

Editorial

Socio-Environmental Vulnerability Assessment for Sustainable Management

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Received: 15 September 2020; Accepted: 18 September 2020; Published: 24 September 2020



Research on complex socio-environmental systems (also known as socio-ecological systems) has a long tradition in scientific considerations. Their theoretical basis was defined already in the 1970s [1]. In the following decades, the concept of a holistic consideration of complex interactions between social, economic, and environmental systems became permanently embedded in the paradigm of sustainable development. In the 21st century, in the face of global challenges faced by human civilization, it was necessary to develop new study areas in the context of research on social and environmental systems. Such concepts as resilience, integrated assessment of ecosystem services, socio-ecological system frameworks, coupled human and natural systems, and vulnerability frameworks appeared [2].

The conceptual framework that considers the vulnerability of complex human–environment systems proposed by Turner et al. (2003) is a rapidly developing research perspective [3]. In the context of the latest research, it has become crucial to seek answers to the question of who or what is most vulnerable to global environmental changes and where this vulnerability is the most crucial in terms of the geo-spatial point of view. Research conducted all over the world indicates that vulnerability to change is not a simple function of exposure to hazards, but also depends on the sensitivity and resilience of complex systems at a particular place and time [4].

Ongoing parallel processes of urbanization, aging of society, population growth, and increasing consumption interplay with threats caused by climate change, extreme weather events, and depletion of resources. As climate-related hazards impact both human and environmental elements, there is a need to explore, analyze, and understand the vulnerability of socio-environmental systems. Therefore, adaptation to climate change as well as sustainable development required a knowledge-based approach and intelligent solutions for integrated assessment of the state of the environment and society. With the purpose of illustrating the dynamics of research on the vulnerability of socio-environmental systems, we have conducted a query of the term “socio-environmental vulnerability” in the Web of Science and Scopus databases. Since 2006, we have observed a gradual increase in interest in the problem of socio-environmental vulnerability. In recent years, on average, six to eight works indexed in databases have appeared annually (Figure 1). Finally, we identified 53 articles in Web of Science and 57 in the Scopus database.

According to the classification of research areas in Web of Science, the largest number of works had been assigned to Environmental Sciences (and Studies) (30%), Geography (25%) and Public, Environmental, and Occupational Health (19%). A total of 11% of the papers were in the field of Green and Sustainable Science and Technology and 8% in Education Research. Some articles (4%) had been tagged as Biodiversity Conservation, Economics, Law, Social Sciences, Interdisciplinary, and Urban Studies. Regarding the Scopus classification, Social Sciences covered 58% of the papers. In Environmental Science, it was 47%, while in Medicine, it was about 25%. Some papers had been assigned to Agricultural and Biological Sciences (14%), Earth and Planetary Sciences, or Energy (11%). In the field of Business, Management, and Accounting, there were 9% of the publications. Decision

The articles collected in this volume come from all over the world and seek answers to multidimensional questions.

- What is the current state of the world’s environmental and social systems in local, regional, and national terms [23–25]?
- How can the resilience of environmental and social systems to changing climate or hydrological threats be assessed? Multidimensional and multi-factorial issues require new approaches and analytical tools. Hierarchical methods, clustering, and ranks have been successfully tested by the authors whose work is included in this volume [26–29].
- How does one implement sustainable development in practice? How can the principles of social participation and partnership support modernization processes [30,31]? Is it possible to formulate a progressive environmental and development policy [32]?
- What is the future of social–environmental systems? How will demographic change, particularly in an aging society, affect social and environmental resilience [33]? How should we supply ourselves with energy [34–36]? How should we shape our transport systems [37]? How can technical infrastructure and spatial management support the development of tourism in environmentally valuable areas [38]? Can we leverage our efforts by applying nature-based solutions [39,40]? How can open data and artificial intelligence support us [41,42]?

These and other questions will be answered in this Special Issue. We hope that dissemination of this broad spectrum to the scientific community will be helpful and may possibly open new horizons for future research.

Acknowledgments: The work has been created as a result of scientific activity conducted within the Leading Research Group: Sustainable Cities and Regions at the Wrocław University of Environmental and Life Sciences.

Conflicts of Interest: The authors declare no conflict of interest.

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