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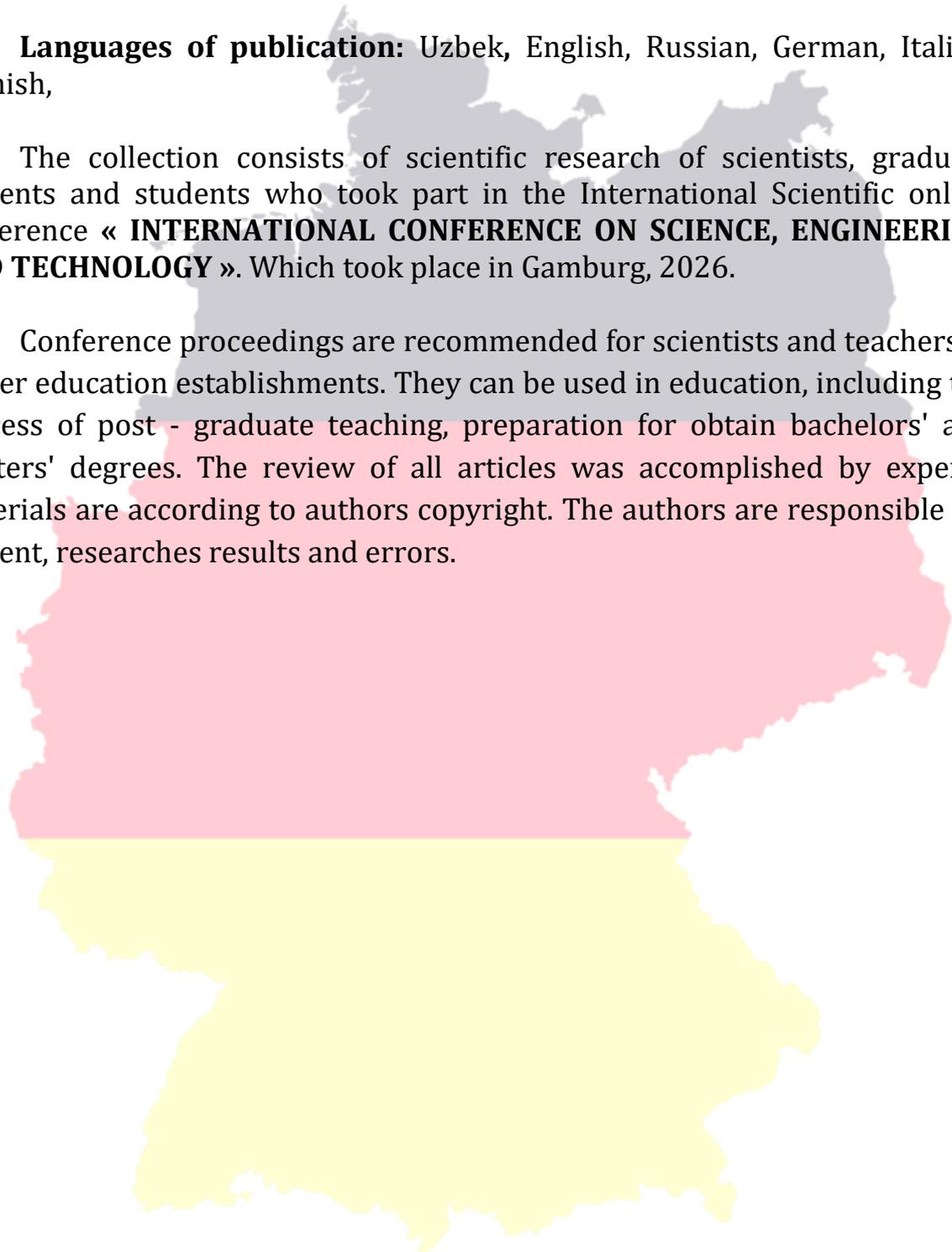


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The Role of Desert and Semi-Desert Landscapes in the Development of Ecotourism in the Khorezm Region

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Abstract: Desert and semi-desert landscapes represent unique natural systems with high ecological, scientific, and tourism value. In recent years, ecotourism has emerged as an effective tool for balancing environmental conservation and socio-economic development, especially in environmentally vulnerable regions. This article examines the role of desert and semi-desert landscapes in the development of ecotourism in the Khorezm region of Uzbekistan. The study analyzes the natural and geographical characteristics of the region, ecological conditions, biodiversity, and existing tourism potential. Special attention is paid to the opportunities and limitations of desert-based ecotourism under conditions of climate change, water scarcity, and anthropogenic pressure. The research highlights the importance of sustainable management, community involvement, and environmental education in promoting ecotourism. The findings suggest that the rational use of desert and semi-desert landscapes can significantly contribute to regional development while ensuring environmental protection.

Keywords: Ecotourism, desert landscapes, semi-desert, Khorezm region, sustainable tourism, biodiversity, environmental protection.

Introduction: Ecotourism has become one of the most dynamic sectors of the global tourism industry, driven by increasing awareness of environmental issues and the growing demand for nature-based travel. According to international tourism studies, ecotourism contributes not only to environmental conservation but also to the socio-economic development of rural and remote regions. Desert and semi-desert landscapes, often perceived as harsh and unproductive environments, are now recognized as valuable ecological systems with significant tourism potential.

The Khorezm region, located in the lower reaches of the Amu Darya River, is characterized by a combination of irrigated agricultural lands, desert and semi-desert landscapes, and unique cultural heritage. The region is closely connected to the Aral Sea basin, which has experienced severe environmental degradation. In this context, ecotourism can play a crucial role in mitigating ecological problems, diversifying the regional economy, and raising environmental awareness.

The purpose of this article is to analyze the role of desert and semi-desert landscapes in the development of ecotourism in the Khorezm region. The objectives of the study include assessing natural and ecological conditions, identifying tourism resources, analyzing challenges, and proposing sustainable development strategies.

The Khorezm region is situated in northwestern Uzbekistan and occupies part of the Amu Darya delta. It borders Turkmenistan to the west and south and



Karakalpakstan to the north. The region lies within an arid climate zone, where desert and semi-desert landscapes dominate large areas beyond irrigated zones. The climate of Khorezm is sharply continental and arid, characterized by hot summers and cold winters. Average summer temperatures often exceed 40°C, while winter temperatures can drop below -10°C. Annual precipitation is low, ranging between 80–120 mm, which significantly influences vegetation cover and land use.

The study is based on a combination of qualitative and quantitative research methods, including:

Analysis of scientific literature and regional statistical data

Geographical and ecological analysis of landscapes

Comparative analysis of ecotourism development models

Descriptive assessment of tourism potential

Desert and semi-desert landscapes in Khorezm are primarily represented by sandy plains, takyr soils, and saline areas. These landscapes are shaped by natural processes such as wind erosion, sedimentation, and climatic extremes. Despite harsh conditions, they support unique ecosystems adapted to aridity. Soils in desert and semi-desert zones are mainly sandy, saline, and low in organic matter. Vegetation is sparse and dominated by drought-resistant species such as saxaul (*Haloxylon*), tamarisk (*Tamarix*), and salt-tolerant shrubs. These plants play a crucial role in stabilizing soils and preventing desertification. The fauna of desert landscapes includes reptiles, small mammals, insects, and bird species adapted to extreme conditions. Although biodiversity levels are lower compared to humid regions, desert ecosystems are highly specialized and ecologically valuable. Protecting these species is an important component of sustainable ecotourism. Desert ecotourism focuses on responsible travel to arid environments, emphasizing environmental conservation, cultural respect, and educational experiences. Activities include guided nature tours, wildlife observation, scientific expeditions, and eco-camping.

Ecotourism can serve as an alternative source of income for local communities, reducing dependence on agriculture and natural resource exploitation. By creating employment opportunities in guiding, accommodation, and handicrafts, ecotourism supports rural development.

In the Khorezm region, community-based ecotourism can enhance social cohesion and preserve traditional knowledge related to nature and land use. Involving local residents in tourism planning and management is essential for long-term sustainability. Water scarcity is one of the most critical challenges affecting desert ecosystems in Khorezm. Climate change has intensified droughts and reduced water availability, increasing pressure on fragile environments. Agricultural expansion, overgrazing, and infrastructure development contribute to land degradation and biodiversity loss. Uncontrolled tourism activities may further exacerbate environmental problems if not properly managed. Limited transport



access, lack of eco-friendly accommodation, and insufficient tourism services restrict the growth of ecotourism in desert areas. Addressing these issues requires investment and strategic planning. Engaging local communities in decision-making processes ensures social acceptance and economic benefits. Training programs for eco-guides and small tourism enterprises are essential. Ecotourism should serve as a platform for environmental education, promoting awareness of desert ecosystems, climate change, and biodiversity conservation among tourists and residents.

The analysis demonstrates that desert and semi-desert landscapes in the Khorezm region possess significant untapped ecotourism potential. However, successful development depends on balancing tourism growth with environmental protection. International experiences show that well-managed desert ecotourism can contribute to sustainable development even in fragile ecosystems. Ecotourism in arid and semi-arid regions is based on the principle of minimizing environmental impact while maximizing educational and conservation benefits. Unlike mass tourism, desert ecotourism emphasizes low-intensity activities, small group travel, and strict ecological regulations. Scientific studies indicate that arid ecosystems are among the most fragile environments due to slow natural regeneration processes.

In desert regions such as Khorezm, even minor anthropogenic disturbances may cause long-term ecological damage. Therefore, ecotourism development must rely on geographical zoning, landscape sensitivity assessment, and ecological carrying capacity analysis. These approaches ensure that tourism activities remain within sustainable limits. Landscape sensitivity refers to the degree to which natural landscapes respond to external impacts. Desert and semi-desert landscapes are highly sensitive due to: In the Khorezm region, sandy deserts and saline soils are particularly susceptible to degradation. Scientific assessment of landscape sensitivity is essential before establishing ecotourism routes or facilities. Carrying capacity is defined as the maximum number of visitors that an area can accommodate without causing irreversible environmental damage. In desert environments, carrying capacity is significantly lower than in forested or mountainous regions. Climate change has a profound impact on desert ecosystems worldwide. Rising temperatures, increased evaporation, and changing precipitation patterns intensify desertification processes. In the Khorezm region, climate change exacerbates water scarcity and land degradation, directly affecting ecotourism potential. However, climate change also increases scientific interest in desert ecosystems. Ecotourism can support climate research tourism, where visitors participate in environmental monitoring and educational programs focused on climate adaptation strategies. One of the strongest advantages of ecotourism development in the Khorezm region is the integration of natural landscapes with rich cultural and historical heritage. The region is home to ancient settlements, archaeological sites, and traditional rural landscapes shaped by centuries of human-

environment interaction. Desert ecosystems host specialized flora and fauna adapted to extreme conditions. Ecotourism can contribute to biodiversity conservation by: In Khorezm, ecotourism revenues could support conservation projects in desert buffer zones and degraded lands affected by salinization. Community-based ecotourism (CBET) emphasizes local ownership and management of tourism activities. This model is particularly suitable for rural desert regions, where local communities possess valuable traditional ecological knowledge. The integration of GIS and remote sensing technologies allows continuous monitoring of environmental changes and tourism impacts. The successful development of ecotourism in desert regions requires supportive policies and institutional coordination. National tourism strategies, environmental protection laws, and regional development programs must be harmonized. In Uzbekistan, ecotourism development aligns with sustainable development goals (SDGs), particularly those related to environmental protection, economic diversification, and community well-being. International experience demonstrates that desert ecotourism can be successfully developed in regions such as: The Sahara Desert (North Africa)

The Mojave Desert (USA)

The Australian Outback

These regions apply strict environmental regulations, community participation, and educational tourism models. Lessons from these practices can be adapted to the Khorezm context.

Desert and semi-desert landscapes of the Khorezm region represent a valuable yet underutilized resource for sustainable ecotourism development. Despite environmental vulnerability and climate-related challenges, these landscapes possess high scientific, ecological, and tourism value.

This study confirms that ecotourism, when based on scientific planning, environmental protection, and community involvement, can become a strategic tool for regional development. The integration of desert landscapes into ecotourism not only diversifies the local economy but also contributes to biodiversity conservation and climate change awareness.

Future research should focus on quantitative environmental assessments, GIS-based tourism planning, and pilot ecotourism projects in desert areas of Khorezm.

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