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NEW APPROACHES TO GROUNDWATER VULNERABILITY



ABSTRACTS

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PLACING A RESERVE DRINKING WATER SOURCE IN AN URBAN AREA - CRAZY IDEA OR NECESSITY?

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Keywords: reserve drinking water source, spatial planning, drinking water source protection, Ljubljana field aquifer

In accordance with legislation, Decree on drinking water supply (National gazette N° 88/12), the public water supply service has to have the reserve drinking water source to increase reliability and safety of public water supply. In Ljubljana the public water supply has tradition for almost 130 years. Water well fields that were in the past quite far away from urbanised area are today in inside. The distribution pipeline is spreading all over the Ljubljana field porous aquifer so the most suitable and efficient location of reserve drinking water source is one near the existing pipeline system.

The first investigations for reserve drinking water source for Ljubljana drinking water supply were in 2004-2006. On the basis of previous geological and hydrogeological research, three suitable locations for reserve water well fields on Ljubljana field aquifer were selected. One of them is Dravlje valley, which was also selected for pilot action in Interreg Central Europe project PROLINE-CE, aiming to harmonize land use practices and drinking water source protection and management.

The pilot action area is settled area, crossing by highway and with large open spaces adjacent to a Natural Park of hilly area. Because of its location in the suburbs of Ljubljana, there is also a high pressure on land use. Dravlje valley is also a flood area with no properly regulated surface waters drainage coming from hinterland. Despite favourable hydrogeological conditions, there is influence of existing land use on groundwater vulnerability, especially when considering also climate change. The main goal is to assess impact of agriculture, urbanization (sewage system, cesspits), industry, and forestry, transportation (highway) for elaboration of improved protection measures for potential drinking water source, based on modelling results and stakeholder meetings and workshops.

Acknowledgement

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VULNERABILITY OF WATER RESOURCES TO CLIMATE CHANGE IN SOUTH-EAST EUROPE

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Keywords: water resources vulnerability, climate change, South-East Europe

Land use and climate change pose increasing pressure on water resources quality and quantity. Climate changes indicate an increase of mean annual temperature combined with decreasing and/or increasing precipitation. Furthermore, associated with economic changes in South-east Europe region the land use pattern is expected to change, too. This topic was the main objective of the EU transnational project CC-WARE (program South-East Europe) aiming to develop an integrated transnational strategy for water resources protection and mitigating water resources vulnerability. Vulnerability is an integrated indicator which considers the physical and chemical state of water resources, the ecosystem capacity to ensure long term water provision and the adaptive capacity of the society to ensure water supply. To assess climate impacts a grid based water balance model has been established to estimate local water availability. Furthermore, the local water exploitation index (WEI) was calculated by comparing water demand with water availability considering also seasonal variability. For water quality vulnerability land use is a major driver, therefore land use load coefficients were applied to Corine land cover units. As adaptive capacity, socio-economic indicators (population density, GDP) and natural indicators (ecosystem services) were considered. Vulnerability maps were produced and designed for two periods covering the time periods from 1991 till 2020 (recent period) and from 2021 till 2050 (indicating a near future situation). For both periods water quantity and quality vulnerability maps were produced, from which we could identify regions with high or low sensitivity to climate change.

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