affect wider landscapes within the SFF and in protected areas. The SCF undertakes preventive measures to avoid landscape and forest fires and strengthen precautionary measures and forest-related fire-protective actions. Fire-preventive corridors and forest belts are established when afforestation investments are undertaken. However, systematic monitoring of forest fires is not conducted in Uzbekistan.<sup>149</sup>

Figures on forest areas affected by fire vary greatly year by year. In the last registered year 2017, as reported to FRA 2020, the forest area affected by severe fire was 2,420 ha, corresponding to 0.07 percent of the total forested area. In 2018, 5,390 ha were damaged by wildfires according to official statistics.<sup>150</sup> In 2019, the affected area was 39,000 ha or 1 percent of the total forested area. Only in 2009, a similarly high area was affected by wildfire. According to official statistics, 38,800 ha of forest lands were damaged in 2009. In almost all recorded years, the largest area affected was in Syr Darya Region (for example, 28,965 ha in 2009), although many wildfires affected Jizzakh Region in 2013 (35,180 ha). Extended landscape fires have also been recorded in summer 2021 but exact figures are lacking.

### 3.3.3. Forest pests and diseases

Due to the effect of changing climate, the risk for pests and diseases is increasing in the forested landscapes of Uzbekistan as in other parts of the world. However, information on impacts of pests and diseases of forests in Uzbekistan and throughout Central Asia is generally incomplete.<sup>151</sup> Much of the forest is in the cold desert area, dominated by saxaul (*Haloxylon* spp.) and other shrubs that are usually considered as robust. Higher risks are encountered in the juniper and walnut-fruit forests of mountain-

<sup>149</sup> UNECE. 2010. "2<sup>nd</sup> Environmental Performance Review of Uzbekistan."

<sup>150</sup> Uzbekistan official statistics (<https://stat.uz/en/official-statistics/environment>).

<sup>151</sup> Gafforov, Y. S., A. A. Orozumbekov, A. A. Rakhimova, et al. 2012. "Pest and Diseases of Forest Trees in Central Asia." Working Party Meeting Palanga, IUFRO WP 7.03.06.

ous areas. One well-known problem is the sustained outbreaks of gypsy moth (*Lymantria dispar*) in pistachio and walnut forests. Other insects can become invasive on cherry trees.

Fungal diseases include elm disease, apple scab, shoot blight poplar, ash septoria leaf spot, and some other leaf spot diseases. Other fungi cause stem dieback on juniper, poplar, willow, and hawthorn. Canker diseases are caused by *Cytospora*, *Leucostoma*, *Tubercularia*, *Nectri*, among other pests.

The wide use of chemical insecticides against forest pests is believed to be increasing. Chemical insecticides are cheap and highly efficient; however, they are nonselective and not environment-friendly and therefore risk detrimental impacts on the forest biocenosis. Biological methods, including investigating natural enemies in these populations, should help detect species that might play an important role in the natural control of the pests and diseases. Forestry activities include biological pest control on approximately 15,000 ha of forest land annually.

The SCF, supported by its specialized agencies, implements stock-taking and forecasting of potential development of forest pests and diseases, monitors negative impacts of the pollution of industries and utilities, and other effects. Forest pathological surveys are undertaken, based on which the surface and biological approaches to combat the forest pests and diseases are applied. Transboundary exchange, however, remains a challenge. In the field of pests and diseases, there is a need for transboundary cooperation and the development of a strategy for forest health protection in the Central Asian region.

### 3.4. Forest Landscape Restoration

FLR is a planned process that aims to regain ecological integrity and enhance human well-being in deforested or degraded landscapes.<sup>152</sup> It is an active process that brings people and organizations together to identify, negotiate, and implement practices that restore an agreed upon optimal balance of the ecological, social, and economic benefits of forests and trees within a broader pattern of land uses. It goes beyond afforestation or restoring existing natural forests but considers forestry activities within a wider landscape management approach. A defining feature of FLR is engaging with stakeholders interested in the resource and supporting collaboration.

Uzbekistan has adopted FLR as an approach and engaged in the Astana resolution and the process of ECCA 30 (see Chapter 2.3.3 for some details in the policy context). However, from a policy declaration down to implementation there is a need to start a programmatic shift and transform the way forest land is managed.

At the level of the forest research institute, there is considerable experience of successful FLR which started in the 1990s, for example in the Aktash river catchment in the Samarkand region. The trigger for this work was destructive mudflows due to deforestation of steep slopes in excess of 30°. This work now provides clear guidance of what can be achieved through terracing and close planting of a range of tree species, which bring production values as well as improved control of soil erosion and flooding. The Forestry Research Institute is currently actively engaged through the International Union of Forest Research Organizations (IUFRO) with colleagues in Central Asia extracting and documenting the experience gained and lessons learned.

With the recent policy engagement of the SCF in FLR, there are good prospects for transformational change to integrate FLR into the wider development agenda of the country.

<sup>152</sup> Stanturf, John, Stephanie Mansourian, and Michael Kleine. eds. 2017. "Implementing Forest Landscape Restoration, a Practitioner's Guide." International Union of Forest Research Organizations, 1–128. <https://www.fs.usda.gov/treearch/pubs/54459>.

Uzbekistan is deeply engaged in the broader global development agenda. The GoU SDGs, the achievement of the Paris Agreement on Climate change with ambitious Nationally Determined Contributions (NDCs) (see Chapter 6), is engaged in achieving the Aichi targets of the CBD and the targets for LDN of Convention on Combating Desertification. Developing a conceptual framework for FLR will allow the forestry sector to play an important role in these broader developments and the environmental agenda in which the country is engaged.

In this regard, the SCF and its associated organizations from other SCs, research and education, and civil society have a lot to offer. There is extended knowledge available on forest and integrated land management, in particular rangeland and pastures. An FLR agenda to further the wider SDG agenda, supporting nature based-solutions, is thus highly commendable.

### 3.5. Nature-Based Solutions<sup>153</sup>

NBS are innovative approaches that harness natural capital to increase the resilience of people and ecosystems to climate change while simultaneously providing environmental, social, and economic benefits. NBS provide a cost-effective and sustainable way of delivering on climate mitigation actions, through on-land protection, restoration, and sustainable management of natural carbon sinks and reservoirs. Moreover, there is additional mitigation potential from NBS in coastal and marine ecosystems. At a global level, the cost-effectiveness of scaling up investments in NBS is clear. According to the Global Commission on Adaptation, the global benefits of protecting mangroves are over five times the cost, while they protect 15 million people from flooding per year.<sup>154</sup>

Existing evidence and research indicate that by 2030, NBS implemented across all ecosystems globally can deliver emission reductions and removals of at least 5 GtCO<sub>2</sub>e per year. Approximately 62 percent of this contribution is estimated to come from NBS related to forests, about 24 percent from solutions in grasslands and croplands, and 10 percent from additional solutions in peatlands. The remaining 4 percent will come from solutions implemented in coastal and marine ecosystems.

NBS can deliver multiple benefits, beyond mitigation, for adaptation and resilience. These benefits include retained and restored ecosystem services from forests, croplands, grazing lands, wetlands, and other coastal ecosystems that support human health and livelihoods. NBS can also contribute to future security of food and water and thus improve human resilience to the potential negative impacts of climate change. More generally, NBS can increase societal capacity to adapt to impacts of climate change, reduce exposure to climate-related risks such as flooding, and lower the sensitivity of human communities to climate change and shocks, for example, by diversifying income.

According to the flagship report of the World Commission on Adaptation, NBS often work well at a broad scale, such as in whole watershed restorations or along coastlines. They can be more cost-effective than engineered approaches, such as seawalls, and can also work well in tandem with those engineering approaches to control floods, protect coasts, and reduce urban heat.<sup>155</sup>

Recognizing its merits, the concept of applying NBS has been adopted widely, including in resolutions of the G7, the G20, the United Nations General Assembly, and increasingly in private sector investment strategies. NBS is one of the key priority areas for the World Bank Group as it aims to prioritize adaptation

<sup>153</sup> This section, on NBS, draws significantly from the following report: United Nations Environment Programme and International Union for Conservation of Nature. 2021. Nature-based Solutions for Climate Change Mitigation. Nairobi and Gland.

<sup>154</sup> See blog at <https://blogs.worldbank.org/climatechange/can-we-help-nature-bounce-back-realizing-benefits-nature-based-solutions-climate>.

<sup>155</sup> Adapt Now: A Global Call for Leadership on Climate Resilience. Global Commission on Adaptation. September 2019.

and resilience on several fronts as part of its new Climate Change Action Plan (2021–2025).<sup>156</sup>

Forest- and agriculture-specific NBS include a range of interventions: avoided deforestation and forest conversion, improved natural forest management, development of plantations, and conservation of agriculture and planting trees on farms. These solutions include restoring and leveraging natural vegetation and other natural resources to mitigate and adapt to climate impacts. NBS can also be applied to protection of vulnerable infrastructure such as slope stabilization through protective planting and road protection through roadside tree planting. Compared with traditional engineering-type approaches, NBS approaches deliver higher economic returns, are faster to implement, and are more sustainable in the long run. Such activities are cost-efficient ways to reduce the risk of flooding, erosion, and landslide impacts on roads while also restoring natural ecosystems and creating local employment and should be closely linked with FLR.

Implementing NBS needs additional finance. Equally important is that planners and decision-makers, at the national and local (leskhoz) levels, need to be convinced of the potential of NBS to address mitigation and adaptation issues. Given Uzbekistan's need to manage its large forest and grassland areas under an FLR approach, integrating NBS into the approach is crucial and creates the opportunity to address climate change and economic development issues jointly.

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<sup>156</sup> See blog at <https://blogs.worldbank.org/climatechange/can-we-help-nature-bounce-back-realizing-benefits-nature-based-solutions-climate>.

## 4. BIODIVERSITY CONSERVATION

In Uzbekistan, biodiversity conservation and its sustainable development is one of the priorities of the national environment policy.

On June 11, 2019, the GoU approved the NBSAP for 2019–2028. The NBSAP is derived from the CBD and sets national priorities to meet the CBD targets globally on biodiversity conservation measures such as strengthening the monitoring activities of biodiversity, expanding the protected areas in all ecosystems of the country, and establishing a unified database of biodiversity conservation.

In 2018, Uzbekistan released its Sixth National Report on the conservation of biological diversity.<sup>157</sup> The report was prepared under the framework of a joint project of the United Nations Development Programme (UNDP), the GEF, and the SCEEP. The work was supported by a project 'Technical Support to Eligible Parties to Produce the Sixth National Report to the Convention on Biological Diversity'.

Conservation of biodiversity is one of the priorities of the state environmental policy, while ensuring sustainable development and addressing climate change. The main targets with respect to biodiversity include the following:

- Further developing and implementing the NBSAP
- Keeping the National Red Book up-to-date
- Continuously improving the legal and regulatory framework
- Monitoring the performance of the State Environmental Expert Review and Environment Impact Assessment (EIA) for economic activity projects
- Keeping cadasters of fauna and flora.

Also, a priority of the country is the introduction of economic arrangements for the conservation and sustainable use of biodiversity.

The national strategic goals and targets in the framework of the CBD and links to forests are shown in Table 17.

**Table 17. National Biodiversity Goals and Targets in the Framework of the CBD and Link to Forests**

### National Biodiversity Goals and Targets

**Strategic Goal I.** Mainstreaming biodiversity across the state administration and governance bodies and society for sustainable development of the country

- NT 1:** Improvement of the system of state monitoring of natural environment by inclusion of biodiversity monitoring into it.
- NT 2:** Expansion of knowledge and awareness of the state administration and governance bodies and the whole society of the value of biodiversity and ecosystem services
- NT 3:** Development and integration of arrangements of economic valuation of biodiversity and ecosystem services into the planning processes
- NT 4:** Development and integration into state EIA procedure of arrangements to evaluate impact of economic and other activities on biodiversity

<sup>157</sup> Kuchkarov, Sixth National Report of the Republic of Uzbekistan on the Conservation of Biological Diversity (above, n. 37).

### Links to Forests and Forestry

- NT 1.** Link forestry and biodiversity monitoring together. If an NFI is planned and conducted, biodiversity monitoring should be included (see also FAO TCP on forest monitoring)
- NT 2.** The knowledge base of foresters and ecologists should be combined; joint education in some areas would be crucial for future integrated forest landscape management and ecosystem-based solution for integrated protected area management and managing planted forests
- NT 3.** Economic valuation should include both, forest goods and ecosystem services (soil, water, carbon, biodiversity, scenic beauty). This is an area in which foresters, ecologists, and economists should work together for a national solution package

### National Biodiversity Goals and Targets

**Strategic Goal II.** Reducing the direct pressures on biodiversity and sustainable use of its components in productive landscapes

- NT 5:** Development and commencement of implementation of the set of measures to reduce the rate of degradation and fragmentation of the most vulnerable natural ecosystems
- NT 6:** Ensuring sustainable use of biodiversity in water bodies within improved legal and methodological frameworks

### Links to Forests and Forestry

- NT 5.** Particularly in the Tugai area, there is need for a comprehensive forest landscape planning, developing through appropriate planting stepping-stones and reducing fragmentation of highly endangered natural riparian forests
- NT 6.** See NT 5. The protection of specialized fauna and flora is a task of environment that should be supported by forestry through appropriate measures (adequate forest stands)

### National Biodiversity Goals and Targets

**Strategic Goal III.** Developing the system of PNAs to conserve biodiversity and increase the scope of benefits from ecosystem services

- NT 7:** Expansion of total area of PNAs in the country for creation of national environmental network (PNA of different categories), ensuring their efficient management
- NT 8:** Development of state program on conservation and sustainable use of biological diversity components used for food production and farming

### Links to Forests and Forestry

- On NT 7,** the coordination between natural forests used for SFM and protected areas is crucial. Proposed biosphere reserves could cover both aspects: sustainable production (not single sanitary cuts but single-tree thinning and close-to-nature silviculture) and protection and conservation
- On NT 8,** the development of NWFPs, particular genetic pools in natural walnut-fruit forests are important. A joint approach between forestry and environment seems to be adequate



## National Biodiversity Goals and Targets

**Strategic Goal IV.** Enhancing the effectiveness of conservation and sustainable use of biodiversity through participatory planning and capacity building

**NT 9:** Inclusion of provisions of the NBSAP as integral parts of the plans for national, territorial, and sectoral development

### Links to Forests and Forestry

A coordinated effort between the various sectors of the economy is crucial for sustainable development based on a variety of land uses. The main factors in the destruction of natural forests and a wider natural ecosystem are agricultural reclamation of land, redistribution of the surface flow, distant-pasture cattle rearing, development of energy and mining industry, and infrastructure and growth of populated areas. FLR offers a combined approach for an effective multisectoral approach to reach sustainable land management (SLM).

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**NOTE:** NT = National target.

As summarized, in all listed strategic goals, the forestry sector can play an important role in the solution package to address national biodiversity goals and targets.

# 5. FOREST AND CLIMATE CHANGE ADAPTATION AND MITIGATION

## 5.1. Climate and Observed Climate Change

The climate of Uzbekistan is continental and subtropical (Figure 17 with large seasonal and daily variations in air temperature.<sup>158</sup> An extended summer season is one of the prominent climate features; see the example of the climate diagram of Tashkent (Figure 18). Quite often in summer a thermal depression is located over Uzbekistan, which consists of a front-free, non-mobile area of low air pressure with dry and hot weather. The vast Karakum and Kyzylkum Deserts are sources of intensive heat air flows in summer. The hottest month generally is July when average mean monthly air temperature reaches 30°C in the south and up to 28° in the north (Ustyurt Plateau). In winter a cold air mass from the Arctic and Siberian regions, accompanied by winds and heavy precipitations, penetrates into Uzbekistan. The absolute minimum winter air temperature is -40°C in the north and mountains and -20°C in the south of Uzbekistan.

Generally, the territory of Uzbekistan is considered an arid zone. As a rule, the significant amount of precipitation falls in autumn, winter, and spring. The minimum annual precipitation (less than 100 mm) occurs in the western part of the country. Distribution of precipitation across the territory is extremely uneven and closely associated with terrain elevation, orientation of mountain systems, direction of mountain slopes, and other features of orography. Analysis of regional variations in average annual precipitation, based on data from 1950 to 2013, indicates decreasing trends in precipitation in the majority of cases. In some mountain regions, there is a slight increase in precipitation in the winter season.

Uzbekistan has many different climates but is dominated by dry-cold-semi-arid climate (Table 18).

**Table 18. Illustrative Table: Köppen-Geiger Climate Zones of Uzbekistan<sup>159</sup>**

Classification	Count	Climate*	Examples
Cold semi-arid climate	304	BSk	Kokand, Namangan, Andijan, Samarkand, Bukhara
Hot summer Mediterranean	189	Csa	Tashkent, Kitab, Eshonguzar, Zangiata, Kachramon
Cold desert climate	89	BWk	Nukus, Fergana, Margilon, Urgench, Termez
Hot humid continental	55	Dsa	Chirchig, Angren, Sokh, Gazalkent, Krasnogorsk
Warm humid continental	1	Dsb	Nanay

\* OCHA\_ROAP\_KoppenGeiger\_2015 ([reliefweb.int](http://reliefweb.int))

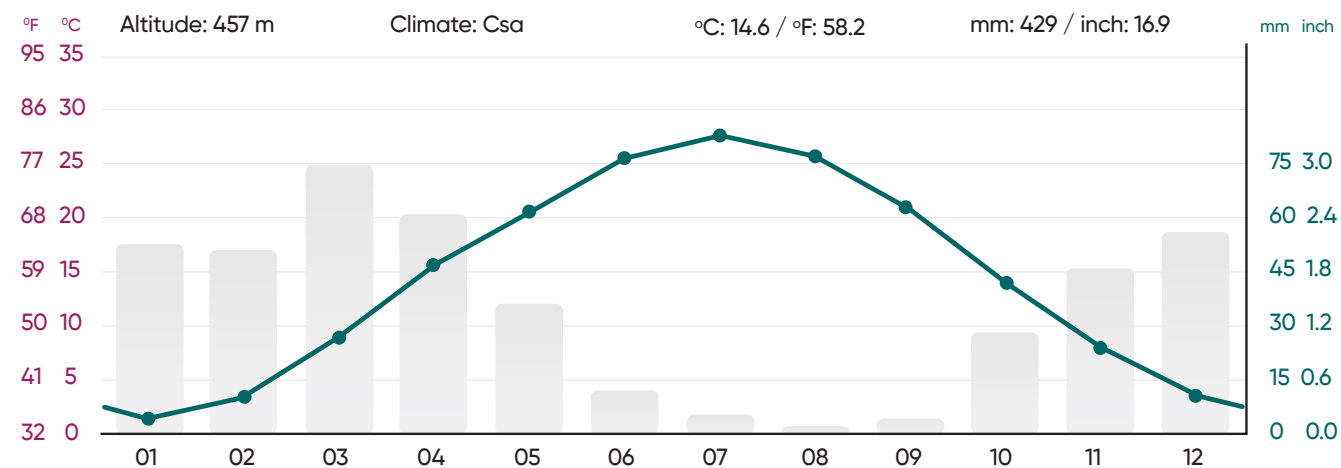
BSK: arid, steppe, dessert; Csa: Warm temperate, summer dry and hot; BWK: arid, dessert, cold; Dsa: Snow, steppe, hot summer; Dsb: snow, steppe, warm summer

<sup>158</sup> Third national Communication to the UNFCCC (2016)

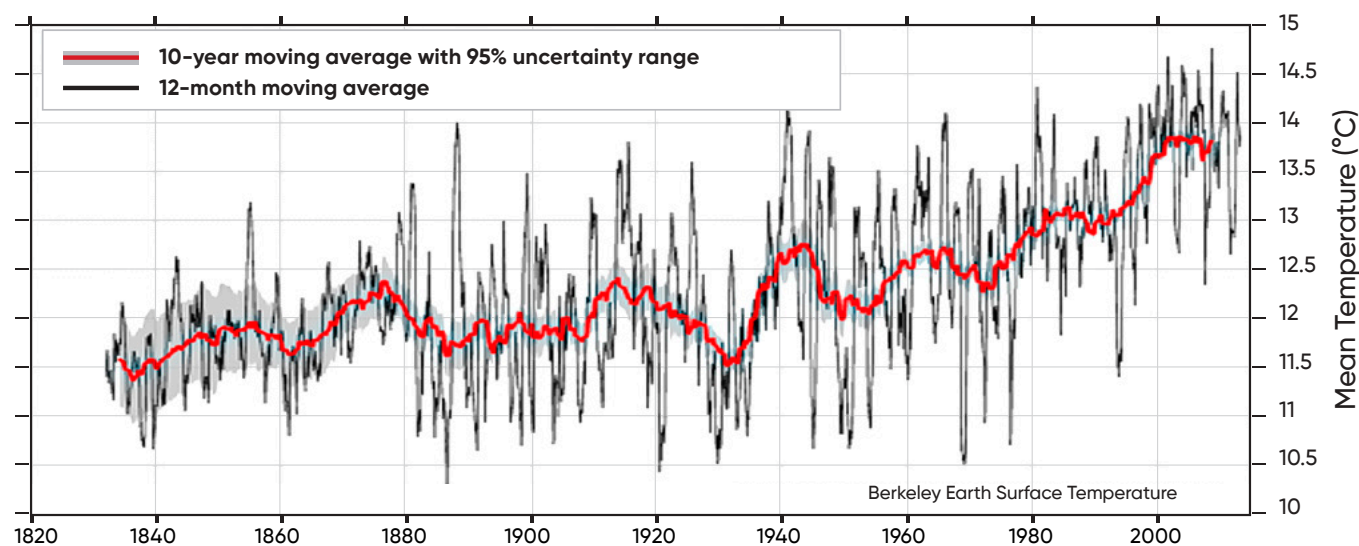
<sup>159</sup> [climate-data.org \(https://en.climate-data.org/asia/uzbekistan-161/\)](https://en.climate-data.org/asia/uzbekistan-161/)

Climate change can be observed over the past decades. From 1950 to 2013 on average, the rate of temperature increase was  $0.27^{\circ}\text{C}$  for every 10 years, which is more than two times higher than the global rate (Figure 19). The highest warming rates were observed in the north of the country and in the large cities ( $0.43^{\circ}\text{C}$ , over every 10 years); the lowest rates were in mountain areas ( $0.10\text{--}0.14^{\circ}\text{C}$ , over every 10 years). The air temperature increases both during cold and warm seasons of the year. The number of days with frost is decreasing significantly (by 4–5 days on average every 10 years). An increase in number of days with high air temperatures is observed, especially in the south and in deserts. For example, in the 1950s the number of days with maximum air temperature above  $40^{\circ}\text{C}$  in the central part of the Kyzylkum Desert was around 10; currently it is more than 20 days.

**Figure 18. Walter/Lieth Climate Diagram for Tashkent for 2017 160**



**Figure 19. Regional Climate Change Uzbekistan, Reconstructed on Mean Annual Surface Temperatures<sup>161</sup>**

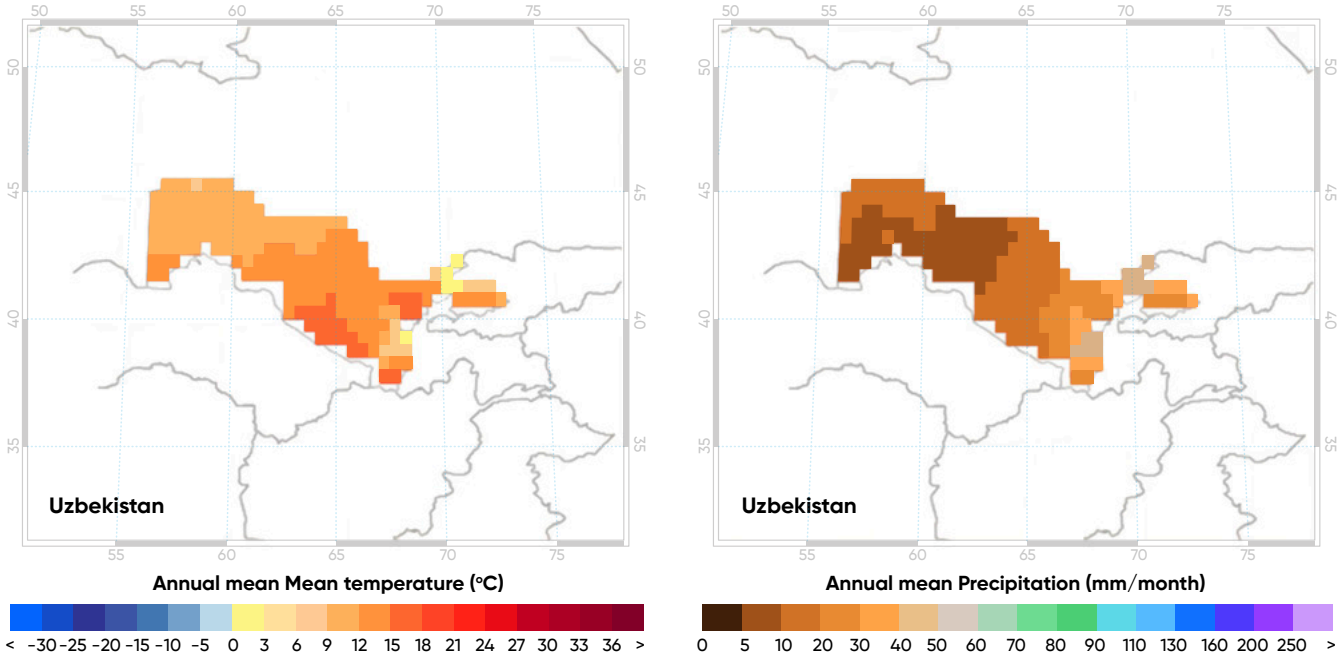


<sup>160</sup> Climate-data.org (<https://en.climate-data.org/asia/uzbekistan/tashkent/tashkent-485/>).

<sup>161</sup> Berkeley Earth (<http://berkeleyearth.lbl.gov/regions/uzbekistan>).

In conclusion, an increase in air temperature variations is observed throughout the country. Clearly, the trend toward intensive warming in Uzbekistan aggravates the climate aridity. Also important is the significant increase in deficiency of air humidity in summer (28 percent) observed in the Aral Sea littoral zone and the lower Amu Darya river delta, due to the combined impact of air temperature increase and the gradual disappearance of vast parts of the Aral Sea water area.

**Figure 20. Current Annual Mean Temperature (left) and Precipitation (right), 1961–1990**



## 5.2. Adaptation of Forests to Climate Change, Vulnerability, and Resilience

Considering the trends mentioned above, Uzbekistan is heavily affected by climate change. Climate change affects all the sectors of the economy. Land use, particularly agriculture, water management, biodiversity, and forests are affected. Increased vulnerability is expected at the land use level in the coming decades.

Forests and woodlands will be affected by the changing climatic conditions and increased vulnerability, particularly in physiological health (pest and diseases), fire, and other conditions (winds, dust) that reduce photosynthesis, salinity, and other changing conditions. Climate change intensifies land degradation and desertification processes and thus affects productivity, biodiversity, and other environmental services of these landscapes. These processes are the most intense in the Aral Sea region, the Ustyurt Plateau, the Kyzylkum Desert, and in mountain woodlands and submontane areas.

Global climate change is a decisive factor increasing the threat of forest degradation and loss of biodiversity; however, existing information is limited, particularly on how to adapt forests to changing conditions and make them resilient so they can play a role in reducing the vulnerability of people and ecosystems toward climate change.

162 UEA (<https://crudata.uea.ac.uk/~timo/climgen/national/web/Uzbekistan/projs.htm>).

## Climate change and its effects on forest ecosystems

Based on the sixth biodiversity assessment and existing forest conditions in the country, the following observations can be made regarding forests and climate change:

- The observed temperature rise will result in long-term vertical shift of zonality in the mountains, which will make species such as insect stenophages vulnerable, as their ecological plasticity is insufficient for survival in altered conditions. The same can be applied to plant species that rely on vegetative reproduction more than seeds as well as to species confined to narrow ecological niches.
- The upward displacement of the alpine and subalpine belts under the influence of climate change is expected to result in a reduction in the area of these habitats, which is a serious direct threat to the forest biodiversity. As a result, the reduction of habitat areas will increase the mortality of high mountain inhabitants, both large and small species, as they migrate beyond the limits of their natural habitats.
- The vertical shift of the boundaries of lower- and middle-mountain belts will also lead to reduction of tree-shrub and forest habitats, and, accordingly, to a similar process—the movement of species to unusual habitats (both up and down), where they will enter into competitive relations with typical inhabitants and invasive species. A significant negative impact will be associated with an expected increase of livestock, particularly in mountain pastures and watering places due to the degradation of lowland and lower montane pastures.
- Different and unpredictable impacts on the territorial distribution of communities of trees and shrubs.
- The tree vegetation in the area of lowland deserts is unlikely to change greatly, since there will be little change to salinization conditions with shallow groundwater occurrence in saline basins, although growth rates might be reduced. The sandy vegetation, which lives off moisture accumulated during the winter period, will remain in approximately similar current environmental conditions. Adaptability to withstand high summer temperatures is already expected to be achieved in the process of evolution; thus activities to reforest and regreen dry areas with saxaul and similar species are likely to be successful.
- Tugai tree vegetation of lowland territories, confined to floodplains and riverbanks that need periodic flooding, is also likely to be little affected in conditions of river flooding. However, a partial drying of wet areas, a reduction of width of tugai vegetation bands and its further fragmentation may occur, if there is a significant change in the flood regime and a decrease in the flow in rivers.
- The vegetation of the juniper forest in higher mountains can also be affected as the temperature rises by an increase in the hypsometric levels of the habitat boundaries and a narrowing of the altitudinal belt of their distribution. However, juniper has relatively wide ecological amplitude and adaptability, both to temperature extremes and to a change in the mode and amount of rainfall. The most sensitive is Turkestan juniper, which may disappear according to circumstances.
- Almonds and pistachios are xerophytic plant species with wide ecological amplitude and the air temperature increase should not negatively affect them.
- The tree vegetation of the middle-mountain broadleaf forests belt, including mesophilic species such as walnut, cherry, white poplar, apple tree, and others, as well as their accompanying mesophilic shrubs can significantly suffer from climate change. An air temperature increase, especially in summer, with simultaneous soil moisture reduction can result in a significant habitat narrowing of these species.

- Climate change may have an impact on forest biocenosis for other reasons, for example, it may cause an outbreak of fungal diseases of tree vegetation due to reduced immunity when living conditions deteriorate. The probability of outbreaks of insect pests of tree species will increase.

As noted above, ecosystem vulnerability increases significantly when anthropogenic factors overlap with the impact of adverse climate events. Consequently, any environmental activities aimed at sustainable management and use of biological components of ecosystems will contribute to the preservation of their biospheric and socially useful functions. In this regard, the restoration and preservation of forests and associated biodiversity is a rational way for ensuring environmental stability and sustainable development as well as for adaptation to ongoing climate change trends and processes.

## 5.3. Mitigation Role of the Forests

### Role of forests to confront climate change

Forest of Uzbekistan can contribute, although only modestly, to climate change mitigation. The forests are limited in their extent and amount of biomass as 80 percent of the land area is cold desert with shrub-like forest cover. They have a modest role as carbon storage and carbon sink as they are natural long-term absorbers of carbon dioxide. The total sink capacity of carbon dioxide in Uzbekistan is estimated in global statistics at 2.53 million tons CO<sub>2</sub>eq a year (aboveground biomass only), of which 0.58 million tons CO<sub>2</sub>eq result from forest and woodland plantations on lands of the SFF and an estimated 1.95 million tons CO<sub>2</sub>eq are generated on agricultural lands.<sup>163</sup> Table 19 offers an additional estimate for forest carbon only.

FAO estimates that in 2015, 106 million tons CO<sub>2</sub> equivalents were stored in aboveground tree biomass of the forested area of 3.3 million ha, or about 33 tCO<sub>2</sub>e/ha forest land (FRA 2015). In the FRA 2015 country report, Uzbekistan presents the following figures (Table 19) about growing stocks of different species and/or forest types and corresponding biomass conversion and expansion factors used for converting timber volumes to aboveground biomass.

**Table 19. Growing Stock of a Number of Tree Species**

Species	Forest area g 1000 ha	Growing stock M m	GS m ha	BCEF	Root-shoot ratio	AGB	BGB
Haloxylon	2268	13.05	5.7	0.8	0.46	10.44	4.80
Juniperus	153	6,14	40.1	1.4	0.40	8.60	3.44
Populus diversifolia	23.5	1.05	44.7	2.05	0.46	2.15	0.99
Other Populus	3.8	0,26	68.4	1.4	0.46	0.36	0.17
Ulmus	2.7	0.10	37	1.7	0.46	0.17	0.08
Acer	1.2	0.08	66.7	1.4	0.46	0.11	0.05
Robinia pseudoacacia	0.8	0.03	37.5	1.7	0.46	0.05	0.02

<sup>163</sup> Third national Communication to the UNFCCC 2016.

Species	Forest area g 1000 ha	Growing stock M m	GS m ha	BCEF	Root-shoot ratio	AGB	BGB
Salix	2.5	0.15	60	1.4	0.46	0.21	0.10
Fraxinus excelsior	0.5	0.02	40	1.7	0.46	0.03	0.01
Remainder of species	839	2.17	2.59	1.7	0.46	3.69	1.70
<b>TOTAL</b>	<b>3295</b>	<b>23.05</b>				<b>25.81</b>	<b>11.36</b>

**SOURCE:** Based on illustrative documentation to FAO-FRA 2015, SCF.

**NOTE:** GS: Growing Stock; BCEF: biomass conversion and expansion factor; AGB: above-ground/BGB below-ground biomass.

Applying the same growing stocks and expansion factors to recent figures of forest cover results in estimated aboveground biomass carbon stocks of 22.9 tCO<sub>2</sub>e/ha, ranging from 8.4 tCO<sub>2</sub>e/ha for saxaul shrubland to 154 tCO<sub>2</sub>e/ha for riparian forests (see Table 20). Annual gross sequestration due to plant growth is estimated at 1.3 tCO<sub>2</sub>e/ha on average or 4.7 million tCO<sub>2</sub>e/ha on all forest land.

Table 20 is a rough estimate based on official data. Carbon storage of saxaul biomass could be overvalued. Thevs, Wucherer, and Buras (2013) estimated that saxaul shrubland usually stores between 2.75 and 5.5 tCO<sub>2</sub>e/ha in aboveground biomass or 19.1 million tons tCO<sub>2</sub>e for the whole of Uzbekistan.<sup>164</sup> The same study estimated that in Uzbekistan more than 80 percent of the saxaul vegetation has been lost and that through regeneration of this area an additional 30–60 million tons CO<sub>2</sub>e could be sequestered in aboveground biomass.

**Table 20. Own Estimate of Forest Carbon Sinks Per Year, Based on Wood Growth Rates by FOREST type**

Forest Type	Total Area ha	Growing Stock m / ha	Growth Rate m /ha and year	BCEF	Above ground Carbon Stock tCO <sub>2</sub> e/ha	Annual Growth tCO <sub>2</sub> eq/ha	Aboveground Carbon Stock mtCO <sub>2</sub> e	Annual Growth mt CO <sub>2</sub> e
Saxaul cold desert	3,200,000	5.7	0.6	0.8	8.4	0.9	26.8	2.8
Mountain junipers/ walnut-fruit	350,000	40.1	1.2	1.4	102.9	3.	36.0	1.1
Riparian forests	130,000	~60	2.0	1.4	154.0	5.1	20.0	0.7
Fast-growing species	10,000	~60	4.0	1.4	154.0	10.2	1.5	0.1
<b>Total</b>	<b>3,690,000</b>				<b>22.9</b>	<b>1.3</b>	<b>84.3</b>	<b>4.7</b>

**NOTE:** a. own estimates; BCEF: biomass conversion and expansion factor

<sup>164</sup> Thevs, N., W. Wucherer, and A. Buras. 2013. "Spatial Distribution and Carbon Stock of the Saxaul Vegetation of the Winter-Cold Deserts of Middle Asia." *Journal of Arid Environments* 90:29–35, doi:10.1016/j.jaridenv.2012.10.013.

From figures reported by FRA 2020, forest area increased from 3,045,000 ha in 1990 to 3,689,000 ha in 2020. Assuming an average carbon stock of 22.9 tCO<sub>2</sub>e/ha, this increase in forest cover corresponds to a net sequestration of 4.7 million tCO<sub>2</sub>e or 490.6 ktCO<sub>2</sub>e per year in aboveground biomass. A recent FAO study estimates that forests of Uzbekistan currently remove 560 ktCO<sub>2</sub>e from the atmosphere.

That potential opens the door to exploring opportunities that provide a value to standing forest and ecosystems in their mitigation function to climate change. Climate change mitigation should be integrated in all forms of forest management that is aimed to increase resilience to the effects of climate change. A combined adaptation/mitigation approach is an important element of any future investment in forestry in Uzbekistan.

### Proposed Forest NAMA

A Forest Nationally Appropriate Mitigation Action (NAMA)<sup>165</sup> was proposed and registered in 2015 with the support of the M. Succow Foundation (NS-249-Rainfed mountain belt reforestation). The proposed mitigation action consists of reforestation of 30,000 ha (by the year 2030) initially and 400,000 ha (long term) of foothill slopes, currently used for low-productive wheat production and as pasture land, with native tree species, such as pistachio (*Pistacia vera*), almond (*Amygdalus communis*) and dog rose (*Rosa canina*), oleaster (*Elaeagnus* spp.), and *Amygdalus spinosissima* (as barriers for livestock). The proposed outcomes include (a) achieving a substantial net GHG sequestration; (b) achieving a comprehensive, countrywide organized transformation to sustainable, low-carbon land management; (c) decreasing aboveground soil erosion of watersheds and improving water retention; (d) improving soil fertility; and (e) providing sustainable livelihoods to local communities. The proposed target comprised, among others, the planting of 6 million pistachio plants as main species by 2030. For natural pistachio sites, a sequestration net gain of 5.9 tCO<sub>2</sub>/ha/year for the first 20 years has been calculated (above and below ground biomass), which accumulated for the first 20 years to 118.1 tCO<sub>2</sub>/ha. No information is currently available on the status of this project.

## 5.4. Nationally Determined Contribution and Forests

Uzbekistan submitted its first intended NDC to the UNFCCC in November 2018<sup>166</sup> and updated it in October 2021.<sup>167</sup> NDC 2021 has two long-term objectives:

- **Mitigation objective.** To reduce by 2030-specific GHG emissions per unit of GDP by 35 percent from the level of 2010.<sup>168</sup> GHG-relevant mitigation targets include energy, industrial processes and product use (IPPU), agriculture, forestry and other land use (FOLU), and waste.
- **Adaptation.** Uzbekistan will continue its efforts for adaptation capacity building to reduce risk of adverse climate change impact on various sectors of economy, social sector, and in particular the Aral Sea Coastal Zone (Priaralie). A national adaptation plan (NAP) is currently in preparation with support of UNDP, financed by a grant of the Green Climate Fund.<sup>169</sup> The role of forests and forest conservation will be integrated in the NAP.

<sup>165</sup> [<sup>166</sup> \[https://www4.unfccc.int/sites/ndcstaging/PublishedDocuments/Uzbekistan%20First/INDC%20Uzbekistan%2018-04-2017\\\_Eng.pdf\]\(https://www4.unfccc.int/sites/ndcstaging/PublishedDocuments/Uzbekistan%20First/INDC%20Uzbekistan%2018-04-2017\_Eng.pdf\)](https://www4.unfccc.int/sites/PublicNAMA/_layouts/un/fccc/nama>NamaSeekingSupportForPreparation.aspx?ID=169&viewOnly=1</a>.</p></div><div data-bbox=)

<sup>167</sup> Uzbekistan Updated NDC\_2021\_EN.pdf (unfccc.int).

<sup>168</sup> [https://www.climatewatchdata.org/ndcs/country/UZB?document=revised\\_first\\_ndc](https://www.climatewatchdata.org/ndcs/country/UZB?document=revised_first_ndc).

<sup>169</sup> Advancing medium and long-term adaptation planning in Uzbekistan, UNDP Climate Change Adaptation (adaptation-undp.org)



The total GHG emissions of Uzbekistan for 2017 are 189.2 mtCO<sub>2</sub>e without removals, which corresponds to approximately 0.3 percent of global emissions. The main sources of emissions in 2017 were the energy sector (about 148 mtCO<sub>2</sub>e) and agriculture (about 40 mtCO<sub>2</sub>e). FOLU is registered as a carbon sink, as outlined in Table 21 with a sink rate of -8.6 mtCO<sub>2</sub>e (Table 21). Considering only forests, the CO<sub>2</sub> removal is -12.2 mtCO<sub>2</sub>e for 2017. Pastures acts as a source of CO<sub>2</sub> with about 5 mtCO<sub>2</sub>e.

**Table 21. FOLU in the GHG Inventory, 2010 and 2017 (CO<sub>2</sub>e, millions)**

IPCC Category	2010 GHG Emissions/ Removal	Share of Total (%) 2010	2017 GHG Emissions/ Removal	Share of Total (%) 2017
Forests conserved as forests	-22,148	9.4	-12,208	5.8
Pastures conserved as pastures	11,200	4.8	5,024	2.4
Arable land conserved as arable land	-2,002	0.9	-1,449	0.7
<b>Total</b>	<b>-12,950</b>		<b>-8,632</b>	

Overall, between 2010 and 2017, the carbon sink potential has been reduced by nearly 50 percent. However, because of the absence of an NFI, the data have to be considered with some care.

The sink in 2017 was 4.57 percent of the total national emissions excluding the FOLU sector. In forest land, the largest sink in 2014 was tree biomass: -534,280 tCO<sub>2</sub>e. The prevailing part of annual carbon loss is caused by harvested fuelwood. Other emission sources in the FOLU sector include settlements and wetlands. Emissions from croplands are negligible.

Forests and forest landscapes are listed prominently in NDC 2021, on both climate change strategies and adaptation and mitigation. In the following actions proposed in the NDC, the forest sector will make a major contribution to the Commitment of the Republic of Uzbekistan to the Paris Agreement. The concrete role of forests and forest landscapes is mentioned in the NDC as summarized in Table 22.

**Table 22. Forests and Forest Landscapes as Referred to as Adaptation Measures in the Revised NDC 2021**

Area in NDC	Direct Forest Project as Mentioned in the NDC	Remarks
Reporting GHG	Development of the system for inventory of GHG sinks and emissions in the 'Land Use Change and Forestry' sector on the basis of advanced GIS technologies.	Part of the NFI, forest management system and information, communications and technology
Energy efficiency	Creation of biogas plants	Not a priority but a way to look at the specific issue on fuelwood management

Area in NDC	Direct Forest Project as Mentioned in the NDC	Remarks
<b>Mitigation of Aral Sea disaster impact</b>	Conservation and restoration of forest resources, including afforestation of the dried Aral Sea bottom	Forest restoration techniques are developed and have been proven to be an effective means
<b>Agriculture</b>	Restoration of degraded pastures and introduction of sustainable pasture management mechanism	Forest restoration on non-forested SFF land and other forest landscapes
<b>Adaptation of ecosystems</b>	Restoration of forests in mountain and piedmont areas, conservation of indigenous plant species in semideserts and deserts Conservation, restoration, and maintenance of ecological balance in the protected nature territories Improvement of sustainability in management of fragile desert ecosystems.	The proposals are fully in line with new strategic approaches of the SCF to promote FLR

The institutional links regarding the NDC implementation relating to forests are as follows:

- The Center of the Hydrometeorological Service of the Republic of Uzbekistan (Uzhydromet) is the National Focal Point for the UNFCCC and is responsible for fulfilling the country's commitments under the UNFCCC and the Paris Agreement.
- The SCF is responsible for the implementation of measures to prevent desertification, conservation, and restoration of irrigated and rainfed lands, pastures, and forest resources, including on the dried bottom of the Aral Sea.
- The State Committee on Ecology and Environmental Protection is the Operational and Political Focal Point of the GEF and is responsible for the allocation of GEF grant funds.

# 6. INTERNATIONAL COMMITMENTS AND THEIR RELATION TO FORESTS [Update December 2021]

## 6.1. Relevant International Treaties, Conventions, and other International Policy Commitments

Table 23 summarizes the most relevant UN conventions, other international policy processes, and initiatives that include commitments relevant to the framework of forest and forestry in Uzbekistan. The participation in such international conventions and processes has raised the obligations of Uzbekistan to adhere to international standards and criteria and to commit to a number of time-bound targets and objectives.

**Table 23. UN Conventions, UN-Linked Forest Policy Processes, and International Processes Linked to Forests**

Conventions with Legal Obligations	Date of Adoption	No. of Parties	Uzbekistan Member	Link to Uzbek Forests
<b>UNFCCC</b>	May 1992	194	1993	Third national communication to the UNFCCC, 2016
▪ Kyoto Protocol	Feb 2005	191	1999	
▪ Paris Agreement, NDC	Dec 2015	197	2018	NDC 2017
<b>CBD</b>	Jun 1992		1995	Sixth national report to CBD and Aichi targets, 2018
▪ Cartagena Protocol Biosafety	2003	198	2020	
▪ Nagoya Protocol	2010		no	NBSAP approved for 2019–2028
<b>UNCCD</b>	Jun 1994	193	1995	Concept of land degradation neutrality (LDN) endorsed, 2019
<b>CITES</b>	Mar 1973	175	1997	Protection of specific fruit tree species in Annexes of CITES
<b>ILO Labor Inspection Convention, 1947 (No. 81) and the Labor Inspection (Agriculture) Convention, 1969</b>	Jun 1989	148	2019	Adopted in November 2019, entry into force November 2020, including safety and health in forestry
<b>Wetland Convention (Ramsar)</b>	Feb 1971	159	2002	2 sites designated as Wetlands of International Importance area of 558,400 ha

Conventions with Legal Obligations	Date of Adoption	No. of Parties	Uzbekistan Member	Link to Uzbek Forests
<b>Convention Migratory Species of Wild Animals, Water Bird Agreement (AEWA), including the Memorandum of Understanding concerning Conservation and Restoration of the Bukhara Deer</b>	1998	>100	2005	Bird species habitat conservation in wetlands and riparian Tugai forests in particular
<b>Convention concerning the World Cultural and Natural Heritage</b>	Nov 1972	193	1993	Western Tian Shan Natural Heritage site since 2016
<b>International Poplar Commission and other fast-growing species (IPC)</b>	1947	38	no	Poplar, Salix, and other fast-growing species knowledge exchange and applied research
<b>Others (not conventions)</b>				
<b>United Nations Forum on Forests</b>	2000	All UN	2000	National reporting on the UN Strategic Plan on Forests 2017–2030; see also Annex 3
<b>Committee on Forests: FAO COFO – FRA</b>	1946	All FAO	1992	FRA reporting; since 1995 financed TCPs in forests
<b>UNECE/FAO forests and timber committee</b>	1948	48	1993	Active member, capacity building
<b>World Bank Group</b>	1944	189	1992	Project Resiland in preparation
<b>Green Climate Fund</b>	2012	open	2018	Projects in preparation
<b>UNFF/Strategic Plan for forest reporting</b>	2000/2017	All UN	2005	Strategic plan adopted in 2017–2030
<b>SDGs, and SDG Reporting SDGs 15 reporting on Goal 15 in FRA 2020</b>	2015	All UN	2018	October 20, 2018, the Ministers roundtable on SDGs and related tasks
<b>GEF</b>	1992	183	1992	A number of ongoing programs GEF-6 and GEF-7 relate to forestry, GEF.8 in preparation in 2022
<b>Bonn Challenge</b>	2012	open	2018	Signing of Astana resolution in 2018
<b>ECCA 30</b>	2019	open	2019	Pledge made to Bonn Challenge, in progress (see Chapter 2.3.3)
<b>UNFCCC COP 26 Glasgow leaders' declaration on forests and land use</b>	2021	141	2021	Declaration signed by the GoU in November 2021

As an example, a narrative of the link between forests/natural resources management and the specific SDG agenda of Uzbekistan is shown in Box 12.<sup>170</sup> The elements are taken from a special MAPS mission in April 2018.

### **Box 12. SDGs Uzbekistan - Acceleration Area 3: Toward sustainable and resilient natural resources managementa**

Expanding the use of commonly accepted international tools to measure natural capital, among others, to conduct a forestry resources survey and to invest further in reforestation/afforestation, sand stabilization, and pasture improvement in areas threatened by desertification, particularly in Karakalpakstan

Implementing long-term (that is, to 2030) national energy and water strategies, with a focus on (a) the energy/water links, (b) investments for institutional as well as productive capacity development, and (c) water and energy conservation and efficiency as well as renewable energy technologies

Supporting the broader dissemination and use of climate and meteorological data and information via early warning systems, to enhance preparedness for and resilience to extreme events, among nature conservation agencies, local authorities, and civil society organizations, as well as central government agencies

Ensuring that all infrastructure/investment projects undergo climate- and disaster-risk screenings.

**NOTE:** a. UZB-MAPS Report Full version.pdf (un.org).

## **6.2. Past and Current International Projects Affecting Forests and Forestry**

For obvious reasons, the majority of international assistance has been focused on the Aral Sea region since more than a decade. This focus remains up-to-date, and reforestation and rehabilitation of the dry bed of the Aral Sea and adjacent land remain a priority in international cooperation.

Overall attention is given to the biome of 'cold deserts' which is unique for Central Asian countries. The Tian Shan Mountain complex as the single most important water and mineral source for the lowlands also has a prominent role, and international environmental support in the past has focused on these unique ecosystems (Juniperus, walnut-fruit tree and in the lowland, the dwindling Tugai forests areas).

There are gaps in international cooperation in the areas of forest policy and governance, economics of forest products, including NWFPs, FLR in the various biomes, community forestry, and capacity building.

Table 24 gives an overview of a number of important **past** projects. More recent projects are discussed in the section following the table.

<sup>170</sup> <https://uzbekistan.un.org/en/46176-mainstreaming-acceleration-and-policy-support-maps-achieving-sustainable-development-goals>

**Table 24. Extract of Past Initiatives and Donors Engaged in Uzbekistan's Forest Sector<sup>171</sup>**

Project Title	Donor / Implementing Agency (Time Period)	Activities
<b>Region: Aral Sea</b>		
Restoration of degraded land through afforestation of the dried bed of the Aral Sea project	Aral Sea Salvation Fund (2003–2008)	Afforestation of 10,000 ha
Forest planting in the dried bed of the Aral Sea	US Program Section 416(b) 2004–2006	1,500 ha of saxaul trees planted
Enhancing environmental welfare in the Aral Region	GIZ (2000–2005)	Saxaul established
Achieving ecosystem stability on degraded land in Karakalpakstan Kyzylkum Desert	GEF-4, UNDP, Central Asia countries Initiative for Sustainable Land Management 2008–2012	Regional with Kazakhstan
Afforestation of the dried bottom of the Aral Sea and agrotechnology of cultivation of poplars in the Fergana Region	France (2002–2005)	Cultivation of saxaul in Aral region, establishing hybrid poplar plantations
<b>Region: Regional</b>		
Central Asia Transboundary Biodiversity Project	GEF-1/World Bank (1999–2006)	Basic project, partner in Uzbekistan Committee on Nature Protection
<b>Region: National</b>		
Tugai forest conservation and strengthening of protected area systems in the Amu Darya delta of Karakalpakstan	GEF-3/UNDP (2005–2013)	Executed by the Karakalpak State Committee for Nature Protection
Developing National Forestry Programme and improving forestry legislation	FAO (2008/2009) TCP/UZB/3101	Developing Uzbekistan's Forest Policy, NFP, and Forestry Code
Promoting use of non-timber forest resources	FAO TCP (2012–2013)	National strategy, expanded production of apicultural products and aromatic herbs
Strengthening Sustainability of the National Protected Area System by Focusing on Strictly Protected Areas	GEF-4, UNDP (2008–2017)	Biodiversity protection, protected areas expansion with MAWR/main forestry department
FLERMONECA: Forest and Biodiversity Governance including Environmental Monitoring	EU, GIZ, Austrian environmental agency (2013–2015)	Climate change, forest law enforcement and governance, environmental monitoring
Integrated Forest Land and Tree Resources Assessment	FAO TCP/UZB/3503 (2015–2017)	Results used for designing the elements of an NFI for Uzbekistan

<sup>171</sup> The initial list of international cooperation projects derived from the working paper "Forestry of Uzbekistan" Chief Directorate for Forestry of the Republic of Uzbekistan, 2013. More recent information was not made available.

**FAO forestry** is active in Uzbekistan since 2001 and has conducted a number of TCPs and co-financed projects.

Also, with support of the **FAO/Turkey Partnership Program**, several projects have been conducted over the past eight years, including (a) Capacity Building for Sustainable Management of Mountain Watersheds in Central Asia and the Caucasus (US\$100,000); (b) Multifunctional forest management planning, including forest inventory (US\$500,000); and (c) development of modern forest nurseries techniques (US\$500,000). GIZ is also associated with the FAO in a number of initiatives and capacity-building efforts in forestry.

The country is currently implementing a number of projects aimed at **sustainable ecosystem and land management** and improving land quality that are relevant to forests. The most relevant projects are listed in the following sections.

#### **GEF-5<sup>172</sup> / UNDP / The State Committee on Land Resources, Geodesy, Cartography and State Cadaster project 'Reducing Pressures on Natural Resources from Competing Land Use in Non-Irrigated Arid Mountain, Semi-Desert and Desert Landscapes of Uzbekistan,' since 2013, not yet concluded**

This project with a total budget of US\$12.2 million was approved for implementation in 2013. It contains two major components: (a) an enabling cross-sector environment and in-country capacity (at system, institutional, and individual levels) for applying integrated landscape management in arid mountain, semi-desert, and desert areas and (b) development of best practices on sustainable rangeland and forestry management and integrated natural resources management planning implemented in two districts in Jizzakh and Bukhara provinces.

#### **GEF-6 / UNDP / State Committee on Nature Protection 'Sustainable Use of Natural Resources and Forestry in Key Mountain Areas Important for Globally Significant Biodiversity,' 2016–2021**

The project, with a total budget of US\$32 million, aims at strengthening protected areas in mountains through improved zoning, equipment, and capacity development. To do so, it implements community-based forest management on 16,000 ha, including establishing nurseries for walnut and fruit trees and shrubs as well as fast-growing trees, creating woodlots and fuelwood plantations, and supporting the shift to alternative energy (for example, gas, coal, and connection to the electricity grid) as well as energy efficiency. The project also has a special goal of maintaining the habitat of the endangered snow leopard.

#### **GEF-6 / FAO / State Forestry Committee project 'Sustainable management of forests in Mountain and Valley Areas in Uzbekistan,' GEF/LDCF/SCCF Project ID 9190, February 2018–January 2023**

This project, with a GEF allocation of US\$3.2 million and a co-financing package of US\$18.7 million, is implemented jointly by the FAO and the SCF since early 2018. It is broad and ambitious and addresses information management system including the establishment of a forest data monitoring unit, multifunctional forest management, and monitoring and knowledge sharing. It intends to improve the data situation and information and management on mountain forests, including developing modern forest inventory at forest management level, protecting forests from illegal cutting and uncontrolled grazing, and supporting natural regrowth and realizing reforestation in the Ugam-Chatkal National Park. Furthermore, it intends to convert, at the pilot level, low-productive farmland into pistachio stands. Additional activities include the improvement of tugai forests and the restoration of windbreaks in the Ferghana Valley. An overall target is to bring 121,750 ha of forest under improved forest management. As a wider policy approach, it is proposed to amend legislation and review and update the NFP. Also, the

<sup>172</sup> The basic documents of all GEF projects (GEF-1 to GEF-7) can be found under <https://www.thegef.org/projects>.

plan foresees the preparation of a NAMA for the forestry sector. **This GEF project potentially develops models and approaches that could be used in an upscaled way by the planned development of and increased role for trees and forests in Uzbekistan.**

**GEF-6/UNDP Regional Project 'Integrated Natural Resources Management in Drought-Prone and Salt-Affected Agricultural Production Landscapes (CACILM-2),' 2018–2021, which is based on GEF-3 / ADB: CACILM-1 'Land improvement project'**

Completed 2007–2015, it was supported by Asian Development Bank, with support component of UNDP on Aral Sea issues and in partnership with the State Committee for Nature Protection (Goskompriroda).

**GIZ/BMZ/Michael Succow Foundation under funding of the German International Climate Initiative Ecosystem-based land management and conservation of ecosystem at the lower course of the Amu Darya (Tugai forest ecosystems),' 2018–2021**

In 2011, the GoU established a biosphere reserve on the basis of Uzbekistan's legislation in the lower reaches of Amu Darya. The project tested innovative ecosystem-based approaches to overcome challenges and to implement best practice cases. It aimed to develop sustainable, climate- and site-adapted land use practices and natural resource utilization of overexploited, degraded, and salinized tugai forest lands along the Amu Darya. Local area target was the support for rehabilitation of natural tugai forest ecosystems.<sup>173</sup>

### **Box 13. Central Asian Desert Initiative [CADI] - A Multi-Year Regional Initiative**

Central Asian cold deserts deliver a broad range of ecosystem services, providing the most important pastures in the arid and semi-arid drylands of the region, fixing sand and dust, and sequestering carbon. They are also a major migration area for wild ungulates as well as migratory birds. These deserts are threatened by degradation processes initiated through overexploitation of natural resources, for example, firewood collection, inappropriate grazing practices, and large-scale infrastructure development. The vulnerability of this biome is still poorly understood, but ongoing desertification processes are already putting livelihoods of millions of people at risk.

As national governments are becoming increasingly aware of desertification processes, national strategies and legislation in Kazakhstan, Turkmenistan, and Uzbekistan are being elaborated on the conservation and sustainable use of desert ecosystems.

CADI, initiated as the quintessence of eight years' experience on scientific and implementation projects in Central Asian desert regions, is to be leveraged for future conservation and sustainable use of the unique desert ecosystems in Central Asia. The project intends to elaborate, jointly with national stakeholders, a neutral platform to engage in a constructive dialogue with all relevant actors. Using their knowledge, networks, and experience, the long-term goal is arresting and reversing land degradation trends, promoting conservation of desert ecosystems, and increasing resilience to climate change and extreme weather events in Central Asia.

<sup>173</sup> per.com, jens.wunderlich@succow.stiftung.de.



CADI national partners in Uzbekistan are the SCF and the State Committee for Nature Conservation and Land Resources, in Kazakhstan the Association for the Conservation of Biodiversity (ACBK) and the Committee for Forestry and Wildlife; in Turkmenistan the National Institute of Deserts, Flora and Fauna. The project is implemented by the FAO and the M. Succow Foundation and part of the International Climate Initiative of The German Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety (BMUB).

For more information see <https://cadi.uni-greifswald.de/en/>.

### **International Climate Initiative ‘Central Asian Desert Initiative (CADI) Conservation and sustainable use of cold winter deserts in Central Asia’ (see Box 13 above) – regional; current phase 2017–2021<sup>174</sup>**

CADI is probably one of the most relevant initiatives currently in implementation that aims to preserve the biodiversity and ecosystem services of the winter cold deserts in Central Asia with focus on Uzbekistan, Kazakhstan, and Turkmenistan.

### **GIZ/BMZ ‘Regional program on integrative and climate-sensitive use of land resources in Central Asia,’<sup>175</sup> December 2017–November 2020**

The program’s activities range from direct support for communities and intersectoral policy dialogue to the promotion of cross-border cooperation and regional partnerships. Forests, pastures, environmental economics, knowledge management, environmental education, and awareness raising are the areas of program work. In the framework of this program, in the regions of Samarkand and Kashkadarya, the SCF has allocated two areas to pilot plantations of sea buckthorn (*Hippophae rhamnoides*) to serve as demonstration plots. With this crop, local people can earn additional income by producing raw materials for pharmaceutical purposes and by selling its fruits. In the Surkhandarya region, the STC has allocated five areas as demonstration plots with pistachio trees. Local people with land lease agreement from the forest enterprise can increase the quantity and quality of their harvest of pistachios and increase their income accordingly.

### **GIZ/BMZ ‘Integrative and Climate-sensitive Land Use in Central Asia’ 2021–2024<sup>176</sup>**

As a follow-up of the former project, a new regionally implemented project covering Kazakhstan, Kyrgyz Republic, Tajikistan, Turkmenistan, and Uzbekistan was started in 2021 by GIZ. The lead executing agency for Uzbekistan is the SCF. The project’s approach includes the following:

- Improving framework conditions for implementing policies, strategies, and laws on integrative land use approaches at regional and national levels
- Piloting and subsequently scaling up these approaches at the local level
- Facilitating exchanges of information about experiences and best practices in the region between expert networks and working groups
- Leadership coaching together with technical training to improve professional skills.

<sup>174</sup> A partner in this project is the Technical University Greifswald, Germany. <http://cadi.uni-greifswald.de/en/home/>.

<sup>175</sup> [https://www.giz.de/projektdaten/projects.action?request\\_locale=de\\_DE&pn=201721109](https://www.giz.de/projektdaten/projects.action?request_locale=de_DE&pn=201721109).

<sup>176</sup> Establishing better framework conditions for climate-sensitive land use in Central Asia (giz.de).

Further information can be found under Establishing better framework conditions for climate-sensitive land use in Central Asia (giz.de)

Finally, it should be noted that under GEF-7, two projects are in the pipeline and potentially important to consider carefully in any future World Bank operation. Both have been approved in December 2019 and the Project Identification Form of the UNDP project is available. No further information is, however, available at this stage.

**Table 25. Approved GEF-7 Projects in Uzbekistan (status December 2019)**

Project Title	Type	Proposed by	Status
Sustainable Forest and Rangelands Management in the Dryland Ecosystems of Uzbekistan Focal area: land degradation	Full size US\$36 million	FAO SCF and State Committee on Land Resources, Geodesy, Cartography and State Cadaster	Concept note approved December 2019
Conservation and sustainable management of lakes, wetlands, and riparian corridors as pillars of a resilient and land degradation neutral Aral Basin landscape supporting sustainable livelihoods	Full size US\$63 million	UNDP State Committee on Ecology and Environment Protection	Concept note approved December 2019

# 7. RECOMMENDATIONS

## 7.1. Role of Trees and Forests in Uzbekistan

The climate, soils, ecology, demography, and economy of Uzbekistan mean it will never be a major forest country in production of timber and timber products. Major forest countries usually have either extensive natural forests, which produce timber slowly but at low financial cost, such as Canada, Finland, or Russia; or they have conditions that are conducive to rapidly growing plantations such as Argentina, Korea, New Zealand, and the U.S.; or Brazil and Turkey, which have both extensive low productivity natural forest and large areas of fast-growing plantations. This situation is clearly reflected in the statement from UNECE (2006): *"The primary role of the forests in Uzbekistan is to protect agricultural lands, populated areas and the soil of surrounding territories from water and wind erosion, to prevent mudflows, and to stabilize the sands of desertified areas. Forests [and trees] in Uzbekistan are a source of some low-quality timber, as well as the source of such non-wood products as nuts, fruits, medicinal plants and fodder."*

This statement is worthy of further analysis. The soil and water protection services, although vital for sustainable agriculture, are difficult to value economically and are made more complex by the long-time horizon over which benefits accrue. At the same time, because the trees delivering this role will in most cases occupy only a small proportion of the landscape, the effectiveness and the value of their role will be closely linked with the management of the pasture and arable areas forming the greater proportion of the landscape.

Within pastoral landscapes, soil structure and the water cycle are strongly affected by, often uncontrolled, grazing and its negative effects, such as surface compaction and reduced diversity of ground flora; these parameters are also affected by landscape fires. In essence, any tree-related work to improve soils and water conservation will only deliver its full range of values if it is combined with measures to limit the damaging influences of fire and grazing in the wider landscape.

Demand for firewood and charcoal varies across the country and is stronger in rural areas. Much is informally collected and often directly used, resulting in heavy underreporting in official figures. Demand is particularly strong in the dry western parts where saxaul trees and bushy vegetation are cut for fuel leading to further degradation of the environment. Nut, fruit, and fodder trees require pruning and trimming, which results in woody fuel material that can replace fuel cut from trees planted for other purposes. It also reduces need to cut other trees and bushes for firewood in places where nut, fruit, and fodder trees are grown.

While nuts, fruit, and medicinal plants can be for direct consumption and sale, both these assist in livelihood improvement and provide the starting point for business enterprises at a range of scales. Besides their potential contributions to improved livelihoods and business, fodder trees can provide a living buffer of fodder and also an alternative to pasture that enables pasture management to take place.

In addition to the forest products and services noted earlier, there is a national need for timber products such as sawn wood, boards, poles and posts, and packaging material, which are strategic materials in any economy and provide low-embedded energy products in construction. The country will have to depend on imports for the bulk of these materials but also needs to have a reserve supply as insurance against supply chain interruptions caused by geo-politics, severe price increases and, as seen recently, pandemics.

The upland forests, largely juniper species with some broadleaves including important walnut and fruit trees at lower elevations, are under threat from a warming climate and have been damaged by fires and illegal cutting. Besides their vital soil and water values, upland forests are also essential for biodiversity and underpin the important nature-based tourism sector with their wildlife and mountainous scenery. Here again, the service values from trees and forests complement and will exceed the economic value of the limited production potential.

The brief discussion above provides the basis for policies and management plans relating to trees and forests in Uzbekistan:

- Tree-based interventions as part of a wider program of landscape restoration with enhanced soil and water conservation need to be subjected to comprehensive socioeconomic cost-benefit analysis run over a long-time horizon. This will require sound knowledge of forest service values and a willingness to work with time horizons measured in decades rather than years.
- Tree plantations primarily for timber production, although limited in extent due to the particular site conditions in the country, need to be designed and managed for flexibility to adjust the timing, thinning, and felling to enable them to smooth out fluctuations in imported supplies. This will require good understanding of forest plantation dynamics and comprehensive knowledge of the demand for the different species and sizes of raw material required.
- All interventions need to be designed and refined to consider the specific interests and skills profile of those who will implement them. Activities that can be readily performed by skilled and experienced state institutions (such as *leskhoz*s) cannot simply be passed over to farmers, who have other priorities and limitations on what they can do and when and also different, and at times conflicting interests; thus co-management schemes need to be designed, tested, and implemented.
- Given the relatively long-time cycle of most forestry and tree-based interventions, the effects of climate change, which are already becoming apparent, must be included in all forward planning.
- Forest product processing chains should be designed to utilize 100 percent of all material extracted through using residues from one process as feedstock for secondary processing. Most supply chains in Europe have already achieved this. Given the shortage of wood, there should be no waste generated in the supply chain although residues left in the forest for biodiversity and fertility would count as viable uses.
- Effective control of fire and grazing will be vital for successful tree planting as well as forest management and protection from other damaging influences.
- All forestry and tree planting activities will need to be considered in the wider context of sustainable landscapes and not as stand-alone interventions.

It is important that the wider operating framework for trees and forests, which includes forest and forest-related policies, legislation, and regulations as well as financial structures and the development and sustention of human resources, is framed so that these encourage and support the long-term delivery of sound practices in all tree and forest-related activities. As detailed in Section 2.4.1, the law already provides for participation of civil society in implementing programs and activities; conducting explanatory work among the population on the rational use of forests; carrying out public control; and providing assistance, and necessary support, to state bodies in this area.

The role of trees and forests in Uzbekistan is heavily integrated into the livelihoods of much of the rural

population at various levels whereas for urban dwellers the connection is likely to be less strong and direct. This makes it vital to include representatives of these stakeholders in the evolution of policies through a range of appropriate mechanisms. As noted in Section 2.7, the unique institution mahalla, some 10,000 throughout Uzbekistan, can provide an existing system for support to communities and small businesses based on forest products and services.

## 7.2. Policy Recommendations

The most important issue to be addressed is policy coherence and synergy. While technical matters relating to trees and forests lie within the mandates of those with expertise and experience of trees and forests, their products and services underpin much wider livelihood and societal group needs. Interventions should be designed around the needs of all these beneficiaries, including society as a whole. Effective two-way engagement and interaction with other sectors will be crucial to identify opportunities and design solutions that bring the greatest benefits to all.

While forests and trees require resources to be allocated to them in return for future benefits, because the sector underpins other larger sectors, such as agriculture, tourism, and the environment more widely, these benefits extend far beyond the boundaries of the forest sector. These links and interactions must be made explicit so that they are clear to all engaged. This will require compromise and coordination if the overall results are to be optimal as well as adequate valuation of currently unpriced service values so that these are included adequately in material on which decisions are made.

The policy recommendations proposed here can be structured as follows:

- Forest Governance
- Economics and Finance
- Capacity Building
- Nature-based Solution and Forest Landscape Restoration
- Knowledge Gaps and Supportive Actions.

An indication of whether the suggested actions should be carried out continuously or periodically, or are one-off, or are a matter that should be monitored is given after each action or set of actions listed below.

### 7.2.1. Forest governance

The gap analysis undertaken in 2019 by the SCF on forest governance identified (see Chapter 2.5.1) overlapping policies, laws, and regulations; weaknesses in enforcement in forest and landscape management; availability of data; revenue management; transboundary communication and collaboration; and weaknesses in capacities for FLR.

This can be the starting point for a more detailed and comprehensive review undertaken by a national steering group that engages representatives of all affected agencies and key stakeholders with a mandate to clarify the governance structure, identify conflicts and overlaps, and propose remedies. Of particular importance will be ensuring that the hierarchy of legislation is clear on where forest-related regulations take precedence and where they are subsidiary to other legislation.

Top-level national policy and legislation must ensure that it supports the country's compliance with UN SDGs and commitments to international conventions, such as those on climate change, biodiversity, and

desertification, and is fully congruent with national priorities defined by the constitution and national development policies and plans.

A basic requirement is the development and implementation of a national strategic plan for forest development that supports the country's SDGs, its objectives to combat climate change, through implementing the country's NDC to the Paris Agreement, and its contribution to the global aim of LDN by 2030 and the Bonn Challenge. This will address the issues identified in activities in this field and will result in improved knowledge of modern forest management, including forest and landscape fire monitoring and management technologies, natural resource dynamics and management, as well as increased capacity for cost-effective and results-oriented public expenditure to restore resilient forests and forest landscapes. A national Action Plan on Combatting Desertification, Degradation and Droughts and Concept for Forestry Development up to 2030 was drafted by FAO-UNECE in 2019.

### Actions required on Governance

- Continue and broaden the gap analysis work on forestry-relevant policies and legislation to resolve conflicts and inconsistencies and optimize intra- and cross-sectoral coherence and collaboration, including with neighboring countries for transboundary issues, ensuring that there is adequate participation by representatives of all stakeholders. (Continuous)
- Establish mechanisms to ensure that there is regular review of policies and legislation as these evolve to guarantee consistency and coherence as revisions are made to respond to changed circumstances. (One-off then repeated periodically)
- Ensure that clear definitions of all technical forestry terms are agreed and included in relevant documentation to avoid doubt over the meaning, noting that new terminology, such as forest landscape restoration, continues to emerge. (One-off then updated as required)

Of particular importance to delivery of refining forest sector governance is improving cross-sectoral coordination mechanisms. The area of the SFF land is large and diverse enough to develop a wider program dealing with (a) forest landscape restoration and increasing value chains based on forestry and agroforestry concepts and (b) forest conservation and nature-based tourism development. In this context, close and effective collaboration between the SCF, other ministries and state agencies, and international development partners will be key. Examples of better collaboration include the following:

- Identifying mechanisms for interagency coordination including with external stakeholders at all levels
- Identifying investment operations, policy recommendations, finance instruments (for example, World Bank instruments such as Advisory Services and Analytics [ASAs], Development Policy Loans [DPLs], and so on), and locations for the most promising interventions
- Supporting forest-smart interventions (ongoing and proposed) that use forests as solutions to development problems in other sectors and minimize the impact of other sectors' activities on forests, outlining benefits that these activities will have
- Developing a landscape approach adapted to the particular conditions in the country, to balance competing land use demands in a way that is best for human well-being and environmental resilience.

## 7.2.2. Economics and finance

Much of the value delivered by trees and forests in Uzbekistan comes from services that are currently inadequately priced or valued and, in some cases, poorly recognized or even not at all (see Chapter 2.8). The result is that the benefits from these services and the costs of undermining them are not adequately explicit to be reflected in forward planning and decision-making. Unless this situation is remedied, it will ultimately lead to suboptimal activities and, potentially, severe economic losses.

Effective forest law enforcement requires improved clarity in legislative text and its application. Income from forest law enforcement, including managing the revenues received from forest policy functions, such as land use fees, and fees for the control of hunting and fines from illegal activities, will be important for the effective functioning of the recently created Forest Development Fund.

### Actions required on Economics and Finance

- Undertake detailed studies and analysis to make all service values explicit so that they are at least recognized if not fully valued. This can be done progressively. (One-off then periodic)
- Ensure that decision-making takes into account service values of forests and their potential contribution to the wider national good and are adequately reflected in the decision-making process. (Monitor and implement)
- Ensure that revenues from fees and other sources such as fines are clearly plowed back into the Forest Development Fund and not dispersed as general government revenue. (One-off, then monitor and implement)
- The extended time frame that trees and forests need to become established and start to deliver their full value in both production and service values is much longer than the political or normal government planning time frame. This period needs to be recognized when dealing with this aspect in forward planning and decision-making. (Continuous)

Within Uzbekistan, the diverse ways in which trees and forests contribute to the wider national economy and the livelihoods and well-being of society, particularly for those living in rural locations, need to be clearly delineated and understood. The following are examples of this:

- Clear definition of the role of forests and trees in landscapes in the wider climate change strategy (including NDC), vulnerability assessment and resilience, and improved carbon accounting
- Assessment, including economic valuation, and monitoring of ecosystem services
- Community management plans for using remaining natural forests based on applied scientific evidence
- Domestication of medicinal and aromatic NWFPs with the participation of rural communities
- Identification of nature-based tourism hotspots and corresponding needs analysis
- Targeted wildlife and hunting management for biodiversity conservation and nature-based tourism
- Investigation of opportunities from improved grazing/fodder production and haymaking as income-generating activities for forest-dependent people.

### 7.2.3. Capacity building

The PD No. PP-4960 (see Chapter 2.2.3) authorizes both the creation of a Forestry Vocational School and that 5 percent of the SCF Forestry Development Fund be assigned to scientific institutions and research to promote research on the forest sector. The decree also covers restructuring of research and education as well as updating of curricula. Thus, there is clear recognition of the need for investment in both research and education if the forestry sector is to be successful to sustain existing forests, restore degraded forests and landscapes, and expand the forest cover.

The development of a national strategy on forest development as part of an NBS approach also requires that the SCF continues the institutional reform process it has already embarked upon. In this regard, close attention should be given to clear separation of control and regulatory functions from the management function of the SFF. This includes strengthening the regulatory and monitoring capacity of the forest authority and improving management capacities of the SFF through the leskhozoes in the field of subsidized afforestation and forest restoration work and the sustainable management of forest resources, including fuelwood, NWFP, and ecosystem services, as well as nature-based tourism activities.

Leskhozoes will play a critical role in applying improved practices countrywide and strengthening their capability to perform this task is fundamental to achieving success. To do this effectively, it will be important to strengthen human resources and technical capacities through applied research, updated forest education curricula, and cross-sectoral cooperation and collaboration to improve knowledge base.

The purpose of capacity building is to invest in improving the ability of personnel to identify and resolve issues with parallel investment in filling knowledge gaps. The priority future forestry-related initiatives should be identified and proposed as topics for forestry staff and employees to improve their managerial and technical skills, particularly the following:

- Strengthening applied training for the forestry staff, with particular attention to increasing interest and experiences for more collaborative forestry implementations and for improving managerial and technical skills
- Revising and developing the training programs and materials, through the improvement of the means and facilities of the Training Center of the SCF/Forestry Department as well as collaboration with the other relevant institutions for these purposes
- Improving support for scientific research studies through consistent long-term financing and human resource capacity building, noting that effective research on trees and forests may take decades to be delivered in full
- Taking joint initiatives for strengthening capacities of the forestry education and research institutions as well as upholding a dialogue and collaboration between the forestry organizations and education-research institutions.

#### Actions required for Capacity Building

- Formulate, finance, and support increased investment in both research and education in forests and landscape management, building on existing knowledge and the identification of skills and knowledge gaps required to meet future challenges.
- Ensure that both researchers and educators are adequately represented in the work to revise and update forest policies, legislation, and national forestry plans and new initiatives such as nature-based solutions.



- Include representation from forestry-relevant sectors outside the formal forestry sector in activities covering curriculum and research program development so that both are fully relevant and appropriate for the wider cross-sectoral approaches that will be required.

#### 7.2.4. Nature-based solutions and forest landscape restoration

The main problem facing Uzbekistan regarding its landscapes is that much of the landscape is already highly degraded. Consequently, an integrated landscape approach is needed, encompassing a variety of land uses within each of which trees and forests will have different range of roles. This is new for the country as it requires cross-sectoral coordination and collaboration at all levels, top-down and bottom-up. Chapters 3.4 and 3.5 identify FLR and NBS as practices that are highly relevant to the current situation of Uzbekistan. It is almost a question of definition, but FLR is focused on restoring wider landscapes while NBS also encompasses the use of natural means to protect infrastructure and rehabilitate mining sites through biological rather than civil engineering solutions to reduce disaster risks.

FLR should be the main operational approach for forest sector contributions to combat climate change and achieve LDN and the biodiversity goals of the country through (a) restoration and multiuse management of remaining natural forests (mountain Archa, walnut/fruit forests, tugai, saxaul) and installation of multiuse forest management in other forests; (b) continuous afforestation in all major biomes based on revised planning; (c) agroforestry, shelterbelt management, and roadside plantations; (d) integrated protected area management as investments for future development; (e) fuelwood management to satisfy the needs at local levels; and (f) management of grazing land to support forest regeneration.

##### Actions required on Nature-based Solutions

Develop a national consensus on the role of forests and forestry in the framework of NBS, including the policy goals and availability of resources necessary to achieve them, flowing from high level political will to include forestry as a core sector in the country's sustainable development agenda. Such dialogue and consensus building will include the development of a common view on the major challenges and opportunities for forestry and the forest sector.

Examples of the application of NBS include the following:

- Determining the major threats and underlying drivers of the existing forested areas in all three major biomes (cold desert, valleys/riparian, and mountain forests), including (a) degradation to existing forests due to gradual climate change effects and (b) pressure from agricultural use of water, grazing in forest areas, and excessive fuelwood harvesting
- Defining the role of the forest sector in general and the SFF particularly in the broader development goals of the country (SDGs, NDC, UN Decade of Ecosystem Restoration, Bonn Challenge)
- Increasing forests' contribution to the protection and restoration of fragile ecosystems, notably in the upstream area of watercourses toward the Aral Sea and in the dry seabed and area surrounding the Aral Sea
- Reflecting on a payment for ecosystem services (PES) scheme for forests to protect agricultural land and contribute to disaster risk reduction
- Developing the role of forests and trees in a combined adaptation/mitigation approach to climate change
- Planning a targeted and inclusive approach for fast-growing energy/fuelwood plantations and service wood, as appropriate

- Improving livelihoods of forest-dependent people through forest and tree-based activities, in the key areas of FLR, NWFP value chains with a focus on fruits, nuts, and honey; better organized pasture and fodder management and improved livestock value chains; and expansion of inclusive nature-based tourism.

(All one-off and sustained)

### Actions required on Forest Landscape Restoration

These will be implementation of approaches that are distinct in the three main biomes (desert, valleys, and mountains), including transboundary cooperation and coordination. In nearly all biomes the fact that significant shares of forest and low woodlands suffer from overgrazing is of great importance, particularly so in mountainous areas, where trees need many years to regenerate. At the same time, most of the leskhozoes generate a significant share of their revenues from grazing leases despite the long-term impacts of grazing on landscape degradation.

Resolution of the potentially negative influence of leskhozoes being dependent on grazing fees to meet their revenue target must be a priority, and thereafter they can engage in FLR processes. Such engagement includes the following:

- Saxaul afforestation in the dry western and central part of the country, with emphasis on the Aral Seabed, including collaborative approaches with local communities
- Restoration of existing natural forests through assisted natural regeneration, silvicultural measures, and enrichment planting, with emphasis in the mountainous western part of the country
- Afforestation and greening as defined in regional forest development plans in the various biomes
- Establishment of agri-silvo-pastoral systems on degraded pasture lands in central and eastern biomes
- Management of pastures and physical separation of tree regeneration from livestock (for example, fencing)
- Agroforestry in the walnut-fruit forest belt and in agricultural zones (including shelterbelts and road site plantations)
- Restoration of riparian forest areas (tugai) with native poplar, willow, and other species
- Support close to urban forests and urban forestry in the framework of the 'Green Space Project' to plant 200 million trees, promoted by the Presidential declaration in November 2021
- Industrial plantations with fast-growing tree species, for example, Paulownia, on irrigated lands, considering, however, that this type of plantation competes with land needed for food production.

(All one-off and sustained)

## 7.2.5. Knowledge gaps and supporting actions

As the current report shows, there are serious data and knowledge gaps about the state of the forest and landscapes in Uzbekistan. If policies, legislation, and forward planning are to be effective and responsive to the needs identified in this analysis, then there is urgent need for both an NFI and an up-to-date information and communication platform to provide accurate and objective information and data for forward planning. Thus, there is urgent need for the SCF to have a much improved, up-to-date, and responsive information system if it is to deliver its mandate for effective management control of

and reporting internally and internationally on forests in Uzbekistan. The two core structures for this are an NFI and a modern ICT platform.

The NFI should be preceded by field and remote sensing surveys with the aim of having high precision and unbiased data, to then be compiled into the NFI. A fully developed NFI will address present weaknesses in forest data (inconsistency and unreliability), non-availability of data on forestry-related issues in agricultural and reserve land, outdated methodologies, technologies, and equipment needed to implement a nationwide assessment, and the lack of reliable data for international reporting on forest and tree resources.

Activities can be built on the prior and ongoing work done by the FAO in the framework of the GEF/LDCF/SCCF Project ID 9190. 2018 – 2023 (see Chapter 6.2).

A modern information and communication platform for forest planning and development (ICT platform), built on and complementing the results from the NFI can address the lack of updated and consistent data on the current state of the forests, including integrity of forests and the threats it faces, in particular forest and landscape fire, erosion control, and loss of biodiversity.

The ICT and NFI together will underpin forest management planning and identify afforestation and forest restoration potential. Together these two resources will provide those responsible for the management, protection, and expansion of trees and forests with accurate information to identify needs, priority intervention areas, and approaches as well as up-to-date information on the progress with these.

### Actions required for Knowledge Gaps and Supporting Actions

- Implement an effective NFI to inform dialogue and decision-making for and around the forest sector so that all decisions are based on the most up-to-date information possible.
- Create and manage a modern information and communication platform for forest planning and development (ICT platform) to address the lack of updated and consistent data on the current state of the forests.
- Support use of the comprehensive information and communication platform for forest planning and development so that personnel at all levels and those outside the forest sector whose decisions will affect the sector can work with the most accurate and up-to-date information possible.

(All one-off and then updated as required)

## 7.3. Final Remarks

The current Note is a first summary and assessment of the State of Uzbekistan's forest sector. To make the assessment more useful, future work will require some gaps to be addressed, particularly with respect to forest and land use-based policy. Some of the missing information may exist but only in the Uzbek language; other knowledge gaps would need further search and elucidation followed by additional research work. The immediate gaps as identified in this study pertain, among others, to

- Availability in English of major policy documents, forest law, and legislative texts, including the four-year forest development programs (2017–2021, 2022–2025, and beyond);
- Precise stakeholder mapping, particularly regarding civil society and private sector involvement;

- Role and responsibilities of SCEEP and SCF in protected area management;
- Control functions of state inspectorates over management of forests by SCF;
- Level of interaction among important ministries about land use;
- Role of research institutes in contributing to policy decision-making;
- Clarification of long-term leasing of SFF land with respect to forest and tree-based investments;
- Assessment of the total fuelwood needs of rural and urban households and estimation of the volume of sanitary felling used for fuelwood;
- Potential for private sector involvement in fast-growing tree plantations;
- Assessment of major NWFP value chains and potential for domestication and commercialization of underutilized species and products;
- Potential for valuation of forest ecosystem services, including forest carbon (for example, through the FAO EX-ACT tool); and
- Roadmap for nature-based tourism (including assessment of opportunities and existing initiatives in different regions).

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United Nations Common Country Analysis Uzbekistan\_en.pdf

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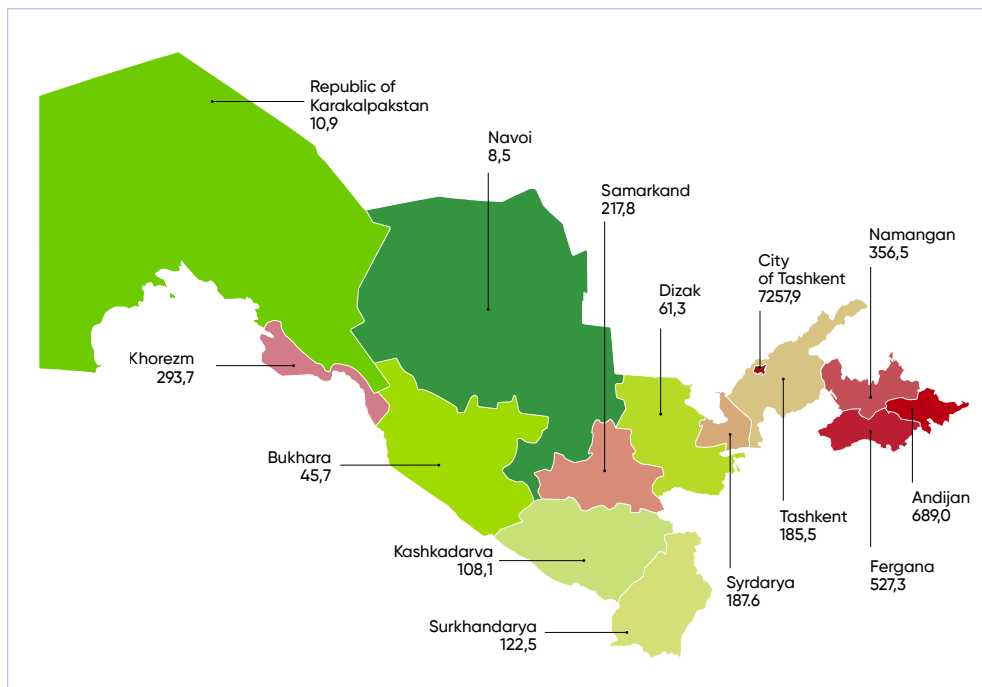
[https://link.springer.com/chapter/10.1007/978-3-319-19168-3\\_10](https://link.springer.com/chapter/10.1007/978-3-319-19168-3_10) - Economics of Land Degradation Central Asia



# ANNEX 1

## Thematic Maps of Uzbekistan

**Figure 21.**  
Population Density  
by Regions of  
the Republic of  
Uzbekistan (as  
of January 1,  
2017, persons per  
square km)



**SOURCE:** <https://stat.uz/en/435-analicheskie-materialy-en1/2075-demographic-situation-in-the-republic-of-uzbekistan>.

**Figure 22.**  
Landscapes of  
Uzbekistan



**SOURCE:**  
Kuchkarov, B. T. ed.  
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of Uzbekistan on the  
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# ANNEX 2

## List of International Initiatives Engaged in the Forest Sector in Uzbekistan

Table 26. List of International Projects in Forestry, Provided by SCF [June 2020, updated July 2021]

Nº	Project Name	Donor agency	Start Date	End Date	Status	Grant amount, US\$
1	Republic of Uzbekistan Forest Monitoring and Evaluation	FAO	20.01.2016	31.12.2017	Closed	0.4
2	Sustainable Forest Management in Mountain and Valley Areas in Uzbekistan	FAO/GEF	12.09.2016	28.02.2023	In progress	3.2
3	Central Asian Desert Initiative (CADI) Project	FAO and partners	01.08.2017	31.12.2020	In progress	1.5
4	Development of Joint Forest Management Models to Establish Buckthorn Plantations on State Forest Stock Lands in Uzbekistan (Sea Buckthorn Project)	German Federal Ministry of Economic Cooperation and Development through GIZ	04.04.2019	30.11.2020	In progress	0.24
5	Ecological Land Use and Lower Amur Darya Ecosystem Conservation	German Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety (BMUB)	01.01.2018	30.06.2020	In progress	2.4
6	Amu Darya Delta Coastal Tugai Restoration and Technical Support of the Aral Area Leskhozes	Turkish Cooperation and Coordination Agency (TIKA)	03.02.2017	03.02.2021	In progress	2.0
7	Capacity Building at Leskhoz Level	Korea International Cooperation Agency (KOICA)	2019	2021	In progress	0.1
8	Sustainable Forestry in Uzbekistan's Drylands	FAO and partners	2020	2025	In planning	4.3
9	Restoration of Degraded Forests and other Lands	FAO and partners	2020	2022	In planning	0.5

Nº	Project Name	Donor agency	Start Date	End Date	Status	Grant amount, US\$
10	Aral Sea Saxaul Plantation Support	Turkish Cooperation and Coordination Agency (TIKA)	2021	2024	In planning	0.5
11	Nurseries to prevent Drought in the Aral Sea Area	Turkish Cooperation and Coordination Agency (TIKA)	2021	2024	In planning	0.5
12	Planting of Protective Forest Strips on Aral Seabed (80 000 ha)	JICA, Japan	2021	2025	In planning	6.0
13	Sukak Sustainable Forest Management through Forest-Based Recreation	U.S. Forest Service	2020	2024	In progress	0.5
14	Economics of Saxaul to Improve Ecological Situation	World Bank	2020	2021	In progress	0.1
15	Investing in Forest Landscape Restoration in Uzbekistan	World Bank	2021	2025	In planning	10.0
16	Regional Approaches for Combatting Sand and Dust Storms and Drought	Central Asia Regional Environmental Center (CAREC)	2020	2021	In progress	0.1
17	Sustainable Land Use in Leskhozoes through Innovative Forestry Approaches	German Federal Ministry of Economic Cooperation and Development through GIZ	2021	2023	In planning	1.0
18	Community-Based Forest Landscape Restoration	Green Climate Fund (?) and FAO	2021	2030	In planning	40.0
19	Establishment of Desert Plant Seed Bank in the Aral Sea Region	IFAS-Aral Sea Trust Fund	2020	2022	In planning	2.7
20	Aerial-Based Seeding of Dry Aral Seabed (100 000 ha)	IFAS-Aral Sea Trust Fund	2020	2021	In planning	3.2
21	Commercial Poplar Development in Forest Enterprises in the Republic of Karakalpakstan	IFAS-Aral Sea Trust Fund	2020	2022	In planning	1.1
22	List to be completed in 2021, information from the SCF is lacking					
TOTAL						81.4

**Table 27. List 2 Amended from a List Prepared by APFNet -The Asia-Pacific Network for Sustainable Forest Management and Rehabilitation - 2018**

International Agency	Description
APFNet	Promoting the SFM and rehabilitation. Forest policy dialogues, capacity building, and information sharing. Since 2014
FAO	FAO Regional Project "Capacity Building for Sustainable Management of Mountain Watersheds in Central Asia and the Caucasus" "Integrated Forest Land and Tree Resources Assessment"
FAO/GEF	"Sustainable Forest Management in Mountain and Valley areas in Uzbekistan". GEF-FAO Project "Sustainable Forest Management in Mountain and Valley areas in Uzbekistan". Introduction of the SFM, sequestering carbon and improving the quality of forests
FAO/GEF Small Grants	Introducing principles of the SFM, participatory forestry and local measures to achieve global environmental benefits. UNECE-FAO Project "Accountability Systems for Sustainable Forest Management in the Caucasus and Central Asia"
FAO/M. Succov Foun.	"Central Asian Desert Initiative". protection of the ecosystem, improvement of nature conservation, and feeding lessons learned into national, regional and international dialogue.
	Development of models of joint forest management for establishing buckthorn plantations at the state forest stock lands in Uzbekistan
GiZ	Regional project: Forest and Biodiversity Governance Including Environmental Monitoring" (FLERMONECA), with German Forestry Agency Hessen-Forest, Austrian Environment Agency and Regional Environmental Center for Central Asia (CAREC). Supporting application of legal and sustainable approaches to forestry management
Islamic Dev. Bank	In collaboration with Saudi Development Fund and Kuwait Fund for Arabic Economic Development: Establishing protective forest belts at the exposed bed of the Aral Sea
KOICA	Greenery of the Territory Attached to Navoi Free Industrial Economic Zone for prevention of desertification
Michael Succov F.	"Ecosystem-based land and forest management of the tugai habitats of Amu Darya River for improved livelihood of local communities and as adaptation strategy to climate change"
TIKA (Turkish International Cooperation Agency)	Two projects on reforestation and afforestation are planned (a) natural reproduction of tugai forests of coastal areas of Amu Darya river delta and (b) forest nursery facilities for breeding desert species growing in the Aral Sea region to be located in Bukhara, Navoi, and Khorezm provinces of Karakalpakstan.

International Agency	Description
<p><b>UNDP/GEF</b></p>	<p>“Reducing Pressures on Natural Resources from Competing Land Use in Non-Irrigated Arid Mountain, Semi-Desert and Desert Landscapes of Uzbekistan.” Integrated management of rangeland and forests at a landscape level (focusing on non-irrigated, arid mountain, semi-desert, and desert landscapes). Improve the socioeconomic stability of communities.</p> <p>“Sustainable Natural Resource and Forest Management in Key Mountainous Areas Important for Globally Significant Biodiversity.” Demonstration of viability of landscape approach to conservation of internationally important biodiversity, land and forest resources in Uzbekistan’s mountain ecosystems.</p>

# ANNEX 3

## Voluntary National Contribution the Republic of Uzbekistan toward Achieving the Global Forest Goals and Targets of the United Nations Strategic Plan for Forests [2017-2030]

**Goal 1:** Reverse the loss of forest cover worldwide through sustainable forest management, including protection, restoration, afforestation and reforestation, and increase efforts to prevent forest degradation and contribute to the global effort of addressing climate change

Uzbekistan had planned to create forest plantations of about 1.3 million ha by 2021. Currently, more than 0.58 million ha already been created. Usually, we implement measures to halt deforestation and restore 42,000 ha of degraded forests annually. But, with special resolution of the President of Uzbekistan, in 2019 forest plantation increased to 0.5 million ha and is targeted to increase to 0.7 million ha in 2020. Combating sand and dust storms on the dried bottom of the Aral Sea region created about 462 000 of ha forest plantations. Uzbekistan committed to the Bonn Challenge of restoring 0.5 million ha and has already achieved it.

**Global Forest Goal 2:** Enhance forest-based economic, social, and environmental benefits, including by improving the livelihood of forest-dependent people

The contribution of forests and trees to food security is significantly increased. Uzbekistan produces 5,500 tons of medical herbs annually, which is being implemented under its National Development Program. In the past two years, more than 500,000 ha of soil and water erosion areas have been restored. During the two years, 20,000 ha of nut tree plantations were created.

**Global Forest Goal 3:** Increase significantly the area of protected forests worldwide and other areas of sustainably managed forests, as well as the proportion of forest products from sustainably managed forests

From 2018, recreational zones were created to increase the area of protected forests and to develop nature-based tourism in forest areas. In 2019, six recreational zones were created. At present we are going to develop a management plan for recreational zones. In 2018, the national park in Samarkand region was established. The government has adopted programs to establish new national parks and two reserves in forest areas. The proportion of forest products from sustainably managed forests has increased. Uzbekistan is developing the green ecological industry, especially establishing plantations of trees of valuable species, fruit trees, and herbal medicines.

**Global forest goal 4:** Mobilize significantly increased, new, and additional financial resources from all sources for the implementation of sustainable forest management and strengthen scientific and technical cooperation and partnerships

Uzbekistan is establishing and perfecting the financial supporting system for forest management. The government is planning to subsidize forest management with local finance. To support forest activities,

the Forest Development Fund was established. Public-private partnership mechanisms are actively developing in the forestry sphere. Uzbekistan actively cooperates with Eberswalde University (Germany), OYO Corporation (Japan), Turkey, and the World Bank and with the forestry organization of Turkey, USA, and GIZ, KOICA, FAO, and APFNet on improvement of capacity building. In 2017, the Forest Research Institute was established.

**Global forest goal 5.** Promote governance frameworks to implement sustainable forest management, including through the United Nations forest instrument, and enhance the contribution of forests to the 2030 Agenda for Sustainable Development

In 2017, the SCF of the Republic of Uzbekistan was established on the basis of the General Directorate of Forestry under the MAWR of the Republic of Uzbekistan. In 2018, a new edition of the Forest Law was adopted.

**Global forest goal 6:** Enhance cooperation, coordination, coherence, and synergies on forest-related issues at all levels, including within the United Nations system and across member organizations of the Collaborative Partnership on Forests, as well as across sectors and relevant stakeholders.

Enhance cross-sectoral coordination and cooperation to promote sustainable forest management and halt deforestation and forest degradation, establishing synergies with state and international organizations.

**SOURCE:** <https://www.un.org/esa/forests/wp-content/uploads/2019/12/VNC-Uzbekistan-Dec2019.pdf>.



# ANNEX 4

## Overview of Recent Presidential Decrees

PP-4424	PP-4850	PP-4960
August 2019	October 2020	January 2021
<b>Title</b>		
Development of forestry system until 2030	Development of the forest sector until 2030	Measures to develop science in the forest sector
<b>Goals</b>		
<ul style="list-style-type: none"> <li>▪ Increase efficiency and effectiveness of forest use</li> </ul>	<ul style="list-style-type: none"> <li>▪ Increase efficiency and effectiveness of forest use</li> </ul>	<ul style="list-style-type: none"> <li>▪ Promote scientific research work in the forest sector</li> </ul>
<b>Actions</b>		
<ul style="list-style-type: none"> <li>▪ Establish leasing system for non-forest lands of the SFF</li> </ul>	<ul style="list-style-type: none"> <li>▪ New forms of support for users of SFF lands</li> </ul>	<ul style="list-style-type: none"> <li>▪ Restructure scientific institutions related to the forest sector</li> </ul>
<b>What is new?</b>		
Zero rent for forest land leases in 2020–2022: <ul style="list-style-type: none"> <li>▪ 5 years for orchards/plantations</li> <li>▪ 10 years for plantations in deserts</li> <li>▪ 3 years for medicinal plants</li> <li>▪ 1 year for agricultural food crops</li> </ul>		Department for Coordination of Activities of Scientific Organization and Introduction of Innovations (four staff)
Support of labor wages and infrastructure (irrigation) for agricultural crops and orchards		Scientific Experimental Pistachio Farming Station under the Scientific Research Institute
Provision of soil and water information by the SCGM		Forest Economy Department
Support for forestry research and cooperation, laboratories	<ul style="list-style-type: none"> <li>▪ Staff training at the Department of Forest Management and Landscape</li> <li>▪ Design at the TSAU, sector-specific transition of curricula</li> </ul>	Center for Analysis and Seed Farming for Forest and Medicinal Plants transferred to the Scientific Research Institute of Forestry
Nature-based tourism (cooperation with the SC for Tourism Development, assessment of forest lands potential, preparation of tourist materials)		Design Institute to improve quality and effectiveness of design and survey work in forestry (O'rmonloyikha)
Attracting carbon credits to finance forest plantations (together with SCEEP and Ministry of Investments)		5% of the Forestry Development Fund assigned to science

PP-4424	PP-4850	PP-4960
August 2019	October 2020	January 2021
<b>To be done</b>		
Concept development (2030): <ul style="list-style-type: none"> <li>▪ 14 million ha forest area (SFF)</li> <li>▪ 6 million ha forested land</li> <li>▪ 840 tons/year seed production</li> <li>▪ 300,000 bee colonies</li> <li>▪ 32,000 tons/year agriculture production</li> <li>▪ 11 million tons/year medicinal plants</li> </ul>	<ul style="list-style-type: none"> <li>▪ Medicinal plants: 11,600 tons/year</li> </ul>	Introduce changes to certain resolutions as provided in the annex
Roadmap in 2020–2022 <ul style="list-style-type: none"> <li>▪ Prepared every 2 years until 2030</li> </ul>		
Submit proposal to approve honorary title 'Honored forester of Uzbekistan'		
<b>Annex</b>		
	Concept for the development of the forest sector in Uzbekistan*	Changes to be introduced
	All figures by region (additional document)	Organizing structure of SCF
		List of organizations and agencies within SCF
		Structure of the central office SCF

### Results observed from renting out unforested lands of the SFF

On January 1, 2020, the system for renting out unforested lands of the SFF was introduced, until October 2021 the following achievements are noted:

- 29,000 ha rented out
- 1,561 individuals and legal entities
- For period of up to 49 years, if investments greater than UZS 275 billions and US\$7 millions, 4,300 jobs created.

### Other resolutions

- PP-6061 (September 2020) "On measures to radically improve the system for the land management and state cadasters"
- Ensure by the end of 2021 complete state registration in the national GIS
- SC together with council of ministers and municipalities and Cadaster Agency ensure the registration of rights of forestry for permanent use of forest estate lands.

### Current state of the forest sector

- SFF: **11,975,200** ha (26 percent of the country's territory) as the official figure. A different figure is indicated in other reports of the SCF in the recent past.
- SFF: 3,235,700 ha are forested areas (reporting to FAO-FRA, however, is different: 3,688,000 ha).
- 66 state forest enterprises (leskhozes), 3 NNPs, 9 specialized state forest units, 5 state hunting units, 4 scientific and experimental stations, and 3 other scientific organizations.
- 2020: 433 tons of seeds produced, 70 million saplings produced, 2,020 ha shelterbelt forests around agricultural lands created.
- 28,832 heads of livestock, 102,000 birds, 22,655 bee families.
- 5,100 tons of medicinal and food plants harvested; forestry income at UZS 200 billion.

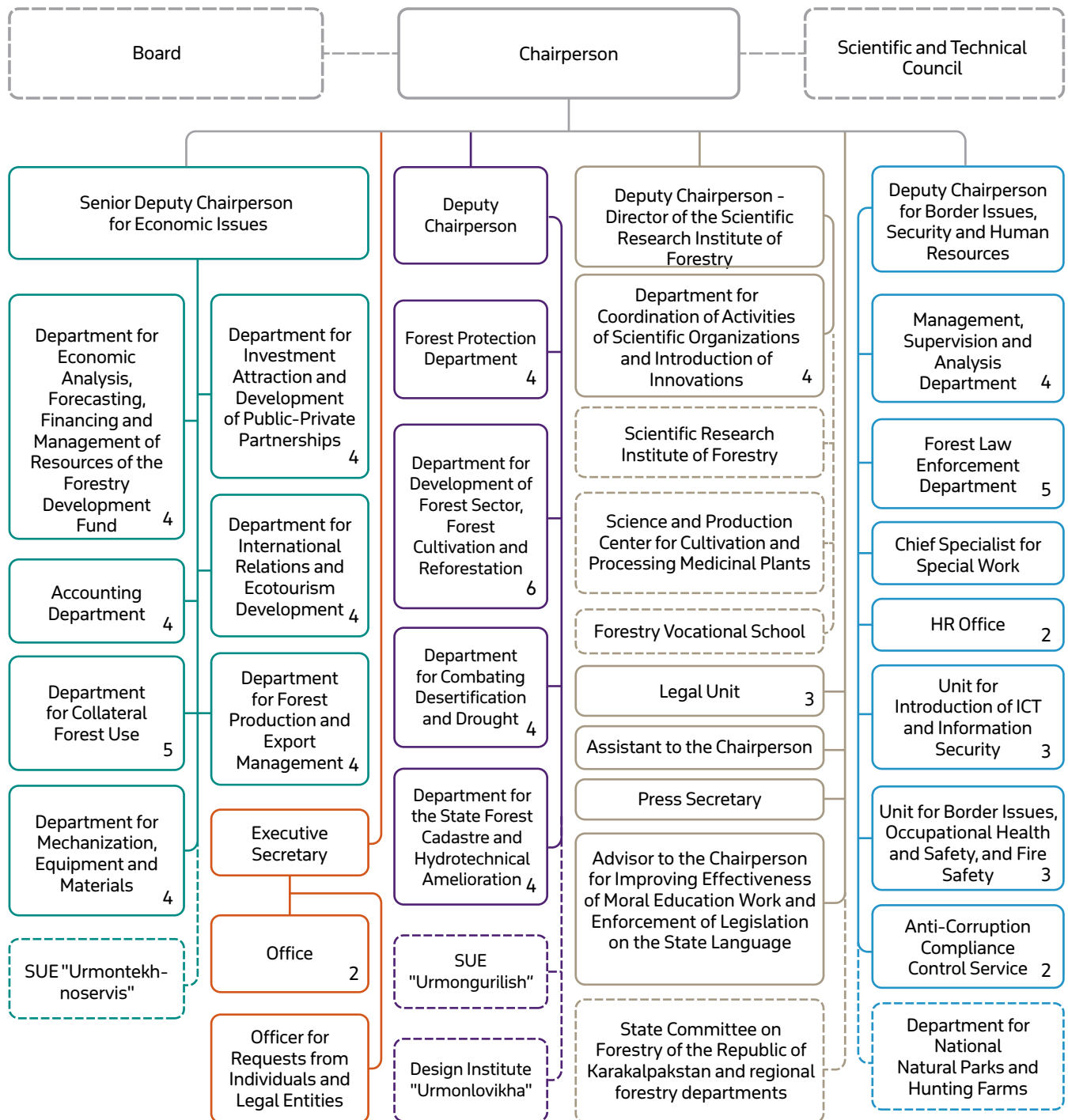
### Problems in the forest sector

- No public control over forests and no electronic system for record-keeping and monitoring
- No NFI and need for legal basis of NFI
- No science-based inventory of natural reserves of medicinal and food plants
- Lack of timber to meet population's demand
- Inefficiently organized systems of hunting, nature-based tourism, and processing of consumer goods
- Lack of infrastructure for foresters in the forests, lack of modern laboratories, lack of training for qualified staff.



# ANNEX 5

## Organigram of SCF Central Office [PD-4960, 2021]





# ANNEX 6

## Functional Organization of the SCF [PD-4960, January 2021]

