sustainability

MDPI

Editorial

Editorial on Environmental Planning and Modeling

Christian N. Madu [1,2]

[1] Department of Management & Management Science, Lubin School of Business, Pace University, 1 Pace Plaza, New York, NY 10038, USA; cn_madu@yahoo.com or cmadu@pace.edu
[2] Center for Environmental Management & Control, University of Nigeria, Enugu Campus, Nsukka 410001, Nigeria

The aim of this Special Issue is to facilitate environmental decision making by considering the natural environment, as well as social, political, economic, and governance issues. This holistic approach of the natural environment around achieving sustainability offers a win–win for both society and the environment. It is therefore imperative that models developed as decision-supports to enhance environmental policy and decision making consider the vital influences of socio-economic, political, and governance issues in effective decision/policy making. This is even more important as concerns about climate change, food security, and resources limitations are linked with increasing population growth in developing countries. Our focus here was to solicit research papers that are systemic in scope and yet integrative of these factors; building a framework to consider these factors, developing novel methods or models, or applying existing models may be carried out to solve any of the environmental management problems. Many of the models available in the areas of mathematics, statistics, engineering, management, and social sciences have been found useful in solving an array of multi-faceted problems and are equally applicable in solving environmental problems. Specifically, papers that address optimization, or "satisficing" techniques to solve problems in the areas of environmental planning, resources allocation, biodiversity, and ecology, were of great interest to address some of the world's most pressing environmental problems. We successfully sought papers that may be conceptual, application-based, or theoretical.

The Special Issue presents five major papers that were published, each with uniqueness and contributions to the field of environmental planning and management. The views and models articulated in these articles can be beneficial in solving some of the environmental problems that confront the world today. This editorial summarizes the conclusions of our Special Issue which was highly successful. All the published papers have policy implications and are easier to read and interpret without losing the scientific component. It is our hope that the ideas espoused here will find wider applications in solving these important environmental problems. We aimed to address macro-environmental problems by understanding that environmental issues interface and interact with other subsystems on Earth. Environmental problems cannot be addressed by looking only at a problem as independent of all other subsystems that it interacts with. Some of the work has also attempted to draw parallels with sustainability development goals.

In this editorial, we shall briefly discuss the contributions of the five published papers in this Special Issue. We shall follow the sequence of publication by starting from the first published article to the last.

Shi, K., Zhou, Y., and Zhang, Z., in their article titled "Mapping the Research Trends of Household Waste Recycling: A Bibliometric Analysis", considered household waste recycling as a major cause of municipal solid waste pollution. They reviewed the status and mapped the research trend of research in household waste recycling published in the Web of Science database from 1991–2020. A bibliometrix analysis of these publications was carried out to identify the top contributing authors, countries, institutions, and journals. They note that most of the influential and well-cited articles focused on factors influencing residents'

Citation: Madu, C.N. Editorial on Environmental Planning and Modeling. *Sustainability* **2022**, *14*, 9728. https://doi.org/10.3390/su14159728

Received: 1 August 2022
Accepted: 4 August 2022
Published: 8 August 2022

recycling behavior. Recycling behavior is viewed primarily from an sociopsychology and economics perspective. However, research in house waste recycling now includes other areas such as e-waste, source separation, life cycle assessment, sustainability, organic waste, and circular economy. These studies are increasingly becoming interdisciplinary, thus suggesting a systemic view of household waste recycling.

The article is very informative and shows an exponential growth rate in the number of publications on household waste recycling from 1991 to 2020. This growth rate signifies the growing interest in this research field and may very well align with the growing concerns of the general society about climate change and the resultant effects of pollution (see Figure 1 of the paper). China, the United Kingdom, and the USA seem to be the leading countries in terms of research, based on the number of citations of work in this area. This may also suggest growing environmental consciousness and awareness, and also represents the growing, and concerning, volume of waste in those countries. Interestingly, none of the developing countries appear to be on the top ten list and only China and Japan appear from the Asian countries. More awareness is required to solve household waste problems. Although the number of publications and citations may not be indicative of the environmental burden in a country, it may show the level of awareness and environmental consciousness. Then again, the database that was used may affect the number of publications that may be obtainable from the different countries. We understand the fact that the Web of Science is the leading database for quality research, but this may not necessarily cover some of the local publications that exist in many of the other countries. It is however imperative that we make all countries understand the consequences of household waste. Research collaborations with researchers from other countries that are not listed here may help to promote research interests and illuminate research works in household recycling.

Nnadi, V.E., Madu, C.N., and Ezeasor, I.C., in their article titled, "A systematic technic of prioritization of biodiversity conservation in Nigeria", developed a multi-criteria decision model to prioritize biodiversity conservation. This model is based on the use of analytic hierarchy process (AHP)—a multicriteria decision-making model. A group of biodiversity experts in the country was used to rank the three biodiversity conservation approaches, namely eco-system-, area-, and species-based approaches. The result showed the high performance of countries using eco-system-based approaches, followed by area-based and species-based approaches, respectively. The priorities developed were subsequently applied in resource allocation modeling. The research identifies areas for performance gap in the country and offers a policy-making approach for allocating limited resources to solve biodiversity conservation problems. This paper introduced management techniques and operational research models that can be used to address biodiversity problems. Although it is focused on a particular country, it has wider application since the frameworks and the model approaches presented can be applied in different settings.

Nantasaksiri, K., Charoen-amornkitt, P., Machimura, T., and Hayashi, K. titled their paper "Multi-Disciplinary Assessment of Napier Grass Plantation on Local Energetic, Environmental and Socioeconomic Industries: A Watershed-Scale Study in Southern Thailand". They investigated the potentials of using Napier grass in power generation in Southern Thailand. Napier grass is supposedly an energy crop that has far-reaching impacts on energy, environment, and socioeconomic features. A soil and water assessment tool (SWAT) is used to investigate its impacts on runoff, sediment, and nitrate loads in Songkhla Lake Basin (SLB), Southern Thailand. The results obtained show that Napier grass decreased the average surface runoff and sediment in the watershed. These results were applied in a multidisciplinary framework for decision support. It is shown that Napier grass provides benefits to hydrology and water quality when nitrogen fertilizers were applied at the levels of 0 and 125 kgN ha^{-1}. Conversely, benefits in terms of reducing energy supply, farmer's income, and carbon dioxide were highest when 500 kgN ha^{-1} of nitrogen fertilizer was applied. The paper concludes that the planting of Napier grass should be supported to increase energy supply; provide jobs; and reduce surface runoff, sediment yield, nitrate load, and carbon dioxide emission. The findings of this research are of particular impor-

tance, especially as we aim to decrease the demand on fossil fuel for energy consumption. Napier grass is a renewable source of energy. It is clean and sustainable and can contribute in reducing the generation of carbon dioxide, thereby helping to reduce global warming. While biogas energy generated from organic matters may release carbon in generating power, they are carbon-neutral, as crops also absorb the same amount of carbon during their growth. This is, however, not the only benefit of biogas as they also have higher yields and shorter life cycles. This ensures a stable fuel supply. This study should encourage an exploration of other organic matters and renewable resources, in terms of their efficiency in replacing, substituting, or reducing the use of fossil fuels.

H. Jiang and Y. He, in their paper titled "Evaluation of Optimal Policy on Environmental Change through Green Consumption", explored the association between green consumption and sustainable economic growth. They looked at the demand side of green consumption and how to use it to design an environmental policy package, in order to achieve economic growth and optimal social allocation. Using mathematical models, they concluded that: (1) green consumption does not necessarily have to be supply-side-driven to improve the environment; (2) green consumption driven by the demand side is better than the supply side in improving the environment and increasing the social welfare; (3) environmental change is more efficient when the environmental policy package includes green consumption. It is important to note that production activities that drive the economy will impact both the environment and social welfare. It is therefore significant to investigate the demand-side policy, which is exemplified by green consumption, and compare it to the supply-side policy, exemplified by green production on how they influence and/or are associated with environmental changes and social welfare.

Koo, J., Kim, J., Ryu, J., Shin, D.-S., Lee, S., Kim, M.-K., Jeong, J., and Lim, K.-J., in "Development of Novel QAPEX Analysis System Using Open-Source GIS", developed an Agricultural Policy/Environmental eXtender (APEX) interface that uses an open-source-based GIS software to simulate water quality impacts on various management practices for local farming activities. This model provides opportunities for farm/small watershed management and for local farmers, especially in developing countries, since there is no fee payment to use the interface. This new interface is also more flexible than the existing interface that requires paid license subscription. Furthermore, it can simulate hydrology and water quality with considerable precision. This model also presents visual output, making it easier to interpret simulation results. The open source model may also be used to derive data for sustainable agricultural practices and to develop effective policies on the different agricultural farming practices.

This Special Issue presents five different articles that took different approaches to address sustainability issues from planning and modeling perspectives. These articles are holistic in their considerations and are multidisciplinary as they adopt modeling approaches from other areas of learning, especially from management. They also emphasize the need to serve as decision support for policy and decision making. It is worth noting that to address the issues of sustainability and climate change, which are crucial in environmental planning and modeling, we must be cognizant of human involvement and the different worldviews that may inform such policies and decisions. The papers offer policy guidelines and framework, making the outcomes easier to implement. These articles address some of the complex issues in environmental planning and modeling. However, they are not exhaustive. Rather, they provide a stepping-stone for more work on developing approaches that can help to address these important problems. We do not necessarily need to start from scratch or reinvent the wheel. We can borrow from existing knowledge and models, and also take advantage of the multidisciplinary nature of environmental issues. We should also view the environment as a system that interacts with other systems and strive to develop a systemic approach to problem solving. The issues raised here are thought-provoking and aim to solve some crucial existing problems. The insights gained here could be used to solve other problems and to develop effective implementation plans. Ongoing research and future studies are required to continue to explore environmental problems and/or

climate change issues from a holistic perspective, while considering other stakeholders to develop an efficient and effective solution.

Funding: This research received no external funding.

Conflicts of Interest: The author declared no conflict of interest.