

Abiotic factors as environmental pressures on protected natural ecosystems: A case study of the South-East Region, Republic of Moldova

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ABSTRACT: Republic of Moldova is characterized by a high diversity of natural landscapes, accompanied by pronounced vulnerability to environmental change and anthropogenic pressures. This study presents an integrated assessment of geo-ecosystem vulnerability and the cumulative impact of abiotic and anthropogenic factors on natural habitat status and biodiversity conservation. It focuses on the southeastern region of the country. The research is transdisciplinary, based on the integrated analysis of geological, geomorphological, hydrological, climatic, and pedological data, correlated with the structure of the National Ecological Network and the protected natural areas system, and complemented by GIS analysis and field observations. Land use is dominated by human activities, particularly agriculture and built-up areas, at the expense of natural vegetation, which is unevenly distributed and lacks ecological connectivity. Abiotic pressures and threats include slope and soil erosion, riverbank instability, and reservoir siltation, all amplified by hydromorphological alterations of the Dniester River and its tributaries. Climate analysis reveals rising mean annual temperatures and an increasing frequency of extreme events in the region. Consequently, 70% of the study area exhibits landscape instability, with 20% of the territory categorized as highly vulnerable to climate change, which underscores the urgent need for natural heritage conservation. The overlay of the most intense environmental pressures indicates that around 18% of the study area exhibits high vulnerability, unfortunately overlapping with some of the region's most valuable protected ecosystems. To address these challenges, the study provides practical recommendations for protected area management, including enhanced ecological connectivity, habitat restoration, and the integration of climate adaptation strategies into biodiversity conservation planning.

KEYWORDS: threats and pressure, natural habitats, biodiversity, climate change, ecosystem management

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