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SOIL-CLIMATIC CONDITIONS AND VEGETATION COVER OF DESERTS

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Abstract: The desert zone constitutes 61.6% of the territory of our Republic. In these regions, predominantly xerophytic plants grow, which are adapted to dry and hot summer conditions. The soils of deserts consist of three main types: saline-soil deserts, sandy deserts, and gypsific (gypsum) deserts. Perennial grasses such as Aristida pennata Trin, along with species like Calligonum aphyllum, Calligonum eriopodum, Calligonum junceum, Calligonum caput-medusae, Haloxylon persicum, and Haloxylon aphyllum, play a major role in stabilizing moving sands.

Keywords: Desert zone, xerophyte, sea level, Kyzylkum desert, desert soil, saline soils, salt deposits, saline lands, takyrs, sandy deserts, loamy sand, white sands, shifting sands, gypsific deserts, carbonate lands, extra-arid, rhizome, ephemeral, ephemeraloid.

The desert zone constitutes 61.6% of the territory of our Republic. Located at altitudes up to 500–600 meters above sea level, these lands primarily encompass a significant portion of the Kyzylkum Desert in the western part of Uzbekistan, the entire area of the Amu Darya delta, the Ustyurt plains, and the Karshi and Surkhan deserts. In these regions, predominantly xerophytic plants grow, which are highly adapted to dry and hot summer conditions.

The soils of deserts comprise three main soil types:

1. **Saline-soil deserts** (incorporating salt deposits, saline lands, takyrs, and puffy saline soils);
2. **Sandy deserts** (consisting of sand, loamy sand, white sands, and shifting sand dunes);
3. **Gypsific deserts** (characterized by stony-mixed carbonate lands).

The diversity of soil types across the desert zone serves as the primary reason for the variation in its vegetation cover. For instance, salt-tolerant plants thrive in saline soils, sand-adapted xerophytic plants flourish in sandy terrains, and plants specifically adapted to gypsific substrates populate gypsum-rich areas.

In the extra-arid desert zone, temperatures are extremely high, reaching $+40^0$ to $+45^0$ during the summer months. The summer season is characterized by intense daytime heat, a complete absence of

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precipitation, strong hot winds, and cloudless skies. The annual precipitation in the desert zone ranges between 120 and 200 mm. Due to the complete absence of precipitation for up to 4–5 months in summer, the absolute humidity of the air drops dramatically in July. There are no natural barriers capable of deflecting the hot air currents blowing from the deserts, and these currents do not readily mix with humid air masses.

Plant life on the desert plains is fundamentally tied to sandy, gypsific, and saline (solonchak) soils. Sandy deserts include the Kyzylkum, the dry riverbed of the Kashkadarya (Sandiklileem), the Kattakum in the lower reaches of the Surkhandarya, and various sandy massifs within the Khorezm oasis. The majority of these sandy areas are stabilized by vegetation. In sand dunes, trees or large shrubs such as white saxaul, juzgun (kandym), and cherkez are common, alongside smaller shrubs like white boyalich, quyon suyak (hare's bone), and ephedra (qizilcha). The lateral roots of the juzgun plant can grow up to 20 meters horizontally, fixing the moving sands to a certain degree.

The perennial grass selen (Aristida pennata Trin) holds particular importance in stabilizing moving sands. With its extensive root system and above-ground stems, it prevents sand movement and creates a sheltered environment that traps the seeds of other crucial species, enabling them to grow. These species include:

- Black juzgun (Calligonum aphyllum)
- Norjuzgun (Calligonum eriopodum)
- White juzgun (Calligonum junceum)
- Red juzgun (Calligonum caput-medusae)
- White saxaul (Haloxylon persicum)
- Black saxaul (Haloxylon aphyllum)

Additionally, the perennial ephemeral plant iloq (Carex physoides), which is highly adapted to sandy conditions, propagates through its underground rhizomes. During the brief spring months, it grows rapidly, flowers, and manages to set seed before the summer heat.

Gypsific deserts encompass the Ustyurt Plateau and certain massifs located in southwestern and northwestern Kyzylkum. The flora of the gypsific desert is relatively poor in species diversity. Plant communities (formations) here are formed primarily by species belonging to the Amaranthaceae (formerly Chenopodiaceae) family. Among these, semi-shrubs and shrubs like buyurgun and boyalich, annual saltworts (Climacoptera / baliqko'z), white jusan (Calligonum junceum), and various ephemerals are widely encountered.

Vegetation varies depending on the concentration of salts within the solonchak (saline) soils. Wet, crusted, and fine puffy solonchaks are highly unfavorable for plant development. Nevertheless, certain species can be found in these areas, including sarsazan (Halocnemum strobilaceum), qizilsho’ra (Suaeda microphylla), oqbosh (Karelinia caspia (Pall.) Less), donasho'r (Gamanthus), saltwort (Chenopodium), and Bermuda grass (Cynodon dactylon (L.) Pers.). Overall, more than 100 species are capable of growing under these harsh conditions. Widespread plants in solonchaks include saxaul (both species) and numerous other representatives of the goosefoot family, such as Climacoptera (baliqko'z) and Halocharis hispida (quyonjun). They have adapted structurally to survive

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the severe (hot and dry) desert conditions; some feature succulent (fleshy) leaves and stems, while others have leaves reduced to spines or lack true leaves altogether.

On takyrs—clay plains that were once submerged under shallow waters—vegetation is extremely sparse. Only occasionally can isolated ephemerals, such as Gamanthus (dona sho'r), be observed emerging from the deep cracks of the takyr surface.

The flora and fauna of Uzbekistan are highly diverse, tightly regulated by nature, and intrinsically linked to the regional topography and climate.

The soils of the desert zone are highly diverse, consisting of gray-brown, sandy desert, meadow-swamp, takyr, and gray soils (serozoems). Gray-brown soils are distributed across the Ustyurt Plateau, the low mountains of the Kyzylkum, and the stony deserts at the foothills of the Nurata mountains. These soils possess a very low humus content (0.3–1%). Sandy desert soils are found in the sandy plains of the Kyzylkum, Central Fergana, and Mirzachul, where the humus level ranges from 0.3 to 0.6%. In deserts composed primarily of clay substrates, takyrs are formed, and their humus content can reach up to 0.5–1%.

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