Abstract

There is a growing international concern for the decontamination of historically polluted industrial sites that induce significant environmental risks not only to land and water ecosystems, but also to human communities. Among these, the natural and landscape resources in Eastern Europe are often currently ignored or overexploited without consideration for their sustainable development. The effective management of these sites emerges as a significant environmental challenge, whose tackling involves a comprehensive understanding of the impacts of pollution, with a special emphasis on the well-being of all receptors, including humans. The extractive industry sector in Romania, exemplified by regions like Baia Mare and the Apuseni Mountains, showcases instances of ignorance or abuse in the mining sector. These areas have experienced periods of semi-industrial or industrial production that resulted in distinct pollution legacies. These old issues are currently overlaid by contemporary challenges stemming from consumption-related waste patterns. Consequently, the environmental issues are highly complex, involving diverse stakeholders and accumulating over decades.

The current work presents a 14-year-long research in such areas affected by industrial pollution, which addresses in a comprehensive manner the elements of risk management and the stakeholders affected and/or involved. The thesis is divided into three sections: the first presents the main academic and professional achievements since the PhD defense, the second is grounded in the author's papers published in various highly ranked peer-reviewed journals, while Section III is dedicated to outlining future plans and ideas for furthering research in this particular scientific domain of environmental risk management, which holds significant promise for responding to pressing societal issues.

Section II includes four subchapters. *Chapter 2.1* focuses on the expert assessment of the impacts and risks in former or abandoned mining areas, by an original environmental impact and risk assessment method. Besides the identification of hazards and the assessment of risks, the vulnerability of the mining settlements is also addressed in *Chapter 2.2*, considering that the implementation of adequate sustainable development actions to mitigate the negative effects of mining activities by the decision-makers is not possible without a correct assessment of the vulnerability degree of settlements based on a complex approach of the determinant factors. Urban vulnerability and exposure of local communities to dangerous chemical substances are other issues that need scientific attention in the context of urbanization and industrialization processes, which have led to increased exposure and risks and have also caused significant changes in land cover and land use. Within these urban, industrialized areas, the vulnerability of the poor and marginalized groups is amplified even more through processes of evictions and invisibilization. *Chapter 2.3* presents the environmental risks identified in previous research that needed to be investigated in a wider, interdisciplinary context, by the in-depth analysis of the social components of risks. These risks depend on certain actors and stakeholders and the complex subject requires an interdisciplinary approach. Therefore, this chapter delves into environmental social studies, exploring the communities' understanding of environmental issues. Environmental risks are understood, perceived, and represented differently by various stakeholders and groups of involved or exposed actors, which translate into several interdisciplinary topics such as environmental injustice, environmental conflicts in mining

areas, and the social representation of risks in exposed mining communities. *Chapter 2.4* focuses on the need to consider public participation in risk management in a more inclusive manner, thus bridging the gap between science and society. Building on previous research regarding the social representations of risks and the effective risk communication channels, a bottom-up framework for community engagement is addressed to assess its potential for collective environmental action. The social network analysis (SNA) methodology is a useful tool for assessing the extent to which collective action is supported by the networks of communication and intended joint action of the local actors. In addition, citizen science mobile apps also enable individuals to actively contribute to scientific endeavors and address local challenges, such as minimizing risks and pollution, preserving biodiversity, or enhancing well-being.

In conclusion, the transition from expert environmental risk assessment to community participation in risk management embodies a progressive approach that considers not only the technical aspects, but also acknowledges the social, cultural, and ethical dimensions of risk. This thesis captures the essential elements of this transition, emphasizing the importance of community engagement and the broader societal impact of this approach in environmental risk management practices.

Section III presents the author's professional goals for the future, including the research topics she would like to pursue and ways to combine them with teaching and mentoring activities.