

# Uzbekistan – Ecosystems, Biodiversity, History and Culture



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## Ecosystems and Biodiversity of Uzbekistan

### *Geographical Location*

Uzbekistan is located in Central Asia and according to natural and geographical conditions, represents one of the most favorable regions in Central Asia. The Republic of Uzbekistan is located at the interfluvium of the Amudarya and Syrdarya rivers and covers an area of 448,900 thousand km<sup>2</sup>. The territory of Uzbekistan is a combination of plain and mountain terrain, but most is occupied by plains (about 80%), the largest of which is the Turan Plain. In the east and northeast of the country are the spurs of Tien Shan and the Pamirs, with the highest point of

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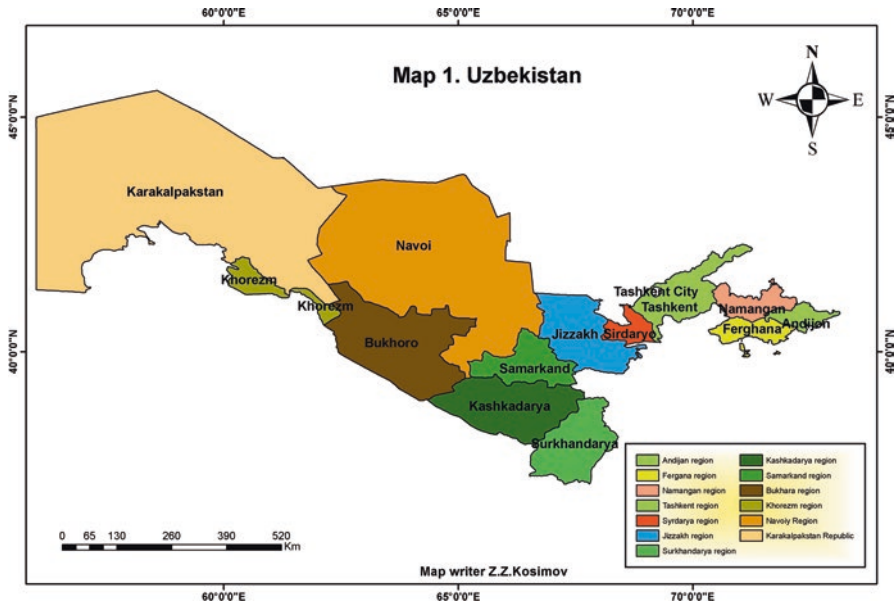
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**Map 1** Uzbekistan

the country (4643 m). In the north of the central part of Uzbekistan there is one of the largest deserts in the world – Kyzylkum, in the west – Karakum.

Mountains and foothills make up about 20% of the republic's territory. In the east, mid-mountain and high-mountain relief forms prevail: the slopes or endings of the Western Tien Shan ridges (Ugam, Pskem, Chatkal, Kuramf ridges) and Pamir-Alay (Zeravshan, Turkestan, Gissars, Kugitangtau ridges), to the south and west, gradually decline and pass into the plains. Quite large depressions stretch between the mountains: Kashkadarya, Surkhandarya, Zeravshan, Samarkand. The largest intermountain depression is the Ferghana basin (valley) – 370 km long, and 190 km wide. It is framed on three sides by mountain ranges and only open from the west. On the border with Afghanistan is the vast Amudarya depression. of the republic from west to east is 1425 km, from north to south – 930 km (Map 1).

The territory in the north and northeast borders with Kazakhstan, in the east and southeast with Kyrgyzstan and Tajikistan, in the west with Turkmenistan, in the south with Afghanistan. The total length of the state border is 6221 km. The length of the borders with Afghanistan is 137 km, with Kazakhstan 2203 km, with Kyrgyzstan 1099 km, with Tajikistan 1161 km, and with Turkmenistan 1621 km.

The largest rivers of both Uzbekistan and the whole of Central Asia are Amudarya and Syrdarya. The total length of Amudarya is 1437 km, Syrdarya 2137 km. However, Syrdarya is inferior to it in aquifer content.

## *Climate of Uzbekistan*

The climate of Uzbekistan is sharply continental. It is expressed in sharp amplitudes of daytime and night, summer and winter temperatures. The nature is arid, there is little atmospheric precipitation, and relative humidity is low. The duration of the day in summer is about 15 hours, in winter at least nine. The coldest month is January when the temperature in the north drops to  $-8^{\circ}\text{C}$  and below. The absolute minimum winter temperatures are  $-35$ – $38^{\circ}\text{C}$ . The hottest month is July, and in the mountainous regions July – August. The average temperature in this period on the plains and foothills is  $25$ – $30^{\circ}\text{C}$ , and in the south (Termez and Sherabad) it reaches  $41$ – $42^{\circ}\text{C}$ . The maximum air temperature was recorded in the city of Termez with  $50^{\circ}\text{C}$  (July 1944). In most of the territory, the annual rainfall does not exceed  $200$ – $300$  millimeters. There are few lakes on the territory of the republic, the largest of them is Aral Sea. The Aral Sea began to dry out in the 60 s, when water from rivers flowing into it began to be used for irrigation of fields. In 1989, the Aral Sea broke up into two isolated reservoirs – the Small Aral Sea in Kazakhstan and the Big Aral Sea in Uzbekistan. By the beginning of the 2000s the absolute water level in the sea decreased to an elevation of 31 m, which is 22 m below the initial level observed in the late 1950s. In 2001, the South (Big) Aral Sea was divided into western and eastern parts. In 2003, the surface area of the Aral Sea was about a quarter of the original, and the volume of water was about 10%. Today, on the site of the once deep sea, a new sand-salt-marsh desert Aralkum is formed, the area of which is already  $38,000\text{ km}^2$ . Uzbekistan, together with the other Central Asian States and with the support of the international community, is taking urgent measures to reduce the negative consequences of this environmental disaster.

About 20% of Uzbekistan's area is made up of human-transformed landscapes. As a result of economic development in such regions of Uzbekistan as the Ferghana Valley, the valleys of Zeravshan, Kashkadarya, Surkhandarya, Khorezm and Tashkent oasis, the Golodnaya Steppe, natural ecosystems were almost completely replaced by anthropogenic landscapes. Flora and vegetation cover of many regions are severely degraded. The range and number of many plant species decreased significantly; many species were on the verge of extinction. An analysis of the current state of ecosystems and biological diversity in Uzbekistan and existing trends shows that the country continues to reduce biological diversity, mainly as a result of degradation and destruction of habitats and overexploitation of bioresources. A characteristic feature of the ecosystems of Uzbekistan is their increased fragility; the western part of the country is located in the zone of the Aral ecological crisis. The ever-increasing anthropogenic impact on nature has caused significant changes in indigenous plant communities in all regions of the Republic. The current state of vegetation is characterized by rarefaction, low biomass productivity, a significant reduction in forest area, a wide distribution of secondary communities and adventitious, weed plant species. The highly vulnerable and highly anthropogenic component of vegetation is represented by all types of natural forests in Uzbekistan. Uzbekistan belongs to low-forest countries, the forest area covered in 1990 was 7.2% of the total land area, and as of 2013 it is about three million hectares or 6.7%

of the territory of the Republic. A sharp deterioration in the state of forests occurred in the 1970–1980s. During this period, about 150,000 ha of forest land were seized from the state forest fund for the needs of agriculture, and many of the best forests were transferred to agricultural development. Due to climate change and various anthropogenic impacts, the degradation of tree and bush vegetation on the lands of the forest fund has begun to develop intensively. Despite the efforts made, to date it has not been possible to restore the level of forest cover of the 1960s. The Red Book of Uzbekistan (2019) includes 184 species of animals, of which 77 species of invertebrates, 18 species of fish, 16 species of reptiles, 48 species of birds and 25 species of mammals, as well as 313 species of vascular plants and 3 species of fungi.

The most important role in preserving the biological diversity of Uzbekistan, according to employees of the State Committee for Natural Resources, is played by a network of protected natural areas (PNO). The PNO system of Uzbekistan includes 8 state reserves, 1 Lower Amudarya State Biosphere Reserve, 2 national natural parks, 9 state reserves and one republican center for breeding rare species of animals – the Dzheyran eco-center (Figs. 1, 2, 3, 4, and 5).

**Fig. 1** Surkhandarya region, Baisun district.  
(Photo A.N.Khujanov)



**Fig. 2** Kashkadarya region, Yakkabog district,  
Gissar State reservation.  
(Photo A.N.Khujanov)



**Fig. 3** Kashkadarya region, Yakkabog district, Gissar reservation. (Photo A.N.Khujanov)



**Fig. 4** Tashkent region, Bustonlik district, Chatakal range, Charvak reservoir. (Photo O.K.Khojimatov)



**Fig. 5** Surkhandarya region, Sariosiyo district, Sangardak waterfall. (Photo A.N.Khujanov)





## ***Natural Resources of Uzbekistan***

The natural resources of the Republic are rich and diverse. Depending on the use of minerals in the economy and their composition, they are divided into metal, non-metallic, fuel and energy, raw materials for building materials. On the territory of the Republic, more than 2700 deposits of a variety of minerals have been identified. These deposits include 100 types of minerals, more than half of which are involved in production. The total mineral resource potential of the country is estimated at 3.3 trillion dollars. The country is developing the richest deposits of non-ferrous, noble and rare metals, organic fuel, many types of building materials. Hydrocarbon deposits are considered promising for production in an area of 60%. Kashkadarya and Bukhara regions are large areas of natural gas. In terms of geological coal reserves, Uzbekistan ranks second in Central Asia. Three large coal deposits are known – Angren, Shargun, Baisun. In the Angren deposit, which is the most significant, brown coal is mined in an open-pit manner. The republic occupies a leading place not only in the CIS, but also in the world in the confirmed reserves of uranium, copper, gold, natural gas, tungsten, phosphorites, potassium salts, kaolin. Fourth in the world is the Republic in terms of gold reserves and the first in terms of per capita. In Uzbekistan, 40 deposits of precious metals were explored, 20 deposits of marble, 15 deposits of granite and gabbro were identified. Most of these deposits are unique and largest within the Euro-Asian zone. The reserves of phosphorites, potash and stone salts are significant in the Republic. A variety of soil cover is formed in arid desert conditions. The main zonal type of soils are gray earth. The Republic is rich in groundwater, which is used not only in water supply, but also for irrigation and watering of pastures. Mineral water reserves are significant. Hydrogen sulfide, iodine-bearing, radon, weakly mineralized alkaline thermal waters were identified. There are few forest resources in Uzbekistan, the area of the forest fund is 5.2 million hectares, which is only 2% of the country's area.

## **Biodiversity of Uzbekistan and Its Global Value**

### ***Flora and Vegetation***

The nature of Uzbekistan is a combination of plain and mountain terrain. The plains are located in the southwest and northwest and consist of the Ustyurt plateau, the Amudarya delta and the Kyzylkum desert. In the central and southwestern part of this desert there are rather large mountain hills. Mountains and foothills, occupying about a third of the territory of the republic, are located in the east and southeast, where they connect with the powerful mountain formations of Kyrgyzstan and Tajikistan. The highest point of the mountains of the republic is 4643 m.

Uzbekistan belongs geographically to Central Asia, whose plant and animal world is diverse due to the fact that weather and climatic conditions are

heterogeneous throughout the territory. The plant world of Uzbekistan has about 4400 species of plants, at least 20% of which are endemic of Uzbekistan. The basis of the animal world of Uzbekistan is 732 species of wild vertebrates and about 14,900 species of invertebrates (among them 109 species of mammals, 468 species of birds, 60 species of reptiles, 3 species of amphibians, 92 species of fish, about 11,000 species of insects, 223 mollusks, 61 species of ringworms, 1179 species of round and 533 species of flatworms, 850 species of protozoa. The territory of Uzbekistan is mountains, plains, foothills, steppes and deserts. And since the climatic conditions in these natural zones are different, they are different plant and animal worlds. The vegetation and wildlife of deserts, surprisingly, is rich and diverse. It is especially diverse in the territory of sandy deserts. Deserts revive in the spring, while the rest of the year weather conditions are not very favorable to the plant and animal world. Many plants are found here – ephemera, which end their annual cycle in a very short period of time. Camels, saigas, various rodents, lizards, geckos, turtles live in the deserts. Here there are snakes, the bite of which is deadly – this is the Central Asian cobra and epha. In the mountains and foothills of the plant world there are many herbs, cereals, almonds and pistachios also grow here. In the mountains there are many birds of prey, you can find mammals. The snow leopard, listed in the red book of the republic and distinguished by its special beauty, also lives here. Most of Uzbekistan's plants, which are not found anywhere else in the world, grow in the mountains. The plains are rich in both plant and animal life. There are no harsh conditions for survival, such as in mountains or deserts. The plant world is reviving already in February, with the advent of spring. On the plains in Uzbekistan, many fruit trees, melons, grain crops and one of the most famous plants in this region are grown – cotton. Thanks to the hot summer without precipitation, cotton grown in Uzbekistan is of special quality. Uzbekistan has many reserves and reserves, the total area of which is more than 5% of the republic area. The territory of Uzbekistan is one of the centers of origin of many plants that are part of the modern flora among them there are many species – wild relatives of cultivated plants, which man grows as food, medicinal, ornamental, technical, etc. Many of these plants occupy a large place in his life – apple, walnut, barley, spicy, oilseeds, onions, carrots, pistachios and many others – more than 50 species in total.

Among the rather extensive list of wild relatives of cultivated plants of Uzbekistan there are species that occupy a significant place in human nutrition. These include *Malus domestica* (Suckow) Borkh., five almond species *Amygdalus* sp., *Juglans regia* L., *Pistacia vera* L., *Allium pskemense* B. Fedtsch., *Hordeum spontaneum* K. Koch. Of particular interest is the presence of wild relatives of cultivated plants, which are of great importance in the work to create new and improve existing economic and valuable varieties of plants. These are species: *Diospyros lotus* L., *Ficus carica* L., *Juglans regia* L., *Malus domestica* (Suckow) Borkh., *Prunus amygdalus* Batsch, *Prunus bucharica* (Korsh.) Hand.-Mazz., *Punica granatum* L., *Pyrus turcomanica* Maleev, *Vitis vinifera* L., *Ziziphus jujuba* Mill.

N.I. Vavilov and M.G. Popov consider the most likely center of origin of cultivated varieties of some plants, in particular the genera *Malus* L., *Pyrus* L., *Ficus* L., *Morus* L. and other fruit plants of mountain and foothill regions of Uzbekistan

(Tashkent, Kashkadarya and Surkhandarya regions). This hypothesis is confirmed by the presence of the above species in these areas.

Spicy and aromatic plants are widely used by the local population and very appreciated. This includes *Elwendia* Boiss., *Berberis* L., *Ziziphora* L., *Origanum* L., *Mediasia* Pimenov, *Mentha* L. In general, botanical diversity, and especially wild relatives of cultivated plants, are a powerful potential resource for meeting the needs of the economy, which will help achieve sustainable development of society as a whole.

## *The Flora of Uzbekistan*

The flora of Uzbekistan has studied since the mid nineteenth century and is likely the best known in Central Asia. First assessments were mainly published by botanists affiliated with the Russian Academy of Sciences in St. Petersburg starting in the 1840, and the first synopsis of the flora of Central Asia was published starting 1906 (Fedtschenko and Fedtschenko 1906–1916). The University of Turkestan, established in 1920, now the National University of Uzbekistan, took the lead on floristic and vegetation studies both in Uzbekistan and Central Asia especially during Soviet occupation (1922–1991).

The ‘Flora of Uzbekistan’ (Kudryashev 1941; Vvedensky 1953–1962) provided the first detailed treatment of vascular plants of the country, including descriptions of 3663 species. The most recent treatment of vascular plants of Uzbekistan is the ‘Conspectus Florae Asiae Mediae’ (Adylov 1983, 1987; Adylov and Zuckerwanik 1993; Bondarenko and Nabiev 1972; Kamelin et al. 1981; Kovalevskaya 1968–1971; Nabiev 1986; Pakhomova 1974–1976). Since then, generic delimitations have however been updated, and many species new to science have been described, e.g., over 100 new species and three new genera (*Kamelinia* F.O. Khass., I.I. Malzev, *Autumnalia* Pimenov, *Kuramosciadium* Pimenov et al.; all belonging to Apiaceae) have been found, and distribution data improved (Khassanov 2015).

## *Vegetation Zonation*

The first overviews on the vegetation of Uzbekistan were published by Korovin (1934, 1941, 1961–1962), Babushkin and Kogai (1971), Granitov and Babushkin (1971–1973), and Maylun (1982), and expanded by Rachkovskaya et al. (2003). The phytogeographical zonation of Central Asia was described quite early (Abolin 1929; Korovin 1941) and further detailed by Kamelin (1973, 1979, 1990, 2012). Detailed phytogeographical descriptions of Uzbekistan were published by Tojibaev (2010, 2013).

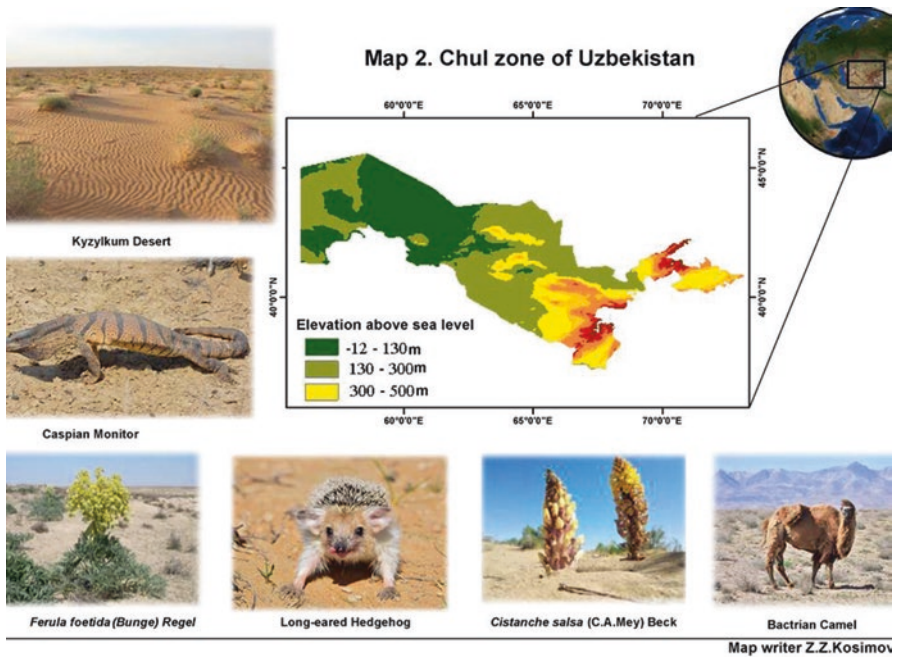
The vegetation of Uzbekistan can be grouped into four major ecosystems in different altitudinal zones (Belolipov et al. 2013). These zones form belts directly



correlated to an increase in precipitation and elevation. With increasing precipitation along the altitudinal gradient water is no longer a limiting factor above 2500 m. Diverse soil conditions, in combination with other environmental factors, lead to a great diversity of vegetation, reflected in the vernacular names “Chul” (arid plain, desert), “Adyr” (foothills), “Tau” (mountains), and “Yailau” (alpine zone) (Zakirov 1947).

The Chul zone (arid plain, desert) consists of the plains of Uzbekistan (Turan) up to 450–600 m, with a dry period of 3–6 months. The climate of the Chul is continental and characterized by a low precipitation of about 70–200 mm per year and humidity levels dropping as low as 1–2%, with a dry period from May to October. Summer temperatures can reach 45 °C whandle winter temperatures often drop to freezing. This zone is occupied mainly by the desert forests (*Haloxylon aphyllum*, *H. persicum*) and *Artemisia* spp. communities (*A. turanica*, *A. diffusa*) as well as perennial species of *Salsola*. The Chul zone displays four soil types: salty Chul, sandy Chul, gypsum (stony) Chul, and clay Chul. Parts of the salty Chul support no plant life, but zones Areas with lower salt content are dominated by *Artemisia halophila* and Chenopodiaceae including *Halocnemum strobilaceum*, *Halostachys caspica*, *Haloxylon aphyllum*, *Salicornia herbacea*, *Salsola dendroides*, *Suaeda dendroides* and *S. microphylla* (Map 2; Figs. 6, 7, and 8).

The sandy Chul is dominated by *Acanthophyllum korolkowi*, *Ammodendron conollyi*, *Astragalus villosissima*, *Calligonum aphyllum*, *Convolvulus hamadae*, *Ephedra strobilacea*, *Ferula foetida*, *Salsola arbuscula* and *S. richteri*. The gypsum



Map 2 Chul zone landscapes and characteristic species

**Fig. 6** Chul zone, Khorezm region, Karakum desert. (Photo N. Yu.Beshko)



**Fig. 7** Chul zone, Bukhara region, Kizil-Kum desert. (Photo N. Yu.Beshko)



**Fig. 8** Chul zone, saline soils, Karakalpakstan, Kizil-Kum desert. (Photo N. Yu.Beshko)



Chul, mostly found in the hills of the southwestern and central Kyzylkum desert is characterized by *Artemisia* associations, especially *Artemisia diffusa* (less commonly *A. ferganensis*) with *Aellenia subaphylla*, *Anabasis eriopoda*, *Anabasis turkestanica*, *Calligonum junceum*, *Convolvulus hamadae*, *Nanophyton erinaceum*, *Reaumuria turkestanica* and *Salsola arbuscula*.

**Fig. 9** Tugai vegetation, near to Amudarya River, Khorezm region. (Photo O.K.Khojimatov)



**Fig. 10** Dalverzin tugai, Tashkent region. (Photo O.K.Khojimatov)

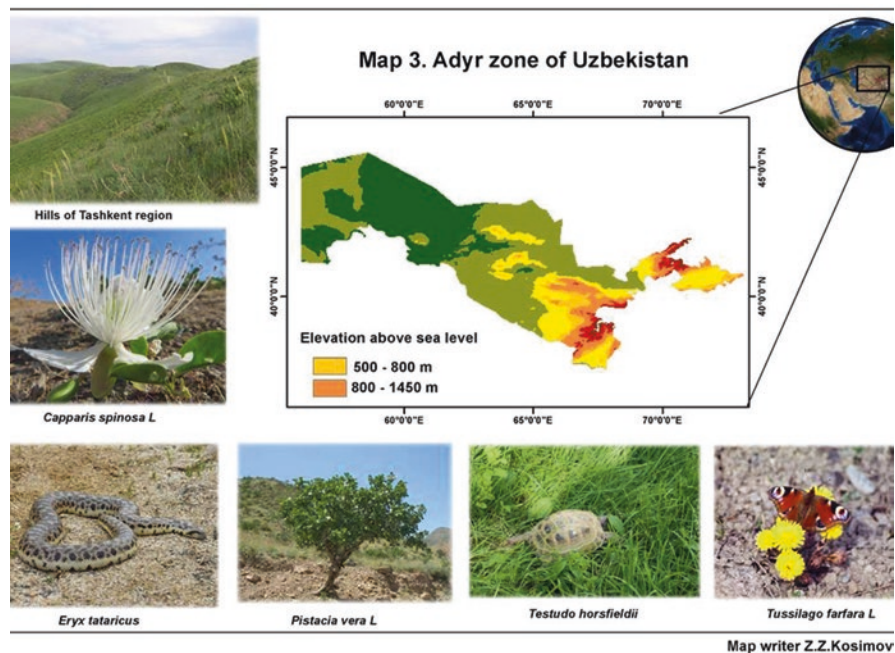


Where river valleys cut into the zone the increased humidity facilitates the development of mesophytic communities locally called “Tugai” (Figs. 9 and 10). Common species in these communities are *Alhagi persarum*, *Apocynum scabrum*, *Asparagus persicus*, *Clematis orientalis*, *Elaeagnus orientalis*, *Erianthus purpurascens*, *Glycyrrhiza glabra*, *Halimodendron halodendron*, *Hippophae rhamnoides*, *Karelinia caspia*, *Limonium otolepis*, *Lycium ruthenicum*, *Phragmites communis*, *Populus diversifolia* and *P. pruinosa*, and *Tamarix* spp.

The Adyr zone (lowlands and foothills) is a broad belt at elevations of around 500–1500 m in all mountains of Central Asia between the xerothermic Chul (desert) and the mesothermic Tau (mountain region). The soils of the Adyr zone contain less salt and more humus than the Chul soils and can be classified as sierozem. Bedrock is often found exposed on the surface. The annual precipitation ranges from 250–400 mm, rarely up to 500 mm. The mean monthly temperature for July is 25 °C 3–4 °C lower than in the Chul and 5–6 °C higher than in the Tau. The dry season lasts from June to September. Due to its location the Adyr zone is exposed to the influence of both the hot desert along its lower edge, and the cooling effects of the mountains on its upper edge, allowing to divide the Adyr into subzones: the lower Adyr with rolling relief and the upper Adyr with broken relief. This zone is

characterized by the ephemeroïd vegetation with *Carex pachystylis* and *Poa bulbosa*, dry forb steppes (*Eremurus* spp., *Hordeum bulbosum*, *Inula macrophylla*, *Phlomis* spp., *Phlomoïdes* spp *Tulipa* spp., *Verbascum songoricum*), and shrub communities (*Berberis* spp. *Cerasus* spp, *Lonicera* spp., *Rosa* spp). Typical species found in the lower Adyr area are *Amygdalus spinosissima*, *Artemisia sogdiana*, *Carex pachystylis*, *Mediasia macrophylla*, *Phlomis thapsoides*, *Pistacia vera* and *Psoralea drupacea*. At altitudes of 1200–1500 m in the upper Adyr zone, *Acanthophyllum gypsophiloides*, *Agropyron trichophorum*, *Astragalus eximius*, *Bunium persicum*, *Centaurea squarrosa*, *Cousinia pulchella*, *Onobrychis* spp., *Phlomis salicifolia* and *P. olgae*, *Potentilla soongarica*, *Scabiosa songarica* and *Ziziphora pamiroalaica* become dominant (Map 3, Figs. 11 and 12).

The Tau zone (mid-mountain zone) is a broad belt at an elevation of around 1500–2800 m, with brown soils. Precipitation in this zone exceeds 500 mm per year, with a dry season from July to September. The mean monthly temperature in July is 19 °C. The Tau zone is an important area for growing cereals and fabaceous crops, for hay, and as pastures. It is characterized by juniper forests (*Juniperus seravschanica*, *J. semiglobosa*, *J. turkestanica*) with small areas of deciduous forests with *Acer semenovii*, *A. turkestanica*, *Betula tianschanica*, *Crataegus pontica*, *C. turkestanica* *Juglans regia*, *Malus sieversii*, *Prunus sogdiana*, *Sorbus persica*, *S. tianschanica*, *Ziziphus jujuba*. The dominating wild and cultivated species (e.g., *Crataegus* spp., *Juglans regia*, *Malus* spp., *Prunus* spp.) provide the local



**Map 3** Adyr zone landscapes and characteristic species



**Fig. 11** Adir zone, Poppy fields, Bakhmal district, Jizzakh region. (Photo A.N.Khujanov)



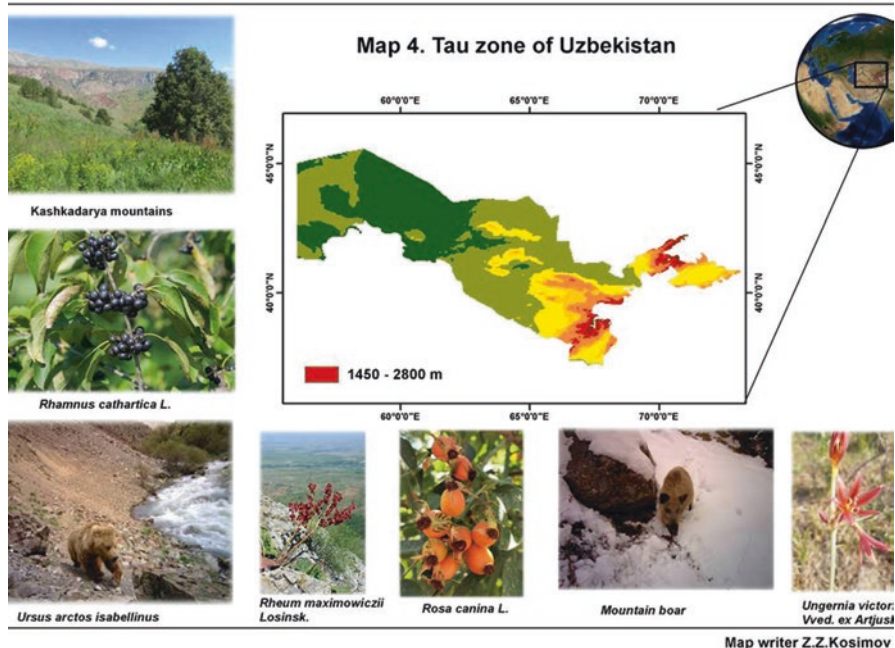
**Fig. 12** Adir zone, Kitob district, Kashkadarya region. (Photo Z.Z.Kosimov)



population with fuel, building materials, and food. Common species of shrubs are *Berberis oblona*, *Cerasus tianshanica*, *Ephedra equisetina*, *Lonicera microphylla*, *Rosa kokanica* and *Spiraea hypericifolia* (Map 4, Figs. 13 and 14).

The Yailau zone (high-altitude, subalpine to alpine zone) extends from 2800 to around 4600 m. The soils are mostly light brown meadow-steppe types. Summer is short and warm, with sharp differences between day and night temperatures, with daytime temperature reaching up to 25 °C, dropping to 0 °C at night. In the winter the temperature may drop to –40 °C. Precipitation varies from 400 to more than 600 mm per year. The Yailau is mostly utilized as the main summer pasture. While Karakul sheep graze mainly in the Chul, Merinos and fat-tailed breeds of sheep (including the Gissar breed) are pastured mainly in the Yailau. Agriculture is limited by the low temperatures. This zone is covered by tall grass meadows (*Aconogonon coriarium*, *A. hissaricum*, *Alopecurus* spp., *Ferula tenuisecta*, *Geranium regelii*, *Lagotis korolkowii*, *Polygonum bucharicum*, *P. hissaricum*, *Prangos pabularia*) and





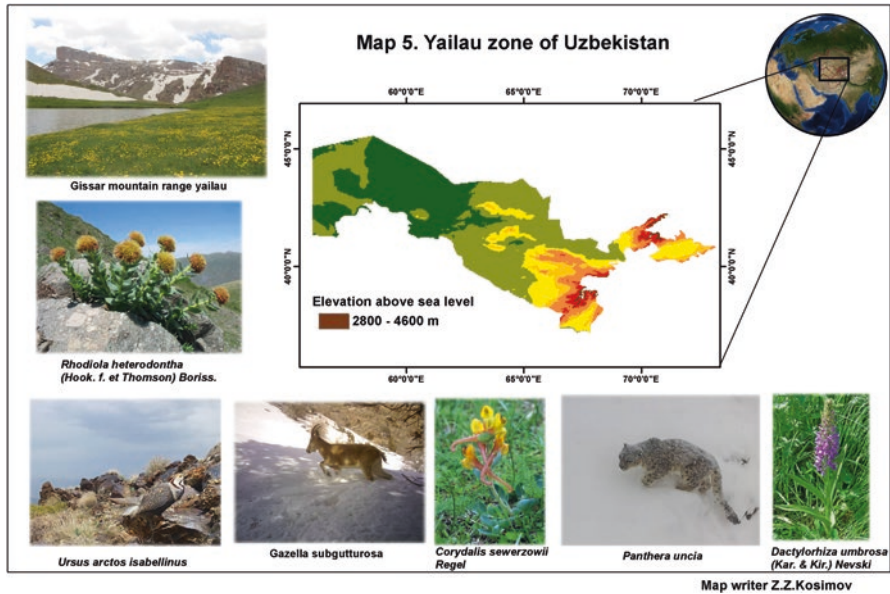
**Map 4** Tau zone landscapes and characteristic species

**Fig. 13** Tau zone, Juniperus belt, Tashkent region, Bustonlik district, Chatkal range. (Photo O.K.Khojimatov)



communities of spiny cushion-shaped plants (*Acantholimon* spp., *Astragalus* spp., *Gentiana* spp., *Oxytropis* spp., *Onobrychis echidna*, *Potentilla* spp., *Ranunculus* spp.), as well as alpine steppes (*Festuca valesiaca*, *Puccinellia subspicata*). High altitude meadows also contain *Alopecurus* spp., *Festuca* spp., *Poa alpina* and *Phleum alpinum*, and sedges such as *Carex* spp. and *Kobresia* spp. are also characteristic of the upper Yailau zone (Map 5, Figs. 15 and 16).

**Fig. 14** Tau zone, Juniperus belt, Surkhandarya region, Baisun district, Gissar range. (Photo A.N.Khujanov)



**Map 5** Yailau zone landscapes and characteristic species

Due to human activities many of the natural areas of the planet are being disturbed or destroyed. Conservation of natural environments and resources are of great importance for the future of mankind and the conservation of Uzbekistan’s natural resources is no exception. (Belolipov et al. 2013; Sennikov et al. 2016; Tojibaev et al. 2017; Khojimatov 2008, 2021a, b).

**Fig. 15** Yailau zone,  
Highlands of Gissar range.  
(Photo O.K.Khojimatov)



**Fig. 16** Yailau zone,  
Highlands of Baisun,  
Gissar range. (Photo  
A.N.Khujanov)



## The Peoples of Uzbekistan and Their Traditions

### *Population*

Uzbekistan is a multinational state. Dozens of nationalities and nationalities live here, including residents of the Central Asian region: Uzbeks, Karakalpaks, Tajiks, Turkmens, Kazakhs, Kyrgyz, Uighurs, Dungans; Western and Eastern Slavs: Russians, Ukrainians, Belarusians, Poles; numerous diasporas in Uzbekistan are Koreans, Iranians, Armenians, Georgians, Azerbaijanis, Tatars, Bashkirs, Germans, Jews, Lithuanians, Greeks, Turks and many other nationalities (Figs. 17, 18, 19, and 20).

The ethnic diversity of the population of Uzbekistan is due to various historical events. Many representatives of the indigenous peoples of the Union republics of the USSR were evacuated to Uzbekistan during World War II (Russians, Tatars, Armenians, Belarusians, Ukrainians, Germans, Jews, etc.). Representatives of



**Fig. 17** Greeting the young bride, Ferghana region. (Photo D.A.Akhunbabaev)



**Fig. 18** Wedding ceremony in Karakalpakstan. (Photo G.J.Abdiniyazova)



**Fig. 19** Traditional game – Kupkari, Jizzakh region. (Photo N.Yu. Beshko)



**Fig. 20** Days of Korean Culture at the Korean Cultural Center, Tashkent. (Photo V.V.Pak)



individual nations were deported from places of permanent residence during the years of Stalin's repressions (Koreans, Crimean Tatars, Chechens, and others). And in peacetime, active migration took place, especially for young people who took part in large-scale construction and projects to raise and develop new lands, subsequently remaining in inhabited places.

Uzbekistan is the most populous state in Central Asia and ranks third among the CIS countries in terms of population, second only to Russia and Ukraine. The population of Uzbekistan exceeds 35 million people (as of October 1, 2021). About 80% of the modern population of Uzbekistan are Uzbeks, over 10% are representatives of other peoples of Central Asia (4.5% are Tajiks, 2.5% are Kazakhs, 2% are Karakalpaks, 1% are Kyrgyz, as well as Turkmen and others.). One of the largest ethnic minorities remains the Russian and other Slavic peoples (10%). Employment: 44% in agriculture, 20% in industry, 36% in services. The State language of Uzbekistan and the language of interethnic communication is Uzbek. However, most of the population can also speak Russian. In some areas, such as Samarkand, Bukhara, the population speaks Tajik.

### *National Art*

Components of the plant and animal world have found their application in the decorative and applied art of Uzbekistan. From plants, natural pigments are obtained, used both in architecture and in weaving, up to carpet weaving. Wood is also used in architecture, in the manufacture of furniture, crafts, small plastic and musical instruments. From the horns and bones of animals cut unusually beautiful, at the same time strong knife handles, figurines, various accessories. The decorative and applied art of Uzbekistan developed from ancient times, leaving a legacy of unique products of famous and nameless masters, striking with a wealth of artistic fantasy, filigree, and perfection of forms. In Uzbekistan, for centuries, peculiar centers and schools of folk-art crafts were formed. Each region has its own direction. Chust



(Namangan) is widely known for its tubes and knives, Rishtan (Ferghana) – azure ceramics, ancient Margilan – a rainbow overflowing atlas, ikat, adras, sacred Bukhara – golden art. The creations of Ferghana, Samarkand, Bukhara, Khiva, and other masters have long been famous far beyond the homeland and continue to arouse interest among lovers of the beautiful from all over the world. Various schools of embroidery susane and ceramics, tubes of a variety of types and destinations, national chick knives for each occasion, silk and woolen carpets, silk and minting – wonderful works, for many centuries now, created by the hands of local masters and craftsmen, constitute a unique exotic of Uzbekistan (Figs. 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, and 31).

**Fig. 21** Hand-made production of carpets using natural dyes. (Photo S. Muradov)



**Fig. 22** Manual production of carpets using natural dyes. (Photo S. Muradov)



**Fig. 23** Suzane maker, Iskhakov S.M., Hasti Imom, Tashkent. (Photo O.K.Khojimatov)



**Fig. 24** Carpet weaving in Karakalpakstan. (Photo G.J.Abdiniyazova)



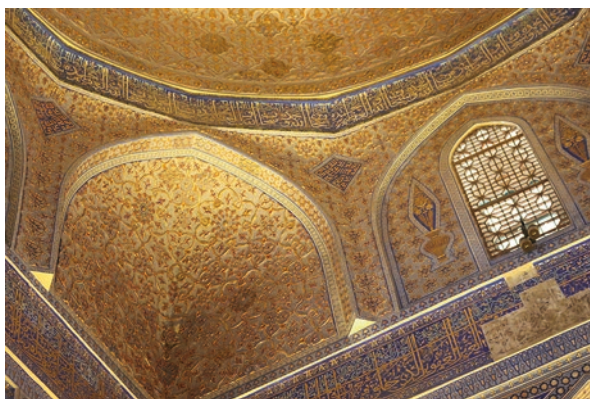
**Fig. 25** Work with walnut wood, cabinet maker Azlarov A.A., Hasti Imom, Tashkent. (Photo O.K.Khojimatov)



**Fig. 26** Works of art in the national style. (Photo O.K.Khojimatov)



**Fig. 27** Fragment of stucco molding of the inside of the dome of the Gur-Emir mausoleum. Samarkand, fifteenth century. (Photo Z.S.Bagirova)



**Fig. 28** Ichan Kala Fortress Wall. Khiva, sixteenth century. (Photo O.K.Khojimatov)



**Fig. 29** Ensemble Registan. Samarkand, fifteenth century. (Photo O.K.Khojimatov)



**Fig. 30** Fragment of the painting of the inner part of the Tillya-Kari madrassa, Registan. Samarkand, fifteenth century. (Photo Z.S.Bagirova)



**Fig. 31** Architectural complex Ichan Kala. Khiva, sixteenth century. (Photo N.Yu.Beshko)



## A Brief History of Ethnobiology in Uzbekistan

The folk medicines in Middle Asia have a long history, which began many centuries ago, but the most notable period was in the tenth to eleventh centuries. The existence of the Great Silk Road, which covered most of the Eurasian mainland with caravan paths, contributed to the development of not only trade relations, but also gave a significant impetus to the cultural and scientific exchange of knowledge. The information received was further disseminated and improved, which significantly enriched knowledge on the use of biological species in medicine.

Many scientists tried to explore the secrets of folk medicines; among them, Abu Raihon Beruni (973–1048) and Abu Ali ibn Sino (Avicenna) (980–1037) did a great contribution in herbal medicines.

Beruni (Abu Raihon Muhammad ibn Ahmad Al Beruniy) was born in Khorazm in Kiyat city in 973. He wrote more than 150 works devoted to almost all branches of knowledge of that time. Some works (Chronology, India, Geodesy, Canon Masuda) are published in translation into Russian, Uzbek and Western European languages and are available to a wide range of readers. Among Beruni's works, the last work "Kitab as Saidana fi-t-tibb" (abbreviated "Saidana") in terms of volume and content is a valuable source on the history of medicinal science in the medieval East. This work of Beruni differs from other works devoted to pharmacognosy, even from Avicenna's second book, The Canon of Medical Science, because it focuses not on the properties and effects of drugs, but on their definition, since in the medical literature of that time there were more foreign-language names of drugs that were not known to all doctors. He cited in work about 4500 names of plants, animals, minerals and other products obtained from them, in different languages of the peoples of the East of that time. Of the 1116 paragraphs given in the book, 901 plant species are devoted to medicinal herbs, 104 to animal products, 124 to minerals. However, the appendix contains information about 116 plants. Currently, of the plants reported by Beruni, 135 species are growing in the territory of Uzbekistan as wild, 89 species are as cultivated plants. Among them, 56 plant species are used in modern medicine and 114 in folk medicine (Tayjanov et al. 2021).

Avicenna (Abu Ali Hussin bin Abdallah ibn Hasan ibn Ali ibn Sina) was born in 980 in the village of Afshana, present day Bukhara region. He is one of the outstanding encyclopedist scholars of the medieval East, who made a huge contribution to the history of world science and culture. His scientific heritage includes a variety of industries: philosophy, medicine, astronomy, mathematics, physics, poetry, music. In his autobiography, he writes "I didn't sleep all night, I didn't rest from morning till night, and I didn't do anything but mental work." The results of such work were reflected in his creative activity as a medical scientist. He lived and worked in many cities in Bukhara, Gurganj, Nishapur, Hamadan, Jurjan. As the ruler of Hamadan, he spent 9 years as a treating physician and vizier. In Hamadan, he began to write the "Book of Healing" (Kitob al-Shifa), then the first book with 5 volumes, "The Canon of Medical Science", which he finished all volumes in 1020. Numerous wanderings, continuous hard work exhausted the health of Avicenna. He died in 1037 in



Hamadan. Avicenna's contribution to the development of medicine was especially significant, amounting to more than 55 books, of which 31 were written by Ibn Sina. The "Canon" ("Kitab al-Kanun fi-t-tib") – the main medical work of Avicenna is a genuine medical encyclopedia. For many centuries, this work of Avicenna served as the main medical guide of many countries, including in the East. The author himself divided the "Canon" into five books. The second book of the Canon is an encyclopedia of medicines. More than 800 medicinal agents of vegetable, mineral, and animal origin are described. It combines the experiments of medicine of ancient Rome, Greece, India, Iran and Central Asia. Of the 810 drugs listed in the second book of Canon, 515 are medicinal plants (and their agents), 125 products of animal origin, 85 minerals. In addition to higher plants, it contains lichens (*Leconora*, *Roccellia*, *Usnea*) and fungi (*Morchella*, *Fomitopsis*, *Tuber*). Avicenna divides drugs into simple and complex ones. Simple consists of one plant (or resources), complex numbers from 4–6 to 10–15 items. Means are consisting of 60–80 plants and means of animal and mineral origin. In addition to drugs prepared by hands, he used the medicine of other authors, such as Barmacius (composition of 5 plants), Antil (7 plants), Andromachus (9 plants), Aristotle (25 plants), Mithridates (57 plant species) (Tayjanov et al. 2021).

## **Diversity of Medicinal Plants, Fungi and Animals Use in Uzbekistan**

Current state of plant resources of Uzbekistan, trends, and problems. The vegetation cover of Uzbekistan is represented by unique reserves of raw materials and the richest gene pool of plants; therefore, the conservation and rational use of biodiversity is of extremely important environmental, economic and social importance.

## **Useful Wild Plants of the Flora of Uzbekistan**

Currently, a little more than 100 species of medicinal plants are used in medical practice, which is about 2.5% of the total number of species of the flora of Uzbekistan, although at least 1157 species of plants that have found their application in the medical practice of the peoples of Central Asia and neighboring countries grow on the territory of the republic. Unfortunately, valuable information about the use of plants in folk medicine and other aspects of their use in everyday life is lost due to the aging of carriers and custodians of unique information. Therefore, the collection of available information on the use of medicinal plants, its analysis and systematization, as well as the identification of new sources of biologically active substances, are an important link in the development and implementation of effective natural medicines. Every year, about 80 species of wild medicinal plants are

**Table 1** Important useful plant groups of Uzbekistan

Use categories	Important useful plant families	Number of species
Food	<i>Rosaceae, Amaryllidaceae, Juglandaceae, Rhamnaceae, Apiaceae, Polygonaceae</i>	350
Fodder	<i>Poaceae, Fabaceae, Amaranthaceae, Asteraceae</i>	1700
Medicinal	<i>Ranunculaceae, Lamiaceae, Rosaceae, Boraginaceae, Apiaceae, Asteraceae, Nitrariaceae</i> и др.	1157
Essential oils	<i>Asteraceae, Acoraceae, Lamiaceae, Apiaceae, Rosaceae, Cupressaceae, Geraniaceae, Iridaceae</i>	650
Alkaloid bearing	<i>Amaranthaceae, Solanaceae, Ephedraceae, Ranunculaceae, Berberidaceae, Papaveraceae, Euphorbiaceae</i>	200
Dye plants	<i>Malvaceae, Papaveraceae, Asteraceae</i>	150
Decorative	<i>Liliaceae, Asphodelaceae, Iridaceae, Amaryllidaceae, Rosaceae, Asteraceae</i>	270
Aromatic plants	<i>Lamiaceae, Apiaceae, Berberidaceae, Cuprissaceae, Asteraceae</i>	200
Saponin bearing	<i>Fabaceae, Caryophyllaceae, Solanaceae, Astereceae, Liliaceae</i>	100
Fibrous plants	<i>Urticaceae, Cannabaceae, Malvaceae</i>	6

submitted for quotas from procurement organizations, pharmaceutical enterprises, and other environmental users, among which there are both red-listed and endemic species (Table 1).

Only from 2018 to 2021, the procurement of wild plant resources increased more than four times (Fig. 32).

Since then, the Government of Uzbekistan has paid close attention to studying the experience of traditional medicine in the country, the creation of new effective and affordable medicines based on plant raw materials, which is facilitated by a number of Orders, Presidential Decrees and Cabinet Resolutions. In addition, within the framework of these and other decrees, work is underway on a large scale in the country to create industrial plantations of medicinal plants, including such species as: *Crocus sativus* L., *Ferula tadshikorum* Pimenov, *Glycyrrhiza glabra* L. *Hippophae rhamnoides* L. and many others.

## Folk Healers (Tabib's) Knowledge and Communication About Traditional Uses of Ethnobiological Species in Uzbekistan

The carriers of knowledge in the field of herbal medicine in Uzbekistan are folk healers called tabib's. Most of them are hereditary tabib's that have accumulated knowledge of previous related generations.

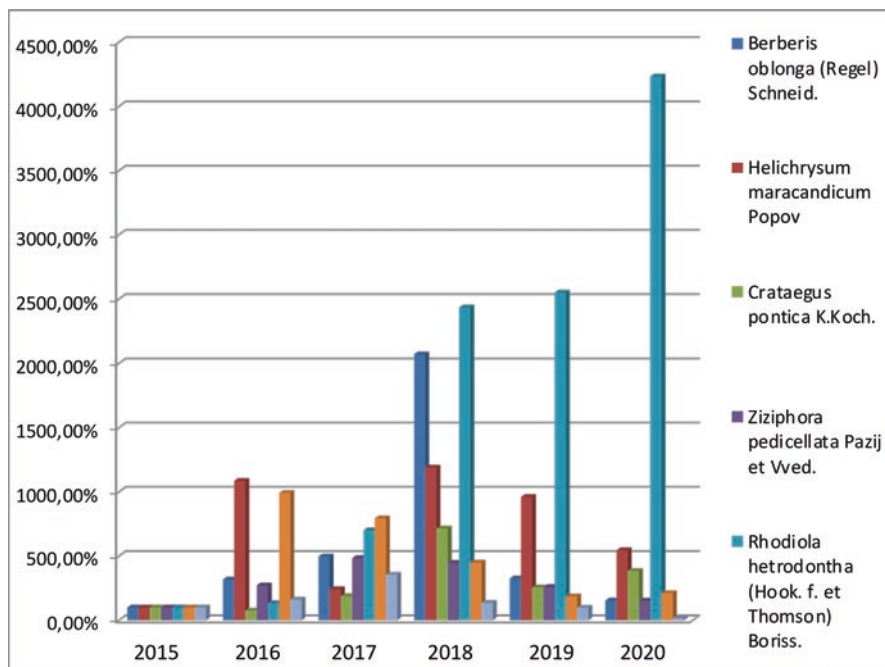


Fig. 32 Increase of wild plant raw material use for selected species

### *The Personality of Tabib and the Specialization of Tabib in the System of Worldviews of the Uzbek People*

In traditional medicine, the profession of tabibs, skill, norms of behavior were formed in a harmonious connection with professional experience and knowledge, guaranteeing the integrity of this area. Being Arabic, the word tabib is used in the sense of davo (cure). The word tib itself means “reform,” straighten, “and the tib turnover was kildi used in the sense of” straightened, cured. “Another meaning of the word tib is – “skill,” “experience.” Uzbeks in relation to experienced doctors and prominent scientists used the word xakim” (doctor, healer, scientist, thinker, sage). Tabib is a person who has absorbed the empirical knowledge of health inherent in the ethnic group to which he belongs, and himself turned into a tradition, since he conveys this experience to his descendants in oral or written form. By their professional activities and treatment process, tabibas are classified as follows:

**Siniqchilar** – Bone-setter, usta (master). Tabibs siniqchi treat bruises, cracks, fractures, correct dislocations. At the same time, special attention is paid to the age of the victim. Usually, bone breeders insist that after the procedure, the damaged part of the body should be protected for as many days as the patient is old. Tabib’s siniqchi and today have extensive practice.

**Doyalar** – Midwives and healers of women’s diseases. In ancient times, people, along with methods of treatment, were able to provide assistance in childbirth.

And among Uzbeks, the history of the doylar profession goes back centuries, and its representatives are called bibi halfa, momo, kushnoch momo. Now childbirth is accepted according to the rules of modern medicine, so the help of popular midwives is important in the recommendations regarding the health of babies and mothers. With their participation, rites are also held in families when the baby is first placed in the cradle or bathed for the first time.

**Zharroxlar** – Surgeons. In Uzbek folk medicine, tabibs-jarroch were circumcised, teeth were removed, and bloodletting was performed. Once upon a time, the population turned to the help of Tabib jarroch to get rid of the parasitic worm, common in some areas. Today, jarroches are invited to perform circumcision or release blood.

**Dorigarlar, attorlar.** Due to the constant occupation of tabibs, dorigars were engaged in the collection of medicinal herbs and the manufacture of medicines. The population on the outskirts was also supplied with medicinal herbs. Their knowledge in the field of traditional medicine was very primitive, however, they understood what medicinal herbs were needed for certain diseases. With the advent of pharmacies in the region, the activities of attors for the manufacture of medicines have lost their significance.

**Kakhkhol** (tabibs involved in the treatment of eye diseases). In the documents of the Cossacks of the XVI century there is information about the medical procedure that was carried out by the Samarkand tabibs.

Along with them, there are tabibs involved in the treatment of skin and sexually transmitted diseases, as well as diseases of the internal organs (Jumanazarov 2018).

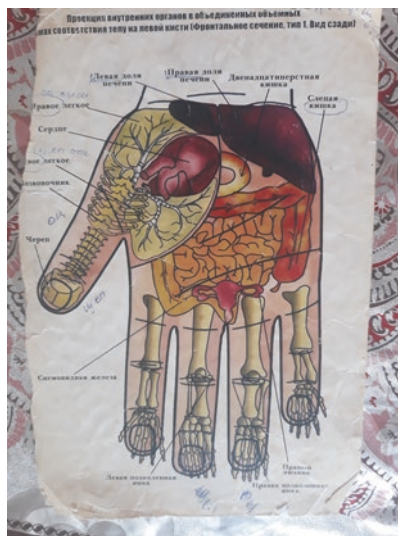
### *Traditions of Uzbeks Related to Treatment and Medical Practice*

The traditions of treatment among the peoples of the world differ in the methods of treatment and diagnosis, as well as in the methods of using medicines. The regional features of the traditional medicine of Uzbeks were influenced by such factors as the experience of the settled agricultural population and semi-settled cattle breeders who simultaneously lived in the region, the seasonal-cyclical climate, trade relations, as well as the exploration of tabibs. O characterize the factors that influence the local features of treatment (Figs. 33 and 34).

### *Geographic Factors*

When studying the regional features of folk medicine in terms of geographical environment, the territory of residence of the population should be divided into mountain-foothill regions and flat terrain. At the same time, the regional difference is reflected in the daily diet, collection of medicinal herbs, storage conditions and at the cost of natural medicines.

**Fig. 33** Internal organ projection diagram. (Photo G.J.Abdiniyazova)



**Fig. 34** Folk healer with 40 years of experience Kobeyzin Erniyazov (79 years old). Nukus, Karakalpakstan. (Photo G.J.Abdiniyazova)



### *Lifestyle and Type of Occupation of the Population*

Depending on the economic activities of people, the traditions of traditional medicine also acquire their special manifestations. Thus, studying the lifestyle of livestock breeders and farmers, we note the following feature: in relation to representatives of traditional medicine, livestock breeders have a tendency to empirical, and among farmers – to a mystical type of treatment. There is also a difference in the use of medicinal products: cattle breeders used simple drugs, and in farmers the composition of medicines included many components. The differences in the tools used during the treatment are also very noticeable: livestock breeders used objects of natural origin, while farmers used specially made hand-made tools.



## ***Native Flora and Fauna***

For people, they have always been an inexhaustible source. In everyday life, people used the healing qualities of the plant world around them. As a result, the body adapted to certain products, that is, the side effect of local remedies was reduced. Uzbeks use products obtained from small and cattle.

## ***Religious Views***

In folk medicine, the religious views of Uzbeks were formed under the influence of Zoroastrian and Islamic religions. This is manifested in the rules of hygiene, sanitary standards, in behavior with the patient. The Avesta noted that it is necessary to protect water, air, fire and soil. This call is consonant with misage – the “doctrine of the human body” in folk medicine. With the establishment of the Islamic religion in Central Asia, the concepts of permissiveness, cleanliness and neatness have acquired a stronger foundation, this is one of the factors that distinguish Eastern medicine from the medicine of other peoples. Currently, in the study of regional features, territorial location, economic situation, integration of state and traditional medicine is of certain importance. Sometimes in this regard, factors such as the ethnic composition of the population, standard of living, migration flow, urbanization, and the legal state of traditional medicine play a significant role. Thus, the regional study of traditional medicine makes it possible to learn the traditions and customs inherent in the people, as well as methods of treatment that are not fully known in state medicine. Traditional medicine, the emergence and development of which dates back to the era of the birth of mankind, absorbed all the achievements of society. Thus, the tools of tabib reflect the development of the craft, and its rights and obligations, responsibility for improper treatment make it possible to determine the legal literacy of society.

## ***Tabib’s Culture: Personal and Professional Norms of Behavior***

Based on the available information, the following standards of personal and professional behavior of tabib can be characterized:

A benevolent and sympathetic experience is a sign of professional behavior, its main tool. According to Alisher Navoiy, if tabib is skilled in the profession, however, has a bad character, he speaks indifferently and rudely, no matter how much he treats the patient, he will not be able to make changes in his condition (Navoiy and Makhbub ek-kulub 1983).

Adherence to the rules of professional etiquette is one of the important principles of tabib culture. The professional mystery of tabibs consists of two aspects.

The first aspect is that tabib keeps its methods of treatment and technology for the manufacture of a therapeutic agent secret. As a rule, a lot of effort was spent on this, so the recipe and treatment method are considered its property, which the mentor (father) wants to transfer to his son, and, therefore, it will be of material benefit.

The second aspect contains a medical secret that arises during tabib communication with the patient. So, he is obliged to keep secret information about the disease from others, and sometimes from the patient himself. Gender equality, being one of the national characteristics of the profession, consists in the observance of these norms by a tabib man. There are also special criteria for the attitude towards women in society and the moral norms of behavior of Tabib-men in communicating with them: a healer should see only a patient in a woman. For this profession, it was characteristic to know the folk customs and rites, mentality, marital status of the patient (Jumanazarov 2018).

### ***Determination of Treatment Fees***

This criterion depends on the severity of the disease, the duration of treatment, the time and effort spent by the tabib, as well as the patient's financial situation. In the far villages, the tabibs still receive a fee in their natural form, that is, with fruits, grains or other agricultural products. The low price and availability of raw materials for medical products are the reason for the preservation of the need for tabibs in society.

### ***Raising a Student Is a Duty of Tabib***

Healing is considered one of the professions passing from father to son. Sometimes there was no continuation of traditions in the family, so the student was taken from the outside. The student inherited all the achievements and knowledge of the mentor, on whom professional training and the attitude of people towards him depended. So that the school he created did not disappear, the mentor brought up a worthy replacement. When the student reached the pinnacle of knowledge and skills, the mentor convened other tabibs, and they examined the student, and then blessed him for independent activity. Knowledge of the history of the profession for tabib, these are necessary conditions. Each science has its own history and heritage. Representatives of not only traditional medicine, but also other professions, were interested in the history of their industry. In the process of treatment, experiencing a new remedy or facing a disease unknown to him, tabib inevitably turns to the history of his profession. Knowledge of history allows you to realize your weaknesses or achievements.

### ***Following the Precepts of a Mentor***

It's the duty of the apprentice. Most Tabibs left commandments to their disciples, who, due to their knowledge and abilities, became the successors of his work. The purpose of the commandment is to preserve the school created by the mentor and prepare a worthy successor in the future.

It should be noted that the formation of the rules of the professional culture of Tabibs and control over their observance are carried out due to the worldview of the people, the status of *ḫakim*'s in the life of society and the legal norms of the state. In Uzbek folk medicine, the moral character of tabib, its personal and professional culture are the focus of the community. Tabib's status is also determined by his knowledge of folk values, religious views, traditions, customs and rites.

### ***Traditions of Treatment and Pharmacology in Uzbek Folk Medicine***

In general, diagnostic methods in oriental medicine can be distinguished into four main groups: visual examination, olfactory perception, information on the conditions of residence and susceptibility to individual products, measurement of heart rate and palpation. In addition, experienced tabibs, diagnosing the disease, perform the following actions: study the amount of color, the volume of urine, feces, sweat, sputum and measure the patient's pulse.

In Uzbek folk medicine, the process of determining a disease can be divided into the following two groups by tabib actions:

through direct communication with the patient (palpating parts of the body, interviewing about the nature of pain and changes, studying discharge); by observing the patient (without entering into direct contact with the patient, conclusions are drawn after monitoring him from the outside). Thus, we can say that in ancient times, due to the limitations of human communication and the ignorance of the population (lack of knowledge in the field of medicine), patients could not tell in detail about their condition. As a result, the tabibs studied ways to determine the diagnosis in a mediated way and over the years of practice mastered them perfectly.

### ***Working Tools Used in Traditional Medicine***

In their activities, tabibs use special tools and utensils, which can be conditionally distinguished into the following groups:

1. Utensils used in the preparation of medicinal products. Medicinal products according to the method of preparation are divided into two types: simple and complex. Simple means consist of one raw material product and do not require

much effort. For this reason, household and kitchen utensils can be used during preparation. The second type includes more complex medicinal products consisting of a number of components (medicinal herbs, mineral additives). They also include substances that beat off an unpleasant smell or give a taste and aroma.

Based on this, the items used to prepare drugs are also divided into three groups:

- (a) items of kitchen utensils – casa, sieve, cauldron, knife, kettle, piala, spoon, pieces of different canvas.
  - (b) special tools. Devices for the preparation of complex drugs to comply with high accuracy certain conditions (darkened and cool room) and utensils: scales with cups, mortars, cauldrons of different volumes, spoons, sieves, hand mill, special dishes (vessels) for drugs, alembic.
  - (c) modern devices: electronic scales, gas stoves, refrigerators, mixers, grinders.
2. Tools used in the treatment process. They are used in the treatment of therapeutic diseases and diseases related to other areas of medicine. Among them are universal tools used by tabibs of different profiles:
- (a) bloodletting instruments: horns, lancets. Leeches are used during the procedure.
  - (b) costing tools: lubes from planks. Chicken eggs are used in the procedure.
  - (c) surgical instruments: straight and curved scissors, metal lancets, knives, hooks, needles, silver threads, forceps.

### ***Natural Raw Materials and Medicinal Products Used in Pharmacology***

Raw materials used in traditional medicine are conditionally divided into the following types:

1. Medicinal herbs, bushes, trees – cultivated and wild plants (roots, bark, petals, stems, fruit peel, flowers, fruit seeds) and the components obtained from them (oils, juices, resins).
2. Animals, insects, birds – parts of organs (bones, blood, bone marrow, fats, meat, horns, internal organs, skin), products (dairy products, eggs), waste (excrement, urine, saliva).
3. Minerals – mumiyo, copper vitriol, mercury, sulfur, nitric acid, etc.

Therapeutic agents used in folk medicine can be grouped as follows: Therapeutic agents used in folk medicine can be grouped as follows:

1. according to the composition of the medicine: Turkona (Turkic medicinal product) – consists of from one type of product, for the preparation of which no special room is required; complex therapeutic mixtures – have more than two components (boiled or infused broth; exciting infusion; syrup; powder; binding component).



2. by the method of use: for internal use (cakes, tablets, gruel), for external use (ointments), as well as candles (nasal, eye, rectal).
3. in appearance: in hard (cakes, pills), in liquid (infusions, syrups), in powders.

Thus, it can be argued that the collection of plant components origin, selection of animal products, search for minerals form the basis of pharmacology. Today in pharmacies you can find healing products of traditional medicine, the bulk of which retained the previous names, although there are some changes in composition.

Another rather large group of people with knowledge of herbal medicine are shepherds and elders of mountain villages. This is due to the fact that shepherds are in high-altitude pastures for a significant time of the year and in the event of a disease that does not require emergency medical intervention, plants growing here may well be used. As for the oldest residents of the villages, their experience is based on information transmitted from generation to generation. In both of these cases, respondents willingly share the available information, while showing plants and talking in detail about recipes and methods for preparing drugs.

A common feature of tabibs is a persistent reluctance to share existing treatment experience with medicinal herbs. First of all, this is due to the reluctance to lose the financial source and keep recipes secret.

However, there is another category of practicing folk healers, whose knowledge is obtained by studying modern books and other sources. In this case, a problem is revealed that there is insufficient knowledge of systemic knowledge, lack of experience, ignorance of medicinal plants, correct diagnosis and treatment of human diseases. Such “tabibs” will not only not bring benefits, but also harm.

Analyzing the available materials on the collection of ethnobotanical data, we can note that tabibas mainly treat diseases of the gastrointestinal tract, hepatobiliary, cardiovascular, nervous systems and respiratory organs with herbs. Disorders of the musculoskeletal system (osteochondrosis of the spine; rheumatoid arthritis; gout; polyarthrosis, etc.). And a very small number of turns are used in the treatment of mechanical injuries (bone fractures).

Nevertheless, work in the direction of studying the secrets of traditional medicine in Uzbekistan must be continued, for this it is necessary to make every effort of scientists of botany, chemists, pharmacologists and many other specialists. The result of this cooperation will undoubtedly be the creation of new highly effective medicines based on environmentally friendly plant raw materials. In support of the above, we can cite an example of the experience of the creation by the scientific team of the Institute of Botany, the Institute of Plant Substances Chemistry of the Academy of Sciences of the Republic of Uzbekistan of a highly effective medicine “*Species cholagogae Chodjimatovi*”, used to treat liver diseases of various etiologies. This drug is patented and approved for use in medical practice of the Republic, by the Ministry of Health of the Republic of Uzbekistan. The production and sale of the drug was established by “Salvare” LLC at the Institute of Botany of the Academy of Sciences of the Republic of Uzbekistan.

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