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DYNAMICS OF CLIMATE CHANGE AND POLLUTION IN THE PERI-URBAN AREAS OF ROMANIA

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Abstract: Peri-urban areas in Romania are highly vulnerable to climate change and pollution due to rapid land-use changes and increasing anthropogenic pressure. This study analyses the dynamics of key climatic and environmental indicators, highlighting rising average temperatures, increased frequency of extreme weather events, and growing variability in precipitation patterns. The main pollution sources, road traffic, residential heating, and industrial and agricultural activities are examined in relation to their impact on air, soil, and water quality. The results indicate a strong interdependence between climate change processes and pollution levels, particularly during periods of drought and heatwaves, which intensify pollutant accumulation. The study emphasizes the need for integrated sustainable development strategies focused on emission reduction.

• Introduction

Peri-urban areas represent dynamic transition zones between urban and rural environments, characterized by rapid land-use changes, population growth, and increasing socio-economic complexity. In Romania, these areas have undergone significant transformations over the past decades, driven primarily by urban expansion, infrastructure development, and the relocation of economic activities.

As a result, peri-urban zones have become key spaces where environmental pressures, particularly those related to climate change and pollution, are strongly manifested.

• Material and method

The study is based on a descriptive and analytical approach, focusing on the dynamics of climate change and pollution in Romania's peri-urban areas during the period 2019–2023. The analysis uses secondary data from national and European environmental sources, including meteorological information, air quality indicators and land-use data

• Results and discussions

The research results indicate that peri-urban areas in Romania are exposed to a complex combination of climatic, environmental and socio-economic pressures. These areas are not affected only by the general effects of climate change, but also by local processes such as urban expansion, land-use conversion, increased road traffic, residential development and the concentration of industrial and logistical activities. As a result, the environmental vulnerability of peri-urban zones is higher than in purely rural areas, while their capacity to adapt is often limited by fragmented spatial planning and insufficient green infrastructure.

• Conclusions

The analysis carried out in this study highlights that peri-urban areas in Romania are increasingly exposed to the combined effects of climate change, pollution and rapid territorial transformation. These areas represent sensitive transition zones where urban expansion, infrastructure development, residential growth, industrial activities and agricultural land use coexist and generate complex environmental pressures