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Editorial

Landscape, Water, Ground, and Society Sustainability under the Global Change Scenarios

Kevin Cianfaglione [1,*] and Doru Bănăduc [2,*]

[1] ICL, Junia, Université Catholique de Lille, LITL, F-59000 Lille, France
[2] Faculty of Sciences, Lucian Blaga University of Sibiu, I. Raţiu Street 5-7, RO-550012 Sibiu, Romania
* Correspondence: kevin.cianfaglione@univ-catholille.fr (K.C.); doru.banaduc@ulbsibiu.ro (D.B.)

1. Special Issue Topic, Aims, and Scope

The increasing human world population and its hunger for space, ecosystem services, energy, and other natural resources are widely indicated as the main causes of human negative impact, together with the dominant cultural model and the currently predominant economic type of development.

The issues causing environmental problems that we are currently facing are the dark side of our economic development model, with its culture, society rules, and technology advances linked with an improper, unpredictable, and aggressive use of land and natural resources. All this is the cause of unsustainable way of our living and of our development. All this represent major challenges for the future of our planet and of humanity.

The most negative consequence of these problems are climate change, habitat degradation, pollution, biodiversity loss, invasive species chronicity, chronic anthropization, social unrest, and conflicts. Also human large migrations and wars, macroeconomic crises, loss of cultural traditions, wrong (local, national, and global) policies and incorrect land management approaches, are some of the main issues that impact the landscape, water, ground, and human society sustainability on a spatiotemporal scale.

All of them are crucial driving forces for our society's development, for our quality of life, for the environmental quality and functioning of our ecosystems, and even to face the possible challenges of global change. They are a major reason for constant concern in relation to the impact of human activities on ecosystems and human societies [1–4]. These editorials focus on the research topic issues related to landscape, water, ground, and society sustainability under global changes scenarios.

2. Special Issue Contributions

The aim of this Special Issue is to focus mainly on landscape, water, ground, and societal characteristics under global change scenarios: happenings, and perspectives.

Water is a constituent of all creatures and environments; consequently, it is a crucial element of habitats, communities and biocoenosis. Water is also considerable as an important landscape element, and an increasing important energy resource for human activities.

Ground is a needed base and component for the life cycle, agriculture, ecosystems. Ground is another important landscape element and an important resource for human activities.

Ground, water, and society primarily determine the characteristics of the landscape. When at least one of these features is altered, the landscape changes consequently. Anthropic dynamics on the landscape are intended as the human past, present, or mixed activities that influence the landforms, land elements, biodiversity, or the natural dynamics of biological communities, populations and ecosystems. Important problems related to water and the ground may be directly or indirectly caused by human activities.

The first manuscript of our Special Issue highlights the fact that throughout their history, humans "tamed" the whole Danube watershed terrestrial and aquatic ecosystems,

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Citation: Cianfaglione, K.; Bănăduc, D. Landscape, Water, Ground, and Society Sustainability under the Global Change Scenarios. *Sustainability* **2024**, *16*, 1897. https://doi.org/10.3390/su16051897

Received: 12 February 2024
Accepted: 18 February 2024
Published: 26 February 2024

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significantly determining their species, communities, associations, and habitat characteristics. One of the characteristic flagship endemic fish species, the European mudminnow (*Umbra krameri* Walbaum, 1792), was influenced by the watershed geography, history, politics, and ecology. This research about this European community concern fish umbrella species in the circumstance of long-term human negative impact on its particular habitats, with possible synergic harmful effects of climate change, was treated as extremely desirable by an international researcher's group initiative to support the efforts for this species and its ecosystems survival. All the specific mapped wetlands habitats expose the diminishing trend of this fish distribution area continuousness; fragmentation being the power that skewed it severely until the present and influencing quantitatively and qualitatively the characteristic habitats. The key categories of human activities that impacted this species' habitats are water regulation, pollution, dredging, draining, and the introduction of non-native species. Generally, various human impact activities, especially in a climate change context, induce severe concerns about negative influence on this species. All the studied wetlands where this fish survived can be considered refuge and stepping stone wetlands, particularly in the growing climate change trend circumstances [5].

The second study in this Special Issue was based on the idea that today is yesterday's future. A set of comparisons among past Intergovernmental Panel on Climate Change climate projections and gauge-based observations of the last three decades (1990–2016) were undertaken. Monthly and annual precipitation and temperatures were studied over West Africa, separated into three climatic sub-regions. The outcomes highlighted that the identified variances are higher at higher latitudes and are strongly scenario-dependent. The Business-as-Usual scenario (few or no steps are taken to limit greenhouse gas emissions) seemed to be nearby to the observations. The AR1 projections were shown to be detached from the observations, the AR2 projections were the most performant, and the AR3 projections presented higher uncertainties in the northern zones. The relative significance and possible implications of the differences between projections and observations on people's perception were appreciated with regard to certain climate and weather-related factors that could seriously influence sustainable development in the studied area, such as water capital management, agriculture practices and yields, health conditions, and fishery management [6].

The third manuscript focused on how the G5 works in partnership with different worldwide entities, which are in authority for managing logistics actions, financial flows, and technological solutions. Charitable support has a major role in the area, in spite of its various challenges and limits in macroeconomic progress. This study targeted the macro-logistics potential of humanitarian aid and protection on national and international scales from a social sustainability perspective. Most of the humanitarian crises in the studied area came from conflicts, food access uncertainty, underfeeding, and malnourishment. Sahel necessitates numerous creative enterprises to deal with the effects of environmental-related problems. The quantitative and qualitative aspects of logistics infrastructure, a varied array of natural and human directly or indirectly induced calamities, and the economic circumstances of the G5 Sahel usually cause numerous problems for charity in the area, problems that should be supported by continuous transnational tightening strategies and partnerships [7].

Then, the fourth study of this Special Issue focused on water sustainability in the context of global warming. Using water in a sustainable manner is a crucial issue today, especially since global warming is more than ever having an important negative impact on water capital. This study's bibliometric analysis focused on water resource sustainability in the context of global change, trying to find potential gaps in the research. The selection and investigation of the most significant papers debating this topic revealed a robust rise in research, led by US researchers and research entities, concentrating both on the present impact of global warming on water sustainability and its characteristic effects on water supply and ecosystem functioning, or on problem solving and creating a framework for water sustainability, or on future perspectives and potential solutions for achieving water

sustainability. It was revealed that only 6% of the studied papers dealing with water sustainability contain data related to global warming, with a growing trend lately in terms of articles and citation numbers, but the field of such studies seems to be in an early stage, with a large number of journals including very few such articles. The main weaknesses are that the focus of a large majority of the studies is on present problems and not on future challenges and reliable solutions for them. Importantly, there is also an almost complete lack of research about the role of conserving natural habitats or of re-naturalization, as well as a relative low number of studies including cultural aspects in addressing water sustainability issues [8].

The fifth contribution, in the context in which it focused on its main role in the process of regulating environmental pollution, was based on an example of pollution control in the Lancang-Mekong River watershed: "Lucid waters and lush mountains are invaluable assets" (referred to as the "Two Mountains Theory"). The study stresses the fact that upstream and downstream countries can carry out water pollution control by implementing fines on enterprises that induce environmental problems and making them invest in pollution control activities. Firstly, the differential game model of pollution control by individual countries and international collaboration is established. Then, a differential game model of joint pollution control with a recompense mechanism is established under the collaboration framework. Lastly, the feedback Nash equilibrium of each state is acquired. The research reveals that in the process of industrial pollution control by countries, due to the one-way externality of water pollution control, the more downstream countries are, the more resources will be financed for pollution control, and the fewer fines will be imposed on enterprises that cause environmental damage. At the beginning phase of management, if more pollution control resources are input, fewer countries will join in cooperation, and the fines for polluting enterprises will be less. When the amount of fines for enterprises is relatively small, the formation of a river pollution compensation mechanism is not conducive to the input of pollution control resources. The coordinated development of economic development and ecological civilization construction is the core purpose of the "Two Mountains Theory". Therefore, this case demonstrates the viability of this theory based on cooperation [9].

The sixth contribution focused mainly on precipitation as a vital element of the water cycle; on its irregularity, which radically impacts agriculture, ecosystems, and water resources; and on water scarcity induced by climate variability. In this research, the Innovative Polygon Trend Analysis (IPTA) method was applied for precipitation trend discovery in the Wadi Sly basin, Algeria, from 1968 to 2018. For different stations, the first results revealed that there is no regular polygon in the IPTA graphics, thus indicating that precipitation data varies by year. The IPTA method revealed different trend behaviors, with a precipitation increase in some stations and a decrease in others. This variability is induced by climate change. The results point to a greater focus on flood risk management in severe seasons and drought risk management in transitional seasons across the studied basin. The method used is appropriate for preliminary analysis trends of monthly precipitation in other neighboring basins too [10].

The seventh contribution was dedicated to the unexplored Bani Valley (2651 km^2) plant diversity in the Himalaya. A total of 196 plant species belonging to 166 genera and 68 families (70.62% native and 29.38% non-native) were inventoried as voucher samples, identified, and placed in the Janaki Ammal Herbarium. In total, 46% of species were Indo-Malayan, followed by 22% of Palearctic species. In angiosperms, dicotyledon species (68.37%) dominated. *Poales* were the most dominant order, with 38 species (19.38%). The most abundant families were *Poaceae*, with 29 species (14.79%), *Fabaceae* (17, 8.67%), *Rosaceae*, *Cyperaceae*, and *Asteraceae* (9, 4.59% each). The life form analysis showed 50% of species as phanerophytes, followed by therophytes (25.77%). The leaf size spectra show mesophyllous species (34.69%) as the dominant group. The IUCN Red List of Threatened Plants categorized *Ailanthus altissima* as endangered (EN), *Aegle marmelos* and *Quercus oblongata* as near threatened (NT), *Ulmus wallichiana* and *Plantago lanceolate* as vulnerable

(VU), *Taxus baccata* and 75 other species as least concern (LC), and 2 species as data deficient (DD). The study helps to shape conservation and management plans for threatened species management and conservation [11].

The eighth study approaches the issue of foraging for wild food plants among migrants and relocated communities in order to understand how human communities readjust their habits in relation to nature and how they acclimatize to different socioecological systems. Here, the Traditional/Local Environmental Knowledge (LEK) changes linked to wild plants are addressed across four groups of Afghan expats living in Mansehra District, NW Pakistan. Forty-eight wild plants represented both the past and present wild plant gastronomic heritage. The prevalence of the quoted wild plant ingredients was only evoked and no longer used, thus revealing a significant loss of LEK. Furthermore, the total number of wild vegetables and herbs used at present by Afghan Pashtun farmers is much higher than those used by the other groups. The practiced LEK is constantly kept alive via continuous contact with nature, being important for the flexibility of the biocultural heritage, which is, however, also influenced by the readjustment of social life embraced by refugees after relocation [12].

The ninth contribution focused on the pharmaceutical pollution of aquatic ecosystems. High levels of four pharmaceutical compounds (carbamazepine, ibuprofen, furosemide, and enalapril) and some of their derived metabolites (enalaprilat, carboxyibuprofen, 1-hydroxyibuprofen, and 2-hydroxyibuprofen) were found in this research in the Mureș River Basin. Overall, pharmaceutical concentrations were identified to be highest in the wastewater treatment plant (WWTP) effluent, median downstream of the WWTP, and lowest upstream of the WWTP. Carbamazepine displayed the highest mean values upstream, downstream, and at the WWTP. The highest concentrations for all the studied pharmaceutical compounds were detected in the WWTP effluent. The relatively large and complex hydrographical system of the Mureș River Basin proved to be a hotspot in terms of contamination with emerging pollutants. Pharmaceutical compound concentrations were found to be the highest in WWTP effluents. The WWTP effluent concentrations were among the highest in Europe, showing that treatment plants are the primary source of water pollution with pharmaceutical compounds. The identified levels were higher than the safety limits for carbamazepine and ibuprofen. Based on the achieved results, human communities can assess, monitor, predict, and adapt to the present regional challenges and risks for sustainable use of natural resources, including water and associated products and services [13].

The tenth research paper in our Special Issue refers to clustering structures appearing on small to large scales that are omnipresent in the physical world. Clustering structures are ubiquitous in human history, oscillating from the mere organization of life in societies to the growth of large-scale infrastructure and policies for meeting structural needs. Mankind has continuously sought the advantages of unions. As the scale of the projects increases, the price of the provided products is cheaper while their quantities are maximized. Thus, large-scale infrastructures are considered beneficial and are always being pursued at greater scales. This paper develops a general method to quantify the temporal progress of clustering using a stochastic computational tool, namely 2D-C, which is appropriate for the research of both natural and human social spatial structures. The evolution of the structure of the universe, of ecosystems, and of human clustering structures was investigated using novel sources of spatial information. The outcomes highlight the existence of both episodes of clustering and de-clustering in nature and in human social structures; however, clustering is the general trend [14].

We are grateful to the authors and their institutions that have proposed their contributions to our Special Issue. We hope that this Special Issue can serve as a spark, illuminating the path we must take towards the future, perhaps contributing to scientific, societal, and environmental progress, and pursuing an increase in the quality of our environment and of our lives.

3. In Memoriam of Dr. Angela Curtean-Bănăduc



Tragically, the period between the conclusion of this Special Issue and the preparation of the second edition on the same topic SI (https://www.mdpi.com/journal/sustainability/special_issues/DFEHLSAIDN, accessed on 10 October 2023) was the final period of life for one of the editors, our beloved Angela Curtean-Bănăduc, who passed away in Clermont-Farrand, France, on 1 November 2023.

The other two editors, Dr. Doru Bănăduc and Dr. Kevin Cianfaglione, wish to pay an 'in memoriam' tribute to Angela, who was a valuable good friend, an esteemed colleague, and the beloved wife of Doru.

Angela was born in Orăștie (Transylvania, Romania) on 27 January 1971, into a caring family of intellectuals whose main educational moral rule, "everything you do, do it right!", profoundly influenced her contented golden childhood and teenage years.

This happy family and the location of their picturesque, multicultural native city, lying near the Carpathian Mountains where the legendary Sarmizegetusa Regia, capital of the ancient Dacians, over the last 2000 years beneficially influenced Romanian dreams and realities—if only to recall here a temple of the Romanian language, "Palia de la Orăștie", the monumental translation of the Old Testament into the Romanian language carried out in the 16th century—created the necessary milieu that inspired Angela to achieve something important with her life.

The vicinity of one of the largest Danube River tributaries, the scenic Mureș River, inspired her to fall in love with the color blue, as seen in her beautiful eyes, rivers, and streams. The chance to dream, imagine, organize, support, and directly shape the lives of people of goodwill involved in the continental waters scientific understanding and protection, and the forces that uphold them, came through the professional opportunities afforded by her studies in chemistry at the Nicolaus Olahus High School of Orăștie, in ecology at the "Lucian Blaga" University of Sibiu, for her PhD in aquatic ecology at the "Ovidius" University of Constanța, and her post-doctoral research in water resources management at the "Costin C. Kirițescu" Romanian Academy National Institute of Economic Research in Bucharest, etc.

The rivers and streams were indeed symbolic of her beautiful blue life on this blue planet. Nature was her temple, home, and source of support for numerous projects in ecology, biology, and nature protection and conservation. Benthic macro-invertebrates and fish populate her written output—scientific episodes that are on permanent record in over 200 publications. To give just some examples of what Angela founded and/or led over the years with fabulous positive and honest energy, efforts, and results: "Transylvanian Review of Systematical and Ecological Research" (https://magazines.ulbsibiu.ro/trser/index.html (accessed on 10 October 2023)) since 1999, including the Wetlands Diversity series; "Aquatic Biodiversity International Conference (ABIC)" since 2007 (https://magazines.ulbsibiu.ro/trser/events.html (accessed on 10 October 2023)); "Acta Oecologica Carpatica" since 2008; environmental "Ecotur Sibiu" Association since the end of the XX century; "Applied Ecology Research Center" in the last century (https://appliedecologysibiu.wordpress.com/ (accessed on 10 October 2023)); "Lucian Blaga" University of Sibiu Faculty of Sciences, where she has worked hard in teaching and research since 1996, finally for 10 years as a Dean; etc.

Many devoted friends accompanied her genuinely extraordinary and beautiful personal and professional life, the co-editors of this Special Issue being only two of them. A

unique personal and professional match was achieved without a break since 2000 between the beloved Angela and her husband Doru, who, not by chance, pays his deep loving respect for an incredible shared lifetime experience.

A cruel illness took Angela too soon from this world, but up until her final days, she smiled with her characteristic kindness.

All of us who had the good fortune to meet Angela in this all-too-short life and to benefit from her angelic heart and mind will forever keep her in our warmest memories!

Family, friends, colleagues, and students wish her eternal blue waters on the other side, where sooner or later we shall all meet to again be happy together!

Conflicts of Interest: The authors have no conflicts of interest to declare.

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