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Mapping river flood protection demand and supply in Lithuanian floodplain areas. A national scale analysis

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River floods are an important threat to the environment, society, and economy. In Europe is one of the most important natural hazards, responsible for agriculture areas destruction, human fatalities, and enormous economic losses. Climate change will increase the frequency and severity of river floods. In addition to this, the increasing soil sealing as a consequence of urbanization expansion will increase the floods destruction capacity and vulnerability of populated areas to these events. In Lithuania, after the Soviet Union collapsed, there was an increase of urbanization and urban sprawl in flood risk areas, increasing the flood protection demand areas, and decreasing the flood protection supply. The objective of this work is to map flood protection demand and supply at a national scale. In Lithuania, river floods are the most common as a consequence of rainfall events, ice jams, fast snow melt, or dam's failure. Floods Directive 2007/60/EC required to map flood extend and in Lithuania flooding maps were created with the periods of return of 10, 100 and 1000 years. In this work, to estimate flood demand and supply using 1000 years period flood area. In order to model the flood demand area, we first identified the urban areas within the flooded area. Subsequently, we created a multi-criteria model considering as input variables the altitude, degree of imperviousness, river network density, distance to water lines and water accumulation areas. River network density was carried out with line density, while the distance to water lines was identified with the Euclidean distance. Data was reclassified and the weights attributed to each variable were measured using the Analytical Hierarchy Process (AHP), according to Satty (2003). Flood demand model map was validated with the number of floods in floodplain areas. To model flood protection supply, first we delimitated the non-urban areas and as in the flood demand model, we created a multicriteria model that included as variables the different types of non-urban land uses, soil organic carbon, bulk density, texture and depth to rock. Data was reclassified and the weight of each method was carried out using the AHP method. Flood protection supply model was validated with water infiltration capacity in floodplain areas. The results of this work will be presented and discussed during the talk.

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References
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