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TOPOGRAPHIC AND CADASTRAL ASSESSMENT OF BUILT-UP AREA BOUNDARY DELIMITATION IN GENERAL URBAN PLANNING: A CASE STUDY OF EZERIȘ COMMUNE, ROMANIA

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Introduction

The expansion of built-up areas represents an important challenge for territorial planning, land management, and infrastructure development in rural communities. Accurate topographical and cadastral information is essential for establishing urban boundaries, evaluating land-use changes, and ensuring consistency between property records and urban planning regulations. This study examines the proposed expansion of the built-up areas of Ezeriș and Soceni, two localities within Ezeriș Commune, Caraș-Severin County, Romania. The research focuses on comparing existing and proposed urban boundaries and evaluating the spatial and quantitative implications of territorial development. Particular attention is given to the integration of cadastral documentation, topographic mapping, and General Urban Plan (PUG) proposals to support coherent and sustainable rural development.

Material and method

The research is based on topographic and cadastral documentation, technical reports, and General Urban Plan (PUG) drawings for Ezeriș and Soceni localities. Topographic measurements were performed using a Leica TC705 total station and a STONEX S900A GNSS receiver, with spatial data represented in the Stereographic 1970 coordinate system. Topographic plans at a scale of 1:2000 were examined to identify existing and proposed built-up boundaries, cadastral configurations, road networks, and territorial development areas. The methodology involved comparing existing and proposed surfaces, calculating absolute extensions in hectares and relative increases in percentages, and evaluating the contribution of each locality to the overall territorial expansion. Cartographic interpretation was used to assess the spatial continuity of the proposed boundaries and their relationship with existing infrastructure.

Result and discussions

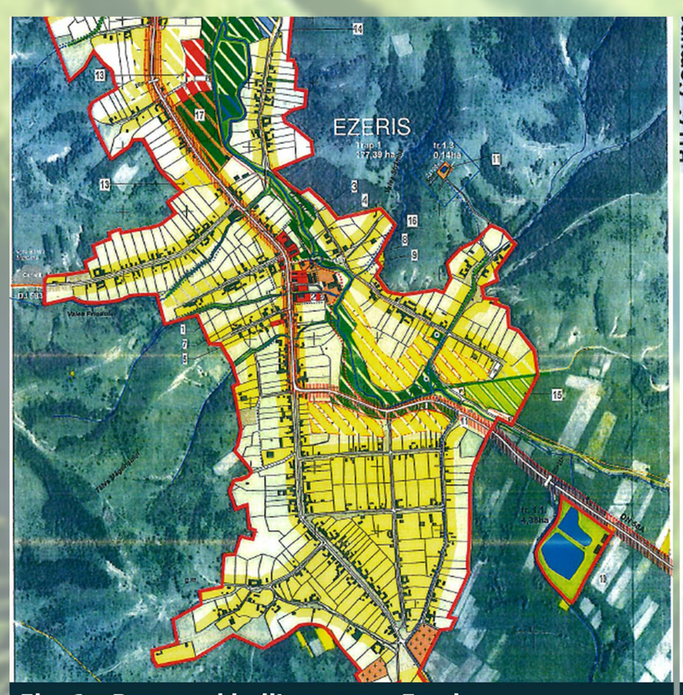

Fig. 1 – Proposed built-up area: Ezeriș

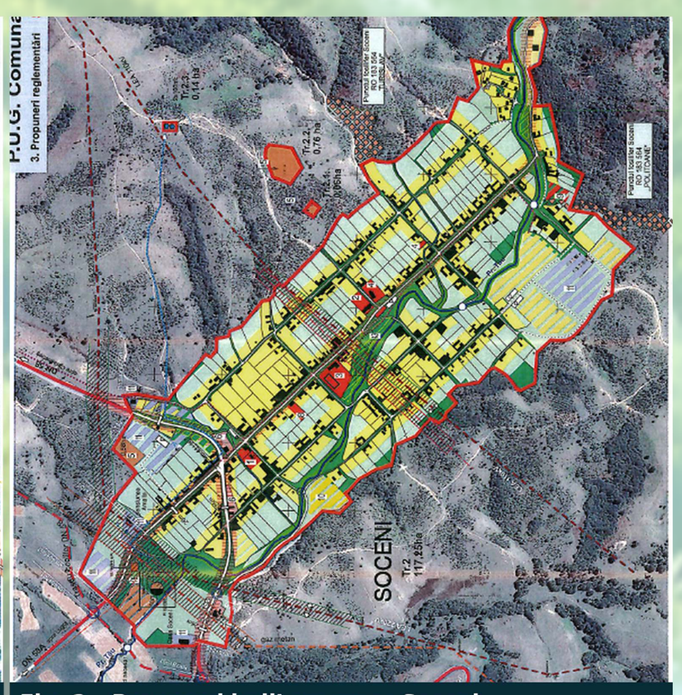

Fig. 2 – Proposed built-up area: Soceni

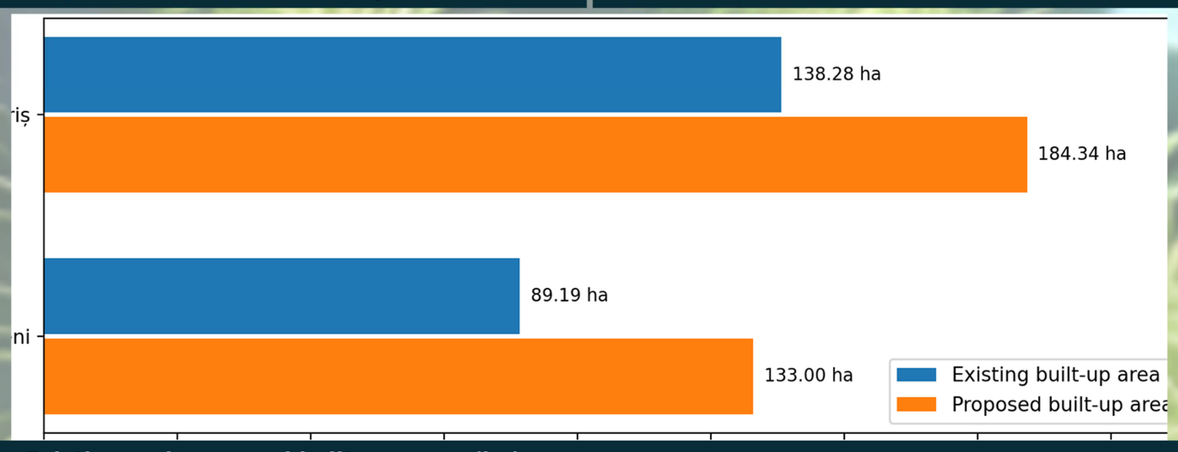

Fig. 3 – Existing and proposed built-up areas (ha)

The cartographic analysis illustrates the proposed built-up area boundaries and spatial organization of Ezeriș and Soceni, highlighting their relationship with existing settlements, road networks, and surrounding land (Figs. 1 and 2).

In Ezeriș, the built-up area increases from 138.28 ha to 184.34 ha, representing an extension of 46.06 ha (33.31%). In Soceni, the proposed built-up area reaches 133.00 ha, compared with 89.188 ha in the existing situation, corresponding to an increase of 43.812 ha (49.12%) (Fig. 3). The cumulative extension of the two localities is 89.872 ha, increasing the total built-up area from 227.468 ha to 317.340 ha, equivalent to an overall growth of 39.51%. Although the absolute extensions are relatively similar, Soceni records a higher percentage increase due to its smaller initial built-up area.

Ezeriș contributes 51.25% to the total expansion, while Soceni accounts for 48.75%. The results highlight the importance of combining quantitative indicators with cartographic analysis to evaluate territorial changes and support coherent urban planning decisions.

The analysis reveals that both localities contribute significantly to the proposed territorial expansion, with Ezeriș accounting for 51.25% and Soceni for 48.75% of the total increase. The higher relative growth recorded in Soceni (49.12%) highlights the importance of considering initial settlement size when evaluating urban development. The integration of topographic and cadastral information supports accurate boundary delimitation, infrastructure planning, and coherent territorial development.

Conclusions

The study demonstrates the essential role of topographical and cadastral information in evaluating built-up area extensions and supporting General Urban Planning in rural communities. The proposed expansion reaches 46.06 ha in Ezeriș and 43.812 ha in Soceni, resulting in a cumulative increase of 89.872 ha. Although the absolute extensions are comparable, Soceni records a higher relative growth of 49.12%, compared with 33.31% in Ezeriș. The integration of topographic plans, cadastral boundaries, and urban planning documentation provides a consistent framework for evaluating territorial changes, infrastructure accessibility, and future development opportunities. Overall, the comparative methodology supports accurate boundary delimitation, improved land management, and coherent spatial planning, with potential applicability to other rural localities undergoing territorial expansion.

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