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The Impact of Economic and Technological Factors on the Global Environment: Guest Editorial

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Abstract

This editorial introduces the Special Issue of the *Global Journal of Natural Resources* (GJNR), titled "Applied Science and Communities," which explores the multifaceted relationships between economic development, technological advancement, and environmental sustainability. The issue assembles interdisciplinary research examining the environmental implications of industrialization, technological innovation, and economic policy across global and regional contexts. Key topics include energy efficiency, waste management, sustainable tourism, biogas development, and public health impacts arising from pollution and climate change. Articles highlight the dual nature of technological progress—while facilitating economic growth, it often exacerbates environmental degradation through increased resource exploitation and emissions. Studies from regions such as Ukraine, the Western Balkans, and Central Asia emphasize the urgency of transitioning to circular economies and decentralized renewable energy systems. The issue also addresses the socio-economic challenges of rural communities, the legal frameworks governing urban ecological footprints, and the strategic significance of the Arctic in global trade. Moreover, it explores sustainable agricultural practices, biodiversity restoration, and the effects of environmental factors on public health. A notable theme is the integration of innovation parks and digital technologies in promoting sustainability and resilience. Collectively, these contributions underscore the pressing need for coherent policy frameworks that align economic objectives with environmental stewardship. The issue advocates for innovative, inclusive, and evidence-based approaches to managing natural resources and mitigating environmental risks, offering valuable insights for policymakers, academics, and practitioners seeking sustainable development pathways in an era of rapid change.

The Special Issue of GJNR, "Applied Science and Communities", examines the complex interrelationships between economic development, technological advances, and the resulting environmental impacts. As the world faces rapid technological advancement and global economic growth, evaluating how these factors impact the environment is crucial. This special issue aims to explore the effectiveness of various technological innovations in addressing pressing environmental issues, analyse how economic policies can promote sustainable practices, and assess the broader ecological implications of these advances. Focusing on critical areas such as energy efficiency, sustainable tourism, biogas technologies, and waste-management solutions, the issue offers a comprehensive and nuanced understanding of the key role that economic and technological elements play in environmental sustainability. It also analyses the regulatory frameworks and global standards that influence initiatives, both locally and internationally, clarifying the convergence of ecological policy and technical solutions in pursuit of a more sustainable future.

In recent decades, rapid technological development and economic growth have led to significant changes in global production methods, consumer behaviour, and industrial

practices (Yingjun *et al*., 2024). These changes have resulted in significant environmental impacts. While technological advances have undoubtedly brought significant economic benefits - increased productivity, greater efficiency, and lower costs - their effects have been less favourable, particularly for the environment (Abdigul *et al*., 2025). Widespread industrialisation and the introduction of new technologies have led to increased resource consumption, higher energy consumption and a significant increase in greenhouse gas emissions (Akhtar *et al*., 2024). Industries such as manufacturing, mining and petroleum refining, despite stimulating economic growth, have contributed significantly to environmental degradation through toxic waste generation, water and soil pollution, among others (Lina, 2024). Extensive dependence on fossil fuels - coal, oil and natural gas - has increased global warming, leading to higher levels of carbon dioxide in the atmosphere, the main catalyst for climate change.

In addition, economic growth has increased the use of natural resources, exacerbated the depletion of vital materials and created serious waste management problems (Shebanin *et al*., 2024). Continuous growth in urban population, industry and consumer demand increases the volume of garbage, which is difficult to recycle or dispose of responsibly (Khalegi *et al*., 2024). The environmental impacts of this growth are manifested in the loss of biodiversity, soil erosion, deforestation and ocean pollution, as well as negative impacts on public health due to air and water pollution (Ali *et al*., 2024). The growing pressures emphasise the need for a paradigm shift in natural resource management, away from extractive and linear methods to more sustainable, circular practices.

Thus, while economic and technological advances offer several benefits, they also pose serious environmental challenges that require immediate attention and creativity (Stadnyk *et al*., 2024). The development of economic systems requires innovative strategies for natural resource management, including the development of sustainable energy solutions, environmentally friendly production processes, and effective waste management practices (Cernisevs *et al*., 2024). In addition, these solutions must be accompanied by comprehensive economic policies that protect the environment and conserve resources (Zyhrii *et al*., 2023). This special issue explores these challenges, as well as the impact of economic and technological elements on the trajectory of global environmental sustainability. In light of accelerating technological breakthroughs and the changing dynamics of the global political economy, there is a need to not only adopt new technologies but also to create integrated policy frameworks that combine economic growth with environmental conservation (Shcherban *et al*., 2025). This issue provides vital insight into how coherent, progressive practices are needed to address the pressing environmental challenges of our era.

Some studies focus on the economic aspects of sustainable development, the impact of green transformation policies on global trade and supply chains, and the analysis of global standards that define economic and environmental strategies. For example, in the articles “Global standards for sustainable development and their effects on international economic relations” and “Environmental policy and the green transition: impact on global trade and supply chains”, the authors focus on how international environmental agreements and policies are aimed at reducing carbon dioxide emissions and ensuring sustainable use of resources, changing the structure of the global economy, and promoting new approaches to international trade and supply chain regulation.

Another important research topic is energy efficiency and sustainable development in the context of energy transformation in certain regions. The researchers focus on the importance of developing and implementing technological innovations in the field of renewable energy, in particular biogas and biomethane, which can become key components of a sustainable energy future. The articles “Energy Efficiency in the Western Balkans: The Case of Kosovo” and “Technological and Engineering Aspects of the Development of Biogas and Biomethane Plants in Ukraine: Prospects for Integration into the Country's Energy System” explore critical advancements in energy efficiency and renewable energy development in two distinct regions. In Kosovo, initiatives are underway to promote energy efficiency across various sectors, leveraging modern technologies to minimise energy consumption. A significant focus is placed on enhancing renewable energy sources such as solar and wind power, alongside the establishment of stronger energy standards and policies aimed at reducing overall energy costs. Meanwhile, in Ukraine, the development of biogas technologies presents a dual opportunity: it aims to lessen the nation's reliance on imported energy and mitigate greenhouse gas emissions, thereby contributing to environmental betterment. Plans to establish biogas plants and integrate them into the national energy framework are progressing, particularly in rural and agricultural areas. Together, these efforts underscore the necessity for innovative approaches that diminish dependence on conventional energy sources while promoting energy sustainability and reliability in both regions.

Other articles in this special issue focus on technical innovations that help reduce pollution and support sustainable production. The emphasis is on improving cleaning technologies and using industrial waste to create new materials, which helps reduce the burden on the environment and facilitates the transition to a circular economy. In the article “Enhancement of sulphur removal efficiency from propane-propylene fraction (PPF) from catalytic cracking process (CCP) by adsorption: A field study”, the authors study purification technologies, in particular, improving the efficiency of sulphur removal from the propane-propylene fraction obtained in the catalytic cracking process (CCP). Sulphur contamination is one of the main environmental risks associated with petroleum products. Studying the effectiveness of adsorption materials for sulphur removal can significantly reduce air and water pollution, as well as reduce harmful emissions in industrial processes, contributing to the achievement of environmentally friendly production. This technology not only improves the environmental performance of oil refining processes but also makes production processes more cost-effective, which is in line with the principles of sustainable development.

An essential component of this study is the exploration of waste utilisation for the development of new materials, with a particular focus on the textile industry. The article titled “Investigation of the Efficiency of Various Adhesives in the Production of Complex Textile Materials Derived from Leather Industry Waste” analyses the effectiveness of different adhesive types in producing complex textile materials from leather industry byproducts. Emissions from the leather industry can be a significant source of pollution, so recycling this waste into useful materials, such as textiles, helps reduce its negative impact on the environment. The use of alternative adhesives based on environmentally friendly components can significantly reduce toxic emissions during

the production process. These technological innovations, which focus on reducing pollution and recycling industrial waste, can achieve significant results in conserving natural resources, reducing the negative impact on ecosystems and promoting sustainable production practices.

Environmental issues such as air, water and soil pollution, climate change, natural resource depletion and biodiversity loss have a significant impact on human health. Environmental pollution causes not only acute infectious diseases, but also chronic diseases such as asthma, respiratory problems, cardiovascular diseases, and has a long-term impact on the mental health of the population.

For example, in the study "Ecological situation of the regions and problems of population health", the authors raise the issue of the environmental situation in the Republic of Uzbekistan and its impact on public health. They studied the problems of air, water and soil pollution, as well as industrial waste and climate change. For example, in densely populated urban areas where pollution levels are high, the number of diseases associated with respiratory disorders is growing, which is a direct consequence of air pollution with toxic substances. In rural areas, where the use of chemical fertilisers and pesticides is more widespread, there is also an increase in the number of diseases associated with toxic substances entering water resources and food chains. Therefore, understanding environmental problems and their impact on health is critical to developing effective strategies to combat them.

Climate change and air pollution are leading to an increase in the level of allergens in the environment, including grass pollen, which is one of the main causes of allergic reactions among the population. In many regions of the world, especially in cities with high levels of pollution, there is an increase in the number of cases of asthma and other allergic diseases. It is also important to note that climate change can lead to an extension of the allergen season, which further increases the level of allergic diseases. The study of the mechanisms of these reactions is described in the article "Epidemiology and mechanisms of allergic reactions to grass pollen". This allows us to develop more effective methods of treatment and prevention, as well as find ways to reduce the impact of environmental factors on human health. To achieve sustainable development and preserve public health, it is necessary to integrate environmental strategies into health policy and pollution control strategies.

Historical sites, traditional villages and natural areas are important elements of tourist destinations. At the same time, intensive development of tourism, especially mass tourism, can lead to negative environmental and social impacts, such as a decrease in the natural and cultural value of places, environmental pollution, and social burden on local communities.

Preserving cultural heritage is important for supporting sustainable tourism, as it allows balancing tourism development with the protection of natural and historical resources. The specifics of this issue are highlighted in the article "Saving and transforming cultural landscapes for sustainable tourism". The transformation of cultural landscapes in the context of sustainable tourism includes the use of modern planning methods, adaptation of infrastructure to environmental standards, and consideration of the needs of local

communities. An important part of this process is the integration of local cultural and natural values into tourism strategies to ensure not only economic development but also environmental sustainability and cultural authenticity. It also involves the involvement of local communities in tourism planning and management, which helps to ensure social sustainability and a level of involvement in economic processes. In addition, the development of sustainable tourism helps to preserve biodiversity and protect natural ecosystems, which makes it important for regions where tourism is one of the main sources of income.

Climate change threatens not only the environmental stability of the region but also the sustainability of tourism, which is a vital component of the economies of many Balkan countries. In the study, "Estimating storm surge risk along Balkan coast: Methodologies, models, and applications", the authors examine methodologies and models for assessing storm surge risk, which enable the prediction of potential consequences of such events for coastal areas, including tourism and infrastructure. Predicting these risks is essential for developing adaptation measures aimed at minimising damage from natural disasters and climate change. Storm surge risk analysis also involves studying its impacts on natural ecosystems, such as coral reefs, coastal forests, and mangroves, which play crucial roles in biodiversity conservation and maintaining ecological balance. Additionally, assessing such risks aids in identifying weaknesses in infrastructure, such as hotels, resorts, and tourist attractions, and developing strategies to protect them and adapt to climate change.

Modern environmental governance also hinges on robust legal instruments, sector-specific economic strategies and internationally harmonised liability regimes. The manuscript "Legal aspects of ecosystem protection in the context of growing urbanisation" explains how advanced regulatory designs can mitigate the disproportionate ecological footprint of cities, which, while occupying a mere three per cent of the Earth's surface, generate roughly half of global waste and about 70% of greenhouse-gas emissions. Complementing this perspective on urban sustainability, the authors of the article "State and prospects of essential oils production in Ukraine and the world" demonstrate how targeted agri-industrial modernisation, particularly in lavender and peppermint cultivation, can unlock high-value green exports for economies undergoing structural transformation, provided that processing infrastructure and logistics chains are strategically upgraded.

The research "Legal aspects of ecosystem protection in the context of growing urbanisation" emphasises enhancing legal frameworks for safeguarding urban ecosystems amid fast urbanisation. This article offers a comparative examination of environmental legislation in Ukraine and Lithuania, emphasising notable disparities in their methodologies for ecosystem protection and the adoption of European norms. The study underscores the necessity for more robust legal frameworks, incorporating explicit performance metrics, economic incentives, and improved public oversight. Finally, the authors of the paper "International practice of compensation for damage caused by environmental violations in the management of tailings storage facilities and waste dumps" offer a comparative analysis of compensation frameworks in jurisdictions such as Brazil, Canada and the European Union, underscoring the preventive efficacy of

stringent design standards, the deterrent effect of clear liability rules and the risk-sharing potential of environmental insurance.

A notable research domain is the convergence of innovation parks, digital technologies, and energy efficiency within contemporary organisations. Researchers examine the transformative capacity of innovation centres in promoting sustainable development through the integration of advanced technologies, eco-friendly solutions, and entrepreneurial initiatives. Specifically, studies like “The Role of Innovation Parks in Promoting Digital Transformation and Energy Efficiency” and “Assessment of Innovation Parks in Ukraine: Case Study of LvivTech.City and UNIT.City Kharkiv” examine the efficacy of these parks in advancing energy-saving initiatives via technological innovation. The results demonstrate that, notwithstanding certain dangers, these parks are essential for promoting energy-efficient technology and digital solutions, providing significant assistance to enterprises in Ukraine.

A pertinent subject attracting interest is the emergence of autonomous energy supply systems for rural residences in Ukraine. Due to escalating apprehensions over energy reliability and expenses, the demand for decentralised energy solutions is expanding. Researchers examine the feasibility of renewable energy sources, including solar, wind, bioenergy, and geothermal, while considering local environmental conditions and economic viability. A case study from the Khmelnytskyi region examines a hybrid solar power plant, emphasising the benefits of using energy storage and intelligent management technologies to enhance energy utilisation in rural residences. The results highlight the capacity of these technologies to offer sustainable, economical solutions for homes, while also addressing the overarching necessity for energy independence in rural regions.

The paper, titled “The Latest Measures and Tools for Energy Management, Ecology, Labour Protection," explores innovative energy solutions and environmental protection measures in countries like Germany, Denmark, and Canada, contrasting them with practices in Ukraine. It highlights the role of smart grid systems in enhancing energy efficiency and the impact of green building technology in reducing carbon footprints. The report stresses the need for stricter environmental regulations to cut industrial pollution and boost sustainability, a theme that is also examined in "Energy-Saving Technologies and Innovations: Driving Competitiveness in Contemporary Business." The findings suggest that adopting these modern technologies can significantly enhance energy resilience, economic competitiveness, and environmental conservation in Ukraine, fostering long-term sustainable development.

The collection of studies presented herein investigates a range of environmental and socio-economic challenges faced by various regions, underscoring the imperative of adopting sustainable practices and employing informed management strategies. The study titled “Assessment of Contamination and Accumulation of Heavy Metals in Sediments of Lake Issyk-Kul” delves into the significant ecological repercussions associated with heavy metal pollution in Kyrgyzstan's Issyk-Kul Lake. This research highlights the critical necessity for continuous monitoring and the implementation of enhanced management practices to safeguard the ecological integrity of the lake.

Similarly, the article “The Impact of the Ecosystem on Biodiversity Restoration in the Natural Ecosystems of Ukraine” engages in a comprehensive analysis of plant species diversity within the Carpathian Biosphere Reserve. It elucidates the dynamic stability of ecosystem equilibrium and documents positive trends in species recovery, thereby emphasising the importance of ecosystem health in promoting biodiversity.

Furthermore, the work titled “Methodology for Assessing the Environmental Impact of Wind Energy Facilities” presents a robust framework for evaluating the ecological consequences associated with wind power installations. This study indicates that, although wind farms generally exhibit minimal ecological impact, it is essential to consider specific factors, such as the implications for avian populations, in the assessment process. Collectively, these studies contribute to a greater understanding of the intricate interplay between environmental practices and socio-economic outcomes, advocating for informed decision-making that prioritises sustainability.

“A Methodological Approach to Environmental Modelling in Coastal Wetlands of Cameroon Using Geographically Weighted Regression and MaxEnt” employs advanced spatial modelling techniques to monitor the prevalence of Acute Gastroenteritis (AGE) in Cameroon, emphasising the influence of environmental factors on public health and the necessity for targeted interventions. Simultaneously, “Remote Sensing and GIS in the Research of Young River Landscape” employs satellite data to examine the hydromorphological alterations of rivers in Ukraine, concentrating on erosion and flooding dynamics, as well as the significance of these technologies in flood risk management and sustainable water resource management. The “Documentation of Lipote (Syzygium Polycephaloides) and Respondents' Knowledge and Experience Towards Ecological and Economical Usefulness” emphasises the endangered status of a native fruit tree in the Philippines and promotes its conservation via reforestation initiatives and community involvement.

The article titled “Tourism, Ecology, and War: Neoliberal Aspects and Social Impacts” provides a comprehensive analysis of the repercussions of the ongoing conflict on the tourism sector in Ukraine. It critically examines the shifts in consumer preferences resulting from the conflict, explores the environmental consequences of neoliberal policies, and evaluates the potential of volunteer tourism as a catalyst for social progress and ecological preservation in post-conflict scenarios. Collectively, these studies provide significant insights into the convergence of environmental protection, socio-economic variables, and sustainable development.

The articles “Navigating Challenges and Exploring Opportunities within a Green Economy Framework: Case of Urban Transport Networks in Ukraine,” “Green Accounting Within the Framework of Corporate Social Responsibility and Sustainable Development,” and “Ecological Aspect and Prospects of Sustainable Development of Regions” offer a rigorous exploration of sustainability and environmental issues across diverse sectors.

The first article provides a detailed analysis of the ecological impacts associated with Ukraine's transport sector. It underscores the imperative transition toward sustainable infrastructure and the adoption of electric vehicles as strategies to mitigate

environmental pollution. Furthermore, it proposes recommendations for enhancing the efficiency of transportation infrastructure. The second study highlights the critical role of green accounting within the context of corporate social responsibility (CSR), elucidating its significance in promoting financial transparency and supporting the achievement of sustainability objectives.

The final essay delves into the public health risks associated with rising temperatures in Tashkent, revealing the urgent need for adaptive strategies to mitigate the health impacts of climate change in rapidly urbanising areas. Collectively, these studies reinforce the importance of embedding sustainability considerations into urban planning, corporate governance, and public health frameworks, thereby advocating for a holistic approach to addressing contemporary environmental challenges.

The articles “Corporate Social Responsibility in Ukraine as a Tool for Sustainable Development,” “Interdisciplinary Research in Sustainability: A 15-Year Bibliometric Analysis of Sustainability Journal,” and “Sustainable Marketing within the Environmental Responsibility Context: Research and Communication Strategies for Business Growth” explore diverse dimensions of sustainability. The initial essay examines corporate social responsibility in Ukraine, particularly concerning the war, and contrasts it with Germany's methodology. The second paper examines the evolution and influence of the “Sustainability” journal over 15 years, emphasising its role in global sustainability discourse. The final piece examines the influence of sustainable marketing practices on business strategies in Europe, highlighting the correlation between these activities and enhanced operational efficiency. These studies jointly demonstrate the contributions of CSR, sustainability research, and marketing techniques to long-term sustainable development.

The article "Exploring the Potential of Circular Economy in Ukrainian Enterprises" examines the principles of circular economy inside Ukrainian manufacturing firms. It analyses the adoption of resource-efficient techniques by enterprises, focusing on the influence of the EU Environment Programme. The study delineates significant obstacles to the execution of circular economy methods and underscores the economic and environmental advantages of these activities. It also demands enhanced legal backing and sector-specific incentives to promote the implementation of circular economy principles in Ukraine.

The articles “Sustainable Land Use Planning in Ontario: Protecting Against Aggregate Extraction Operations” and “Agricultural Practices’ Impact on Achieving the Sustainable Development Goal: Eliminating World Hunger” examine sustainability concerns in land use and agriculture. The initial paper analyses land use planning in Ontario, advocating for a more holistic approach to controlling the environmental and community effects of aggregate extraction. The second essay analyses the impact of organic farming on alleviating hunger in Europe, illustrating how enhanced production and mechanisation foster sustainable agricultural practices. These studies underscore the necessity for sustainable approaches in agriculture and land utilisation to foster enduring environmental and social resilience.

Another significant area of agricultural research is the enhancement of sowing methodologies and the influence of various agricultural technologies on crop yield and quality. The research examines the impact of sowing dates, row spacing, and variety selection on the yield of mustard and beetroot seeds across different areas. The article "Yield and Quality of Mustard Seeds Depending on the Use of Technology Elements" emphasises the significance of early sowing, especially in April, in promoting plant growth and augmenting seed yield in Ukraine's Right-Bank Forest-Steppe region. The study indicates that early sowing coupled with optimum row spacing markedly enhances mustard yield. The study "Effect of Date of Sowing on Growth, Yield, and Quality of Beetroot (*Beta vulgaris L.)* Varieties at Kapilakot, Sindhuli, Nepal" indicates that early sowing in October and the choice of the 'Action' variety enhance plant height, root size, and total yield. The results indicate that planting on October 15 with the 'Action' variety yields maximum beetroot production for growth and quality. The study "Yield and Quality of Beetroot (*Beta vulgaris L.*) Varieties in Inner Terai Area of Sindhuli, Nepal" investigates optimal varieties for yield and quality, identifying 'Action' as superior in economic yield, 'Ruby Queen' in total soluble solids, and 'Ruby Red' in flavour and overall acceptability.

The study "Impact of Extraction Methods on the Yield and Quality of Essential Oil from Oregano (*Origanum Vulgare*)" investigates various extraction methods for oregano essential oil, concluding that ultrasonic extraction with n-hexane yields the largest oil quantity and optimal chemical composition. These findings highlight the significance of technology in enhancing agricultural productivity and maintaining the chemical quality of products. These studies collectively underscore the crucial importance of technology and refined agricultural practices in improving crop yield and quality, with ramifications for both regional and global agricultural progress.

An essential element of agricultural research is comprehending the socio-economic difficulties encountered by rural farmers, especially during global emergencies such as the COVID-19 epidemic. The paper titled “Exploring the Socio-Demographic Profile of Rural Vegetable Growers Affected by the COVID-19 Pandemic: A Comparative Insight from Coastal Odisha” analyses the socio-demographic characteristics of rural vegetable cultivators in Odisha, India, who experienced the repercussions of the COVID-19 pandemic. It indicates that the majority of cultivators were middle-aged, possessed a primary school education, resided in nuclear households, and were marginal farmers with annual incomes ranging from ₹50,001 to ₹1,00,000. The findings underscore the vulnerabilities of farmers, especially those with little education, smaller landholdings, and larger families, who faced greater challenges during the pandemic. Despite these obstacles, numerous individuals adjusted by diversifying their crops, employing direct marketing strategies, and utilising digital platforms for knowledge and market access.

A critical research area is the function of inclusive governance in sustainable tourism development, especially in safeguarding cultural heritage and guaranteeing equitable stakeholder engagement. Academics underscore the significance of multi-actor involvement approaches, exemplified by the Pentahelix framework, which unites government, academia, business, community, and media in the formulation of tourist strategies. The articles “Saving and Transforming Cultural Landscapes for Sustainable Tourism” and “The Dynamics of No One Left Behind: Contestation of Pentahelix Actors

in Sustainable Tourism Governance in the Coastal Area of Tanjung Bunga, Indonesia" demonstrate the potential of sustainable tourism to enhance cultural landscape revitalisation and promote local development. In several regions, including Poland, Georgia, Kyrgyzstan, and Indonesia, tourist projects can provide jobs, enhance local identities, and promote ecological conservation. Nonetheless, these studies highlight structural obstacles—such as inadequate policy support, the marginalisation of local people, and conflicts among stakeholders—that impede the achievement of equitable tourist governance. Addressing these deficiencies through capacity-building, inclusive planning, and the incorporation of Indigenous and community-led knowledge is crucial for promoting long-term sustainability in tourism development.

A critical area of research pertains to the economic implications of natural resource development in the Arctic, as well as its strategic importance within the context of global trade. Scholars are focusing on the Arctic's extensive energy resources, including oil, gas, and various minerals, alongside the emerging transportation opportunities presented by the Northern Sea Route. The articles "The Role and Importance of the Arctic and its Sea Route in International Economic Relations" and "Geopolitical Challenges in the Arctic Region: Navigating Legal, Environmental, and Economic Issues" delve into specific cases that illustrate the increasing relevance of the Arctic in international discourse.

These studies underscore the economic potential of Arctic resources and the prospect of reduced transportation costs while addressing the complex legal, environmental, and geopolitical challenges associated with their extraction. Moreover, they highlight the growing necessity for international collaboration and the urgent need for sustainable management practices.

Evaluation and mitigation of storm surge risks, especially in coastal areas susceptible to the effects of climate change, is a critical research domain. The article titled "Estimating Storm Surge Risk along the Balkan Coast: Methodologies, Models, and Applications" critically examines forecasting methodologies and protective strategies essential for effectively managing storm surges along the Balkan coastline. This study utilises advanced meteorological and hydrodynamic models to investigate the impacts of storm surges on coastal ecosystems, with a particular emphasis on the East Coast region.

In addition, the research evaluates the effectiveness of natural barriers, such as sandbanks and barrier reefs, in reducing wave intensity and minimising damage to coastal infrastructure. The findings underscore the importance of integrated forecasting techniques, sustained monitoring of coastal morphodynamics, and adaptive management strategies, including dune restoration and the development of protective infrastructure, as vital components for mitigating storm surge risks and fostering long-term coastal resilience. The study ultimately advocates for a holistic approach to coastal management that balances ecological preservation with community safety and infrastructure sustainability.

This special issue explores the important topics needed to understand the complex relationship between economic growth, technological progress and environmental sustainability. It highlights the continuing challenges in reconciling technological

progress and environmental conservation and provides important insights into critical areas such as energy efficiency, waste management and sustainable transformation of companies. The articles emphasise the need for innovative solutions, strong regulatory frameworks and sustainable practices in various sectors, including energy, agriculture and tourism. This issue addresses serious environmental challenges and offers practical methods for mitigating the negative impacts of industrialisation, providing crucial insights into developing successful policies that promote long-term sustainability and resilience.

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Guest Editor for Special Issue

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