Summary of the doctoral dissertation titled:

The use of remote sensing data and GIS tools in the process of rural areas shaping

Sustainable development of rural areas is one of the biggest challenges in Poland. Ensuring proper level of rural development, while limiting its negative impact on the environment, is an extremely difficult task requiring the application of legal, economic and technical measures. One of the most important tools allowing for the shaping of rural areas are land consolidation works. They allow to put spatial structure of arable land into order and, at the same time, enable the improvement of road infrastructure and hydrographic conditions. Land consolidation works allow for a significant improvement of conditions for agricultural activity and their effects are visible for many years. In Poland, there is a noticeable demand for land consolidation works, which, however, are long-term processes. Therefore, it is of great importance to implement these activities as effectively as possible, as it will not only allow to organize the spatial structure, but will also ensure proper environmental conditions.

The work presents the possibilities of using remote sensing data and GIS tools in the processes of shaping rural areas. The research area covered locations in the Małopolska Voivodeship. Remote sensing data were used, which were represented mainly by data obtained using LiDAR (Light Detection and Ranging) technology. Solutions were proposed to improve the works related to the assessment of the existing state, which is carried out within the framework of land consolidation. The developed methodology may improve land consolidation works on three levels, which concern the analysis of the parameters of land fragmentation, analysis of arable land on which agricultural production has stopped, and the possibility of using data on erosion hazard. The use of remote sensing data and GIS tools allows not only to supplement the data that has been used in land consolidation, but also to obtain new data that can be used in consolidation works. The results allow to conclude that the presented methodology provides a comprehensive set of tools, making it a valuable source of information from the point of view of land consolidation works.

Keywords: land consolidation, GIS, LiDAR

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