



## **Delimitation of areas under the real pressure from agricultural activities due to nitrate water pollution in Poland**

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The aim of the performed research was to determine catchments under the nitrogen pressure in Poland in period of 2007–2010. National Water Management Authority in Poland uses the elaborated methodology to fulfil requirements of Nitrate Directive and Water Framework Directive. Multicriteria GIS analysis was conducted on the base on various types of environmental data, maps and remote sensing products. Final model of real agricultural pressure was made using two components: (i) potential pressure connected with agriculture (ii) the vulnerability of the area.

The agricultural pressure was calculated using the amount of nitrogen in fertilizers and the amount of nitrogen produced by animal breeding. The animal pressure was based on the information about the number of bred animals of each species for communes in Poland. The spatial distribution of vegetation pressure was calculated using kriging for the whole country base on the information about 5000 points with the amount of nitrogen dose in fertilizers.

The vulnerability model was elaborated only for arable lands. It was based on the probability of the precipitation penetration to the ground water and runoff to surface waters. Catchment, Hydrogeological, Soil, Relief or Land Cover maps allowed taking into account constant environmental conditions. Additionally information about precipitation for each day of analysis and evapotranspiration for every 16-day period (calculated from satellite images) were used to present influence of meteorological condition on vulnerability of the terrain.

The risk model is the sum of the vulnerability model and the agricultural pressure model. In order to check the accuracy of the elaborated model, the authors compared the results with the eutrophication measurements. The model accuracy is from 85,3% to 91,3%.