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Integrated Water Resources Management and Ecological Status Assessment in the Banat Hydrographic Area, Romania

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Abstract This study synthesizes reported hydrological and ecological indicators for the Banat Hydrographic Area, south-western Romania, within the European Water Framework Directive. A documentary analysis of supplied basin-management material was used to characterize water-body typology, pressures, monitoring and management implications.

• Introduction

Integrated water resources management combines hydrological, ecological, economic and institutional considerations within a common river-basin framework. In the European Union, Directive 2000/60/EC establishes the objective of preventing deterioration and achieving good ecological and chemical status for natural surface waters, while heavily modified water bodies are assessed against ecological potential [1]. These distinctions are important when interpreting basin-level assessments.

Material and method

The study area corresponds to the Banat Hydrographic Area, bounded by the Mureș basin to the north, Serbia to the west, the Jiu hydrographic area and Mureș basin to the east, and the Danube to the south. The source material reports an area of 18,312.20 km², equivalent to 7.68% of Romania, and a registered river network of 389 watercourses totaling 6,704.87 km. The main sub-basins include Aranca, Timiș, Bega, Caraș, Nera and Cerna.

• Results and discussions

The Banat relief ranges from the Godeanu, Țarcu, Cerna and Banat mountains to the Western Plain. This topographic gradient produces substantial differences in runoff generation, channel slope, sediment transport, aquifer recharge and exposure to floods or low-flow periods. The source reports mean annual precipitation broadly ranging between 600 and 1,400 mm, with spatial differences driven by elevation and atmospheric circulation. Geological diversity also influences hydrological behavior.

Conclusions

The Banat Hydrographic Area is a heterogeneous water-management system encompassing 18,312.20 km² and more than 6,700 km of registered watercourses. The source reports 311 surface-water bodies, including 236 natural, 74 heavily modified and one artificial body. Intermittent river bodies constitute a substantial share of the river network.