

Abstract

A CONCEPT OF A GIS MULTI-METRIC ANTHROPOGENIC PRESSURE INDEX

Widespread suburbanisation and significant anthropogenic pressure have tremendous repercussions for the environment. The transformations they cause are both multi-faceted and dynamic. It is, therefore, important to seek such methods for measuring anthropogenic pressure, analysing it, and presenting scientific results that could employ measurable parameters and expert knowledge to represent the scale and diversity of this phenomenon.

In light of the above, the dissertation proposes a concept of a Multi-metric Anthropogenic Pressure Index for the effective identification of areas under anthropogenic pressure and calculation of its intensity. To this end, the author used universal and versatile computational GIS algorithms based on advanced geoprocessing tools to propose and calculate a set of 18 component indices as potential diagnostic characteristics for an econometric anthropogenic pressure model. The input was both vector spatial data models and descriptive statistical data. The study area covered a ten-kilometre ring around Kraków city limits, a zone under a significant development and settlement pressure. The index was calculated three times for three different basic fields of assessment. Three econometric models were built using backward stepwise selection, one for each analytical variant. The models were verified with control models in the form of linear regression equations. The diagnostic features for the equations were selected with Hellwig's method and expert knowledge.

The proposed concept was found to facilitate the effective measurement of anthropogenic pressure, understanding of the significance of factors that affect it, and potentially spatial-planning decision-making. Thanks to its versatility, the concept can be implemented for any study area for which a set of preprocessed input data is available.

Keywords: anthropogenic pressure, GIS, econometric model of anthropogenic pressure, Hellwig's method for selection of diagnostic variables, spatial engineering, geostatistics

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