



ANTHROPOGENIC IMPACTS ON THE LANDSCAPES OF THE QARSHI DESERT AND THEIR CONSEQUENCES

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<https://doi.org/10.5281/zenodo.20523458>

Abstract: This article analyzes the processes of degradation and the ecological state of landscapes in the arid regions of Uzbekistan, with a particular focus on the Karshi Desert, under the conditions of climate change and intensive anthropogenic impact. The study provides a scientific justification for the changes in the composition and structure of natural landscapes caused by human economic activities (agriculture, urbanization, infrastructure), as well as the geophysical and ecological consequences of the “anthropization” process. The author examines the theoretical perspectives of scholars such as V.V. Dokuchaev, Yu.G. Saushkin, and F.N. Milkov on anthropogenic landscape science and highlights the historical stages of the relationship between nature and society. The results of the research serve as a basis for developing scientific recommendations for maintaining landscape stability, mitigating desertification processes, and ensuring the rational use of natural resources in arid zones, such as the Karshi Desert.

Keywords: landscape degradation, anthropogenic impact, anthropization, ecological state, desertification, arid regions, landscape science, geosystem, sustainable development.

Аннотация: В статье анализируются процессы деградации и экологическое состояние ландшафтов аридных регионов Узбекистана, в частности Каршинской степи, в условиях изменения климата и интенсивного антропогенного воздействия. В исследовании научно обоснованы изменения в составе и структуре природных ландшафтов, вызванные хозяйственной деятельностью человека (сельское хозяйство, урбанизация, инфраструктура), а также геофизические и экологические последствия процесса «антропизации». Автором проанализированы теоретические взгляды таких ученых, как В.В. Докучаев, Ю.Г. Саушкин и Ф.Н. Мильков на антропогенное ландшафтоведение, и освещены исторические этапы взаимоотношений природы и общества. Результаты исследования служат основой для разработки научных рекомендаций по сохранению устойчивости ландшафтов, смягчению процессов опустынивания и рациональному использованию природных ресурсов в аридных зонах, подобных Каршинской степи.

Ключевые слова: деградация ландшафтов, антропогенное воздействие, антропизация, экологическое состояние, опустынивание, аридные регионы, ландшафтоведение, геосистема, устойчивое развитие.

Annotatsiya: Mazkur maqolada iqlim o'zgarishi va intensiv antropogen ta'sir sharoitida O'zbekiston arid hududlari, xususan, Qarshi cho'li landshaftlarining degradatsiyasi hamda ekologik holati tahlil qilingan. Tadqiqotda inson xo'jalik faoliyati (qishloq xo'jaligi, urbanizatsiya, infratuzilma) natijasida tabiiy landshaftlarning tarkibi va tuzilishidagi o'zgarishlar, shuningdek, «antropizatsiya» jarayonining geofizik hamda ekologik oqibatlari ilmiy asoslab berilgan. Muallif tomonidan V.V. Dokuchayev, Yu.G. Saushkin va F.N. Milkov kabi

olimlarning antropogen landshaftshunoslikka oid nazariy qarashlari tahlil qilinib, tabiat va jamiyat o'rtasidagi o'zaro munosabatlarning tarixiy bosqichlari yoritilgan. Tadqiqot natijalari Qarshi cho'li kabi arid hududlarda landshaft barqarorligini saqlash, cho'llanish jarayonlarini yumshatish va tabiiy resurslardan oqilona foydalanish bo'yicha ilmiy tavsiyalar ishlab chiqishga xizmat qiladi.

Kalit so'zlar: landshaft degradatsiyasi, antropogen ta'sir, antropizatsiya, ekologik holat, cho'llanish, arid hududlar, landshaftshunoslik, geosistema, barqaror rivojlanish.

Introduction. In recent years, climate change and the increasing intensity of anthropogenic impacts have led to the degradation of landscapes and rangelands, as well as a significant reduction in their extent worldwide. As a result, the need for scientific research aimed at conserving natural landscapes and rangelands and maintaining their ecological stability has been steadily increasing. Landscapes and the rangelands they contain are important natural resources. When used rationally and sustainably, these natural resources possess the ability to regenerate themselves. Since ancient times, humans have utilized desert and semi-desert rangelands and have been well aware of the necessity of their conservation. This is because people have long recognized that land and natural pastures are fundamental sources of livelihood and well-being [2].

However, over the past 50 years, the vegetation crisis in desert regions has intensified [3]. Climate change-induced increases in drought and decreases in atmospheric precipitation are causing serious damage to the rangeland flora. In the rangelands of Uzbekistan, where there were once 1,700 plant species, today about 200 species have completely disappeared, and some species have declined sharply [4].

Until the 19th century, human economic activity had little impact on the natural environment. However, since the second half of the 20th century, the rapid development of industry, the widespread use of chemicals in agriculture, the cultivation of the same crops for a long time in large areas, the increase in the number of vehicles, and the intensification of urbanization have had a significant negative impact on the natural environment. In addition, insufficient attention to nature conservation issues has led to a radical change in some landscapes [1].

According to UNESCO, one third of the land is at risk of desertification. This ecological process poses a serious threat to the livelihoods and socio-economic stability of millions of people living in arid regions. As a result of the intensive impact of human economic activity, desertification processes are deepening and expanding in the territory of Uzbekistan. Desertification processes are typical for arid regions of Central Asia, which cover a total area of 210 million hectares, and more than 60 percent of the territory of the Republic of Uzbekistan is subject to desertification processes of varying degrees [16].

Changes in landscape fragmentation and heterogeneity around the world are largely due to increased human activity, particularly agriculture [5].

In recent decades, increased human activity has become the main factor leading to the reduction of biodiversity at the local, regional, and global levels [6, 7, 8].

Ongoing anthropogenic (human-induced) disturbances resulting from activities such as livestock grazing, firewood collection, and the use of non-timber forest products represent the main types of environmental change in developing countries [9, 10].

On a global scale, landscapes typically reflect the inextricable link between human activities and biodiversity, and are therefore often described as biocultural landscapes [11, 12]. This study considers the cultural aspect of landscapes as a broad spatial expression of human activity. The main criterion is the change in natural cover due to anthropogenic impacts such as agriculture, urbanization, industry and infrastructure. This process is called “anthropization” [13]; Anthropogenicization of the landscape under the influence of human activity leads to the predominance of technogenic elements, which causes the fragmentation and fragmentation of natural areas [14].

Preservation of natural landscapes requires the protection of their structure and functioning. Therefore, it is advisable to integrate geographical and ecological approaches to the conditions of intensive nature use and pollution. This approach allows for a comprehensive assessment of the state of the geosystem and the relationship between living organisms and their habitat [15].

Methods and materials

The issues of changes in the natural environment under the influence of human activity were first reflected in the scientific works of scientists such as V.V. Dokuchaev and A.I. Voeykov. Yu.G. Saushkin, V.L. Kotelnikov and B.V. Bogdanov are considered the founders of anthropogenic landscape studies. In this regard, Yu.G. Saushkin's proposal in 1946 to define cultural landscapes as a separate object of research gave impetus to the development of this field as a science. He also detailed his theoretical views on agricultural landscapes in his monograph published a year later (1947). The first theoretical views on anthropogenic landscapes were formulated by V.P. Semyonov-Tyan-Shansky at the beginning of the 20th century. Later, this direction was developed and deeply studied in the scientific works of S.V. Kolesnik, N.A. Solntsev, A.G. Isachenko, F.N. Milkov, M.G. Sergeev, A.I. Perelman, V.B. Sochava and a number of other researchers. F.N. Milkov (1986) divided the geochronological development of the landscape shell into three stages, the last of which was designated as the anthropogenic stage. Later, based on his research in 1990, he classified this anthropogenic stage into four periods, substantiating the scientific concept of long-term interaction between nature and society.

- The first period, distinguished by the scientist, is the oldest stage, covering the Upper Paleolithic period and lasting 30 thousand years;
- The second period mainly covers the Mesolithic, Neolithic (new stone age) and Bronze Ages.
- The third period is the new period, covering the Iron Age and subsequent stages of development.
- The fourth period is the most recent period, covering the period from the middle of the 20th century to the present day [1].

This periodization, developed by F.N. Milkov, serves to shed light on the stages of historical development of the relationship between man and nature. In particular, in the latest period of the anthropogenic stage, as a result of the intensification of human economic activity, the degree of transformation of natural landscapes has sharply increased. This has led to significant changes in the composition, structure and functional properties of landscapes. Therefore, in modern landscape science, the study of the scale, directions and ecological

consequences of anthropogenic impact is of great scientific and practical importance. The landscapes of the Karshi steppe are also one of the territories that have been formed and changed under the influence of human economic activity for many years, and the study of anthropogenic transformation processes in them allows us to assess the current state of landscapes and predict future environmental problems.

Conclusion

The landscapes of the Karshi steppe have been undergoing serious ecological transformation in recent years under the influence of climate change and intensive anthropogenic pressure. The expansion of agriculture in the region, land reclamation processes, and the development of infrastructure have led to the fragmentation of natural geosystems and a decrease in their biological productivity.

The main conclusions of the study are as follows: Degree of anthropogenesis: In the Karshi Desert, the human factor has radically changed the natural structure of landscapes, ensuring the dominance of technogenic elements. This situation reduces the self-recovery capacity of landscapes and puts them at risk of desertification.

Ecological consequences: Intensification of irrigated agriculture and livestock farming has impoverished the species composition of the rangeland flora. The reduction in atmospheric precipitation and the increase in drought in the region, combined with these anthropogenic impacts, have undermined ecological stability.

Scientific approach: Based on the theories of landscape science, in particular, the classifications of F.N. Milkov, it was determined that the Karshi Desert is currently in the latest stage of development of the anthropogenic stage. This period requires the use of complex geographical and ecological approaches to the use of nature.

Practical significance: To preserve landscapes and stop degradation, it is necessary to introduce a set of measures aimed at pasture rotation, reclamation of degraded areas, and assessment of ecosystem services, taking into account the geophysical characteristics of the territory.

In general, the sustainable preservation of the landscapes of the Karshi steppe can be achieved through the rational use of their natural resource potential and the coordination of human economic activities within ecological boundaries. This, in turn, is the main guarantee of ensuring the socio-economic development and ecological safety of the region.

References:

1. Qarshiboyeva Shaxnoza G'ayrat qizi, Jomolov Eliyor Abdurasul o'g'li, Tabiiy-antropogen landshaftlar rivojlanishining mazmun va mohiyati hamda geoekologik qarashlarning ilmiy-nazariy masalalari. O'zbekiston Respublikasi hududlarini barqaror rivojlantirishning geagrafik asoslari. Respublika ilmiy-nazariy konferensiyasi Vol. 1 No. 16 (2025):
2. Alibekov L.A, Nishonov S.A. «Tabiatni muhofaza qilish va tabiiy resurslardan ratsional foydalanish». Toshkent. «O'qituvchi». 1983 y. 45-74b.
3. Maxmudov M. M., Qorakulchilik yaylovlarining hozirgi holati va istiqbolli fitomeliorantlarni tanlashning asosiy kriteriyalari. Chul-yaylov chorvachiligini rivojlantirish muammolari. Samarqand, 2005, 187-189 b.



4. Шамсутдинов З.Ш. Создание долголетних пастбищ в аридной зоне Средней Азии. Ташкент: Фан, 1975, 176 с.
5. Diwediga, B.; Wala, K.; Folega, F.; Dourma, M.; Woegan, YA; Akpagana, K.; Le, QB Mo tepalik havzasida (Togo) landshaft naqshlari va o'simlik jamoalarining degradatsiyasining biofizik va antropogen determinantlari. Ecol. Eng. 2015, 85, 132–143.
6. Arnan, X.; Leal, IR; Tabarelli, M.; Andrade, JF; Barros, MF; Câmara, T.; Jamelli, D.; Knoechelmann, CM; Menezes, TG; Menezes, AG Surunkali antropogen buzilishlarni o'lchash uchun asos: Braziliya Caatingasida surrogat, to'g'ridan-to'g'ri, bitta va ko'p metrik indekslar. Ecol. Indic. 2018, 94, 274–282.
7. De Chazal, J.; Rounsevell, MD Bioxilma-xillik o'zgarishini baholash doirasida yerdan foydalanish va iqlim o'zgarishi: Sharh. Glob. Environ. Change 2009, 19, 306–315.
8. Martirosyan, A.; Ilyushin, Y.; Afanaseva, O.; Kuxarova, T.; Asadulagi, M.; Xloponina, V. Neft konining kontseptual modelini ishlab chiqish. Xalqaro J. Eng. Trans. B Appl. 2025, 38, 381–388.
9. Davidar, P.; Sahoo, S.; Mammen, PC; Acharya, P.; Puyravaud, J.-P.; Arjunan, M.; Garrigues, JP; Roessingh, K. Hindistonda o'rmonlarning degradatsiyasi darajasi va sabablarini baholash: Biz qayerda turibmiz? Biol. Conserv. 2010, 143, 2937–2944.
10. Specht, MJ; Pinto, SRR; Albuquerque, UP; Tabarelli, M.; Melo, FP Yonayotgan biologik xilma-xillik: Yoqilg'i yog'ochini yig'ish odamlar hukmronlik qiladigan tropik landshaftlarda o'rmonlarning degradatsiyasiga olib keladi. Glob. Ecol. Conserv. 2015, 3, 200–209.
11. Ribeiro, EM; Arroyo-Rodriguez, V.; Santos, BA; Tabarelli, M.; Leal, IR Surunkali antropogen buzilish Braziliya Caatinga o'simliklarining biologik qashshoqlashishiga olib keladi. J. Appl. Ecol. 2015, 52, 611–620.
12. Rito, KF; Arroyo-Rodriguez, V.; Keyroz, RT; Leal, IR; Tabarelli, M. Yog'ingarchilik Braziliya Caatinga o'simliklariga inson buzilishining ta'siriga vositachilik qiladi. J. Ekol. 2017, 105, 828–838.
13. Bogaert, J.; Koline, G.; Mahy, G. Anthropisation des Paysages Katangais; Presses Universitaires de Liège — Agronomie-Gembloux: Gembloux, Belgique, 2018.
14. Bogaert, J.; Vranken, I.; André, M. Landshaftlarga antropogen ta'sirlar: tarixiy kontekst va fazoviy naqsh. Biomadaniy landshaftlarda; Hong, SK, Bogaert, J., Min, Q., muharrirlar; Springer: Dordrecht, Niderlandiya, 2014; 89–112-betlar.
15. Gagarina, O.; Kovalchuk, O. Landshaft-gidrologik komplekslarga antropogen ta'sirni baholash. Geogr. Nat. Resource. 2010, 31, 291–295.
16. Abdullayev S.I., Nazarov M.G. Qashqadaryo havzasining antropogen landshaftlari va ularning geoekologik holati/ Monografiya. Qarshi -2020 y. 133 b.