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CLIMATE CHANGE, BIODIVERSITY CONSERVATION, AND NATURAL RESOURCE MANAGEMENT: A COMPARATIVE STUDY OF ENVIRONMENTAL SUSTAINABILITY IN TAJIKISTAN AND ROMANIA

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Introduction

Climate change, biodiversity loss, and increasing pressure on natural resources represent major environmental challenges for Tajikistan and Romania, affecting ecosystem stability, water availability, and sustainable development. Despite their different geographical and environmental conditions, both countries face growing risks associated with land degradation, climate variability, and habitat deterioration, highlighting the need for integrated environmental management strategies, biodiversity conservation, and responsible natural resource utilization. Protecting biodiversity and natural ecosystems is essential for strengthening climate resilience, preserving natural resources, and ensuring long-term environmental sustainability in both countries.

Material and method

The study employs a qualitative and comparative research approach based on scientific literature, environmental reports, and national policy documents from Tajikistan and Romania, focusing on six key dimensions: climate change vulnerability, biodiversity conservation, water resource management, forest and land protection, environmental governance, and opportunities for sustainable development cooperation, with particular attention to ecological challenges, institutional frameworks, and strategies for improving environmental resilience. A comparative thematic matrix was used to identify similarities and differences between the two countries in ecological vulnerability, biodiversity conservation, resource management, and institutional capacity, while considering the role of environmental monitoring and geospatial technologies in supporting sustainable development.

Result and discussions

The comparative analysis reveals distinct environmental challenges in Tajikistan and Romania, reflecting their geographical characteristics and ecological vulnerabilities. Tajikistan faces glacier retreat, mountain ecosystem degradation, and hydrological variability, while Romania experiences drought, forest degradation, habitat fragmentation, and increasing climate-related risks. Both countries require integrated strategies for biodiversity conservation, sustainable water and land management, and ecosystem restoration to strengthen environmental resilience. The analysis emphasizes the importance of ecosystem restoration, sustainable forest management, and soil conservation in reducing environmental degradation. Improved environmental monitoring, modern technologies, and international scientific cooperation can further support biodiversity protection, efficient resource utilization, and long-term ecological resilience in both countries.

The results also highlight the need for country-specific environmental strategies, with Tajikistan prioritizing glacier monitoring, mountain ecosystem protection, and water security, while Romania focuses on drought adaptation, forest conservation, and habitat restoration. Integrating these priorities into sustainable development policies can improve ecosystem resilience and reduce environmental vulnerability.

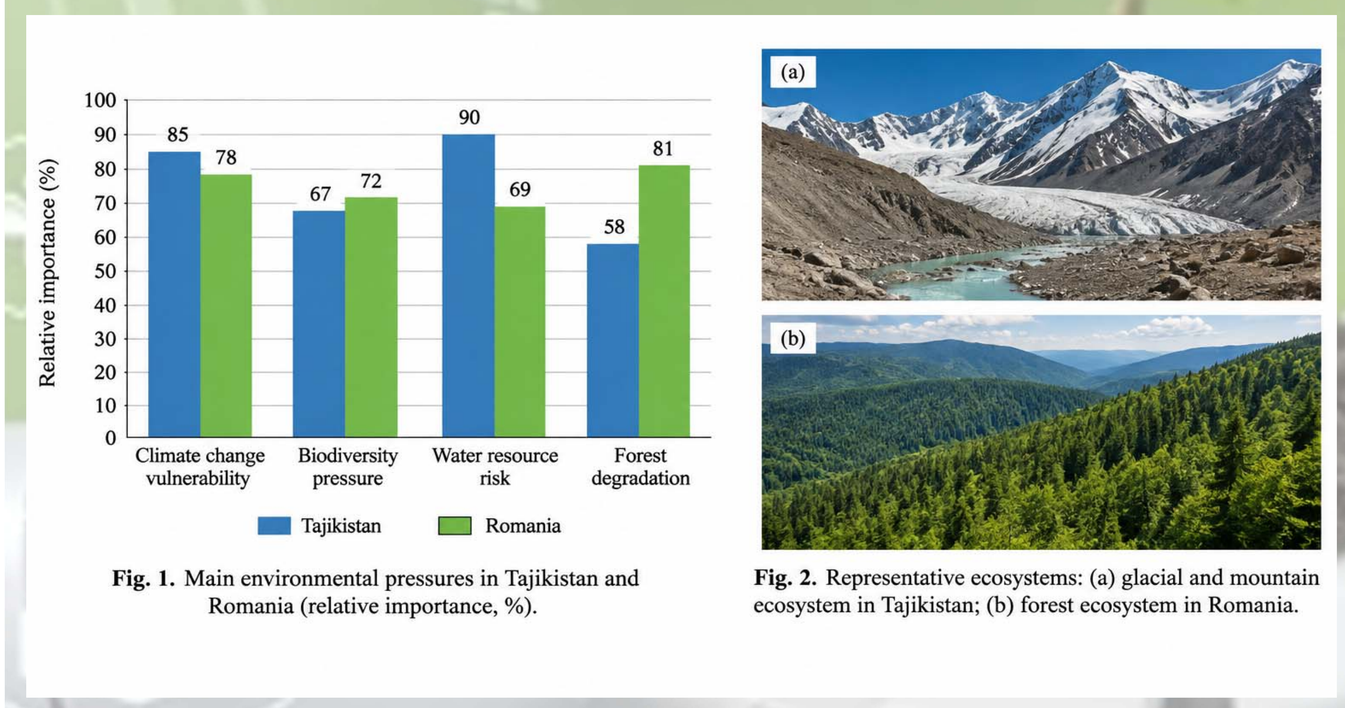


Fig. 1. Main environmental pressures in Tajikistan and Romania (relative importance, %).

Fig. 2. Representative ecosystems: (a) glacial and mountain ecosystem in Tajikistan; (b) forest ecosystem in Romania.

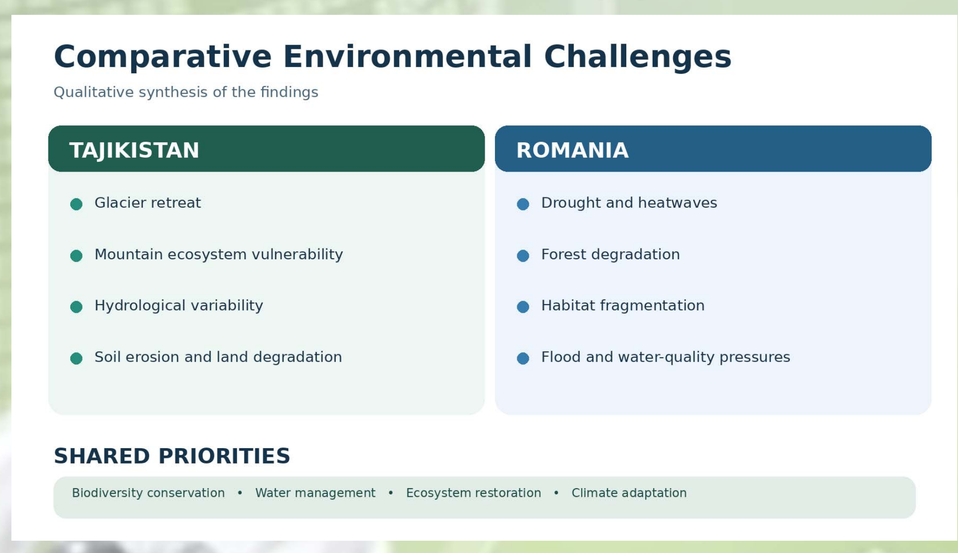


Fig. 3. Comparative overview of environmental challenges and shared sustainability priorities in Tajikistan and Romania.

The comparative findings highlight distinct environmental vulnerabilities in Tajikistan and Romania, reflecting differences in geographical conditions, climate-related risks, and natural resource availability, while emphasizing the shared importance of biodiversity conservation, sustainable water and land management, ecosystem restoration, and integrated climate adaptation strategies to strengthen ecological resilience, reduce environmental degradation, and support long-term sustainable development in both countries.

Conclusions

The comparative study highlights the importance of integrating climate adaptation, biodiversity conservation, and sustainable natural resource management. Tajikistan faces challenges related to glacier retreat and mountain ecosystems, while Romania is affected by drought, forest degradation, and habitat fragmentation. Both countries require effective ecosystem restoration, sustainable water management, and stronger environmental monitoring. Scientific cooperation, innovative technologies, and coordinated policies are essential for improving ecological resilience and ensuring long-term sustainability.

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