

SUSTAINABLE DEVELOPMENT OF THE REGION THROUGH THE LENS OF ENVIRONMENTAL IMPACT (ON THE EXAMPLE OF UKRAINE'S WESTERN REGION)

RYGAILO Sviatoslava

Leading Engineer

Western Scientific Center of the National Academy of Sciences of Ukraine and the Ministry of Education and Science of Ukraine

ORCID ID: <https://orcid.org/0009-0002-0871-8351>

Abstract. *This article analyzes the structure and geographical characteristics of emissions of major air pollutants (SO₂, NO, NO₂, CO, and particulate matter) in Ukraine, with a focus on the western region. It has been established that the contribution of various economic sectors to pollution formation is uneven, and environmental impact levels vary significantly between regions and change over time. The results underscore the importance of integrated emissions management, the modernization of industrial enterprises and thermal power plants, the development of renewable and hydrogen energy, as well as the improvement of GIS monitoring systems to ensure sustainable development and environmental safety.*

Keywords: *air pollution, environmental burden on the economy, sectoral structure of emissions, correlation analysis, western region of Ukraine, sustainable development.*

This article examines the issue of sustainable regional development through the lens of environmental impact, using the western region of Ukraine as a case study. It analyzes the structure and dynamics of emissions of major air pollutants, including sulfur dioxide, nitrogen oxides, carbon monoxide, and particulate matter. It has been established that the level of environmental impact is uneven and varies significantly depending on the sectoral structure of the economy and the territorial characteristics of individual regions.

Particular attention is paid to the role of industry, energy, and transportation in determining emission levels. It is substantiated that energy enterprises and industrial complexes contribute the most to pollution, while in some regions the impact of the transport sector is increasing. Trends in changes in the environmental load over time have been identified, which are associated with both transformational processes in the economy and the implementation of environmental protection measures.

The necessity of an integrated approach to emissions management is demonstrated, which involves the modernization of production facilities, improved energy efficiency, and the development of renewable and hydrogen energy. The importance of using modern information technologies, particularly geographic information systems, for environmental monitoring and management decision-making is emphasized.

It was concluded that reducing the environmental burden is a key prerequisite for ensuring the region's sustainable development, improving the quality of life for the population, and strengthening environmental security. The implementation of the proposed measures will contribute to harmonizing economic growth and the preservation of the natural environment.

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