

***PART III: INTEGRATION OF ENVIRONMENT INTO  
SELECTED SECTORS AND ISSUES***



## Chapter 12

# ENERGY AND THE ENVIRONMENT

### 12.1 Overview of the energy sector

#### Coal

Uzbekcoal, the major coal company, quotes Uzbekistan's explored reserves as 1.8 billion tons of brown coal and 47 million tons of black coal. Coal resources are estimated at over 5 billion tons, of which 3 billion tons are classified as reserves. Reserves at Angren alone are estimated at over 2 billion tons, of which most is classified as lignite. Coal mining is carried out at three deposits: the open-pit Angren mine (brown/lignite coal) and underground mines Baisun and Shargun (both hard coal).

There are fluctuations in total coal production, with a peak in 2014, a decline in 2015 and some increase since then (table 12.1). Brown coal production has increased in recent years to around 4 million t/y, reflecting a modernization programme at Angren mine and power plant.

#### Oil

According to the State Committee on Geology and Mineral Resources, the country has about 177 million tons of oil reserves as at 1 January 2019, including crude oil and gas condensate, which are located in 188 oil and gas fields. Currently, crude oil is produced at 55 fields and condensate at 22 fields. Over 60 per cent of them, which accounts for about 70 per cent of oil production, are situated in the Bukhara-Kiva region. Some 20 per cent of oil fields are developed in the Fergana region. There are also oil deposits in the

south-west part of the country at Kokdumalak, Northern Urtaulak, Kruk and Umid. Currently, there are oil explorations on the Ustyurt Plateau and in the Aral Sea.

In 2018, total annual petroleum and other liquids production was 2,891 million tons.

The decline of oil output, which started in 2004, continued during the period 2013–2018 (table 12.2). The decrease in production was caused by the depletion of oilfields. In 2017–2018, gas condensate production increased in comparison with 2015–2016. The prospects of oil and gas content are related to the Ustyurt Plateau and the Aral Sea. Although the volume of oil produced in the country does not cover its demands, conversion of transport to gas (liquefied natural gas (LNG)) reduces the need for liquid fuels.

Also, the decrease in oil production had a positive effect. The Government was motivated to largely abolish an inward-focused energy policy that stimulated self-sufficiency and subsidized domestic prices. Current objectives are to attract foreign investment to increase oil production and explore new reserves. The state oil and gas company Uzbekneftegaz pursues production-sharing agreements and joint ventures with foreign companies.

#### Natural gas

According to the State Committee on Geology and Mineral Resources, the country has about 2.2 trillion m<sup>3</sup> of proven natural gas reserves as at 1 January 2019.

**Table 12.1: Coal production, 2013–2018, 1,000 tons**

	2013	2014	2015	2016	2017	2018
Hard coal	20	107	127	160	124	..
Brown coal	4 070	4 290	3 361	3 707	3 915	..
<b>Total</b>	<b>4 090</b>	<b>4 397</b>	<b>3 488</b>	<b>3 867</b>	<b>4 039</b>	<b>4 174</b>

Source: State Committee on Statistics, 2019.

**Table 12.2: Crude oil production, 2013–2018, 1,000 toe**

	2013	2014	2015	2016	2017	2018
Crude oil	1 280	1 031	1 000	868	814	746
Gas condensate	1 887	1 836	1 728	1 748	1 953	2 145

Source: State Committee on Statistics, 2019.

Uzbekistan is the third largest natural gas producer in Eurasia, after the Russian Federation and Turkmenistan, and ranks among the top 20 gas producers globally. There are 240 natural gas fields in the country. The country produces close to 60 billion m<sup>3</sup> (bcm) of natural gas annually and consumes roughly 54 bcm of natural gas. Thus, around 10 per cent is currently exported due to market constraints and high domestic consumption.

The development of national natural gas reserves faces several challenges, such as deep deposition and high sulfur content in some gas fields, and conversion of natural gas from the fields to marketable gas. There are several processing facilities, such as Mubarek Gas Processing Factory, Kandym Gas Processing Factory, Shurtan Gas Processing and Chemicals Complex and Ustyurt Gas Processing and Chemicals Complex, to remove impurities such as sulfur and separate heavy components. The output of these facilities is pure hydrocarbons, such as:

- Methane (CH<sub>4</sub>), which is exported by transnational pipelines as well as being used by the local population;
- Ethane (C<sub>2</sub>H<sub>6</sub>) and heavier components, which are used as a feed stock for refineries; for supply to the population; in production of LNG, which is used as a transport fuel; and in production of some chemicals, such as ethylene as feedstock for low-density polyethylene.

These facilities also produce granulated sulfur.

In 2017, Uzbekistan produced around 52 billion toe of natural gas (table 12.3). Natural gas output does not fluctuate strongly, but is showing some tendency to increase.

Uzbekistan is an exporter of natural gas: around 50 per cent of exported gas flows to the People's Republic of China and the remainder to the Russian Federation, Kazakhstan, Tajikistan and Kyrgyzstan.

### *Hydropower*

The technically feasible hydropower potential of Uzbekistan exceeds 35 billion kWh/y, and the potential economically viable for development is

estimated at around 27 billion kWh/y. As at January 2019, the state-owned company Uzbekhydroenergo operated 37 HPPs with installed capacity of 1,914 MW.

### *Uranium*

According to the IAEA, Uzbekistan ranks seventh globally in terms of uranium reserves (4 per cent of world reserves) and fifth in terms of its production. About 40 deposits have been explored, of which 27 are the main source of production. According to the State Committee on Geology and Mineral Resources, the explored and estimated reserves of uranium amount to 185,800 tons, of which 138,800 tons are of infiltration type.

As at early 2019, Uzbekistan does not yet have a nuclear industry and nationally produced low-enriched uranium is exported.

### *Transmission of fossil fuels*

Uzbekistan's sole domestic crude oil pipeline links the Fergana and Alty-Aryk refineries. The only international crude oil pipeline runs through Uzbekistan, linking the Shymkent refinery in Kazakhstan to the Chardzhou refinery in Turkmenistan.

The natural gas pipeline system in Uzbekistan includes 122,000 km of high-pressure pipeline and 14,000 km of medium- and low-pressure pipelines. Uzbekistan plays a role as a transit country for natural gas supply from Turkmenistan.

With the development in the 1960s of a unique Gazli gas field, the main gas pipelines Bukhara–Urals and Central Asia–Centre were commissioned. The Bukhara–Urals pipeline runs from Turkmenistan through the Bukhara gas region in Uzbekistan, via Kazakhstan to the Russian Federation. The capacity of this pipeline is 55 bcm/y; however, it does not operate at full capacity. Sections of this pipeline have been rehabilitated in the past few years.

The Central Asia–Centre is a system of natural gas pipelines that runs from Turkmenistan via Uzbekistan and Kazakhstan to the Russian Federation.

**Table 12.3: Natural gas production, 2010–2017, 1,000 toe**

	2010	2011	2012	2013	2014	2015	2016	2017
<b>Production</b>	48 944	51 329	51 224	48 553	50 271	50 642	51 503	51 962

Source: ESCAP Asia-Pacific Energy Portal, <https://asiapacificenergy.org/>.

The Central Asia–China pipeline, which was commissioned in the 2010s, starts in Saman-Depe to supply natural gas from the Bagtyyarylyk gas fields on the right bank of the Amu Darya River in Turkmenistan. This pipeline enters Uzbekistan in Olot and runs across Uzbekistan to the southern part of Kazakhstan, parallel to the long-standing Bukhara–Tashkent–Bishkek–Almaty pipeline. Then the exported gas flows from Kazakhstan to China through the Horgos cross-border point. The pipeline has three parallel lines of 1,833 km and a total capacity of 55 bcm/y. In 2013, China signed agreements with Uzbekistan and other Central Asian countries to construct a fourth line of the Central Asia–China pipeline. However, the project has been delayed, and the pipeline is not expected to begin operations until around 2020. The system is expected to have a total capacity of 85 bcm on the completion of Line D.

For the last few years, Uzbekistan has been developing its gas transportation system to heighten the country's level of gasification and to create a unified national network of gas transportation. It has been a part of the Government's plan to increase the energy security and environmental friendliness of the economy. Thus, two new natural gas pipelines, Gazli–Kagan and Gazli–Nukus, were built to connect the Ustyurt Plateau and Bukhara-Khiva region with the existing pipeline system.

The Bukhara–Tashkent–Bishkek–Almaty natural gas pipeline, with a capacity of 3.2 bcm/y, is the main Uzbek owned and operated pipeline. It supplies natural gas for Kyrgyzstan and southern Kazakhstan.

The Mubarek–Shurabad–Dushanbe natural gas pipeline connects Uzbekistan and Tajikistan.

#### *Electricity and heat production*

At the present stage of economic development, the main goals of the electric power industry are to meet the growing needs of consumers in electricity, modernize and reconstruct existing power plants and grids and build new generating capacities based on

efficient power production technologies. The development of the power sector up to 2021 envisages implementation of 62 investment projects, which aim at:

- Further upgrading power generation technologies, increasing the efficiency of natural gas usage and reducing the energy intensity of the industry;
- Accelerated development of the hydropower resources;
- Further diversification of the fuel and energy balance using RES (wind and solar);
- Development of the optimal configuration of backbone power grids to increase the sustainability of the electricity system, meeting the growing electricity needs of industries and the population and for export;
- Improving the sustainability of the unified power system and the reliability of electricity supply to consumers, and strengthening the country's energy security.

The main power fleet of Uzbekistan belongs to JSC Uzbekenergo<sup>25</sup> and consists of TPPs and CHPPs (table 12.4). There is also some 300 MW installed capacity, which belongs to industrial enterprises. Total installed capacity in the country, including HPPs, is around 14,000 MW. Thirty-seven HPPs with installed capacity of 1,914 MW generate around 6 billion kWh/y. However, all HPPs were erected as component elements of irrigation systems. Power production is their secondary purpose and correlates with the release of water for irrigation. There are several cascades of HPPs: at Urta-Chirchik, Chirchik, Nizhne-Bozsuisk, Kadyrinsk, Tashkent and Farhad.

#### Modernization and new capacities

Electricity transmission assets have not been properly maintained and upgraded, affecting the delivery of reliable power supply to domestic customers, especially in the southern regions. There is a high level of electricity losses. According to Uzbekenergo, transmission system losses are 18 per cent and distribution losses are 14 per cent.

<sup>25</sup> Following the reorganization of JSC Uzbekenergo, TPPs and CHPPs will be under the JSC Thermal Power Plants.

**Table 12.4: Main thermal power plants and combined heat and power plants, 2010–2017, MW**

	2010	2011	2012	2013	2014	2015	2016	2017
Syrdarinskaya TPP	3 000	3 000	3 000	3 000	3 000	3 015	3 065	3 065
Novo-Angrenskaya TPP	2 100	2 100	2 100	2 100	2 100	2 100	2 100	2 100
Tashkentskaya TPP	1 860	1 860	1 860	1 860	1 860	1 860	1 860	1 860
Navoiskaya TPP	1 250	1 250	1 250	1 728	1 618	1 618	1 618	1 618
Talimarjanskaya TPP	800	800	800	800	800	800	800	1 700
Tahiatashskaya TPP	730	730	730	730	730	730	730	730
Angrenskaya TPP	484	484	484	484	484	484	484	393
Ferganskaya CHPP	305	305	305	305	305	305	305	305
Muborekskaya CHPP	60	60	60	60	60	60	60	60
Tashkentskaya CHPP	30	30	30	30	30	57	57	57
<b>Total</b>	<b>10 619</b>	<b>10 619</b>	<b>10 619</b>	<b>11 097</b>	<b>10 987</b>	<b>11 029</b>	<b>11 079</b>	<b>11 888</b>

Source: Ministry of Energy, 2019.

**Photo 12: Tashkentskaya CHPP**

Photo credit: Mr. Vadim Ni

From 2012, JSC Uzbekenergo increased installed power capacity. This was done by modernization of existing facilities as well as installation of new ones:

- At Navoiskaya TPP, a new combined cycle unit with 478 MW capacity was installed in 2012;
- At Tashkentskaya CHPP, a new gas turbine unit with 27 MW capacity was installed in 2013;
- At Syrdarinskaya TPP, modernization of existing units 1 and 2 (+50 MBТ) was undertaken in 2015;
- At Angrenskaya TPP, a new fluidized bed combustion unit with 130–150 MW capacity for coal with high ash content was installed in 2016;
- At Talimarjanskaya TPP, two combined cycle units with 450 MW capacity each were installed in 2016;
- At Tashkentskaya TPP, a combined cycle unit with 370 MW capacity was installed in 2018.

Several ongoing projects are aimed at construction of additional generation capacities. These include:

- Construction of a new combined cycle TPP with two units with 450 MW capacity each in Turakurgansk District;
- Extension of Navoiskaya TPP with a second combined cycle unit with 450 MW capacity;
- Construction of two combined cycle units with 230 MW and 280 MW capacity at Tahiatashskaya TPP.

Efficiency of combined cycle units is around 55 per cent with consumption of 225 g of fuel for generation of 1 kWh. Ongoing projects are expected to increase power generation but also reduce consumption of natural gas.

According to ESCAP, in 2016, natural gas was responsible for 75 per cent of produced electricity, hydro for 20 per cent, coal for 4 per cent and fuel oil for 1 per cent (table 12.5(a)). According to national data, hydropower accounted, on average, for 11.17 per cent of power generation in 2013–2018 (table 12.5(b)). Steady growth of power generation was observed in the period 2010–2018.

### Nuclear energy

Since 2017–2018, Uzbekistan has been firmly stating its intention to construct a nuclear power plant (NPP) in order to meet the growing demands of the economy for energy resources and to diversify energy supply.

### Oil refining

Uzbekistan has two oil refineries located in Fergana (annual crude oil distillation capacity 5.5 million tons) and Bukhara (annual capacity 2.5 million tons). The refineries' actual operation is below capacity because of insufficient domestic oil production. They produced some 60 different products (table 12.6). There is also a small-scale refinery to process heavy oil in Surhandariya Oblast. About 52 per cent of nationally consumed oil products are used in transport, 16 per cent in agriculture, 13 per cent in the power sector and 5 per cent in industry.

**Table 12.5(a): Power generation by source, 2010–2016, GWh**

	2010	2011	2012	2013	2014	2015	2016	2016 (%)
Natural gas	37 992	39 478	38 763	40 148	41 106	42 963	43 742	75
Hydro	10 846	10 240	11 210	11 560	11 830	11 830	11 830	20
Coal	2 112	2 140	2 145	2 214	2 263	2 340	2 382	4
Oil and other	750	542	382	278	201	147	365	1
<b>Total</b>	<b>51 700</b>	<b>52 400</b>	<b>52 500</b>	<b>54 200</b>	<b>55 400</b>	<b>57 280</b>	<b>58 319</b>	<b>100</b>

Source: ESCAP Asia-Pacific Energy Portal: <https://asiapacificenergy.org>

**Table 12.5(b): Power generation by producer, 2013–2018, GWh**

	2013	2014	2015	2016	2017	2018	Average 2013–2018 (%)
Combined heat and power plants (CHPPs)	1 090.6	1 230.9	1 239.2	1 237.0	1 250.9	1 039.7	2.02
Thermal power plants (other than CHPPs)	47 823.8	48 459.9	49 349.9	50 536.4	51 141.8	55 470.6	86.09
Hydropower plants	5 704.2	6 075.0	6 824.7	6 859.8	7 929.6	5 897.3	11.17
Other sources (except electricity produced by waste incineration)	-	-	244.2	467.3	497.9	488.9	0.72
<b>Total</b>	<b>54 618.6</b>	<b>55 765.6</b>	<b>57 658.1</b>	<b>59 100.1</b>	<b>60 820.1</b>	<b>62 896.6</b>	

Source: State Committee on Statistics, 2019.

**Table 12.6: Selected product output of Fergana and Bukhara refineries, 2013–2016, million tons**

	2013	2014	2015	2016
Benzene	1.80	1.07	1.07	1.13
Kerosene	0.25	0.16	0.16	0.18
Diesel	1.12	0.99	1.09	0.98
Mazut	0.19	0.12	0.07	0.10

Source: State Committee on Statistics, 2019.

## 12.2 Trends in energy balance

In 2016, the diversity of primary energy supply was concentrated in fossil fuels, mainly natural gas, with some hydropower (table 12.7). The total primary energy supply began to decrease in 2012. The development of local fuels such as natural gas and coal is a goal of national energy policies. Therefore, fossil fuels continue to play a dominant role, although their supply has declined. The share of natural gas is about 87–89 per cent of total supply; the next largest share is oil (6 per cent).

According to the International Energy Agency, final energy consumption by the industrial sector at the end of 2016 made up half the total final energy consumption. The transport sector accounted for 2.33 per cent and other sectors of the economy for 18.18 per cent of total final consumption.

## 12.3 Environmental pressures

### *Extraction of energy sources*

#### Open-pit mining

Angren brown coal deposit is developed by surface mining. Extraction of coal by open-pit mining requires the removal of vegetation, soil and rock (overburden) from above the coal. Removal of overburden and coal mining requires drilling and blasting as well as the operation of different types of equipment/machines, which cause dust. For surface mines, the main environmental problems are large-scale land use, overburden removal and disposal, disturbance of hydrology, acid mine drainage and fugitive dust. The overburden has traditionally been dumped in piles around the mines, which can be exposed to weather conditions that lead to environmental hazards. This refuse can contain enough coal to burn after piling up and will often internally combust and burn slowly for

years. Since these mounds of overburden are quite dense, the interior may burn, while the top and outer levels are exposed to rain. Rains could leach toxins into water bodies. Toxins that are released through fires are major contributors to air contamination and are returned to the ground by rains to contaminate crops consumed by forage animals, which are eventually consumed by humans. In addition, during the summer, which is typically hot and dry, the outer layer of these mounds dries out and the wind spreads the dust throughout nearby areas, where the dust and its toxins are inhaled by people.

#### Underground mining

For underground mines in the Shargun and Baisun deposits, the problems related to environmental impact are mine water drainage, methane emissions and fugitive dust. If not managed correctly, any of these could adversely affect the health and livelihood of the poor and vulnerable groups living near mining operations. Underground coal mining may cause emissions of coal-bed methane. There are no data on methane content and emissions in the coal seams of these mines.

#### Oil and gas transportation and production

The construction of pipelines always raises issues around the protection of the land and water basins in the areas through which the pipelines will pass. In general, pipelines are the safest and most efficient method of moving fossil fuels, and Uzbekistan has a good safety record in this area. However, even properly maintained and modern pipelines can have oil spills and gas leakage. The pipeline system is very important for the national economy since it also delivers gas to many TPPs and customers, as well as delivering oil to refineries.

**Table 12.7: Total primary energy supply, 2010–2016, 1,000 toe**

	2010	2011	2012	2013	2014	2015	2016
Natural gas	37 229.00	41 570.00	42 931.00	37 571.00	38 313.00	33 895.00	32 752.00
Hydro	933.00	880.00	964.00	994.00	1 017.00	1 017.00	1 017.00
Coal	1 306.00	1 372.00	1 386.00	1 443.00	1 570.00	1 552.00	1 549.00
Oil	3 741.00	3 525.00	3 133.00	2 955.00	2 783.00	2 587.00	2 391.00
Electricity	7.57	7.65	7.65	7.91	8.08	- 90.10	- 127.00
Renewables	3.77	3.77	3.82	3.89	3.96	4.04	4.11
<b>Total</b>	<b>43 200.00</b>	<b>47 400.00</b>	<b>48 400.00</b>	<b>43 000.00</b>	<b>43 700.00</b>	<b>39 000.00</b>	<b>37 600.00</b>

Source: ESCAP Asia-Pacific Energy Portal: <https://asiapacificenergy.org>



Pipelines are often slated to go through rural parts of the country; one of the concerns of residents is that the pipeline and noisy compressor stations that can accompany it would disrupt their way of life and disturb the environment. Transportation of gas and, especially, oil, raises the possibility of loss of biodiversity and habitats. Uzbekistan follows international guidelines and practice on the management of risk of spills from pipelines. The greatest possible threats of oil discharge in operations are posed by pipeline leaks and release of bunker oil.

The main pollutants released by the oil industry are carbon monoxide, carbon dioxide, nitrogen oxides, sulfur compounds, methane, methanol and volatile organic compounds (VOCs).

During oil production, the associated natural gas is flared when barriers to the development of gas markets and gas infrastructure prevent it from being used. Flaring (the burning of associated petroleum gas in an open flame at production sites) has long been part of the process of hydrocarbon extraction worldwide, including in Uzbekistan. Flaring gas wastes a valuable energy resource that could be used to support economic growth. It also contributes to climate change by releasing millions of tons of CO<sub>2</sub> into the atmosphere. It used to be one of the main sources of oil industry pollution.

In Uzbekistan, the volume of gas flaring has declined. While in 2013 the volume of gas flared was around 1.494 bcm, this had decreased to 0.788 bcm in 2018 (table 12.8). The decrease was caused not only by reduction of oil production but also by some measures implemented by oil production companies. Thus, flaring intensity (volume of gas flared per produced amount of oil – cm/barrel) was also in decline. While some associated petroleum gas is consumed for own use, such as reinjection to maintain reservoir pressure, the limited market and low prices for commercial gas, especially in remote areas, result in some gas still being flared.

Waste is also generated in oil production and processing. There is no information on the land and soil polluted by oil products in Uzbekistan. According to SCEEP, there were no registered oil

leakages/contaminations in the period 2010–2018.

However, accidents do occur in the natural gas industry. In 2015, the rupture of the main gas pipeline Yangier–Tashkent, 157 km from Yangier, caused the loss of 1,758,684 m<sup>3</sup> of natural gas and emission of air pollution products. Also in 2015, the rupture of the Bukhara–Tashkent–Bishkek–Almaty gas pipeline in Jizzakh Oblast, 34 km from Bukhara, caused the loss of 4,545,495 m<sup>3</sup> of natural gas.

Gas leakage due to the rupture of gas pipelines subordinated to the Mubarek Gas Pipeline System during the period 2010–2017 amounted to more than 5,000 m<sup>3</sup>.

Available information on gas leakages focuses on economic aspects (losses of natural gas) rather than environmental impact. Nevertheless, such accidents cause the release of carbon monoxide, carbon dioxide, nitrogen oxides, sulfur compounds, methane, methanol and other pollutants.

With potential natural gas production expected to increase in the coming years, the risk of gas leakages would increase.

In the past few years, natural gas processing facilities, which aim to remove impurities, introduced new technologies/techniques to improve environmental protection. For example, in 2016–2017 the Mubarek Gas Processing Factory commissioned new units for the most complete extraction of gas fractions. It enables a significant decrease of emissions of air pollutants. The Kandym Gas Processing Factory, commissioned in April 2018 in Bukhara region, focuses on treatment of sulfurous gases, which had previously been flared.

Detailed data on sources, types and volumes of pollution and waste discharges during oil and gas activities, which would allow the Government to develop the necessary preventive measures, are lacking. The collection of detailed information from all enterprises is not carried out and hinders a comprehensive assessment of the oil and gas industry's impact on the environment.

**Table 12.8: Gas flaring, 2013–2018**

	2013	2014	2015	2016	2017	2018
Annual volume of gas flared (million m <sup>3</sup> )	1 494.0	1 301.0	1 115.0	1 043.0	849.0	788.0
Oil production (kilobarrel/d)	63.0	61.0	54.0	58.0	54.0	54.0
Intensity (m <sup>3</sup> /barrel)	58.5	55.4	50.8	54.0	50.5	39.7

Source: [www.worldbank.org/en/programs/gasflaringreduction#7](http://www.worldbank.org/en/programs/gasflaringreduction#7)

### Uranium extraction

Uranium mining was carried out in Uzbekistan during the Soviet period. For more than 50 years, a large amount of radioactive materials had been disposed of in the dumpsites and tailing sites of mines, without almost any remediation work. The main amount of radioactive waste was accumulated on the mined-out uranium deposits of the Chatkalo-Kuramin region and in the Kyzylkum region at the facilities of the SUE Navoiy Mining and Metallurgical Combine (NMMC). The accumulated radioactivity-contaminated materials are a threat to the environment and human health. Many of these deposits are situated along tributaries of the Syr Darya River, which flows through the densely populated Fergana Valley.

Rehabilitation work to overcome the legacy of uranium mining in Uzbekistan is expected to start in 2019. This work would be done in accordance with a plan developed by a group of experts established by IAEA. The work will be through the Environmental Remediation Account for Central Asia established at the EBRD in 2015 at the initiative of the European Commission (chapter 6).

At present, radioactive waste is formed as a result of uranium mining for the production of low-enriched uranium. According to the Ministry of Energy, current mining of uranium ore is carried out by the in-situ leaching (ISL) mining process. The ISL method has a clear advantage over traditional ore mining methods (mining and quarrying). Since the reserves are extracted without eliminating the surrounding rock (cap rock), expenditures on ore extraction (excavation) and mining are significantly reduced or even eliminated altogether, while operating costs are minimal.

Although some environmental impacts are minimized, such as there being no need for large uranium tailings, the productive solution (containing the leaching agent and wastewater) has to be disposed of after the initial treatment. One of the challenges in terms of environmental protection in the application of ISL is to prevent contamination of groundwater.

### *Electricity and heat production*

Each enterprise or power plant under JSC Uzbekenergo must operate an environmental control system. Environmental protection measures at various enterprises under JSC Uzbekenergo are coordinated by the Environmental Protection Service of JSC Uzbekenergo. Also, environmental protection measures are reflected in the annually developed plan “Basic Measures for Environmental Protection” and in

the annually updated order of JSC Uzbekenergo No. 21 “Main directions of socio-economic development of JSC Uzbekenergo”.

### Power plants

Approximately 75–80 per cent of the electricity in Uzbekistan is produced using natural gas produced in Uzbekistan. Natural gas is considered to be the cleanest of all the fossil fuels as combustion by-products are primarily carbon dioxide and water vapour, with low levels of nitrogen oxides and hardly any particulate matter. In generating a given quantity of energy through combustion, natural gas produces approximately 30 per cent less carbon dioxide than oil and 45 per cent less carbon dioxide than coal. However, even gas TPPs might use mazut (heavy oil) as a reserve fuel. However, Angrenskaya and Novo-Angrenskaya TPPs, which use coal and gas, emit larger amounts of emissions. Table 12.9 shows selected air emissions from the main TPPs and CHPPs.

Coal combustion causes emissions of SO<sub>2</sub>, NO<sub>x</sub>, CO, PM<sub>10</sub>, CO<sub>2</sub> and VOCs. Angren coal is of poor quality and has high ash content (up to 48 per cent) and the specific structural properties of the coal have rendered its enrichment uneconomic to date. Its combustion is associated with substantial emissions of particulate matter.

The amount of fly ash, SO<sub>2</sub>, NO<sub>x</sub> and CO emitted from boilers depends on equipment design, combustion modus operandi and the quality of the fuel. For example, the high ash content of Angren coal, consumed by the two power plants, causes challenges for fly ash capture. The average fly ash removal rate is rather low, at about 96 per cent.

### *Oil refineries*

Refineries could be sources of air, water and soil pollution. According to data from JSC Uzbekneftegaz, concentrations of air pollutants do not exceed the limit around the existing refineries. Generated waste from the plants undergoes a full cycle of deep cleaning at the cleaning facilities, including the units of mechanical, physical and chemical, and biological purification. Refineries carry out self-monitoring to ensure control over emissions into the air and discharges to surface waters.

Recently, the Fergana refinery introduced additional measures aimed at environmental protection:

- Reconstruction of treatment facilities: In 2019, the installation of equipment and its preparation for commissioning works are carried out. As a result

of modernization, the amount of pollutants in wastewater should be reduced;

- A hydrodesulfurization unit for diesel fuel was put into operation, which allows the sulfur content in diesel fuel to meet the requirements of the world standard – 0.05 per cent (previously, the sulfur content was 1.2 per cent). Burning diesel fuels reduces sulfur dioxide emissions;
- The first stage of the gas fractionation unit was commissioned to produce light petroleum products whose quality meets the world standards. It reduces emissions of pollutants into the atmosphere.

#### *Prospective development of nuclear energy*

The prospective development of a nuclear power industry in Uzbekistan has important environmental dimensions. There are several advantages in any NPP project: nuclear fuel is produced nationally, there are no emissions of GHGs or other harmful substances,

advanced nuclear power production has a tiny radiation impact (less than coal combustion), and only a small volume of radioactive waste is generated during operation. As with all energy sources, pollution is associated with supporting activities, such as mining, manufacturing and transportation, in addition to storing radioactive waste.

On the other hand, there is a risk of releasing large quantities of fission products into the environment in the event of an accident. It is important to ensure compliance with the international standards of NPP construction and operation and make the compliance strategy known to all stakeholders. The application of internationally adopted standards, taking into consideration recommendations of IAEA in respect of design, siting, operational safety, radiation safety and safe management of radioactive waste, is indispensable, to provide necessary safeguards to reduce environmental and health risks.

**Table 12.9: Emissions from TPPs, 2010–2018, 1,000 tons**

	2010	2011	2012	2013	2014	2015	2016	2017	2018 (11 months)
<b>SO<sub>2</sub> emissions</b>									
<b>Total</b>	<b>44.8</b>	<b>49.9</b>	<b>48.2</b>	<b>69.6</b>	<b>59.4</b>	<b>49.8</b>	<b>50.7</b>	<b>54.5</b>	<b>41.4</b>
Angrenskaya TPP (coal/gas)	9.1	10.0	9.6	9.9	8.6	11.4	12.3	19.1	14.0
Novo-Angrenskaya TPP (coal/gas)	20.0	22.1	28.4	52.2	43.5	32.8	32.4	27.4	22.0
Tashkentkaya TPP	7.6	8.2	4.1	4.7	4.2	2.7	4.0	5.0	2.5
Navoiskaya TPP	0.0	0.0	0.0	0.0	0.0	1.9	0.0	0.0	0.0
Syrdarinskaya TPP	6.5	7.2	3.7	0.8	1.7	0.4	0.9	1.9	2.4
Talimarjanskaya TPP	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Tahiatashskaya TPP	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Muborekskaya CHPP	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Ferganskaya CHPP	1.6	2.5	2.4	1.9	1.3	0.5	1.0	0.9	0.5
Tashkentkaya CHPP	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
<b>NO<sub>x</sub> emissions</b>									
<b>Total</b>	<b>31.2</b>	<b>41.8</b>	<b>53.8</b>	<b>57.4</b>	<b>61.8</b>	<b>63.8</b>	<b>65.2</b>	<b>55.7</b>	<b>53.3</b>
Angrenskaya TPP (coal/gas)	1.0	0.9	0.8	2.5	0.7	0.9	0.8	1.7	2.4
Novo-Angrenskaya TPP (coal/gas)	5.4	5.4	7.5	6.7	6.1	5.3	4.9	4.4	3.7
Tashkentkaya TPP	3.9	5.3	5.1	4.8	4.4	5.0	5.1	3.7	3.7
Navoiskaya TPP	2.5	3.6	3.7	3.7	3.4	4.4	3.7	2.3	2.1
Syrdarinskaya TPP	11.9	19.4	29.8	32.9	39.7	41.3	43.4	36.3	33.9
Talimarjanskaya TPP	3.2	3.5	3.3	3.4	3.8	3.6	3.5	3.9	4.4
Tahiatashskaya TPP	2.3	2.5	2.4	2.6	2.7	2.4	2.7	2.5	2.1
Muborekskaya CHPP	0.4	0.4	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Ferganskaya CHPP	0.4	0.4	0.3	0.2	0.2	0.2	0.3	0.3	0.2
Tashkentkaya CHPP	0.3	0.3	0.3	0.2	0.2	0.2	0.2	0.3	0.3
<b>Particulate matter</b>									
<b>Total</b>	<b>37.8</b>	<b>43.3</b>	<b>63.7</b>	<b>120.2</b>	<b>107.6</b>	<b>85.9</b>	<b>78.2</b>	<b>94.1</b>	<b>57.8</b>
Angrenskaya TPP (coal/gas)	11.1	14.3	11.6	11.6	10.1	13.2	18.9	33.9	8.5
Novo-Angrenskaya TPP (coal/gas)	26.4	29.0	52.2	108.6	97.5	72.7	59.3	60.1	49.3
Tashkentkaya TPP	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Navoiskaya TPP	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Syrdarinskaya TPP	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Talimarjanskaya TPP	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Tahiatashskaya TPP	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Muborekskaya CHPP	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Ferganskaya CHPP	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Tashkentkaya CHPP	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Source: State Committee on Ecology and Environmental Protection, 2019.

In May 2019, Uzatom announced that a priority site location for the future NPP has been identified. The site is close to Lake Tuzkan of the Aydar-Arnasay Lakes System in Jizzakh Oblast. The Aydar-Arnasay Lakes System is a Ramsar site. It is located at the crossroads of the Afro-Eurasian and Central Asian flyways and is a centre for migrating and wintering waterfowl. The “Aydar-Arnasay Lakes system” Ramsar Site is partly covered by the Arnasay State Reserve (“zakaznik”) (chapter 11).

The obligations of Uzbekistan as a party to the Ramsar Convention are to promote the conservation of its Ramsar sites and to maintain their ecological character (Article 3). This means that the possible effects of planned projects such as an NPP on the ecological character of the wetland ecosystem concerned need to be evaluated before the development takes place. Additionally, the Convention requires that if the ecological character of wetlands has changed or is likely to change, the party has to inform the Secretariat without delay.

Key instruments for implementation of the Convention’s obligations to promote the conservation and to maintain ecological character of Ramsar sites are the management plans for the Ramsar sites. Other instruments are SEAs and EIAs (2008 Resolution X.17). If negative effects are foreseen and when the development cannot be stopped or placed somewhere else, the Party can delete or restrict – in its urgent national interest – the boundaries of a wetland included in the Ramsar List, but has an obligation to compensate the loss of ecosystem services in the same area or elsewhere with an adequate portion of original habitat (Article 4).

As of May 2019, no management plan exists either for the “Aydar-Arnasay Lakes System” Ramsar Site or for the Arnasay State Reserve, and no EIA or SEA has been conducted for the NPP project. While the decision on the location of the NPP has not yet been made, the choice of the Lake Tuzkan for the location of the NPP would need to be reconsidered vis-à-vis the implementation of international obligations, in particular the Ramsar Convention, by Uzbekistan. If not, Uzbekistan would need to prove that the NPP cannot be placed somewhere else and that the project takes place as “in its urgent national interest”. Furthermore, the country would likely need to delete or restrict the boundaries of the wetland already included in the Ramsar List, and fulfil the obligation to compensate for any loss of wetland resources, with

all these decisions potentially damaging the image of the country on the international arena.

As at October 2019 the Cabinet of Ministers has not yet taken a decision on site selection for the NPP.

## 12.4 Energy efficiency and renewable energy development

### *Energy efficiency*

Uzbekistan has a high level of primary energy intensity (amount of consumed energy per unit of GDP). According to the State Committee on Statistics, in 2016, it was 203.9 kg of oil equivalent (kgoe) per US\$1,000 GDP (2011 PPP). According to ESCAP, in 2016 it was 195 kgoe per US\$1,000 GDP (2011 PPP). For comparison, in Azerbaijan, which has a similarly structured energy sector, it was 91 kgoe, while the average energy intensity in Asia and the Pacific in 2016 was 129 kgoe per US\$1,000 GDP. Energy intensity is high in Uzbekistan due to own hydrocarbon production and inefficient consumption.

The country’s energy efficiency potential is high due to inefficient infrastructure and the absence of incentives to introduce energy efficiency measures. A 2013 World Bank report<sup>26</sup> noted major energy efficiency challenges, which are still valid:

- Demand-side energy efficiency, particularly in industry and agriculture, the most inefficient sectors of the economy. Industry uses outdated technologies while the irrigation system used in agriculture is inefficient;
- Efficiency of gas-fired power plants, which are 40 per cent less efficient than modern thermal plants;
- Efficiency of electricity networks, with losses of up to 20 per cent.

In recent years, a wide range of measures has been implemented to ensure energy efficiency and energy savings in sectors of the economy and the social sphere.

Standards for energy management of industrial production and energy labelling of household equipment have been introduced. The introduction of energy-efficient technologies in the system of street lighting and energy-saving lamps for residential and public buildings is being carried out. The sale of incandescent lamps with a capacity of over 40W has been halted.

<sup>26</sup> Artur Kochnakyan and others, “Uzbekistan: Energy/Power Sector Issues Note”, Report No. ACS4146 (Washington, D.C., World Bank, 2013).

At the same time, despite these measures, the energy intensity of the domestic economy remains high, and the level of diversification of the fuel and energy balance due to the involvement in industrial production of RES does not meet world trends. The structure of the primary fuel for the production of electrical and thermal energy is dominated by natural gas and other traditional types of hydrocarbon fuels.

Currently, the basic sectors of the economy, through a set of measures to save energy, undertake measures for saving more than 1 billion kWh of electricity and almost 1 billion m<sup>3</sup> of natural gas, or around 5 per cent and 3.6 per cent, respectively, of the total annual consumption of these energy resources. According to the State Committee on Statistics, this has contributed to the decrease in the primary energy intensity of GDP from 425.6 kgoe per US\$1,000 GDP (2011 PPP) in 2010 to 203.9 kgoe per US\$1,000 GDP (2011 PPP) in 2016. While this is still very high, the trend is promising.

JSC Uzbekenergo implements energy-efficiency measures on the generation side through modernization, rehabilitation and use of new technologies. However, demand-side management is lacking and there is no understanding of energy savings potential and its benefits. New building standards are under development and new tariffs aimed at reducing energy consumption by households and businesses were introduced in November 2018.

The phase-out of tariff subsidies, which started in November 2018, is expected to reduce consumption. No measure to increase energy efficiency in buildings and transport has been introduced.

The JSC National Energy Saving Company was established in Uzbekistan in mid-2017 as the sole supplier of goods, works and services for implementation of energy-efficient and energy-saving technologies in government agencies and organizations; however, the company was abolished in February 2019.

### Tariffs

The Cabinet of Ministers, by its Resolution No. 897 of 2018, approved a gradual increase in prices and tariffs for fuel and energy resources. The first to raise tariffs was JSC Uzbekenergo. From 16 November 2018, the tariff for 1 kWh for residential consumers (without electric stoves) increased from 228.6 sum to 250 sum (by 9.3 per cent), and from 15 August 2019, to 295 sum.

For household consumers living in apartment buildings centrally equipped with electric stoves for food preparation, the tariff for 1 kWh from 16 November 2018 was set at 125 sum (previously 114.3 sum) and from 15 August 2019 at 147.5 sum.

### Public buildings

The current budget regulations do not allow khokimiyats and other state-funded organizations to keep savings resulting from energy efficiency improvements in their budgets. This creates a barrier for implementation of energy efficiency improvements, including through the use of new institutional and financial mechanisms and structures, e.g. energy service companies (ESCOs) and public-private partnerships, for developing, financing and implementing energy efficiency investments.

In public sector buildings, the problem is caused by the budgeting process undertaken by the governmental authorities: public buildings receive an annual budget allocation for running expenditures. Should the building administration implement energy efficiency improvements, it is not allowed to keep the resulting savings from its administrative budget; these have to revert to the Government. The budget allocation for the following year will even then be reduced by the amount saved through the implementation of energy-efficiency measures. Therefore, the public sector building administrations are not interested in energy efficiency improvement since the implementation of energy efficiency improvements in fact results in a decreased budget allocation.

### Industrial sector

Since 2010, the World Bank's Energy Efficiency Facility for Industrial Enterprises Project has greatly contributed to raising the energy efficiency of industrial enterprises through financing energy-saving investments in both large industrial enterprises and industrial SMEs (chapter 15). Nevertheless, much more remains to be done to modernize industry and reduce energy losses in the industrial sector.

### *Renewable energy*

In 2019, there is no renewable energy (other than hydro) generation in Uzbekistan, except some off-grid and/or small-scale units. The country's enormous technical potential for the use of solar energy is not used (table 12.10). With a target of 19.7 per cent of total energy production being produced by RES by 2025 (2017 Resolution of the President No. 3012), Uzbekistan plans to further develop hydropower and start developing solar and wind energy. Most of the

targeted 19.7 per cent is to come from hydropower (15.8 per cent), while solar and wind energy are expected to provide 2.3 per cent and 1.6 per cent respectively.

**Table 12.10: Estimated technical potential for renewable energy resources, GWh/y**

	Technical	Used
Solar	2 058 000	0
Large and medium hydro	20 934	1 650
Small hydro	5 931	200
Wind	4 652	0
Biomass	1 496	0

Source: Artur Kochnakyan and others, "Uzbekistan: Energy/Power Sector Issues Note", Report No. ACS4146 (Washington, D.C., World Bank, 2013).

In Namangan Oblast, with the assistance of the Ministry of Trade, Industry and Energy of the Republic of Korea, a solar PV station with a capacity of 130 kW based on Korean technologies was commissioned in December 2014 and connected to a power grid that can produce 234,300 kWh annually. Projects are being prepared for the construction of large solar PV stations in the Surkhandarya, Namangan and Navoiy Oblasts. An investment project for the construction of a pilot wind power plant with a capacity of 750 kW in the Bostanlyk District of Tashkent Oblast is at the final stage.

Four investment projects for the construction of solar and wind power plants, including three solar stations with a capacity of 100 MW each in Samarkand, Surkhandarya and Navoiy Oblasts and one wind station with a capacity of 102 MW in Navoiy Oblast, are under consideration by investors.

#### Support measures

Renewable energy units are prioritized over generating capacity using fossil fuels in the dispatching schedule of the operator of the unified power system for the purchase of energy.

Calculations of the electricity generated by renewable sources, except for the power plants of JSC Uzbekhydroenergo, and supplied to the unified power system are made according to the current tariff for consumers (excluding VAT) but reduced by the cost of transmission of a unit of electric power in a unified electric power system, as well as by the cost of the distribution and sale of a unit of electricity charged by utilities companies.

Equipment, raw materials and components, devices, spare parts, and technological documentation that are

not produced in the country and imported for the implementation of renewable energy projects are exempted from customs duties until 1 January 2022. Feed-in tariffs and competitive bidding/auction support schemes have so far not been envisaged.

Several unresolved issues hinder the accelerated development of the use of RES, such as the absence of experience with application of incentives for renewable energy projects development and lack of experience of joint operation of TPPs and RES.

#### *Energy audits*

Enterprises are subject to mandatory energy audits when their total annual energy consumption exceeds 2,000 tons of reference fuel. Information on practical implementation of energy audits is not available.

## **12.5 Legal, policy and institutional framework**

### *Legal framework*

National primary legislation on energy comprises the 1997 Law on Rational Use of Energy, 1994 Law on Subsoil, 2001 Law on Production Sharing Agreements and 2009 Law on Electricity. Although some amendments were introduced into these laws, they are rather outdated and new laws on these issues are under development. The draft law on gas supply has been discussed for years but is not adopted.

The 2019 Law on the Use of Renewable Energy Sources envisages tax and customs preferences for the import of RES installations. Those who produce energy from RES are exempted from the property tax and land tax for RES installations for 10 years. Producers of RES installations are exempted from all taxes for five years. Tariffs for electricity produced by RES will be determined through auctions.

The 2019 Law on the Use of Nuclear Energy for Peaceful Purposes regulates the procedures of establishment and operation of nuclear installations and storage facilities for nuclear materials and radioactive waste. The Law names the principles of the use of nuclear energy for peaceful purposes, in particular the priority of protecting the life and health of citizens, property of individuals and legal entities, as well as environmental protection. It regulates the powers of various authorities in the process of decision-making on various aspects of the establishment and operation of nuclear installations. The President has the power to decide on the construction of a nuclear installation upon the proposal by the Cabinet of Ministers. The Cabinet of Ministers is empowered to take a decision on site

selection for a nuclear installation. Detailed rules for site selection are not part of the Law.

The operation of the energy sector is mainly regulated by decrees and resolutions of the President and resolutions of the Cabinet of Ministers.

The 2013 Decree of the President on Measures of Further Development of Alternative Energy No. 4512 outlines measures aimed at facilitating the development of primarily solar energy in the country.

The 2014 Resolution of the Cabinet of Ministers No. 164 on the use of petroleum products sets the general rules of delivery of petroleum products, storage conditions and transportation rules and specifies environmental and safety requirements.

The 2014 Resolution of the Cabinet of Ministers No. 230 approved a regulation on the development of state exploration programmes of the national holding *Uzbekneftegaz*. Such programmes determine the main directions of development for the oil and gas sector.

The 2017 Resolution of the Cabinet of Ministers No. 338 on measures to further promote production and instalment of biogas plants in the period 2017–2019 envisaged installation of up to 726 biogas plants in large-scale livestock and poultry farms by 2018. By June 2019, 13 biogas plants were put in operation by *Uzbekneftegaz*.

The 2018 Resolution of the President No. 3687 approved the power-purchasing agreement with *SkyPower Global*. The Resolution also sets a package of incentives that are likely to be expanded to all other successful bidders for solar power projects in Uzbekistan, so as to avoid creating a disadvantageous environment for competitive independent power producers. It establishes that: (i) the investor company, its project companies and subcontractors are exempt from customs duties, corporate income tax, VAT and mandatory payments to the Republican Road Fund and Education and Medicine Development Fund, property tax on specific equipment and pertaining land use tax; and (ii) if *JSC Uzbekenergo* fails to purchase power, the state budget will take responsibility; and (iii) the Ministry of Finance will issue the guarantee for *JSC Uzbekenergo*.

The 2018 Resolution of the President No. 3981 on the Accelerated Development and Provision of Financial Stability of the Electricity Sector aims at creating a modern scheme for the production, transportation, distribution and sale of electricity. In particular, it aims at attracting private investment, including FDI, to the entities that produce and distribute electricity,

including based on PPPs, while maintaining full control of electricity transportation, and the gradual creation of a modern electricity market based on competitive purchase of electricity directly from the producers. It mandates the work to prepare and approve the methodologies for calculating electricity tariffs, based on coverage of current and capital expenses. Furthermore, it envisages creating an interdepartmental tariffs commission under the Cabinet of Ministers.

The 2018 Decree of the President No. 5484 “On measures to develop nuclear energy in the Republic of Uzbekistan” established the Agency for the Development of Nuclear Energy (*Uzatom*) and firmly stated the intention of the Government to develop nuclear energy.

### *Policy framework*

#### Oil and gas

According to the Programme to Increase the Extraction of Hydrocarbons in the period 2017–2021 (2017 Resolution of the President No. 2822), the Government plans to significantly increase the production of oil and gas condensate to keep the country’s economy independent of oil imports. The Government is looking to improve the rate of oil recovery, conversion and gas processing efficiency to raise product quality to world standards, and to increase the area of the hydrocarbon resource base, primarily of liquids, through new discoveries.

#### Energy efficiency and renewable energy

The Programme of Measures for Further Development of Renewable Energy, Increase of Energy Efficiency in Economic Sectors and the Social Sector for the period 2017–2021 (2017 Resolution of the President No. 3012) replaced the 2015 Programme of Measures to Reduce Energy Intensity and Introduce Energy Efficient Technologies in Economic Sectors and the Social Sector for the period 2015–2019 (2015 Resolution of the President No. 2343). The new Programme targets the promotion of private sector investments in renewable energy development and reducing energy intensity and implementing energy-saving technologies and systems. Specific privileges and preferences are granted to enterprises and organizations that use energy from renewable sources in their production. The Programme outlines key directions for the implementation of energy-saving technologies and energy-reduction programmes, while also promising tax benefits to entities producing energy from alternative sources. The Programme also aims at reducing energy intensity by 8–10 per cent

annually in key economic development sectors. At the same time, it also set targets to rehabilitate central and district heat power plants by the substitution of 17,251 obsolete heat boilers, 879 water pumps and 1523 electric motor parts with energy-efficient technologies and devices by 2020.

The Programme of Measures to Secure Structural Reforms, Modernization and Diversification of Production for the period 2015–2019 (2015 Decree of the President No. 4707) covers 846 investment projects worth US\$40.8 billion. Consistent modernization of existing facilities and the creation of new power-generating facilities is expected on the basis of the introduction of resource-saving and modern combined-cycle plants and solar technologies.

In accordance with the 2015 Resolution of the Cabinet of Ministers No. 86 “On measures of obligatory energy-efficient labelling and certification of domestic electrical appliances and newly constructed buildings and infrastructures”, all household electrical appliances not corresponding to energy efficiency standards cannot be imported to Uzbekistan and should be gradually phased out. The targets envisage the importation of appliances that have a category label of A, A+ or A++ and phasing out of those that fall under category label “G” by 1 January 2017, “F” by 1 January 2018 and “E” by 1 January 2019. At the same time, in 2015, the Government issued a prohibition on the use, production and importation of incandescent lamps with a capacity of more than 40W.

### Nuclear energy

The Concept for the Development of Nuclear Energy for the period 2019–2029 (2019 Resolution of the President No. 4165) and its roadmap for implementation envisage the construction of an NPP in Uzbekistan. The Concept is a follow-up to the 2018 Agreement between the Government of Uzbekistan and the Government of the Russian Federation on Cooperation in Construction on the Territory of the Republic of Uzbekistan of a Nuclear Power Plant.

The NPP project would be implemented in three stages. The first stage (2019–2020) is intended for carrying out site selection and licensing. In the second stage (2020–2022), it is planned to design the NPP and its external infrastructure. The construction and commissioning of the NPP will be carried out in the period 2022–2030. Two units with an installed capacity of 1.2 GW each are envisaged. The construction is to be financed through a credit from the Russian Federation.

The Concept envisages the organization of an EIA during the first stage of project development. It provides for a dialogue in the form of negotiations with neighbouring countries but does not envisage organization of a transboundary EIA. In fact, the legislation of Uzbekistan does not provide for transboundary consultations as part of an EIA and Uzbekistan has no practical experience with transboundary EIA (chapter 2). The Concept envisages that a safe and cost-effective nuclear fuel cycle would be organized; however, it gives no detail in this respect.

A state programme on development of nuclear energy for the period 2019–2029 is under development.

### Draft sectoral policy document

As at mid-2019, a concept of the country’s fuel and energy supply for 2020–2030 is under development.

### *Sustainable Development Goals and targets relevant to this chapter*

The current stand of Uzbekistan vis-à-vis most targets of Sustainable Development Goal 7 is described in box 12.1.

### *Institutional framework*

The institutional framework of the energy sector in Uzbekistan was restructured in late 2018–early 2019.

The Ministry of Energy was established in February 2019 (2019 Decree of the President No. 5646) and entrusted with functions and powers in energy resources and power production. The Ministry is responsible for creating a modern scheme of organization of the production, transportation, distribution and sale of electricity, with the aim of attracting private investment, including FDI, to the entities that produce and distribute electricity, including based on PPPs, while maintaining full control of the transportation of electricity, and the gradual creation of a modern electricity market based on the competitive purchase of electricity directly from the producers. The Agency for the Development of Atomic Energy (Uzatom), previously under the Cabinet of Ministers, and the State Inspectorate for Control over the Use of Oil Products and Gas were reassigned to the new Ministry. The Ministry of Energy will also include the Inspectorate for Supervision in the Electric Power Industry.



**Box 12.1: Goal 7 of the 2030 Agenda for Sustainable Development****Goal 7: Ensure access to affordable, reliable, sustainable and modern energy for all**

Uzbekistan has adopted all global targets under Goal 7 except target 7.a (related to international cooperation on clean energy research) as national targets. Uzbekistan is drafting an action plan to meet Goal 7. The action plan would identify best practices, measures and procedures relevant to preparing a transition to sustainable energy, with a particular focus on the cross-cutting nature of energy efficiency, renewable energy and energy access.

**Target 7.1: By 2030, ensure universal access to affordable, reliable and modern energy services**

This target is measured by indicator 7.1.1 (Proportion of population with access to electricity), nationalized by Uzbekistan without changes. The State Committee on Statistics reports to have already achieved 100 per cent electrification of both urban and rural areas in 2012 (<http://nsdg.stat.uz/>). Nevertheless, it is difficult to assess reliability and affordability due to the lack of reliable data, especially on rural electrification. Reportedly, rural areas experience regular and long electricity shortages and interruptions. In the cities, even in Tashkent, the power can be off for several hours a day during winter.

Unreliable power supply has a clear gender dimension in Uzbekistan, since women typically perform most household and family obligations and are key consumers of electricity. According to a 2018 report by the Asian Development Bank (ADB), unsustainable supply of energy means that women cannot take advantage of labour-saving appliances such as washing machines and electric cooking stoves, which affects women's efficiency while performing traditional social roles and creates barriers for working women.

The nationalized indicator 7.1.2 (Proportion of population using clean fuels (gas and electricity) technologies for cooking) differs slightly from global indicator 7.1.2 (Proportion of population with primary reliance on clean fuels and technology). No data are available on indicator 7.1.2 in Uzbekistan.

**Target 7.2: By 2030, increase substantially the share of renewable energy in the global energy mix**

Progress towards target 7.2 is measured by global indicator 7.2.1 (Renewable energy share in the total final energy consumption), nationalized by Uzbekistan as indicator 7.2.1 (Proportion of electricity generated from renewable energy sources in total electricity generation). The State Committee on Statistics reports that the values for the national indicator are 15.8 per cent in 2010, 10.8 per cent in 2011, 12.6 per cent in 2012, 10.5 per cent in 2013, 10.9 per cent in 2014, 11.8 per cent in 2015, 11.6 per cent in 2016 and 13.0 per cent in 2017 (<http://nsdg.stat.uz/>). However, these numbers account only for hydropower. Other RES (wind and solar) cannot be accounted for in total electricity production due to their insignificant capacity. It is important that Uzbekistan has set targets on renewable energy up to 2025 and 2030; however, effective support measures are not yet in place to achieve the targets.

**Target 7.3: By 2030, double the global rate of improvement in energy efficiency**

With regard to indicator 7.3.1 (Energy intensity measured in terms of primary energy and GDP), according to the ESCAP Asia-Pacific Energy Portal, energy intensity in Uzbekistan decreased from 357 kgoe per US\$1,000 GDP (2011 PPP) in 2010 to 195 kgoe per US\$1,000 GDP (2011 PPP) in 2016. While this is still very high, the trend is promising. For comparison, the average energy intensity in Asia and the Pacific in 2016 was 129 kgoe per US\$1,000 GDP (2011 PPP).

According to the State Committee on Statistics, the primary energy intensity of GDP decreased from 425.6 kgoe per US\$1,000 GDP (2011 PPP) in 2010 to 203.9 kgoe per US\$1,000 GDP (2011 PPP) in 2016.

**Target 7.b: By 2030, expand infrastructure and upgrade technology for supplying modern and sustainable energy services for all in developing countries, in particular least developed countries, small island developing States and landlocked developing countries, in accordance with their respective programmes of support**

Uzbekistan puts a lot of effort into developing its energy infrastructure, mostly focusing on new generation capacity based on clean gas combustion technologies, electrification and gas transportation.

Global indicator 7.b.1 (Investments in energy efficiency as a proportion of GDP and the amount of foreign direct investment in financial transfer for infrastructure and technology to sustainable development services) has been nationalized by Uzbekistan differently, as "Share of capital investments in the energy sector in the total capital investments). The values for national indicator 7.b.1 are 5.8 per cent in 2010, 5.1 per cent in 2011, 4.3 per cent in 2012, 4.6 per cent in 2013, 4.8 per cent in 2014, 5.4 per cent in 2015, 5.7 per cent in 2016 and 8.0 per cent in 2017 (<http://nsdg.stat.uz/>).

The Commission for the Reform of the Electric Power Industry was established in late 2018 (2018 Resolution of the President No. 3981). A project office is being created in the Ministry of Energy, which is the

working body of the Commission for the reform of the electric power industry. The project office will be headed by the Deputy Minister of Energy, who oversees the electricity industry. In March 2019, the

President took a decision on the reorganization of JSC Uzbekenergo as part of the transition to modern methods of organizing the production, transportation, distribution and marketing of electric energy (2019 Resolution of the President No. 4249). Three independent companies are created on the basis of JSC Uzbekenergo – JSC Thermal Power Plants, JSC National Electric Networks of Uzbekistan and JSC Regional Electric Networks. Following the completion of the reorganization process, JSC Uzbekenergo will be liquidated.

Following the reorganization, JSC Thermal Power Plants will manage the TPPs and CHPPs.

JSC National Electric Networks of Uzbekistan, created on the basis of UE Uzelektroset and Energosotish branch of Uzbekenergo, will operate and develop the country's trunk grids, transport electricity via trunk grids, be in charge of the export and importation of electricity, function as a single electricity purchaser and sell electricity to enterprises in charge of regional power grids.

Another new entity, JSC Regional Power Grids, will manage the enterprises of the regional power grids that distribute and sell electricity to end users.

Coal mining in Uzbekistan is undertaken by Uzbekcoal. Uzbekcoal has nine subsidiaries in exploration, mining, operations and repair and maintenance, among other functions.

Uzbekneftegaz owns and operates the entire oil and gas sector in Uzbekistan. Uzbekneftegaz has six subsidiaries: Uzgeoburneftegaz (oil and gas exploration); Uzneftegazdobycha (production of oil and gas); Uztransgaz (gas transportation and storage); Uznefteproduct (refining, processing); Uzneftegazmash (production of technological equipment for the industry); and Uzneftegazstroyinvest (capital investment projects). Uzbekneftegaz is majority state owned, with parts of each subsidiary privatized. Gas transmission and distribution are operated by Uztransgaz, with six regional enterprises that are legally and financially unbundled. Uztransgaz sells directly to large industrial consumers.

The Ministry of Finance is in charge of tariff-setting for electricity, heat and gas, among other functions. Tariffs are drafted by Uzbekenergo and Uzbekneftegaz and approved by the Ministry of Finance.

The State Committee on Ecology and Environmental Protection (SCEEP) is responsible for SEE, state

environmental control and interagency coordination on environmental issues.

The Republican Commission on Energy Efficiency and Development of Renewable Energy Sources (created in 2015) was abolished in 2018 and reestablished in 2019. It is chaired by the Prime Minister.

#### *Data collection*

As at September 2019, the raw data collected by the State Committee on Statistics in the energy sector are intended mainly as information for governmental bodies. Data and information in the energy sector are poorly disclosed outside the government. Furthermore, the data and data collection practices are not harmonized with international standards. The knowledge of national experts on relevant best practices on collection and monitoring of national data on sustainable energy in compliance with international standards is insufficient. Data collection is not organized in accordance with International Recommendations for Energy Statistics (IRES), adopted by the United Nations Statistical Commission in 2011 as a statistical standard, and the Energy Statistics Compilers Manual, which provides additional practical guidelines on the collection and compilation of energy statistics.

In September 2019, the country's leadership took a political decision to open all information on energy balance. It is expected that in the future information of energy balance and other energy statistics will be prepared in line with international recommendations and will be published on the website of the State Committee on Statistics.

#### *Participation in international agreements and processes*

In 2015, Uzbekistan joined the “Zero Routine Flaring by 2030” Initiative, introduced by the World Bank, which brings together governments, oil companies and development institutions that agree to eliminate routine flaring no later than 2030.

Uzbekistan is a member of the Energy Charter Conference. Since 1998, it is a party to the 1994 Energy Charter Treaty and the 1994 Protocol on Energy Efficiency and Related Environmental Aspects. No In-Depth Energy Efficiency Review has ever been prepared for Uzbekistan.

Uzbekistan joined the International Renewable Energy Agency (IRENA) in 2009.

Uzbekistan participates in the work of the Commonwealth of Independent States (CIS) Electric Power Council, the Interstate Environmental Council of the CIS Member States, and the Commission of the CIS Member States on the Use of Nuclear Energy for Peaceful Purposes.

Uzbekistan is a member of IAEA. Uzbekistan acceded to the 1997 Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management in 2009. As at early 2019, Uzbekistan is not a party to the 1986 Convention on Early Notification of a Nuclear Accident, 1994 Convention on Nuclear Safety or 1986 Convention on Assistance in the Case of a Nuclear Accident or Radiological Emergency. The recently approved Concept for the Development of Nuclear Energy for the period 2019–2029 (2019 Resolution of the President No. 4165) states the intention of Uzbekistan to join and ensure the implementation of the provisions of the international nuclear safety conventions, with national legislation in the field of the use of atomic energy for peaceful purposes to be developed and adopted.

## 12.6 Assessment, conclusions and recommendations

### *Assessment*

The national energy mix is represented mainly by natural gas use. However, coal combustion remains present in the country's power production. The construction and commissioning of an NPP is planned to be carried out in the period 2022–2030. The growth of renewable energies (apart from hydropower) has not yet begun. An important aspect is that the country has set targets for the development of renewable energy. The recent developments show Uzbekistan's good intention to develop wind and solar sources.

Uzbekistan has a high level of energy supply per unit of GDP. Energy intensity is high due to own hydrocarbon production and inefficient energy consumption. The energy efficiency potential is high. Energy efficiency has become one of the national policy priorities. The introduction of energy-efficient technologies in the system of street lighting and energy-saving lamps for residential and public buildings is being carried out, and the sale of incandescent lamps with a capacity of over 40W has been halted. However, energy-saving measures and energy-efficiency technologies in industrial enterprises and the residential sector, which could potentially improve energy efficiency in the country, are not sufficiently applied because they require

investments and their implementation is much more difficult than lighting upgrades.

The oil and gas industry continues to have environmental and health impacts. Uzbekistan managed to achieve a significant reduction in the volume of gas flaring, from around 1.494 bcm in 2013 to 0.788 bcm in 2018. Flaring intensity was also in decline. However, the waste generated in oil production and processing remains an issue of great concern. Detailed data on sources, types and volumes of pollution and waste discharges during oil and gas activities, which would allow the Government to develop the necessary preventive measures, are lacking.

At present, the raw energy data collected by the State Committee on Statistics are mainly intended as information for governmental institutions and are not harmonized with international standards.

### *Conclusions and recommendations*

#### Data collection

The energy statistics are poorly available outside the governmental bodies and even basic energy data are not publicly available. The internal procedures for statistical data disclosure outside government structures require improvement. The knowledge of national experts on best practices on collection and monitoring of national data on sustainable energy in compliance with international standards is insufficient. Data collection on the energy sector at present does not follow the International Recommendations for Energy Statistics (IRES), adopted by the United Nations Statistical Commission in 2011. Some data that are necessary for monitoring Uzbekistan's progress with the achievement of Sustainable Development Goal 7 are not collected. A political decision to open all information on energy balance was taken in September 2019 but it still needs to be implemented.

Measures to expand statistics collection processes, increase regional and global cooperation on statistics and improve the availability of data on energy, including the energy sector's impact on the environment, are indispensable to gaining greater investor confidence and stronger business interest in the sector.

#### Recommendation 12.1:

*The State Committee on Statistics, in cooperation with the Ministry of Energy, should continue its efforts to:*

- (a) *Develop an integrated system of multipurpose*

energy statistics based on the United Nations Fundamental Principles of Official Statistics and the International Recommendations for Energy Statistics;

- (b) Publish energy statistics, including national energy balances;
- (c) Ensure data collection for monitoring progress with the achievement of Sustainable Development Goal 7 in line with the internationally accepted methodologies.

#### Energy performance of public buildings

The budget regulations do not allow public sector buildings to keep the savings resulting from energy efficiency improvements in their budgets. Expenditures are determined by the Government and do not allow local authorities to retain or reallocate any savings they make for long-term investments in energy efficiency. In these circumstances, incentives for implementation of energy efficiency improvements are lacking.

#### Recommendation 12.2:

*The Cabinet of Ministers should introduce regulations that will allow the financial resources saved through energy-efficiency measures in public buildings to be accumulated in the budgets of organizations undertaking such measures.*

#### Fossil fuels

National policy documents envisage that fossil fuels will continue to be a major energy source in Uzbekistan over the medium term and, potentially, the long term. At the same time, the country has underlined the importance of moving towards sustainable energy. Clean fossil fuels technologies can contribute to increasing sustainability.

There are a number of modern clean fossil fuels technologies that could be implemented in Uzbekistan, which would enhance the country's transition to a low-carbon economy. Increased efficiency, flexible operation to support renewables and carbon capture and storage are key technologies that could deliver such a transition.

There is no information on the land and soil polluted by oil products in Uzbekistan. Soils are severely degraded by mining activities, in particular for the extraction of energy sources, since large amounts of soil and vegetation are removed for open pit mining. This also affects local habitats and causes loss of biodiversity and arable lands.

#### Recommendation 12.3:

*The Ministry of Energy should:*

- (a) Gradually reduce the share of fossil fuels in the energy production and consumption, while continuing to explore ways to use them, especially coal, in a more efficient and environmentally friendly manner;
- (b) Facilitate the use of less polluting energy sources as a valid alternative to fossil fuels;
- (c) Take measures to increase the efficiency of coal utilization with gradual modernization and technology upgrades at existing coal-fired power plants;
- (d) While developing its national policy documents to meet Sustainable Development Goal 7, undertake a comprehensive study on the development of advanced fossil fuel technologies that will include their status, trends, economic analysis, environmental and health impacts, and institutional and legislative barriers;
- (e) Develop economically and environmentally sound policies that also address health impacts in support of Sustainable Development Goal 7, ensuring that such policies are supported by appropriate legal frameworks and economic incentives;
- (f) Collect information about land and soil polluted by oil products and analyse the environmental impacts of gas leakages in Uzbekistan;
- (g) Properly address the environmental hazards of open pit mining.

#### Electricity

Electricity transmission assets have not been properly maintained and upgraded, affecting the delivery of reliable power supply to domestic customers. There is a high level of electricity losses: transmission system losses are 18 per cent and distribution losses are 14 per cent.

#### Recommendation 12.4:

*The Ministry of Energy should promote the regular maintenance and upgrade of the electricity transmission assets to provide reliable power supply to domestic consumers, especially in southern regions.*

#### Renewable energy sources

The changes in the energy sector are expected to be introduced by development of RES. The 2017 Resolution of the President No. 3012 on the Programme of Measures for Further Development of Renewable Energy, Increase of Energy Efficiency in

Economic Sectors and the Social Sector for the period 2017–2021 anticipates that the share of RES in the national power mix will increase to 19.7 per cent by 2025. Most of the increase is to be achieved through the expansion of hydropower, but the development of solar and wind energy is also firmly on the agenda.

However, at this stage, substantial expansion of electricity generation based on renewable sources faces some resource and technological limitations. The development of renewable energy requires a significant level of state support for a long period of time. At present, Uzbekistan does not apply the traditional support schemes for renewable energy such as feed-in tariffs and competitive bidding/auctions. Support schemes to date have been limited to investment tax credits and reduction in import taxes for renewable energy technologies.

*Recommendation 12.5:*

*The Cabinet of Ministers should:*

- (a) *While developing its national policy documents to meet Sustainable Development Goal 7, undertake a comprehensive study on the development of renewable energy technologies that will include their status, trends, economic analysis, and institutional and legislative barriers in renewable energy technology issues in the country;*
- (b) *Take appropriate steps to meet the targets of raising the share of renewable energy sources in total power production;*
- (c) *Further develop support schemes for renewable energy.*

Nuclear energy

Uzbekistan intends to build an NPP in order to meet the growing needs of the economy for energy resources. Design, construction and commissioning of an NPP of two units with an installed capacity of 1.2 GW each are planned for the period 2019–2029. The Government plans to organize a national EIA and conduct a dialogue with neighbouring countries during the first stage of project development (2019–2020). The organization of a transboundary EIA is not planned. The Concept for the Development of Nuclear Energy for the period 2019–2029 envisages that a safe and cost-effective nuclear fuel cycle would be organized at the NPP but it gives no detail in this respect.

Uzbekistan is not a party to several key conventions on nuclear safety.

The construction and operation of an NPP can potentially have environmental impacts associated with this type of development. The application of internationally adopted standards, taking into consideration recommendations of the IAEA in respect of design, siting, operational safety, radiation safety and safe management of radioactive waste, could provide necessary safeguards to reduce environmental and health risks. An EIA procedure, conducted in line with international standards, is an important mechanism to ensure that environmental, including health, considerations, as well as public opinion, are thoroughly taken into account. Conducting transboundary consultations as part of an EIA is a tool for enhancing the quality of decision-making.

In May 2019, Uzbekistan announced that a priority site location for the future NPP has been identified. The site is close to Lake Tuzkan in the Aydar-Arnasay Lake System, which was declared as a Ramsar site in 2008. Construction of an NPP in the Ramsar site would require sound justification, may result in the need to delete or restrict the boundaries of wetlands already included in the Ramsar List, with these decisions potentially damaging the image of the country on the international arena.

The 2019 Law on the Use of Nuclear Energy for Peaceful Purposes names protection of life and health of citizens and environmental protection among its principles but does not include detailed rules for NPP site selection.

*Recommendation 12.6:*

*The Cabinet of Ministers should:*

- (a) *Consider accession to the 1986 Convention on Early Notification of a Nuclear Accident, 1994 Convention on Nuclear Safety and the 1986 Convention on Assistance in the Case of a Nuclear Accident or Radiological Emergency;*
- (b) *Carry out an EIA for the proposed NPP in line with international standards and ensure transboundary consultations as part of the EIA procedure;*
- (c) *Ensure application of recommendations of the International Atomic Energy Agency<sup>27</sup> to provide necessary safeguards to reduce environmental and health risks associated with*

<sup>27</sup> Safety Standards for protecting people and the environment, available at IAEA website ([www.iaea.org/resources/safety-standards](http://www.iaea.org/resources/safety-standards)).

*construction and operation of an NPP;*

- (d) *Ensure compliance with the country's international obligations under the Ramsar Convention by refraining from the construction of an NPP in the territory of a Ramsar site.*

## Chapter 13

# AGRICULTURE AND THE ENVIRONMENT

### 13.1 Conditions and activities in agriculture

In 2018, the agriculture, forestry and fisheries sector accounted for 32.4 per cent of GDP in Uzbekistan (table 13.1). Agriculture is one of the biggest income sources for the rural population, which accounts for about 60 per cent of the total population. The share of agriculture (including forestry and fisheries) in employment remained stable between 2010 and 2017, at around 27 per cent each year, which demonstrates its outstanding role in the labour market.

Agriculture not only ensures food security in the country. Due to the favourable agroclimatic conditions, Uzbekistan is among the top 10 producers in the world of the following fruit products: apricots and dried apricots, persimmons, cherries, grapes and raisins. The Government has recognized the importance of the sector and, due to government measures, investment in agriculture is constantly growing: between 2014 and 2017, total agricultural investment has grown by 64 per cent, from 1,447 billion sum to 2,379 billion sum, mostly through increased funding from enterprises and (loans) from commercial banks.

Annual agricultural output has grown steadily in recent years, by 7 per cent in 2014, 6.8 per cent in both 2015 and 2016 and 2 per cent in 2017. This mostly resulted from gains in productivity growth, due to the stability of the arable land area (around 4 million ha out of 20 million ha total agricultural area) in recent years, even while sown areas decreased from 2010 to 2018 (table 13.2), with major decreases in sown areas observed in Fergana and Tashkent Oblasts and the Republic of Karakalpakstan.

The increase in productivity can be explained by the Government's commitment to crop diversification (from cotton and wheat towards more profitable, so-called higher value crops) and subsequent measures to implement it. The 2015 Resolution of the President No. 2460 "On measures to further reform and develop agriculture in the period 2016–2020" sets the legal base for crop diversification policy by reallocating 170,000 ha of cotton and 50,000 ha of wheat land for the growing of higher value crops in the period 2016–2020. Since then, there were a few subsequent land releases and reallocations for higher value crops, but on a smaller scale.

**Table 13.1: Share of agriculture, forestry and fisheries sector in GDP, 2010–2018, per cent**

2010	2011	2012	2013	2014	2015	2016	2017	2018
32.9	35.9	34.9	33.1	33.8	34.1	34.0	34.0	32.4

Source: State Committee on Statistics, 2019.

**Table 13.2: Sown area of all crops, 2010–2018, 1,000 ha**

	2010	2011	2012	2013	2014	2015	2016	2017	2018
<b>Uzbekistan</b>	<b>3 708</b>	<b>3 602</b>	<b>3 628</b>	<b>3 659</b>	<b>3 678</b>	<b>3 694</b>	<b>3 707</b>	<b>3 475</b>	<b>3 396</b>
Republic of Karakalpakstan	266	224	255	233	230	252	256	264	232
Andijan	230	230	230	230	230	230	230	219	219
Bukhara	242	240	240	240	241	241	241	240	238
Jizzakh	391	390	390	395	396	398	401	356	367
Kashkadarya	493	479	478	494	499	494	494	473	463
Navoiy	106	103	100	102	103	103	104	97	95
Namangan	224	221	221	222	224	225	225	202	193
Samarkand	373	353	331	360	364	360	359	351	352
Surkhandarya	272	280	280	283	283	284	285	267	260
Syrdarya	236	223	227	230	233	233	233	215	207
Tashkent	357	358	360	356	355	353	353	300	305
Fergana	291	290	290	290	290	290	289	271	256
Khorezm	229	210	225	223	232	232	237	219	210

Source: State Committee on Statistics, 2019.

Photo 13.1: Tashkent bazaar



Photo credit: Ms. Angela Sochirca

Agriculture is still significantly regulated by the Government, especially wheat and cotton production. In parallel with crop diversification, the growing of other crops became more flexible (e.g. before 2017, all exports were channelled through the State; now only wheat and cotton exports remain under strict state control).

### *Agricultural activities*

#### Crops

Cotton and wheat production is of outstanding importance to the agricultural sector – they are recognized by the Government as priority crops for ensuring the country's food security (wheat) and foreign currency supply through export revenues (cotton). Together, they still occupy over 80 per cent of irrigated land, despite the Government's long-term programme of crop diversification and subsequent measures in support of it, encouraging farmers to diversify from cotton production towards higher value crops (horticulture and vegetables).

Traditionally, cotton and wheat have been grown on the whole territory of Uzbekistan, while vegetables and fruit were grown on a large scale in areas where cotton is not specified as a priority crop and where the geographical conditions allow it (i.e. soil is less saline and the summers are not extremely dry and hot), on smaller plots of dekhan farms and homestead landowners, which are usually close to larger settlements (particularly around Tashkent City, in Samarkand Oblast and the Fergana Valley). Surkhandarya Oblast is specialized in out-of-season vegetables and fruit production, thanks to its mild winter climate, the steppe lands of the Republic of Karakalpakstan and Jizzakh, Syrdarya, Khorezm and Kashkadarya Oblasts are the primary growing areas for melon and watermelon, while oilseeds are typically grown in the less fertile and saline lands of the Republic of Karakalpakstan and Jizzakh Oblast.

The share of crop production within total agricultural output has increased between 2010 and 2017 by approximately 10 percentage points, but decreased in 2018 by 17 percentage points. The share of animal husbandry decreased between 2010 and 2017 by



approximately 9 percentage points, but increased by 17 percentage points in 2018. In 2018, the share of crop production dropped to only 53.2 per cent, despite the Government's effort to promote it (figure 13.1).

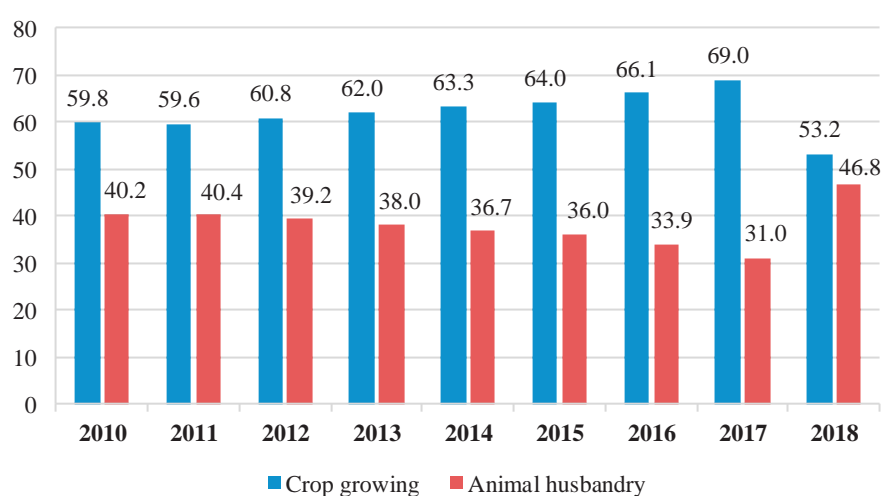
#### Animal husbandry

The share of livestock breeding within total agricultural production was decreasing in the period 2010–2017, even though meat output (figure 13.2) and the number of bred animals (figure 13.3) have grown steadily. This is explained by the greater increase in

crop production. Between 2010 and 2018, poultry numbers more than doubled, while cattle numbers increased by 45 per cent and the numbers of horses, goats and sheep have also been increasing (figure 13.3).

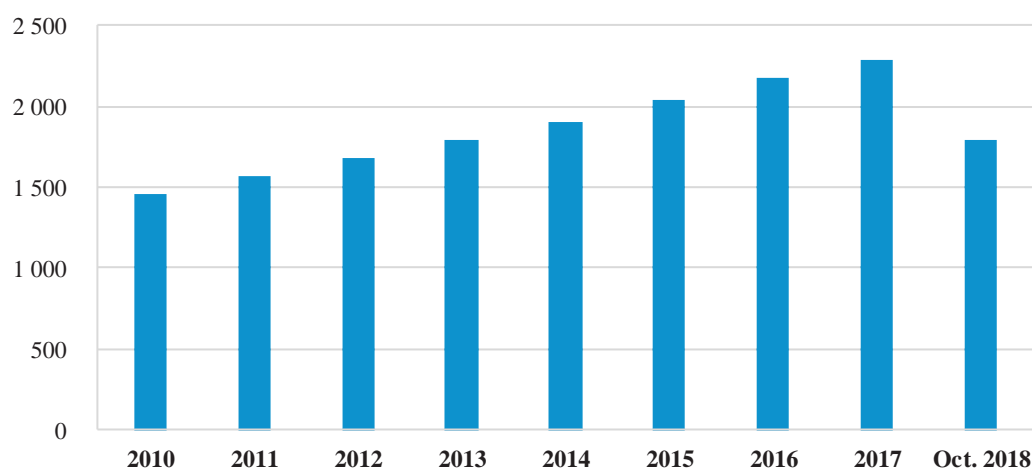
Grazing is still the predominant method for the feeding of animals, although fodder crops are also among the types of crop production the Government is seeking to boost. There are no significant territorial differences in animal husbandry as it is nearly equally present in all the oblasts.

**Figure 13.1: Share of crop production and animal husbandry in total agricultural output, 2010–2018, per cent**

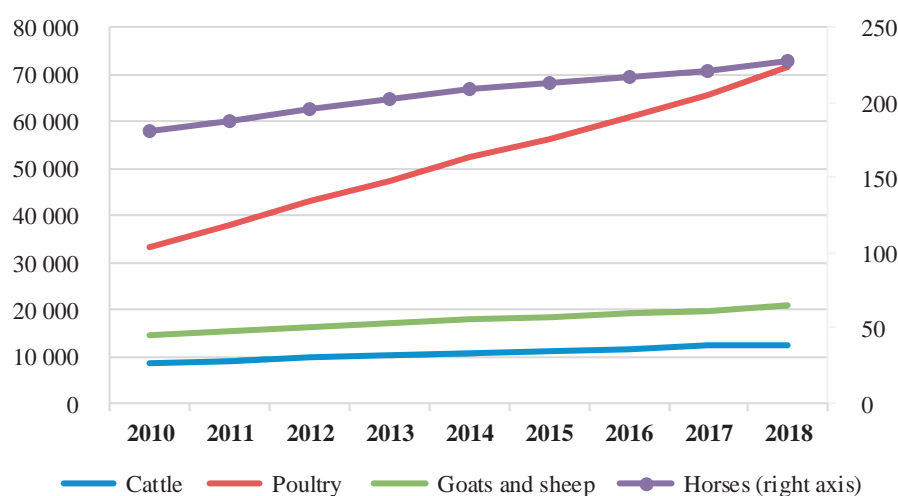


Source: Ministry of Agriculture, 2019.

**Figure 13.2: Livestock and poultry production, 2010–2018, 1,000 tons**



Source: Ministry of Agriculture, 2019.

**Figure 13.3: Structure of livestock, 2010–2018, 1,000 head**

Source: Ministry of Agriculture, 2019.

### Fisheries

Fish farming is growing in Uzbekistan, partly as a result of the Government's efforts to enhance it and ensure food security and quality food for domestic needs and export. Although large-scale fishing has been discontinued in the Aral Sea for decades (since 2010, fish have not been found in the waters of the Uzbekistani part of the Aral Sea), the total fish catch in the country has almost doubled between 2014 and 2017, from 46,391.6 tons to 83,900.4 tons.

Fishing is mostly practised in natural water bodies (in theory, 570,000 ha are available for fishing), but it is also increasing in artificial water reservoirs (38,000 ha). In 2017, the Government established Uzbalkisanoat, the association for the promotion of fishing that already incorporates around 30 per cent of the 3,582 fish farms in the country. The Government foresees the establishment of clusters in fishing.

### *Organizational types of agricultural production units*

In Uzbekistan, three major organizational types of agricultural production are differentiated according to the 1998 Law on Dekhan Farms and 2004 Law on Farms: homestead landowners (producing on household plots), dekhans farms and private farms. In statistics on agriculture, homestead landowners and dekhans farms are presented as one category, with an additional category called organizations conducting agricultural activities.

Homestead landowners' agricultural activity is limited to the plots directly attached to their houses; thus, their production remains smallscale. Homestead

landowners almost exclusively distribute their products in their local or the next bigger settlement's market.

Dekhan farms are the main agricultural producers in the country, even though private farms are the largest entities. In Uzbekistan, land is owned by the State and the agricultural land is leased to farmers, predominantly on a permanent basis (if they fulfil the basic conditions). Land can be inherited, but without the right to sell or transfer it to other farmers or entities.

According to the legislation, a dekhans farm is a family-owned small-scale farm engaged in the production and sale of agricultural products on the basis of the personal labour of family members on a land plot provided to the head of the family for life as an inherited (land) property. Land for dekhans farms (up to 0.35 ha on irrigated and 0.5 ha on rain-fed lands, and up to 1 ha of rain-fed pastures in the steppe and desert zone) can also be granted by the State to young citizens who fulfil several criteria prescribed in the legislation.

Private farms are independent economic entities, performing commercial agricultural production using leased land plots.

While the activities of dekhans farms are less regulated by the State (e.g. they are free to choose what they produce, though, on the other hand, they do not receive subsidies for crop production from the State), the establishment of and production on the private farms is more strictly regulated by the State. The size of the private farms is also regulated according to their specialization. For example, for livestock breeding

farms, the minimum land size is 0.3 ha per conventional head of livestock on irrigated lands in Andijan, Namangan, Samarkand, Tashkent, Fergana and Khorezm Oblasts, 0.45 ha of irrigated land in other oblasts and in the Republic of Karakalpakstan, and 2 ha on non-irrigated (rain-fed) lands where the minimum number of livestock is at least 30 conventional heads. The minimum size of land plots rented to private farms for crop production is at least 10 ha for farms specialized in cotton and grain growing, and not less than 1 ha for horticulture, viticulture and vegetable growing and for the cultivation of other crops.

Dekhan farms used to be more traditional in terms of organization of production processes and the varieties of (local) crops grown; however, in the past decade, they could benefit much more from the Government's agricultural diversification policy and measures by intensifying their production, applying new agricultural techniques (e.g. introducing greenhouse production), introducing new crops (e.g. dwarf and semi-dwarf varieties suitable for intensive cultivation) and thus increasing their productivity. They became the front-runners in Uzbekistan's agriculture.

After the land reform following the independence of Uzbekistan, there were several changes affecting farm types and sizes, mostly due to the changes (increase) in obligatory minimum land sizes. In the past decade, there were also a few, but slighter, corrections affecting land sizes and the farm sector.

The latest change affecting the typology and sizes of farms was prescribed by the 2019 Resolution of the Cabinet of Ministers No. 14 "On additional measures to optimize the land plots of farms and other agricultural enterprises and effective use of cultivated areas in agriculture". It redefined (in fact, increased) the minimum area for different farm types, based on their crop specialization. For cereal and cotton farms, the minimum land size is at least 100 ha; for farms growing cereals and vegetables, 20 ha; for orchards and vineyards, 10 ha; and for farms growing vegetables and gourds, 5 ha. Dekhan farms must be between 0.3 ha and 1 ha, regardless of the type of their (main) crops. The expected result of this regulation is to restructure and increase average farm sizes by prescribing greater land sizes for different types of farms, to promote the active use of land for homestead landowners, promote rural job creation, increase rural income levels and ensure raw material for the meat and dairy sector, i.e. to support agricultural diversification.

Due to the Government measures aimed at increasing the effectiveness of agriculture (among other matters)

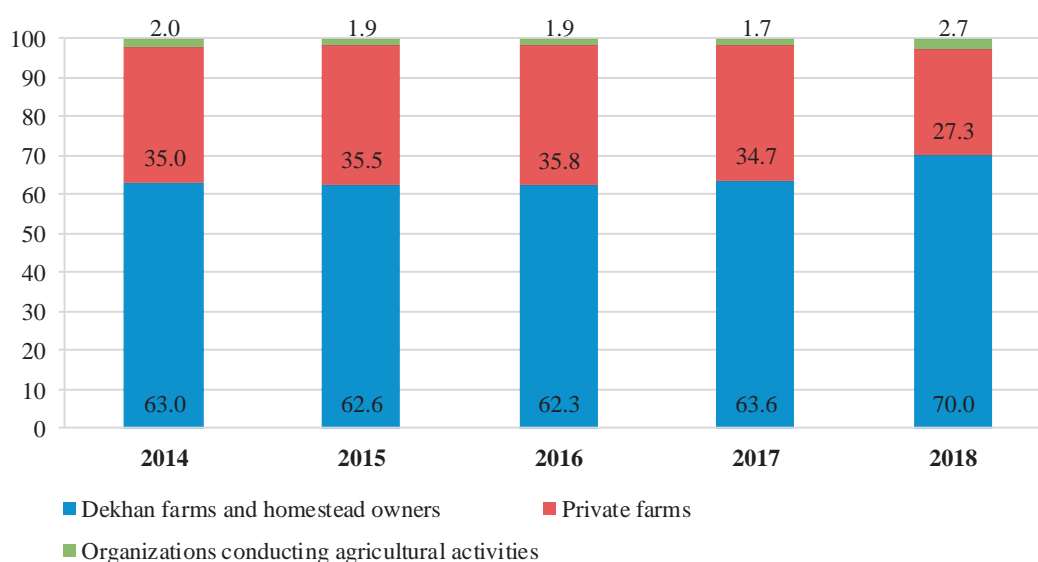
through increasing the size of farms, there was a steady rise in the number of private farms after 2010; their number more than doubled, from 66,134 in 2010 to 151,123 as at 1 December 2018. In the same period, the number of dekhan farms and homestead landowners increased only moderately, from 4,773,013 to 4,952,035. On the other hand, in the period 2014–2017, despite the doubling in number of private farms, their share in the structure of agricultural production remained stable, varying between 34.7 per cent and 35.8 per cent, while the share of dekhan farms (together with homestead landowners) varied between 62.6 per cent and 63.6 per cent (figure 13.4). From 2017 to 2018, the structure of production by farm type changed: the share of dekhan farms has reached 70 per cent, while the share of private farms in production has decreased from 34.7 per cent to 27.3 per cent. According to the estimation of the Council of Farmers, Dekhan Farms and Owners of Household Lands of Uzbekistan, there were approximately 4.7 million homestead landowners, 500,000 dekhan farms and 160,000 private farms before the newly introduced changes affecting the typology of farms in January 2019.

The Government has recognized the possible gains in agricultural production by cooperatives, and so has started to introduce clusters as forms of cooperative production (2018 Resolution of the Cabinet of Ministers No. 53). Despite this currently being clearly a top-down initiative of the Government applied in some pilot areas in cotton production, the Government has ambitious plans to involve all the cotton fields in clusters and also expand clusters to other agricultural subsectors by 2020.

### *Prevailing agricultural practices*

#### Use of fertilizers and pesticides

The use of mineral fertilizers is very high in Uzbekistan. The high consumption is a basic precondition for agricultural production on irrigated lands in Uzbekistan because of the problem caused by poor irrigation techniques, which causes the loss of nutrients (mostly nitrogen and phosphorus) from the soil; thus, the soil fertility would be very low without the use of fertilizers. For international comparison, Uzbekistan used much more fertilizer (233 kg/ha) than the world average (141 kg/ha) in 2016 (figure 13.5). In the period 2009–2016, fertilizer use in Uzbekistan was 60–70 per cent higher than the world average and more than five times higher than the average in Europe and Central Asia (excluding the high-income countries). Fertilizers are mainly applied before the autumn sowing and in the early spring sowing.

**Figure 13.4: Structure of agricultural production by farm type, 2014–2018, per cent**

Source: State Committee on Statistics, 2019.

**Photo 13.2: Bukhara street market**

Photo credit: Ms. Alessandra Fidanza

Organic fertilizers are widely used in the country, the volume (weight) of their consumption being 20 times higher than that of mineral fertilizers (figure 13.6). Manure makes up a significant proportion of the organic fertilizers in use and it is an essential input for maintaining the soil fertility of irrigated lands. Organic fertilizers are applied before the autumn sowing (20–30 tons per 0.5 ha) and, in addition to the sowing period, they are also mixed with mineral fertilizers and applied. Compost is produced along with cattle and poultry manure, tree leaves, rhizomes and phosphate fertilizers. Such compost is ready in 120–130 days.

About 12–15 tons per ha are applied as finished compost.

Pesticides are mainly used to protect sowing seeds from pests and diseases, as well as for spraying crops for protection from pests, diseases and weeds during the growing season. As a measure to prevent negative impacts of plant protection products on human health and the environment, SCEEP conducts EIA/SEE procedures for new plant protection products prior to their registration.

Over the past 10 years, the use of chemical plant protection products has decreased more than fourfold. This is mainly due to the government policy that promotes biological plant protection. More than 1,500 biological laboratories for processing crops by biological methods have been created in the country. According to the 2017 data, the volume of pesticides applied to arable land was 0.4 kg/ha, whereas, in the past (in the final years of the Soviet Union), it was 15–19 kg/ha, although the area where pesticides were applied to cotton and wheat increased between 2016 and 2018, from 3.4 million ha to almost 5.0 million ha nationwide, primarily through increases in such areas in Andijan, Bukhara, Namangan, Tashkent and Fergana Oblasts (table 13.3).

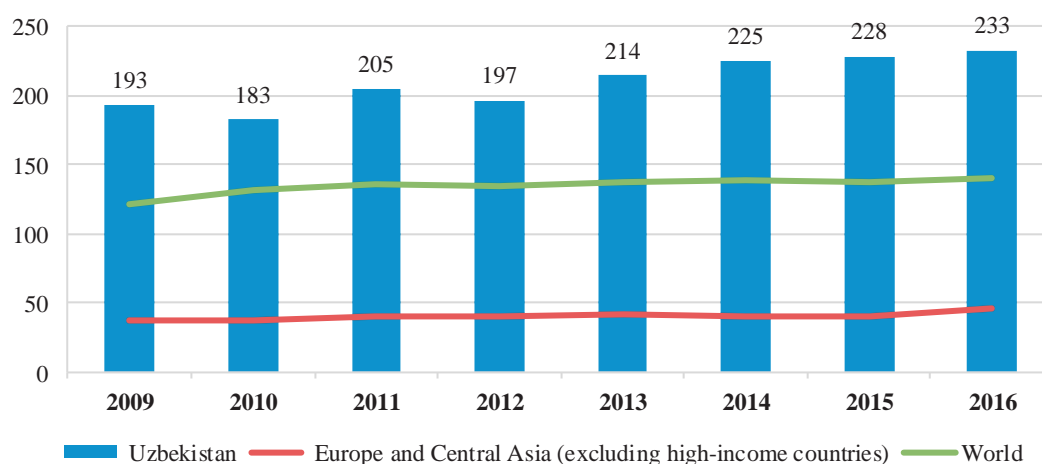
#### Use of genetically modified organisms

In Uzbekistan, the use of GMOs is not regulated by the law or controlled by any state body, although the Ministry of Health adopted SanPiN No. 0366-19, which covers food safety, including GMOs.

#### *Water use for irrigation*

In Uzbekistan, roughly 90 per cent of the surface water is allocated for agricultural use (officially, to ensure food security, i.e. sufficient food to cover domestic consumption) each year.

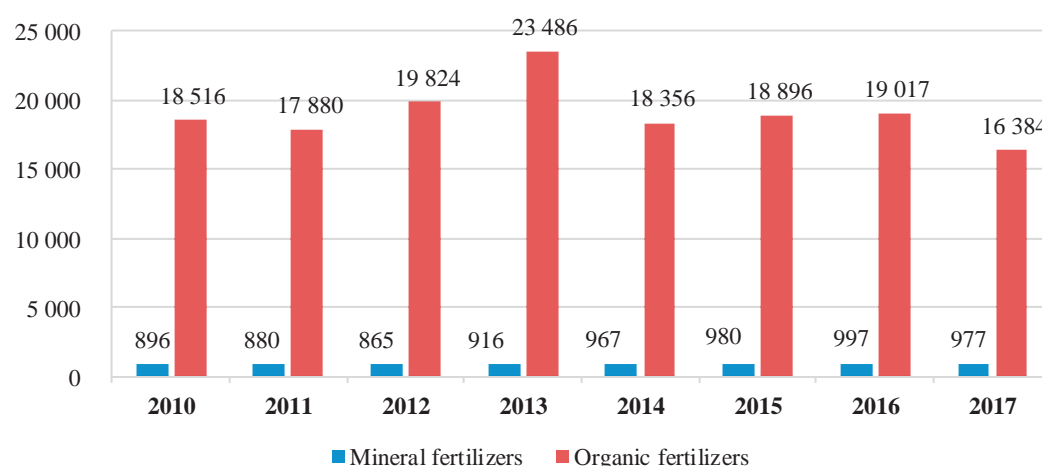
**Figure 13.5: Fertilizer use, 2009–2016, kg/ha**



Source: World Bank, World Development Indicators

(<https://databank.worldbank.org/data/reports.aspx?source=2&series=AG.CON.FERT.ZS&country=#>).

**Figure 13.6: Mineral and organic fertilizer use, 2010–2017, million tons**



Source: Ministry of Agriculture, 2019.

In accordance with the 2013 Resolution of the Cabinet of Ministers No. 82, the Department for Definition and Planning of Water Consumption in Agriculture of the Ministry of Agriculture determines the water demand by agricultural crop type and submits it to the Ministry of Water Management to set the water limits. The territorial (oblast) departments of the Ministry of Agriculture define the water resource needs for agricultural water users on the basis of information provided by specialists of district departments of agriculture. Specialists determine water resource needs jointly with water user associations (WUAs), which conclude contracts for water supply with basin irrigation system administrations (BISAs). Agricultural water users (private and dekhan farms) sign water supply agreements with their respective WUA and the concluded agreements are registered with the district departments of agriculture. WUAs are expected to incorporate different water users and uses beyond farmers and farming. Most decision-making in irrigation management and WUAs is male dominated (box 13.1).

Due to the hot and dry climate, almost 95 per cent of the cultivated area must use irrigation for crop growing. The average rainfall in most areas is 400–800 mm annually and temperatures in the main growing season often exceed 45°C, resulting in severe soil salinization. Most of the irrigation water demand must be met from rivers and connected channels. Around 44 per cent of the total irrigated area is in the Syr Darya River basin and 56 per cent in the Amu Darya River basin.

In the period 2009–2017, total water use in agriculture varied between 43 km<sup>3</sup> and 54 km<sup>3</sup>, depending on the available water sources in a given year, but its share of the total water use remained stable at around 89–92 per cent (table 13.4). Between 14.6 km<sup>3</sup> and 17.7 km<sup>3</sup> of water is lost annually by agricultural activities, meaning that around one third of the total water use in this sector is lost. By reducing or eliminating water losses, the country would be able to solve the problem of a forecast water deficit and save enough water to make reservoirs to mitigate the fluctuations in annual available water quantity caused by the variability of precipitation.

**Table 13.3: Use of pesticides on cotton and wheat, 2016–2018, 1,000 ha**

	2016	2017	2018
<b>Uzbekistan</b>	<b>3 374.3</b>	<b>3 625.1</b>	<b>4 993.0</b>
Republic of Karakalpakstan	60.5	65.5	52.6
Andijan	294.3	338.9	499.6
Bukhara	65.0	162.3	194.6
Jizzakh	349.7	386.9	420.9
Kashkadarya	308.8	310.0	400.5
Navoiy	99.1	119.0	154.3
Namangan	282.7	334.8	514.1
Samarkand	304.7	242.1	405.5
Surkhandarya	738.9	436.7	485.2
Syrdarya	321.8	339.3	373.3
Tashkent	328.0	378.3	541.0
Fergana	185.7	456.9	895.0
Khorezm	35.3	54.5	56.4

Source: Ministry of Agriculture, 2019.

#### **Box 13.1: Gender aspects of irrigation management**

Most decision-making in irrigation systems on water allocation and irrigation management remains male dominated. Nevertheless, changes in these patterns have taken place in recent years. Due to the annual departure of male seasonal labourers, but possibly also because of the culturally protected role of women in Uzbek society, women have become more active in irrigation and water management within the village boundaries.

Women's new roles in this domain are often defined according to age groups. While young women irrigate, elder women negotiate with men, including mahalla mirabs (community water masters), WUA mirabs and local authorities.

The increased involvement of female small-scale water users challenged traditional irrigation-specific gender roles. However, these new roles for women have not been institutionalized so far within the village setting (mahalla staff) or within WUAs.

Source: Nozilakhon Mukhamedova and Kai Wegerich, "Integration of villages into WUAs: The rising challenge for local water management in Uzbekistan", *International Journal of Water Governance*, No. 2 (March 2014).

**Table 13.4: Water use in agriculture, 2009–2017, km<sup>3</sup>**

	2009	2010	2011	2012	2013	2014	2015	2016	2017
Total water use	50.2	57.2	48.8	56.1	54.0	51.8	55.1	54.6	58.9
of which:									
Agriculture	44.7	51.6	43.4	50.9	48.9	46.9	50.0	49.4	53.7
of which:									
Water losses	15.1	17.2	14.6	16.8	16.2	15.5	16.5	16.4	17.7

Source: Ministry of Water Management, 2019.

In theory, the Government's crop diversification policy should decrease water consumption because water demand for cotton growing is higher than water demand for irrigation of most other crops (including the majority of fruits and vegetables). According to the study "Water footprint of cotton, wheat, and rice production in Central Asia",<sup>28</sup> in Uzbekistan, an estimated 4,426 m<sup>3</sup> of water is required to grow 1 ton of cotton and 2,068 m<sup>3</sup> to grow 1 ton of wheat, while horticultural crops, for example, require much less water. According to the Ministry of Water Management, an estimated 2,234 m<sup>3</sup> of water is required to grow 1 ton of cotton, while 1,066 m<sup>3</sup> water is required to grow 1 ton of wheat in Uzbekistan. These data suggest that water requirement for growing cotton is more than double than that for wheat in Uzbekistan. International methodologies suggest that apples require about 820 m<sup>3</sup> of water per ton of yield. Considering that new orchards in Uzbekistan generally apply new technologies and drip irrigation, they would most likely require even less water than international average values suggest.

## 13.2 Pressures from agriculture

### *Greenhouse gas emissions*

The agricultural sector is the second biggest emitter of GHGs in Uzbekistan. The GHG emissions in this sector increased by 27.1 per cent in the period 1990–2012, amounting to 21.65 million tons of CO<sub>2</sub>-eq. in 2012 (table 7.1), while the sector's share of total emissions in this period also increased slightly, from 9.4 per cent to 10.5 per cent, as a result of the development of livestock breeding. Methane emissions in the sector increased by 98.2 per cent, due to an increase in the number of cattle and sheep. Nitrous oxide emissions decreased by 17.3 per cent as a result of a reduction in the amount of nitrogen fertilizers applied to agricultural soils.

According to the Food and Agricultural Organization of the United Nations (FAO), enteric fermentation has accounted for the major part (50.86 per cent, on average, in the period 2010–2017) of the agricultural GHG emissions (figure 13.7), while synthetic fertilizers were the second largest source of GHG emissions (15.78 per cent).

### *Soil*

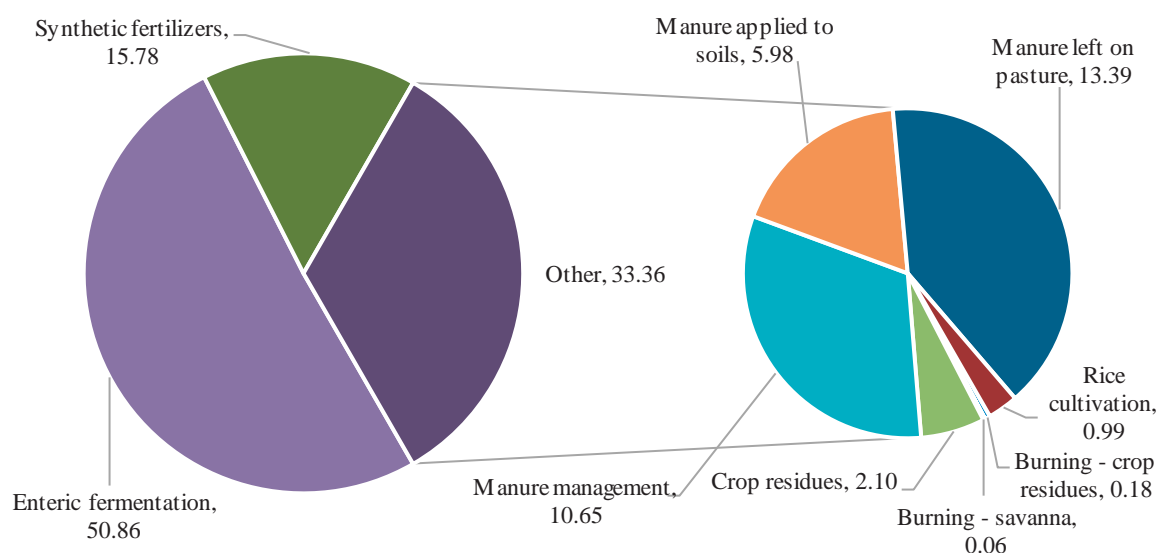
According to some estimates, more than 60 per cent of the total irrigated agricultural land in Uzbekistan (3,702,400 ha in 2018)<sup>29</sup> is classified as affected by salinity and around half of this is moderately or highly saline. The situation with soil salinization is getting worse due to the poor maintenance of the irrigation and drainage infrastructure.

Due to large-scale cotton monoculture, the lands used for such purposes without applying adequate crop rotation measures or cultivation techniques are degraded and often affected by low soil fertility caused by poor soil structure and low organic content.

According to the analysis made for the preparation of the 2019 Law on Pastures, 78 per cent of the pasture lands are degraded, which primarily means that the soil is degraded. The status of the remaining pastures is also not satisfactory; their productivity has decreased by half, demonstrated by the fact that the yield of fodder crops has decreased by an average of 2 per cent per ha. In most of the pasture lands, farmers need to buy fodder even during the grazing season, due to the declining soil productivity. As at 2019, there has been no systematic practical work carried out to identify, restore and increase the yield of degraded pastures.

<sup>28</sup> M. M. Aldaya, G. Muñoz and A. Y. Hoekstra, "Water footprint of cotton, wheat, and rice production in Central Asia", Value of Water Research Report Series, No. 41 (Delft, the Netherlands, UNESCO-IHE Institute of Water Education, 2010).

<sup>29</sup> According to the Ministry of Agriculture, total irrigated land was 4,198,900 ha at the beginning of 2018, while total irrigated agricultural area was 3,702,400 ha.

**Figure 13.7: GHG emissions from agricultural activities, 2010–2017, per cent**

Source: FAOSTAT, 2019.

### Water

Agriculture is by far the biggest water user. There is pressure from agriculture not only on water quantity but also on water quality. Because of the widespread practice of “washing” the fields with water to decrease soil salinization, water quality is also affected. Farmers usually wash their fields twice every year (first after the harvest and then before sowing) and the water used for washing is directed back to the irrigation channels and rivers, and it might contain pesticides and other pollutants. It is the source of secondary salinization and contributes to the toxic sandstorms in the Aral Sea area. Unofficial sources also claim that there are POPs and heavy metals present in the watercourses, especially in the western part of the country where these substances might already reach critical levels, but there are no measurements to prove or reject these suspicions.

### Aral Sea region

The Aral Sea disaster was caused by the overuse of the water of the Amu Darya and Syr Darya Rivers, almost exclusively for irrigation. Agriculture is also responsible for residues of pesticides in the Aral Sea and its former basin.

### Biodiversity

More than 20 per cent of pastures and hayfields in Uzbekistan have been facing serious loss of biodiversity. The number of plant species that grow on the pastures fell from more than 270 species in the 1990s to only 42 in 2019.

### 13.3 Organic agriculture

Government officials working in agriculture in Uzbekistan have already recognized the importance of organic farming and its possible role in further improving the exports balance. Some activities were undertaken in recent years to promote organic production, but the legal framework is still lacking, so the country does not issue certifications for organic agricultural products.

Despite the lack of a related legal framework, organic production is already ongoing in the country. According to the Ministry of Agriculture, 5,645.4 ha are certified for organic products (by foreign certification organizations), including 5,000 ha of wild plants (capers) and 645.4 ha of fruit, which are mostly exported as dried products (apricots, mulberries, almonds); in addition, 1,000 ha (pulses) are in a transitional stage to organic certification.

The Centre for Standardization of Agriculture under the Ministry of Agriculture carried out research related to organic agriculture for the period 2015–2018. As a result of the study, the Plan of practical measures for the integrated development of organic agriculture, the production of organic agricultural and food products in the Republic of Uzbekistan for the period 2019–2022 was adopted by the Prime Minister (19 January 2019, No. 03/1-4665) and is under implementation. Also, a draft law on organic agriculture and the production system has been developed and, as at March 2019, the draft was under consultation with the concerned ministries. The state standards on organic production have already been adopted: O’z DSt 3084:2016 “Organic agricultural and food products.



Terms and definitions” and O’z DSt 3290:2018 “Organic agricultural and food products. Rules of production, storage and transportation”. A draft procedure for conducting voluntary certification has been developed and it is also under consultation within the Government. A national label (logo) for organic products is under development, as are the concept of the certification system and certification bodies in the field of organic production. The Centre for Standardization of Agriculture periodically organizes training and seminars for farmers, dekhkan farmers and other agricultural enterprises on organic farming.

A significant contribution to the design of the national framework of organic agriculture in Uzbekistan was made by the FAO project “Institutional capacity building for the development of organic agriculture and the promotion of good agricultural practice in Uzbekistan”, which was implemented in the period 2015–2018.

### 13.4 Impact from and adaptation to climate change

The results of observations of agroclimatic indicators prepared for the Ministry of Agriculture show a shift in the dates of steady transition of average daily air temperature over 5°C, 10°C and 15°C thresholds during spring or autumn towards winter, therefore indicating an increase in the length of the growing season throughout Uzbekistan. On average, the rate of such an increase is three days over 10 years across the country.

A statistically significant increase in effective temperatures has been revealed, which, by the 2030s, may already exceed the current variability by 1.5–2 times. Such changes will inevitably affect the yields of currently cultivated crop varieties.

Increasing moisture deficit is also expected, according to all GHG emission scenarios, throughout the country, and generally mirrors the rate of increase in effective air temperatures. According to the scenarios, in the period 2021–2040, on average, an increase of 11–14 per cent in moisture deficit is expected in Uzbekistan. According to estimates based on the CropWat model, in the desert and steppe zones, moisture evaporation from cotton, vegetable, melon and gourd crops, alfalfa and tree plantations is expected to increase by 5–7 per cent by the 2030s and 8–15 per cent by the 2050s, relative to climatic norms. In the foothill zone, the rate of increase in evaporation is lower. Calculations show that for most crops (cotton, alfalfa, vegetables, fruit) concentrated on arable land in the desert and foothill zones, as a result of increased evaporation, irrigation will increase by

5.8–7.3 per cent up to 2030 and 9.7–15.0 per cent up to 2050.

Due to climate change, an increase in the number of days with abnormally high air temperatures may lead to a decrease in cotton yields in some areas of the Bukhara, Kashkadarya, Tashkent and other oblasts. Yield losses due to the effect of ballast temperatures (above biological minimum) can reach 10–12 per cent in the southern cotton-growing areas. Due to the poor precipitation, the yield of grains in dryland farming areas may decrease by 15–20 per cent.

In the pastures, the expected increase in air temperature by 2050 will lead to the formation of vegetative winters, which will contribute to better growth of vegetation in spring, but the yield of ephemeral pastures may decrease. Increasing temperature in the warm season, with reduced water availability, will worsen the conditions for the formation of feed stocks and create difficulties in the livestock sector. The growing number of hot days will increase the heat pressure on grazing animals in the pasture in the summer, which can cause a decrease in weight gain or even weight loss.

Climate change projections for Uzbekistan by the World Bank estimate that, between 2005 and 2050, the country’s water demand will increase from 59 km<sup>3</sup> to 62–63 km<sup>3</sup> and the available water resources will decrease from 57 km<sup>3</sup> to 52–54 km<sup>3</sup>, resulting in a fivefold increase in the present water deficit (from about 2 km<sup>3</sup> to 11–13 km<sup>3</sup>).

### 13.5 Legal, policy and institutional framework

#### *Legal framework*

Although there is a proper legal framework in the form of laws for most of the agriculture-related activities and issues, the legal environment has been changing rapidly over the past decade, due to the Government’s efforts to modernize agriculture. These changes were introduced predominantly in the form of presidential decrees and governmental resolutions, which, in some cases, changed several times over the past few years and sometimes had implications that necessitated implementation in a very short time frame. These changes were hard to follow for the stakeholders, especially those outside the governmental structures, such as dekhkan farmers.

The 1998 Law on Dekhan Farms sets the definition of dekhkan farms, as well as the basic terms and conditions for their operation.

The 2004 Law on Farms defines the basic rules and conditions for establishing and operating the private farms as the biggest agricultural units.

The 2019 Resolution of the Cabinet of Ministers No. 14 “On additional measures to optimize the land plots of farms and other agricultural enterprises and effective use of cultivated areas in agriculture” modified the terms and conditions for the different types of agricultural organizational units with the objective to further enhance the effectiveness of land use.

The 1998 Land Code regulates land-related activities in order to ensure rational use and protection of lands, the reproduction of and increase in soil fertility, and preservation and improvement of the natural environment.

The 2000 Law on Protection of Agricultural Plants from Pests, Diseases and Weeds regulates protection of agricultural plants and prevention of harmful influence of the plant protection products on human health and the environment.

The 2015 Law on Veterinary Medicine regulates veterinary medicine and veterinary welfare, the veterinary system and management, and the rights and obligations of owners of animals, products and raw materials of animal origin.

The 2019 Law on Pastures defines the legal status of pastures and sets the policy directions related to pastures and the rules for the protection, restoration and development of pastures.

The 2018 Resolution of the President No. 3626 “On additional measures for improvement of the efficiency of the State Plant Quarantine Service” established so-called “plant clinics” (of which there were more than 120 as at March 2019) for the promotion of biological processing and treatment of plants against pests.

A number of legal acts provide for economic incentives to introduce water-saving techniques in agriculture, including:

- Subsidies (8 million sum per ha) to raw cotton producers for introducing drip irrigation techniques (2018 Resolution of the President No. 4087);
- Subsidies (8 million sum per ha) to vineyard producers for introducing drip irrigation techniques at new vineyards (2019 Resolution of the President No. 4161);
- Subsidies (up to 6 million sum per ha) to owners of new orchards and greenhouses for introducing

water-saving techniques based on drip irrigation or sprinkler irrigation (2019 Resolution of the President No. 4246).

#### *Policy framework*

The main directions of the development of agriculture are defined in the Action Strategy on Five Priority Directions for Development for the period 2017–2021. The Strategy explicitly sets the goal of increasing the efficiency of the agricultural sector through improving the welfare of the population nationwide and reducing Government’s involvement in the regulation of the socioeconomic development of the country, promoting the role of the private sector, increasing the role of NGOs and expanding cooperation with international development institutions. The main objectives for rural development are:

- Deepening the structural reforms within the agrarian sector and the diversification of agricultural production;
- Accelerating the sector’s modernization;
- Promoting the development of the food industry while increasing the processing levels of local agricultural raw materials.

The Action Strategy did not define measurable targets and indicators for agriculture, nor did it prescribe environmental considerations for the development of the sector.

The 2012 Programme for Further Modernization, Technical and Technological Upgrade of Agricultural Production for the period 2012–2016 (2012 Resolution of the President No. 1758) has been adopted with the objective to accelerate the technical modernization of agricultural production. It defined the general framework for the introduction and expansion of modern agricultural machinery and equipment for domestic food production. Even though it did not define any environmental requirement to be met when implementing the programme, technological modernization would certainly contribute to the resource efficiency of the agricultural sector due to the better performance of new equipment.

The 2018 Roadmap on Profound Reform of the Agricultural and Food System (2018 Resolution of the President No. 3671) comprises 50 measures. Most of them aim to increase agricultural productivity by further liberalization of agricultural production and the market and by setting deadlines for some technological and structural changes and modernization measures for the most important agricultural subsectors. Only measure no. 5 contains

explicit environmental goals, since it prescribes the “development and introduction of the mechanism to stimulate farms that take measures to improve soil fertility, land reclamation, introduction and application of water-saving technologies and soil protection, with the definition of specific criteria for assessing the effectiveness of these measures”. The deadline for its implementation was 1 November 2018; however, there is no report on the fulfilment of activities related to this measure. Measure no. 41 relates to the improvement of domestic seed production of cereal crops, fruit and vegetables, and it also aims to gradually increase the area where local varieties are grown, which might contribute to better adaptation to the local land and climatic conditions, as well as to adaptation to climate change in the longer run by the careful selection of traditionally heat-resistant and less water-demanding seed varieties.

The 2013 State Programme for Improvement of Land Reclamation in Irrigated Lands and Rational Use of Water Resources in the period 2013–2017 (2013 Resolution of the President No. 1958) defined exact and measurable objectives for the expansion of water-saving techniques for 2017 and an annual breakdown for the period 2013–2017, as follows:

- Introduction of drip irrigation in gardens, vineyards and when growing vegetables and melons on 25,000 ha;
- Introduction of alternative methods of cotton furrow irrigation (using mobile flexible irrigation pipes) on 34,000 ha;
- Introduction of cotton irrigation technology on screen film furrows on 45,600 ha.

The 2017 Programme of Comprehensive Measures on the Development of Irrigation, Improvement of Land Reclamation of Irrigated Lands and Rational Use of Water Resources in the period 2018–2019 (2017 Resolution of the President No. 3405) set additional goals for 2018 and 2019 related to the expansion of water-saving techniques; in fact, it is a continuation of

the previous programme in terms of water-saving technologies. The goals for 2018 and 2019 are:

- Introduction of a drip irrigation system in orchards, vineyards and plantings of other crops on 22,060 ha;
- Introduction of alternative methods of cotton furrow irrigation (using mobile flexible irrigation pipes) on 83,000 ha;
- Introduction of cotton irrigation technology on shielded foil furrows on 26,600 ha.

The Programme has also defined a new objective related to combating wind erosion: the creation of forest shelter plantations to combat wind erosion of irrigated land and sand entering water management facilities on 2,995 ha in 2018–2019.

In 2019, the target to introduce water-saving techniques in the period 2019–2022, of 253,381 ha of cultivated lands was approved (2019 Decree of the President No. 5742).

These objectives show that the Government has recognized the importance of water saving and the techniques necessary to achieve it, for the further development of the domestic agricultural sector. According to the Ministry of Water Management, the total area under water-saving techniques reached 413,200 ha or 9.6 per cent of irrigated lands in the period 2013–2019. This points to the need to accelerate the expansion of water-saving techniques.

The development strategy for the agricultural sector that will define the vision and strategic objectives until 2030 is under development and consultation as at March 2019.

*Sustainable Development Goals and targets relevant to this chapter*

The current stand of Uzbekistan vis-à-vis targets 2.3, 2.4, 2.5, 2.a and 5.a of the 2030 Agenda for Sustainable Development is described in box 13.2.

**Box 13.2: Targets 2.3, 2.4, 2.5, 2.a and 5.a of the 2030 Agenda for Sustainable Development**



**Goal 2: End hunger, achieve food security and improved nutrition and promote sustainable agriculture**

**Target 2.3: By 2030, double the agricultural productivity and incomes of small-scale food producers, in particular women, indigenous peoples, family farmers, pastoralists and fishers, including through secure and equal access to land, other productive resources and inputs, knowledge, financial services, markets and opportunities for value addition and non-farm employment**

The national target 2.3 (By 2030, significantly increase the average agricultural productivity and incomes of food producers) is very similar to the global target, although less ambitious and with a non-quantified goal.

National indicator 2.3.1 (Yields of the main types of crops by farm categories) is different from the global indicator, but the national one seems to be adequate for expressing and describing the development of agricultural productivity in Uzbekistan. The national indicator 2.3.2 is identical to the global one without separate data by gender and indigenous status. The latter is not relevant in the case of Uzbekistan.

In the last several years, government policies and measures are working towards increasing agricultural productivity. This is supported by subsequent deregulation measures and increasing support, particularly for mid- and small-scale farmers. The Government has recognized the potential of the farming done by the so-called homestead landowners, especially in vegetable and fruit growing, and thus a growing number of measures are aimed at improving their income status by allowing and encouraging them to be freely involved in the domestic and export markets and to establish professional business.

**Target 2.4: By 2030, ensure sustainable food production systems and implement resilient agricultural practices that increase productivity and production, that help maintain ecosystems, that strengthen capacity for adaptation to climate change, extreme weather, drought, flooding and other disasters and that progressively improve land and soil quality**

The national target 2.4 and indicator 2.4.1 are identical to the global ones.

In Uzbekistan, the application of “productive and sustainable agriculture” techniques is at a very low level. Only drip irrigation has expanded over the past decade, but not enough to qualify sufficient land as being under productive and sustainable agriculture, and neither has the share of drip irrigation reached a level that is measurable within the category of irrigated land. Other sustainable agricultural practices (such as organic agricultural production) are even less present in the country and are mostly practised as a result of pilot projects and other small-scale initiatives.

**Target 2.5: By 2020, maintain the genetic diversity of seeds, cultivated plants and farmed and domesticated animals and their related wild species, including through soundly managed and diversified seed and plant banks at the national, regional and international levels, and promote access to and fair and equitable sharing of benefits arising from the utilization of genetic resources and associated traditional knowledge, as internationally agreed**

The methodology has been defined for both global indicators for this target (indicator 2.5.1: Number of plant and animal genetic resources for food and agriculture secured in either medium- or long-term conservation facilities; indicator 2.5.2: Proportion of local breeds classified as being at risk, not at risk or at unknown level of risk of extinction), but, as at March 2019, there were no experts or units within the Ministry of Agriculture designated to deal with the identification of plant and animal species for the purposes of these indicators.

The national target 2.5 is identical to the global one, but the national indicator 2.5.1 (The ex situ/in situ diversity enrichment index) is different from the global indicator, while the national indicator 2.5.2 (Number of local crops and breeds and their wild related species that are at risk of extinction) is similar to the global indicator, with the difference that crops are also included in the national indicator).

**Target 2.a: Increase investment, including through enhanced international cooperation, in rural infrastructure, agricultural research and extension services, technology development and plant and livestock gene banks in order to enhance agricultural productive capacity in developing countries, in particular least developed countries**

The national target 2.a and two indicators correspond to the global ones.

Due to the strong government commitment to the development of agriculture and, especially, to promoting crop diversification and livestock breeding, the share of the state budget allocated to agriculture has been increasing in recent years: between 2014 and 2017, it increased by 64 per cent, from 1,447.9 billion sum to 2,379.3 billion sum. However, within the structure of the agricultural investments there was a shift from direct state funding towards financing secured through companies and organizations and commercial banks: the share of the state budget has decreased from 37 per cent to 23 per cent in the period 2014–2017, while companies' share has increased from 21 per cent to 38 per cent.



**Goal 5: Achieve gender equality and empower all women and girls**

**Target 5.a: Undertake reforms to give women equal rights to economic resources, as well as access to ownership and control over land and other forms of property, financial services, inheritance and natural resources, in accordance with national laws**

National target 5.a (Expand women support programmes to exercise their rights and interests in the social and economic sphere) is different from the global one, while the national indicators correspond to the global ones.

According to government data, in 2016, 5.4 per cent of farms (8,105 farms) nationwide were managed by women, but the proportion of women managers was much higher in Bukhara Oblast (19 per cent), the Republic of Karakalpakstan (13.5 per cent) and Khorezm (9 per cent) and Jyzzakh (8 per cent) Oblasts. The share of women owners is increasing. Under the Committee on Women of Uzbekistan, there is a sector on agricultural issues that is in the process of situation analysis related to women's roles, participation and representation in agriculture.

*Institutional framework*Ministry of Agriculture

Since 2018, the Ministry of Agriculture has most of the state responsibilities related to agriculture except land management, land melioration and water management, which are the responsibility of other ministries or state committees.

The division of the former Ministry of Agriculture and Water Resources, as well as other organizational changes affecting agriculture in 2018, have not been prepared thoroughly (e.g. the land melioration unit remained in the Ministry of Water Management while being of primary importance to agriculture).

Ministry of Water Management

The Ministry of Water Management is in charge of issues related to surface waters and responsible for land melioration and maintenance and restoration of the quality of soils.

Ministry of Health

The Ministry of Health is responsible for the issues related to GMOs; however, it conducts GMO testing only on request by private entities.

State Committee on Ecology and Environmental Protection

The State Committee on Ecology and Environmental Protection (SCEEP) has some minor responsibilities related to agriculture, especially the issues that are directly related to protection of the environment, e.g. the 2019 Law on Pastures assigns SCEEP to carry out ecological expertise and ecological control related to pastures.

State Plant Quarantine Inspectorate

The State Plant Quarantine Inspectorate under the Cabinet of Ministers performs phytosanitary control of all the agricultural crops that are exported from or imported into the country. Until 2017, this Inspectorate was under the Ministry of Agriculture, but since 2018 it is subordinated directly to the Government in order to allow better accountability and improve its activity. This shows the Government's determination to improve the effectiveness of measures for plant quarantine, improve the state phytosanitary control system and, ultimately, increase exports of agricultural products by strengthening their quality control.

State Committee for Veterinary Medicine and Animal Husbandry Development

The State Committee for Veterinary Medicine and Animal Husbandry Development is responsible for protecting animal health and the development of animal husbandry and the production, export and import of animals and their products in accordance with veterinary and sanitary rules and regulations, as well as control of compliance with veterinary legislation.

State Committee on Statistics

The State Committee on Statistics conducts the collection and publication of statistical data related to agriculture.

Inspectorate for Control of the Agro-industrial Complex under the Cabinet of Ministers

The organizational background for inspections related to agriculture has been reorganized twice – first, as of August 2018 and again in 2019. The Inspectorate for Control of the Agro-industrial Complex and Ensuring Food Security within the General Prosecutor's Office has been transformed into the Inspectorate for Control of the Agro-industrial Complex under the Cabinet of Ministers in accordance with the 2019 Decree of the President No. 5690. From 1 August 2018, inspections related to the quality of cotton, previously undertaken by the Uzbek Centre for the Certification of Cotton Products, have been also incorporated into the Inspectorate.

Uzstandard

Uzstandard awards so-called compliance certificates for agricultural products after the products have obtained the relevant hygiene, quarantine, ecological and veterinary certificates issued by other states bodies. The compliance certificates give the right to distribute a product on the internal market or for export. The list of products for which the certification is obligatory is defined by the 2011 Resolution of the Cabinet of Ministers No. 122 "On additional measures to improve certification procedures and implement quality management systems". All food products and most agricultural products are subject to this obligatory certification scheme. Uzstandard has at least one laboratory in every oblast and eight specialized laboratories for international (export) certification to conduct examinations. The conformity assessment system will face significant changes, starting from 2020, with regard to testing laboratories and product certification requirements (2019 Resolution of the President No. 4419).

Uzstandard has also been involved in the preparation of standards for organic agriculture.

#### Council of Farmers, Dekhan Farms and Owners of Household Lands

By law, the Council has the status of an NGO; however, in fact, it acts as the agricultural chamber of the country with organizational units in oblasts and districts and its activities are regulated by the Government. Membership of the Council is obligatory for private and dekhans farmers (since 1 July 2018) and voluntary for homestead landowners. The Council is recognized by the Government as a priority stakeholder and the official representative of the farmers of Uzbekistan. The activities of the Council are diverse: it offers legal protection to its members, some types of extension services and training to members, accounting services to farmers (free of charge for some types of farmers) and financing (loans) of agricultural activities through a newly established fund and also through Tomorkakhizmati LLC, which is owned by the Council.

The Council's Centre for Agro-innovation acts as a knowledge hub and also de facto as a provider of extension services, by providing information on new technologies and know-how (particularly for irrigation, hydroponic technologies and organic farming). It also cooperates with companies organizing fairs, and with universities, connects foreign actors with farmers to disseminate new

technologies in Uzbekistan and organizes specialized training for women farmers.

#### Uzagroexport

Uzagroexport is the state-owned company for agricultural export promotion, established in 2016. It is also involved in defining the framework of organic farming and implementation of the Government's crop diversification policy.

#### Uzbekbaliksanoat

Uzbekbaliksanoat was established by the Government in 2017 as an association for the promotion of fishing. Uzbekbaliksanoat has branches in all the oblasts and covers the whole value chain of the fishing industry.

#### Association of producers and exporters of walnuts

The Association was established by the President in 2017 (2017 Resolution of the President No. 3025) with the overall objective to promote walnut production and export (box 13.3). The Association is organized as a vertical cluster (both farmers and processing companies can join as members) and consists of the organizations that are already involved in nut research, production and related services. The Association also deals with other nut types (pistachios, hazelnuts, almonds and olives), but walnut production is its focus.

#### **Box 13.3: Association of producers and exporters of walnuts**

The establishment of the Association represents a good example within the agricultural sector because environmental considerations are explicitly included in its mandate (2017 Resolution of the President No. 3025). The Association is assigned to implement and adopt programmes with the aim to create not only modern and high-yielding walnut plantations but plantations that are adapted to local natural-climatic conditions, and to introduce and expand scientifically grounded methods and techniques of walnut growing that are also resource saving.

The Association is also assigned to carry out extension services related to walnut production, such as organization of special courses for agronomists involved in the care of walnut seedlings, to train them in the proper implementation of agrotechnical measures on walnut plantations.

The 2017 Resolution of the President No. 3025 defined a set of measures for promoting and boosting walnut production in the country. Initially, 10,000 ha of land were assigned by different state institutions for planting walnut seedlings with the mandatory introduction of drip irrigation, and US\$50 million was allocated in the form of loans to finance walnut plantation projects. The member organizations of the Association were exempted from customs payments (except customs duties) until 1 January 2020 for the purchase and import of equipment for drip irrigation, specialized agricultural equipment, seedlings, rootstock, graft and walnut seed material.

The Association promotes not only the walnut variety that is currently the most widely grown globally ("Chandler") but also the traditional local variety, "Boy yong'oq". According to its experts, walnut growing has several beneficial effects on the environment. Walnut and other nut plantations are established on non-arable and non-irrigable lands on foothills, hills and mountainous areas, help to fight soil erosion and improve the moisture content of the soil and improve the microclimatic conditions and biodiversity of their surroundings.

*Regulatory and economic measures*Assistance and support to farmers

The State Plant Quarantine Inspectorate gives practical advice to farmers, including field visits and the provision of necessary equipment (e.g. pheromone traps). The “plant clinics” are established as a public–private partnership: the State provides the building and land free of charge for those who open a clinic and the clinics are exempt from payment of all taxes (2018 Resolution of the President No. 3626).

The Council of Farmers, Dekhan Farms and Owners of Household Lands is mandated to provide several types of financial support to farmers (2018 Resolution of the President No. 3680). The Council manages a fund established by the Government for this purpose. Among other matters, the Fund will provide loans to Tomorkakhizmati LLC (the Council’s company) for agricultural production, processing, procurement, supply, trade organizations, the lease or purchase of agricultural machinery and transport, and the purchase of materials and components for the installation of greenhouses. The fund is exempt from all types of taxes and mandatory payments to state trust funds. Also, Tomorkakhizmati LLC is exempted from payment of all types of taxes and mandatory payments to state trust funds in the framework of its core business for three years.

Until 1 January 2021, the importation of equipment for the installation of greenhouses of light construction, agricultural machinery and agricultural vehicles is exempted from customs payments (except for customs clearance fees).

The 2018 Resolution of the President No. 3680 has also introduced a novelty in agricultural pensions: individual homestead landowners who perform home-based activities and work on the basis of a contract concluded with Tomorkakhizmati LLC or with private farms are exempted from paying income tax for individuals and also from mandatory payments to the Pension Fund.

For investments aiming at the introduction of new technologies and drip irrigation, farmers can get 8 million sum in initial assistance and five years of exemption from income tax.

Extension services

Agricultural extension services in Uzbekistan are still mostly based on the network of state research

institutes established in the Soviet period. In practice, this meant that some universities and research institutes conducted training courses for specialists of the agro-industrial complex in the relevant areas. The Centre for Standardization of Agriculture within the Ministry of Agriculture periodically organizes training and seminars for farmers and agricultural companies on new directions in agriculture, in all the regions of the country. However, the promulgation of agricultural knowledge in unsystematic.

In the last decade, some international donor-funded projects contained elements on extension services (boxes 13.4 and 13.5), but the development of extension services remains an important aspect for further improving the sector’s performance and resilience to climate change, especially since small farmers still cannot afford private consultancy services, which are mostly offered by local branches of foreign companies.

*Participation in international agreements and processes*International Plant Protection Convention

Uzbekistan is not a party to the International Plant Protection Convention, although it is cooperating with the Convention and working on accession based on the roadmap prepared internally by the State Plant Quarantine Inspectorate under the Cabinet of Ministers, which is the designated Convention Information Point. As at March 2019, it has participated in a few workshops and training events organized by the Convention Secretariat and has already submitted a national report on the legislation related to phytosanitary requirements, restrictions and prohibitions, which is one of the 10 reporting obligations that full members need to fulfil.

Cartagena Protocol on Biosafety

In late 2019, Uzbekistan acceded to the Cartagena Protocol on Biosafety to the Convention on Biological Diversity. This is a big step forward, since participation in the Protocol would allow the country to prevent possible risks from uncontrolled movements between countries of living modified organisms (LMOs) resulting from modern biotechnology. Furthermore, it is expected that participation in the Protocol would facilitate public awareness and participation in decision-making on the use of LMOs.

**Box 13.4: OSCE project “Support to development of farming and integration by promotion of web technologies”**

The OSCE project “Support to development of farming and integration by promotion of web technologies” (2016–2018) developed a web portal, Agromart ([www.agromart.uz](http://www.agromart.uz)) and a mobile application to promote digitalization in agriculture and provide free consultancy and advisory services to farmers. Once the web page went live, nearly 9,000 agricultural producers and other stakeholders signed up voluntarily. Agromart connects agricultural producers, suppliers and service providers in a marketplace by engaging all players in the supply chain, such as freight forwarders, financial services providers, food terminals and cold storage owners, in order to ease their access to the market.

The web portal also provides farmers with access to the knowledge database and quality, real-time advisory services, in order to reduce the risk for farmers of losing their harvests or missing the right moment for planting. Agromart’s online advisory services aim at promoting sustainable, environmentally friendly farming solutions in Uzbekistan in the sector that is energy intensive and uses pesticides heavily. The web portal actively promotes sustainable farming practices by developing useful materials on applicable solutions on issues such as organic farming and drip irrigation.

**Box 13.5: Mobile application TOMCHI**

The National Project on Water Resources Management in Uzbekistan, financed by the Swiss Agency for Development and Cooperation and implemented by the Ministry of Water Management, created a new mobile application called TOMCHI to attract attention to water conservation issues.

The new platform informs users about water-saving irrigation methods and helps calculate the approximate cost of their implementation. The application was designed for farmers, employees of water management organizations and other water users, as well as entrepreneurs who produce and install water-saving irrigation technologies. It targets specialists working on irrigation and agriculture and students of agriculture-related universities, as well as a wider audience relevant to water management issues.

The application is linked to the knowledge portal of the Information-Analytical and Resource Centre under the Ministry of Water Management.

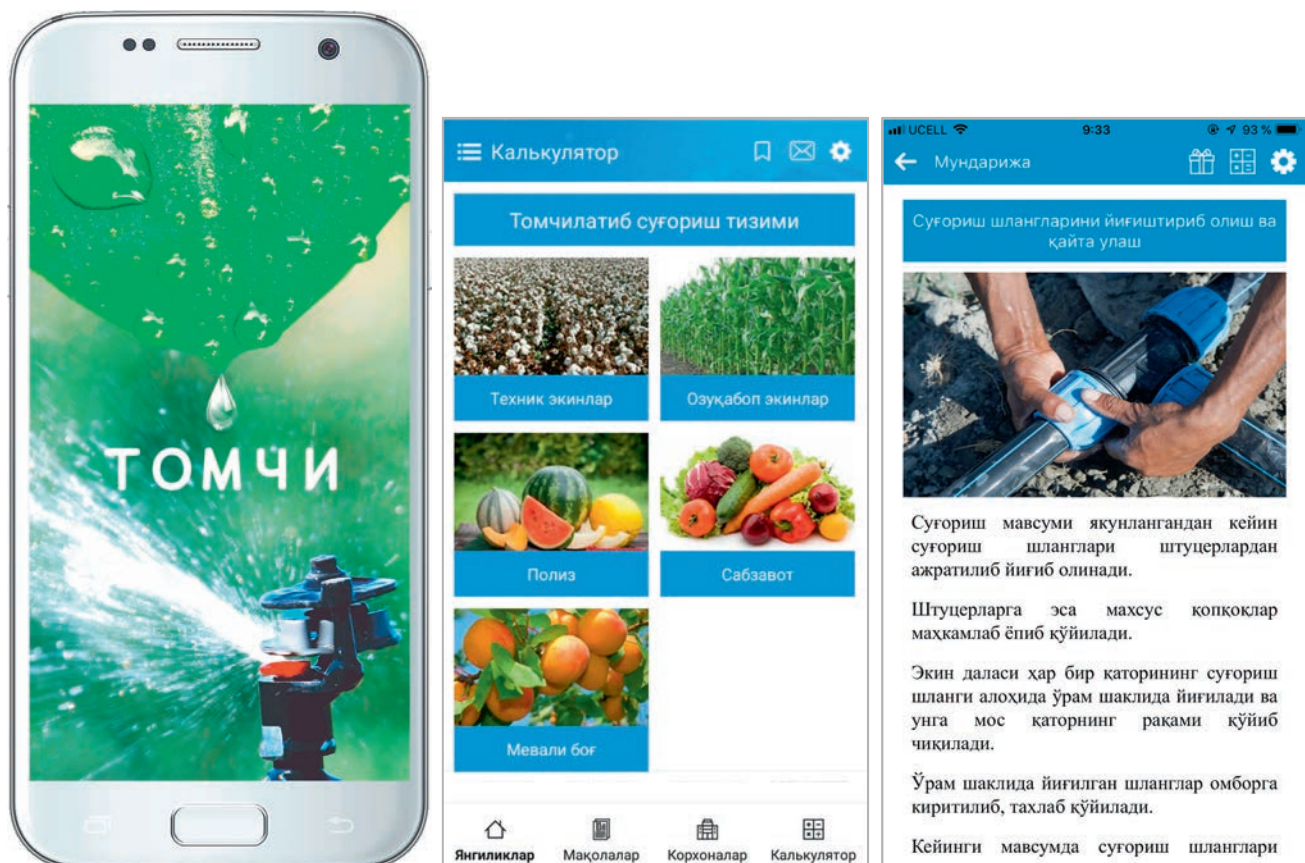
**Photo 13.3: Mobile application TOMCHI**

Photo credit: Information-Analytical and Resource Centre under the Ministry of Water Management



## 13.6 Assessment, conclusions and recommendations

### *Assessment*

Agriculture has an outstanding role within the economy of Uzbekistan. It accounts for about 32 per cent of GDP. About 27 per cent of the workforce is working in agriculture and its role in rural employment and in securing rural incomes is even higher. Agricultural export was and remains a source of foreign currency for the country. Given the favourable agroclimatic conditions, modernization offers an opportunity to make agriculture more productive and sustainable at the same time.

In the years since 2010, gradual deregulation and crop diversification have been among the main policy objectives for agriculture. Implementation of the crop diversification policy implies possible environmental gains in the form of reduced water, fertilizer and pesticide consumption, and thus the halting of soil quality degradation. Nevertheless, these positive gains are eliminated by the poor state of the irrigation infrastructure.

Despite the introduction of new varieties and intensive (fruit and vegetable) growing methods, sustainable agricultural development (except of some small-scale projects) is still not recognized as an essential factor for ensuring the progressive development of agriculture in the long run. Agricultural policy in Uzbekistan still does not pay enough attention to environmental aspects, not even to its most obvious symptom, irrational water use: by the end of 2019, only 9.6 per cent of the total irrigated area will be subject to some type of water-saving technique.

### *Conclusions and recommendations*

#### Organic agriculture

Although the Government has recognized organic agriculture as one of the flagship subsectors with high export potential and, consequently, possible high revenues, besides the adoption of related standards, the legal framework for organic agriculture is largely lacking. In the absence of legislation on organic agriculture, the establishment of the certification and labelling system is also at a halt. At the same time, organic agriculture is among possible pillars to help Uzbekistan progress towards sustainable agricultural practices and, in a broader sense, towards productive and sustainable agriculture, in line with target 2.4 of the 2030 Agenda for Sustainable Development.

#### Recommendation 13.1:

*The Cabinet of Ministers should ensure the development and adoption of a legal framework, allowing for the establishment of a national certification and labelling system that is recognized internationally, for organic agricultural production.*

#### Use of water in irrigation

The water losses in agriculture amount to around 30 per cent of the sector's water use in Uzbekistan. By reducing or eliminating water losses, the country would be able to solve the problem of forecast water deficit and save enough water to make reservoirs to mitigate the fluctuations in annual available water quantity caused by the variability of precipitation. Strengthening the capacity of the agricultural sector to adapt to climate change (target 2.4 of the 2030 Agenda for Sustainable Development) can most easily be achieved through reduction of water losses in Uzbekistan.

Outdated irrigation methods and poorly maintained irrigation systems seriously limit the crop yields and lead to soil salinization and low soil fertility. Water-saving irrigation technologies, which are favourable for and respect soil fertility, are not widespread enough and not expanding at an adequate pace, despite their promotion by the Government in the past decade.

#### Recommendation 13.2:

*The Ministry of Agriculture and the Ministry of Water Management should enhance their efforts to further promote water-saving irrigation techniques.*

*See Recommendations 3.5, 9.2.*

#### Sectoral strategy

In the lack of a comprehensive sectoral strategy and vision, there is a threat that government measures and legislative development will not be consistent. Explicit environmental considerations are also missing from the existing sectoral policy documents and from most of the related legal acts, even though ensuring good environmental conditions in agriculture is of the utmost importance for the sector's long-term sustainability and productivity.

#### Recommendation 13.3:

*The Cabinet of Ministers should finalize and adopt a strategy on agriculture that considers environmental matters, particularly for the rational use of water and for the expansion of environmentally friendly crop cultivation techniques.*

Participation in the International Plant  
Protection Convention

Despite its strengthening connections with international organizations in the field of plant protection, Uzbekistan has not yet joined the International Plant Protection Convention, although, as a basic preparatory activity, the State Plant Quarantine Inspectorate has already defined a roadmap for accession to the Convention.

*Recommendation 13.4:*

*The Cabinet of Ministers should consider accession to the International Plant Protection Convention.*

## Chapter 14

# TRANSPORT AND THE ENVIRONMENT

### 14.1 Overview of transport sector and transport infrastructure

Transport in Uzbekistan is undergoing a revolution with significant investment being undertaken in all the main transport sectors with the aim of modernizing the sector overall and also improving its environmental performance. As Uzbekistan is a double-landlocked country, efficient, land-based transport connections with neighbouring countries are of fundamental importance and current policy is directed at improving national and international connectivity.

In terms of passenger transport, road transport is by far the dominant mode with a market share of 98.3 per cent in 2018. Freight transport is more balanced, but road transport still dominates with a market share of 88.3 per cent in 2018. Passenger aviation is increasing but accounts for only a small share of the total, while waterway transport is very minor in terms of both freight and passenger transport. In 2017, transport and storage services accounted for 9.4 per cent of GDP.

#### *Logistics performance*

Uzbekistan has seen some improvement in its Logistics Performance Index scores and rank since 2014. This followed a period of alternating increases and decreases from 2007 (table 14.1). Of particular interest is the low rank assigned to the customs area,

which, although it has improved in recent years, still remains worse than in 2007 and is ranked lowest of all the categories identified. On the other hand, infrastructure has improved dramatically, with a significant jump in comparison with other countries, and is ranked highest of all the categories in 2018.

#### *Road transport*

According to data reported by Uzbekistan to ECE, in 2016, there were 42,695 km of roads, of which 98.5 per cent were paved.

Recent years have seen investment in upgrading and renewing the main transit routes, including the following: Tashkent–Osh, Tashkent–Termez, Samarkand–Bukhara–Alat, Kungrad–Beyneu, Samarkand–Bukhara–Alat and Guzar–Bukhara–Nukus–Beyneu. In addition, the reconstruction of the A-380 Guzar–Bukhara–Nukus highway to the border with Kazakhstan, financed by the ADB, serves as an important transit corridor between Afghanistan/Tajikistan/Turkmenistan and Kazakhstan/Russian Federation.

The private sector occupies a leading position in road transport with almost 90 per cent of cargo transportation and almost 100 per cent of passenger transportation executed by private carriers.

**Table 14.1: Logistics Performance Index, 2007, 2010, 2012, 2014, 2016, 2018**

	2007	2010	2012	2014	2016	2018
LPI rank	129	68	117	129	118	99
LPI score	2.16	2.79	2.46	2.39	2.40	2.58
Customs rank	136	107	118	157	114	140
Customs score	1.94	2.20	2.25	1.80	2.32	2.10
Infrastructure rank	124	70	120	148	91	77
Infrastructure score	2.00	2.54	2.25	2.01	2.45	2.57
International shipments rank	133	83	127	145	130	120
International shipments score	2.07	2.79	2.38	2.23	2.36	2.42
Logistics competence rank	118	89	117	122	116	88
Logistics competence score	2.15	2.50	2.39	2.37	2.39	2.59
Tracking and tracing rank	123	63	105	77	143	90
Tracking and tracing score	2.08	2.96	2.53	2.87	2.05	2.71
Timeliness rank	112	50	101	88	114	91
Timeliness score	2.73	3.72	2.96	3.08	2.83	3.09

Source: World Bank, 2019.

In 2016, there were more than 2.2 million cars on the road network, a motorization rate of 65 passenger cars per 1,000 inhabitants. The existence of a car manufacturing facility in Uzbekistan has meant that the national fleet is dominated by one producer, but the growth rates of vehicle registration are very high with an average of 100,000 new cars being registered annually over the last few years.

Due to the domestic production of vehicles, there are fewer car imports than in neighbouring countries. To further incentivize the acquisition of domestically produced vehicles, duties are levied on vehicles being imported into the country. However, for vehicles worth more than US\$40,000, import duties are waived but excise tax and VAT still apply.

A total of 120.7 billion passenger-km were registered on the roads in Uzbekistan in 2018 and 13.9 billion tonne-km of freight were moved on the road network in 2018, an increase of 3 per cent from 2017 (13.5 billion tonne-km).

#### *Rail transport*

Uzbekistan has the highest density of railways in the region (13.7 km of lines operated per 1,000 km<sup>2</sup>, compared with around 6 km per 1,000 km<sup>2</sup> in Kazakhstan, 2 km per 1,000 km<sup>2</sup> in Kyrgyzstan and 4 km per 1,000 km<sup>2</sup> in Tajikistan). The railways sector is managed by the state enterprise JSC “O‘zbekiston temir yo‘llari” (Uzbekistan Railways), which is the largest national enterprise for the transport of goods and passengers by rail.

In 2018, the total length of the country’s railways amounted to 7,000 km, of which around 2,700 km were electrified. In the same year, 94.79 million tons of cargo were transported on the rail network with a total cargo turnover of 22.9 billion tonne-km.

In terms of passengers, 2018 saw a total of 22.3 million passengers transported on the rail network, an increase of 6.1 per cent on the previous year, with a registered value of 4.4 billion passenger-km, an increase of 1.3 per cent on the previous year.

Currently, the locomotive fleet is about 28 per cent electric and 72 per cent diesel powered. The national railway company is currently focusing on rolling stock renewal to reduce the average age of locomotives, thus

increasing their efficiency and ensuring that the environmental and cost (lower maintenance and higher efficiency) benefits of infrastructure electrification works that have been carried out can be maximized. This is being pursued through the project “Updating the fleet of locomotives of O‘zbekiston temir yo‘llari” being undertaken jointly with the ADB. This project will fund the acquisition of 39 new electric locomotives for freight and passenger services. This is being accompanied by a renewal of locomotive engines that is planned to lead to a 15 per cent increase in fuel efficiency and a 30 per cent improvement in environmental performance.

The electrification of the Karsh–Termez line, which opened in January 2019, led to the switch to the use of electric locomotives and enabled the reduction of the consumption of diesel fuel by more than 28,000 tonnes per year and of CO<sub>2</sub> emissions by more than 3,000 tonnes per year.

Railways are fundamental to the economic development of the country and recent years have seen investments in this area. Over the past three decades the following projects can be identified as the main ones on the rail network: construction of the Navoiy–Uchkuduk–Sultanuizdag–Nukus railway; construction of the road and rail bridge across the Amu Darya River; construction of the Tashguzar–Boysun–Kumkurgan railway; improved connections in the Kashkadarya and Surkhandarya oblasts; and improved connectivity to other countries.

The State and the national railway company are investing in the railways to improve the efficiency of the system and reduce the environmental impact of transport as a whole. Major tasks and actions to improve the railways include: the renewal of railway infrastructure; research into and the introduction of technological advancements; coordinated development of the infrastructure as well as the legal basis, technical regulations and traffic safety; increased foreign investment; improved safety; electrification of more lines; construction of new lines; increasing average speeds; the development of key corridors; the further development of high-speed services; opening up the market for forwarding and other logistics services, including the creation of logistics centres; improving infrastructure and practices at railway border crossings; and improving labour productivity.

**Photo 14.1: Electric-powered train Tashkent–Khodjikent**



*Photo credit: Mr. Sergey Kivenko (tashtrans.uz)*

**Photo 14.2: High-speed train Tashkent–Samarkand**



*Photo credit: Ms. Angela Sochirca*

*Aviation transport*

The aviation sector is in the process of reforms to align the national sector with international requirements through the separation of the Civil Aviation Authority from the Ministry of Transport. This has been done to ensure that policy aspects related to the sector are separated from technical and safety-related aspects. In addition, reform has extended to Uzbekistan Airways where it includes the separation of the airline from air traffic control and management of the airports.

In 2018, approximately 2.6 million passengers were transported by air across the country, an 18.7 per cent increase on 2017. In 2018, 8.8 billion passenger-km were covered by air, an increase of 17 per cent on 2017 and of over 50 per cent on the 2010 value (5.8 billion passenger-km).

The sector is focused around Tashkent International Airport, with a small role also being played by other smaller airports. The majority of air transport is carried out by the national carrier Uzbekistan Airways. Furthermore, the airline provides maintenance services to more than 300 foreign aircraft annually.

Eleven airports are currently operational, providing flight services in accordance with international standards. Of these, the airports of Tashkent, Bukhara, Samarkand and Urgench have the status of international airports. Currently, domestic aviation is very limited, although the fact that Uzbekistan pursues an “open skies” policy (in 2019, the Government introduced the “fifth freedom of the air”, for all major airports) may stimulate growth in this area. In addition, the international intermodal logistics centre at Navoiy Airport is one of the largest and most technologically advanced air cargo terminals in the Central Asian region.

Recent years have seen the fleet of Uzbekistan Airways modernized with the acquisition of four Boeing 787 aircraft, expected to be supplemented by a further one in 2020, leading to a reduced average age of the fleet and improved environmental performance. This has had a positive effect on CO<sub>2</sub> and noise emissions from aviation, which have decreased thanks to the use of more efficient aircraft. While no specific data on this have been provided, it is known in the sector that the Boeing 787 aircraft emits 20–30 per cent less CO<sub>2</sub> and makes around 60 per cent less noise than the models it replaces.<sup>30</sup>

*Urban transport*

Urban transport is handled by local authorities. In Tashkent, the Tashkent City Khokimiyat oversees and regulates all forms of urban public transport but the operations are carried out by individual companies. In particular, the Tashkent Bus Company operates surface public transport services in the city and Tashkent Metro operates the metro service. In addition, there are a number of licensed minibus service providers that account for about 5 per cent of the urban fleet and provide additional services throughout the city. The Khokimiyat is pushing to improve road safety, transport accessibility and public transport services, while discouraging car use as much as possible, through the new urban transport strategy that it is in the process of developing with the assistance of a study. This study has been recently commissioned with the aim of helping the Khokimiyat to identify actions that it can take to improve all forms of transport in the city, for example through the introduction of priority lanes for public transport, improving the interchange and integration between modes and seeking to address the problem of parking.

The Tashkent Bus Company is investing in improving public transport in the city and making it more environmentally friendly. It has recently acquired a new fleet of LNG-powered buses, which are more fuel efficient and less polluting as well as being more attractive for users. The Company also plans to introduce electric buses to further improve the environmental performance of the vehicle fleet. The vehicle fleet is gradually expanded with buses equipped with climate control.

The use of public transport in Tashkent remains below its potential as, historically, public transport networks have not covered key residential areas for long period of time and the services themselves have not been attractive, due to, for example, overcrowding. There is the opportunity to increase market share, which local authorities explain is low because much of the population currently prefers to travel in private vehicles. The investments that are being undertaken would help increase the attractiveness of the public transport network, not only through the construction of the new lines but also through the renewal and modernization of the bus fleet, introducing new levels of comfort for the travelling public. A new transport strategy is being developed for the city, focusing on improvements to these services while also discouraging car use through traffic limitations for certain vehicle types, as well as through the promotion

<sup>30</sup> <https://aviationbenefits.org/case-studies/boeing-787-dreamliner/>

of these new alternatives. In addition, the strategy should ensure that it maximizes the potential of the city in relation to cycling infrastructure and other alternative forms of transport. The promotion of public transport is something that should be encouraged in, and extended to, all cities in Uzbekistan.

Tashkent is the only city in Uzbekistan with a metro system; its network is currently 36 km long. Tashkent Metro is also investing in expanding its network with the aim of attracting more passengers to its services. New lines and line extensions are being opened to serve new areas of the city and areas with high population density, accompanied by the acquisition of new metro trains and carriages.

A 14.1 per cent increase in passenger traffic by electric transport between 2017 and 2018 was observed, which is due to the growth in passenger transportation by metro (which increased by 12.1 per cent on the previous year). Most of the electric transport is accounted for by the metro (93.4 per cent of all

passengers in 2018), with 5.9 per cent of passengers travelling on trams and 0.7 per cent on trolley busses. Electric passenger transport reached 0.48 billion passenger-km in 2017 and 0.55 billion passenger-km in 2018.

## 14.2 Environmental pressures

### *Air pollution*

According to official statistics on SO<sub>2</sub> emissions, the “transport and storage” category accounted for 21,900 tons of emissions in 2016, about 7 per cent of the total (table 8.8). In terms of NO<sub>x</sub>, transport is the highest emitter with 156,900 tons emitted in 2016, 63 per cent of the total and a 33 per cent increase on the 2009 value. PM<sub>10</sub> and PM<sub>2.5</sub> data for transport are not available; however, the “transport and storage” category accounted for 15,800 tons of total suspended particles in 2016.

**Photo 14.3: The first electric bus, Vitovt Electro E420, on the streets of Tashkent City**



*Photo credit: Mr. Sergey Kivenko (tashtrans.uz)*

*Greenhouse gas emissions and climate*

According to the Third National Communication under the UNFCCC (TNC), transport accounted for 12.4 per cent of GHG emissions from fuel combustion

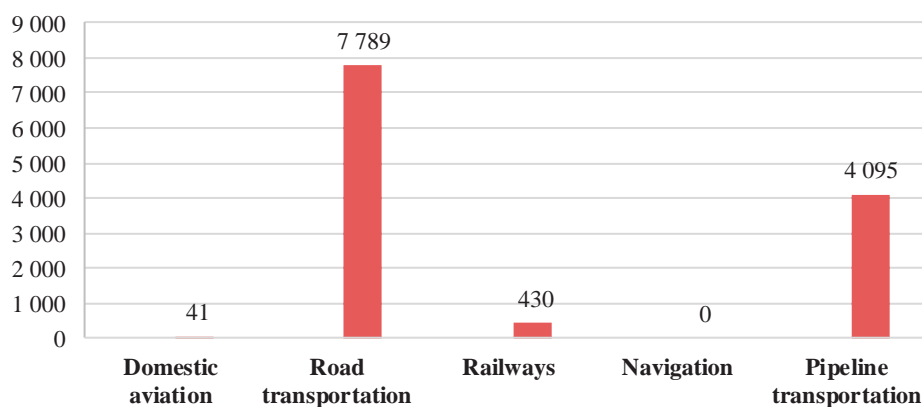
in 2012, emitting 12,355 Gg of CO<sub>2</sub>-eq. (or 6.6 per cent of total emissions without LUCF). In 2012, the largest contributors to CO<sub>2</sub> emissions were road (mainly petrol-fuelled) vehicles (63 per cent) and pipeline transport (33 per cent) (figure 14.1).

**Photo 14.4: Construction of a new station for a surface line of Tashkent Metro along Akhangaran Road**



Photo credit: Mr. Sergey Kivenko (tashtrans.uz)

**Figure 14.1: CO<sub>2</sub> emissions by transport mode, 2012, Gg of CO<sub>2</sub>-eq.**



Source: GHG Inventory for the period 1990–2012, 2016.



The TNC also states that, between 1990 and 2012, GHG emissions from transport decreased by 25.1 per cent thanks primarily to the renewal of the road vehicle fleet and investments in oil and gas transmission. Measures aimed at reducing energy consumption in road transport have so far focused on both technical (e.g. renewal of road fleet) and institutional (e.g. introduction of CO<sub>2</sub> emission standards) initiatives.

*Forward-looking GHG emissions scenarios using the For Future Inland Transport Systems tool*

### Introduction

The For Future Inland Transport Systems (ForFITS) tool (annex IV) provides projections of transport sector CO<sub>2</sub> emissions for Uzbekistan. Four scenarios have been developed to show potential pathways to reduce CO<sub>2</sub> emissions in Uzbekistan to 2045:

- Reference Scenario: It maintains the existing structure of the transport sector and mainly looks at the impact of GDP and population evolution;
- Shift to Mass Transport for Passenger and Freight Scenario (Shift Scenario): This scenario looks at the impact of shifting passenger and goods transport to mass transportation modes such as buses, coaches and trains;
- Improved Fuel Economy Scenario (Improve Scenario): Energy use is evenly distributed between passenger and freight transport. Ambitious and cost-effective vehicle technology deployment to save energy would deliver significant GHG emissions reduction at low or negative costs to vehicle users. Both light and heavy duty vehicles are included in this scenario;
- Combined Shift and Improve Scenario (Combined Scenario): Though not entirely additional, combining both Shift and Improve Scenarios brings additional benefits to energy and emissions reductions by combining the best vehicle technologies with the most adequate mode of transportation.

### Baseline projections

Between 2016 and 2045, CO<sub>2</sub> emissions from the transport sector are expected to increase more than sixfold, mainly as a consequence of the expected strong increase in the passenger vehicle stock (figure IV.3).

### Alternative scenarios

The Shift Scenario projects future emissions assuming a modal shift towards more efficient mass transportation, buses, coaches and trains. Moving people away from cars to buses and non-motorized modes of transport would halve the CO<sub>2</sub> emissions between the Reference and Shift Scenarios in 2045 (figures IV.8(a) and IV.8(b)). At the same time, the effect of moving goods from trucks to trains is expected to have a limited impact on CO<sub>2</sub> emissions, the existing fuel mix and energy efficiency of trains being similar to that of trucks.

Energy efficiency is a key contributor to energy security and GHG emissions mitigation. Energy use in the Improve Scenario drops dramatically, by around 30 per cent in 2045 compared with the Reference Scenario (figures IV.9(a) and IV.9(b)), as a consequence of the fuel economy improvement and the fuel switching assumptions. This scenario also has a positive impact on energy security as Uzbekistan would be able to rely less on imported energy sources for the transport sector.

The Combined Scenario simulates the cumulative effect of the Shift and Improve Scenarios. Overall CO<sub>2</sub> emissions are reduced by half compared with the Reference Scenario in 2045 (table 14.2). However, in terms of absolute volume, they still increase by a factor of 3 compared with 2016 levels. CO<sub>2</sub> intensity, expressed in CO<sub>2</sub> emissions per unit of GDP, decreases only in the Combined Scenario, showing a decoupling of the economy from CO<sub>2</sub> emissions.

**Table 14.2: Main ForFITS outputs for all scenarios**

	Unit	2016	2045			
			Reference Scenario	Shift Scenario	Improve Scenario	Combined Scenario
Total pkm	billion pkm	81	364	227	366	226
Total tkm	billion tkm	50	286	282	292	292
Total energy use	million toe	4	24	16	17	12
Total WTW CO <sub>2</sub> emissions	billion kg CO <sub>2</sub>	12	78	54	53	38
Total WTW CO <sub>2</sub> emissions per capita	kg CO <sub>2</sub> /person	387	2 000	1 385	1 359	974
Total WTW CO <sub>2</sub> emissions intensity	kg CO <sub>2</sub> /GDP 1,000*	95	158	109	107	77

Note: \* GDP is measured in purchasing power parity (PPP) units at 2014 prices. WTW: well-to-wheel.

### Conclusions from ForFITS

The transport sector is expected to grow dramatically in the coming decades as the Uzbekistan economy develops further. As set out above, traffic activity in the Reference Scenario is expected to increase significantly in the years ahead. All CO<sub>2</sub> mitigation scenarios will only slow down the expected growth in emissions and emissions are not likely to revert to present levels. However, decoupling of economic growth and CO<sub>2</sub> emissions from transport under the Combined Scenario is an important achievement that Uzbekistan should embrace in order to meet its (I)NDC target submitted in the framework of the Paris Agreement under UNFCCC.

### *Vehicle emissions*

As a result of local resource availability, and the fiscal advantage associated with certain fuels, many vehicles run on natural gas or LPG in Uzbekistan (figure IV.2). This high share is difficult to quantify precisely, as many CNG/LPG fuel systems are retrofitted to vehicles that originally operated on gasoline (for light duty vehicles) or diesel (for heavy duty vehicles). However, the quality, reliability and emissions from such retrofitted systems can be problematic in some cases, unless the right provisions are put in place to ensure they operate appropriately. These retrofits are not part of the original equipment featured in vehicles and are subject to a separate approval rule to ensure that such systems also deliver acceptable environmental performance.

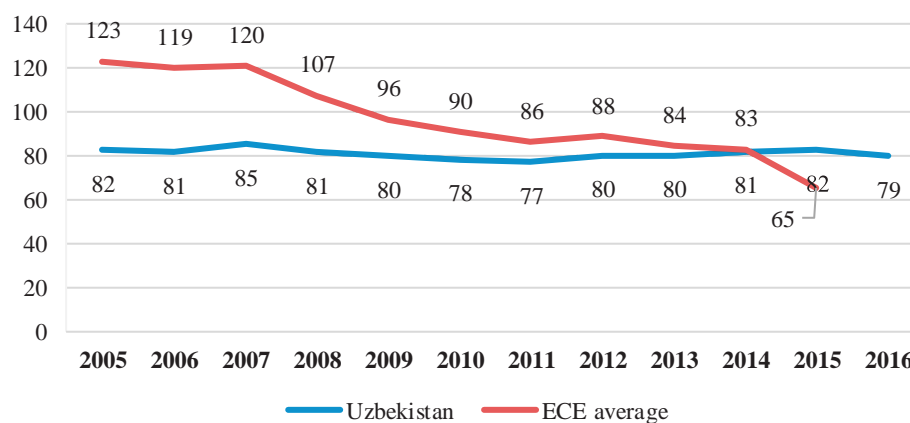
The 1958 Agreement concerning the Adoption of Harmonized Technical United Nations Regulations for

Wheeled Vehicles, Equipment and Parts which can be Fitted and/or be Used on Wheeled Vehicles and the Conditions for Reciprocal Recognition of Approvals Granted on the Basis of these United Nations Regulations (the 1958 Agreement) facilitates the mutual recognition of vehicle approval for the contracting parties of this multilateral agreement. United Nations Regulation No. 115 under the 1958 Agreement provides a harmonized procedure specifying how CNG/LPG retrofitted systems should be tested and the acceptable emissions limits for such systems once they are fitted to vehicles. The 1958 Agreement enables access to state-of-the-art testing procedures to ensure the acceptable environmental performance of retrofitted CNG/LPG systems. However, Uzbekistan is not a party to the 1958 Agreement.

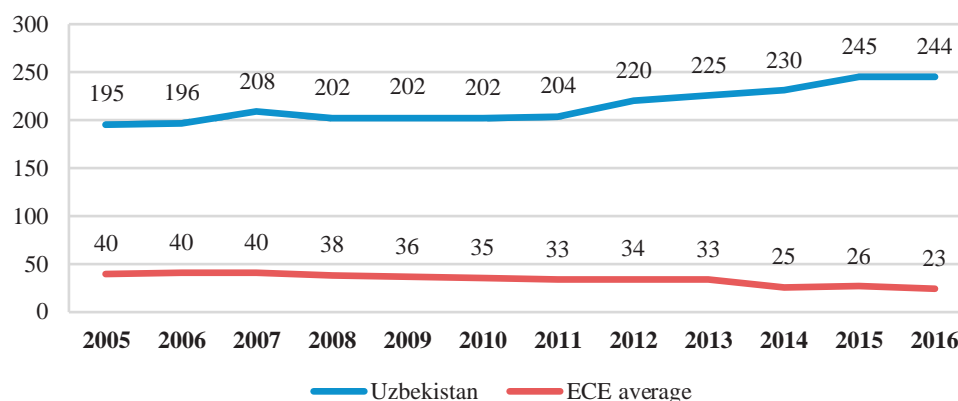
### **14.3 Road safety**

A total of 2,496 fatalities were registered on Uzbek roads in 2016. National data for 2017 point to a 2.2 per cent decrease in fatalities. A further 9,845 injuries and 10,212 injury accidents were recorded in the same year. Between 2011 and 2016, fatalities increased by around 16 per cent, but the rate per inhabitant has remained steadier over this period (approximately 80 fatalities per million inhabitants) due to population growth (figure 14.2). Figure 14.3 displays the severity of road traffic accidents in Uzbekistan over the same period compared with the ECE average. While the ECE average has shown a slight downward trend, the values for Uzbekistan have increased by about 25 per cent, which indicates that road infrastructure and vehicle safety is not improving.

**Figure 14.2: Road safety performance, 2005–2016, fatalities per million inhabitants**



Source: ECE transport statistics infocards, 2019.

**Figure 14.3: Fatalities, 2005–2016, per 1,000 injury accidents**

Source: ECE transport statistics infocards, 2019.

In order to ensure traffic safety, all vehicles are subject to mandatory technical inspection. The procedure for the technical inspection of vehicles is defined in the Regulation on the Procedure for Mandatory Technical Inspection of Vehicles (2003 Resolution of the Cabinet of Ministers No. 54). From 1 January 2018, the procedure is in line with the changes made by the 2017 Resolution of the Cabinet of Ministers No. 1010.

Since 2018, mandatory technical inspections of private cars belonging to individual owners can be done by authorized private companies, in addition to the road safety authorities. Private companies are expected to take responsibility for all mandatory technical inspections, starting from 2021. The inspection must be undertaken when the private car is first registered and thereafter on an annual basis. Vehicles used to transport passengers on a commercial basis, buses, trucks equipped for the systematic transportation of people, with eight or more seats, as well as special vehicles and their trailers for transporting bulky, heavy and dangerous goods, must go through technical inspection twice a year.

#### 14.4 Legal, policy and institutional framework

##### *Legal framework*

The 1998 Law on Road Transport sets out the basic parameters for passenger and freight road transport operations, including the obligations of the carrier to ensure safety and compliance with environmental requirements. Rules for the transportation of dangerous goods by road are in place (2011 Resolution of the Cabinet of Ministers No. 35).

The 1997 Law on Urban Passenger Transport identifies the main conditions for passenger movements in the urban environment and defines the division of responsibilities between the central public

administration bodies and the local authorities on urban passenger transport management.

The 1999 Law on Railway Transport sets out the organizational and operational requirements of the railways.

The 1993 Air Code sets out the framework for the regulation and management of the aviation sector.

The 2017 Resolution of the President No. 3028 “On measures to further improve management and accelerate development of the automotive industry for the period 2017–2021” aims to improve the corporate governance system of the automotive industry and ensure its growth in the face of fierce competition in foreign markets. Through tax and fiscal measures, it aims to increase the production of competitive national products and deepen the localization of production. It also addresses the management of JSC Uzavtosanoat. The 2019 Resolution of the President No. 4397 cancels the excise duty on vehicles produced by General Motors Uzbekistan (GMU) for sales contracts concluded as of 1 October 2019 (chapter 3).

The 2018 Decree of the President No. 5584 “On measures for the improvement of civil aviation” introduced new management methods in the field of civil aviation. It required the restructuring of aviation industry enterprises, creating conditions for the development of competition in the air transportation market and facilitating investment in the sector.

The 2015 Decree of the President No. 4720 “On measures for the implementation of modern corporate governance methods in joint stock companies” aimed to ensure the openness and attractiveness of JSCs for potential investors through the introduction of modern methods of corporate management.

Several resolutions of the President supported the implementation of projects to extend Tashkent Metro (e.g. 2016 Resolutions of the President No. 2664 and No. 2653).

The 2017 Decree of the President No. 5005 referred to reform of the Ministry of Internal Affairs. It envisaged measures to improve the activities of the road safety units under the Ministry. Several other road safety measures, mostly of an organizational character, were initiated by the 2017 Resolution of the President No. 3127. This Resolution highlighted the need for improved road infrastructure and improved driving culture. It was implemented through 10 detailed regulations focusing on such aspects as environmental protection and the technical inspection of vehicles, among others.

The 2019 Decree of the President No. 5647 “On measures to fundamentally improve the system of public administration in the field of transport” established the Ministry of Transport and outlined major directions for reforms in the transport sector, including:

- Developing a unified state transport policy aimed at the harmonized development of all forms of transport based on their integration into a single transport network and the use of new and efficient transport and logistics systems;
- Creating a unified tariff policy in the field of transport, aimed at stimulating the development of the transport and logistics services market, ensuring their availability for all users and attracting investments in the industry;
- Developing public–private partnerships and increasing the investment attractiveness of the country in the field of transport and road facilities.

The 2019 Resolution of the Cabinet of Ministers No. 429 established a Fund for Development of Transport and Logistics under the Ministry of Transport. The Fund will hold the fines paid for transport-related offences and fees for the licensing of transport operations. Its revenues will be used for the introduction of information and communications technologies (ICT) in transport management and maintenance and repair of transport stations.

#### *Policy framework*

As at mid-2019, a draft strategy for transport system development up to 2035, which would cover the entire transport sector, is under development.

Programmes and other policy documents to develop the individual transport sectors in Uzbekistan often

intersect in order to ensure an integrated approach across transport as a whole (an example of this is the cooperation between Uzbekistan Railways and Tashkent Metro in the development of the urban rail network to ensure that the metro is well integrated with it).

The Programme on Development and Modernization of Communications, Road and Transport Infrastructure for the period 2015–2019 (2015 Resolution of the President No. 2313) supported the construction and reconstruction of sections of roads that are part of the Uzbek National Highway, as well as public roads.

The Comprehensive Programme to Improve Transport Infrastructure and Diversify External Trade Routes for Freight Transport for the period 2018–2022 (2017 Resolution of the President No. 3422) aims to ensure that Uzbekistan plays a key role in the development of transit traffic by participating in the creation of the Azerbaijan–Georgia–Turkey–EU transit corridor.

The Programme on the Development of Regional Roads for the period 2017–2018 (2017 Resolution of the President No. 2775) aimed at the overhaul and maintenance of inter-farm rural roads and the streets of cities, urban settlements and villages.

The Programme of Further Development of Transport Services in Cities and Villages for the period 2017–2021 (2017 Resolution of the President No. 2724) aims to improve transport connectivity through improved bus connections in order to address the problem of unemployment in cities and villages of the country. It also addresses passenger transport safety and reducing harmful emissions.

The Metro Development Plan until 2025, officially announced by Uzbekistan Railways in March 2019, foresees that, by 2025, the length of the Tashkent Metro will increase more than fourfold to 157 kilometres, with the addition of 74 stations, of which 17 will be interchange stations.

The Services Sector Development Programme for the period 2016–2020 (2016 Resolution of the Cabinet of Ministers No. 55) aims to create conditions for the accelerated development of the services sector, including through the development of road and transport infrastructure and implementation of modern ICT in these sectors.

The Concept on Road Safety for the period 2018–2022 (2018 Resolution of the Cabinet of Ministers No. 377) builds on previous resolutions to significantly increase the punishment associated with gross violations of the

traffic regulations, as well as providing direction on the improvement of road infrastructure with a particular focus on the quality of roads.

The above policy documents are accompanied by national investment programmes targeted at undertaking major infrastructure investments as well as sector specific programmes. These investment programmes are developed by the Ministry of Investments and External Trade, together with the Ministry of Finance and other responsible ministries. These programmes set out the main parameters for capital investments in their respective year, including for transport infrastructure (e.g. the Investment Programme for 2019 (2018 Resolution of the President No. 4067)). The main investment initiatives in the transport sector are set out in table 14.3.

The Concept on Environmental Protection until 2030 (2019 Decree of the President No. 5863) echoes policy documents in the transport sector and provides for further development of the railway network and transition from road to rail transportation for passengers and goods, transfer of the transport fleet to CNG and electric engines, and intelligent traffic management to reduce pollution and ensure road safety.

#### Sustainable Development Goals and targets relevant to the chapter

The current status of the country vis-à-vis targets 3.6 and 11.2 of the 2030 Agenda for Sustainable Development is described in box 14.1.

#### *Institutional framework*

The establishment of the Ministry of Transport in February 2019 to succeed several bodies that were previously in charge of various modes of transport (chapter 1) confirms the increased focus that is being given to the growth of the transport sector in Uzbekistan. The Ministry was established to create and implement the national transport policy as well as to develop appropriate regulations to support the transport policy. It is in charge of the automobile, railway, air, river transport and metro sectors, as well as road facilities.

The other main actors in the transport sector are the Republican Road Fund, Fund for Reconstruction and Development, Uzbekistan Railways, Uzbekistan Airways and Uzavtosanoat. In recent years, the sector has been transformed through a process of

deregulation of the state monopolies and their transformation into independent commercial organizations, in some cases accompanied by their privatization.

The Main Department on Road Safety of the Ministry of Internal Affairs is the body responsible for road safety.

#### *Regulatory, economic and fiscal measures*

Road vehicles are taxed as follows:

- A one-off registration fee equivalent to 3 per cent of the market value of the vehicle or 6 per cent for buses and heavy goods vehicles;
- A one-off licence fee;
- A one-off fee for the technical passport of the vehicle;
- An annual fee for the technical inspection of the vehicle equivalent to 10 per cent of the national minimum wage.

Revenues from the registration fee and from the fee for entry into, and transit through, the territory by vehicles registered in foreign countries go the Republican Road Fund (chapter 3) while revenues from the other one-off fees go to the state budget.

The majority of the vehicle fleet is powered by CNG as a consequence of it being readily available domestically through local production (figure IV.2). Current government policies are aimed at introducing more energy-saving technologies, including in the transport sector, such as adapting public buses to run on gas and building more CNG filling stations. This has been coupled with a gradual increase in fuel prices over time (chapter 3) and a different approach to the regulation of the various types of fuel quality.

For example, tax rates for gasoline are differentiated by octane ratings (80, 91–93, 95) (chapter 3). The regulated prices on fuels below 92 octane are lower than those at 92 octane and above. This has a perverse effect on the quality of the fuel that is being burnt in vehicles as the consumer is incentivized to use lower quality fuel that increases the emissions from vehicles. Significant improvements in vehicle emissions could be achieved by reducing these perverse incentives, for example through reducing access to lower quality fuels, changing the approach to price regulation across all fuels, introducing a ban on certain vehicles in urban areas or introducing a requirement that fuels are not mixed at the pump.

Table 14.3: Selected transport sector investment projects, US\$ million

	Name of project	Financing institution	Amount
2012–2017	Electrification of the Karshi–Termez railway line. Completed with the launch of electric services in January 2019. The transfer of railway sections from diesel to electric locomotives reduced the need for material resources, primarily diesel fuel, by 28,324 tons/year, reduced the harmful effects of rail transport on the environment and reduced emissions of carbon monoxide, nitrous oxide, dioxide, sulfur and other harmful substances into the atmosphere to 3,413 tons/year. The project reduced transportation costs for passenger and cargo transportation by 35 per cent.	Japan International Cooperation Agency (JICA)	160
2016–2019	Construction of a new international passenger terminal in Tashkent International Airport (Tashkent-4)	International banks	236
2010–2017	The development of regional highways. Phase 2	ADB	485
2012–2017	Reconstruction of 85 km of the A-380 Guzar–Bukhara–Nukus–Beyneu highway section 355–440 km (2nd tranche)	ADB	240
2016–2021	Reconstruction and upgrade of the A-380 Guzar–Bukhara–Nukus–Beyneu highway section 228–315 km	ADB	150
2011–2018	The development of regional highways. Phase 3	ADB	500
2016–2021	The development of regional highways of local importance	World Bank	220
2017–2021	Construction of an above-ground metro line in the City of Tashkent	Export-Import Bank of China and Fund for Reconstruction and Development of Uzbekistan (UFRD)	200
2017–2021	Electrification of the Pap–Namangan–Andijan railway section	ADB	80
2016–2021	Reconstruction of 77 km of the Karshi–Shahrisabz–Kitab road	ADB	198
2016–2020	Reconstruction of 87 km of the A-380 Guzar–Bukhara–Nukus–Beyneu highway	ADB	150
2011–2019	Reconstruction of 35 km of the 4R87 Guzar–Chim–Kukdala road	Saudi Fund for Development and Kuwait Fund for Arab Economic Development	51
2016–2019	Construction of the second stage of the Yunusabad metro line from Shahriston station to Turkiston station	Government spending planned and UFRD	70
2017–2020	Construction of the Sergeli metro line	Government spending planned and UFRD	41
2016–2019	Modernization of the Andijan–Savay–Khanabad railway section with the organization of suburban trains	Government funding	2
2017–2019	Electrification of the Karshi–Kitab railway section with the organization of high-speed passenger trains	Government funding	2
2016–2020	Acquisition of four new Boeing 787-8 aircraft	Industrial and Commercial Bank of China, UFRD	551
2013–2021	Construction of a new electrified Angren–Pap railway line with electrification of the Pap–Kokand–Andijan section	International Bank for Reconstruction and Development (IBRD)	545
2018–2021	Construction of an electrified high-speed double-track ring railway in the City of Tashkent	TBA	TBA
2018–2022	Construction of a railway line between Urgench and Khiva	TBA	TBA
2018–2021	Construction of 12 overpasses in Tashkent	TBA	TBA

Source: ECE.

Note: TBA: To be announced.

**3** GOOD HEALTH  
AND WELL-BEING

**Box 14.1: Targets 3.6 and 11.2 of the 2030 Agenda for Sustainable Development**
**Goal 3: Ensure healthy lives and promote well-being at all ages**
**Target 3.6: By 2020, halve the number of global deaths and injuries from road traffic accidents**

Uzbekistan significantly modified global target 3.6 when it approved its national target “To halve the number of road traffic accidents, including accidents due to violations of traffic rules by pedestrians, by 2025”. The national target implies different underlying concepts from global target 3.6. Also, the national target differs in terms of the time horizon from the global target.

Uzbekistan nationalized global indicator 3.6.1 (Death rate due to road traffic injuries) without change. The national data for this indicator in the period 2010–2016 vary between 77 fatalities per million inhabitants in 2011 to 79 fatalities per million inhabitants in 2016.

More concerted efforts are needed in Uzbekistan given the strong increase in motorization and given the data in relation to the severity of road accidents (figure 14.3). Global target 3.6 requires a reduction in fatalities by 50 per cent by 2020, and Uzbekistan is currently falling well short of that target with only a modest fall in fatalities.

Several changes were introduced to the road traffic safety regulations in 2016, and activities to rigidly control adherence to those are required to reduce road traffic accidents. Further efforts are necessary to strengthen implementation and enforcement of several road safety measures, e.g. on seatbelts and child restraints and measures to enhance vehicle safety, as well as on monitoring the conduct of road traffic regulations classes in kindergartens and schools.


**Goal 11: Make cities and human settlements inclusive, safe, resilient and sustainable**
**Target 11.2: By 2030, provide access to safe, affordable, accessible and sustainable transport systems for all, improving road safety, notably expanding public transport, with special attention to the needs of those in vulnerable situations, women, children, persons with disabilities and older persons**

Uzbekistan nationalized global target 11.2 with minor modification, and adopted global indicator 11.2.1 (Proportion of population that has convenient access to public transport, by sex, age and persons with disabilities) as the national indicator. This indicator is one of the very few indicators for which Uzbekistan provides gender-disaggregated data, with slightly more women (85 per cent) than men (84.8 per cent) deemed to have convenient access to public transport in 2017.

The largest cities in Uzbekistan are currently investing in renewing their fleets and improving accessibility. For example, the Tashkent Bus Company is investing in a new fleet of more environmentally friendly buses and is also improving the accessibility and usability of those buses with the installation of wheelchair ramps and air conditioning systems. A further extension of the metro system currently under construction will increase accessibility and draw further passengers away from the use of cars. Furthermore, the City of Tashkent is currently preparing a new transport plan that will give further guidance on improving accessibility for its citizens and help in achieving target 11.2.

## 14.5 International agreements and processes

Uzbekistan is a party to 13 United Nations transport legal instruments under the purview of ECE; of these, four are road-safety-related conventions and five are related to the facilitation of border crossing. The following United Nations key conventions on transport, which are not among the 13, can have a positive impact on the transport sector and, in particular, on its environmental performance:

- 1958 Agreement concerning the Adoption of Harmonized Technical United Nations Regulations for Wheeled Vehicles, Equipment and Parts which can be Fitted and/or be Used on Wheeled Vehicles and the Conditions for Reciprocal Recognition of Approvals Granted on the Basis of these United Nations Regulations; among other matters, this sets out the parameters for vehicle emission categories and the wear of
- tyres and brakes, which have a direct impact on the environmental performance of vehicles;
- 1997 Agreement concerning the Adoption of Uniform Conditions for Periodical Technical Inspections of Wheeled Vehicles and the Reciprocal Recognition of Such Inspections; participation in this Agreement would contribute towards the improvement of the roadworthiness of vehicles travelling on the roads of Uzbekistan, since, among other matters, the Agreement sets out the parameters for how vehicle emissions are to be tested during technical inspection;
- Agreements governing the transport of dangerous goods, aimed at ensuring that dangerous goods are transported safely, thus limiting the potential negative impact on the environment in the event of leakage or an accident:
  - 1957 European Agreement concerning the International Carriage of Dangerous Goods by Road (ADR);

- 1993 Protocol amending article 1 (a), article 14 (1) and article 14 (3) (b) of the European Agreement of 30 September 1957 concerning the International Carriage of Dangerous Goods by Road (ADR);
- 1989 Convention on Civil Liability for Damage caused during Carriage of Dangerous Goods by Road, Rail and Inland Navigation Vessels (CRTD);
- Agreements on infrastructure networks aimed at ensuring the harmonized development of inland transport infrastructure and thus ensuring that it is developed in a sustainable manner:
  - 1950 Declaration on the Construction of Main International Traffic Arteries;
  - 1975 European Agreement on Main International Traffic Arteries (AGR);
  - 1985 European Agreement on Main International Railway Lines (AGC);
  - 1991 European Agreement on Important International Combined Transport Lines and Related Installations (AGTC).

#### 14.6 Assessment, conclusions and recommendations

##### *Assessment*

The transport sector in Uzbekistan relies on road transport. Over 98 per cent of passenger journeys are currently undertaken on roads while over 88 per cent of freight is also moved by road. Aviation traffic continues to grow, albeit with a newer and less polluting fleet. The Government has pushed for significant change and development of the transport sector to increase its performance, through policy initiatives and legal acts. This has been accompanied by targeted investments in rail, road and aviation which has led, for example, to an improvement in most parameters of the Logistics Performance Index.

These initiatives have helped in the modernization of the sector and have also gone some way towards improving the environmental performance of transport, with a particular focus on road transport. These are initial steps in a transformation process that needs to continue to ensure that the sector counters the ever-increasing use of private vehicles and road transport as a whole, with initiatives that aim to reduce the environmental impact of road transport and stimulate the use of alternative forms of transport such as the railways and, where this is not possible, alternative propulsion systems.

#### *Conclusions and recommendations*

##### Road vehicle emissions

Road vehicles remain the main source of transport-related CO<sub>2</sub> emissions. Transport vehicles, in particular private cars and freight vehicles, are currently using low quality fuels on a daily basis. Low octane fuels pollute more and are less efficient when burned in internal combustion engines, leading to negative effects on the environment as well as on the efficiency of vehicles and their durability. This is facilitated by fossil fuel subsidies through regulated prices that incentivize the use of these lower quality fuels. The ForFITS analysis shows that reducing these subsidies can have a significant impact on the environmental performance of the sector henceforth, which can be done not only through the use of cleaner fuels but also through the use of more efficient engines and an increase in electromobility.

##### Recommendation 14.1:

*The Cabinet of Ministers should:*

- (a) *Consider the best ways to modulate or reduce fossil fuel subsidies to ensure that higher quality fuels are used in vehicles that have a lower impact on the environment;*
- (b) *Encourage the move away from the use of lower quality fuels and the take-up of alternative, low-carbon-fuelled vehicles;*
- (c) *Encourage the simultaneous deployment of electromobility along with renewable electricity production to help meet the objective of reducing the total amount of vehicle emissions.*

*See Recommendation 3.2.*

##### Public transport

The use of public transport remains limited in cities as people continue to prefer to use their private cars to commute and move around the urban environment. This is because, historically, public transport has not been accessible, the networks have not covered key residential areas and the services themselves have not been attractive.

In order to reverse this trend and help in achieving target 11.2 of the Sustainable Development Goals, recent investments have been initiated, such as the extension of the metro and the acquisition of new buses. These initiatives are not supplemented by policies and action plans such as those currently being developed in Tashkent City aimed at rendering public



transport and the use of alternative modes of transport more attractive to users.

Recommendation 14.2:

*The Cabinet of Ministers and other relevant authorities should:*

- (a) *Improve access to, and use of, public transport in the urban environment to reverse the increase in congestion and emissions;*
- (b) *Develop and implement coherent policies and actions aimed at incentivizing the use of public transport and of alternative modes such as cycling.*

Long-distance transport

Uzbekistan has invested in the railways in recent years, in both electrification projects and the acquisition of new rolling stock. This has started to have a positive effect on the use of the network with the fast trains between the major cities often full. This shows that there is significant potential for the use of the railways to grow further. Therefore, it is important that continued focus is directed towards this area with the aim of increasing capacity and speed for both passenger and freight trains to further draw traffic away from the roads.

Recommendation 14.3:

*The Cabinet of Ministers, in cooperation with Uzbekistan Railways, should facilitate further development of the railway network and the switch away from road transport for both passengers and freight while ensuring that there are good intermodal connections for both passengers and freight for their last mile journeys.*

Road safety

Data show that the number of road fatalities has remained steady since 2015 with only minor fluctuations, at around 80 fatalities per million inhabitants. The number is not decreasing in Uzbekistan, unlike the average in the ECE area, and is well below the requirements in target 3.6 of the 2030 Agenda for Sustainable Development, which requires a 50 per cent decrease in fatalities by 2020. The severity of accidents has increased by about 25 per cent over the period 2005–2016, which also demonstrates that the road infrastructure is not safe for drivers and pedestrians. Vehicles sold in Uzbekistan do not meet the highest possible technical safety standards for the occupants, but also for pedestrians and other road users. In addition, the enforcement of laws and regulations presents challenges.

Recommendation 14.4:

*The Cabinet of Ministers should develop a safe-system approach to road safety covering all aspects of road safety activities, including:*

- (a) *Coordinated governmental action and policies on road safety, including the involvement of all relevant stakeholders;*
- (b) *Investment in making the road infrastructure safe;*
- (c) *Appropriate enforcement of driving and road safety laws and regulations;*
- (d) *Ensuring that the vehicles registered domestically meet the highest international technical specification standards.*

United Nations transport-related agreements

ECE develops multilateral agreements and harmonized technical regulations for all inland transport modes, offering off-the-shelf legal texts on energy and emissions measurement and mitigation. Vehicle safety features and harmonized development of transport infrastructure are also covered in these multilateral agreements. Uzbekistan is not a party to some of these important agreements and, consequently, is not reaping the rewards from the regulatory framework that they provide.

Recommendation 14.5:

*The Cabinet of Ministers should consider accession to transport-related agreements, including:*

- (a) *1958 Agreement concerning the Adoption of Harmonized Technical United Nations Regulations for Wheeled Vehicles, Equipment and Parts which can be Fitted and/or be Used on Wheeled Vehicles and the Conditions for Reciprocal Recognition of Approvals Granted on the Basis of these United Nations Regulations;*
- (b) *1997 Agreement concerning the Adoption of Uniform Conditions for Periodical Technical Inspections of Wheeled Vehicles and the Reciprocal Recognition of Such Inspections;*
- (c) *1957 European Agreement concerning the International Carriage of Dangerous Goods by Road (ADR);*
- (d) *1993 Protocol amending article 1 (a), article 14 (1) and article 14 (3) (b) of the European Agreement of 30 September 1957 concerning the International Carriage of Dangerous Goods by Road (ADR);*
- (e) *1989 Convention on Civil Liability for Damage caused during Carriage of Dangerous Goods by Road, Rail and Inland Navigation Vessels (CRTD);*

- |   |  |
|---|--|
| (f) <i>1950 Declaration on the Construction of Main International Traffic Arteries;</i> | (h) <i>1985 European Agreement on Main International Railway Lines (AGC);</i>  |
| (g) <i>1975 European Agreement on Main International Traffic Arteries (AGR);</i>        | (i) <i>1991 European Agreement on Important International Combined Transport Lines and Related Installations (AGTC).</i> |

## Chapter 15

# INDUSTRY AND THE ENVIRONMENT

### 15.1 Trends in industry development

According to the State Committee on Statistics, in 2018, the industrial sector accounted for 23.3 per cent of GDP, of which manufacturing industries represented 15.5 per cent and mining and quarrying 6 per cent. The largest contribution to GDP growth was made by industry, which grew by 10.6 per cent compared with the previous year. The positive dynamic was achieved due to the growth of the added value of the mining industry and the development of quarries by 28.2 per cent, manufacturing industry by 6.4 per cent and other industries by 4.7 per cent. In terms of value added, the largest share is accounted for by manufacturing industry, representing 66.8 per cent of the total value added from the industrial sector in 2018. Mining and quarrying and other industries accounted for 25.9 per cent and 7.3 per cent respectively in 2018.

At the end of 2018, in the gross value-added structure of the manufacturing industry, the largest share was accounted for by the metallurgical and metalworking industry (except for machinery and equipment) – 24.5 per cent. The share of food, beverages and tobacco production was 17 per cent, textiles, clothing, leather and related products 16.1 per cent, rubber, plastic products and other non-metallic mineral products 11.3 per cent, chemical products 9.2 per cent, motor vehicles, trailers and other transport equipment 7.4 per cent, electrical equipment 3.5 per cent and other manufactured products 11 per cent.

In the structure of industrial output, the largest share is produced in Tashkent City (18.6 per cent), and Tashkent (15.3 per cent), Andijan (11.8 per cent), Navoiy (0.9 per cent), Kashkadarya (6.2 per cent) and Fergana (5.6 per cent) Oblasts. In 2018, 56,900 industrial enterprises operated in Uzbekistan, of which 13,400 (23.6 per cent of the total number of operating

enterprises) were located in Tashkent City, 6,200 (11 per cent) in Fergana City and 6,010 (10.6 per cent) in Tashkent Oblast.

The value of total exports in 2018 amounted to US\$14,253.9 million (an increase on the previous year of 13.6 per cent). The share of goods in the composition reached 78.7 per cent, of which energy and oil products accounted for 18.7 per cent, food products 7.7 per cent and ferrous and non-ferrous metals 8.2 per cent. According to the State Committee on Statistics, gold is one of the main export goods of the country. During 2018, the country delivered US\$2.9 billion of gold to foreign markets. For comparison, food exports brought in around US\$1 billion, textiles US\$1.6 billion and ferrous and non-ferrous metals US\$1.1 billion, which demonstrates that natural resources dominate the country's exports.

According to preliminary data from the State Committee on Statistics, in 2018, industrial production output reached 228.9 trillion sum, which is almost six times greater than in 2010 (table 15.1), with a notable increase in the volume of production in the period 2016–2018 (table 15.1).

In 2018, the main factor in the growth in total industrial production output was an increase in manufacturing industry production by 13.2 per cent (10.5 percentage point contribution to the increase in total industrial production), mining and quarrying by 25.4 per cent (3.4 percentage point contribution to growth), electricity, gas, steam and air conditioning by 4.1 per cent (0.3 percentage point contribution to growth) and water supply, sewerage, waste collection and disposal by 22.6 per cent (0.2 percentage point contribution to growth), compared with the previous year. In the total volume of industrial production, output with high value added (food products, textiles, chemicals, pharmaceuticals, etc.) has increased.

**Table 15.1: Industrial production output, 2010–2018, billion sum**

	2010	2011	2012	2013	2014	2015	2016	2017	2018
<b>Total</b>	<b>38 119</b>	<b>47 587</b>	<b>57 552</b>	<b>70 634</b>	<b>84 011</b>	<b>97 598</b>	<b>111 869</b>	<b>148 816</b>	<b>228 866</b>
Mining and quarrying	5 704	6 059	8 481	8 963	9 257	10 870	10 721	18 234	36 870
Manufacturing	28 141	36 717	43 620	55 332	67 097	77 088	89 793	117 736	175 357
Electricity, gas, steam supply and air conditioning	4 084	4 538	5 161	5 967	7 118	8 993	10 523	11 656	14 525
Water supply, sewerage, control over waste collection and distribution	189	271	290	371	539	646	832	1 189	2 113

Source: State Committee on Statistics, 2018.

In 2018, manufacturing enterprises produced goods valued at 175.4 trillion sum (table 15.1) and accounted for 76.6 per cent of the total value of industrial production (figure 15.1). The share of manufacturing industry in the structure of industrial output has increased, from 73.8 per cent in 2010 to 76.6 per cent in 2018. The modernization and diversification of leading industries and introduction of modern technologies for processing raw materials and semi-finished products contributed to this increased share.

The production volume of mining and quarrying enterprises increased from 5.7 trillion sum in 2010 to 36.9 trillion sum in 2018 (table 15.1), when it represented 16.1 per cent of total industrial production (figure 15.1).

According to the State Committee on Statistics, in 2017, the total employed population was 13.5 million people. In the same year, employment in the industrial sector was estimated at 1.82 million people, including 83,500 people in the mining industry and 1.59 million people in the manufacturing industry, which presents 4.5 per cent and 87.6 per cent of the total employed population in the industrial sector respectively. The manufacturing industry accounts for 13.4 per cent of the total employed population, while the mining industry accounts for 0.61 per cent.

The number of industrial enterprises has increased by 38 per cent, from 35,000 in 2011 to 49,000 in 2018. The number of newly created enterprises in 2017 was 10,200.

## 15.2 Developments in main industrial branches

### *Mining and metallurgy*

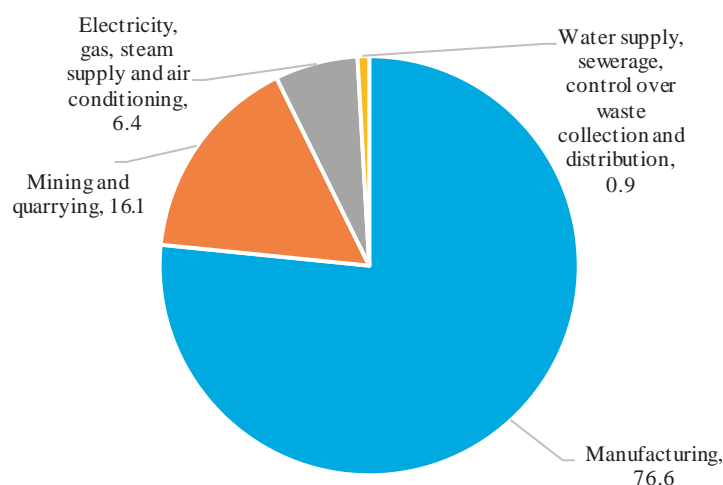
#### Overview

Uzbekistan is the world's thirteenth largest producer of natural gas and ninth largest producer of gold. It is also the world's seventh largest producer of uranium. In terms of reserves and resources of the most important types of minerals, such as copper, potassium salts, phosphorites and kaolin, Uzbekistan is among the world's top 10 countries. The country produces nitrogen, petroleum, rhenium and sulfur in significant amounts in terms of world production. Other valuable minerals produced include copper, gypsum, silver, tungsten and zinc.

During the past several years, the country had made significant efforts to increase its mineral production, including through expansion of copper and gold production facilities, construction of new phosphate and potash plants and development of shale oil and gas condensate deposits.

As at 1 January 2017, according to the country's State Balance of Mineral Reserves, in total, 1,931 deposits had been discovered in Uzbekistan. In 2017, there was a notable increase in the extraction of black coal (almost sixfold) and gas condensate, compared with 2013, while oil and brown coal (lignite) production have both declined steadily since 2013.

**Figure 15.1: Industrial production by sector, 2018, per cent**



Source: State Committee on Statistics, 2018.

The volume of metallurgical industry production has increased significantly, from 3,087.2 billion sum in 2010 to 25,570 billion sum in 2018, while production of coke and refined petroleum products has increased more than threefold in the same period, from 1,785.3 billion sum in 2010 to 5,539.1 billion sum in 2018 (figure 15.2).

#### Ferrous mining and metallurgy

According to the State Committee on Statistics, the industrial production of iron ore commenced in 2017 and its volume reached 26.4 tons in 2017.

The Tebinbulak field is located in the Karauzak District of the Republic of Karakalpakstan. The proved reserves of the deposit are 450 million tons of ore and total reserves are estimated at more than 3 billion tons. A mining and processing plant to produce iron ore concentrate with an average iron content of 65 per cent is planned to be constructed.

#### Non-ferrous mining and metallurgy

According to Nordgold, the internationally diversified low-cost gold producer, the volume of proven and confirmed gold reserves in Uzbekistan is about 2,100 tons. The total reserves are approximately 3,350 tons.

In 2017, the Government approved a list of 12 gold deposits for their industrial development with the participation of foreign investments. This list includes deposits of mainly gold-quartz and gold-sulphide ores

in four regions of the country – Tashkent, Samarkand and Navoiy Oblasts and the Republic of Karakalpakstan. The total reserves of the proposed deposits (category C2) are more than 14.5 tons of gold.

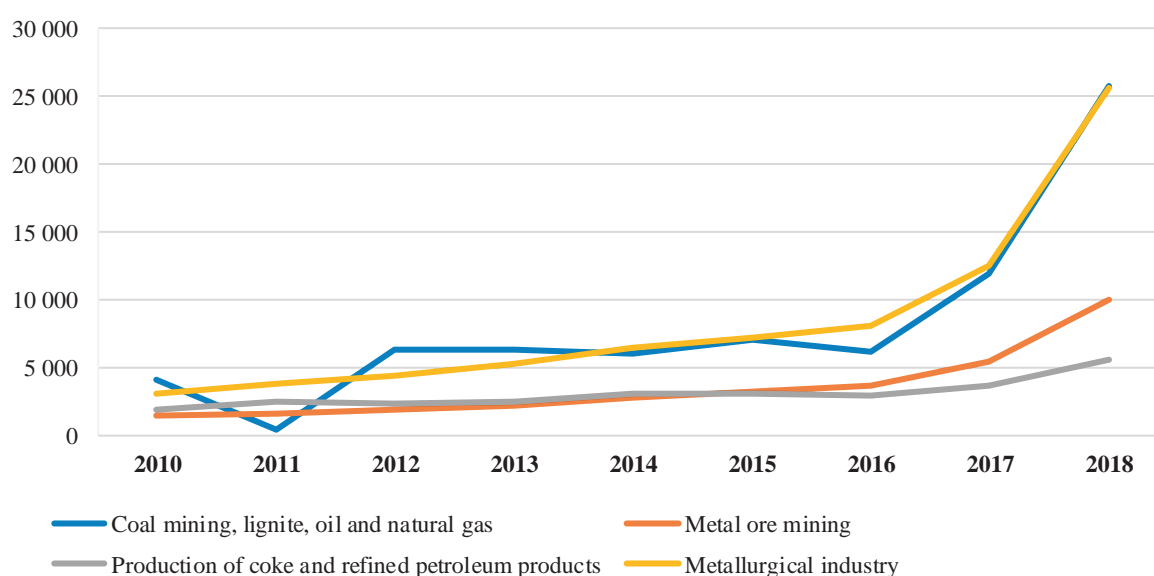
By 2020, the volume of Uzbek gold production is expected to increase to 120 tons per year, from 90 tons per year in 2014. The two main Uzbek mining enterprises, Navoiy Mining and Metallurgical Combine (NMMC) and Almalyk Mining and Metallurgical Combine (AMMC), produce 86 per cent of gold production. In addition, AMMC is the largest silver producer in Uzbekistan, with annual output of around 140,000 tons.

According to the State Committee on Statistics, in 2014, the country had 41 gold deposits; however, only nine of them were developed. The country plans to invest US\$4.5 billion in gold production, which should not only increase the volume of mining by 25–30 per cent but also improve productivity.

In October 2013, AMMC completed the modernization of the Kochbulak gold mine in Tashkent Oblast. The project involved the resumption of work on the Uzun open pit, as well as increasing production from an underground mine. The total cost of the project was US\$10 million.

Uzbekistan has a large number of illegal gold miners. Almost 30,000 are involved, according to local media reports, although the actual volume of illegal gold mining is unknown.

**Figure 15.2: Industrial production by economic activity, 2010–2018, billion sum**



Source: State Committee on Statistics, 2019.

The only producer of copper in Uzbekistan is AMMC, located in Tashkent Oblast. The mineral deposits of Tashkent Oblast are highly complex and contain more than 170 types of minerals. In addition to copper, AMMC mined and processed lead-zinc-barite ores from the Uch-Kulach deposit, located in Jizzakh Oblast, and the Khandiza polymetallic deposit, located in Kashkadarya Oblast. The AMMC facilities include eight mines, five mining and beneficiation plants, two metallurgical plants, a cement plant, a sulfuric acid plant, a mechanical plant and a lime plant.

Production of copper ores and concentrates increased by 8.2 per cent, from 34,613,900 tons in 2013 to 37,467,900 tons in 2017, while lead ore and concentrates, zinc and tin increased by 11.4 per cent, from 524,156 tons in 2013 to 584,021 tons in 2017.

At the end of 2013, AMMC started production of copper pipes, and in March 2014, the plant started operating at full capacity.

AMMC also produces metallic zinc, lead concentrate and other products. Lead and zinc fields are represented by the fields of strata form type in the carbonate rocks (Uchkulach, Kulchulak), scarn (Kurgashinkan, Kumishkan) and pyrites in volcanogenic rocks (Khandiza and elsewhere).

According to the State Committee on Geology and Mineral Resources, about 40 rare metal (e.g. niobium, tantalum, beryllium, lithium, rubidium, caesium) objects have been identified in the Main Tien-Shan rare-metal belt.

Tungsten raw materials are provided by the tungsten ore mines (Lyangar, Ingichke, Koytash, Yakhton, Sargardon and others) and recently discovered fields of Sautbay and ore-showing fields of Sarytau.

According to the U.S. Geological Survey, in 2014, the production of tungsten metal decreased to 83 tons, or by 15.3 per cent compared with 2013. The decrease was owing to reduced demand on international markets. The only producer of tungsten metal in Uzbekistan was the Uzbek refractory and hard metals complex. Reportedly, the plant was operating at about 20 per cent of its capacity and produced tungsten metal from imported tungsten concentrates.

Approved reserves of lithium in the volcanogenic deposit of coal tufo siltstone of Shavazsay in Tashkent Oblast are estimated at over 120,000 tons of lithium dioxide, and accompanying components at 3,200 tons of caesium oxide and 8,900 tons of rubidium oxide.

Manganese ore shows are discovered in the territory

of Uzbekistan. The most studied are the formation deposits Dautash, Kyzylbayrak, Takhtakaracha and others. It is required to also study the manganese-bearing strips of the Zarafshon and Gissar mountains. In Kyzylkum Desert, new types of manganese deposits have been discovered (Alisoy, Oqsoy and others).

#### *Construction materials*

As of 2018, there are five big cement facilities and several small ones, with total capacity of 8.5 million tons. Qizilqumsement JSC, with capacity of 3.1 million tons, and Akhangarancement JSC, with capacity of 1.7 million tons, are the biggest. In the next five years, Uzbekistan plans to increase the volume of cement output to 17 million tons per year.

Cement holds a significant share (76 per cent) in the total volume of construction materials production in Uzbekistan, according to Ozqurilishmateriallari JSC. The annual production of cement has increased by 19 per cent, from 7,639,000 tons in 2014 to 9,132,000 tons in 2017.

Several new large cement plants are expected to be built in the next few years.

#### *Chemical industry*

The chemical industry includes enterprises producing mineral fertilizers, chemical plant protection agents, chemical fibres and threads, synthetic resins, polymeric items and other products. The Republic of Karakalpakstan, and Kashkadarya, Bukhara, Navoiy, Surkhandarya and Fergana Oblasts have an important place in the implementation of large chemical industry projects manufacturing products with high added value and using complex technological processes.

According to the State Committee on Statistics, in 2018, chemical industry output amounted to 18,967.9 billion sum, a 2.1 per cent increase on the previous year. The increase is primarily due to increased capacity utilization and the launch of new enterprises. Production of mineral fertilizers continued to grow and reached 1,141,900 tons in 2017. At the same time, increased production of chromium trioxide, chlorine and caustic soda equalled the level of production of yellow phosphorus, one of the main export products of the country's chemical industry. The share of chemicals in exports increased from 5.1 per cent in 2010 to 6.9 per cent in 2016.

The rapid development of other industries, such as oil and gas and metallurgy, creates favourable conditions for the growth of the chemical industry. The main trends of chemical industry development include:

- Modernization and technological rearmament of existing production of mineral fertilizers;
- Optimizing the variety of mineral fertilizers in production;
- Construction of modern production facilities with the phasing out of outdated technologies and equipment;
- Production of new, scientifically based types of chemical products for the home market and export;
- Mastering the production of non-explosive types of nitric fertilizers.

Despite the recent developments, major obstacles still hamper the increase in competitiveness and profitability of the country's chemical industry, such as obsolete equipment, high operational and transportation costs, and a shortage of qualified personnel and the lack of technology for production of chemicals with high added value.

#### *Pharmaceutical industry*

In recent years, the pharmaceutical industry has seen rapid growth. According to the State Committee on Statistics, in 2018, pharmaceutical industry output amounted to 1,705.7 billion sum, a 13.1 per cent increase on the previous year and more than threefold increase compared with 2014. In 2017, the pharmaceutical industry manufactured 1.6 billion packaging units of medicinal products and medical devices, 34 per cent more than in 2016. However, in value terms, the growth was only 16 per cent.

In 2017, the industry began to implement 71 investment projects, commissioned 33 facilities worth US\$148 million and launched the manufacturing of 76 new products.

The overall intention of the Government is to stimulate local production of pharmaceuticals by providing local producers with a more favourable tax, customs and sales regime and also to ensure that the population of Uzbekistan has access to affordable pharmaceuticals. In addition, the Government seeks foreign partners interested in establishing local production of pharmaceuticals and medical equipment. Special attention is paid to ensuring that national products are competitive. Work on introducing international quality standards is being carried out. According to ITE-Uzbekistan, in 2015, the ISO 9001 quality control system has been implemented on 28 national pharmaceutical enterprises. As of 2018, 12 of the 94 pharmaceutical manufacturers in Uzbekistan had Good Manufacturing Practice (GMP) certificates.

In most of the pharmaceutical industry, manufacturing

is limited to single formula medicines. There is still a lack of use of modern technology by pharmaceutical companies, which are still engaged in importing and packaging finished products.

#### *Light industry*

According to the State Committee on Statistics, in 2016, light industry accounted for 26.2 per cent of the total industrial volume of the country, 3.8 per cent of GDP and over 44 per cent of non-food consumer goods production. There has been around 18 per cent annual growth in the industry's output in recent years and 10 per cent growth in exports. More than 105,000 people are employed in the industry.

In recent years, the textile industry has seen dynamic development. According to the State Committee on Statistics, industrial production in the textile industry has seen steady growth and increased in value from 12,675 billion sum in 2014 to 31,262 billion sum in 2018.

As at 2018, more than 1,000 enterprises in the textile and garment and knitwear industry were operating as part of the Uztextileprom Association. Over 70 per cent of these have implemented quality management systems and ISO and other certification.

Uzbekistan, the world's sixth largest cotton producer, produced 2.3 million tons of raw cotton in 2018. Traditionally, cotton is Uzbekistan's most important cash crop. In recent years, however, the country has been taking serious steps to develop its textile industry to produce value-added products rather than exporting raw cotton.

According to the State Committee on Statistics, textile exports continued to grow rapidly in 2018, reaching a value of US\$1.6 billion, up by 41.4 per cent on the previous year.

#### *Automotive industry*

According to the State Committee on Statistics, in 2018, automotive industry output amounted to 44,697.3 billion sum, a 51.5 per cent increase on the previous year. The automotive industry produces passenger cars, trucks, buses, tractors and automobile engines.

Despite the increased output in 2018, automotive industry production does not meet domestic demand. The Government intends to make the automotive sector more competitive and diverse and has pledged to increase car production threefold in the period

2017–2021 (2017 Resolution of the President No. 3028).

### *Food industry*

Food production in Uzbekistan decreased by 3.7 per cent in 2018 compared with 2017 and amounted to 30,263.6 billion sum in value terms, according to the State Committee on Statistics. The food industry's share in total industrial production decreased from 20 per cent in 2016 to 13.2 per cent in 2018. At the same time, growth was observed on many indicators in food production. In particular, the production of canned fruit and vegetables grew 10.8 per cent to 161,000 tons.

The Government measures in the sector aim to ensure structural reforms, modernization and production diversification, with a focus on four main areas: export supplies; establishment of 15 trade and logistics centres with a total capacity of 60 thousand tons; financial support worth US\$596 million for 180 investment projects; and packaging sector development.

### **15.3 Environmental pressures from industry**

#### *Air*

According to the data provided by the SCEEP, there is no consistent trend in industrial air emissions since 2009. The highest increase was noted between 2014 and 2015, when emissions peaked at 222,900 tons; this was followed by a notable decrease in 2016 to 202,200 tons (table 15.2).

In 2017, the monitoring data showed continuous exceedance of emissions of nitrogen oxides, sulfur dioxide, carbon oxides, ammonia and dust (mainly by chemical industry, energy and construction industry enterprises) in Tashkent, Navoiy and Fergana Oblasts. The greatest exceedance of nitrogen oxide emissions was observed at the chemical industry enterprises Navoiazot Public Joint State Company (PJSC),

AMMC PJSC, construction enterprises Bekabacement PJSC, Kyzylkumcement JSC and NIES PJSC (table 15.3). Emissions of sulfur dioxide above the norms were noted at the enterprises of Bekabacement PJSC, Almalykgishtchisi LLC, Hamkorkeramik LLC and AMMC PJSC. In addition, at the enterprises of Navoiazot PJSC and Maxam-Chirchik JSC, the values of ammonia also exceeded the permissible amount. The energy enterprise Angrenskaya TPP, the construction industry, Akhangarancement JSC, AMMC PJSC, Bekabacement JSC and Kuvasoycement JSC have also exceeded permissible emission levels for dust. High rates of carbon monoxide emissions were recorded at the refinery enterprise of the joint venture Zharkurgon Nefteikaishashash and at the construction industry enterprise Kyzylkumcement JSC.

These emissions are potential sources of health problems (e.g. respiratory diseases) for industrial workers and the population living near the enterprises, especially when they contain heavy metals (e.g. arsenic, cadmium, lead).

Many of the largest enterprises are carrying out modernization through investment in new technologies and devices to reduce air emissions from their facilities. Automated systems for emissions monitoring have also been installed by large enterprises, but these are not widespread.

Technological upgrading is still lagging behind in small and medium-sized enterprises (SMEs) that cannot afford the implementation of emissions reduction measures.

While significant progress was achieved to reduce gas flaring, 788 million m<sup>3</sup> of gas was still flared in 2018 (table 12.8). Efforts to reduce gas flaring include the construction of the Kandym gas processing plant complex in Bukhara Oblast. In April 2018, the second line of the gas processing plant was launched. The plant is focused on the processing of sulfurous gases, which were previously flared.

**Table 15.2: Air emissions from industry, 2009–2016, 1,000 tons**

	2009	2010	2011	2012	2013	2014	2015	2016
SO <sub>2</sub>	95.9	108.6	113.0	111.1	118.3	152.9	147.2	123.6
NO <sub>2</sub>	9.8	9.5	8.1	8.3	7.8	9.0	9.4	11.2
NH <sub>3</sub>	12.6	12.1	2.3	2.3	2.2	2.1	2.0	2.0
TSP	61.9	53.5	53.6	84.5	52.7	46.6	61.7	63.3
NMVOC	2.6	2.8	2.7	2.4	2.6	2.2	2.6	2.1
<b>Total</b>	<b>182.8</b>	<b>186.5</b>	<b>179.7</b>	<b>208.6</b>	<b>183.6</b>	<b>212.8</b>	<b>222.9</b>	<b>202.2</b>

Source: State Committee on Ecology and Environmental Protection, 2019.



## Water

For industrial and domestic needs, enterprises use groundwater sources and water from the municipal water supply networks. Water records are kept for each source, annual targets are established and programmes are being implemented to conserve water resources. Over 96 per cent of the water consumed is contained

in circulating systems used for cooling technical equipment and in air conditioning systems.

Water use by the industrial sector decreased between 2009 and 2017, from 834.5 million m<sup>3</sup> to 709.6 million m<sup>3</sup> (table 15.4). The industrial sector's share of total water use is negligible, accounting, on average, for 1.4 per cent in 2009–2017.

**Table 15.3: Air emissions exceedances from industrial enterprises, 2013–2017, times**

Enterprise	NO <sub>x</sub>	SO <sub>2</sub>	NH <sub>3</sub>	CO	Dust
Navoiyazot PJSC	1.3 (2013)		1.18–1.22 (2013)		
	1.23–2.46 (2014)		1.8 (2014)		
			1.2 (2015)		
AMMC PJSC	1.2–2.3 (2013)	1.2–3.3 (2013)			1.3–2.8 (2013)
	1.2–1.6 (2014)	1.3–2.0 (2014)			1.7–3.4 (2014)
	1.1–2.7 (2015)	1.9–7.7 (2015)			2.5–20.0 (2015)
		1.1–2.8 (2017)			2.7–10.6 (2017)
Bekabadcement PJSC	1.7–2.8 (2014)	2.2–2.4 (2014)			1.2–15.6 (2013)
	1.3–2.2 (2015)	4.7–5.9 (2015)			1.2–1.6 (2014)
	1.5 (2017)				1.4–12.2 (2015)
					1.4 (2017)
Kyzylkumcement JSC	3.55–5.83 (2013)			2.36 (2013)	1.6–1.8 (2015)
NIES PJSC	1.81–4.27 (2013)				
Hamkorkeramik LLC		3.9 (2014)			
Maxam-Chirchik JSC			1.5 (2013)		
			1.4–2.31(2014)		
Angrenskaya TPP	1.1 (2013)	1.1–1.3 (2013)			1.4–1.8 (2013)
	1.3 (2015)	1.3 (2015)			4–1.9 (2014)
					1.3–6.1 (2015)
					2.2 (2017)
Akhanganacement JSC					1.3–6.4 (2013)
					1.8–16.3 (2014)
					1.4–4.7 (2015)
					1.1–3.0 (2017)
Kuvasoycement JSC					2.2 (2013)
					3.0 (2014)
					2.0–18.5 (2015)
					1.3–2.1 (2017)
Zharkurgon Nefteikaiishashash				1.6 (2015)	

Source: State Committee on Ecology and Environmental Protection, Information Bulletin on Sources of Environmental Pollution and their Impact on the Environment 2013–2017.

**Table 15.4: Water use by the industrial sector, 2009–2017, million m<sup>3</sup>**

	2009	2010	2011	2012	2013	2014	2015	2016	2017
<b>Total water use by all sectors</b>	50 225.3	57 169.1	48 750.9	56 096.4	53 977.3	51 793.9	55 138.0	54 555.7	58 918.3
Of which:									
Industry	834.5	838.9	837.8	743.9	675.4	691.2	666.7	707.1	709.6
Industry's share of total water use (%)	1.70	1.50	1.70	1.30	1.30	1.30	1.20	1.30	1.20

Source: State Committee on Ecology and Environmental Protection, 2019.

In Uzbekistan, common types of water pollution are contamination from the chemical, oil, manufacturing and metallurgical industries. Many industrial enterprises do not have wastewater treatment facilities on their premises or do not carry out preliminary treatment. Industrial wastewater is often discharged directly into rivers or into urban sewerage systems by illegal connection. Municipal wastewater treatment plants (WWTPs) are mainly intended for the treatment of household wastewater, but the number of industrial enterprises not equipped with local WWTPs is growing, which leads to large amounts of highly polluted and toxic wastewater entering the municipal treatment plants – the proportion of industrial wastewater can reach 80–90 per cent. Monitoring of wastewater inlet and outlet indicators is not carried out systematically. Many enterprises do not have the necessary equipment installed to permit adequate monitoring. Often, laboratories are in poor condition and there is no equipment to perform the tests.

Regular controls, also covering wastewater discharges, are carried out by the territorial bodies of the Centre for Specialized Analytical Control on Environmental Protection under SCEEP at pollution sources of 119 enterprises. The list of enterprises is included in the “Programme for monitoring the sources of environmental pollution”. The results of such monitoring during the period 2013–2017 indicate low cleaning efficiency at a number of enterprises, in particular:

- Cleaning efficiency of WWTPs of up to 30 per cent in: Andijan and Asaka, ETZ Markhamat Kurgontepa Don, Andijonbalik, Krafteks JV, Best Tex Intern, Kurgan Tex, Shakhrikhan Sut, ANTEX Shakhrikhan and Andijan Cable (Andijan Oblast); and Urgench, Pitnak and Khiva, and JSC “Khonkadonmahsulotlari” (Khorezm Oblast);
- Cleaning efficiency of WWTPs of no more than 50 per cent in: Suu Kham Aqaba (City of Takhiatash) and UEMV Tuyamuyun Nukus (Republic of Karakalpakstan); Oktoshdon JSC (Samarkand Oblast); Sirdare IES JSC (Syrdarya Oblast); Almalyk WWTP, Urtachirchikparranda JSC, and first basin of Chirchik (Tashkent Oblast); Salarsky aeration plant, Bozsu aeration plant and Bektemirsky WWTP (Tashkent City); Kuvasay, Kokand and Buvaydinsky WWTPs (Fergana Oblast); and LLC Murruvat tex (Khorezm Oblast).

The main source of pollution of the Chirchik River is the Maxam-Chirchik JV plant, and of the Ahangaran River is AMMC. The discharged effluents into the Chirchik and Akhangaran Rivers, due to their insufficient purification, are characterized by

significant concentrations of nitrogen compounds, specific chemical ingredients and toxic metal ions.

#### *Soil and land*

In Uzbekistan, the mining industry occupies vast territories with quarries and waste dumps, which make a significant contribution to soil degradation. Overall, soils are severely degraded by mining activities, which remove large amounts of soil and vegetation for open pit mining. This also affects local habitats and causes loss of biodiversity and arable lands.

Mining tailings and other hazardous industrial waste have a significant impact on soil if effective prevention measures are not in place. Historically low levels of ore recovery in the non-ferrous mining industry is a major factor that contributes to the high volume of tailings accumulated in the country.

Nowadays, soil pollution with concentrations of pollutants beyond maximum allowable concentrations (MACs) occurs in the country’s industrial regions. The level of soil contamination with heavy metals is observed in the territories of industrial zones and in areas located in close proximity to industrial enterprises.

Since 2017, soil monitoring has been carried out in the areas where 104 objects are presenting a potential hazard of soil contamination: tailing dumps and sludge accumulators of large industrial enterprises, oil refineries and oil depots, large warehouses of mineral fertilizers and toxic chemicals, poisons burial sites and former agricultural airfields (chapter 4). According to the monitoring results for the period 2013–2017, on the territory of Akhangarancement JSC, the baseline lead content in soils has been exceeded by 4.6 times, and at the Angren TPP by 4 times. Around the AMMC tailing dump in Tashkent Oblast, the level of soil contamination with copper above the background content ranged from 6.8 to 10.3 times, while the chemical waste dumps of Ammophos JSC exceeded the background content by 2.3–8.2 times.

Soil pollution with oil products is constantly recorded in the territories adjacent to industrial enterprises associated with oil refining. In Bukhara Oblast, this is Gazelineftkazib-Chikarish enterprise, where the excess of oil products is observed at 12–20 times above the background content. In Kashkadarya Oblast, the Mubarakneftegaz enterprise is recorded at 105 times above the background content and, in the Karshi area, the Koson oil and gas production enterprise at 111 times above the background content.

The excess of petroleum products above the background content was observed around the branches of the UE “Gulistan petroleum depot” and “FĖTSH” in the Mirzaabad and Bayavut regions of Syrdarya Oblast by 55 and 65 times respectively.

The general lack of prevention measures to avoid soil pollution by heavy metals from tailings (old and current), such as the installation of a geomembrane, is an important issue for the country, as the costs of related environmental rehabilitation (soil recultivation using phytoamelioration methods, and reestablishment of the soil structure and its self-regulating capacity) are high. Besides, old metal tailings can be considered as ore deposits (if the ore grade is economically viable) to be exploited.

### *Waste*

Energy facilities, and the mining and metallurgical, chemical and construction industries are the main sources of environmental pollution forming waste. Most industrial waste is generated and concentrated in Navoiy Oblast in the central, remote desert part of the country and around the cities of Tashkent, Almalyk and Chirchik. Historic legacies include the abandoned uranium mining sites in Charkesar and Yangiabad.

Approximately 100 million m<sup>3</sup> of industrial waste is generated in the country annually (table 10.5), of which 14 per cent is classified as toxic, and about 68 per cent is mining waste. A significant amount of waste is generated in the chemical industry. The chemical industry is a source of toxic waste, such as phosphogypsum, lignin, manganese sludge and sulfur. The volume of phosphogypsum alone is about 70 million tons per year and lignin accounts for 15 million tons per year. As at 2018, accurate statistics for the annual generation of industrial waste were not available. Only 0.2 per cent of the solid industrial waste generated is used as secondary raw materials.

About 10,000 hectares of land are currently used for storage of industrial waste. A landfill site for the burial of toxic wastes has recently been built at the processing plant of DzhiEmUzbekistan JSC. In 2019–2020, a landfill site is scheduled for construction at the Jizakh Accumulator Plant LLC.

Due to the insufficient number of landfills for storage and disposal of industrial waste, there is a widespread practice of dumping in unauthorized places, which is particularly dangerous for the environment.

In recent years, several mining and chemical enterprises have shifted to technologies that allow

more efficient extraction and production, generate less hazardous waste and reuse more of the waste.

Environmental hazards from the legacy of uranium mining persist (chapters 6 and 10).

### *Ecosystems and biodiversity*

Habitat disturbance in connection with engineering and industrial activity is caused by the construction of industrial facilities and their associated infrastructure, the development and mining of mineral resources and the construction works. As at 2018, land occupied by industry and used for other special needs accounted for 1.91 per cent of the total area of the country.

The oil and gas industry is one of the actively developing economic sectors in Uzbekistan. In territorial terms, this activity covers mainly the Ustyurt Plateau and the region of the delta of the Amu Darya River. Separate types of activities, in particular those connected with the construction of the main infrastructure, such as pipes and roads, have a significant impact on migratory routes of saiga antelopes and vulnerable arid ecosystems. Other industrial sectors that negatively affect natural habitats include the chemical, mining and energy industries.

Industrial activities have severely affected the ecosystems in the country, notably in the localities where industrial operations occur. Pressures on the country’s biodiversity, such as loss of habitats with the degradation of soil, forests and water resources, have increased in the last decade as industrial activities have intensified. Despite periodic environmental inspections of mining industry facilities and the availability of various other data that are sufficient for the maintenance of cadastres, full information on industry’s impacts on the condition of populations of endemic and rare plant species is not available.

In the absence of such information, the impacts of large industrial enterprises on biodiversity are not addressed in Uzbekistan. The concept of biodiversity offsetting is currently not applied. Moreover, the economic value of biodiversity and benefits from its use are not properly streamlined into decision-making, including in industrial production sectors.

### *Climate change*

The main climate change impacts related to industrial activities in Uzbekistan include:

- Emissions of GHGs from industrial processes;
- Water resources consumption, use and discharge, which can affect river flows and be a direct source

of surface water pollution and salinization of internal water bodies.

In 2012, the industrial processes and waste sectors accounted for 3.8 per cent and 3.7 per cent of anthropogenic GHG emissions respectively.

The industrial processes sector includes GHG emissions resulting from:

- Processing and use of mineral raw materials (production of cement and lime, and the use of soda);
- Activities of chemical enterprises (production of nitric acid, ammonia, methanol and polyethylene);
- Metal (steel) production;
- Consumption of hydrofluorocarbons (HFCs).

The largest source is the chemical industry; its contribution to sectoral GHG emissions in CO<sub>2</sub>-eq. in 2012 was 46 per cent (figure 7.4). The next most important source of emissions was the production and use of mineral products, which accounted for 38 per cent. For the period 1990–2012, the contribution of emissions from the chemical industry decreased by 5 per cent, while that from the production of metals increased by 4 per cent. Carbon dioxide dominates in the total emissions of the sector, accounting for 76 per cent (table 15.5). The main sources of CO<sub>2</sub> emissions are cement clinker, ammonia and steel.

Implementation of projects under the Clean Development Mechanism (CDM) at three enterprises, Navoiazot PJSC, Ferganaazot PJSC and Maxam-Chirchik PJSC, has significantly reduced emissions of nitrous oxide.

#### *Noise and vibration*

Information is not available on noise and vibration from industrial activities.

#### *Health*

Industrial air emissions, wastewater discharges and soil pollution by industry can negatively affect human health in communities where the operations occur, and sometimes farther afield. Health impacts mostly include respiratory diseases due to air pollution. Contaminated water (heavy metals, phenols, radionuclides), if used as drinking water or for recreational purposes, is a source of health problems such as cancer, typhoid fever, stomach sickness, poor development of the nervous system, etc. Similarly, polluted soils (by heavy metals and other toxic substances) can contaminate food, which is later consumed by humans, affecting their health. No information is available on health problems in communities in the vicinity of major industrial enterprises.

Uzbekistan has an estimated 30,000 illegal gold miners. Artisanal and small-scale mining can be the source of the large releases of mercury that can have serious health impacts. Detailed information is not available in Uzbekistan to evaluate health impacts from illegal gold mining activities. Despite this activity potentially having negative effects upon the “legal” goldmining activity in the country, no actual work in this area is being carried out. This is because the largest gold producers are not interested in developing the type of deposits the illegal miners are extracting.

According to the State Committee on Statistics, in 2018, 27 per cent of all male workers and 16.3 per cent of all female workers were working in conditions that did not meet sanitary and hygiene standards (chapter 17). These high values are a matter of concern.

**Table 15.5: GHG emissions in the industrial processes sector, 1,000 t CO<sub>2</sub>-eq.**

	Gas	1990	1995	2000	2005	2010	2012	2012 (%)
Production and use of mineral products	CO <sub>2</sub>	3 007	1 765	1 633	2 406	3 127	2 965	37.88
Chemical industry	CO <sub>2</sub>	2 272	1 445	1 292	1 396	1 762	1 783	22.78
Chemical industry	N <sub>2</sub> O	1 782	1 457	1 287	1 479	1 789	1 783	22.78
Metal production	CO <sub>2</sub>	998	587	665	972	1 170	1 200	15.33
Other production	CH <sub>4</sub>	-	-	-	3	3	3	0.04
Hydrofluorocarbons consumption	HFCs	-	-	6	12	22	94	1.20
<b>Total</b>		<b>8 059</b>	<b>5 254</b>	<b>4 883</b>	<b>6 268</b>	<b>7 873</b>	<b>7 828</b>	<b>100.00</b>

Source: GHG Inventory for the period 1990–2012, 2016.

## 15.4 Measures towards the greening of industry

### *Energy efficiency in industry*

Uzbekistan's industrial sector is characterized by high energy intensity (chapter 12). According to the International Energy Agency, energy consumption by the industrial sector at the end of 2015 made up half of the total final energy consumption (50 per cent, or 19.141 Mtoe). Mining, chemicals, oil and gas, electricity and the production of construction materials are among Uzbekistan's most energy-intensive industries.

The reduction of energy intensity is considered a priority to ensure the competitiveness of industry.

In 2010, the World Bank piloted a new financial approach through its Energy Efficiency Facility for Industrial Enterprises Project, which provided financing for 32 strategic enterprises to pilot 81 subprojects in Uzbekistan. As a result, AMMC has installed a new 6-kV frequency converter and retrofitted compressor stations at a zinc- and copper-smelting workshop – improvements that led to savings of 12.5 million kWt/h of electric power in 2015. Maksam-Chirchik JSC, which produces agricultural fertilizers, has introduced a natural-gas-fired heater, which has reduced the emission of harmful substances and lowered the temperature of flue gases emitted into the atmosphere.

Phases 1 and 2 of the Energy Efficiency Facility for Industrial Enterprises Project, approved in 2010 and 2013 respectively, supported the introduction of dedicated credit lines for investment in improving industrial energy efficiency. By the end of 2017, these investments had resulted in energy savings equivalent to 360 GWh per year over the lifespans of the modernized equipment or facilities, and more than 580,000 tons of CO<sub>2</sub> emissions per year avoided.

Phase 3 of the Project will continue to finance energy-saving investments in both large industrial enterprises and industrial SMEs, and support energy efficiency capacity development through targeted technical assistance. It is expected that investments under Phase 3 will generate an additional 386 GWh of annual energy savings and help avoid an additional 799,000 tons of annual CO<sub>2</sub> emissions.

Within the Government and the industrial sector, there is broad agreement on the importance of reducing energy use by modernizing industry and reducing energy losses. However, there is insufficient awareness about energy conservation beyond the core group of Uzbek business leaders.

### *Corporate social responsibility and health and safety management*

There is no legislation on corporate social responsibility (CSR) in Uzbekistan, and the concept has not been widely adopted, though many companies are active in charity activities, either on their own initiative or at the direction of local government officials.

CSR in Uzbekistan is implemented by companies in various industries, from mobile phone operators to the construction and pharmaceutical industries. Industries' concerns about the development and well-being of local communities where they operate have improved during recent years. Several companies, such as cement and copper mining companies, are implementing CSR and health and safety management.

### *Certification*

In recent years, measures have also been taken to stimulate enterprises introducing and certifying quality management systems that are consistent with international standards. Current legislation provides certain benefits and preferences for enterprises that have implemented and certified quality management systems. Such businesses are granted certain tax privileges as well as advantages during tender bidding for the purchase of products.

According to Uzstandard, as at 1 January 2018, 15.4 per cent of existing standards in the country are harmonized with international requirements. The Government has set itself the task, in the period 2018–2028, of bringing the level of harmonization to 75 per cent. The adoption and implementation of more than 2,000 international standards in all sectors in the period 2017–2021 is planned. As part of this programme, in 2017, enterprises and business associations adopted and implemented 647 international standards, including: 111 standards for the mining and metallurgical industry, 55 for electrical engineering, 44 for light industry, 42 for the food and chemical industry, 41 for oil and gas, and 26 for the construction industry. As of 1 January 2018, 6,457 enterprises in Uzbekistan implemented quality management systems and were issued 6,632 certificates, including:

- 6,180 certificates for compliance with international standard ISO 9001: 2008;
- 64 certificates for compliance with the international standard of the environmental management system ISO 14001: 2004;

- 83 certificates for compliance with the international standard of the occupational health and safety management system OHSAS 18001: 2007;
- 129 certificates for compliance with the international standard of the food safety management system ISO 22000: 2005 - QMS;
- 41 certificates for compliance with the requirements of the international standard for quality management in the automotive industry and enterprises supplying the relevant component parts of ISO 16949;
- 12 certificates for compliance with the requirements of the international standard Good Manufacturing Practice;
- 35 certificates of compliance with the requirements of the international standard of the energy management system ISO 50001;
- 88 certificates of Integrated Management Systems.

According to Uzstandard, as at 1 January 2018, the total number of enterprises that have introduced and certified management systems is dominated by the food (2,084 units), light (1,152 units), construction (778 units) and chemical and petrochemical (580) industries. An example of measures introducing and certifying quality management systems at Akhangaran cement plant is presented in box 15.1.

#### *Green technologies and cleaner production*

The Green Ecology Technologies Central Asia Business Forum – GETCA–2018 was held for the first time in Uzbekistan in June 2018, within the framework of the Central Asian International Environmental Forum. It has provided a platform for exchanging experience in improving the environment and sustainable development of the region, attracting attention and technical assistance of the international

community to solve the most pressing problems in the countries of Central Asia and attract investment and clean technologies to the development of the national economies.

At present, the mechanisms to facilitate the introduction of green technologies in all branches of industry, such as financial incentives, are still lacking. Another barrier to the shift to green technologies is the generally limited access of SMEs to financing.

The establishment of a Green Economy Financing Facility (GEFF) in Uzbekistan in 2018 is expected to help address high levels of energy and carbon intensity through the scaling-up of investments in green technologies.

#### *Labelling*

The 2018 Resolution of the President No. 4042 “On measures to introduce modern methods of labelling certain types of goods” introduces measures in the field of consumer protection, including the purchase of products of good quality, safe for life and health, as well as obtaining information about products and their manufacturers. As of 1 August 2019, Uzbekistan will gradually introduce mandatory labelling of imported and locally manufactured goods using a protected label and (or) nano-molecular technology, depending on the category of goods.

However, the application of specific product standards to ensure that the products are designed and manufactured in such a way as to achieve the requirements for waste prevention (e.g. minimizing waste volume/weight), are still lacking in the legislation. Furthermore, measures are not in place for the reuse of waste, or for training and campaigns for raising public awareness on reuse, labelling and marking, such as reuse labels, for example.

#### **Box 15.1: Akhangaran cement plant**

Akhangaran cement plant is one of the leading enterprises of the cement industry in Uzbekistan. It ranks second in the country's cement industry in terms of production. It is located in the industrial zone of Akhangaran District of Tashkent Oblast. The design capacity of the plant is 2,180,000 tons of cement per year.

At each stage of production, from the extraction of raw materials to the shipment of finished products to the final consumer, strict quality control is carried out. In 2010, the company passed a certification audit of the quality management system in the National Certification System according to the O'z DSt ISO 9001 standard, as well as the international standard DIN EN ISO 9001: 2008.

In 2013, the company received EMS certifications according to the O'z DSt ISO 14001 standard and the occupational health and safety management systems according to the O'z DSt OHSAS 18001 standard.

In 2019, the company is working on the introduction of investments in the project for the construction of a new technological line to produce cement in an energy-efficient and environmentally friendly manner using a dry method with a capacity of 6,000 tons of clinker per day.

*Reduction of major industrial accident risks*

Competent authorities have developed and implemented policies on industrial safety concerning hazardous production facilities in the mining industry, including coal mining, and the metallurgy, oil and gas, petrochemical and chemical industries, geological exploration, boiler facilities, trunk pipelines and blasting. During recent years, measures to prevent major industrial accidents and reduce risks have been strengthened. These measures relate mainly to supervision over compliance with industrial safety requirements by hazardous production facilities and organizations operating hazardous technical devices, and accident investigations, together with relevant state bodies and emergency training at hazardous production facilities.

Measures implemented by the industrial sector to manage chemicals safely include:

- Establishment of factory committees on safe handling of chemicals at the enterprises using chemical substances;
- Development of Kst 15359652-10319: 2013 standard “Chemical handling control”;
- Introduction of a material safety data sheet (MSDS) and safe use instructions (SUI);
- Supply of the storage and handling facilities with chemical spill response kits;
- Organization of annual training for emergency situations involving chemical spills.

*Industry-relevant targets*

The 2015 Resolution of the Cabinet of Ministers No. 8 “On additional measures to reduce production expenditures in industry and reduce net costs of products in industry” established mandatory levels of energy savings for 27 industrial enterprises. Each large enterprise was assigned a target. This made it possible to reduce the existing energy consumption to produce a unit of production in 2015 by 17 per cent for natural gas and 14 per cent for electricity.

The 2017 Programme of Measures for Further Development of Renewable Energy, Increase of Energy Efficiency in Economic Sectors and the Social Sector for the period 2017–2021 set further targets for enterprises to reduce their consumption of energy resources (natural gas, electricity, petroleum products) for the production of goods by 37.4 per cent by 2021.

There are currently no targets and indicators specified for industrial waste.

**15.5 Legal, policy and institutional framework***Legal framework*

The 2002 edition of the 1994 Law on Subsoil provides the fundamental legal framework governing exploration and development of all subsoil resources, including minerals and oil and gas. The Law provides for state licensing and control, rights and obligations, basic rules regarding efficient use of resources, types of subsoil use, duration of subsoil use and other matters.

The 1996 Law on Ambient Air Protection regulates the activities of enterprises related to emissions of pollutants. It stipulates that enterprises and organizations are obliged to save fuel and energy resources by introducing energy-saving technologies and alternative energy sources, thereby reducing GHG emissions.

The 1997 Law on Rational Use of Energy provides for state control over compliance with the indicators of energy efficiency and energy quality established by regulatory documents, revised every five years. It determines the conditions for conducting mandatory energy audits at enterprises with a total annual energy consumption of more than 2,000 tons of coal equivalent. Enterprises and organizations can be given preferential tariffs when energy costs are reduced against the established standards or when products have lower energy intensity than the established standard. The Law provides for the administrative liability of individuals and legal entities for the irrational use of energy.

The 2002 Law on Waste defines the obligations of legal entities and individuals to ensure the collection, proper storage and prevention of the destruction and damage of wastes of resource value. The Law obliges waste owners to take measures for the development and implementation of waste management technologies.

The 2006 Law on Industrial Safety of Hazardous Production Facilities stipulates requirements for handling hazardous substances assigned to hazard classes, explosives, and industrial wastes containing substances in concentrations that are hazardous to human health and the environment.

The 2000 Law on Ecological Expertise regulates environmental assessment in order to prevent potential adverse impacts of economic and other activity on the environment and the lives and health of the population. The Law requires subsoil users, prior to financing construction works on mining projects, to

obtain a SEE conclusion as to compliance of the intended activity with ecological requirements. The SEE requirements are focused on emissions and discharge of polluting substances, and waste; however, they poorly reflect specific issues related to impacts on biodiversity.

The 2019 Resolution of the President No. 4124 requests major mining companies to (box 2.1):

- Implement a corporate disclosure process in accordance with the principles and requirements of the International Standards of Accounting and Reporting (ISAR);
- Publish reports on the economic, social and ecological issues in accordance with the Global Reporting Initiative (GRI).

#### *Policy framework*

#### Programme of Actions on Environmental Protection for the period 2013–2017

The Programme of Actions on Environmental Protection for the period 2013–2017 (2013 Resolution of the Cabinet of Ministers No. 142) provides for a number of industry-relevant directions:

- Greening of economic sectors, improvement of technological processes and environmental activities;
- Introduction of environmentally sound low-waste technologies in the mining and metallurgical industry, modernization of the existing technology of sulfur production at gas and chemical enterprises by the method of direct oxidation; construction of an associated gas utilization facility at oil and gas production facilities;
- Prevention and elimination of the harmful effects of industrial and household waste on the environment; reclamation of disturbed lands; rehabilitation of burial grounds and landfills with toxic waste; improvement of the ecological situation in the territories of the former uranium mines;
- Improvement of the ecological situation on the territory of the former mines of Namangan and Tashkent Oblasts; rehabilitation of tailings with toxic waste at mining and metallurgical facilities; reclamation of disturbed lands at the facilities of the mining and metallurgical industry in the Navoiy and Bukhara Oblasts and their return to use.

According to the findings of the 2018 Report of the Chairman of SCEEP on implementation of the

Programme, the implementation of a number of projects (in particular, WWTPs) faced delays.

#### Programme of Measures to Ensure Structural Reforms, Modernization and Diversification of Production for the period 2015–2019

The Programme of Measures (2015 Decree of the President No. 4707) covers 846 investment projects worth US\$40.8 billion. It is expected that the share of industry in the country's GDP will increase from 23.3 per cent in 2015 to 27 per cent in 2020. The consistent modernization of existing facilities and the creation of new power-generating facilities is expected, based on the introduction of resource-saving and modern combined-cycle plants with solar technologies.

#### Programme of Measures for Further Development of Renewable Energy, Increase of Energy Efficiency in Economic Sectors and the Social Sector for the period 2017–2021

The Programme of Measures (2017 Resolution of the President No. 3012) sets out the target parameters of reducing energy intensity in the sectors of the economy in the period 2017–2021. In the framework of this Programme, a percentage reduction in the consumption of fuel and energy resources (natural gas, electricity, petroleum products) for the production of goods and services was apportioned to specific industrial enterprises, with a total planned energy consumption reduction of 37.4 per cent by 2021. These targets are planned to be met through further modernization, technical and technological re-equipment of existing production facilities, establishment of new production facilities based on modern energy-efficient technologies, and wider utilization of RES, while also promising tax benefits to entities producing energy from alternative sources.

Implementation in the industrial sector has been slow, but the shift to green technologies has recently started.

#### Policy documents on chemical industry

The Programme for Chemical Industry Development for the period 2017–2021 (2017 Resolution of the President No. 3236, no longer in force) stipulated investment of US\$3.093 billion and featured 43 projects for the construction of new facilities and modernization and reconstruction of existing facilities. However, the Programme did not propose environmental safeguards to reduce negative environmental impacts of related industrial projects.

Its successor, the Programme for Chemical Industry Development for the period 2019–2030 (2019



Resolution of the President No. 4265), includes a revised list of 31 projects. Planned measures include the development of disposal of used vehicle tyres.

#### Programme of Measures for Further Development of the Textile, Garment and Knitwear Industry

Based on the importance of the textile industry for the economic development of the country, Uzbekistan is implementing the Programme of Measures for Further Development of the Textile and Knitwear Industry for the period 2017–2019 (2016 Resolution of the President No. 2687). The Programme aims to increase the processing of raw cotton and silk and provides tax incentives to enterprises in these fields. The Programme does not provide for any environment-related clauses.

#### Concept on Environmental Protection until 2030

The Concept on Environmental Protection until 2030 (2019 Decree of the President No. 5863) includes a section on industrial waste and prevention of negative impacts of industrial waste on population health and the environment (chapter 10).

#### *Sustainable Development Goals and targets relevant to this chapter*

The current stand of Uzbekistan vis-à-vis targets 8.2, 9.2 and 9.4 of the 2030 Agenda for Sustainable Development is described in box 15.2.

#### *Institutional framework*

##### Ministry of Economy and Industry

In early 2019, the Ministry of Economy was transformed into the Ministry of Economy and Industry. Among other tasks (chapter 1), the Ministry is mandated to develop strategies for the country's industry based on the effective use of the existing natural and economic resources of the regions of Uzbekistan.

##### State Committee on Ecology and Environmental Protection

The State Committee on Ecology and Environmental Protection (SCEEP) is the state governing body on ecology, environmental protection and the rational use and restoration of natural resources. One of its new tasks is the organization of an effective collection system for the transportation, processing, recycling

and disposal of municipal solid waste.

SCEEP has a responsibility to conduct environmental inspections of specified enterprises and organizations. Since 1 January 2017, all types of non-scheduled inspections of industrial enterprises have been cancelled. Several other measures have been taken to reduce the number of inspections (chapter 2). Although the Government's policies aiming at reduction of the administrative burden on business may lead to the improvement of general business-enabling conditions, such excessive deregulation may, in turn, aggravate the existing environmental pollution caused by industrial enterprises.

##### State Committee on Geology and Mineral Resources

The State Committee on Geology and Mineral Resources is the state governing body in the field of geological survey and the use and protection of subsoil resources. Its tasks include the promotion of measures to modernize geology through accelerated implementation of modern and high-performance geological prospecting equipment, advanced technology and innovation.

##### State Committee on Industrial Safety

The State Committee on Industrial Safety (Goskomprombez) was formed in 2018 on the basis of the former State Inspection for Surveillance on Geological Exploration of Subsoils, Safety in Industry, Mining and Utilities Sector that was under the Cabinet of Ministers (2018 Decree of the President No. 5594).

The State Committee will be the responsible authority in the field of radiation and nuclear safety at nuclear power facilities and nuclear technologies, as well as for industrial safety at hazardous production facilities. Its main tasks are supervision and control over compliance with industrial, radiation and nuclear safety legislation, contribution to the development of strategic plans and programmes for the development of the oil and energy sector and basic industries, and licensing in the use of atomic energy.

##### Chamber of Commerce and Industry

The Chamber of Commerce and Industry focuses on protecting the rights of business entities, improving the business environment and investment climate, assisting entrepreneurship, interacting with government bodies, training entrepreneurs and personnel, foreign economic activities and attracting investment.

### Box 15.2: Targets 8.2, 9.2 and 9.4 of the 2030 Agenda for Sustainable Development

Global targets 8.2, 9.2 and 9.4 and their indicators were adopted by Uzbekistan as national targets and indicators without changes.



**Goal 8: Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all**

**Target 8.2: Achieve higher levels of economic productivity through diversification, technological upgrading and innovation, including through a focus on high-value-added and labour-intensive sectors**

The main policy directions in Uzbekistan include the development and diversification of the national economy. The sustained growth of GDP and industrial production during recent years, combined with the rapid development of manufacturing industry and increased value-added production, show that Uzbekistan is setting up a framework that will allow the achievement of higher levels of productivity in the near future, contributing to the effective implementation of target 8.2. This progress is mostly due to the higher effectiveness and innovation in priority subsectors, the promotion of SMEs and an increase in employment.



**Goal 9: Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation**

**Target 9.2: Promote inclusive and sustainable industrialization and, by 2030, significantly raise industry's share of employment and gross domestic product, in line with national circumstances, and double its share in least developed countries**

In terms of raising industry's share of employment, as required in target 9.2, indicator 9.2.1 (Manufacturing value added as a proportion of GDP and per capita) has been assessed. Industry accounted for 23.3 per cent of GDP in 2018. The two largest industrial sectors are mining and manufacturing. The manufacturing sector's share of GDP has grown during the last decade, accounting for 15.5 per cent of GDP in 2018. The Government expects a steady increase in production in many branches of manufacturing industry in the next few years as a result of the Programme of Measures to Ensure Structural Reforms, Modernization and Diversification of Production for the period 2015–2019. The mining industry plays an important role in the country's economy, accounting for 6 per cent of GDP. Crude oil, coal and gas production accounted for 11.2 per cent of total industrial output in 2018.

The employed population was estimated at 13.5 million people in 2017, including 83,500 in the mining industry and 1.82 million in manufacturing industry. Thus, indicator 9.2.2 (Manufacturing employment as a proportion of total employment) shows that the country's manufacturing share of total employment accounts for 13.4 per cent of the employed population. The mining industry accounts for 0.61 per cent of the employed population.

**Target 9.4: By 2030, upgrade infrastructure and retrofit industries to make them sustainable, with increased resource-use efficiency and greater adoption of clean and environmentally sound technologies and industrial processes, with all countries taking action in accordance with their respective capabilities**

The Programme of Measures to Reduce Energy Intensity, Introduce Energy-saving Technologies in Economic Sectors and the Social Sector for 2015–2019 and the Programme of Measures for Further Development of Renewable Energy, Increase of Energy Efficiency in Economic Sectors and the Social Sector for the period 2017–2021, have been steering the country to shift to green technologies, with higher resource-use efficiency and lower emissions from industrial processes. The programmes set ambitious targets to significantly increase energy efficiency in all sectors of the economy. Targeted parameters were set for reducing the energy intensity of production in the core sectors of the economy for the period 2017–2021, setting the projected reduction in specific energy consumption rates for 25 large industrial enterprises and organizations.

Uzbekistan also established the Green Economy Financing Facility in 2018, which aims to address high levels of energy and carbon intensity in Uzbekistan through: (i) scaling up investments in green technologies; (ii) demonstrating the commercial viability of investments in energy efficiency; and (iii) encouraging Uzbekistan's transition to a green economy.

In the period 2011–2017, the Chamber of Commerce and Industry has supported implementation of a number of projects with a focus on the greening of industry, including projects on improving energy efficiency and facilitating renewable energy deployment. However, the main impetus of activities of the Chamber of Commerce and Industry has recently been on addressing the issue of youth unemployment.

#### Centre for Advanced Technologies

In 2018, the Centre for Advanced Technologies under the Ministry of Innovation Development was created to support high-tech enterprises and the introduction of innovative ideas, technologies and projects, based on the SUE “Educational and Experimental Centre for High Technologies”.

The 2018 Resolution of the President No. 3983 “On measures for accelerated development of the chemical industry” provides for the establishment of the Centre for Chemical Technologies, a research and design institution, in cooperation with the Korea Research Institute of Chemical Technology.

*Participation in international agreements and processes*

Convention on the Transboundary Effects of Industrial Accidents

Although, Uzbekistan is not a party to the ECE Convention on the Transboundary Effects of Industrial Accidents, it is a beneficiary of the Convention’s Assistance and Cooperation Programme and has made a high-level commitment to implement the Convention.

Along with four other countries of the subregion, Uzbekistan is a beneficiary of the ECE Project on Strengthening Industrial Safety in Central Asia (2016–2019). In the framework of the Project, in 2018, the country prepared and finalized its updated self-assessment (following the submission of the previous one in 2013), which included clear analysis of the level of implementation of the Convention under the six working areas (identification of hazardous activities; notification of hazardous activities; prevention; preparedness; response and mutual assistance; information and public participation) and identification of challenges faced in each of these areas. Furthermore, Uzbekistan prepared and finalized its updated national action plan (following the submission of the previous one in 2013), setting out actions for those working areas in which the country faces challenges, with clear identification of the authorities responsible and timing foreseen for their implementation. These steps make the country better prepared to accede to the Convention.

Extractive Industries Transparency Initiative

As at 2019, Uzbekistan has not enacted any laws enforcing provisions of the Extractive Industries Transparency Initiative (EITI) standard. This may be explained by an absence of both the internal and external forces promoting the EITI, i.e. the country’s motivation and capacity to join the Initiative, and pressure to do so from international donors or organizations.

## 15.6 Assessment, conclusions and recommendations

*Assessment*

The mining and manufacturing industries continue to play an important role in the national economy, being the main drivers of economic growth. During recent years, Uzbekistan has made efforts to diversify its economy through the development of non-resource-based sectors. Nevertheless, the mining industries still account for a significant share of value added and the bulk of exports and foreign investment. Developing a modern approach to the mining sector that can minimize environmental and health impacts while maximizing social and economic benefits can be an opportunity to introduce new, environmentally sensitive practices that can have positive impacts on other, related areas of the economy and ensure that the environmental impact of the mining sector is reduced.

Target 9.2 of the 2030 Agenda for Sustainable Development, on inclusive and sustainable industrialization, is pursued by Uzbekistan through developing manufacturing industry, introducing modernization and innovation and increasing the manufacturing of higher-value-added products. To this end, the Government has adopted several programmes and plans. On the one hand, it has improved modernization and innovation in industry, particularly in manufacturing, during recent years. On the other hand, the lack of environmental, health and safety and social responsibility management objectives lessens their contribution to the well-being of communities that face the negative impacts of industrial operations. Furthermore, programmes on industry development do not systematically include environmental safeguards to reduce the negative environmental impacts of the proposed related industrial projects. This points to a need for a more harmonized approach to the industrial sector, development of which inherently touches upon a number of cross-cutting environmental issues. This need for greater efforts on streamlining environmental considerations into industry sector development should be recognized by the Government whenever mining, manufacturing or large infrastructure investments are planned.

*Conclusions and recommendations*

The greening of industry

In recent years, Uzbekistan has made strides in the greening of industry, where several mining and chemical enterprises have shifted to technologies that allow more efficient extraction and production, generate less hazardous waste and reuse more of the

waste. Many of the large enterprises are carrying out modernization through investment in new technologies and devices to reduce air emissions from their facilities, making the country better prepared to achieve target 9.4 of the 2030 Agenda for Sustainable Development. Nevertheless, technological developments are still lagging behind in SMEs that cannot afford to implement emissions reduction measures.

Recommendation 15.1:

*In order to support the introduction of green technologies in industry, the Cabinet of Ministers should:*

- (a) *Create economic and financial incentives for industrial enterprises to move towards green technology;*
- (b) *Foster the creation of small and medium-sized enterprises and start-ups focused on green technology.*

Industrial waste management

Currently, there is no strategy or programme for industrial waste management that includes specific targets and indicators, although some aspects of industrial waste management were reflected in the Concept on Environmental Protection until 2030, adopted in October 2019. In addition, due to the insufficient number of landfills for storage of industrial waste, there is a practice of using unauthorized dumpsites, which are particularly dangerous for the environment. The application of standards to achieve requirements for waste prevention (e.g. minimizing waste volume/weight) are still lacking in the legislation. Measures are not in place for the reuse of industrial waste as a secondary raw material.

There is also a lack of measures to compel manufacturers to design their products in an environmentally sound manner in order to reduce waste and environmental impacts.

Many industrial enterprises do not have wastewater treatment facilities on their premises or do not carry out preliminary treatment. Industrial wastewater is often discharged directly into rivers or urban sewerage systems.

Recommendation 15.2:

*The Cabinet of Ministers should:*

- (a) *Develop and adopt legislation and policies on the management of industrial waste, setting out specific targets and indicators for*

*industrial waste reduction and reuse;*

- (b) *Elaborate appropriate standards for wastewater treatment facilities in industrial enterprises and facilitate installation of such facilities by creating incentives for investments in wastewater treatment and ensuring the financial viability of modern wastewater treatment plants.*

Statistical data on impacts from industrial activities

There are no data available on the annual waste generation from specific industrial sectors. Neither are estimates available on industrial wastewater discharges. Limited or no quantitative information is available on the land uptake and degradation by industrial enterprises.

Recommendation 15.3:

*The State Committee on Statistics, in cooperation with the Ministry of Economy and Industry and the State Committee on Ecology and Environmental Protection, should ensure regular collection of environment-related data from industrial enterprises and the publication of such data.*

Environmental safeguards of industrial development

To achieve economic growth, Uzbekistan intensively uses its natural resources, including biodiversity and ecosystem services. Recently adopted programmes on the development of specific industrial sectors do not include environmental safeguards to reduce negative environmental impacts of the proposed related industrial projects; therefore, little information is available on the potential pressures that they may place on the environment.

Recommendation 15.4:

*The Cabinet of Ministers should assess the impact of industrial activities on the environment and ensure that new programmes on industrial development contain information on environmental safeguards to reduce negative environmental impacts of the proposed industrial projects.*

Convention on the Transboundary Effects of Industrial Accidents

Uzbekistan is not a party to the ECE Convention on the Transboundary Effects of Industrial Accidents. The ECE Project on Strengthening Industrial Safety in Central Asia (2016–2019) provided support to Uzbekistan in enhancing industrial safety and, thus, protecting human health and the environment. The

country prepared and finalized its updated self-assessment, and an updated national action plan, in 2018.

*Recommendation 15.5:*

*The Cabinet of Ministers should:*

- (a) *Approve and proceed with the implementation of the National Action Plan for the implementation of priority actions identified based on results of Uzbekistan's self-assessment of progress towards accession to the Convention on the Transboundary Effects of Industrial Accidents;*
- (b) *Consider accession to the Convention to fully enjoy its benefits and enhanced level of prevention of and preparedness for industrial accidents with potential transboundary effects;*
- (c) *Identify hazardous activities that may cause accidents with potential transboundary effects and subsequently notify its neighbours of such activities.*

Extractive Industries Transparency Initiative

As at 2018, Uzbekistan has not enacted any legislation applying provisions of the Extractive Industries Transparency Initiative (EITI) standard. A country's participation in the EITI increases the investment attractiveness of its mining industry.

*Recommendation 15.6:*

*The Cabinet of Ministers should develop and enact legislation to ensure implementation of the Extractive Industries Transparency Initiative (EITI) standard.*

Corporate social responsibility

There is no legislation on CSR in Uzbekistan, and the concept has not been widely adopted.

*Recommendation 15.7:*

*The Cabinet of Ministers should develop and adopt legislation on corporate social responsibility.*



## Chapter 16

# HUMAN SETTLEMENTS AND THE ENVIRONMENT

### 16.1 Overview

#### *Population and urbanization*

The population of Uzbekistan grew by 14.36 per cent in the last decade, from 28.56 million in 2010 to 32.66 million in 2018. Of a total of 32,656,700 inhabitants, 16,532,700 lived in urban areas and 16,124,000 in rural areas in 2018 (table 16.1). Oblasts with a predominantly urban population are Andijan, Namangan and Fergana.

In 2018, the average population density is 72.7 inhabitants per km<sup>2</sup>, with Tashkent City reaching 7,380 per km<sup>2</sup> and Navoiy Oblast just 8.6 per km<sup>2</sup> (table 16.2).

As at March 2019, Uzbekistan has 123 urban settlements, 1,071 urban-type villages and around 12,000 rural villages. In 2019, about 50.5 per cent of the population lives in cities and about 49.5 per cent in rural areas, including those living in rural settlements. In 2012, 64 per cent of the population lived in rural areas and the remaining 36 per cent in urban areas.

Medium-sized cities with a population of 50,000–100,000 people play a crucial role in Uzbekistan's economic development. More than 40 per cent of the country's urban population live in cities with a population of fewer than 100,000 inhabitants.

#### *Land use*

Actual land use and the official land use categories differ. In 2018, the total land fund was about 44.90 million ha. Of this, 57.06 per cent was actually used as agricultural land (table 16.3).

Distribution of the land fund by land use categories is shown in figure 16.1 and table 16.4. Over the past decades, a clear trend towards a decrease in the category "agricultural land" can be observed (from 72.76 per cent in 1990 to 45.13 per cent in 2018), along with a considerable increase in the categories of "forest fund lands" (from 5.50 per cent in 1990 to 24.84 per cent in 2018) and "reserve lands" (from 15.92 per cent in 1990 to 24.16 per cent in 2018). The high share of "reserve lands" indicates a large potential for developing new protected areas and designation of ecological corridors in the country (chapter 11).

#### *Spatial planning and housing development*

Spatial planning, since independence in 1991 and until recent times, basically maintained the Soviet planning framework, with urban development plans (known as "general plans") elaborated at the national level in a highly centralized way with very little public participation. General plan documents are still considered and treated as a confidential matter and are therefore not public.

**Table 16.1: Urban and rural population as at 1 January 2018, number**

	Total	Urban	Rural
<b>Total</b>	<b>32 656 700</b>	<b>16 532 700</b>	<b>16 124 000</b>
Republic of Karakalpakstan	1 842 300	905 500	936 800
Andijan	3 011 700	1 576 000	1 435 700
Bukhara	1 870 200	698 600	1 171 600
Jizzak	1 325 000	622 200	702 800
Kashkadarya	3 148 400	1 357 500	1 790 900
Navoiy	958 000	467 600	490 400
Namangan	2 699 600	1 743 700	955 900
Samarkand	3 720 100	1 390 800	2 329 300
Surkhandarya	2 514 200	893 300	1 620 900
Syrdarya	815 900	350 000	465 900
Tashkent	2 861 200	1 411 500	1 449 700
Fergana	3 620 200	2 049 900	1 570 300
Khorezm	1 805 000	601 200	1 203 800
Tashkent city	2 464 900	2 464 900	..

Source: State Committee on Statistics, 2019.

**Table 16.2: Population density (at the beginning of the year), 2012–2018, inhabitants/km<sup>2</sup>**

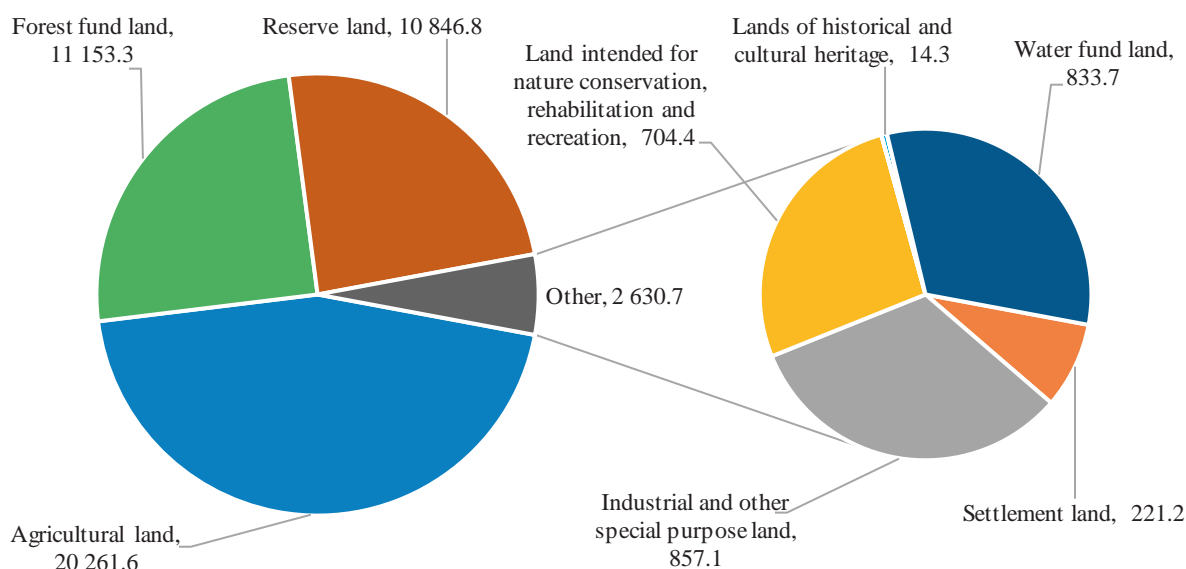
	2012	2013	2014	2015	2016	2017	2018
Uzbekistan	65.8	66.8	67.9	69.1	70.3	71.5	72.7
Republic of Karakalpakstan	10.2	10.3	10.4	10.6	10.8	10.9	11.1
Andijan	631.2	641.0	652.4	664.5	676.9	689.0	700.4
Bukhara	42.3	42.9	43.6	44.3	45.0	45.7	46.4
Jizzakh	55.9	56.8	57.8	58.9	60.2	61.3	62.5
Kashkadarya	97.2	99.1	101.3	103.6	105.9	108.1	110.2
Navoiy	7.9	8.0	8.1	8.2	8.4	8.5	8.6
Namangan	325.3	330.5	336.6	343.3	349.9	356.5	362.8
Samarkand	198.3	201.6	205.5	209.6	213.7	217.8	221.8
Surkhandarya	110.4	112.5	114.8	117.3	120.0	122.5	125.1
Syrdarya	172.8	175.4	178.5	181.6	184.7	187.6	190.6
Tashkent	175.1	176.8	178.7	180.9	183.2	185.5	187.6
Fergana	485.3	492.6	501.0	509.6	518.5	527.3	535.5
Khorezm	269.3	273.4	278.4	283.6	288.7	293.7	298.5
Tashkent city	6 914.0	7 009.0	7 045.0	7 100.0	7 165.2	7 257.9	7 380.0

Source: State Committee on Statistics, 2019.

**Table 16.3: Land use by actual manner of use, 1990, 2000, 2017, 2018, 1,000 ha**

	As at 01.01.1990	As at 01.01.2000	As at 01.01.2017	As at 01.01.2018	Share of total 2018
Agricultural land	28 080.4	26 753.6	25 625.2	25 614.0	57.1
of which:					
Acreage	4 176.5	4 056.6	4 035.3	4 026.4	9.0
Perennial tree plantations	366.8	352.9	385.6	391.6	0.9
Virgin lands	62.1	80.7	79.9	80.8	0.2
Hayfields and pastures	23 475.0	22 263.4	21 124.4	21 115.2	47.0
Farmland	437.9	642.9	695.3	696.6	1.6
Forest plantations	1 410.0	1 511.9	3 586.3	3 595.4	8.0
Gardening associations	13.4	8.5	7.3	7.3	0.0
Reclaimed land	103.7	79.3	72.1	71.9	0.2
Other lands	15 539.6	15 414.1	14 906.2	14 907.2	33.2
<b>Total</b>	<b>45 585.0</b>	<b>44 410.3</b>	<b>44 892.4</b>	<b>44 892.4</b>	<b>100.0</b>

Source: State Committee on Land Resources, Geodesy, Cartography and State Cadastre, 2019.

**Figure 16.1: Land use distribution by land category, 2018, 1,000 ha**

Source: State Committee on Land Resources, Geodesy, Cartography and State Cadastre, 2019.



**Table 16.4: Land use distribution by land category, 1990, 2018, 1,000 ha**

	As at 1 Jan.		As at 1 Jan.		Difference 1990-2018
	1990	%	2018	%	
Agricultural land	33 167.8	72.76	20 261.6	45.13	- 12 906.2
Settlement land	197.2	0.43	221.2	0.49	24.0
Industrial and other special purpose land	1 821.2	4.00	857.1	1.91	- 964.1
Land intended for nature conservation, rehabilitation and recreation	13.9	0.03	704.4	1.57	690.5
Lands of historical and cultural heritage			14.3	0.03	14.3
Forest fund land	2 507.5	5.50	11 153.3	24.84	8 645.8
Water fund land	618.8	1.36	833.7	1.86	214.9
Reserve land	7 258.6	15.92	10 846.8	24.16	3 588.2
<b>Total</b>	<b>45 585.0</b>	<b>100.00</b>	<b>44 892.4</b>	<b>100.00</b>	<b>- 692.6</b>

Source: State Committee on Land Resources, Geodesy, Cartography and State Cadastre, 2019.

General plans were designed on a 30-year timeframe; therefore, many plans are currently in place, but their provisions are outdated. According to the Tashkent Institute of Architecture and Construction, in 2018, only 17 per cent of the settlements in Uzbekistan have an approved and valid general plan.

During the elaboration of new general plans, consultations with the public are held on general strategic visions, which do not contain details and are organized through the involvement of local self-governing units (makhallas).

In 2018, the procedures for the preparation of general plans changed, in particular with regard to the allocation of future business areas in cities. The input to prepare a new general plan must always come from a governmental decree. The khokim (head of representative and executive authority in the territory) has the right to undertake preliminary activities for the initiation of a new general plan, but all the decisions are taken at a higher level.

In the preparation of the general plans for cities, a series of different actors, such as the various departments of urban planning at the oblast, district and city levels, take part in the exercise, which makes the procedures very long and often not open to the full sharing of information with the public at the earliest stage possible.

The local departments of urban planning inside the khokimiyats work with three design institutions: (i) Toshboshplan LITI is responsible for the elaboration of general plans of Tashkent City, cities in the Tashkent Oblast, and Samarkand City; (ii) Uzshakharsozlik LITI foresees the elaboration of master plans for major historical cities, such as Namangan, Andijan, Bukhara, Shakhrisabz, Fergana, Urgench, Khiva and the industrial cities of Navoiy and Zarafshan; and (iii) Kishlokkurlishloicha, which elaborates plans for rural villages in the rest of

Uzbekistan. They are the only institutions allowed to work on general plans and operate through regional branches to cover the territory of Uzbekistan.

There are no specific provisions for the application of strategic environmental assessment (SEA) during the preparation of general plans, since SEA is not used in Uzbekistan (chapter 1), but general plans and other urban planning are subject to state ecological expertise (chapter 1).

With regard to environmental considerations in the preparation of urban plans and programmes, there is a standard provision of considering the “landscape of the site” and the “wind rose”. Regulation KMK 2.01.01-94 “Climatic and physical-geological data for design” (1994 Order of the State Committee on Architecture and Construction No. 40) refers to the development of general plans for cities, towns and rural settlements. However, climate change adaptation is not integrated into the current planning exercise, and neither have mitigation opportunities on the urban scale already been applied. No specific information about the consideration of the landscape value, wind corridors, provisions for orientation of the plots or more detailed design and planning attention to climate change adaptation and mitigation at the local level is available. Maps and GIS tools concerning flood-prone zones and urban heat islands are not developed. General plans cannot benefit from updated geolocalized information.

The placement of industrial facilities in urban areas remains an issue in Uzbekistan and no measures have been taken to remove such facilities from urban areas.

As at 2019, the general plans of Tashkent and Samarkand Cities are currently under revision. The previous general plans, developed in 2013 for Tashkent and in 2009 for Samarkand, were not approved.

Tashkent City benefits from a special status regarding housing development, which represents important opportunities but also challenges for sustainable development of the city (box 16.1).

### *Cultural heritage*

There are four areas in Uzbekistan inscribed on the UNESCO World Heritage List as cultural properties: Historic Centre of Bukhara (1993), Historic Centre of Shakhrisyabz (2000), Itchan Kala (1990) and Samarkand – Crossroad of Cultures (2001).

Several national programmes and projects have been developed to protect and promote Uzbekistan's cultural heritage. However, the preservation of some sites suffers from the absence of management plans, inadequate restoration interventions, the construction of modern buildings and the modernization of private properties, which have affected the authenticity of sites such as Samarkand.

UNESCO has worked on promoting cultural tourism in the Khorezm Oblast and the Republic of Karakalpakstan, highlighting the importance of connecting major protected sites to other areas with a

rich tradition of tangible and intangible cultural heritage. The contribution of intangible cultural heritage (ceramics, embroidery, traditional music), including museums, is of crucial importance in the promotion of sustainable tourism, especially for cities such as Bukhara, where several restoration activities are still ongoing, while several traditional workshops are successfully operating in the revived city centre. In Bukhara, also thanks to UNESCO funding, a part of the city centre has been restored, and some buildings host wood craftsmanship shops that have the competencies to restore wooden parts of the monuments.

Funds for restoration are programme based and consist of state funds and foreign grants.

In Uzbekistan there are 4,203 protected objects of culture. The city centre of Samarkand is the major repository, with 490 objects, of which 256 are residential buildings. Usually, protected sites are in satisfactory condition, but the most remote ones are not well inspected, due to the lack of human resources. In general, there is a lack of awareness among the population of the importance of historical and cultural sites.

#### **Box 16.1: Tashkent City special status**

Since October 2018, a legal experiment has been in place for the management of Tashkent City (2018 Decree of the President No. 5515). The experiment refers to many areas, including the development of the general plan for Tashkent City and the management of construction activities in the city.

While the Tashkent General Plan has not yet been approved, the Tashkent Khokim has the power to authorize the development of single housing projects in vacant parts of the city. The Khokim can also attract funds for profitable investment projects by issuing city bonds or shares in newly created companies. This special status makes possible the derogation of the prerequisite of specific general plan provisions for the allocation of land for new purposes. The Department of Investments at the khokimiyat level is responsible for the issue of those permits.

In Tashkent, many plans under the "Obod Makhalla" Programme localized vacant areas or unused spaces/facilities which may be the object of new development. These areas may be assigned for development to foreign investors, who, in principle, may propose the development of new high-rise buildings, to the great concern of the local population.

Tashkent's special status allows for the facilitation of localization of so-called "business class properties", which come with a high added value. Usually, new architectural undertakings require the approval of the chairperson of the territorially competent makhalla, but often local inhabitants complain because of the lack of information and involvement in the decision-making process.

When a new development is approved, previous inhabitants are usually offered apartments in the new buildings, but often they are offered no compensation for the duration of the reconstruction. Mass media report numerous cases in which legitimate inhabitants of apartments in Tashkent have received an order to vacate their properties to allow the demolition of the building for its reconstruction by foreign investors.

An important case to mention is the US\$1.3 billion Tashkent City business centre, located in a central area at the junction of Alisher Navoiy, Almazar, Islam Karimov and Furkat Streets. The Uchki-Almazar Makhalla, the old residential district subject to this renovation project, has been demolished and its residents scattered around various parts of the city. There is no evidence of a specific plan aimed at mitigating the adverse effects on the population of this project. Papers report the "mass eviction of the residents", who were "literally thrown out onto the street, having been promised new housing in the suburbs or the chance to buy existing housing stock elsewhere in the city" (Open Democracy). According to reports from the Fergana News Agency, occupants of several housing blocks were ordered to leave their homes within 10 days, before demolition started, without any accompanying solution.

**Photo 16.1: Construction of a multi-storey car park in the centre of Tashkent City**

*Photo credit: Mr. Vadim Ni*

General plans for a city that contains a UNESCO historical site, such as Samarkand, foresee the intervention of the Ministry of Culture. At the national level, the Ministry of Construction and the Ministry of Culture analyse the contents of the plan in detail and verify that the plan's provisions would not potentially interfere with or harm the cultural heritage. In the past, the Ministry of Culture intervened in the preparation of the general plan of Khiva to avoid the development of a modern building complex that would have affected the historical area's buffer zone. As at March 2019, the plans for the cities of Bukhara, Khiva and Samarkand are in the course of preparation with the intervention of the Ministry of Culture because of its competence on their cultural heritage.

The Tashkent Institute of Architecture and Construction is currently carrying out some studies on how to reintroduce ancient typical urban morphologies and urban patterns in contemporary Uzbekistan; however, findings are not implemented to improve the quality of the rapid transformation that its cities and rural areas are undergoing. In general, Uzbekistan does not integrate approaches to cultural identity and urban landscape into the preparation of urban planning documents, as is done in European countries (box 16.2).

### *Housing stock*

The housing stock in the country consists of 33,146 houses and 1,145,891 apartments, 98 per cent of which are privatized. The majority of the housing stock in Uzbekistan dates to the Soviet period.

The housing stock, especially in Tashkent City, is undergoing an injection of new construction that is expected to radically change the aesthetics of the city and the habits of its inhabitants in the years to come. The "new" Tashkent is intended to represent a symbol of the current administration's openness to the international community.

In Uzbekistan, there is no real competition between urban and rural areas, thanks to the national policy after independence that aimed at guaranteeing the same living standards in cities and rural areas. For that reason, the massive programme to build "standard" human settlements in rural areas was launched in 2009. While trying to guarantee decent, affordable and connected homes to the growing population, the programme has failed so far to reintroduce in the built-up environment of its vast territory upgraded elements of traditional culture. Contemporary inhabitants of the rural settlements are pleased with their new homes

because they come with many comforts that have concretely upgraded their living conditions. On the other hand, this massive homogenization of the built environment causes a loss of identity in the local population: the same design and colours and standards are observed in settlements all over Uzbekistan in regions as different as Fergana Oblast and the Republic of Karakalpakstan.

New, modern buildings in big cities such as Tashkent, Samarkand and Bukhara feature a standard international architectural style (with Turkish or European elements, according to the origin of the developer). The new buildings lack representation of the typical elements and preciousness of ancient Uzbek design.

#### **Box 16.2: Landscape as an opportunity: the concept of landscape in the European Landscape Convention**

The 2000 European Landscape Convention recognizes the crucial role played by the landscape for the cultural, ecological, environmental and social development. It is based on the generally accepted definition of landscape as a natural context of a certain value, to be preserved and maintained. "Landscape" means an area, as perceived by people, the character of which is the result of the action and interaction of natural and/or human factors. The Convention highlights the value of landscape as a resource for the development of economic activities and its potential for job creation through its protection, management and planning.

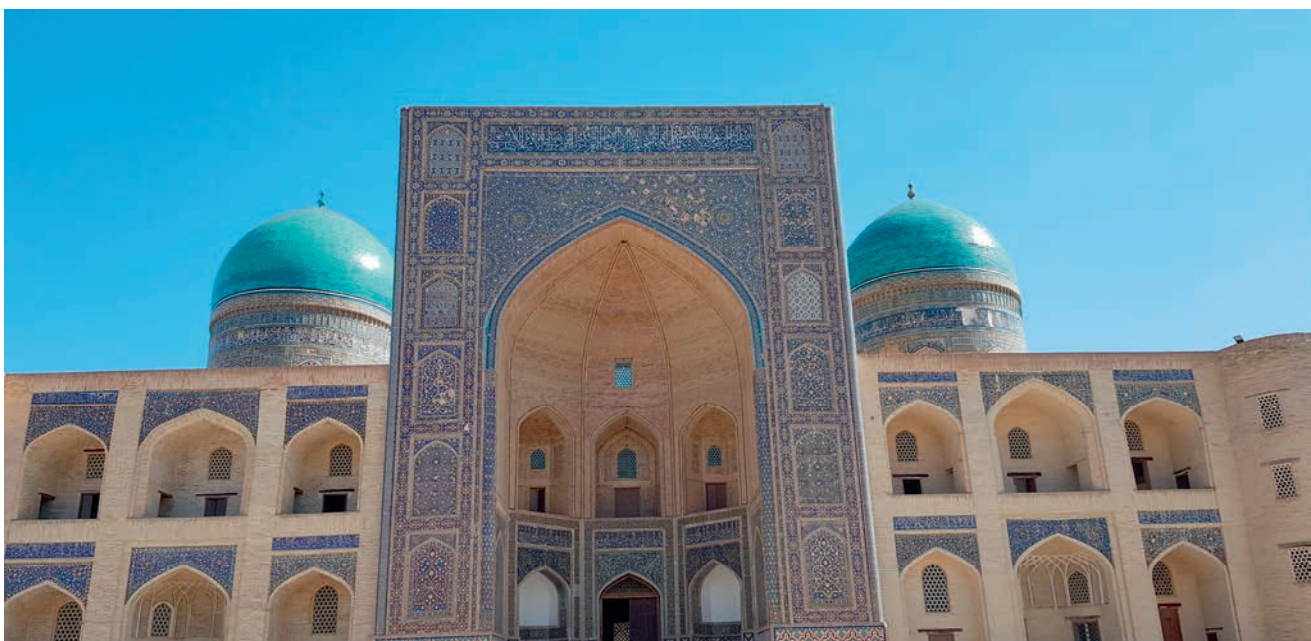
Urban landscapes are an essential part of the daily lives of most European citizens. The Convention recognizes the value of everyday landscapes for the well-being of citizens, in urban areas as well. In many European countries, the integration of this new concept of landscape, which is also extended to degraded areas or industrial sites, has been a useful tool to steer regional and local planning.

In Italy, regional landscape plans, according to the new definition introduced into the legislation after the Convention, cover the entire territory of the regions, and are a precious source for supporting the elaboration of local development plans, because they trace the guidelines for potential transformations compatible with the vision of the territories, and set the aesthetic and morphological elements to be maintained in order to preserve and enhance the identity of the territories. The same approach is followed in France, where detailed guidelines for landscape insertion, even into individual built environments, are provided on the local scale. In Portugal, studies carried out on the urban scale support the elaboration of urban maps that focus on the diversity and uniqueness that provide the character of the urban landscape.

The Convention emphasizes the human perception of landscapes in its definition of landscape and promotes citizen participation in landscape management processes.

Approaching the cultural and technical concepts included in the Convention would allow Uzbekistan to take advantage of the tools it has to boost its economy, also through sound landscape integration into the planning, design and construction processes.

**Photo 16.2: Po-i-Kalan complex, Bukhara City**



*Photo credit: Ms. Alessandra Fidanza*

Nevertheless, even though large, residential parallelepiped (multi-faceted) volumes were constructed during the Soviet period, in Uzbekistan these had some unique surface decorations that brightened the austere, sad and grey facades with some remnants of the former culture.

This is also reflected in the urban topology: huge roads, out-of-scale empty spaces and huge buildings. This remains the case in the Soviet parts of Samarkand and Tashkent Cities.

The affirmation of Uzbek cultural identity can be enhanced by reintroducing into urban designs and architectural undertakings, on both a large and small scale, typical Uzbek elements in terms of morphology, materials and tailored technological solutions. It is very often less expensive and less carbon intensive to approach technological solutions considering the availability of local materials, studying how, in the past, the urban forms developed to adapt to local climatic conditions.

In Bukhara, the city centre has maintained the old urban form, and most of the buildings, even after the disruptions of restoration, maintain their old shape and the characteristics they had in the past. In ancient times, the dense and compact urban pattern was crossed by a network of artificial and natural water canals that, from time to time, ended up in pools inside the city. During the Soviet period, the majority of the network was destroyed, and virtually no pool survived. This network was used to mitigate the effects of hot temperatures during the warm season,

which is particularly intense in Uzbekistan. The mulberry tree was the common species that grew in the city. Today, the reappropriation of ancient solutions to improve the distribution of green areas can be an efficient countermeasure to the effects of climate change.

Establishing a network of pools in urban areas is not only useful to accumulate rainwater as a reserve for the dryer seasons, but is also a means to prevent urban flooding. The most up-to-date international examples of urban adaptation to climate change, such as the adaptation plan of the city of Copenhagen or management of the Cheonggyecheon River in Seoul (Republic of Korea) show the importance of urban flood prevention through intelligent urban design.

The City of Samarkand is currently working on studying the urban water channels used in the past, to preserve those still in place and try to restore those that were either destroyed or unused during the Soviet era.

Uzbekistan is an active seismic zone (the east and south-east regions of the country are affected by high seismic activity). The last earthquake to cause significant damage was in 1966, when the centre of Tashkent was heavily damaged. Tremors are still experienced regularly. There is no evidence that constructions are earthquake proof.

Housing development is implemented through governmental agencies, under the direct control of the administration, or, more often recently, through direct contracts with developers.

**Photo 16.3: Pond Lyab-i Hauz, one of the few remaining ponds in Bukhara City**



*Photo credit: Ms. Alessandra Fidanza*

Developers are obliged to provide a certain percentage of built-up volume in the form of apartments for allocation to the most vulnerable people. Although municipal administrations are expected to maintain information about vulnerable families in need of housing, no such information is available at the Ministry of Housing and Communal Utilities.

In Uzbekistan, there are no development impact taxes, which are commonly paid by developers in Europe. A development impact tax is a tool for local authorities to help cover the costs of building the infrastructure to support the development of their area. The development impact taxes can be used to finance a wide range of necessary infrastructure, including transport, flood defences, schools, hospitals and other health and social care facilities. Basically, by using a development impact tax, the local community is transferring the infrastructure building costs to the developer.

#### Housing maintenance and management

In Uzbekistan, residential property units are private, while the land on which they are located belongs to the State. This may change in the future, following the adoption in May 2019 of the Law on Privatization of Non-Agricultural Land. The housing policy is being revised at the national level to focus on the development of new houses and modern infrastructure, as well as to ensure full ownership rights.

Associations of apartment owners are responsible for the maintenance and rehabilitation of the buildings. Occasionally they can access loans from the Government. Regional departments of the Ministry of Housing and Communal Utilities are responsible for monitoring the activities of the associations of apartment owners.

As at early 2019, 5,443 associations of private homeowners, as well as 296 professional management organizations, are responsible for the management and maintenance of apartment buildings.

The 2017 Resolution of the President No. 2922 “On measures to further improve the system of maintenance and operation of the multifamily housing stock for the period 2017–2021” foresees the refurbishment of 33,146 houses along with the improvement of adjacent territories. About 9,915 houses were repaired in 2017 and 7,621 in 2018. Commercial banks allocated soft loans for more than 1.0 trillion sum for the renovations.

#### Energy efficiency

The existing housing stock is highly energy inefficient. Construction standards changed in 2018 and introduced new energy efficiency requirements. However, they apply only to new projects; therefore, existing buildings are not subject to a specific requirement to upgrade their energy efficiency.

Some of the projects under the Obod Makhalla Programme foresee the refurbishment of common parts and structures of residential buildings.

The Ministry of Construction maintains a database on energy efficient construction materials, initially developed with the support of a UNDP project; the database is updated quarterly.

In Uzbekistan, there are no certification systems aligned with international sustainability and energy efficiency standards (such as Leadership in Energy and Environmental Design (LEED) or Building Research Establishment Environmental Assessment Method (BREEAM)).

Economic and social development in rural areas is greatly affected by energy reliability issues. The very low energy efficiency of rural housing, coupled with the lack of minimum energy performance standards, contributes to the increased recourse to fossil fuels and the consequent increase of GHG emissions from the housing sector.

In recent years, some local producers of energy efficient materials and photovoltaics highlighted that, in Uzbekistan, despite the manufacturing capacity, the development of the market is hindered by low market demand from both the public buildings and private residential sectors, including the rural settlements.

The UNDP-GEF Project “Market Transformation for Sustainable Rural Housing in Uzbekistan”, begun in 2016, has demonstrated the benefits of introducing energy efficient and low carbon solutions for the realization of dwellings in rural areas.

#### Infrastructure

Existing infrastructure in Uzbekistan is the heritage of the Soviet period, and, in most cases, needs upgrading, maintenance or replacement.

Electricity supply is, in general, provided all over the country, but rural regions experience regular, extended electricity shortages and interruptions. Existing road networks require consistent improvement, and the

connectivity between the secondary and tertiary road networks still has to be fully implemented.

The 2018 World Bank survey on the quality of infrastructure in Uzbekistan showed that poorly maintained distribution networks, underfunded operating budgets, almost non-existent domestic capital budgets and limited customer willingness to pay for utilities cause the lack of or poor conditions of utility services in rural and urban areas (figure 16.2).

#### Electricity and heating

The heat supply of the housing and utilities sector of the settlements is provided by small individual heating boilers, which provide heat to individual buildings and structures. Heating in urban areas is generally centralized, with boilers connected to combined heat and power plants (CHPPs) serving parts of neighbourhoods. For new buildings, heating is decentralized.

According to the World Bank, many of the district heating systems installed in the 1950s through to the 1970s are no longer fit for purpose and are suffering from insufficient maintenance. The use of solar thermal collectors for hot water and photovoltaics is not widespread enough, in both new and existing buildings.

There is no information about the exploitation of geothermal solutions, which would be a renewable

energy source for heating and cooling for the residential and commercial sectors.

#### Water supply, sewerage and drainage networks

Since 1991, Uzbekistan has carried out significant work to improve water supply for households, with the provision of high quality drinking water to the population. Nevertheless, according to the Ministry of Housing and Communal Utilities, at present only about 63.5 per cent of the population are covered by centralized drinking water supply services and about 15.6 per cent are connected to centralized sewerage services (chapter 17).

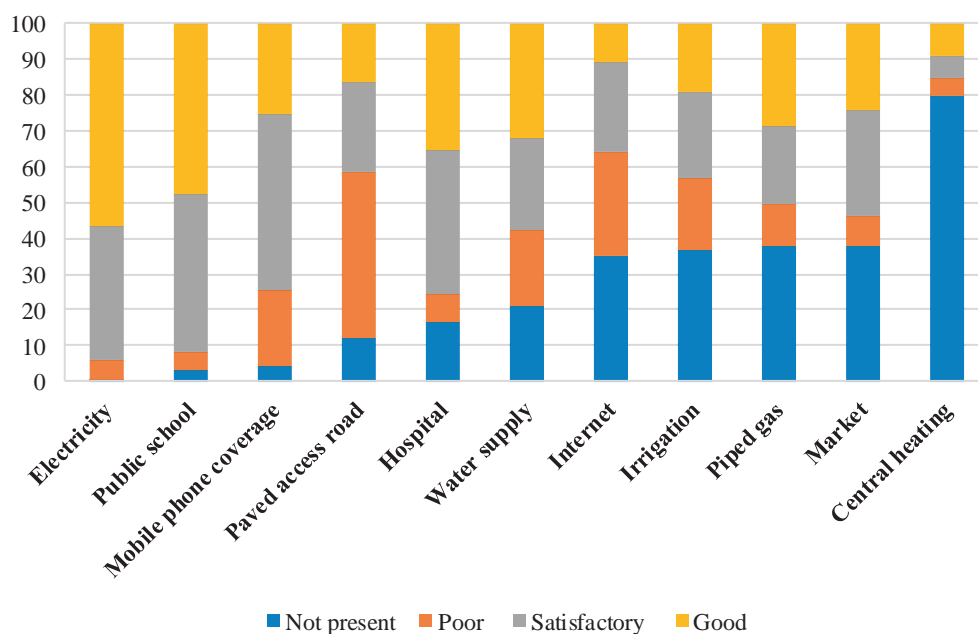
#### Waste collection

The generation of municipal solid waste (MSW) is estimated by the State Committee on Ecology and Environmental Protection (SCEEP) at 219 kg/person/year. In 2017, the population generated 7 million tons of waste (table 10.1) and the current dynamic economic and demographic growth will lead to an increase in MSW generation (chapter 10). In 2018, 53 per cent of the population was covered by waste collection services.

#### Cleaning up common areas

Main roads and green areas in major city centres are, in general, in good condition and regularly maintained.

**Figure 16.2: Reported availability and quality of infrastructure items, percentage of responses**



Source: World Bank, Study – Listening to the Citizens of Uzbekistan, 2018.

### Public transport

In Uzbekistan, most passenger transportation is by road (98.3 per cent in 2018). In urban areas, taxis and minibuses are generally widely distributed and used by the local population.

Tashkent has a metro system and a network of buses and minibuses (chapter 14). The urban bus network is not well signposted, the destinations are not marked and journey times are unpredictable.

There is no information on the transport systems of other cities and towns.

### Social services to vulnerable groups

In five pilot districts of Tashkent, Samarkand, Bukhara, Andijan and Gulistan Cities, UNICEF has assisted the Republican Centre for the Social Adaptation of Children in developing Family and Children's Support Services, a new model for the provision of child protection services.

UNDP has cooperated with the Ministry of Labour and Social Protection since 2008 in widening social integration and employment opportunities for people with disabilities. In 2014, it started working in the area of support to the lonely elderly.

In 2018, the EU launched the Project "Enhancement of Vulnerable Children Protection Mechanism in Uzbekistan". The project covers 10 makhallas in the City of Tashkent and Samarkand and Khorezm Oblasts, reaching 5,000 vulnerable families and about 15,000 children. It is aimed at strengthening the interaction between state and non-state organizations and local governments in protecting and promoting the interests of families and children by providing social support based on the makhallas.

### Green areas

Green areas inside urban and rural settlements occupy, on average, between 0.1 and 2 per cent of the entire territory of the settlement.

The conditions of public urban green spaces vary according to their maintenance status, the different climatic conditions, the status of irrigation networks and the salinity of groundwater and soils.

In recent years, Uzbekistan's policy has aimed at increasing the number of trees planted in urban areas,

with the scope of also creating green belts around major cities. More than 200 tree species grow in the cities of Uzbekistan, and are represented by both local flora, such as poplar, oak, elm, chestnut, juniper, plane, ash, maple, sophora, etc., and imported flora from other countries (e.g. Norway maple, tulip tree, evergreen magnolia, paper tree, ginkgo, pine, lime, box, cypress).

According to SCEEP, in 2018, 160 million bushes and trees were planted all over Uzbekistan. At the city level, greening activities are implemented by dedicated departments of khokimiyats.

According to local media, the City of Tashkent today has 15,200 ha of green areas, compared with 6,800 ha in 1990. The "Green Belt Initiative" began in Tashkent in February 2019; oaks, chestnuts, catalpas and fruit trees have been planted in different parts of the city. More than 409,000 trees were planted in March 2019, with the involvement of more than 2,000 volunteers. Fast-growing deciduous and coniferous trees adapted to the local climate and resistant to low water will be planted in the future.

In Bukhara City, the local authorities plan to add 200 km of green areas with an average width of 10 km around the city, with the support of SCEEP.

A careful assessment of the sustainability of the greening activities in urban areas, especially in the light of available water resources and climate change adaptation, has not yet been conducted in the country. Local vegetation should, in general, be preferred to more aesthetically attractive species, in order to avoid excessive water consumption and to guarantee efficiency in terms of maintenance and the total cost of environmental services.

### *Illegal construction*

The Ministry of Culture reports that illegal constructions are sometimes built in the proximity of archaeological sites: there have been about five cases in the past five years. The phenomenon is mainly due, on the one hand, to the country's vast territory and the lack of appropriate fencing of the sites, and, on the other hand, to the lack of inspectors who can physically control the areas. Control activities do not use GIS or satellite images matched with remote sensing and aerial surveys, which would improve their efficiency.



**Photo 16.4: Park in Samarkand City Centre**

*Photo credit: Ms. Angela Sochirca*

### *Socio-spatial divide*

The rapid housing boost that is observed in Uzbekistan's major cities, mainly in Tashkent, has some drawbacks that need to be addressed. The majority of old multi-storey residential buildings lack proper maintenance and need urgent upgrading. Their status affects the "aesthetics" of cities, the improvement of which Uzbekistan has been investing in in recent years.

The implementation of urban development and construction policies in recent years has resulted in numerous cases in which the rights of inhabitants of buildings ordered for demolition were violated, leaving many people, especially the most vulnerable, in critical situations.

Several cases are reported of people receiving an order to leave their residences to allow for new buildings to be built, without the provision of new housing or adequate compensation.

## **16.2 Environmental pressures from human settlements**

### *Air*

Air pollution is measured but air monitoring is not yet automated (chapters 4 and 8). The housing sector, boosted in recent years, is partially accountable for the worsening of urban air quality. Construction sites lack specific regulations to prevent pollution due to particulate matter and dust during construction. The application of sustainability standards in the housing sector during construction, such as the LEED standards, is not in place to reduce the impact of construction sites on air quality.

Industrial sites are sometimes still present in urban areas, and their emissions directly affect air quality in urban areas. In some areas, such as Almalik in Tashkent Oblast, there are a CHPP, a metallurgic plant and a chemical plant; in Bekabad, there is a metallurgical plant and a CHPP. In Tashkent City, industrial sites are still present and are affecting the city's air quality.

### *Water*

The primary sources of pollution of groundwater and surface water are discharges of wastewater (chapter 9). The pollution is associated with the lack of a centralized sewerage system, the lack of stormwater sewers and wastewater treatment systems at industrial facilities, and the poor sanitary condition of the territory.

### *Biodiversity and landscape*

The concept of an urban ecological network, consisting of core areas, corridors and buffer zones, is not implemented in Uzbekistan. Green corridors are envisaged only for road management.

In Uzbekistan, unfinished construction projects and empty buildings remain an issue. These buildings are not only not used rationally in economic and social terms, but also affect the landscape and aesthetic perception of human settlements. This problem is especially acute in the regions, where there are a significant number of inactive and inefficiently used buildings and unfinished construction objects owned by the State or enterprises partly owned by the State, as well as those built by business entities.

### *Land*

The construction of rural settlements has an impact on Uzbekistan's territory. The new settlements are built on previously undeveloped land. The only constraint is that the assigned areas are not reserved for agriculture, but other landscape considerations are not required for the implementation in the new built-up areas. At the same time, there are cases in which land reserved for agricultural purposes was occupied for new settlements.

### *Soil*

The territory of Uzbekistan is classified as an arid zone that is subject to air and soil drought, and therefore susceptible to degradation and desertification. The progressive extension of rural settlements and cultivated lands has increased soil sensitivity and degradation. Soil remediation and restoration activities are not undertaken in the most affected and vulnerable areas.

### *Human health*

Waterborne diseases play a significant role in Uzbekistan's health status (chapter 17). The water quality is often poor (figure 9.1), with microbial and chemical pollution due to inadequate infrastructure to

treat wastewater and purify drinking water. Bacterial pollution increases in warmer temperatures and is reflected in an increased number of cases of intestinal diseases during summer. Bacterial dysentery, for example, increases significantly during the summer.

Even though public health experts recognize asbestos as a harmful material, it is used in the construction industry in Uzbekistan. Asbestos is still considered a cheap and appropriate construction material in Uzbekistan, and therefore is extensively used. The interviewed population and technical officers believe that it is not harmful as long as it is used to produce "compact" products, and they see no risk of volatile emissions.

## **16.3 Impact from and adaptation to climate change**

The rapid growth of rural settlements, which occupy previously undeveloped lands all over the country, and the rapid expansion of existing cities, increase the number of people exposed to the effects of "urban" climate change on the one hand, and upsurges in the production of GHG emissions from human settlements on the other.

Climate adaptation planning in urban areas and rural settlements has not yet been introduced in Uzbekistan, nor have specific zoning requirements to mitigate the GHG emissions and energy efficiency been put in place.

### *GHG emissions*

In 2012, the buildings sector emitted 44 million tons of CO<sub>2</sub>-eq., representing 21.46 per cent of total emissions. The construction sector is included in the industry and construction sector, which emitted 8 million tons of CO<sub>2</sub>-eq. (3.9 per cent of total emissions) in 2012.

The production of building materials, and facilities for cement and burnt bricks, have a very high energy intensity: in 2013, over 980 million kWh of electricity and over 1 billion m<sup>3</sup> of natural gas were consumed by enterprises in this industry (of which 93 per cent were at cement plants). Due to the use of outdated technologies, the energy consumption in the production of 1 ton of cement or burnt bricks exceeds that in most developed countries. There are no incentives to introduce modern technologies in the cement industry to save energy resources, nor to reduce GHG emissions in the housing sector. Using a carbon footprint calculation for the housing sector would allow households to reduce their carbon footprint.

### *Floods and mudslides*

Regarding the flooding risk, Uzhydromet is tasked to monitor the hydrometeorological situation in the areas of risk of hydrometeorological events. Uzhydromet, along with the Ministry of Emergencies and representatives of interested khokimiyats, conducts two-cycle (December, November) surveys of dangerous territories of the country, issuing orders for the protection of residential and technical facilities located in the water-hazardous zone. The surveys allow the preparation of a list containing the number of dwellings, farms and technical facilities located in areas prone to water hazards, which is shared with the Government Flood Commission, the Ministry of Emergencies and relevant khokimiyats. GIS and remote sensing are not used to allow the rapid checking and monitoring of the flood risk for human settlements.

Mudslides are another threat posed to human settlements in Uzbekistan (chapter 17). March–July is the period with a higher risk of mudflow events.

Owing to intense precipitation and increase in temperature in the mountainous areas in March–April, snow avalanche hazards occur, threatening the lives and livelihoods of the population (chapter 17). The high-risk areas are located in Tashkent, Namangan, Kashkadarya and Sukhandarya Oblasts.

Human settlements are not designed or refurbished in order to balance the impervious/pervious surface ratio inside the cities. The presence of adequate pervious areas has the natural capacity to mitigate thermal excursions and to support the adaptation to flooding events. At present, there is a lack of climate change adaptation/mitigation considerations in the design of the new rural settlements. There is vast potential for the design of new settlements to pay attention to resilience to the changing climate, shaping settlements to exploit local climatic conditions. In particular, new built-up volumes could create a design that is climate friendly, such as in terms of sun orientation, prevailing wind direction, reduction of impervious surfaces and establishment of green infrastructure.

## **16.4 Legal, policy and institutional framework**

### *Legal framework*

The 2001 Law on the Protection and Use of Cultural Heritage provides a protection regime for cultural objects.

The 2019 Law on Privatization of Non-Agricultural Land, to enter into force in March 2020, will enable

the privatization of non-agricultural land by Uzbek citizens and legal persons residing in Uzbekistan. Before March 2020, procedures for privatization will be tested in Surdarya Oblast.

The 2002 Code on Urban Construction defines the urban planning activities, documentation, and responsibilities of state bodies, legal entities and physical persons in town planning. While the Code provides for the participation of citizens, local self-government units and NGOs in decision-making on urban planning, public participation procedures are not detailed. Local administrations do not have a predominant role in the planning framework. No general plans and schemes of settlements or technical assessments of their content are publicly available. As at 2019, a draft of the new edition of the Code is under development that would significantly extend the requirements to public participation and would also regulate in more detail the issue of compensation to citizens affected by the expropriation of land or buildings.

The 1998 Housing Code regulates property rights on housing, preservation and maintenance of housing, procedures for the distribution and provision to citizens of premises according to lease agreements, the payment system for housing and utilities, and other aspects. As at 2019, a draft of the new edition of the Housing Code is under development.

The 2018 Resolution of the President No. 4028 “On additional measures to improve the construction of affordable houses in rural areas and for individual categories of citizens” addresses issues posed by the implementation of the Programme for the Construction of Affordable Residential Houses on Updated Model Projects in the Rural Areas for the period 2017–2021, such as the construction of new settlements on agricultural land – despite its being forbidden by the law, and the need to address the issue of energy efficiency for the standard rural houses. The Resolution sets priority areas for further development of housing construction in rural areas and the provision of affordable housing. It mentions explicitly the UNDP-GEF project “Market Transformation for Sustainable Rural Housing in Uzbekistan” on assistance in the development of the construction of energy efficient housing in rural areas.

The 2009 document ShNK 2.07.01-3 prescribes the measures for rational use of natural resources in the design of settlements, including:

- Urban planning measures (e.g. requirements for the organization of water protection zones along rivers, canals and reservoirs, as well as zones of

sanitary protection of water resources, zones of formation of groundwater deposits; creating green belts around cities; relocating industries that are in violation of environmental and town planning legislation; and developing and reconstruction of the road transport system);

- Engineering and technological measures (e.g. reconstructing industrial and energy facilities; introducing non-waste technologies; developing engineering infrastructure and utilities at a high technological level; and providing settlements with engineering equipment).

Uzbekistan introduced a moratorium on cutting down valuable species of trees and shrubs that are not part of the state forest fund, from November 2019 until the end of 2020 (2019 Decree of the President No. 5863). This measure is designed to prevent the felling of trees in human settlements during the development of new infrastructure and construction – in these cases, valuable tree species must be preserved, including by replanting them in other places.

#### *Policy framework*

##### State programmes for rural development, including housing

Providing people with decent housing in rural areas in Uzbekistan has remained a pressing issue since 1991; the availability of houses does not satisfy the growing demand due to population growth. Together with limited employment opportunities, this has caused many people to relocate to urban areas in search of work and a suitable place to live.

For that reason, since 2009, practically every year, the Government has launched rural housing programmes (e.g. 2012 Resolution of the President No. 1687; 2013 Resolution of the President No. 1902). They aimed at building thousands of new, “modern” rural houses, along with infrastructure such as schools and sports facilities.

In addition to governmental authorities, the players in the development of the rural housing programmes were the financial institutes (banks) and the construction companies (such as Qishloq Qurilish Invest). New rural settlements and houses were built by the Government with loans from several banks, then people could buy individual houses by accessing specific mortgages.

The programmes had built “standard design” houses with practically the same shapes, materials, colours and urban pattern all over Uzbekistan.

Initially, the rural single-family houses were built based upon a plot of six acres, or 24,281.1 m<sup>2</sup>, with a one-storey single-family home. The standard design of individual houses evolved from the original 6-acre single plot to the new 4-acre model (2017) then the 2-acre one (2019), also with the provision of multi-storey multi-family buildings.

The 2016 Programme for the Construction of Affordable Residential Houses on Updated Model Projects in the Rural Areas for the period 2017–2021 (2016 Resolution of the President No. 2639) provides the following data: in the period 2009–2016, in the 1,308 residential areas in the countryside, 69,557 residential buildings with a total area of 9,573,000 m<sup>2</sup> were built, serving over 83,500 rural families.

The number of new settlements and new houses to be built during the year is publicly announced. The Government plans to significantly increase investment in new rural housing and infrastructure, including social facilities (schools/hospitals), gas supply pipelines, roads and water supply networks. Under the Programme for the Construction of Affordable Residential Houses on Updated Model Projects in the Rural Areas for the period 2017–2021, in 2017 alone, more than US\$692 million in government funds and commercial bank lending of more than US\$690 million was allocated. This initiative enjoys continued support from the ADB through its Affordable Rural Housing Programme and through the Islamic Development Bank. Loans from the ADB operate through the National Bank for Foreign Economic Activity, QQB and the JSC Mortgage Bank “Ipotekabank”. The Ministry of Economy and Industry manages the Programme.

The ADB estimates that investment in affordable rural housing would have a further substantial impact on employment, as the Programme is expected to generate up to 220,000 jobs. The Programme would specifically target women, with a goal that 30 per cent of all mortgages are issued to women over the course of the programme’s duration. Encouraging women’s ownership of dwelling units is likely to increase the participation of women in economic activities and contributes to their empowerment.

Since 2011, the ADB has requested the preparation of an environmental assessment along with the project proposals for new settlements, in order to evaluate their potential harm to the environment and also to ensure that no plot is located on land reserved for agriculture. The “environmental management guidelines” were used from 2011 to 2016, and were updated in 2017 with provisions for monitoring construction sites, noise levels, dust and the follow-up

of complaints. As of 2019, Uzhydromet is part of the assessment board, in particular for the climate change component, which has not been taken into account to date.

Plans for the development of the new rural settlements are prepared based on requests from the local population, which, recently, have been requesting improved housing standards. The standardized design of houses, however, fails to capture opportunities to use local sources of alternative energy, nor can it offer maximum comfort and well-being to residents in terms of cultural identity. A GEF project proposal is being developed by the Ministry of Construction and UNDP to improve the energy efficiency standards and test a green mortgage mechanism.

In contemporary Uzbekistan, there is a general lack of appreciation of the cultural and architectural identity typical of its different regions. Of course inhabitants are pleased to live in houses with upgraded standards that are better than the average prior living conditions. However, they would benefit much more, in terms of social and cultural well-being, if they could also exercise their own cultural identity by identifying themselves with features and design typical of the territory they belong to. While the rural settlements programme was initially conceived to answer an urgent issue, today, modern Uzbekistan has the opportunity to take advantage of the results accomplished to promote a cultural reappropriation of the Uzbek identity, which bears some typical features that mark its difference from the western world.

Nowadays, rural areas could well be upgraded through the provision of affordable, decent new housing, which would benefit greatly from the rediscovery of traditional and local shapes, materials and volumes, for instance by integrating, where possible, local materials or traditional structural design.

Land-use plans for the new settlements do not contain low-carbon considerations in the zoning design, and thus fail to realize significant energy efficiency gains to be made from applying village-level energy solutions and passive solar design techniques. By implementing holistic, sustainable urban design, new rural settlements may well address critical issues such as climate change adaptation and mitigation at the site level, which also entails energy efficiency benefits for entire settlements and their buildings. Modern heating and cooking facilities using natural gas would avoid the recourse to solid fuels, which are linked to respiratory diseases.

“Obod Makhalla” (“Prosperous neighbourhood”) Programme

The 2018 Programme “Obod Makhalla” (2018 Decree of the President No. 5467) consists in the participatory preparation and implementation of neighbourhood plans that aim at improving common spaces, infrastructure facilities and building facades, and also to identify vacant areas where it will be possible to undertake further housing or infrastructure development. Proposals to upgrade existing objects, such as buildings or facilities, can be included in Obod Makhalla projects.

**Photo 16.5: Standard design houses in the suburbs of Bukhara City**



Photo credit: Ms. Alessandra Fidanza

To support the implementation of the Programme, khokimiyats receive funding for constructing and repairing water pipes, electric networks, gas pipes and sewerage systems, among other things. The following activities are included in the Obod Makhalla plans/projects:

- Construction of a “makhalla centre” in each makhalla, which will include pharmacies, amenities and services, playgrounds and small amusement parks;
- Revival or new development of business, commercial and artisanal potential;
- Organisation of microindustrial zones and craft centres; to support this measure, entrepreneurs and artisans may receive for free vacant land areas or unused buildings or structures within the territory of the makhalla;
- Support for the provision of electricity, drinking water, coal and natural gas, creating the necessary infrastructure for the collection and removal of household waste;
- Establishment of irrigation systems based on available water resources, as well as modernization of collector and drainage systems;
- Construction and repair of internal roads and footpaths, improvement and landscaping of the roadside zone, organization of the lighting system;
- Reconstruction and repair of kindergartens, schools, medical, sports and cultural institutions located on the territory of makhallas;
- Provision of material and financial assistance to families in need of housing repair, provision of the population with construction materials on preferential terms.

Under the Programme, at least two makhallas in each city of Uzbekistan were upgraded in 2018, and at least three makhallas will be upgraded annually until 2022.

The City of Tashkent hosts 505 makhallas, of which 44 developed their Obod Makhalla plans/projects in 2018, while 24 others are planned for 2019. The khokimiyat of a district is responsible for choosing the best versions of Obod Makhalla plans/projects, among those prepared in the form of a concept by district architects, with the participation of the public and, almost regularly, with the engagement of students in the process. Districts are also responsible for the issue of construction permits, which must be compliant with the provisions of the Obod Makhalla plans. When the plans/projects locate vacant public objects (vacant areas or constructions), usually one of the three existing state-owned design institutes is involved in the development of new projects. This point is crucial to understanding the current boost in construction activities in Uzbekistan: not only empty spaces but

also unused or underused buildings and complexes may be recognized as requiring transformation.

Makhalla chairpersons regularly report to the khokim and receive instructions on the administrative tasks to be undertaken at the local level. Makhallas are tasked to hold consultations with the public on proposals for new developments or the implementation of specific projects on their territory. Sometimes local inhabitants report that the makhalla chairperson has failed to guarantee a real participatory process, so that, especially in Tashkent, decisions affecting the lives and well-being of the citizens are taken without proper engagement of the local population.

#### “Obod Qishloq” (“Prosperous village”) Programme

The 2018 Programme “Obod Qishloq” (2018 Decree of the President No. 5386) supported the construction of infrastructure and landscaping activities in 386 villages of 159 districts in 2018. The activities were: repair of 3,000 km of roads, restoration of 142,000 individual houses and more than 1,000 multi-storey residential buildings, new provision or the restoration of 2,500 km of electricity networks, construction of 2,000 km of water pipes and construction of other infrastructure facilities. The first phase of the Programme, supported by the World Bank, targets the Fergana Valley, specifically, Fergana, Andijan and Namangan Oblasts.

#### Draft urbanization policy

In line with the 2019 Decree of the President No. 5623, the Agency for Urbanization under the Ministry of Economy and Industry prepared a draft concept of urbanization policy to 2030 for Uzbekistan. The draft contains provisions on the modernization of existing satellite towns adjacent to cities. It aims to ensure full access of the population to infrastructure. It envisages the development of a new housing policy, which will provide access to housing for all population groups, as well as the modernization and energy efficiency of the existing housing stock. The draft pays special attention to improving the environmental sustainability of cities, including the introduction of clean technologies in urban construction and the expansion of green spaces in towns and cities. The draft provides for the removal of polluting industrial facilities from urban areas.

#### Others

A draft programme to improve the energy efficiency of buildings, including the reconstruction of old high-rise and individual buildings is under development as

at 2019. In 2018, Uzbekistan requested the assistance of the World Bank to develop a national medium-size cities programme that would aim at achieving the integrated and balanced socioeconomic development of the oblasts, districts and cities of Uzbekistan. Initial steps will be taken as part of the Medium-Size Cities Integrated Urban Development Project in Chartaq (Namangan Oblast), Qagan (Bukhara Oblast) and Yangiyul (Tashkent Oblast).

*Sustainable Development Goals and targets relevant to this chapter*

The current stand of Uzbekistan vis-à-vis selected targets under Goal 11 of the 2030 Agenda for Sustainable Development is described in box 16.3 and vis-à-vis target 11.b – in box 7.1.

*Institutional framework*

The Uzbek governance system is highly centralized, with the central Government taking the most critical decisions on budgets and administrative appointments. Officials at the subnational level are appointed by the central Government. The khokim, head of representative and executive authority in the territory, is the highest official in an oblast, district or city. At the oblast level, most ministries provide services and directly manage budgets and planning. District khokims have a double subordination to oblast khokims and to regional line ministry officials. This affects decision-making and weakens responsiveness to citizens' needs. Governance at the village level is heavily influenced by makhalla committees (local self-government units). In practice, makhallas are not self-governing but are subordinated to subnational government officials who often veto the appointment of makhalla leaders.

Among other matters, the Ministry of Economy and Industry is responsible for the development of urbanization policies. At the beginning of 2019, the Agency for Urbanization under the Ministry of Economy and Industry was established.

According to the 2018 Resolution of the President No. 3502, supervision of the procedure for the preparation of general plans is done by the Ministry of Construction, through architectural councils operating at the oblast level. For big cities, general plans are approved by the Cabinet of Ministers.

The Ministry of Housing and Communal Utilities is responsible for the provision of utilities and municipal services.

The Ministry of Culture is responsible of the preparation of the historic preservation component of general plans. The Ministry of Culture is responsible for the inspection and maintenance of a certain number of “objects of culture” (buildings, monuments, archaeological sites) around the territory of Uzbekistan (mainly in urban areas). The list and the geographical localization of the objects are not available. The elaboration of the general plan for cities such as Samarkand entails a process of scrutiny by the Ministry of Culture.

The State Committee on Land Resources, Geodesy, Cartography and State Cadastre maintains the State Land Cadastre, the State Cadastre of Buildings and Facilities and several other cadastres.

QQB is a state-owned bank (75 per cent share). From 2000 to 2009, it was the only bank in Uzbekistan dedicated to financing the housing sector. In 2018, around 60 per cent of its activities are dedicated to individual mortgage loans. Since 2015, five more banks operate in this field.

*Participation in international agreements and processes*

Uzbekistan did not take part in the Habitat III process.

No town or city of Uzbekistan participates in the Covenant of Mayors movement, which supports local governments to take climate and energy action.



**Box 16.3: Selected targets under Goal 11 of the 2030 Agenda for Sustainable Development**

**Goal 11: Make cities and human settlements inclusive, safe, resilient and sustainable**  
**Target 11.1: By 2030, ensure access for all to adequate, safe and affordable housing and basic services and upgrade slums**

Uzbekistan nationalized global target 11.1 in slightly revised wording, omitting reference to slums. It has also modified global indicator 11.1.1 (Proportion of urban population living in slums, informal settlements or inadequate housing) to two national indicators. National indicator 11.1.1 (Provision of housing to population (m<sup>2</sup>/person)) stood at 15.7 m<sup>2</sup> in 2017. National indicator 11.1.2 (Proportion of households having no housing in ownership) stood at 2.1 per cent in 2017.

Through the extensive implementation of programmes on rural housing, Uzbekistan is trying to provide affordable housing to rural inhabitants, also targeting vulnerable categories such as single mothers, the elderly and disabled people. These efforts aim at upgrading existing living conditions and providing basic services in zones that were not previously served.

There is no information about social housing aimed at giving a home to the socially vulnerable and low- or no-income people.

**Target 11.3: By 2030, enhance inclusive and sustainable urbanization and capacity for participatory, integrated and sustainable human settlement planning and management in all countries**

Uzbekistan nationalized global target 11.3 and its indicator 11.3.1 without changes, but has not adopted global indicator 11.3.2 (Proportion of cities with a direct participation structure of civil society in urban planning and management that operate regularly and democratically).

Uzbekistan has not yet introduced a proper system of participatory urban planning and management. Usually, new architectural undertakings require the approval of the territorially competent makhalla chairperson, but often local inhabitants complain because of the lack of information and involvement in the decision-making process. Preliminary discussions about the projects under development (mainly new commercial and residential developments) sometimes involve the public, but the effectiveness and impact of such involvement is often questioned.

Reportedly, in the case of the 2018 makhalla renovation plans (neighbourhood development plans), despite some public participation at the neighbourhood level, the final decisions taken at the higher level by khokims sometimes introduced new built-up objects in areas indicated as “vacant”.

In 2019, the Ministry of Construction has proposed the participation of active citizens, as well as self-government bodies and NGOs in the decision-making process on urban planning. The draft urban planning code which includes these proposals has been published for discussion in 2019.

**Target 11.7: By 2030, provide universal access to safe, inclusive and accessible, green and public spaces, in particular for women and children, older persons and persons with disabilities**

National target 11.7 is to extend, by 2030, the area of green spaces, parks and children playgrounds in cities and settlements with special focus on persons with disabilities.

In recent years, Uzbekistan’s policy has aimed at increasing the number of trees planted in urban areas, with the scope of also creating green belts around major cities. According to media reports, in 2019, the City of Tashkent has 15,200 ha of green areas, compared with 6,800 ha in 1990. The “Green Belt Initiative” began in Tashkent in February 2019; oaks, chestnuts, catalpas and fruit trees have been planted in different parts of the city.

There are no specific data on the targeting of women, children and persons with disabilities in implementation of target 11.7.

**Target 11.a: Support positive economic, social and environmental links between urban, peri-urban and rural areas by strengthening national and regional development planning**

Uzbekistan has not nationalized global target 11.a. There is not a specific policy aimed at supporting linkages between urban and rural areas. It is intended to develop a national medium-size cities programme aimed at achieving the integrated and balanced socioeconomic development of oblasts, districts and cities.

## 16.5 Assessment, conclusions and recommendations

### *Assessment*

Human settlements are at the core of the economic development in contemporary Uzbekistan. Their rapid growth also implies rapid changes in the economy, society and the environment – the three pillars of sustainable development.

Rapid growth in the housing sector in any country must be thoroughly sustainable; otherwise, the development is done at the expense of cultural identity, social well-being and the environment.

Intervening on the issue of human settlements is an excellent opportunity for Uzbekistan to deliver a new, sustainable country for the next generations and to uplift the country’s economy in the world ranking. However, the Government should invest in carefully steering this rapid growth towards successful, long-lasting and truly sustainable development.

Uzbekistan is intensifying its efforts to give a strong impulse to the economy, including through the development of the housing sector and new planning policies, but this rapid evolution does not fully exploit the considerable potential of human settlements in the fight against climate change. Since 2009, Uzbekistan is significantly investing in building new settlements



in rural areas, with standardized houses for the rural population. More new dwellings are expected in the years to come; however, in rural areas, new human settlements are resulting in the same model of housing everywhere.

Since 2017, there has been a boost in the construction sector, especially in the City of Tashkent, but also in other major cities. Foreign investors are attracted to support the transformation of the country into a modern state. Support is still lacking for environmental considerations to steer this process, which sometimes does not carefully consider the needs of citizens when investments in large renovation and construction projects take place.

### *Conclusions and recommendations*<sup>31</sup>

#### Climate change concerns

The rapid growth of rural settlements, which occupy previously undeveloped lands all over the country, and the rapid urban expansion of existing cities increase the number of people exposed to the effects of “urban” climate change on the one hand, and upsurges in the production of GHG emissions from human settlements on the other. The country has not yet developed specific policies for adaptation to climate change, and limited information is available on the expected measures to reduce GHG emissions from the housing sector. Such measures are indispensable for the country to deliver on global target 11.b of the 2030 Agenda for Sustainable Development.

#### Recommendation 16.1:

*The Cabinet of Ministers should consider:*

- (a) *Introducing climate adaptation planning in urban areas and rural settlements;*
- (b) *Introducing specific zoning requirements to mitigate GHG emissions and energy efficiency in urban areas and rural settlements;*
- (c) *Fully exploiting the potential for GHG emissions reduction from the housing sector;*
- (d) *Implementing the use of local materials for the housing sector, to reduce its energy intensity and their carbon footprint;*
- (e) *Introducing incentives for investments in low carbon buildings;*
- (f) *Introducing incentives to reduce the carbon footprint of the housing sector and to introduce modern technologies in the cement*

*industry by using the carbon footprint calculations;*

- (g) *Prescribing the integration of traditional materials, morphologies and aesthetic shapes with contemporary techniques and technologies for the design and construction of new rural housing;*
- (h) *Elaborating, maintaining and updating the maps of flood-prone areas;*
- (i) *Addressing climate resilience of rural settlements by designs tailored to local climatic conditions (in terms of sun orientation, prevailing wind direction, pervious surfaces, establishment of green infrastructure) and not based on standard multiplication of rows of buildings;*
- (j) *Introducing climate change adaptation and mitigation in the policy documents related to urban development.*

*See Recommendation 7.1.*

#### Industrial facilities in urban areas

The placement of industrial facilities in urban areas remains an issue in Uzbekistan and no measures have been taken to remove such facilities from urban areas. Improvements in this area could significantly contribute to Uzbekistan’s progress towards achievement of Sustainable Development Goal 11.

#### Recommendation 16.2:

*The Cabinet of Ministers should ensure:*

- (a) *Removal of existing industrial facilities from urban areas;*
- (b) *Strengthening environmental requirements for the localization of new factories, or the upgrading of existing ones in urban areas.*

#### Cultural identity and urban landscape

Uzbekistan does not integrate the approaches to cultural identity and urban landscape envisaged by the European Landscape Convention into the planning, design and construction processes. The Tashkent Institute of Architecture and Construction is carrying out studies on how to reintroduce ancient typical urban morphologies and urban patterns in contemporary Uzbekistan. The findings of these studies are not used to improve the quality of urban areas and rural settlements and the life of their inhabitants.

<sup>31</sup> In 2014, Uzbekistan hosted a Country Profile on Housing and Land Management, published by ECE in 2015. Many recommendations of the Country Profile remain relevant in 2019.

Recommendation 16.3:

*The Cabinet of Ministers should consider:*

- (a) *Introducing an extended concept of landscape, which takes into account the promotion of Uzbek cultural identity;*
- (b) *Taking stock of existing studies carried out by Uzbek universities to introduce distinctive elements of Uzbek identity in housing and urban and rural settlement design, to improve the quality of life in cities and rural areas;*
- (c) *Promoting awareness-raising activities on distinctive Uzbek cultural identity and architectural and urban forms.*

Public participation

Effective public participation is not ensured in the choices affecting the territory, nor do the local administrations have a predominant role in the planning framework. The new architectural undertakings require the approval of the territorially competent makhalla chairperson, but often local inhabitants complain because of the lack of information and involvement in the decision-making process.

Recommendation 16.4:

*The Cabinet of Ministers should ensure:*

- (a) *Effective public participation in the elaboration of plans and programmes affecting the territory at the earliest stage possible;*
- (b) *Effective public participation in decision-making on projects to be implemented in inhabited areas, and specifically those that would entail their total or partial transformation;*
- (c) *That due account is taken of the outcomes of such public participation procedures.*

*See Recommendation 5.3.*

GIS systems and remote sensing

GIS systems and remote sensing allow the geolocalization and management of cultural heritage, the monitoring of illegal settlements and territorial management. They also enable web interfaces to inform the public and disseminate environmental information. However, GIS systems and remote sensing are not used for these purposes in Uzbekistan.

Recommendation 16.5:

*The Cabinet of Ministers should facilitate the updating of remote sensing and GIS systems to:*

- (a) *Geolocalize, manage and monitor protected sites and objects of culture;*
- (b) *Share information about cultural heritage and raise awareness among the population about the importance of cultural heritage;*
- (c) *Monitor the construction activities inside and outside urban areas.*

Energy efficiency of housing

The existing housing stock is highly energy inefficient. Construction standards changed in 2018, introducing new energy efficiency requirements. Those standards apply only to new construction projects; therefore, existing buildings are not subject to a requirement for improving energy efficiency. The UNDP-GEF Project “Market Transformation for Sustainable Rural Housing in Uzbekistan” has demonstrated the benefits of introducing energy efficient and low carbon solutions for the construction of rural housing. As of November 2019, the use of solar thermal collectors for hot water and photovoltaics is not widespread in new and existing buildings.

No certification systems aligned with international standards, such as Leadership in Energy and Environmental Design (LEED) or Building Research Establishment Environmental Assessment Method (BREEAM) are implemented in the country.

Recommendation 16.6:

*The Cabinet of Ministers should:*

- (a) *Develop and introduce energy efficiency standards and requirements for existing buildings;*
- (b) *Enforce the 2018 construction standards;*
- (c) *Promote in the housing sector the use of:*
  - (i) *Market-based solutions for energy efficiency;*
  - (ii) *Geothermal systems;*
  - (iii) *Solar thermal collectors for heating water and air and generating electricity.*

Urban ecological networks

Urban ecological networks are not developed in Uzbekistan. The development of ecological networks within urban areas would be useful to promote their sustainability, and would allow Uzbekistan to move

beyond merely greening cities towards having cities that provide habitats for native biodiversity.

Recommendation 16.7:

*The Cabinet of Ministers should consider developing and implementing urban ecological networks.*

Asbestos

Asbestos is still considered a cheap and appropriate construction material in Uzbekistan, and therefore is extensively used. The interviewed population and technical officers believe it is not harmful as long as it is used to produce compact materials, and they see no risk of volatile emissions.

Recommendation 16.8:

*The Cabinet of Ministers should:*

- (a) *Ban asbestos as a construction material and its use in the remediation of existing buildings;*
- (b) *Organize dedicated campaigns to inform the population of the extreme danger of asbestos for human health.*

Social protection and social housing

Issues related to the rapid development and refurbishment of inhabited parts of cities to safeguard inhabitants of residential buildings listed for demolition and reconstruction are not adequately addressed by the Government.

There is no information about the provision of social housing aimed at giving a home to the socially vulnerable and low- or no-income people.

Recommendation 16.9:

*The Cabinet of Ministers should:*

- (a) *Implement social protection measures aimed at safeguarding the rights of inhabitants of residential buildings that receive demolition orders;*
- (b) *Ensure the provision of social housing for people in vulnerable categories and the low-income population.*

Urban development

In Uzbekistan, developers do not pay development impact taxes but are obliged to provide a certain percentage of built-up volume in the form of apartments to be allocated to most vulnerable people. In Europe, the development impact taxes can be used to finance the building or upgrading of necessary urban infrastructure or funding health and social care facilities.

Recommendation 16.10:

*The Cabinet of Ministers should consider:*

- (a) *Introducing development impact taxes;*
- (b) *Requiring that large construction developments fully compensate the communities affected by demolition and reconstruction;*
- (c) *Introducing strategic environmental assessment as a support tool to develop sustainable urban planning documentation.*

*See Recommendation 1.3.*



## Chapter 17

# HEALTH AND THE ENVIRONMENT

### 17.1 Population health status

#### *Population development*

With its 32.66 million inhabitants in 2018, Uzbekistan is the most populous country in Central Asia. With a median age of 28.7 years in 2018, Uzbekistan's population is considerably younger than that of the WHO European Region, with a median age of 39.7 years. Around 66 per cent of the population are in the age range of the potentially economically active population (15–64 years), which is close to those indicators for the Commonwealth of Independent States (CIS) and the WHO European Region (table 17.1).

Uzbekistan witnessed population growth at a rate of 1.5 per cent in 2015, due to the persistently high birth rate and relatively low death rates, which have remained almost unchanged since 2009. The fertility rate is higher than that of the CIS countries and the

WHO European Region. A large proportion of the population (50.6 per cent in 2018) live in urban areas but about half the population (49.4 per cent) still live in rural areas.

According to 2016 estimates by WHO, life expectancy in Uzbekistan was 75.0 years for females and 69.7 for males, 1.4 years higher than in 2010. Although one of the main developmental achievements of Uzbekistan is that life expectancy has increased by approximately five years since 1995, it is still one of the lowest in the WHO European Region.

Officially recorded life expectancy rates do not fully reflect actual trends. Official statistics overestimate life expectancy: in 2016, the respective values were 71.4 years for males and 76.2 years for females; in 2017, they were 71.3 years for males and 76.1 years for females. However, life expectancy in Uzbekistan is lower than in the WHO European Region and slightly higher than the CIS average (table 17.2).

**Table 17.1: Key demographic indicators, 2010, 2015, 2017**

	Uzbekistan			CIS	WHO European
	2010	2015	2017	2015	2015
Mid-year population (million)	28.6	30.3 <sup>a)</sup>		282.3 <sup>a)</sup>	910.5 <sup>a)</sup>
Population aged 0–14 (%)	29.1	28.1	28.6	19.7	17.8
Population aged 65+ (%)	4.5	4.2	4.4	11.5	15.5
Live births (per 1,000 population)	22.2	24.4 <sup>b)</sup>	22.1	15.7	12.5
Deaths (per 1,000 population)	4.8	4.9 <sup>b)</sup>	5.0	11.3	10.0
Natural growth rate (per 1,000 population)	17.4	19.5 <sup>b)</sup>		4.4	2.5
Total fertility rate (children per woman)	2.2 <sup>c)</sup>	2.5 <sup>b)</sup>	2.4	1.7	1.7

*Source:* All data are from WHO Regional Office for Europe, Health for All Database, 2018, except data for Uzbekistan for 2017, which were provided by the State Committee on Statistics, 2019.

*Note:* a) Data refer to 2016; b) Data refer to 2014; c) Data refer to 2011.

**Table 17.2: Selected population health indicators, 2016**

	Uzbekistan	CIS	WHO European Region
	Life expectancy at birth (years)	72.3	72.0
Adult mortality rate (per 1,000 adults 15–59 years)	131.0	181.0	113.0
Infant mortality (per 1,000 live births)	21.3	11.0	8.1
Under-5 mortality rate (per 1,000 live births)	23.9	12.6	9.3
Maternal mortality ratio (per 100,000 live births)*	36.0	26.0	16.0

*Source:* WHO Global Health Observatory data repository <http://apps.who.int/gho/data/node.home>; accessed January 2019.

*Note:* \* Data refer to 2015.

There is an urban–rural divide in life expectancy. In 2016, people living in the cities tended to live 1.5 years longer than their rural counterparts; the difference for the female population was more than 2 years, most likely due to better living and working conditions and access to health services in urban areas. Within the country, there is lower life expectancy at birth in the Republic of Karakalpakstan (the Aral Sea region) and Andijan, Syrdarya and Tashkent Oblasts.

The adult mortality rate is lower than the CIS average but higher than the average of the WHO European Region.

#### *Maternal and child mortality*

The United Nations Interagency Group (WHO, UNICEF and United Nations Population Fund (UNFPA)) estimates on maternal mortality in Uzbekistan show a decrease from 54 per 100,000 live births in 1990 to 36 per 100,000 live births in 2015. The reduction in maternal mortality during this period indicates that the country has met the national target of Millennium Developmental Goal (MDG) 5 aimed at reducing the maternal mortality ratio by one third between 1990 and 2015. The official statistics report lower values and a decreasing trend, from 23.5 per 100,000 live births in 2007 to 17.4 per 100,000 live births in 2016, mostly owing to the use, until mid-2014, of the definition of live births adopted during the Soviet period, which is different from that of WHO. Nevertheless, the official statistics for 2017 show an increase to 21 per 100,000 live births. In any case, the country levels are higher than those of the CIS countries and much higher than the WHO European Region average (table 17.2).

Both the under-5 mortality rate and infant mortality rate have been decreasing since 2000. According to WHO estimates, the under-5 mortality rate fell from 36.2 per 1,000 live births in 2010 to 23.9 per 1,000 live births in 2015, and infant mortality from 31.6 per 1,000 live births to 21.3 per 1,000 live births, but both still remain high compared with the WHO European Region and CIS countries. Important differentials in infant mortality in relation to income quintile continue to persist, with babies born in the bottom income quintile being twice as likely to die before the age of 1 compared with those in the top quintile.

Infant mortality among the rural population was consistently lower than that of the urban population, most probably due to deficiencies in registration and reporting in rural areas.

As regards the infant mortality rate, official statistics show lower values than the WHO estimates, with no

significant dynamics: 11 per 1,000 live births in 2010, 10.8 per 1,000 live births in 2014 and 11.5 per 1,000 live births in 2017. As regards the under-5 mortality rate, official statistics are again lower than WHO statistics, showing a decrease from 14.9 per 1,000 live births in 2010 to 12.0 per 1,000 live births in 2013.

In terms of the causes of under-5 mortality, in 2012, the largest share (37.5 per cent) was due to respiratory diseases. Mortality from these diseases is preventable. Perinatal causes rank second and some conditions attributed to these, such as asphyxia and infections, are also preventable.

The current stand of Uzbekistan vis-à-vis targets 3.1, 3.2 and 3.7 of the 2030 Agenda for Sustainable Development is described in box 17.1.

#### *Mortality by main causes of death*

Non-communicable diseases (NCDs) continue to represent by far the major share of deaths and of years of life lost in the country. The State Committee on Statistics data on mortality from the most important NCDs (diseases of the circulatory, digestive and respiratory systems, malignant neoplasms and external causes of injury and poisonings) show a decrease for all causes during the period 2007–2017, with the exception of malignant neoplasms, which are on the rise, especially after 2013, at about 4 per cent of relative change against the previous year. Cause-specific mortality rates per 100,000 population decreased in the period 2007–2017, from 723 to 638 for circulatory system diseases, from 62 to 46 for digestive system diseases, from 54 to 33 for respiratory system diseases and from 20 to 11 for infectious and parasitic diseases. The decrease in mortality from each of these causes slowed after 2013. In 2015, mortality from the leading cause – diseases of the circulatory system – was twice as high in Uzbekistan than in the WHO European Region (table 17.3).

Similarly to the rest of the WHO European Region, in Uzbekistan, ischaemic heart and cerebrovascular diseases constitute the leading cause of death, followed by cancer (table 17.3). Their share in all-causes mortality in the country is larger than in the CIS countries and much larger than in the WHO European Region. The distribution of cause-specific mortality by external causes, respiratory diseases, digestive system diseases and communicable diseases is different in Uzbekistan, with diseases of the digestive system ranking third in the cause of death. Though the incidence of liver cirrhosis in the country has decreased over the last five years, it remains a very significant cause of death, killing about 11,000 people

in 2015. The share of deaths due to respiratory diseases in Uzbekistan is similar to that by external causes, ranking fourth and fifth respectively, whereas injuries and poisoning are the third leading cause of mortality in the CIS and the WHO European Region.

Dietary risks, malnutrition, tobacco and alcohol use, as well as air pollution, are among the top 10 risk

factors that drove the highest number of deaths and cases of disability combined during the period 2007–2017 in Uzbekistan.

The current stand of Uzbekistan vis-à-vis target 3.4 of the 2030 Agenda for Sustainable Development is described in box 17.2.



### Box 17.1: Targets 3.1, 3.2 and 3.7 of the 2030 Agenda for Sustainable Development

#### **Goal 3: Ensure healthy lives and promote well-being for all at all ages**

#### **Target 3.1: By 2030, reduce the global maternal mortality ratio to less than 70 per 100,000 live births**

Uzbekistan's national target 3.1 is to reduce by one third the maternal mortality ratio by 2030.

This target is measured by two indicators: 3.1.1, Maternal mortality ratio, which is estimated by the United Nations Interagency Group at 36 per 100,000 live births in 2015; and 3.1.2, Proportion of births attended by skilled health personnel, which is reported by the country to be 100 per cent in 2015.

Maternal mortality is decreasing but the annual rates of reduction have slowed since 2005 and the levels still remain among the highest in the WHO European Region. The nutritional status of women in Uzbekistan is one of the main concerns in maternal health, as anaemia and deficiencies of several micronutrients which are associated with higher maternal mortality risks are still persistent. Also, owing to economic pressure, women are sometimes required to perform hard physical work during their pregnancy, which is also preventing them from seeking health care.

Half the maternal deaths are related to obstetric factors, most of which occur among rural women less likely to have delivered with a skilled birth attendant.

#### **Target 3.2: By 2030, end preventable deaths of new-borns and children under 5 years of age, with all countries aiming to reduce neonatal mortality to at least as low as 12 per 1,000 live births and under-5 mortality to at least as low as 25 per 1,000 live births**

National target 3.2 is to reduce by half neonatal mortality and under-5 mortality by 2030.

The under-5 mortality rate (indicator 3.2.1) declined from 36.2 per 1,000 live births in 2010 to 23.9 per 1,000 live births in 2015, and the neonatal mortality rate (indicator 3.2.2) from 19.4 per 1,000 live births in 2010 to 12.1 per 1,000 live births in 2017.

Undernourishment continues to be a problem in Uzbekistan, given the prevalence of stunting and wasting in children under the age of 5. The country is aiming to achieve the international goal of reducing stunting and wasting by 2025 through improving food security. The State Programme "Year of a healthy mother and child" of 2016, among other activities, reflects the efforts made towards providing quality health-care services and building the capacities of health workers.

#### **Target 3.7: By 2030, ensure universal access to sexual and reproductive health-care services, including for family planning, information and education, and the integration of reproductive health into national strategies and programmes**

National target 3.7 is to ensure universal access to sexual and reproductive health-care services, including for family planning, raising the marriageable age for girls to 18, and integration of reproductive health into national strategies and programmes by 2030.

No data are collected on the proportion of women of reproductive age (aged 15–49 years) who have their need for family planning satisfied with modern methods (indicator 3.7.1). According to the official gender statistics, in 2015, about 45 per 100 women of reproductive age applied contraceptive methods. The birth rate among adolescent girls (indicator 3.7.2) was still high in 2010: almost 30 per 1,000 in the age-group 15–19 years. There are no data on the birth rate in the younger age group (10–14 years). In August 2019 Uzbekistan raised the marriageable age for girls from 17 years to 18 years.

The State Programme on Strengthening Reproductive, Maternal and Children's Health for the period 2014–2018 has resulted in certain improvements. The profound health system reform currently under way in the country would further enhance quality, availability and accessibility of health-care services towards the achievement of target 3.7.

**Table 17.3: Standardized death rates for the most important causes of death, 2015, per 100,000 population**

	Uzbekistan		CIS		WHO European Region	
	SDR	%	SDR	%	SDR	%
All causes	932.80	100.00	1 014.43	100.00	718.27	100.00
Diseases of circulatory system	640.40	68.65	559.01	55.11	314.89	43.84
Malignant neoplasms	75.10	8.05	143.42	14.14	151.31	21.07
External causes of injury and poisoning	35.80	3.84	88.03	8.68	49.93	6.95
Diseases of digestive system	48.10	5.16	54.60	5.38	33.88	4.72
Diseases of the respiratory system	36.40	3.90	46.85	4.62	46.41	6.46
Infectious and parasitic diseases	12.80	1.37	17.85	1.76	12.32	1.72

Source: WHO Regional Office for Europe, Health for All Database, 2019 (<https://gateway.euro.who.int/en/hfa-explorer/>); State Committee on Statistics, 2019 (<https://gender.stat.uz/ru/osnovnye-pokazateli/demografiya/smernost/123-standartizovannye-koeffitsienty-smernosti-ru>).

Note: SDR = standardized death rates.

### 3 GOOD HEALTH AND WELL-BEING



#### Box 17.2: Target 3.4 of the 2030 Agenda for Sustainable Development

##### **Goal 3: Ensure healthy lives and promote well-being for all at all ages**

##### **Target 3.4: By 2030, reduce by one third premature mortality from non-communicable diseases (NCDs) through prevention and treatment and promote mental health and well-being**

National target 3.4 is to reduce by 30 per cent premature mortality among the population from cardiovascular diseases, oncological diseases, diabetes mellitus and chronic respiratory diseases by 2030.

In 2016, the probability of dying between age 30 and exact age 70 from any of cardiovascular disease, cancer, diabetes or chronic respiratory disease (national indicator 3.4.1) in Uzbekistan was 24.5 per cent, compared with 16.7 in the WHO European Region. The probability has been decreasing since 2000. As for global/national indicator 3.4.2 (Suicide mortality rate), the suicide rate in Uzbekistan was lower than in the WHO European Region, but the age-standardized suicide rate increased from 6.0 per 100,000 population in 2010 to 7.4 per 100,000 population in 2016, with higher rates among men.

NCDs pose a huge burden and contribute to economic losses in the country, and the health system is oriented predominantly towards treatment, giving less attention to NCD reduction through prevention. In addition, the gap in life expectancy between women and men suggests that the gender-related influence on mortality has not been sufficiently addressed. Several surveys were conducted from 2005 to 2016 but the results were not published officially, so evidence-based policy development is an issue.

Most deaths from NCDs arise in the age range of 30–70 years, where the risk factors are amenable to interventions. Environmental pressures, such as exposure to air pollution and noise, contribute to high levels of blood pressure and low birth weight, which are among the most important risk factors for NCDs in the country, along with diet, child and maternal malnutrition and tobacco use. Effective prevention and control of NCDs and risk factors are essential to reduce premature mortality. New skill sets are required to engage in strengthening public health and health system reform towards health promotion and disease prevention, early detection and other actions, in order to advance NCDs management. Equally, mechanisms for effective multisectoral collaboration and integrated policy action are keys to reducing and preventing premature mortality and disability in the country.

#### *Selected trends in morbidity*

Diseases of the respiratory system and blood are the main causes of hospitalization. With respect to communicable diseases, acute respiratory and intestinal infections are the main causes of hospitalization.

According to the World Bank's 2016 Systematic Country Diagnostic, the majority of the population subsists near the poverty line and is at significant risk of falling below it. Tuberculosis (TB) incidence rates, which began declining steadily around 2005, remain twice as high as those in the WHO European Region

(figure 17.1). Children account for more than 11 per cent of all TB cases. Within the country, the Republic of Karakalpakstan and Tashkent Oblast have the highest incidence of TB. While the burden of TB and HIV/AIDS has declined somewhat in recent years, the prevalence of multidrug-resistant TB has been increasing rapidly and presents a serious challenge.

Uzbekistan is among the countries attaining zero indigenous malaria cases for three consecutive years (2011–2013) and has moved forward from malaria control to elimination. The country received the WHO certificate on elimination of malaria in 2018. Despite the high immunization coverage against traditional



vaccine-preventable diseases, communicable diseases such as Hepatitis A, which are associated with poor hygiene, and also rabies are on the rise.

The current stand of Uzbekistan vis-à-vis targets 3.3 and 3.8 of the 2030 Agenda for Sustainable Development is described in box 17.3.

#### Morbidity in the Aral Sea area

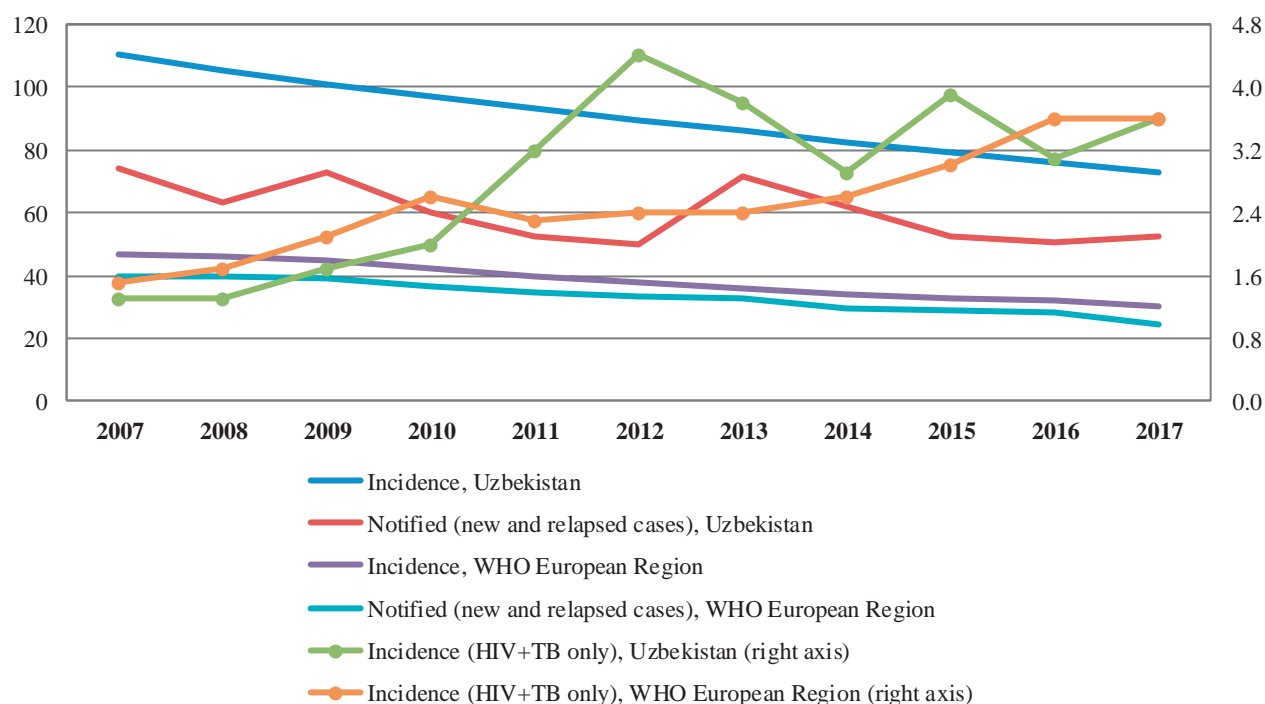
The Aral Sea region in Uzbekistan comprises the Republic of Karakalpakstan and Khorezm Oblast, with a total population of 3.647 million in 2018. The crisis of the drying Aral Sea has brought profound impacts on the entire ecosystem and a large burden of disease and disability to the population. There are no systematic epidemiological studies on the population's health status and trends and associated environmental, socio-economic and other factors following the Aral Sea disaster. Some human biomonitoring surveys were conducted more than 15 years ago.

In the framework of the seven-country initiative of the WHO Regional Office for Europe aimed at protecting health from climate change, a study found high morbidity from respiratory diseases in the Republic of

Karakalpakstan during the period 2006–2010 and an increase towards the end of the period, which was attributed to climatic factors, in particular ambient air dust and temperature. Within the same initiative, analysis of morbidity in the Republic of Karakalpakstan for the period 2007–2009 carried out by the State Sanitary and Epidemiological Surveillance Centre of the Republic of Karakalpakstan has shown an increase in diseases of the endocrine system (endemic goitre), digestive system (gallstones) and urological system (kidney stones), as well as chronic bronchitis and asthma.

Even if the routinely reported morbidity data have limitations for assessment of the population's health status in the Aral Sea Region, very limited statistics were published but they are rather difficult to access, especially at the subnational level. The data reported in the framework of the regional and international initiatives on the Aral Sea show chronic bronchitis morbidity persisting throughout the period 2005–2016 at levels from 86 per 100,000 population to 113 per 100,000 population. The incidence of urological system disease (kidney stones) was on the rise, from 17 per 100,000 population in 2005 to 39 per 100,000 population in 2016.

**Figure 17.1: Tuberculosis incidence, incidence among HIV-positive persons, 2007–2017, estimated rates per 100,000 population**



Source: WHO Global Health Observatory data repository (<http://apps.who.int/gho/data/node.home>), accessed January 2019; State Committee on Statistics, 2019.



### Box 17.3: Targets 3.3 and 3.8 of the 2030 Agenda for Sustainable Development

#### **Goal 3: Ensure healthy lives and promote well-being for all at all ages**

#### **Target 3.3: By 2030, end the epidemics of AIDS, tuberculosis, malaria and neglected tropical diseases and combat hepatitis, water-borne diseases and other communicable diseases**

National target 3.3 is to reduce the incidence of TB and HIV and to combat hepatitis, water-borne diseases and other communicable diseases.

The country ranked sixth highest in the WHO European Region on the incidence of new HIV infections, with an estimated 0.21 new infected persons per 1,000 uninfected population (indicator 3.3.1) in 2017. The growing rate of new infections in the age groups 15–24 and 25–49 years, where it is associated with the sexual transmission of HIV, has become predominant in recent years, underlining the importance of preventive and control measures in the general population. The country does not conduct sufficient prevention and control measures to counteract growing rates of HIV infection, overcome HIV-related stigma and provide psychosocial support to children and adolescents on HIV-related issues.

The country also ranked sixth highest in the WHO European Region on the incidence of TB, with an estimated 73 persons per 100,000 population (indicator 3.3.2) in 2017. TB incidence is steadily decreasing, but levels well above the WHO European Region average and the resurgence of TB in the country require urgent measures to be taken (figure 17.1). Uzbekistan is among the 18 high-priority countries in the WHO European Region with regard to fighting TB and among the 30 highest ranked countries in the world with regard to the burden of multidrug-resistant TB, having a low TB detection rate. One of the main challenges in TB control in Uzbekistan is the absence of an electronic surveillance system. The same holds true for other infectious diseases, such as hepatitis and HIV/AIDS. Therefore, considerable efforts are required to improve the quality of prevention, diagnosis and treatment towards achievement of the Global End TB strategy targets.

Malaria incidence per 1,000 population (indicator 3.3.3) was zero in 2017. Although Uzbekistan received the WHO malaria elimination certificate, there is still a risk of importing malaria, because of increased migration. Also, there are concerns about insufficient attention being paid to malaria prevention, which might lead once more to local malaria transmission.

The prevalence of Hepatitis B surface antigen among children under 5 years of age (key data input for indicator 3.3.4, Hepatitis B incidence per 100,000 population) was 0.6 per cent in 2015. Viral hepatitis is highly endemic in Uzbekistan and the private sector is supporting vaccinations against hepatitis A and B.

The reported number of people requiring interventions against neglected tropical diseases (indicator 3.3.5) was about 406,000 in 2016, showing some increase since 2014 in contrast to the expected decrease towards “the end of those diseases” by 2030 as a result of their effective control, elimination and eradication. Since 2010, Uzbekistan has been among the countries (mostly from the Caucasus and Central Asia) in the WHO European Region that have reported the highest number of people requiring such interventions.

Combating infectious diseases requires strengthening the sanitary-epidemiological system and introducing modern public health methods. There is no computerized nationwide surveillance system for priority infectious diseases that would be instrumental to identifying causal agents/sources and populations at risk, to inform policy and programme development at the local and central levels and monitoring and evaluation of implementation progress.

#### **Target 3.8: Achieve universal health coverage, including financial risk protection, access to quality essential health-care services and access to safe, effective, quality and affordable essential medicines and vaccines for all**

National target 3.8 is identical to the global target.

Coverage of essential health services (indicator 3.8.1) was estimated at 72 per cent in 2015, close to the threshold level set at 80 per cent (defined as the lower limit of the top quintile), indicating fairly good coverage of essential services for reproductive, maternal, newborn and child health and for infectious and non-communicable diseases, and service capacity and accessibility among the general and the most disadvantaged populations.

According to household surveys organized by statistical authorities of Uzbekistan, the proportion of the population with large household expenditure on health as a share of total household expenditure (indicator 3.8.2) was as follows:

- (a) Over 10 per cent of expenditure on health: in 2018, 13.8 per cent of households; in 2017, 12.5 per cent; in 2016, 10.9 per cent;
- (b) Over 25 per cent of expenditure on health: in 2018, 3.0 per cent of households; in 2017, 2.5 per cent; in 2016, 2.1 per cent.

Financing of the health-care system is predominantly from tax revenues and currently covers about half of total health expenditures – a share that is insufficient to ensure quality health services without additional (out-of-pocket) expenditures. Thus, the burden of cost falls disproportionately on the poor and vulnerable.

The health system reform in Uzbekistan has brought some improvements in accessibility to quality, effective and safe health care through several actions, including in rural areas by the creation of more medical centres and increasing

production of domestic medicines, with the aim to increase access to essential medicines. Also, the country runs a successful immunization programme. The Government has launched reform of primary health care, since strong and multi-profiled primary health care is a key pillar in progressing towards universal health coverage.

According to the Ministry of Health, in 2017, in the Republic of Karakalpakstan, diseases of the blood, blood-forming organs and certain immunity disorders, mostly anaemia, as well as mental disorders, were higher by 10 per cent than the national averages. In Khorezm Oblast, morbidity from diseases of the nervous, circulatory, digestive and urological (kidney stones) systems was higher than the national averages by about 50 per cent and the corresponding incidence rates per 100,000 population were: 2,806 vs. 1,750; 2,932 vs. 2,295; 9,092 vs. 6,766; and 110 vs. 70. In 2017, the incidence of antenatal, perinatal and post-neonatal health conditions/complications in the entire Aral Sea region exceeded the national average by 50 per cent (5,727 vs. 3,782 per 100,000 population). In 2017, Khorezm Oblast, with an incidence of 7,301 per 100,000 population, ranked the highest in the country, also because of the lack of access to quality and effective maternal health care in that oblast.

With respect to infectious diseases, the incidence of TB in the Republic of Karakalpakstan is twice as high as the national average. Within the Republic, the incidence of TB in the districts of Muynak, Karauzyak and Takhtakupyr is twice the average for the Republic overall. This again points to health system deficiencies, but also to poor living conditions and malnutrition. According to the data of the Ministry of Health for the period 2009–2017, in the Republic of Karakalpakstan, morbidity from acute intestinal infections was well over the national averages during the entire period (by an average of 60 per cent), while morbidity from viral hepatitis A exceeded the national average only once, in 2011 (by 50 per cent). In Khorezm Oblast, morbidity levels for both infections were always below national levels.

## 17.2 Health risks associated with environmental factors and environmental causes of morbidity and mortality

### *Air quality*

#### Ambient air quality

In 2016, WHO estimated annual mean concentrations of fine particulate matter (PM<sub>2.5</sub>) in Uzbekistan at 25.3 µg/m<sup>3</sup> – far beyond the WHO Air Quality Guideline value of 10 µg/m<sup>3</sup> – with the population in the urban

areas of Uzbekistan being exposed to even higher levels of pollution.

Two air quality monitoring stations covering PM<sub>10</sub> and PM<sub>2.5</sub> were installed in 2010 in Nukus and Tashkent in the framework of a WHO programme to support the country in assessment of the impact of air pollution on respiratory health, as a part of the seven-country initiative of the WHO Regional Office for Europe aimed at protecting health from climate change. PM<sub>10</sub> and PM<sub>2.5</sub> concentrations in those cities reported to WHO in 2011 and 2012 consistently exceeded the WHO Air Quality Guidelines but the monthly averages showed a differential pattern of variations over time between the two cities, with higher levels in Tashkent that increased in the winter months. After 2012, PM<sub>10</sub> and PM<sub>2.5</sub> monitoring at the Nukus station was discontinued and only data from Tashkent were published. Tashkent measuring station was in operation until 2017. In 2018, both stations were out of order because of a lack of finance for spare parts. No modelling was applied to identify differences in the properties of particle suspension and transportation to effectively guide pollution abatement measures.

Available data for ambient PM<sub>10</sub> and PM<sub>2.5</sub> concentrations in Tashkent for the period 2012–2014<sup>32</sup> show that, during all three years, annual mean PM<sub>2.5</sub> exceeded WHO Air Quality Guideline levels by a factor of 2.6–3.3 (2.9 for the three-year average equal to 28.8 µg/m<sup>3</sup>). This value also exceeds the EU limit value of 20 µg/m<sup>3</sup>. Though PM<sub>2.5</sub> concentrations from October 2013 until February 2014 were higher than in other periods, seasonal variation of PM<sub>2.5</sub> levels were not very large, and hence there is no strong signal of pollution from household heating in Tashkent City. There were prolonged dusty periods from March until October, with a higher contribution of the coarse fraction in PM<sub>10</sub>. The average PM<sub>2.5</sub>/PM<sub>10</sub> ratio was in the range of 0.47–0.62, indicating the substantial, but not extremely high, contribution of mineral dust in PM<sub>10</sub>. Based on mean PM<sub>2.5</sub> concentration from the three years, one can estimate about 10.7 per cent of all-cause natural mortality in Tashkent in the population aged 30+ years to be attributable to PM exposure exceeding WHO Guidelines.

Throughout the country, ambient air quality monitoring conducted by Uzhydromet does not encompass PM<sub>10</sub> and PM<sub>2.5</sub> (chapters 4 and 8). The

<sup>32</sup> Ekologiya Xabarnomasi, No. 9 (209) (2018).

State Sanitary and Epidemiological Surveillance Service (SSESS), which is responsible for environmental health, has not specified PM<sub>10</sub> and PM<sub>2.5</sub> limit values in the sanitary rules and norms. Databases of the air quality parameters levels are lacking. The most recent statistical collection on the state of the environment is limited to air pollutant emissions and compliance with national maximum allowed concentrations (MACs), without reference to the population concerned or potentially “at risk”. There is no information available to allow estimation of health effects.

No policy actions on pollution abatement are in place, despite high levels of ambient PM throughout the years. These give rise to a range of adverse health effects: in 2016, the estimated burden of disease attributed to ambient air pollution exposure in the country amounted to 14,414 deaths, most from ischemic heart disease – among the highest rates in the WHO European Region. WHO estimates the age-standardized death rate attributable to *ambient* air pollution at 69 per 100,000 population in Uzbekistan in 2016. In 2015, a study by WHO and the OECD reported on the economic cost of public health impacts of ambient and household air pollution as of 2010, with particular reference to the countries of the WHO European Region. In 2010, estimates of the effects of air pollution in Uzbekistan amounted to 27,672 premature deaths, with about two thirds of these due to ambient air pollution. The estimated economic cost of the premature death toll due to air pollution is about US\$12.267 million.

#### Indoor air quality

Indoor air pollution has not received due attention in the Government’s agenda, even though people spend a considerable period of their lives indoors. Gas and electricity shortages and a lack of clean and affordable fuel, as well as the use of unsafe heating and cooking appliances, pose significant indoor air problems, especially during the winter months and particularly in small towns and rural areas, which, in turn, affect people’s health significantly.

Even though, according to the WHO Global Health Observatory data repository, the proportion of the country’s population that relies primarily on clean fuels and technologies is on the rise, from 80 per cent in 2000 to 92 per cent in 2016, and about 20 per cent of the rural population was using solid fuels in 2013, fatalities by carbon monoxide poisoning were reported at the end of December 2018 in Tashkent and Samarkand Oblasts. Emissions from faulty, incorrectly installed, poorly maintained or poorly ventilated cooking or heating appliances that burn

fossil fuels, the burning of biomass fuels and tobacco smoke are the most important sources of exposure to carbon monoxide. No data system or register of carbon monoxide poisoning is established in the country.

No data are collected on second-hand tobacco smoke in and outside the home among the population aged 13–15 years. With the prevalence of daily smoking in 2014 at less than 1 per cent in females but 16.6 per cent in males, exposure to environmental tobacco smoke at home can be expected.

Uzbekistan’s national Sustainable Development Goals indicator 3.9.1, “Mortality rate attributed to the toxic effect of chemicals per 100,000 population”, differs from the corresponding global indicator, which is centred on mortality (deaths per 100,000 population) attributed to ambient and household *air* pollution (box 8.3). The national definition of this indicator is somewhat vague, lacking a clear rationale.

#### *Water and sanitation*

##### Population connected to drinking water supply and sanitation

According to the Ministry of Housing and Communal Utilities, at present, 20.7 million people or about 63.5 per cent of the population are covered by centralized drinking water supply services. Of these, 13.5 million or about 41 per cent have in-house connections to piped water supply, and 7 million or about 22 per cent use street standpipe services. Although most urban and rural areas are supplied with water, the water supply infrastructure, built in the late 1960s–1970s, is now in need of repair and inefficient, which leads to frequent breakages, intermittent water supply and contamination. Eight million people or about 25 per cent of the country’s population must use wells, springs, rivers and other water sources, and 3.3 million or about 10 per cent depend on water supplied by carriers.

According to the Ministry of Housing and Communal Utilities, about 6 million people in rural areas do not have access to a centralized drinking water system. They use water from irrigation channels and ditches without disinfection and purification, with a simple basic filtration at home.

Although the entire population in the country has access to basic sanitation, in early 2019, only 5.1 million people or about 15.6 per cent of the population are connected to a centralized sewerage system, according to the Ministry of Housing and Communal Utilities.

The WHO/UNICEF Joint Monitoring Programme estimated access to basic drinking water, sanitation and hygiene (WASH) in schools in 2016 at 90 per cent, 92 per cent and 89 per cent respectively, with slightly higher values for primary schools than secondary schools, but there was no information about urban–rural differences.

The WASH in Schools situation assessment during the period 2011–2012,<sup>33</sup> commissioned by UNICEF in six countries and conducted in Uzbekistan by the Republican Centre for Social Adaptation of Children, revealed marked urban–rural disparities in Uzbekistan. About 93 per cent of urban schools had piped water supply, compared with 63 per cent of schools in rural areas. The majority of schools in rural areas used pit latrines located 20–100 metres from the school building. Providing hand-washing facilities in the absence of a centralized water supply remained challenging, particularly in winter, and, consequently, in cold weather there was less use of school sanitation facilities and the use of hand-washing facilities was nearly negligible. Hygiene was taught in primary school as a part of the optional curriculum; children’s knowledge was high, but their hygiene behaviours were weak. As for regional differences, schools in the western regions, nearest to the Aral Sea, had disproportionately limited WASH access compared with those in the rest of the country, and it was further obstructed by water scarcity and the deterioration of centralized infrastructure.

#### Drinking water safety

Drinking water quality and safety subject to monitoring and control by SSESS shows around 5–25 per cent levels of non-compliance with the national standards. With regard to drinking water, rates of exceedance of the national standards for bacteriological and chemical indices by category of water supply system (municipal/urban, rural and water reservoirs) during the period 2012–2017 are given in figure 9.1.

Overall, the drinking water provided through urban water supply systems showed the lowest bacteriological exceedances when compared with that from rural systems and water reservoirs, but the levels of chemical exceedance were always greater than those of bacteriological exceedance in all bodies used for water supply and throughout all years. Chemical exceedances were twice as high as microbiological

exceedances, and even higher in the water reservoirs, where the sanitary situation is the worst of the three categories of water supply system.

Small and very small individual water supplies (e.g. wells, springs or rainwater collection tanks) that typically serve one family or a small number of households (e.g. farmers or dekhan farms) and are generally operated by the users themselves, are not subject to monitoring and control. Surface water consumed by 6 million people living in rural areas who are not connected to a centralized drinking water system is subject to pollution from livestock, farm runoff and fertilizer wash. The water has a high content of nitrates and pesticides and is contaminated with intestinal pathogenic protozoa, helminth eggs and pathogenic microflora from surface drains. Uzbekistan is among the four countries in the WHO European Region where more than 1 per cent of the population relies on surface water that is prone to severe microbial contamination.

Advancement in drinking water safety, as well as progress towards the 2030 Agenda for Sustainable Development targets on access to safe drinking water and adequate sanitation in the country, is centred on the large, centralized infrastructure. Thus, small-scale water supply systems typical of the countryside are left out of policy and regulatory oversight. Ensuring safe drinking water under those conditions requires an integrated approach focused on health risk prevention and control. The WHO Guidelines for Drinking Water Quality (first issued in 1958) introduced water safety plans (WSPs) as the means of consistently ensuring the safety of drinking water supply through the use of a comprehensive risk assessment and risk management approach at all stages from catchment to consumer. There is an incremental WSP uptake, with about one third of the countries in the WHO European Region having (regulatory) provisions on WSP approaches in place. As at 2019, there have been no demonstration projects on piloting WSPs in Uzbekistan. Uzbekistan is not a party to the ECE/WHO Regional Office for Europe Protocol on Water and Health to the Convention on the Use and Protection of Transboundary Watercourses and International Lakes, which prioritizes WSPs and sets an international framework enabling methodological and technical support for their implementation.

Measures to improve hygiene and sanitation conditions, coupled with hygiene education, can, in

<sup>33</sup> *Equity of Access to WASH in Schools: A Comparative Study of Policy and Service Delivery in Kyrgyzstan, Malawi, the Philippines, Timor-Leste, Uganda and Uzbekistan* (New York, UNICEF, n.d.).

the short term, provide a cost-effective solution for reducing the spread of waterborne infections in communities that rely on surface water for drinking. There is no evidence of targeted sanitation and hygiene programmes including hygiene education in such high water-related risk areas in Uzbekistan.

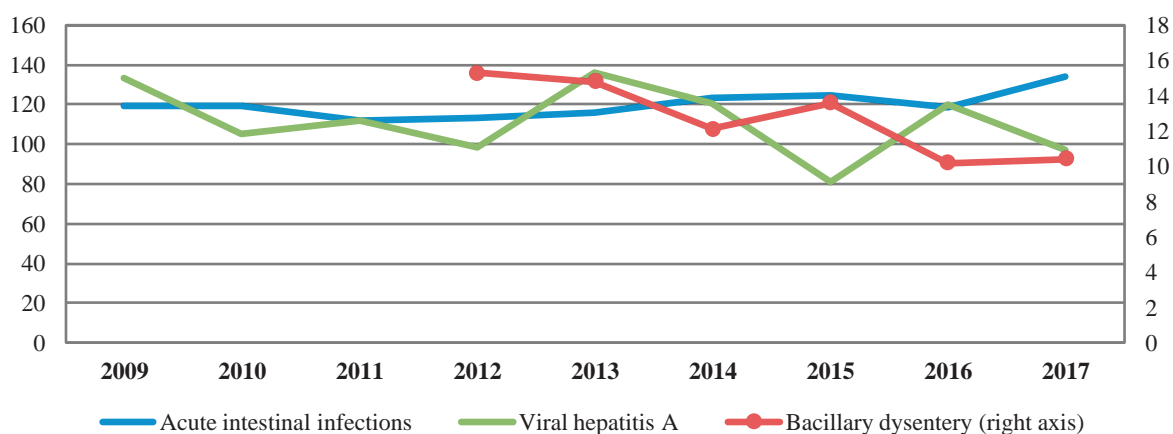
According to the Ministry of Health, in the period 1991–2015, the incidence of salmonellosis decreased by 19.2 times, acute intestinal infections by 4.5 times, bacterial dysentery by 8.8 times and viral hepatitis A by 6.6 times. Since 2015, no typhoid fever has been registered in the country. However, the incidence of acute intestinal infections, which remains high and has even tended to increase in recent years, indicates a significant burden of ill health associated with unsafe water in the country (figure 17.2). Equally, the incidence of viral hepatitis A, particularly frequent under poor sanitary and hygiene conditions, does not show a steady decrease over time. Within the country, high incidence rates have persisted in the Republic of Karakalpakstan and Navoiy and Tashkent Oblasts. Relatively low bacillary dysentery incidence levels, which tended to decrease in the period 2012–2017, may not reflect the real situation, because there is insufficient human and technical capacity necessary to detect the disease/underlying pathogen on a countrywide scale.

A study of spatial distribution and time trends of WASH-related diseases in Tashkent Oblast during the period 2011–2014 revealed four major diseases: enterobiasis, viral hepatitis A, acute intestinal infections and bacillary dysentery.<sup>34</sup> The incidence of all of them persisted during the entire four-year period; the highest was for enterobiasis, followed by acute intestinal infections and viral hepatitis A. The rates per 100,000 population in 2014 were 1,152 (enterobiasis), 174 (acute intestinal infections) and 190 (viral hepatitis A).

The country's infectious disease surveillance system is deficient concerning water-related diseases that have a high epidemic potential. With its insufficient scope and microbiological capacity, the system does not enable identification of those diseases transmitted by water and their disease burden so as to define intervention measures for their control and prevention. It is not possible (also because of the lack of databases) to identify communities impacted by water-related diseases, pollution hazards and risks in order to target resources towards those with priority needs.

The current stand of Uzbekistan vis-à-vis target 3.9 of the 2030 Agenda for Sustainable Development, in particular with regard to reducing deaths and illnesses from water contamination, is described in box 17.4. The position of the country vis-à-vis targets 6.1 and 6.2 of the 2030 Agenda is described in box 9.3.

**Figure 17.2: Incidence of water-related acute intestinal, bacillary dysentery and viral Hepatitis A infections, 2009–2017, per 100,000 population**



Source: SSESS, 2019; State Committee on Statistics (<https://gender.stat.uz/ru/osnovnye-pokazateli/zdravookhranenie/infektsionnye-bolezni>), accessed January 2019.

<sup>34</sup> Veluswami Saravanan Subramanian and others, “Spatial distribution and trends of waterborne diseases in Tashkent Province”, *Central Asian Journal of Global Health*, vol. 6, No. 1 (2017).



### Box 17.4: Target 3.9 of the 2030 Agenda for Sustainable Development (water pollution aspects)

#### Goal 3: Ensure healthy lives and promote well-being for all at all ages

#### Target 3.9: Reduce the number of deaths and illnesses as a result of water and air pollution, toxic effects of chemicals, including chemical production and burial sites

National target 3.9 is slightly differs in wording from the global target. This target covers several aspects, including air pollution (box 8.3), chemicals (box 10.1) and water pollution.

WHO estimates the mortality rate attributed to unsafe water, unsafe sanitation and lack of hygiene in Uzbekistan at 0.4 per 100,000 population in 2016. This is global/national indicator 3.9.2, showing a low level of the attributed burden in terms of mortality. The burden of disease due to diarrhoea from inadequate water, sanitation and hygiene was estimated at about 14,860 disability-adjusted life years (DALYs) in 2016 and the country ranked sixth in the WHO European Region in this respect. Poor household hygiene practices and hygiene education are a major contributing factor. Most of the diarrhoeal disease burden (about 12,950 DALYs) is in children under 5 years of age.

#### Gender aspects

In Uzbekistan, women have the main responsibility for activities related to collecting and using water for different domestic purposes, which may include water treatment to ensure its safety. In case of water shortages, unsafe drinking water, shortage of indoor water supply and poor sanitation, the activities associated with collecting and using water become a daily burden for women and girls, thus increasing the challenges of following good hygiene practices and implying a higher risk of waterborne diseases. Adding to that, the different water and sanitation needs of men and women, especially in public facilities, where access to clean water and sanitation services is lacking, prevent the use of such facilities by women and girls.

In a survey conducted in rural areas of Uzbekistan in the framework of a World Bank assessment (published in 2014), more than 20 per cent of the women interviewed expressed their dissatisfaction with the latrines situation, as the latrines were located 50–60 metres from the houses, and 500 metres from some houses – a situation that makes women feel unsafe using these latrines. According to an assessment undertaken by the ADB in 2014, a large proportion of households in Fergana Valley did not have access to basic bathrooms with piped water supply or showers, which prevented women and girls from fulfilling their bathing needs, while men, having more social freedom, could find other means of doing so, such as bathing in rivers.

UNICEF assessed equity of access to WASH in schools in six countries, including Uzbekistan, in 2011–2012. The outcomes show that, in Uzbekistan, school sanitation infrastructure provides insufficient privacy for girls of secondary school age, and menstruating girls are confronted with a disproportionate obstacle to a comfortable learning environment. Poor maintenance of sanitation facilities

in schools and lack of privacy led the girls to avoid the use of school WASH facilities, which may have deleterious health effects. Limited access to private, clean sanitation facilities at schools, coupled with limited hygiene education, presents a particular disadvantage to secondary school girls in Uzbekistan.

Despite the essential role of water, sanitation and hygiene in women's lives, their actual participation in the decision-making on these issues is not ensured through respective laws and policies in Uzbekistan. National policies and programmes on water supply and sanitation are not grounded in gender analysis.

#### *Food safety*

The incidence of acute intestinal infections, which has remained high throughout the years (figure 17.2), indicates the importance of the issue of food safety and overall sanitation and hygiene in the country.

Morbidity attributable to major notifiable zoonoses such as bovine tuberculosis, brucellosis and echinococcosis and leishmaniosis reported by Uzbekistan to the World Animal Health Information System in the period 2009–2016 shows the presence of those life-threatening diseases affecting animals and transmitted to humans by contact with infected animals or their products. Incidence of brucellosis and echinococcosis is the most common.

Similarly to water-related diseases, the country's surveillance of food-borne diseases does not enable assessment of the actual burden of ill health so as to guide preventive and control measures. A survey of the most common food-borne diseases – salmonella and campylobacter – in humans and poultry and their antimicrobial resistance in Uzbekistan was conducted by the Scientific Research Institute of Epidemiology, Microbiology and Communicable Diseases under the Ministry of Health in 2015 in the framework of the collaborative country agreement with WHO. The

survey revealed that salmonella and campylobacter are important causes of diarrhoeal disease for Uzbekistan's people, with poultry being an important source of both infections. Both human and poultry pathogens are frequently multi-resistant, which reflects the use of antibiotics in poultry production in the country.

During the period 2018–2020, the Institute is implementing a project on the development of a system for control and prevention of food-borne diseases through surveillance of salmonella and campylobacter antimicrobial resistance among humans and poultry, with the aim to inform food safety manufacturing and management policy.

No information was provided by Uzbekistan about food contamination monitoring activities. However, the national capacity has improved in the area of preparedness to respond to food-borne disease risks, through several activities in collaboration with WHO that targeted capacity-building and awareness-raising on antimicrobial resistance from a food safety perspective.

In 2014, Uzbekistan started to introduce hazard analysis and critical control points (HACCP) in the framework of a three-year programme supported by the International Finance Corporation (IFC). Enterprises should fulfil these food safety standards in order to be able to export products to European countries, the Russian Federation and Kazakhstan. Despite the implementation of several projects with the support of foreign donors, the introduction of HACCP and international food safety management and quality standards faces considerable challenges. These include the costs of implementing the standards, which are high for small enterprises, the lack of experts on the topic and challenges with regulations related to obtaining the necessary certifications.

### Nutrition

In 2015, Uzbekistan reported the achievement of the Millennium Development Goal 4 target that aimed to halve the proportion of underweight children in the period 2000–2015.

The last few years have seen improvements in some of the determinants of nutrition status. In 2016, 7 per cent of the population experienced undernourishment, compared with 10 per cent in 2008. The decreasing prevalence of undernourishment accompanied an increase in the availability of fruit and vegetables, but there has not been a big change in total calories available from non-staple foods. While the prevalence of underweight among children and adolescents (aged

5–19) was decreasing between 2000 and 2015, the prevalence of overweight and obesity in that age group was on the rise in the same period, for both sexes; the pattern was similar among adults.

The prevalence of anaemia among women of reproductive age was decreasing slowly between 2011 and 2015 and is still an issue, with a prevalence of 36 per cent in 2015. Additionally, 18 per cent of children under 5 had vitamin A deficiency in 2013. Wheat fortification has become mandatory as of 2015. The country has adequate iodine intake among the population according to the Iodine Global Network and banned non-iodized salt in 2015.

A systematic analysis of the Global Burden of Disease estimated cardiovascular mortality attributable to dietary risk factors in 51 countries of the WHO European Region and revealed that unhealthy diet (low in whole grains, nuts and seeds, unsaturated fats and omega-3, and legumes, and high in sodium) was most deadly in Uzbekistan, where there were 394 diet-related deaths per 100,000 population in 2016. Dietary risk factors are the highest risk category, which had driven the greatest number of deaths and cases of disability in the country in both 2007 and 2017.

### *Chemical safety*

#### Persistent organic pollutants

The stockpiles of obsolete or banned pesticides present a serious problem in Uzbekistan. There are 14 toxic burial sites of obsolete or banned organochlorine and organophosphate pesticides (e.g. DDT, HCCH) and other hazardous agrochemicals (e.g. butyphos, chlorophos) in the country, on a total area of 60 ha (chapter 10). The current conditions of major burial sites in the Republic of Karakalpakstan and the Bukhara, Jizzakh, Kashkadarya, Syrdarya, Samarkand, Surkhandarya, Khorezm and Navoiy Oblasts do not meet health and safety requirements and thus pose significant persistent risks to both the environment and human health. Of serious concern are the former airfields for agricultural aviation, located in certain districts of Jizzakh and Syrdarya Oblasts, and in Khorezm Oblast.

According to the State Committee on Ecology and Environmental Protection (SCEEP), persistently high levels of DDT and organochlorine pesticides were reported during the period 2013–2017 in the soil in close proximity of the above-mentioned pesticide burial sites. There are no biomonitoring activities on population exposure to persistent organic pollutants (POPs). Uzbekistan acceded to the Convention on Persistent Organic Pollutants (Stockholm Convention)



only in 2019; that is why the country has not participated in any of the WHO/UNEP-coordinated surveys on dioxins and other POPs in human breast milk in the framework of the Convention.

In 2001, a study on the levels of certain metals, organochlorine pesticides and dioxins in cord blood, maternal blood, human milk and some commonly used nutrients in the surroundings of the Aral Sea was conducted in the Republic of Karakalpakstan. Findings revealed significantly elevated levels of beta-hexachlorocyclohexane, dichlorodiphenyldichloroethylene (DDE) and dichlorodiphenyltrichloroethane (DDT), and levels of the most toxic dioxin, 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD), six times higher than those found in Western Europe and among the highest in any country in the world. These results suggest chronic, long-term environmental exposure to these compounds, with cotton defoliants being the likely origin of exposure and contaminated foodstuffs the pathway to human ingestion.

#### Heavy metals

According to SCEEP, in Tashkent Oblast, high levels of heavy metal contamination, in particular of lead and cadmium, exceeding by several times the background values/MACs, were reported during the period 2013–2017 in the soil in close proximity to major industrial facilities. A 2014 study on potential contamination of trace elements in Chadak mining area in Namangan Oblast aimed at assessing the potential risk of environmental contamination with trace elements from tailing dumps of the Chadak mine. Levels of arsenic, zinc and lead were much higher in abandoned tailings than in active tailing dumps, with values exceeding the background area concentrations. Arsenic levels were highest in the abandoned tailing dumps, greatly exceeding the eco-toxicological levels and thus presenting a considerable risk for the environment and health of the local population.

There is no information on exposure of the population to heavy metals, due to the lack of human biomonitoring. A 2014 study examined levels of lead, cadmium and mercury among children with iron-deficiency anaemia in Kazakhstan, Kyrgyzstan and Uzbekistan. The highest levels of mercury and cadmium were found in the Uzbek children.

#### Asbestos

Asbestos is still in use in Uzbekistan. Asbestos-containing products are legally available, e.g. pipes and corrugated roofing materials are produced in the

country's cement plants and also exported to other countries. Workers at the asbestos facilities undergo regular occupational medical check-ups. According to the information provided in 2019 by the Scientific Research Institute on Sanitary, Hygiene and Occupational Diseases under the Ministry of Health, asbestos-related occupational diseases are not registered as the country does not have its own mines and uses chrysotile asbestos imported from the Russian Federation and Kazakhstan.

Exposure to asbestos, including chrysotile asbestos, occurs through inhalation of fibres in the air in the working environment, ambient air in the vicinity of point sources (such as factories handling asbestos) or indoor air in buildings containing asbestos materials. Asbestos causes cancer of the lungs, larynx and ovaries, mesothelioma and asbestosis (fibrosis of the lungs). In 2017, a WHO assessment of the economic costs and benefits of banning the use and production of asbestos in the WHO European Region showed that no negative mid- or long-term economic impacts from banning asbestos are to be expected. In contrast, the mid- and long-term health and economic benefits largely outweigh the short-term transition costs. The International Labour Organization (ILO) and WHO are urging their member States to eliminate asbestos-related diseases by banning all forms of asbestos production and use.

Uzbekistan is among the countries making the greatest use of chrysotile asbestos. As at 2019, Uzbekistan has no policy on banning asbestos (chapter 16).

#### *Radiation*

Uranium tailings in Uzbekistan remain an environmental and public health risk. They are located in the Fergana Valley. Several activities conducted in the framework of different projects aim at the remediation of two legacy sites (Charkesar and Yangiabad) (chapters 6 and 10).

The Environmental Modelling for Radiation Safety (EMRAS) project of the IAEA, second phase (2009–2011), focused on environmental radiation dose assessment. Data was collected on exposure pathways, gamma dose rates and indoor and outdoor radon concentrations in mines and disposal areas near Charkesar in Uzbekistan and three other sites close to uranium tailings in Ukraine and Tajikistan. The radiation hazards in Charkesar were characterized by elevated (above background) radionuclide and radiation levels in areas close to and away from the industrial site, at the industrial site, and in water bodies.

**Photo 17: Roofing with corrugated asbestos sheets, Samarkand City**

*Photo credit: Ms. Angela Sochirca*

### *Housing*

No country-representative surveys of the indoor environment in public and residential buildings or surveys on health-related aspects of housing are conducted. The World Bank's 2016 Systematic Country Diagnostic found that many households remain vulnerable to external shocks, which are often linked to climate and disaster risks, especially in rural areas. Also, despite improvements after the 1990s, the country's power generation and distribution infrastructure remains vulnerable to weather conditions; thus, during winter, the population in the rural regions experiences regular and long electricity shortages and interruptions. In Tashkent, the power is off for one to two hours a day during winter, while in other large towns it can be off for up to six hours a day. Moreover, many of the district heating systems, originally installed in the 1950s through to the 1970s, are no longer fit for purpose and are suffering from insufficient maintenance. Housing energy efficiency is low (chapters 8 and 16).

### *Radon and lead*

In Uzbekistan, the main radiation hazards are associated with exposure to naturally occurring radioactive materials (rocks, rubble, slags, ash) used in construction, the burning of radioactive coals, and construction of industrial and residential buildings and houses on soils and rocks with high radiation levels. Radon has been classified as a human carcinogen and is associated with an increased risk of lung cancer. In Uzbekistan, there is a growing concern about the existence of a large number of buildings with radon concentrations that represent a residential health hazard.

Due to a lack of appropriate sensitivity equipment, it is difficult to determine radon concentration distribution, although mapping methods are already under way in Uzbekistan. In Charkesar, where the local population has long used uranium tailing materials for construction and insulation of their houses, the indoor radon (Rn-222) concentrations exceeded 1,000 Bq/m<sup>3</sup>, while WHO's recommended reference levels should not exceed 300 Bq/m<sup>3</sup>. High gamma dose rates were found in the local hospital and school. Adequate remediation measures are not taken

to reduce the resident population's exposure to radiation.

Decorative paint for household use has been identified as the main source of lead exposure from paints. Even at very low levels, lead has important health effects on neurological and cognitive development and can cause anaemia, increase the risk of kidney damage and impair reproductive function. Young children and pregnant women are especially vulnerable to the adverse effects of lead. According to the most recent update (October 2018) of the global report on the elimination of lead in paints by the Global Alliance to Eliminate Lead Paint, 41 countries of the WHO European Region have lead paint laws and many have enacted legally binding limits. Uzbekistan is among the countries with no data on lead in paints or its regulatory control.

#### *Noise and vibration*

The physical factors of noise and vibration are predominantly considered occupational health issues and controlled at workplaces. With existing urban planning practices locating residential areas in proximity to large industrial facilities and transport corridors, the importance of noise pollution has increased in the country. Awareness of the health effects of noise has been growing recently.

The Scientific Research Institute of Sanitation, Hygiene and Occupational Diseases under the Ministry of Health conducted a series of studies in the period 2006–2008 with the aim to assess the environmental pollution in Tashkent City by physical factors such as urban noise and the electromagnetic fields of 50 Hz industrial frequency created by high-voltage power lines, as a basis for development of environmental health measures. Health and safety requirements for electromagnetic fields of industrial frequency in residential and public buildings and residential areas have been defined, and sanitary norms and rules for residential population safety in the vicinity of high-voltage power lines have been endorsed by the Ministry of Health (SanPiN No. 0236-07). Major outcomes consist of a noise map of the road network of Tashkent City, prepared in 2007, and a mid-term forecast of noise pollution on the main transport highways in the city until 2015. Those two useful information tools are well out of date as at 2019 but there is no information on follow-up activities.

#### *Occupational health and safety*

During the period 2007–2017, occupational injuries comprised less than half of all injuries; this share

tended to decrease and caused an average of around 15,000 person-days of work-related disability per year. About 70 per cent of the cases of occupational disease during the period 2011–2018 were due to exposure to dust, 15 per cent to physical factors (noise and vibration), 12 per cent to chemicals and 3 per cent to other causes, including biological risks.

#### Gender aspects

According to the State Committee on Statistics, in 2018, 27 per cent of all male workers and 16.3 per cent of all female workers were working in conditions that did not meet sanitary and hygiene standards. Analytical reports that would add value to the data are currently lacking.

In 2019, the Government changed the approach to regulating women's employment in difficult labour conditions. While, previously, there was a list of 44 areas/occupations in which women's employment was banned, under the new approach, the ban no longer applies and a new list of a recommendatory nature will be developed to include areas/occupations that may adversely affect women's health (2019 Resolution of the President No. 4235).

#### Child and forced labour

The ILO has been monitoring the cotton harvest for child labour since 2013, through an agreement with the Uzbekistan Government, employers and trade unions. By 2014, it was already recognized that child labour on a systematic basis no longer existed in Uzbekistan, and the country was excluded from the list of 25 countries that systematically do not comply with international commitments. Child labour, which was previously a serious problem during harvest time, is no longer a major concern.

In 2015, as part of an agreement with the World Bank, the ILO began monitoring the use of forced labour during the cotton harvest. Up until 2018, ILO experts carried out 11,000 unaccompanied and unannounced interviews with cotton pickers and others involved in the harvest in all regions of the country. Ninety-three per cent of those involved in the 2018 cotton harvest worked voluntarily and the systematic recruitment of students, teachers, doctors and nurses has not been identified, although recruitment of staff from state institutions and enterprises still occurs in some places.

The country's stand vis-à-vis target 8.8 of the 2030 Agenda for Sustainable Development is described in box 17.5.



### Box 17.5: Target 8.8 of the 2030 Agenda for Sustainable Development

**Goal 8: Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all**

**Target 8.8: Protect labour rights and promote safe and secure working environments for all workers, including migrant workers, in particular women migrants, and those in precarious employment**

The wording of national target 8.8 (Protect labour rights and promote safe and secure working environments for all workers) is shorter than the global target and does not emphasize any particular vulnerable groups.

Occupational injuries are low (in the range of 0.4–0.9 injured per 1,000 workers), with some decrease since 2012. Occupational fatalities persist at 0.1 per 1,000 workers, i.e. equivalent to about one fifth of all injuries since 2012. Both fatal and non-fatal injuries are greater among males. However, data do not cover small and medium-sized enterprises and the agriculture sector.

There is no information on the proportion of enterprises that have entered into collective agreements in accordance with ILO conventions (global/national indicator 8.8.2), the reason probably being that the methodology for this indicator at the global level is still under development.

Under the Decent Work Country Programme 2016–2017, Uzbekistan has made important progress with respect to ratifying international labour standards; specifically, in 2016, the country joined the 1948 Convention concerning Freedom of Association and Protection of the Right to Organise (No. 87). Also, the Chamber of Commerce and Industry established a new training service on occupational safety and health for its member companies. In 2018, the Government launched the reform of labour inspection in order to counteract forced labour and informal agreements for work and enforce the occupational safety standards. However, the legislation still does not fully comply with the ILO standards, in particular those enabling progress in occupational health and safety, and also does not encourage enterprises to invest more in ensuring safe labour conditions for their employees.

#### *Extreme weather events*

In the last 10 years, 80 meteorological and geophysical events that constitute emergencies were recorded in the country; around 64 per cent of these were mudflows, around 33 per cent were landslides and the remainder were avalanches. There is no consolidated information about the number of people affected.

According to the Third National Communication to the UNFCCC, rising climate variability and change is expected to lead to an increase in the frequency of extreme and hazardous meteorological and hydrometeorological events. The country is and will increasingly be particularly vulnerable to floods, in particular flash floods and mudflows, and to avalanches, extreme air temperatures and heatwaves, droughts and dust storms.

#### Flash floods and mudflows

Flash floods and mudflows are most common in spring (April to May), but they also occur with destructive potential in summer. Long-term observations in Uzbekistan show that the areas in which flash floods and mudflows originate most frequently are the lowest slopes of the valleys (river canals, plains and terraces), as well as foothills and low mountain areas. Data provided by Uzhydromet show an average of 30 mudflows per year during the period 2014–2018 and an increase over the years, with most mudflows occurring in the Fergana Valley where the mudflow

hazard has a transboundary nature. Floods originating in mountain river areas of Kyrgyzstan and Tajikistan threaten foothill and lowland areas of Uzbekistan, especially the cities of Fergana and Andijan, as well as rural areas in the north-east and south-east of the valley. Climate change will increase flash floods and mudflow hazards, primarily because of more intense rainfall events and warming in winter, resulting in rainfall occurring instead of snow, which will extend the seasons of flash floods and mudflows and also high evaporation, leading to increased soil aridity in flat and foothill areas and the upper soil layer being washed away more easily.

Flooding poses multiple risks to people's health, such as heart attacks, trauma, an increase in waterborne infectious diseases, and common mental and post-traumatic stress disorders. Damp housing and damage to water and sanitation infrastructure can further reinforce the adverse effects on health. People living in the countryside face greater risks, owing to deteriorating housing and infrastructure and various vulnerabilities. According to information from Uzhydromet over the last five years, Navoiy Oblast has the greatest share of households located in mudflow hazard zones (more than 50 per cent of all households), followed by Fergana Oblast, albeit to a lesser extent (about 10 per cent of households). Four settlements are situated in the mudflow hazard zones in Tashkent Oblast, and the highest share (about 50 per cent) of technical facilities are also concentrated in those zones. Available data are limited to distribution

of households and technical facilities by administrative districts and the flood/mudflow hazard zones. Appropriate spatial resolution for population estimates and characterization of the population at risk, along with the mapping of flood hazards (by category) and flood risks, are not available to enable assessments of vulnerability, especially of the population.

#### Avalanches

Owing to intense precipitation and an increase in temperature in the mountainous areas in March and April, snow avalanche hazards occur, which threaten the lives and livelihoods of the population and disrupt economic activities. The high-risk areas are located in Tashkent, Namangan, Kashkadarya and Surkhandarya Oblasts. Despite the general trend towards a decrease in avalanches, the hazard remains high during extremely snowy winters, particularly upstream of the Akhangara River.

#### Heatwaves

Excess heat represents a serious threat for the entire population, but the elderly and small children, and people with pre-existing cardiovascular, respiratory and renal diseases, diabetes and neurological disorders, are more susceptible. Prolonged periods (at least three days) of extremely high air temperatures, called heatwaves, directly affect people's health and an increase in the daily mortality rate is the major measurable impact of a heatwave. Urban areas tend to be at greater risk due to the "urban heat island" effect.

Long-term observations of hot days during the June–August period in Tashkent City show considerable variability in the number of days of heatwaves and a steady increase throughout the years. An increase in the number of days of heatwaves is observed across the entire country, with the highest rates in the Aral Sea area, Fergana Valley and the foothills of the west Tien-Shan mountain range. The frequency of heatwaves varies across the country, with high frequency rates in the south and in desert areas, where maximum air temperatures are close to 40°C. Air temperature of 40°C and above is a severe health hazard, irrespective of its duration; it is an alert/emergency/limit value for occupational health and safety regulations. Currently, the average number of days with extreme temperatures (above 40°C) is 5–10 days per year for the country and 18–25 days for the desert area, and reaches 34 days in the south of the country.

The available information is rather limited: only the number of days, frequency rates and area distribution

by district/oblast are recorded. Thus, it is difficult to draw estimates of the population concerned or potentially affected by excess heat. Climate change projections show an increase in the number of days of extremely high air temperatures and the frequency, intensity and duration of heatwaves and, consequently, an increase in heat-related deaths.

Heat-related deaths are largely preventable. At the same time, no early warning system (EWS) based on reliable meteorological forecasting is in place in the country; if there were one, it would enable a response from the beginning of a period of high temperature (the maximum effect on mortality occurs after one or two days). No research has been conducted in the country to link long-term weather and climatic observations and health indicators to define parameters as a basis for issuing early warnings for health.

#### Droughts

The arid continental climate exposes large areas of the country to meteorological drought conditions. These have become more frequent as aridity has risen, together with the number of days with above-average temperatures and below-normal precipitation in the summer and fall seasons, particularly near the Aral Sea, due to its desiccation, but also in Navoiy, Bukhara, Kashkadarya and Surkhandarya Oblasts.

The hydrological drought depends upon the availability of water in the upper catchments of the river basins and, owing to the high degree of flow regulation, the management of reservoirs and other water infrastructure. Hence, it is largely influenced by water management within the country but also at transboundary scale. Hydrological drought has become more prevalent in the last few decades as drought years are now recorded in three out of every 10 years. The Amu Darya River basin has experienced more frequent hydrological drought with the "depth" of extremely low-water years (i.e. deviation of the mean flow in low-water years from the average) having increased by 1.5 times in the last two decades. The Republic of Karakalpakstan and Khorezm Oblast are under constant threat of drought.

A high number of days with high temperatures (above 35°C) on the background of droughts leads to considerable decrease in crop yields, particularly in the south and central areas of the country. An increase in the areas affected by drought leads to the degradation of agricultural land, causing surface and groundwater deterioration and pollution of water sources, and a greater risk of food and water shortages and malnutrition of the population. Local changes in

dietary content and seasonal micronutrient deficiencies were identified in relation to droughts in the Republic of Karakalpakstan. Drought reduces the amount of water and worsens the conditions for hygiene and food supply in rural areas, which are directly dependent on agricultural production.

Climate change is expected to heighten exposure to meteorological and hydrological drought, particularly during the summer months. In the framework of a UNDP/Uzhydromet project, a drought EWS was piloted in Kashkadarya Oblast in 2015; the necessary activities to advance it were then determined but, as of May 2019, it has not been established.

#### Dust storms

The country has major natural aerosol emission sources, such as the Karakum and Kyzylkum Deserts and their frequent dust storms, as well as the Aral Sea region where dust storms are quite a common phenomenon, particularly after denudation of a sizeable part of the sea bottom. The average annual number of days with dust storms is comparable to those in more remote deserts. The annual course of dust storm recurrences reaches a maximum peak in the warm season (April–August). The main components of solid suspended particles (aerosols) from these sources are soil and mineral particles.

Excessive exposure to dust constitutes a major health risk for many parts of the country. In particular, the retreat of the Aral Sea has exposed the former seabed to significant winds, which has led to extremely high airborne dust deposition rates and, in the Republic of Karakalpakstan, the concentration of total suspended particles (TSP) typically exceeds the maximum safe threshold by more than a factor of 2. The different composition and origins of those particles, including toxic salts containing pesticides and fertilizers from the run-off of the agricultural fields near the Sea, further exacerbate the health risks. Inhalation of salt can cause severe throat and lung problems; salt can also poison agricultural products and cause chemical damage to buildings. Winds transport sand particles for long distances, extending the geographical boundaries affected by this phenomenon, and more than 5.5 million people have become increasingly affected by the dust storms.

Climate change in Uzbekistan is being associated with an increase in the number of hot days along with an increased number of dust storm events, as well as more warm days in winter, affecting human body adaptation. The observed and projected increase in the number of warm days and associated dust storms is leading to increased incidence of respiratory disorders

in areas prone to dust storms. In winter, an increasing number of warm days is affecting the habitual physiological patterns of adaptation to abrupt seasonal changes in weather, thus increasing the prevalence of respiratory infections, particularly in children.

### **17.3 Impact from and adaptation to climate change**

The assessment conducted in the framework of the seven-country initiative of the WHO Regional Office for Europe aimed to protect health from climate change (2009–2013) reported Uzbekistan among the countries most vulnerable to climate change. Increased air temperatures and decreased precipitation in the country as a result of climate change have led to increased microbial and pathogenic pollution in water and heightened the risk of acute intestinal infections. Bacterial pollution increase in warmer temperatures is reflected in a greater number of cases of intestinal diseases during summer (e.g. bacterial dysentery increases by a factor of 3). It is not possible to estimate the impact of climate change associated with intestinal diseases, because of (i) the country's lack of capacity in communicable disease surveillance and consequent inability to record climate change-indicative water- and food-borne infections (such as cryptosporidiosis and salmonellosis) and to detect the causative microbial agent of acute intestinal infections, its source and local outbreaks, and (ii) the country's diverse deficiencies in data reporting. Also, long-term climate change increases the risk of some transmissible diseases such as leishmaniasis and malaria, by creating favourable conditions for their agents.

Furthermore, heat and heatwaves affect the incidence of cardiovascular and respiratory diseases. Lack of health information on the right spatial and time scale does not enable linkage analyses of climatic parameters and health outcomes.

Dust storms are a particular problem for Uzbekistan. Water shortages and increasing aridity caused by climate change, coupled with land degradation problems, have aggravated the desertification processes, with the major consequence of increased frequency and intensity of dust storm events. Their impacts on health cannot be assessed due to the lack of regular PM<sub>10</sub> and PM<sub>2.5</sub> air quality monitoring and analysis (chapter 8).

During the period 2012–2015, Uzbekistan was one of the countries included in the global initiative on equipping health personnel and the wider population with essential tools and knowledge to prevent detrimental effects of changing climate on health. The

initiative was jointly implemented by WHO and UNDP and co-funded by GEF. Activities piloted in the Tashkent and Syrdarya Oblasts centred on: (i) the establishment of an EWS for climate-sensitive health risks; (ii) capacity-building of the health services to respond to climate-sensitive risks and raise public awareness on self-protection measures; and (iii) disease prevention measures for climate-sensitive health outcomes and hygiene and health education to promote the use of disinfection for prevention of waterborne/acute intestinal diseases.

The Ministry of Health, in cooperation with relevant national authorities and with the support of the WHO Regional Office for Europe, prepared a climate change adaptation strategy for the health-care system in Uzbekistan. Priorities for policy actions were identified, based on the assessment of vulnerabilities, impacts and adaptation options. Measures inherent to the health sector envisaged capacity-building for risk assessment of cardiovascular and acute intestinal diseases and other climate change-related diseases, improving communicable disease surveillance, specific interventions at the local level during periods of maximum risk, climate change and health education, and enhancing public health research. Cross-sectoral measures were put forward on EWS and specific plans for preparedness and response to extreme weather events, awareness-raising on health effects of climate change among diverse target groups, setting mechanisms for intersectoral and interagency collaboration and information exchange among health, meteorological, environmental and other stakeholders. An action plan was developed for the period 2013–2016 to support implementation of the strategy. The strategy and the action plan have not been officially adopted.

#### 17.4 Legal, policy and institutional framework

##### *Legal framework*

The 2015 Law on the Sanitary-Epidemiological Well-Being of the Population sets out the general rights and obligations of persons, private entrepreneurs and legal entities on health protection and epidemiological safety. It sets out the content of population health surveillance – as a broad activity also involving health promotion, disease prevention and control measures and sanitary-epidemiological expertise. Provision of information to the public and the people's right to a safe environment are also encompassed. The Law stipulates that air and water quality and food safety and waste management activities are subject to sanitary-epidemiological monitoring and control. The Law sets out the competences and powers of central and local government authorities and, in particular, the

responsibilities, powers and organization of SSESS. Measures to deal with non-compliance focus primarily on suspension, restriction and prohibition of the activities of natural and legal entities, remedial measures aimed at minimizing the risk of non-compliance being left aside. Also, disease prevention and control measures explicitly consider immunization, vaccination and disinfection rather than action on environment-related health determinants, with the aim to reduce health risks from polluted air, contaminated water, etc. The Law also defines actions to be taken during public health emergencies.

The 2013 Law on Counteracting the Disease caused by the Human Immunodeficiency Virus (HIV infection) sets the competences of the central, regional and local authorities in combating the spread of HIV infection and provision of medical care to HIV-infected patients. It establishes legal requirements for compulsory examination and treatment of HIV-infected persons, and for social support for HIV-infected persons and health workers and employees at risk of HIV infection.

The 2013 Law on Environmental Control delineates the system of state and public measures aimed at compliance with the legal requirements on environmental protection. The Law defines the mandates and the competences of the central and local governments, including the role of the Ministry of Health, in particular on the control of environmental pollution from radioactive, chemical and biological substances and drinking water quality.

According to the 1993 Law on Water and Water Use, SSESS under the Ministry of Health is responsible for control of drinking water quality and is also part of the environmental monitoring programme, specifically, for water reservoirs, i.e. checking the sanitary-hygiene and microbiological parameters of the waters in the reservoirs and transboundary rivers.

In 2010–2011, several activities on water quality norms and standards were conducted with the technical support of ECE and WHO, with the aim to move towards harmonization of national water quality standards and norms with international standards, including approximation to EU integrated pollution prevention and control parameters. As a result, the national standards: “Drinking Water. Hygiene requirements and quality control” (Oz'DSt 950: 2011) and “Sources of centralized drinking water supply. Hygiene, technical requirements and selection rules” (Oz'DSt 951: 2011) were revised and, currently, the MAC values for most of the parameters conform to those of international standards, including WHO

drinking water quality guidelines, and the number of the controlled parameters is comparable to the EU Directives.

The 1997 Law on Quality and Safety of Food Products covers: (i) standardization; (ii) registration of foodstuffs and manufacturing equipment; (iii) certification; and (iv) surveillance and control. Standardization covers setting hygiene, sanitary, and veterinary and phytosanitary requirements for product quality, safety, processing, storage, transportation and sale. Registration of food produced and equipment manufactured in the country and imported into it is carried out by SSESS, which issues a sanitary-epidemiological certificate. Food products, technologies, equipment and tools intended for production, storage, transportation or trade are subject to certification of their compliance with the rules and regulations. SanPiN No. 0283-10 sets hygiene requirements for safe food production, while SanPiN No. 0309-14 sets sanitary-hygiene requirements for public catering facilities.

The 2010 Law on Prevention of Micronutrient Deficiencies among the Population includes measures to identify needs and secure production and consumption of enriched foods.

The 2000 Law on Radiation Safety aims at protecting human health and the environment from the effects of ionizing radiation. The amendments of 2011 introduced the concept of radioactive waste and categories of exposure to ionizing radiation and set legal mechanisms for radiation safety control, including by the public.

The 2016 edition of the Law on Protection of Workers replaced the 1993 version. The Law provides for a more modern approach to occupational safety management. Legal provisions on protection of workers from specific occupational risks or hazards are also contained in the 2000 Law on Radiation Safety and the 2013 Law on Counteracting the Disease caused by the Human Immunodeficiency Virus (HIV infection). The 2009 Law on Technical Regulation covers compulsory technical requirements for the safety of products and services.

The 1999 Law on Protection of the Population and Territory from Natural and Man-made Disasters has undergone several amendments as the Government's understanding of emergency prevention, preparedness and response has evolved. The amendments of 2010 introduced the concept of emergency and emergency warning and response and a shift from "protection" to "saving lives and preserving people's health". The 2011 Resolution of the Cabinet of Ministers No. 242

endorsed improvements to the state system of preparedness and response to emergency situations. In 2016, a joint resolution of several ministries endorsed a regulation on the provision of medical service as part of the state emergency preparedness and response system.

The 2011 Law on Restriction of Distribution and Use of Alcohol and Tobacco Products designates all public transportation as the only smoke-free places, smoking in all other public places being allowed in designated smoking areas and (or) special rooms for the use of tobacco products. The 2018 Law on Restriction of Smoking of Hookahs and Electronic Cigarettes in Public Places includes the list of public places where the smoking of such devices is prohibited and also prohibits advertising the smoking of hookahs and electronic cigarettes.

#### *Policy framework*

Recent years have seen a boost in strategic policy developments and organizational reforms. The 2017 Action Strategy on Five Priority Directions for Development for the period 2017–2021 largely coincides with the 2030 Agenda for Sustainable Development and the Sustainable Development Goals, one of the five priority areas being development of the social sphere. Policy measures focus on the health-care sector, with the aim of improving the accessibility and quality of medical and public health services and creating a healthy lifestyle for the population. The need for comprehensive measures to improve family health, maternal and child health and the health of vulnerable population groups is emphasized. With respect to environment-related determinants of health, the focus is on living conditions, in particular the provision of safe and affordable housing and improved access to utilities. Improved access to clean drinking water is also a government priority. Priority policy measures cover public transport services and infrastructure and provision of the population with reliable electric power supply and alternative heating fuel and energy resources, and with modern waste disposal and treatment facilities.

The 2018 Decree of the President No. 5590 "On complex measures on the radical improvement of the health-care system" puts forward a concept (strategy) for health system development for the period 2019–2025, setting the goals, objectives and main directions together with an action plan for the period 2019–2021. The concept has three major goals: (i) increasing life expectancy at birth through active prevention and treatment of the diseases and health conditions representing the leading causes of premature mortality



and disability; (ii) reforming health financing and organization to increase efficiency and improve access to health care; and (iii) enhancing the Ministry of Health's governance capacity. Specific objectives concern a healthy and safe environment, improvements in water supply and sanitation and healthy nutrition through sustainable mechanisms of intersectoral cooperation, and building a strong public health system through further enhancing the sanitary-epidemiological service, control of infectious and chronic diseases and compliance with the International Health Regulations (IHR). Quantitative targets are set for increased life expectancy, reduction of maternal and child mortality, premature mortality from NCDs and TB, and HIV and hepatitis morbidity. The indicators for monitoring and evaluating the progress of the implementation belong entirely to the health sector.

Although there are various policies tackling the risk factors for NCDs in the country, an integrated NCD action programme is lacking. The 2018 Resolution of the President No. 4063 "On measures to prevent non-communicable diseases, support a healthy lifestyle and increase the level of physical activity of the population" further reinforces the 2018 Decree of the President No. 5590 and endorses the establishment of a centre for the promotion of a healthy lifestyle and physical activity, under the Ministry of Health.

With regard to TB, a consolidated national strategic plan for 2016–2020 was prepared in 2015 in the framework of the National TB Control Programme. Guidelines on programmatic management of drug-resistant TB, monitoring and evaluation, infection control and childhood TB were also developed. The Ministry of Health adopted the first national guidelines on identifying and treating multidrug-resistant TB. The 2019 Resolution of the President No. 4191 focuses on measures to control the spread of TB and non-specific lung diseases in the period 2019–2021 and improving diagnosis, prevention and treatment through innovative methods while integrating the efforts of related programmes, e.g. on HIV/AIDS, maternal and child health.

The Strategic Programme for HIV infection control for the period 2013–2017 targeted reducing the spread of HIV and ensuring universal access to comprehensive HIV prevention and treatment, but there is no evaluation of the implementation. In 2018, two Presidential Resolutions (No. 3493 and No. 3800) to counter the spread of HIV were introduced. These Resolutions highlighted the way for further improving the provision of medical and social assistance in prevention, diagnosis and treatment of HIV infection to the population.

The Concept of the population's healthy nutrition for the period 2015–2020 (2015 Resolution of the Cabinet of Ministers No. 251) emphasizes the need to improve logistics for the delivery of agricultural and livestock products as well as to promote the processing of agricultural fruit and vegetables and meat and dairy products. The 2018 Decree of the President No. 5303 "On further advancing food security" focuses on the economic and legal tools to change the operation of the food market in order to improve food security. Diversification is an important element of ongoing efforts in the agricultural sector and should contribute towards a steady market of safe and affordable food in the country.

The topic of the environment and health is not yet high on the national agenda as there is no integrated policy programme on the environment and health, but it is gaining momentum. The Programme of Actions on Environmental Protection for the period 2013–2017 included measures of high relevance for public health.

With respect to climate change, the national adaptation plan is under preparation. The 2017 (I)NDC presented adaptation measures the country plans to take in the period up to 2030, including prevention of disease outbreaks and aggravation caused by climate change.

The Comprehensive Programme of Measures related to Mitigation of the Consequences of the Aral Disaster, Rehabilitation and Socio-economic Development of the Aral Sea Region for the period 2015–2018 (2015 Resolution of the Cabinet of Ministers No. 255) was an important step in improving the living conditions of the population in the region. The State Programme on Development of the Aral Sea Region for the period 2017–2021 (2017 Resolution of the President No. 2731) covers measures on increasing the availability of clean drinking water supply and sewerage systems, solid waste management, the upgrading of heating systems in Nukus and Urgench Cities and other measures.

### *Institutional framework*

#### Ministry of Health

Within the currently ongoing major institutional reform in the country, the 2018 Resolution of the President No. 4055 lays down the organizational aspects of the Ministry of Health. The Ministry carries the responsibility for realization of the state policy of protecting public health and providing health-care services. It is responsible for conducting analyses of public health status and its determinants and trends. The Ministry is mandated with ensuring prevention of diseases and promoting healthy lifestyles. The

Ministry is also entrusted with the monitoring of environmental pollution from radioactive, chemical and biological substances, the drinking water supply and the physical factors affecting ambient air quality. The Resolution initiated the establishment of a centre for the development of ICT under the Ministry, responsible for the development and maintenance of the health information systems and national health databases.

Under the Ministry, two institutes conduct applied research on the population's health and the environment. The Scientific Research Institute of Epidemiology, Microbiology and Communicable Diseases is the national centre for control and prevention of infectious and parasitic diseases. The Scientific Research Institute of Sanitary, Hygiene and Occupational Diseases conducts research on environmental and occupational health risks, child and adolescent health, toxicology of pesticides and fertilizers, and nutrition. The Institute also has a clinical department for diagnosis, treatment and clinical examination of occupational disease patients and those exposed to adverse risk factors at work.

The Main Department of the State Sanitary-Epidemiological Control under the central administration of the Ministry of Health oversees the sanitary-epidemiological system, and develops strategies aimed at combating infectious diseases and reducing the adverse environmental impacts on public health.

SSESS is the authorized state body responsible for public health protection and epidemiological safety. It comprises the Republican Centre, 14 regional centres (12 for the oblasts, 1 for the Republic of Karakalpakstan and 1 for Tashkent City) and 194 centres at the district and municipal levels. Some enterprises, such as the JSC O'zbekiston temir yo'llari (Uzbekistan Railways), the National Air Company, the National Security Service and some structural-territorial units of the Ministry of Defence and the Ministry of Interior, have their own sanitary-epidemiological centres.

The core functions of SSESS focus on: (i) epidemiological surveillance, monitoring and control of the sanitary-epidemiological situation, including sanitary-quarantine control at border checkpoints; and (ii) control for compliance with sanitary-hygiene norms and regulations by private and public entities, as well as of project documentation of industrial, commercial or other enterprises, and enforcement in the case of non-compliance.

The Republican Centre collects data on sanitary status and epidemiological safety and manages national reports on communicable and non-communicable diseases. It conducts quality control of the reports of the regional, district and municipal centres, provides technical and methodological support and serves as a training centre for them. The regional, district and municipal centres of SSESS undertake the core functions in their jurisdictions and report to the Republican Centre. Their structures and organization vary with the size of the population served, but all have two distinct sections (of sanitation and epidemiology), reflecting the dichotomy throughout the entire sanitary-epidemiological system. The sanitation division is responsible for controlling the sanitary problems related to common industrial hazards: hygiene, radiation, food safety and sanitary-epidemiological expertise and certification. Traditionally, the sanitation division covers a broad range of issues, such as environmental and occupational matters, but also child and adolescent health and communal hygiene, food hygiene and nutrition and related activities. The epidemiology division is responsible for preventing and combating communicable diseases. Care related to TB, oncology, mental health, drug addiction, endocrinology and occupational conditions classified as "socially significant and hazardous" is provided by the state health institutions.

Typically, seven types of laboratories, i.e. bacteriology, virology, parasitology, "especially dangerous infectious diseases", sanitary-hygiene, toxicology and radiology, complement and support health-related activities. Throughout the country, SSESS has 208 laboratories of parasitology, 205 of bacteriology, 157 of sanitation and hygiene, 15 of virology, 15 of especially dangerous infectious diseases and 15 of radiology. There are also 13 toxicology units. These laboratories differ considerably in diagnostic capabilities at different administrative levels, due to outdated or absent equipment and infrastructure, reagents and consumables. Erratic supply of water and electricity with no adequate backup is another problem many of the laboratories face, in addition to a lack of required human resources. Uzbekistan benefits from participation in the WHO programme on strengthening laboratory capacity in quality management systems and critical infrastructure in the framework of the ongoing initiative "Better Labs for Better Health", launched in 2013.

SSESS carries out surveillance of communicable diseases, including those mediated by the environment, i.e. water- and food-borne diseases, as well as food poisoning, but the national system is at a

very basic stage. It is prone to underreporting as there are no clearly specified data flows and service delivery models in place to integrate all sources of water- and food-borne disease data, including primary health-care centres and hospitals. Deficiencies in laboratory testing of clinical and environmental (e.g. water, food) samples include the fact that reportable diseases are included in the broader class of acute intestinal infections, without detection of the causative agent and its source. Because of the difficulty in determining the background disease incidence rate, the majority of local outbreaks remain undetected, as do their sources. Vertical data flows (from district to centre) and mainly paper-based reporting, as well as the lack of early reporting tools, fundamentally limit the reliability and timeliness of the surveillance system.

SSESS, through its territorial bodies, conducts monitoring and control of drinking water quality and the safety of centralized water supply systems and wells in rural areas, in particular the level of chlorine at the end-use point and microbiological tests, including pathogen testing, as per SanPiN No. 0182-05 and No. 0256-08. Coverage in rural areas is poor, due to the lack of technical capacity, laboratory equipment and transportation. SSESS also conducts control and inspection of the water reservoirs as per SanPiN No. 0255-08. Reports contain aggregated data on the incidence of infectious diseases and compliance rates. There is a lack of capacity and knowledge in environmental health risk assessment and management throughout the country.

SSESS is authorized to issue permits for the building and establishment of new food processing enterprises, new markets and retail outlets and to implement control and inspection activities according to SanPiNs, standards and guidelines.

The responsibility for occupational health lies with the health sector. The Ministry of Health is responsible for the establishment of sanitary rules, norms and hygiene standards on priority hazards and risk factors in the working environment, for certification of occupational diseases and for periodic medical examinations.

#### State Committee on Ecology and Environmental Protection

SCEEP – the central executive body responsible for environmental policy implementation – has recently undergone institutional reforms (chapter 1). The 2017 Decree of the President No. 5024 strengthened the Department of Coordination and Monitoring of Environmental Pollution, as well as the Fund for Ecology, Environmental Protection and Waste Management, with the purposeful allocation of funds,

including for activities related to environmental monitoring. Pursuant to the 2018 Resolution of the President No. 3956 to improve the efficiency of sanitary cleaning enterprises, the Republican Association of Specialized Sanitary Cleaning Enterprises was set out under SCEEP (chapter 10).

#### Ministry of Emergencies

The Ministry of Emergencies is responsible for coordinating the activities of all authorities involved in preparedness and response to emergencies. The 2017 Decree of the President No. 5066 “On radical improvement of the effectiveness of the system for preparedness and response to emergencies” initiated consolidation of institutional resources under the Ministry. In particular, Uzhydromet (later transferred to the Cabinet of Ministers) and its structural subdivisions, the State Inspectorate for Control and Supervision over the Technical State and Safety of Large and Particularly Important Water Management Infrastructure (later transferred to the Ministry of Water Management), the Early Reporting Service and the Republican Network of Seismological Monitoring of Seismic Hazard and Prognostic Monitoring of the Institute of Seismology, were transmitted to the Ministry of Emergencies. The Republican Centre of Seismological Monitoring was established. The scope of the competences of the strengthened Ministry was extended towards early identification of emergency risks and hazards for early warning and prevention of their occurrence.

Uzhydromet comprises the Centre and 13 territorial administrations (12 for each oblast and one for the Republic of Karakalpakstan) with main responsibilities for the systematic hydrometeorological observations and monitoring of pollution in ambient air, surface waters and soil, as well as the onset and development of extreme weather events (chapter 4). However, the analytical capacity of the institution is limited: the reports on the state of the environment for air, soil and surface waters lack analytical findings. Uzhydromet conducts weather forecasting, providing alerts on extreme weather events or pollution episodes. Also lacking are EWSs to make use of the hydrometeorological observations. Uzhydromet is responsible for maintaining national hydrometeorological and climatic databases and coordinates all the work on the development and maintenance of the State Water Cadastre. In cooperation with the Ministry of Emergencies and representatives of local administrations, it conducts annual two-cycle surveys of areas in high flood hazard zones and issues prescriptions for protection of the residential and technical facilities located in those zones.

### Others

The Ministry of Employment and Labour Relations is responsible for promoting employment and ensuring and guaranteeing occupational safety. In 2018, an integrated State Labour Inspectorate was established under the Ministry with responsibilities for control and enforcement of the labour-related legislation by all individuals and legal entities, whether public or private. Responsibilities for ensuring healthy and safe conditions at the workplace lie with the employer. Enterprises with 51 or more employees that belong to occupational risk categories 15–20 have their own occupational safety and health services, which control compliance with the rules and regulations on occupational safety and health.

Two authorities are mandated on nuclear and radiation safety issues: the State Committee on Industrial Safety (Goskomprombez) (chapter 15) and Agency for the Development of Nuclear Energy (Uzatom) (chapter 12).

### Data and information on health

There is no integrated information system on population health, its determinants and trends in the country. Despite efforts to modify it, the current data collection system is fragmented. There are several data collection systems in the country, which function independently from each other without clear coordination. For example, SSESS, though part of the Ministry of Health, operates a separate data collection system. Public health facilities are thus required to report data to different data-collecting agencies. Inter-agency coordination is weak, and efforts on integration and interoperability are lacking. Several problems undermine the quality and validity of the data, e.g. the paper-based administrative data and patient records, manual system of pooling data, lack of clear lines of responsibility, lack of quality control/quality assurance and insufficient capacity and skills required for uniform diagnosis and case registration and reporting throughout the country.

Data on non-communicable and communicable diseases for a list of predefined indicators are collected by the territorial units of the Ministry of Health, then pooled at the district and regional levels and reported to the State Committee of Statistics. The indicators are mostly from the mortality and morbidity domains and health-care resources and provision; there is a huge data and information gap on health determinants and risk factors, including environmental factors. Though the range of indicators for which data are collected is immense, information relevant to the health of

children and other vulnerable population groups is very limited.

Reports focus heavily on quantitative indicators in the form of statistical tables, without assessments of health status, major health risk factors and their relative importance and time trends. They are prepared mostly in paper format, which shows their limited use, i.e. only for planning and control at the national and oblast levels with little attention paid to the lower level. This hampers the possibility to conduct linkage analyses between health surveillance data and other data (microbiological, meteorological, etc.) for timely detection of extreme events of high health significance at local scale.

Health statistics are published by the State Committee on Statistics, both as printed publications and online. In recent years, there has been substantial progress made towards modernization and the introduction of international standards in the national statistical system, including in the health sector. Examples are the use of the WHO definition of childbirth as of 2014, the use of standardized death rates by main cause of death using WHO methodology, and production of occupational injury and fatality statistics. The health-related statistics published on the website are mostly presented in the format of statistical tables, without analysis. As of 2019, the State Committee on Statistics also publishes the Sustainable Development Goal 3 indicators for the past 10 years (<http://nsdg.stat.uz/>).

In general, the lack of staff with analytical and statistical capacity is clearly felt on several levels. Capacity and knowledge in health impact and risk assessments in public health in general, as well as in environmental health in particular, are lacking. There is no capacity and knowledge to apply geographical and analytical epidemiological methods to support information and evidence for disease control and prevention in the country.

### Coordination

As at mid-2019, several state bodies, i.e. SCEEP, Uzhydromet, the Ministry of Water Management, the State Committee on Land Resources, Geodesy, Cartography and State Cadastre, the State Committee on Geology and Mineral Resources and the Ministry of Health, are mandated with environmental monitoring responsibilities. SCEEP is the coordinating body and its Centre for Specialized Analytical Control on Environmental Protection is the main body for integration of the information, monitoring and analysis of the environmental situation and trends, as well as the preparation of reports and communication with the population (chapter 4).

However, there are shortcomings that fail to enable a modern, integrated, yet distributed environmental monitoring system. These shortcomings are: (i) the lack of mechanisms of intersectoral integration and operational exchange of data and information; (ii) the lack of fully fledged and clearly structured countrywide information on the state of the environment within adequate time frames; and (iii) the lack of mechanisms for dissemination of environmental information among the population.

There is no evidence about specific mechanisms or structures for coordinated activities on the environment and public health throughout the entire policy process. Working groups composed of experts as well as sector-specific policymakers are often established for the development of policy documents and legal acts during the policy preparation phase. Partnerships among different sectors in the implementation of policy and legislation on the environment and public health at the operational level are often limited to donor- or project-driven cases such as those related to climate change and health. Sustainable mechanisms for coordination of activities within, for example, the environmental monitoring and emergency preparedness and response systems, are not sufficiently regulated. This results in each authority managing its own network without coordination and cooperation, as well as without data

exchange. Highly hierarchical vertical organization of the sectors makes effective local intersectoral collaboration on environment and health issues difficult.

### 17.5 Participation in international agreements and processes

#### *Protocol on Water and Health*

The accession process is ongoing in Uzbekistan for the country to become a party to the 1999 ECE/WHO Regional Office for Europe Protocol on Water and Health (chapter 6).

#### *Framework Convention on Tobacco Control*

The country's stand vis-à-vis target 3.a of the 2030 Agenda for Sustainable Development is described in box 17.6.

#### *International Health Regulations*

The revised International Health Regulations (IHR), adopted in 2005 and in force since 2007, provide an international legal framework to ensure global health security. The current stand of Uzbekistan vis-à-vis target 3.d of the 2030 Agenda for Sustainable Development is described in box 17.7.

**3** GOOD HEALTH AND WELL-BEING



#### Box 17.6: Target 3.a of the 2030 Agenda for Sustainable Development

**Goal 3: Ensure healthy lives and promote well-being for all at all ages**

**Target 3.a: Strengthen the implementation of the World Health Organization Framework Convention on Tobacco Control in all countries, as appropriate**

Uzbekistan's national target 3.a is identical to the global target.

Age-standardized prevalence of current tobacco use (smoking) among persons aged 15 years and older (indicator 3.a.1) was estimated at 24.7 per cent for males and 1.3 per cent for females in 2016 (WHO Global Health Observatory data repository). It has declined since 2000, particularly for males; in 2000, it was 30.9 per cent for males.

In 2012, Uzbekistan acceded to the WHO Framework Convention on Tobacco Control. Similarly to many other countries, the country adopted a voluntary global target to reduce the use of tobacco by 30 per cent by 2025 and create zones free from smoking tobacco products. The Concept of the population's healthy nutrition for the period 2015–2020 and its action plan also aim to decrease the consumption of tobacco.

Progress in decreasing tobacco use is nevertheless slow. As at March 2019, the implementation of tobacco control policies in Uzbekistan is limited to achieving a decrease in tobacco consumption. WHO projects that 11 per cent of the population (22 per cent of males and 1 per cent of females) will be smokers in 2025 if the tobacco control interventions remain as they are.




### Box 17.7: Target 3.d of the 2030 Agenda for Sustainable Development

#### Goal 3: Ensure healthy lives and promote well-being for all at all ages

#### Target 3.d: Strengthen the capacity of all countries, in particular developing countries, for early warning, risk reduction and management of national and global health risks

Uzbekistan's national target 3.d is to ensure implementation of the International Health Regulations and preparedness for emergency public health interventions.

The country average of 13 IHR core capacity scores (global indicator 3.d.1) was 83 in 2014 (the WHO Regional average score was 79 in 2017). The indicator is based on self-reporting by the State party; data have to be submitted biannually. However, the country has not organized a joint evaluation of IHR implementation since 2015.

The 2015 Resolution of the Cabinet of Ministers No. 220 mandated the Ministry of Health as the National Coordinator for IHR implementation in cooperation with 17 governmental authorities and public companies. The Resolution requests the Ministry of Emergencies to approve a notification and decision-making scheme for the assessment and notification of events that constitute a potential public health emergency of international concern. The entry points to Uzbekistan in the event of a complicated epidemic situation and occurrence of threats of a radiological, biological and chemical nature at the cross-border regions of neighbouring countries were established. Ensuring the availability of trained personnel at sanitary control entry points and at veterinary quarantine points presents challenges, as does provision of the necessary technical equipment and first aid medicines and equipment to victims in the event of emergency situations at the points. According to the Government, no events that constitute a public health emergency of international concern have occurred in the country since 2010, when there was a refugee crisis.

#### *Selected International Labour Organization conventions*

Uzbekistan is not a party to the following ILO conventions: Convention concerning the Protection of Workers against Ionising Radiations, 1960 (No. 115); Convention on Protection against Hazards from Benzene, 1971 (No. 136); Convention concerning Prevention and Control of Occupational Hazards caused by Carcinogenic Substances and Agents, 1974 (No. 139); Convention concerning the Protection of Workers against Occupational Hazards in the Working Environment Due to Air Pollution, Noise and Vibration, 1977 (No. 148); Convention concerning Occupational Safety and Health and the Working Environment, 1981 (No. 155); Convention concerning Occupational Health Services, 1985 (No. 161); Convention concerning Safety in the Use of Asbestos, 1986 (No. 162); and Convention concerning Safety in the use of Chemicals at Work, 1990 (No. 170).

#### *Strategic Approach to International Chemicals Management*

Uzbekistan joined the Strategic Approach to International Chemicals Management (SAICM) in 2010 (chapter 6).

#### *Climate change*

Uzbekistan is a party to the United Nations Framework Convention on Climate Change (chapter 7). In 2018, using the Carbon Reduction Benefits on Health (CaRBonH) calculation tool, the WHO Regional Office for Europe estimated the potential

environmental and health benefits to be achieved through reductions in domestic carbon emissions, specifically via the (I)NDC pledges submitted by the Member States of the WHO European Region to the UNFCCC. It estimated that reduction in air pollutant emissions in the year 2030 and beyond would result in averting 807 deaths and gaining 12,710 life-years in Uzbekistan annually. Improved air quality would result in averted morbidity in the country, in particular in 18,625 fewer incidences of asthma attack and 4,200 cases of chronic bronchitis in children, and in 242,125 fewer lost work days yearly.

Overall, the country has placed greater emphasis on emergency preparedness and prevention than on building disaster resilience, or on post-emergency response and recovery. The lack of effective early warning systems at the community and other levels, together with the insufficient capacity to monitor and prevent natural hazards and weak communication at the national and regional levels, present challenges.

### **17.6 Assessment, conclusions and recommendations**

#### *Assessment*

Improvement of the health of the population, achieved within the past decade, has led to increased life expectancy. However, progress has been slow, and Uzbekistan still faces public health challenges. Those include a high burden of disease through the rising prevalence of NCDs, in particular, cardiovascular diseases leading to premature mortality and disability. At the same time, the incidence and prevalence of

some communicable diseases, such as TB and, in particular, multidrug-resistant TB, remain a concern. Health risks related to behavioural and metabolic factors are persisting, showing that public health interventions have not been effective enough.

Environment-related health risks and hazards remain high: population exposure to air pollution far exceeds WHO Air Quality Guidelines and is leading to a burden of disease and mortality that is among the highest in the WHO European Region. Access to safe water and sanitation remains a major problem, with important regional disparities, yet the burden of waterborne diseases is not adequately recognized, owing to deficiencies in infectious disease surveillance. Changing and variable climate is creating greater potential for such hazardous environmental exposures. A significant number of people live in areas prone to flash floods, mudflows, heatwaves, droughts and dust storms, which are becoming more frequent and intense, resulting in damage and loss and excessive rates of morbidity and mortality. Though limited, the available data suggest that the consequences of and losses due to disasters do not seem to be decreasing and this is also because of the weak disaster resilience.

Several policies and regulations were put in place that aimed at reducing environmental pressures from economic sectors and improving environmental quality, but health aspects have not been sufficiently considered. On the other hand, the health sector is being primarily focused on health care, while prevention measures are limited to immunization. A lack of reliable information on public health and its determinants and trends undermines consideration of health aspects during policy formulation and monitoring and evaluation of policy effects on health during implementation.

As at mid-2019, the country is in the middle of implementation of a profound economic and societal reform and has started the implementation of the 2030 Agenda for Sustainable Development. The coincidence of the two processes creates a good opportunity to advance the integration of health and environmental aspects in other sectors' policies and regulations.

### *Conclusions and recommendations*

#### Strengthening systematic generation of health information and its use

Reliable information on public health status, including its determinants and trends, is essential to guide health-care providers, managers and decision-makers,

as well as to make policy in other sectors accountable concerning the health of the population. Despite efforts to modify it, the current data collection system is fragmented, with different data collection mechanisms operating independently from each other without clear coordination. Several aspects of data collection and reporting mechanisms that are in place undermine the validity and reliability of data. Information on population health, also in the context of indicators for Sustainable Development Goal 3, is becoming increasingly available on the State Committee on Statistics website, but primarily in the format of numerical tables; analytical information on health, including the environment and health dimension, is lacking.

#### Recommendation 17.1:

*The Ministry of Health, in cooperation with relevant governmental authorities, should:*

- (a) *Introduce legally specified data flows to streamline data reporting by public health authorities, avoiding duplication while ensuring the involvement of all relevant institutions, e.g. primary health-care centres, hospitals and health-care institutions;*
- (b) *Ensure training of all involved in data reporting in uniform diagnosis and case registration;*
- (c) *Establish a publicly available information system that includes data and indicators and some simple indicator-based analysis and reporting tools at the national, oblast and district levels.*

#### Advancing disease surveillance

The current surveillance system is prone to underreporting as organizational arrangements on disease data reporting from all relevant health-care institutions to SSESS are not in place. Surveillance of infectious diseases, in particular those related to the environment, such as water- and food-borne diseases, as well as human zoonoses, has severe limitations. Detection of pathogens in water supply and food products is rather limited and so is the associated analytical capacity.

#### Recommendation 17.2:

*The Ministry of Health, in cooperation with relevant governmental authorities, should:*

- (a) *Enhance infectious disease surveillance through the introduction of integrated service delivery;*
- (b) *Strengthen laboratory networks through cost-effective upgrading of selected laboratories with enhanced capabilities to diagnose a range*

*of infectious diseases and to detect bacterial, viral and parasite pathogens in water and food samples;*

- (c) *Improve capacity and skills to apply analytical epidemiological and public health methods to both infectious and non-communicable diseases, and other relevant data at the national and subnational levels, in order to prepare periodic reports aiming at informing health managers and as a basis for disease control and prevention.*

#### Maternal and child health

The health of mothers and children is one of the high priorities for the Government, and the country has made considerable efforts to improve the quality and coverage of health-care services. As a result, maternal, neonatal and under-5 mortality rates have decreased, but they are still among the highest in the WHO European Region, making targets 3.1 and 3.2 of the 2030 Agenda for Sustainable Development of crucial importance to Uzbekistan. The unequal distribution of health-care services throughout the country and the lack of qualified health professionals in remote rural areas present important challenges for mothers' and children's health. Under current health-care financing, differences in income among population groups results in further health inequalities.

A large proportion of the burden of disease due to diarrhoea and respiratory and other infections falls on children, most of it being preventable, but available data is insufficient for setting effective and targeted measures throughout the country.

#### Recommendation 17.3:

*The Ministry of Health, in cooperation with relevant governmental authorities, should:*

- (a) *Improve access to quality preventive and therapeutic and diagnostic services for pregnant women and newborns throughout the country, in particular in remote rural areas, and introduce changes in health-care financing to ensure equitable access to health services;*
- (b) *Improve collection of data and information on maternal and child health and its determinants to meet the needs of health-care providers and those engaged in health protection.*

#### Advancing population access to safe drinking water and adequate sanitation

Uzbekistan has made substantial investments in upgrading its water supply and sanitation services in the last decade, but provision of safe water and

sanitation remains a problem with important regional disparities. The burden of diarrhoeal diseases due to a lack of adequate water, sanitation and hygiene is one of the highest in the WHO European Region. The level of connection to sewerage systems is low, creating an unsanitary environment and posing a risk of groundwater contamination.

Present policies focus on large infrastructure and do not allow small-scale services to be addressed effectively. Implementation of water safety plans for small-scale water supplies throughout the country, targeted measures to improve hygiene and sanitation conditions and strengthening hygiene education would provide cost-effective solutions and health benefits by reducing water-related risks in the entire population.

#### Recommendation 17.4:

*The Cabinet of Ministers should:*

- (a) *Ensure that the modernization of water treatment systems and distribution networks and connection to sewerage systems is governed by achieving maximum reduction of population health risks from water contamination;*
- (b) *Ensure progressive implementation of the WHO water safety plans for small-scale water supplies across the country;*
- (c) *Ensure that gender analysis is taken into account in the development of measures on access to water and sanitation;*
- (d) *Support development and implementation of programmes to improve hygiene and sanitary conditions in the countryside and reinforce hygiene education.*

*See Recommendation 9.2.*

#### Climate change and extreme weather events

Climate change in Uzbekistan is bringing excessive cardiovascular and respiratory morbidity and mortality and acute intestinal infections, and its impacts are growing. The flash floods and mudflows, heatwaves, dust storms and droughts to which the country is and will be particularly vulnerable pose multiple risks to people's health. Yet there are no systematic policy actions in place targeted to protecting people's health from climate change and to reducing life-threatening risks from natural disasters.

The capacity of the health sector to assess climate change-related health status and trends as a basis for planning preventive measures and monitoring their effects and effectiveness is insufficient. The country is advancing in emergency preparedness and response



systems but lacks practical experience in disaster risk reduction and prevention, building disaster resilience and instituting effective early warning systems at the community and other levels.

Recommendation 17.5:

*The Cabinet of Ministers should:*

- (a) *Ensure integration of concrete actions on protecting the population's health from climate change, along with mechanisms for monitoring their effects and effectiveness in future national strategic documents on climate change adaptation and mitigation and on disaster risk reduction;*
- (b) *Ensure development and sustainable operation of early warning systems, in particular for flash floods, mudflows and heatwaves;*
- (c) *Support the broader dissemination and use of climatic and meteorological information and data among various stakeholders at the central and local levels, to advance preparedness for and resilience to extreme weather events;*
- (d) *Reinforce the building of climate-resilient water supply and sanitation services following the 2010 Guidance on Water Supply and Sanitation in Extreme Weather Events developed under the Protocol on Water and Health;*
- (e) *Ensure capacity-building on climate change, the environment and health among the relevant authorities.*

*See Recommendation 7.1.*

Intersectoral collaboration on the environment and health

Sustainable improvements in health and the environment can be achieved only through coordinated policy actions across sectors. Specific mechanisms to ensure this are currently not present in the country.

Recommendation 17.6:

*The Cabinet of Ministers should endorse mechanisms for intersectoral collaboration on the environment and health and the necessary organizational arrangements, and allocate financial resources for these purposes.*

*See Recommendation 1.4.*