

Using GIS for vulnerability assessment of built cultural heritage from the perspective of natural risks. Case study: Municipality of Bucharest

Cornel Paunescu, Florentina-Cristina Merciu and George Merciu (Romania)

Key words: Risk management; historical monuments; heritage vulnerability; ArcGIS Online

SUMMARY

Abstract

Awareness of the patrimonial values of the built cultural heritage determined the development of policies for its conservation. In the context of the increasing impact of climate change, the preservation of cultural heritage was designed to reduce the impact on the environment and limit the impact of natural risks. Thus, the planning process brought to the fore the elaboration of cultural heritage conservation tools to respond to the objective to implement sustainable development strategies. The sustainable planning of historical monuments also requires reporting on the natural risks that could lead to the destruction or degradation of cultural assets in order to identify measures for limiting the effects generated by them.

The central area of city of Bucharest was selected as case study, being representative of the valuable heritage buildings, the relatively large number of historical buildings affected by natural risks. The importance of the study results from the high concentration of buildings expertized with seismic risk. The aim of this study is to propose an approach to assessing natural risks that impact historic buildings using Geographic Information System (GIS). In this study, the authors evaluated the vulnerability of historic buildings exposed to natural risks: heavy rains, floods, droughts, and seismic risk.

For the elaboration of the study, several methods were used: the analysis of specialized literature, field campaigns to identify the number of heritage buildings classified as seismic risk, the ArcGis for the representation of types of risks for heritage buildings.

Based on GIS techniques and information collected during field campaigns, data related to the

Using GIS for vulnerability assessment of built cultural heritage from the perspective of natural risks. Case study: Municipality of Bucharest (14091)
Cornel Paunescu, Florentina-Cristina Merciu and George Merciu (Romania)

FIG Congress 2026
The Future We Want - The SDGs and Beyond
Cape Town, South Africa, 24–29 May 2026

history of the buildings, size, state of conservation were processed to establish a basic spatial database and to build a risk assessment system for the study area.

Currently, at the level of the study area, several projects have been implemented to consolidate heritage buildings that ensure the extension of their existence and open the perspective of their sustainable reuse.

This study reflects the importance of GIS as a working tool in the evaluation of cultural heritage properties to identify type of risks.

The historical center of the municipality of Bucharest presents a historical urban fund that constitutes a valuable resource of the capital city. Conservation of the heritage buildings allows for sustainable valorization, both through ecological actions (preserving and reusing the valuable built stock through appropriate conservation measures, reducing waste from demolitions), and through actions to recover local memory that has a positive impact on the attractiveness of the city.

Keywords: historical monuments, heritage vulnerability, ArcGIS Online, risk management, interactive map, sustainable development

Using GIS for vulnerability assessment of built cultural heritage from the perspective of natural risks. Case study:
Municipality of Bucharest (14091)
Cornel Paunescu, Florentina-Cristina Merciu and George Merciu (Romania)

FIG Congress 2026
The Future We Want - The SDGs and Beyond
Cape Town, South Africa, 24–29 May 2026