

**TERRITORIAL DISTRIBUTION AND DEVELOPMENT OF FOREST-ECOTONE
NATURAL GEOGRAPHICAL COMPLEXES IN BUKHARA REGION (AS AN
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Abstract: The article examines the territorial distribution, origin, classification, current state and some problems of development of tokai-ecotone natural-geographical complexes of the Bukhara region.

Key words: Bukhara region, Zarafshan river, Vobkentdarya, Amu-Bukhara machine-building canal, Oyakogitma, Karakir, Zamonbaba, Zikri, Katta-Tuzkan, Dengizkul, Devkhona, Khadicha, Kumsultan, river, canal, zavur, Lake Tashlama, natural-geographical complex, landscape, forest ecotone, morphotectonics, lithological structure, relief, soil cover, willow, water willow, red hemp, rower, naked licorice, reed, mat, zerbel thorn, arstam, lonpechak.

Introduction. The territory of the Bukhara region is 40.3 thousand km², on which various natural and geographical complexes have been formed and developed over the centuries. In the second half of the 19th century, and especially during the 20th century, in the development of these natural-geographical complexes, along with natural factors, the influence of socio-economic factors became more acute. This found its expression in the tukai-ecotone natural geographical complexes of the province, which is limited in area. Today, in the natural-geographical complex of Duaba tugai-ecotone, a process of desertification is taking place, primarily a reduction in the area of tugai lands, a reduction in biodiversity, and the process is accelerating. On a territorial scale, it is important to mitigate the geoeological situation and improve the environment.

Main part.

Bukhara region belongs to the natural-geographical territories of the southern deserts of Central Asia. There are various types of natural geographical complexes, describing the main factors of territorial morphotectonics, as well as features, groundwater regimes, etc.

Until now, research at various levels has been conducted to study the natural and geographical complexes of the Bukhara region and their resources. Many sources recognize the merits of such researchers as L. S. Berg (1913), R. I. Abolina (1929), N. L. Korzhenevsky (1960), V. M. Cheterkin (1960), T. V. Zvankova (1962, 1965), P.G. Gulyamova (1966), M.Umarova (1967), I.K.Nazarova (1971-2007), M.P.Petrova (1973), L.N.Babushkina, N.A.Kogaya (1975), P.Baratova (1977), N.A. Kogai (1982), B.A. Fedorovich (1983), Yu.B.Rakhmatova (1984), U. Nurova (1990), A.G. Babaeva (1995), H.R. Tashova (2008, 2013, 2024), Y.K. Khaitova (2017), A.B. Rasulova (2020), G.S. Khalimova (2020), M.K. Ergasheva (2022), A.E. Sharipova (2023), A.K. Samyaeva (2024) and others [10, 11, 13, 16, 19]. Of course, many of these researchers studied and analyzed natural geographical complexes such as landscapes, the outer shells of the Earth, epigenemes and geosystems.

In particular, the scientific and practical aspects of the region's landscapes were studied by I.K. Nazarov and Kh.R. Tashov, and scientific work was carried out on this topic [2, 3, 4, 13, 14, 15, 16, 17, 20, 22, 23, 24]. Among the natural geographical complexes of the Bukhara region, natural geographical complexes such as tugai-ecotone are widespread, but their area is relatively limited and territorially distributed unevenly.

An ecotonic natural-geographical complex is a physiognomically distinct zone of the "transitional" region of plant communities. For example, in the Bukhara region, in a natural and geographical complex (landscape) formed between the arid desert and the humid reservoirs of the tugai-ecoton. Their area is 20950 hectares. The emergence of natural-geographical complexes of tugai-ecoton on the territory of the Bukhara region can be conditionally divided into 3 periods and several factors.

1. 33.9-23.04 million BC. Period from the Oligocene to the middle of the 20th century. Periods of activity of the Zerafshan River and its tributaries in the lower reaches(Fig.1).

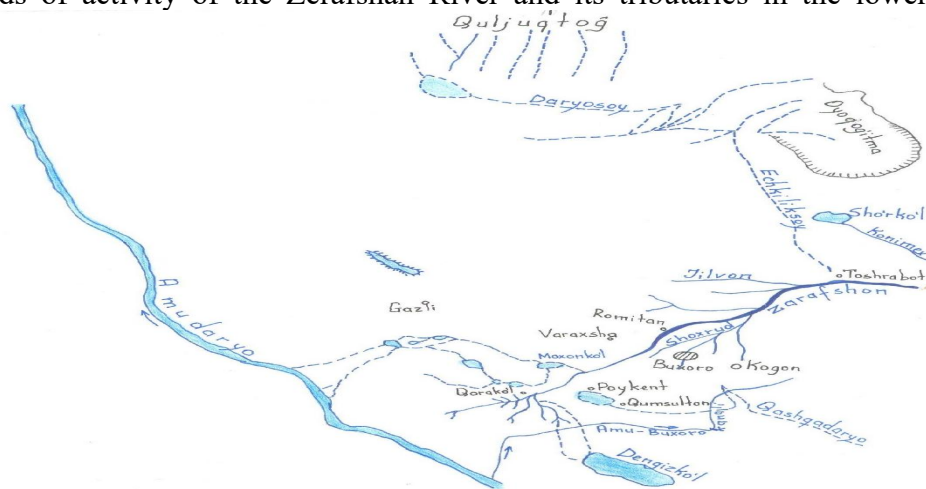


Figure 1. PaleoZerafshan and its tributaries (according to Trofimov).

Consequently, the confluence of the Zerafshan River and its largest right tributary, the Vobkentdarya, played an important role in the formation of the modern Bukhara oasis and lake-tugai landscapes, and later the oasis landscapes in the adjacent lands.

On the toponymy of Vobkentdarya, H. Turaev, M. T. Mirakmalov and M. M. Avezov provided extensive information in their works [1, 5, 18]. Sources note that in the 10th and

12th centuries, Mokhondarya formed lake-delta landscapes (tugai) in the interfluvium of the Amu Darya and the foot of the Karakul plateau at a distance of 150 km [6, 7, 21].

From the Bukhara oasis, the water of "Kharomkom" (Zarafshan-Karakuldarya) flows into Boykand. In Baykand there are reed groves and large reservoirs, - wrote the historian Narshakhi [9]. Even in the book by Yuzhin Skyler "Turkestan: travel notes on Russian Turkestan, Kokand, Bukhara and Gulja" the arrival of the Zarafshan River to the Karakul oasis is mentioned [12].

2. From the beginning of the 19th century to the middle of the 20th century. Bushes formed as a result of the construction of main collectors and discharged lakes. At present, main collectors have been built to eliminate the collector waters formed in the Bukhara, Karakul, and Karaulbazar oases. The total length of these collectors in the desert-pasture zone of the region is more than 800 km. The collector waters were transferred from the ancient Echkiliksay, Chorbakti and Mohondarya to Paleo-Zarafshan. In such places the width of the tugai reaches 2-3 kilometers. In addition, lakes such as Karakir, Zamonbobo, Katta-Tuzkon, Dengizkul, Devkhana, Khadicha, Kumsultan, formed in the lowlands around the oases, are surrounded by tugai. Most of the tugai of the tamarisk-thorn type was formed in the lowlands around the Karakul oasis.

3. The period from the middle of the 20th century to the present. In order to radically improve the water supply of the lands of the lower Zarafshan oasis and thereby further develop the economy in this region, it is necessary to import Amu Darya waters through the Amu-Karakul and Amu-Bukhara machine canals. As a result, tugai forests were formed along the canal and the filtration lakes surrounding it. Wooden tugai forests are represented in two massifs:

It is located on the banks of the Amu Darya and along Lake Khodzhamayat, which surrounds the second stage of the Amu-Bukhara machine canal.

Most of the tugai is located on the territory of the Kyzylkum Nature Reserve, founded in 1971. The territorial scale of bioresources is directly related to the amount of water in the Amu Darya. In the past, such tugai occupied large areas, which in subsequent years decreased over the years in accordance with the volume of river flow. In the woody thickets, two species of turangila form the main landscape. In their vicinity, such species as poplar, willow, water willow, red hemp, tamarisk, licorice, narrow-leaved oleaster, reed, mat, camel thorn, field bindweed are priority in dzhi. An example is the tugai on the shore of Lake Khodzhamayat.

Tugai-ecotone geographical complexes in the Bukhara region are developed mainly in hydromorphic, in places in semi-hydromorphic conditions. They are divided into trees, shrubs and annual plants. On the territory of the region, these landscapes are limited in area (by 20950 or 0.5%), they are found around rivers, canals, collectors and discharged lakes.

Duoba is also mentioned in the "History of Irrigation of the Lower Zarafshan Valley" by A. R. Mukhammadzhonov. In particular, the Shakhrod highway, which supplies water to Bukhara and its environs 10 km below "Kharkhur", will take part in this work. This place is called Duoba" [7]. Some authors call the Duoba region even more extensive.

Currently, the Duoba mausoleum contains two large natural-geographical complexes.

1. Natural-geographical complexes

This is the largest natural-geographical complex of the region. In the ancient delta of the Duoba River, it became famous as a territory of preserved forests. It is located in the Vabkent district. The Duoba hydroelectric complex (upper part of the oasis) is located here. In 1994,

its size was about 4 hectares [8]. As a result of the reconstruction of the Zerafshan River bed, the area of the Duoba tugai began to shrink. In particular, Duaba was assimilated and cultivated. As a result, Duoba remained deformed but broken for a long time. Today, Duoba is a natural corner (Fig. 2).

Duaba tugai is distinguished by its diverse flora. We considered it necessary to list some of their species (Table 1). Here they consist of at least four layers (tiers):

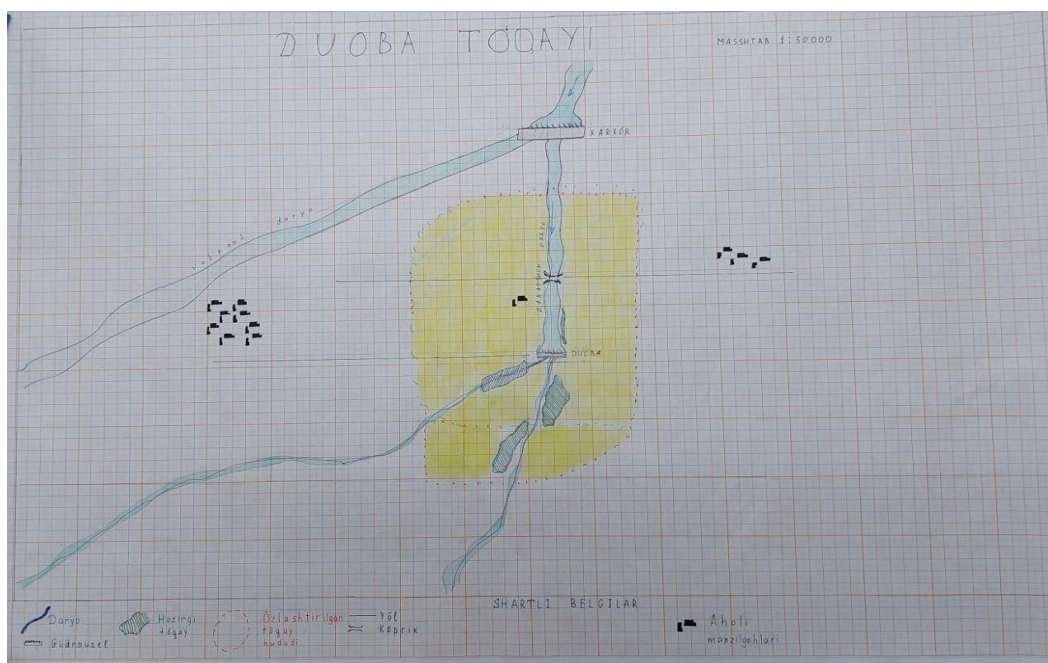
- Trees and trees;
- Covering young plants formed from the fruits of trees and trees;
- Shrubs and subshrubs;
- Annual and perennial plants.

Table 1.

Plants of Duaba

№	Latin name	Russian name	Uzbek name	economic importance
1	Populus diversifolia	Тополь разнолистная	Туранга	Building material (wood)
2	Salix sungarika Andress	Ива	Тол	Building material (wood)
3	Tamarix hispida wild	Гребенщик	Юлғун	Used for various purposes (wood, medical, construction).
4	Alhagi pseudalhagi (Bieb) Desv	Верблюжья колючка	Янтоқ	Livestock and honey
5	Eleagnus angustifolia L.Sp.	Лох узколистный	Қуш жийда	Medicines
6	Convolvulus arvensis L.	Вьюнок полевой	Қўйпечак, дала печаги	Livestock and honey
7	Aeluropus litoralis (Gouan) Parl	Прибрежница солончаковая	Шўр ажриқ	For pets
8	Calamagrostis dubia Bge	Вейник сомнительный	Қамиш, сариққамиш	Livestock and honey
9	Chenopodium glaucum L.SP.	Марь сизая	Шўра	For pets

Currently, the scale of Duabinsky tugai continues to shrink due to human economic activity. Therefore, the plant world has not formed the same 4 tiers in all fragmented parts. The soil horizon of Duabinsky tugai consists of the soil surface, humus layer, washout layer and undercuts.



rice. 2 Schematic map of Duaba tugai

The Duoba hydroelectric complex in the Vabkent area and the Duabinsky tugai remain without public attention. Today, there are 2 factors influencing the reduction of the Duabinsky tugai area. Firstly, this is a sharp reduction in the inflow of water from the Zarafshan River to the Bukhara region, and secondly, the development of the Duabinsky tugai for economic development. The Duoba hydroelectric complex ceased its operations due to changes in the irrigation system of the region.

Conclusion.

In conclusion, it should be noted that the Duoba hydroelectric complex and the Duaba tugai in the Vabkent district remain without public attention. Therefore, when studying where the Duaba tugai is located, it is important to solve such practical issues as nature conservation, rational use of soil, water and biological resources.

1. It is necessary to create a scientifically based “ecological passport” of natural and natural-anthropogenic objects to preserve territories and preserve flora and fauna.
2. In the context of climate change in arid regions, Duaba will undoubtedly play a primary role in maintaining the ecological balance.

References:

1. Авезов М.М., Миракмалов М.Т. Бухоро вилояти оронимлари ва гидронимлари. Монография. Тошкент. “VNESHINVESTPROM” 2020. – 127 б.
2. Азарова Л.В., Большаник П.В., Мезенцева О.В., Рахимов А.Х., Ташов Х.Р. Геоэкология и региональное природопользование: на примере геосистем Омской и Бухарской областей. Учебное пособие для вузов / Под ред. доц. Л. В. Азаровой,

- доц. Х.Р. Ташова г. Омск: Изд-во Омский государственный университет. 2022. 272 с.
3. Звонкова Т.В. Бухарская область. Природные условия и ресурсы Юго-Западного Узбекистана. Ташкент, «Наука», 1965. с. 304-336.
 4. Маъмуров Б.Б., Раҳимов О.Ҳ., Ташов Х.Р. Бухоро сардобалари. Бухоро. 2024. 150 б.
 5. Миракмалов М.Т., Авезов М.М., Асроров Д.Қ. Вобкент тумани топонимлари. Монография. Тошкент. “MUMTOZ SO‘Z” 2017. – 120 б.
 6. Мухаммаджонов А. Қадимги Бухоро. Тошкент, «Фан», 1991.-Б 52.
 7. Мухаммаджонов А. Р., Куйи Зерафшон водийсининг суғорилиш тарихи, Т., 1972.
 8. Назаров И.К. Абиогенные потоки в аридных геосистемах: оптимизация природопользования. (На материалах нижней части р. Зерафшан). Ташкент, «Фан», 1992.-101 с.
 9. Наршахий. Бухоро тарихи. Тошкент «Шарқ баёзи»,
 10. 1993.-128 б.
 11. Нуров У. Динамика и природные ресурсы дельты р. Зерафшан. Автореф. на соиск. уч. степени канд. геогр. наук. Ашхабад, 1990.-25 с.
 12. Рахматов Ю.Б. Природные условия и ландшафтное районирование Каракульской дельты р. Зерафшана и ее сельскохозяйственное освоение. Ташкент, «Фан». 1984.-102 с.
 13. Скайлер, Южин. Туркистон: Россия Туркистони, Қўкон, Бухоро ва Ғулжага саёҳат қайдлари [Матн] Ю.Скайлер. Тарж. З.А.Саидбобоев. – Тошкент: “O‘zbekiston” НМИУ, 2019. – 336 б.
 14. Тошов Х.Р. Чўл ландшафтлари ва уларнинг агроимкониятларидан самарали фойдаланиш (Бухоро вилояти мисолида). География фанлари номзоди илмий даражасини олиш учун тайёрланган диссертация. Тошкент. 2008 йил. 153 бет.
 15. Ташов Х.Р. Климатический фактор и историческая традиция в организации пустынных территории Республики Узбекистан (на примере Джандарского района Бухарской области). Сборник материалов второй Международной научно-практической конференции «Насыровские чтения» (Г.Казань 16-17 февраля 2023 г). - Казань, Новая Казань. 2023. – 72-75 с.
 16. Тошов Х.Р., Раҳимов О.Ҳ., Ҳикматова Г.И. Сув қадри. Бухоро, “SHANZOD PRINT” босмахонаси. 2018.100 б.
 17. Тошов Х.Р. Табиий география тарихи ва баъзи назарий масалалари. Монография. Дурдона. Тошкент. 2021. 520 б.
 18. Тошев Х.Р. Чўл тўқай-экотон ландшафтлар типлари ва уларни оқилона ташкил қилиш хусусида. // Ўзбекистон география жамияти ахбороти. 29-жилд. Тошкент, 2007. Б 42-49.
 19. To‘rayev N. Buxoro toponimikasi. Darslik. Buxoro. “Sadriddin Salim Buxoriy” Durdona, 2021. – 276 b.

20. Умаров М. Природные ресурсы низовьев р. Зерафшан и их использования. Ташкент, «Фан», 1967. -174 с.
21. Toshov X.R., Ergasheva M. The Experience of Landscape Classification (On the Example of the School of Samarkand State University). EUROPEAN MULTIDISCIPLINARY JOURNAL OF MODERN SCIENCE <https://emjms.academicjournal.io/index.php/> ISSN 2750-6274. Volume:5. 2022. P.534-540 (Yirik xalqaro nashriyotlar va ma'lumotlar bazasi: №12 Index Copernicus №25 Scientific Journal Impact Factor, №35 CrossRef).
22. Nasullayeva K.Sh. Qorako'l vohasi tabiiy geografik komplekslari, tarkibi va ularning qishloq xo'jalik maqsadlarida o'rganilishi. Nizomiy nomidagi Toshkent davlat pedagogika universiteti Tabiiy fanlar fakulteti. Tabiiy fanlar: Yangi yondashuvlar va dolzarb tadqiqotlar. Xalqaro ilmiy-amaliy konferentsiya materiallari. 2024 yilning 18-19-oktyabr, 161 - 164 b.
23. XUDOYNAZAR TOSHOV, MAVJUDA ERGASHEVA. Emergence factor and characteristics of landscape science. E3S Web of Conferences 389, 04018 (2023) UESF-2023. <https://doi.org/10.1051/e3sconf/202338904018>.
24. XUDOYNAZAR TOSHOV, NARGIZA TORAYEVA, JASUR ABDUKHAKIMOV. Flora of the Yozgokkum desert and the food problem. E3S Web of Conferences 389, 02010 (2023) UESF-2023. <https://doi.org/10.1051/e3sconf/202338902010>.