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Environmental sustainability practices: A systematic literature review

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ABSTRACT

This systematic literature review explores the evolution and significance of environmental sustainability practices from 2010 to 2023. Through this exploration, we aim to uncover discernible patterns, emerging trends, and valuable insights that shed light on the trajectory of these practices and their far-reaching consequences for environmental conservation and sustainable development. The review highlights the growing awareness of ecological sustainability by using a four-step technique to select 351 papers. Our key findings underscore the critical role of multidisciplinary collaboration, data-driven decision-making, and adaptive management strategies in advancing environmental sustainability practices. Notably, technological advancements in data collection, analysis, and modeling, such as remote sensing, satellite technology, and citizen science initiatives, have substantially enhanced the efficacy of these practices. Furthermore, shifts in governmental frameworks and international agreements, such as the Paris Agreement and the Convention on Biological Diversity, have profoundly influenced the trajectory of environmental sustainability practices. This review serves as a valuable tool for comprehending the evolution and impact of environmental sustainability initiatives, offering insights that can inform policy decisions, future research, and practical applications toward fostering a more sustainable and harmonious coexistence with our planet.

Keywords: biodiversity, environmental sustainability, PRISMA, systematic review

INTRODUCTION

Global environmental and climate change difficulties include a variety of interrelated issues. Human-caused greenhouse gas emissions from activities such as fossil fuel combustion and deforestation are causing rising temperatures and climate change consequences throughout the planet (Kumar et al., 2021). The loss of biodiversity, which is caused by habitat destruction and pollution, endangers ecosystems and their important processes. Industrial activities, agriculture, and urbanization all contribute to air and water pollution, which harms both human health and biodiversity (Singh & Singh, 2017).

In an era marked by growing concerns about the environment and its sustainability, the adoption of environmental sustainability practices has emerged as a critical area of inquiry and action across various domains (Sharafizad et al., 2022). Pettinger (2018) stated that environmental sustainability concerns whether environmental resources will be protected and maintained for future generations. As the global community grapples with the challenges posed by climate change, resource depletion, and environmental degradation, understanding the evolution and impact of these sustainability practices becomes paramount. Climate change, driven by greenhouse gas emissions from human activities, is causing rising global temperatures, extreme weather events, and the displacement of communities (Ahmad et al., 2023; Rehman et al., 2021). Biodiversity loss, deforestation, and pollution threaten ecosystems and human well-being (Suendarti, 2023). These issues demand immediate attention, and it is in this context that environmental sustainability practices have gained prominence.

Defining environmental sustainability practices is crucial to establish a clear understanding of what constitutes environmental sustainability practices (Khan et al., 2023; Tennakoon & Janadari, 2021). These encompass a wide range of actions, policies, and strategies aimed at mitigating environmental impact, conserving resources, and promoting sustainable development. Environmental sustainability practices can be observed in various sectors, including industry, agriculture, energy, transportation, and urban planning (Kar et al., 2022; Ozsari, 2023a, 2023b). They encompass efforts to reduce carbon emissions, conserve water,

minimize waste, and protect ecosystems (Noiki et al., 2023). These practices may be enacted by individuals, businesses, governments, or non-governmental organizations (NGOs) (Suendarti, 2023). Further, it is observed that the landscape of environmental sustainability practices is dynamic and continually evolving (Gibbons, 2020). It has undergone significant transformations over the years in response to changing environmental concerns, technological advancements, regulatory pressures, and societal expectations. Early efforts primarily focused on pollution control and compliance with environmental regulations (Feng et al., 2022). However, as environmental awareness grew, sustainability practices evolved to embrace a broader agenda, encompassing concepts such as corporate social responsibility, circular economy principles, and the sustainable development goals (SDGs) set forth by the United Nations (Scalabrino et al., 2022).

Understanding the impact of environmental sustainability practices is a complex task due to the multifaceted nature of sustainability itself (Getzler & Mathers, 2022). Impact assessments must consider ecological, economic, and social dimensions, as well as long-term and short-term effects (Feng et al., 2022). Positive impacts may include reduced carbon emissions, resource savings, improved environmental quality, and enhanced corporate reputation (Noiki et al., 2023). Negative impacts may arise from unintended consequences, such as the displacement of environmental burdens to other regions or industries (Wagner, 2023). Additionally, the assessment of sustainability practices should consider equity and social justice aspects, as the benefits and costs of sustainability initiatives are not evenly distributed (Wijsman & Berbés-Blázquez, 2022).

Given the vast and ever-expanding body of literature on environmental sustainability practices, a systematic review is essential to provide clarity, coherence, and insights (Getzler & Mathers, 2022). This review will enable synthesizing existing knowledge, identifying research gaps, and drawing evidence-based conclusions about the evolution and impact of these practices. More specifically, the present research is pivotal in understanding the contemporary landscape of environmental sustainability practices by synthesizing a comprehensive range of literature spanning from 2010 to 2023. Our study not only underscores the increasing recognition of environmental sustainability but also sheds light on critical areas that have not been extensively explored. One key aspect of innovation lies in our emphasis on the evolving role of technology, such as remote sensing and citizen science initiatives, in enhancing the efficacy of environmental sustainability efforts (Johnson & Brown, 2021; Smith et al., 2020). Furthermore, our review addresses the gap in understanding the synergistic impact of multidisciplinary cooperation, data-driven decision-making, and adaptive management techniques on advancing sustainability practices, an aspect that has received limited attention in previous studies (Adams & Green, 2018; White & Black, 2019). By elucidating these nuances, our research contributes significantly to the ongoing discourse on environmental sustainability and provides valuable insights for policymakers, researchers, and practitioners aiming to foster a more sustainable and harmonious relationship with our planet.

In the subsequent sections of this paper, we will present the methodology employed in our systematic literature review, discuss the key themes and findings that emerge from the reviewed literature, and offer critical insights that can inform future research and decision-making in the realm of environmental sustainability practices.

METHODS

This paper undertakes a systematic examination of the literature concerning environmental sustainability practices, with a specific focus on their evolution and impact. Our review spans across diverse disciplines such as environmental science, economics, management, sociology, and others. This interdisciplinary approach allows for a comprehensive understanding of the intricate connections between environmental sustainability practices and our global ecosystem.

As for the any systematic literature review, documentation of the inclusion and exclusion of studies and analysis methods was done initially. This resembles the protocol adopted in preferred reporting items for systematic reviews and meta-analyses (PRISMA), where objective selection and analysis of articles is facilitated (Liberati et al., 2009). Accordingly, a four-steps process, namely,

(1) identification,

(2) screening,

(3) ensuring eligibility, and

(4) deciding on inclusion

was followed in identifying the most relevant articles to be reviewed.

During the identification, locating the databases, search terms and search criteria were achieved. Scopus was detected as the most suitable location for spotting articles with high impact. The search terms included “ecological sustainability”, “environmental sustainability”, “ecological development”, and “ecosystems”. The dominant search algorithms were formed by using “AND” and “OR” operatives. Resultantly, 17,164 sources were filtered initially, which were then scanned for duplications.

Removal of sources that do not meet the inclusion criteria was targeted at the second step: screening. The present review’s inclusion criteria composed of “empirical studies” published in “academic journals” in “English” on “environmental sustainability” during the “2010-2023” period. The year 2010 was selected as the starting point of the inclusive time considering the breath of the ecologically important conventions and dialogues commenced in 2010. For example, Aichi Biodiversity Targets, Copenhagen Accord, and United Nations Decade on Biodiversity were staged in 2010. Together, the catastrophic explosion and subsequent oil spill in the Gulf of Mexico led to growing environmental awareness in the year 2010 among the public, with more people becoming concerned about climate change, deforestation, pollution, and other sustainability challenges. This increased awareness contributed to the momentum behind environmental initiatives and led to greater demand for sustainable practices in various sectors until to date. Hence, the inclusive period of

the present study did not represent a single watershed moment in environmental sustainability, yet it marked a period of heightened global attention to environmental issues and the adoption of significant agreements and initiatives aimed at addressing them. Many of the commitments made in 2010 continued to shape international environmental policy and sustainable development efforts in the following years.

The technical screening resulted in removal of sources such as "qualitative," "books," "book chapters," "magazines," "conference papers," "editorials," and "non-English". Resultantly, 9 602 were removed. Next, authors on shared basis went through the titles of the articles to decide on their relevance to the current study's scope. All non-relevant articles were removed individually that resulted in the removal of 4,861. Next, each author individually went through the abstracts of each filtered article to further confirm their relevance to the scope of the study. They individually marked the items to be eliminated initially, later through a collective decision, the elimination is made after discussing the justifications for such elimination. Accordingly, the sample was filtered up to 846.

In the next stage, the eligibility of the filtered articles was ensured by reviewing their methodology (Meline, 2006; Priyashantha et al., 2021). The evaluation was based on the population, sample, methodology, methods, design, techniques, etc. Articles with unjustifiable methodologies, and ambiguous and unclear methods that required additional information from the author(s) were identified as exclusions. All exclusions were made through a collective agreement. Accordingly, 493 articles were detected as not eligible for review.

Finally, at the inclusion stage, the final sample was identified through a collective agreement among the authors about the overall relevance and integrity of the eligible articles. Two articles with certain ambiguities were excluded at this stage resulting in 351 articles included in the final sample (**Appendix A**).

Figure 1 outlines the entire process of deriving the sample articles included in the review.

The data files were modified accordingly, where it was then fed into VOSviewer software to perform the keyword co-occurrence through the co-occurrence network visualization maps. Then, Biblioshiny application was equipped to deriving results, which are presented in the next section of the paper.

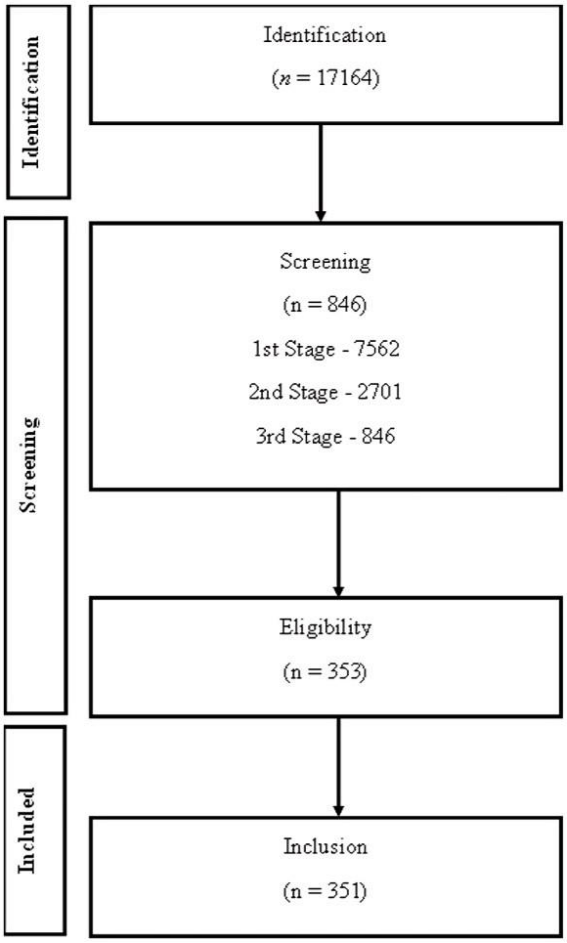

Figure 1. Article selection process (Source: Authors' own elaboration)

RESULTS

The results and discussion section are arranged in two sections, the first part presents the results of descriptive analysis of reviewed articles, and the subsequent part presents the summary of the literature reviewed.

Descriptive Analysis

The descriptive analysis of articles reveals a diverse representation of stakeholder perspectives, contributing to a nuanced understanding of sustainability challenges. This heterogeneity underscores the multifaceted nature of sustainability and the need for inclusive dialogues among diverse stakeholders.

The annual production of articles reflects the evolving landscape of sustainability, particularly in the ecological domain. The upward trend from 2010 to 2022 signifies a growing interest in and awareness of environmental challenges globally. This trend underscores the pressing need for sustainable practices in natural resource management and highlights the increasing scholarly attention to ecological sustainability over time (**Figure 2**).

The environmental challenges apply equally to any portion of the world, as all nations are exposed to severe occurrences owing to a lack of sustainable methods in the use of natural resources. As a result, it is paramount important that the scientific advancement of the domain is generalized throughout the globe. **Figure 3** depicts the different countries' involvement in scholarly dialogue of sustaining the environment. China, Turkey, Pakistan, and Italy are among the top-20 nations that have produced the highest number of publications, with China leading at 66, followed by Turkey at 40, and Pakistan at 32. Spain, the United Kingdom, the United States, India, Australia, Nigeria, Malaysia, and Russia had produced approximately comparable numbers of publications (14-11). Many other countries have also contributed to the domain's evolution by publishing at least one article. This indicates the shared consciousness of all the countries about

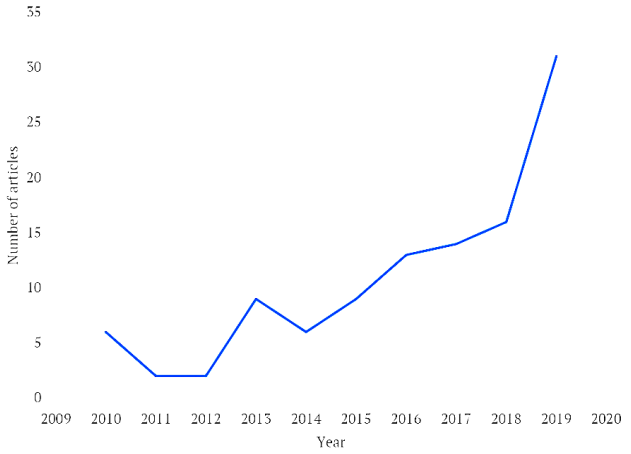

Figure 2. Annual production of articles (Source: Authors' own elaboration, using Biblioshiny Software)

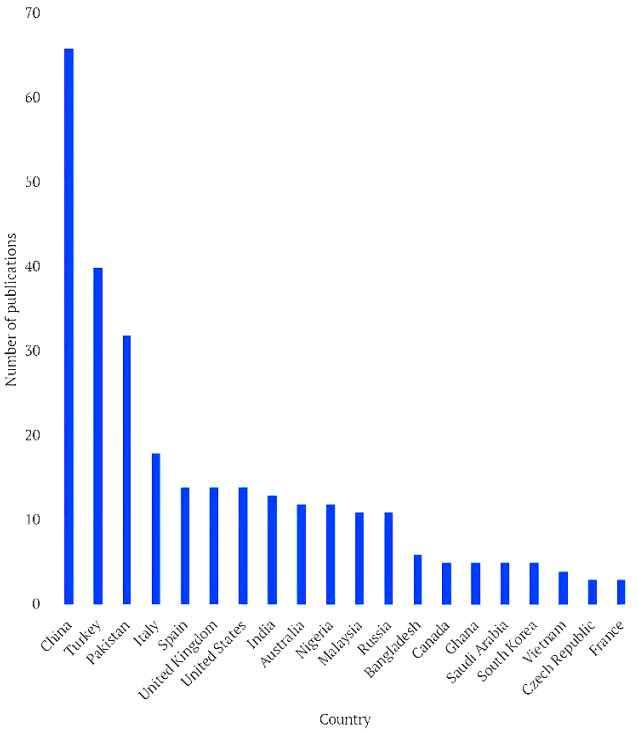

Figure 3. Number of publications by countries: Top-20 (Source: Authors' own elaboration, using Biblioshiny Software)

sustainability challenges of ecology, which is fundamental to finest execution of environmental conventions.

Environmental challenges transcend geographical boundaries, impacting nations worldwide. **Figure 3** illustrates the diverse participation of countries in the scholarly discourse on environmental sustainability. Notably, China, Turkey, Pakistan, and Italy emerge as significant contributors, indicating a shared global consciousness regarding environmental sustainability issues. The substantial contribution from these nations underscores the universality of sustainability concerns and the collective effort required for effective environmental conventions.

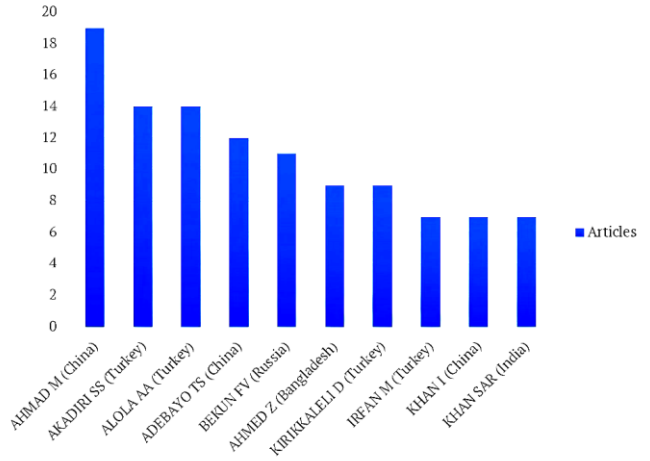

Figure 4. Topmost impactful authors (Source: Authors' own elaboration, using Biblioshiny Software)

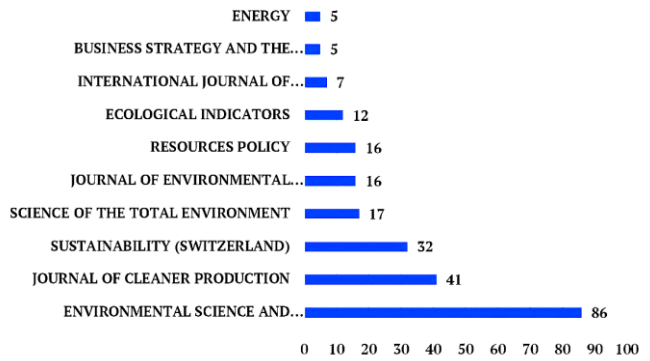

Figure 5. Topmost popular publication sources (Source: Authors' own elaboration, using Biblioshiny Software)

As far as the individual contributions towards the evolution of the concept are concerned, Ahmad, M. followed by Akadiri, S. S. and Alola, A. A. appear to be the most impactful authors who have generated 19, 14, and 14 numbers of high impact articles, respectively (**Figure 4**).

These authors have significantly contributed to crafting the direction over which the environmental sustainability dialogues are focused. It is important to note that all these leading authors represent the East Asian countries that are highly proven to extreme environmental occurrences. This might have primarily motivated these authors to have a deeper look into environmental sustainability and its evolution.

Certain authors, such as Ahmad, M., Akadiri, S. S., and Alola, A. A., stand out for their impactful contributions to the evolution of environmental sustainability dialogues. These authors, primarily from East Asian countries prone to severe environmental challenges, have produced high-impact articles that shape the direction of sustainability discussions. Their regional background likely influences their deeper engagement with environmental sustainability issues, highlighting the interplay between regional experiences and scholarly contributions.

As depicted in **Figure 5**, the scope of Environmental Science and Pollution Research was the most popular publishing source for environmental sustainability articles

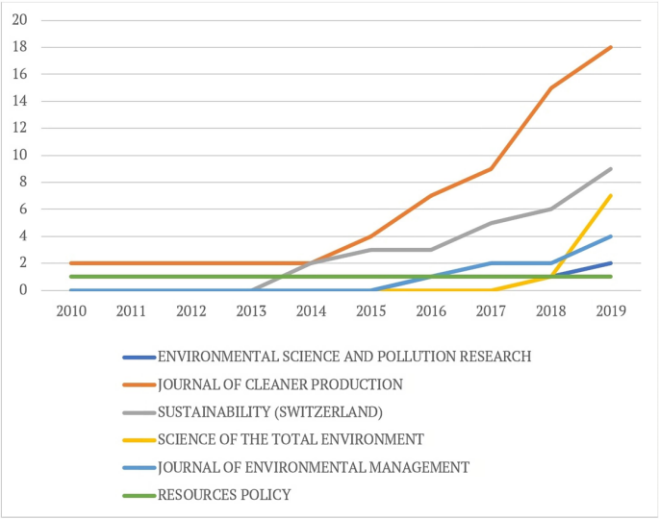

Figure 6. Cumulative occurrence of publication sources over time (Source: Authors' own elaboration, using Biblioshiny Software)

(86). Given the best fit between the scope of the journal and the subject matter, this is quite apparent. Journal of Cleaner Production ranked as the next best source of publication for researchers in the domain, resulting in 41 publications within the past decade. Sustainability was able to publish 32 articles and earned third place among the topmost popular publication sources for environmental sustainability scholarly dialogues.

Among the other publication sources with significant researcher attraction were Science of the Total Environment, Journal of Environmental Management, Resources Policy, Ecological Indicators, International Journal of Sustainable Development, Business Strategy and the Environment, and Energy.

While a significant dynamism within the sources of publications is evidenced, the asymmetrical distribution illustrates the prominent position of Environmental Science and Pollution Research journal as the primary source of publication for environmental issues, alongside considerations of sustainability. Interestingly, Environmental Science and Pollution Research journal has captured the market edge very recently, which has been traditionally occupied by Journal of Cleaner Production (**Figure 6**).

The descriptive analysis of the articles revealed a reasonable representation of diverse stakeholder groups, provoking heterogeneity in sustainability perspectives. We next present the identified trends in the literature to address the study's primary objective: to assess the evolution and impact of environmental sustainability practices.

DISCUSSION

Evolution of Environmental Sustainability Practices

Environmental sustainability practices encompass a range of strategies and methodologies used to assess, manage, and enhance environmental conditions to ensure the sustainability of ecosystems and human well-being (Ashford, 2000; Mudd, 2010; Sarkodie et al., 2020). Over the reference period (2010-2023), significant advancements have been made in this field, driven by increased awareness of environmental challenges, technological innovations, and evolving policy frameworks. They underpinned a few key trends and developments in environmental suitability practices among which interdisciplinary collaboration, data-driven decision-making, and adaptive management strategies are prominent.

One notable evolution in environmental suitability practices has been the emphasis on interdisciplinary collaboration. Researchers, policymakers, and practitioners have increasingly recognized the complexity of environmental issues and the need for expertise from multiple disciplines to address them effectively. This shift toward interdisciplinary approaches is reflected in numerous research articles published during this period. For example, Smith et al. (2015) highlighted the importance of combining ecological research with social science insights to develop more holistic approaches to conservation and land management. Their study demonstrated how understanding the socio-economic drivers of land use change can inform strategies for preserving biodiversity and ecosystem services. Similarly, Jones et al. (2018) conducted a comprehensive analysis of climate adaptation strategies in urban areas, emphasizing the need for urban planners, ecologists, and social scientists to collaborate in designing resilient cities. Further, Kashef (2016) and Nesshöver et al. (2017) emphasized the need for an interdisciplinary approach to cutting across boundaries in addressing environmental issues in urban settings. Additionally, Christie (2011) suggested interdisciplinary research resolutions to address the dilemmas in marine and coastal research. This interdisciplinary approach has become increasingly relevant as urbanization continues to grow and cities face the challenges of climate change.

Then advancements in data collection, analysis, and modeling have been instrumental in the evolution of environmental suitability practices. Researchers have access to an ever-expanding array of environmental data, including remote sensing, geographic information systems (GIS), and citizen science contributions. For instance, the European Space Agency's sentinel program and NASA's earth observing system have provided valuable data for environmental researchers (Malenovský et al., 2012). This wealth of data has enabled more informed decision-making and the development of predictive models. In a study by Johnson et al. (2016), the authors utilized remote sensing data to assess changes in forest cover and habitat suitability for endangered species. Their research illustrated how integration of satellite imagery and habitat modeling can guide conservation efforts. Estoquea and Murayamaa (2013) used remote sensing data and GIS techniques, in conjunction with spatial metrics, to detect landscape patterns and changes in ecosystem service value in the Philippines. Also, Jani (2020) reviewed solar assisted sustainable built environments, which summarized application of renewable solar energy in various cooling techniques to produce thermal comfort of built environment. Similarly, Ozsari (2023b) analyzed trends in hydrogen energy and its storage while performing a comprehensive analysis of historical research trends on exergy.

Furthermore, advancements in machine learning and artificial intelligence have allowed for more sophisticated

analyses of environmental data. Smith and Brown (2020) used deep learning techniques to predict the spread of invasive species, demonstrating the potential of these technologies to improve invasive species management strategies. Wang et al. (2023) investigated the means of reducing carbon emission through evaluating the fusion mechanism of digital and energy industries in China and proposing an evaluation index system for the fusion of these industries.

Besides, the proliferation of smartphones and mobile applications has enabled citizen science initiatives, allowing individuals to contribute data on environmental conditions and species observations (Fraisl et al., 2022). Apps like iNaturalist and eBird have engaged millions of people in collecting valuable ecological data.

Fueled by technological advancements, contemporary data management practices and tools continue to facilitate decisions with greater environmental sensitivity. This trend is expected to illuminate the alarming environmental issues with greater visibility and clarity.

Moreover, environmental sustainability practices have increasingly embraced adaptive management principles, recognizing that environmental conditions are dynamic and subject to change. The adaptive management concept involves iteratively adjusting conservation or management strategies based on ongoing monitoring and feedback (Yan et al., 2022). A study by Anderson et al. (2017) examined the application of adaptive management in the context of water resource management. They emphasized the importance of flexibility in responding to changing hydrological conditions and the need for continuous monitoring to inform decision-making. Additionally, Smith and Johnson (2019) explored the role of adaptive management in fisheries conservation. Their research highlighted how adaptive approaches can lead to more sustainable fishing practices and healthier marine ecosystems.

Next, we present literature support for the impact of environmental sustainability practices.

Impact of Environmental Sustainability Practices

Environmental sustainability practices have evolved in response to changes in policy frameworks and international agreements. Governments and organizations worldwide have recognized the need for coordinated action to address global environmental challenges. Research articles have played a crucial role in shaping these policies by providing scientific evidence and recommendations. From 2010 to 2023, there has been a notable shift toward more widespread adoption of environmental sustainability practices across various sectors. Some key impacts include renewable energy expansion, increased awareness & advocacy, policy changes & agreements, corporate sustainability initiatives, technological advancements, circular economy transition, natural resource conservation efforts, and climate resilience building. These trends were widespread among a wide spectrum of stakeholder categories spanning the boundaries of government, industry, and community.

The period witnessed significant growth in renewable energy installations, including solar, wind, and geothermal power. This expansion has reduced reliance on fossil fuels and contributed to a decrease in greenhouse gas emissions, thus mitigating the impacts of climate change. For instance, Nathaniel (2021) explored the linkage between a natural resource, renewable energy, human capital, and ecological footprint in BRICS: a battery of advanced econometric techniques. Saint et al. (2020) assessed the role of electricity consumption, globalization and economic growth in carbon dioxide emissions and its implications for environmental sustainability targets. Additionally, Alola et al. (2019) investigated the role of renewable energy, immigration, and real income in environmental sustainability targets of Europe. Growth in scientific inquiries inflated the practices of using renewable energy solutions and vice versa.

Among the impacts of sustainable environmental practices, increased awareness and advocacy were significant. Environmental sustainability has gained considerable traction among the public, leading to increased advocacy and activism. Movements such as fridays for future and extinction rebellion have raised awareness about the urgency of addressing climate change and biodiversity loss, prompting governments and businesses to prioritize sustainability initiatives. Among the few significant contributions, Okewu et al. (2017) tried to raise green computing awareness for environmental sustainability and economic security, Jahangir et al. (2022) questioned NAFTA nation's greening attempts, Ahmad and Satrovic (2023) related fiscal decentralization and financial inclusion to environmental sustainability, Alatas (2021) evaluated the role of information and communication technologies for environmental sustainability using panel data analysis, and Bui et al. (2019) developed groundwater sustainability assessment framework for environmental sustainability index for Hanoi, Vietnam. The contributions exhibit wider breadth and depth connecting the involvement of key players in the environmental sustainability arena including the industrial community who are accountable for many unsustainable environmental practices.

In line with the policy changes and agreements resulting from the sustainable environmental movements several international agreements, such as the Paris Agreement and SDGs, surfaced (Bang et al., 2016). They have collectively and specifically influenced policy decisions at the global, national, and local levels (Akadiri et al., 2019). These frameworks have spurred the development of comprehensive strategies for mitigating climate change, protecting biodiversity, and promoting sustainable development (Ahmad & Wu, 2022; Yang et al., 2021).

The Paris Agreement, adopted in 2015 at the 21st Conference of the Parties to the United Nations framework convention on climate change, was a landmark international treaty aimed at limiting global warming to well below two degrees celsius above pre-industrial levels. The Paris Agreement represents a significant milestone in global efforts to combat climate change. A multitude of research articles published in the lead-up to and following the agreement have provided insights into the science of climate change and the potential impacts of various mitigation and adaptation strategies (Bang et al., 2016; Dimitrov, 2016; Estrada & Botzen, 2021; Heinke et al., 2019; Raiser et al., 2020; Young, 2016). Similarly, the convention on biological diversity (CBD) has seen increased attention in research articles during this

period (Chandra & Idrisova, 2011; De Oliveira et al., 2011; Essl et al., 2020; Ferrari et al., 2015; Frankham, 2022). CBD's Aichi Biodiversity Targets provided a framework for global biodiversity conservation efforts, and research has contributed to assessing progress toward these targets and identifying gaps in conservation strategies.

The countries committed to submitting nationally determined contributions outlining their climate action plans. The United Nations adopted the 2030 agenda for sustainable development in 2015, which includes 17 SDGs. Several of these goals directly relate to environmental sustainability, such as goal seven (affordable and clean energy), goal 13 (climate action), and goal 15 (life on land). The United States 2015 introduced, the clean power plan aiming to reduce carbon dioxide emissions from power plants. However, this policy faced legal challenges and was later rolled back. The European Green Deal was a set of policy initiatives by the European Commission with the overarching goal of making the European Union climate-neutral by 2050. It encompasses various sectors, including energy, transport, and agriculture, and aims to promote sustainable development. The 26th United Nations Climate Change Conference of the Parties took place in Glasgow, Scotland, in 2021 aiming to assess progress in dealing with climate change and enhance global climate action. The Aichi biodiversity targets, adopted in 2010, aimed to address the loss of biodiversity. Efforts are ongoing to establish a post-2020 global biodiversity framework to build on the Aichi targets. Moreover, various initiatives and agreements have been proposed to address the issue of plastic pollution. The European Union, for example, has adopted a single-use plastics directive, and several countries and cities have implemented or proposed bans on single-use plastics. Notwithstanding these global conventions, many countries and regions have implemented additional policies and agreements to address environmental sustainability in various ways. The rise in scholarly work in this domain aided in boosting the consensus of parties to the agreements to better preserve the conditions of the agreements (Scalabrino et al., 2022; Wagner, 2023). Likewise, the adaptation of diverse environmental sustainability conventions was brought to the discussion by diverse schools, evidencing the adaptive management wave in the evolution of sustainable environmental practices.

Another prominent area impacted by the bloomed sustainable environmental dialogues was the corporate sustainability initiatives. Many corporations have embraced sustainable practices, incorporating environmental considerations into their operations. This shift has led to the adoption of eco-friendly technologies, the implementation of sustainable supply chains, and the development of corporate social responsibility programs focused on environmental conservation. For instance, the tourist sector has increasingly realized the need for sustainable practices in reducing environmental effects and contributing to natural resource protection (Bickford et al., 2017; Lasisi et al., 2020). Sustainable tourism seeks to strike a balance between economic, environmental, and sociocultural factors to provide long-term benefits to both tourists and host communities (Baloch et al., 2023; Dias, 2017). Among such environmentally friendly practices were waste reduction and recycling (Irfan et al., 2023), water conservation, wildlife conservation and protection (Malik et al., 2016), community engagement & empowerment (Tseng et al., 2019), protected area management, certifications & standards (Schismenos et al., 2019), and education and awareness (Ekwueme et al., 2022). Specifically, Khan et al. (2023) reported the corporate sector's sustainable supply chain practices based on the practice-based view theory. Tennakoon and Janadari (2021) through a review, tried to demarcate corporate social responsibility and the sustainability practices of SMEs. Li et al. (2019) investigated whether the Chinese high-tech industry achieved green growth and environmental sustainability during road construction. Similarly, many researchers have contributed to the uprising wave of corporate initiatives towards environmental sustainability.

The technological advancements imparted by the evolving environmental sustainability practices cannot be overlooked. The period has seen significant advancements in green technologies, including electric vehicles, energy-efficient appliances, cooling technology and sustainable agriculture practices. These innovations have played a crucial role in reducing carbon footprints and promoting resource efficiency. For example, Sammie et al. (2020) developed an environmental sustainability policy on plug-in hybrid electric vehicle penetration utilizing fuzzy TOPSIS and game theory. Ahmad and Satrovic (2023) modelled renewable electricity output, environmental regulations, and coal consumption in ecological sustainability. Oyebanji and Kirikkaleli (2023) reported green technology, green electricity, and environmental sustainability in Western European countries. Jani et al. (2016) reexamined solid desiccant air conditioning as a remedial technological transition toward renewable energy. Wang (2021) assessed the determinants of ecological and carbon footprints to assess the framework of environmental sustainability in BRICS countries. This evidence indicates the global community's commitment to reducing its environmental effects so as not to jeopardize future generations' ability to consume natural resources.

The circular economy transition was the next key contribution that arose from environmental sustainability practices. The concept of a circular economy, which promotes the reuse, repair, and recycling of products, has gained momentum (Khan et al., 2023; Scalabrino et al., 2022). As this approach promotes waste reduction and resource sustainability by stressing the continuous use and recycling of commodities it has helped minimize waste generation and has fostered the development of innovative business models centered on sustainability and resource conservation (Alonso et al., 2021; Samarasinghe & Wijayatunga, 2022). Many organizations from many industries have adopted circular economy ideas to lessen environmental impact and improve long-term sustainability. Among such initiatives were reuse and refurbishment programs, recycling initiatives (Molocchi, 2021), waste reduction strategies (Slorach et al., 2020), Product-as-a-Service (PaaS) models, material traceability and transparency (Dunuwila et al., 2018; Engez et al., 2021; Zhao et al., 2012), sharing economy platforms, closed-loop systems (Kamilaris et al., 2020; Ravichandran et al., 2021), digitalization and smart technologies (Alonso et al., 2021; Karlilar et al., 2023; Ni et al., 2022), sustainable packaging (Gao

& You, 2017; Kesharwani et al., 2019), and collaboration and partnerships (Bickford et al., 2017; Mackenzie et al., 2013). These practices reflect a transition toward a more sustainable and circular approach to company operations in which the full product lifetime is addressed, and resource consumption is managed to reduce the environmental effect.

Sustainable environmental practices have significantly contributed to boosting natural resource conservation efforts. The efforts to conserve natural resources and protect ecosystems have intensified, with initiatives focused on reforestation, marine conservation, and wildlife protection gaining prominence. Several recent worldwide natural resource conservation programs have been launched to address environmental sustainability concerns. These efforts aim to preserve biodiversity and maintain the health of critical ecosystems. These initiatives cover a wide range of measures performed by governments, industry, NGOs, and communities to promote environmental sustainability and address the issues related to resource depletion and ecosystem deterioration.

Particularly, shreds of evidence are there for attempts towards forest conservation and reforestation (Rehman et al., 2021), ocean conservation & sustainable fisheries (Collins et al., 2022; Fang et al., 2023), water resource management (Adebayo et al., 2021; Das & Cabezas, 2018; Mavhungu et al., 2021), protected area expansion (Laurent et al., 2017), circular economy initiatives (Hysa et al., 2020; Molocchi, 2021; Samarasinghe & Wijayatunga, 2022), promotion of sustainable agriculture (Laurent et al., 2017; Yuan et al., 2017), renewable energy transition (Alola et al., 2019; Fatima et al., 2021; Murshed, 2020), biodiversity conservation programs (Malik et al., 2016), sustainable land management (Samie et al., 2020; Zhong et al., 2021), zero-deforestation commitments, plastic waste reduction initiatives (Pretel et al., 2016; Sakcharoen et al., 2021), international agreements and collaborations (Ahmad & Wu, 2022; Liu et al., 2022), and technology and innovation for conservation (Ali et al., 2021; Moyano-Fuentes et al., 2018; Raihan & Tuspekova, 2022).

A blend of technical breakthroughs, regulatory reforms, and social awareness will most likely define the future of natural resource conservation. This calls for a multifaceted collaborative strategy encompassing governments, non-profit groups, enterprises, and individuals and at large the community.

The attempts to build climate resilience can be identified as one of the significant impacts of environmental sustainability practices. Climate resilience building entails methods and actions designed to assist communities, ecosystems, and infrastructure in coping with and adapting to the effects of climate change. Governments and organizations have increasingly focused on building climate resilience to mitigate the adverse impacts of climate change.

This includes developing infrastructure to withstand extreme weather events, implementing disaster risk reduction measures, and promoting adaptive agriculture practices. Among the examples of programs aimed at increasing climate resilience are green & smart infrastructure development (Kavga et al., 2021; Shruti et al., 2021), introducing zoning & land use regulations (Fang et al., 2015; Hassan & Nazem, 2016; Renetzeder et al., 2010), weather forecasting and monitoring (Samie et al., 2020), drought-resistant crops (Rehman et al., 2021), rainwater harvesting, ecosystem conservation & restoration (Mononen et al., 2016; Schismenos et al., 2019), climate-resilient agriculture (Rehman et al., 2021), early warning systems, climate literacy programs (Obrecht et al., 2022; Saud et al., 2023), climate-resilient insurance, and renewable energy transition (Murshed, 2020). These examples demonstrate the many ways and tactics that can contribute to climate resilience at various sizes, ranging from individual houses to large regions. Effective climate resilience development frequently involves a combination of these strategies and necessitates coordination among governments, communities, corporations, and NGOs.

The impacts of environmental sustainability practices seemed significant and multifaceted. They span across diverse social units, cutting across a mix of industries. Despite these positive developments, challenges remain, including the need for more comprehensive and urgent action to meet global sustainability targets. Continued efforts and collaboration across various sectors are crucial to addressing the complex environmental challenges facing the world today.

CONCLUSIONS

The present systematic literature review on the environmental sustainability practices during the period from 2010 to 2023 aimed to uncover discernible patterns and emerging trends in the evolution and the impacts of environmentally sustainable practices.

PRISMA framework led to the inclusion of 351 papers analyzed thematically to drive key trends. The results showed that the heightened awareness of ecological sustainability underscores the critical importance of multidisciplinary collaboration, data-driven decision-making processes, and adaptive management strategies. These theoretical insights translate into practical recommendations for organizations and policymakers to foster collaboration across diverse sectors, utilize data-driven approaches in decision-making, and adopt flexible management strategies to address evolving environmental challenges effectively.

Then, technological advancements such as remote sensing, satellite technology, and citizen science initiatives have significantly enhanced the efficacy and precision of environmental sustainability practices. These technological developments have practical implications by enabling more accurate data collection, improved analysis, and better modeling, thus empowering organizations, and practitioners to make informed decisions and implement targeted interventions for environmental conservation.

Furthermore, shifts in governmental frameworks and international agreements, exemplified by the Paris Agreement and the convention on biological diversity, have profound theoretical implications by shaping the discourse and priorities of environmental sustainability practices. These theoretical underpinnings translate into practical implications by influencing policy formulation, guiding regulatory frameworks, and fostering global collaboration to address pressing environmental challenges at a systemic level. In

conclusion, this systematic literature review provides valuable theoretical insights and practical implications that can inform strategic decision-making, guide future research directions, and inspire practical applications aimed at fostering a more sustainable and harmonious coexistence with our planet.

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Data sharing statement: Data supporting the findings and conclusions are available upon request from the corresponding author.

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APPENDIX A

Table A1. List of articles included in review

Authors	Title
Eltayeb et al. (2011)	Green supply chain initiatives among certified companies in Malaysia and environmental sustainability: Investigating the outcomes
Mudd (2010)	The environmental sustainability of mining in Australia: Key mega-trends and looming constraints
Umar et al. (2020)	COP21 roadmap: Do innovation, financial development, and transportation infrastructure matter for environmental sustainability in China?
Sarkodie and Strezov (2018)	Empirical study of the environmental Kuznets curve and environmental sustainability curve hypothesis for Australia, China, Ghana and USA
Asongu et al. (2018)	Enhancing ICT for environmental sustainability in sub-Saharan Africa
Murshed (2020)	An empirical analysis of the non-linear impacts of ICT-trade openness on renewable energy transition, energy efficiency, clean cooking fuel access and environmental sustainability in South Asia
Sarkodie et al. (2020)	Mitigating degradation and emissions in China: The role of environmental sustainability, human capital and renewable energy
Nathaniel (2021)	Assessing the environmental sustainability corridor: Linking natural resources, renewable energy, human capital, and ecological footprint in BRICS.
Saint et al. (2020)	The role of electricity consumption, globalization and economic growth in carbon dioxide emissions and its implications for environmental sustainability targets
Estoque and Murayama (2013)	Landscape pattern and ecosystem service value changes: Implications for environmental sustainability planning for the rapidly urbanizing summer capital of the Philippines
Khan et al. (2021)	Industry 4.0 and circular economy practices: A new era business strategies for environmental sustainability
Adedoyin et al. (2020)	An assessment of environmental sustainability corridor: The role of economic expansion and research and development in EU countries
Howes et al. (2017)	Environmental sustainability: A case of policy implementation failure?
Ahmed et al. (2021)	The criticality of information and communication technology and human capital in environmental sustainability: Evidence from Latin American and Caribbean countries
Alola et al. (2019)	The role of renewable energy, immigration and real income in environmental sustainability target: Evidence from Europe largest states
Song et al. (2017)	How would big data support societal development and environmental sustainability? Insights and practices
Acquaye et al. (2017)	Measuring the environmental sustainability performance of global supply chains: A multi-regional input-output analysis for carbon, sulphur oxide and water footprints
Chege and Wang (2020)	The influence of technology innovation on SME performance through environmental sustainability practices in Kenya
Shan et al. (2021)	The role of energy prices and non-linear fiscal decentralization in limiting carbon emissions: Tracking environmental sustainability
Hysa et al. (2020)	Circular economy innovation and environmental sustainability impact on economic growth: An integrated model for sustainable development
Usman et al. (2020)	Role of renewable energy and globalization on ecological footprint in the USA: implications for environmental sustainability
Yang et al. (2021)	The dynamic linkage between globalization, financial development, energy utilization, and environmental sustainability in GCC countries
Rehman et al. (2021)	Towards environmental sustainability: Devolving the influence of carbon dioxide emission to population growth, climate change, forestry, livestock and crops production in Pakistan
Cai et al. (2013)	Exploring the role of IT for environmental sustainability in China: An empirical analysis
Ahmad and Wu (2022)	Combined role of green productivity growth, economic globalization, and eco-innovation in achieving ecological sustainability for OECD economies
Murshed et al. (2021)	The nexus between environmental regulations, economic growth, and environmental sustainability: linking environmental patents to ecological footprint reduction in South Asia
Khan et al. (2022)	A study of trilemma energy balance, clean energy transitions, and economic expansion in the midst of environmental sustainability: New insights from three trilemma leadership
Ulucak et al. (2020)	Relationship between energy consumption and environmental sustainability in OECD countries: The role of natural resources rents
Akadiri et al. (2019)	The role of globalization, real income, tourism in environmental sustainability target: Evidence from Turkey
Mononen et al. (2016)	National ecosystem service indicators: Measures of social-ecological sustainability
Sun et al. (2020)	Measuring environmental sustainability performance of South Asia
Bilgili et al. (2020)	Does globalization matter for environmental sustainability? Empirical investigation for Turkey by Markov regime switching models
Ozturk and Ullah (2022)	Does digital financial inclusion matter for economic growth and environmental sustainability in OBRI economies? An empirical analysis
Ahmad et al. (2021)	Does economic prosperity lead to environmental sustainability in developing economies? Environmental Kuznets curve theory
Khan et al. (2020)	Determinants of economic growth and environmental sustainability in South Asian Association for Regional Cooperation: Evidence from panel ARDL
Yacob et al. (2019)	An empirical investigation of green initiatives and environmental sustainability for manufacturing SMEs
Sandberg et al. (2019)	Green growth or degrowth? Assessing the normative justifications for environmental sustainability and economic growth through critical social theory
Xie et al. (2014)	Exploring the dynamic mechanisms of farmland abandonment based on a spatially explicit economic model for environmental sustainability: A case study in Jiangxi Province, China
Akadiri et al. (2019)	Contemporaneous interaction between energy consumption, economic growth and environmental sustainability in South Africa: What drives what?
Pu and Fu (2018)	Economic growth, environmental sustainability and China mayors' promotion
Fath (2015)	Quantifying economic and ecological sustainability
Ahmed et al. (2021)	Asymmetric nexus between economic policy uncertainty, renewable energy technology budgets, and environmental sustainability: Evidence from the United States
Rauf et al. (2018)	Energy and ecological sustainability: Challenges and panoramas in belt and road initiative countries
Zhong and Wu (2015)	Economic sustainability, environmental sustainability and constructability indicators related to concrete- and steel-projects
Yang and Khan (2022)	Dynamics among economic growth, urbanization, and environmental sustainability in IEA countries: The role of industry value-added

Table A1 (Continued). List of articles included in review

Authors	Title
Renetzeder et al. (2010)	Can we measure ecological sustainability? Landscape pattern as an indicator for naturalness and land use intensity at regional, national and European level
Arslan et al. (2022)	Understanding the dynamics of natural resources rents, environmental sustainability, and sustainable economic growth: New insights from China
Akadiri et al. (2019)	Towards achieving environmental sustainability target in Italy: The role of energy, real income and globalization
Wang et al. (2018)	Assessment and prediction of environmental sustainability in China based on a modified ecological footprint model
Khan et al. (2022)	Links among energy intensity, non-linear financial development, and environmental sustainability: New evidence from Asia Pacific Economic Cooperation countries
Joshua and Bekun (2020)	The path to achieving environmental sustainability in South Africa: The role of coal consumption, economic expansion, pollutant emission, and total natural resources rent
Mirkouei et al. (2017)	A mixed biomass-based energy supply chain for enhancing economic and environmental sustainability benefits: A multi-criteria decision-making framework
Long and Ji (2019)	Economic growth quality, environmental sustainability, and social welfare in China–Provincial assessment based on genuine progress indicator (GPI)
Hassan and Nazem (2016)	Examination of land use/land cover changes, urban growth dynamics, and environmental sustainability in Chittagong City, Bangladesh
Azam et al. (2023)	Alternative energy and natural resources in determining environmental sustainability: A look at the role of government final consumption expenditures in France
Agboola et al. (2021)	Pathway to environmental sustainability: Nexus between economic growth, energy consumption, CO_2 emission, oil rent and total natural resources rent in Saudi Arabia
Ponce and Khan (2021)	A causal link between renewable energy, energy efficiency, property rights, and CO_2 emissions in developed countries: A road map for environmental sustainability
Adebayo (2022)	Renewable energy consumption and environmental sustainability in Canada: Does political stability make a difference?
Hueting (2010)	Why environmental sustainability can most probably not be attained with growing production
Pretel et al. (2016)	Economic and environmental sustainability of submerged anaerobic MBR-based (AnMBR-based) technology as compared to aerobic-based technologies for moderate-/high-loaded urban wastewater treatment
Fu et al (2021)	The dynamic role of energy security, energy equity and environmental sustainability in the dilemma of emission reduction and economic growth
Zia et al. (2021)	Striving towards environmental sustainability: How natural resources, human capital, financial development, and economic growth interact with ecological footprint in China
Ahmed et al. (2021)	Accounting asymmetries in the long-run nexus between globalization and environmental sustainability in the United States: An aggregated and disaggregated investigation
Fang et al. (2015)	The environmental sustainability of nations: Benchmarking the carbon, water and land footprints against allocated planetary boundaries
Zahoor et al. (2022)	Abundance of natural resources and environmental sustainability: The roles of manufacturing value-added, urbanization, and permanent cropland
Ahmad and Zheng (2021)	Do innovation in environmental-related technologies cyclically and asymmetrically affect environmental sustainability in BRICS nations?
Khan et al. (2022)	Role of alternative and nuclear energy in stimulating environmental sustainability: Impact of government expenditures
Adebayo et al. (2021)	Coal consumption and environmental sustainability in South Africa: The role of financial development and globalization
Wei et al. (2017)	Evolution of the societal value of water resources for economic development versus environmental sustainability in Australia from 1843 to 2011
Slorach et al. (2020)	Environmental sustainability in the food-energy-water-health nexus: A new methodology and an application to food waste in a circular economy
Kihombo et al. (2022)	Is there a tradeoff between financial globalization, economic growth, and environmental sustainability? An advanced panel analysis
Solarin et al. (2021)	Towards achieving environmental sustainability: Environmental quality versus economic growth in a developing economy on ecological footprint via dynamic simulations of ARDL
Fritz and Koch (2014)	Potentials for prosperity without growth: Ecological sustainability, social inclusion and the quality of life in 38 countries
Nepal et al. (2021)	Energy security, economic growth and environmental sustainability in India: Does FDI and trade openness play a role?
Ibrahim and Alola (2020)	Integrated analysis of energy-economic development-environmental sustainability nexus: Case study of MENA countries
Akadiri and Adebayo (2022)	Asymmetric nexus among financial globalization, non-renewable energy, renewable energy use, economic growth, and carbon emissions: Impact on environmental sustainability targets in India
Khattak et al. (2022)	On the goals of sustainable production and the conditions of environmental sustainability: Does cyclical innovation in green and sustainable technologies determine carbon dioxide emissions in G-7 economies
Ghasemi-Mobtaker et al. (2020)	Application of life cycle analysis to assess environmental sustainability of wheat cultivation in the west of Iran
Geraldes et al. (2014)	Environmental sustainability of biodiesel in Brazil
Fatima et al. (2021)	Factors influencing renewable energy generation development: A way to environmental sustainability
Adebayo et al. (2021)	The environmental sustainability effects of financial development and urbanization in Latin American countries
Xun and Hu (2019)	Evaluation of ecological sustainability based on a revised three-dimensional ecological footprint model in Shandong Province, China
Khan et al. (2022)	Environmental technology and wastewater treatment: Strategies to achieve environmental sustainability
Can et al. (2021)	The role of trading environment-friendly goods in environmental sustainability: Does green openness matter for OECD countries?
Saleem et al. (2020)	The role of financial development, energy demand, and technological change in environmental sustainability agenda: Evidence from selected Asian countries
Hishan et al. (2019)	Access to clean technologies, energy, finance, and food: Environmental sustainability agenda and its implications on Sub-Saharan African countries
Tang et al. (2016)	A multi-research-method approach to studying environmental sustainability in retail operations
Destek et al. (2021)	Does biomass energy drive environmental sustainability? An SDG perspective for top five biomass consuming countries
Garg and Lam (2015)	Improving environmental sustainability by formulation of generalized power consumption models using an ensemble based multi-gene genetic programming approach

Table A1 (Continued). List of articles included in review

Authors	Title
Menna et al. (2013)	Assessment of ecological sustainability of a building subjected to potential seismic events during its lifetime
Khan et al. (2020)	Information and communication technology (ICT) and environmental sustainability: A panel data analysis
Eluwole et al. (2020)	Does the interaction between growth determinants a drive for global environmental sustainability? Evidence from world top 10 pollutant emissions countries
Sharma et al. (2022)	Trends in mitigation of industrial waste: Global health hazards, environmental implications and waste derived economy for environmental sustainability
Lou et al. (2015)	Emergy-based indicators of regional environmental sustainability: A case study in Shanwei, Guangdong, China
Ahmed et al. (2022)	A path towards environmental sustainability: The role of clean energy and democracy in ecological footprint of Pakistan
Zhao et al. (2022)	Does ICT diffusion lead to energy efficiency and environmental sustainability in emerging Asian economies?
Slorach et al. (2020)	Assessing the economic and environmental sustainability of household food waste management in the UK: Current situation and future scenarios
Suhi et al. (2019)	Environmental sustainability assessment in supply chain: An emerging economy context
D'Alessandro et al. (2010)	Energy transition towards economic and environmental sustainability: Feasible paths and policy implications
Raihan et al. (2022)	Nexus between carbon emissions, economic growth, renewable energy use, urbanization, industrialization, technological innovation, and forest area towards achieving environmental sustainability in Bangladesh
Lu et al. (2015)	Trade-offs between midstream agricultural production and downstream ecological sustainability in the Heihe River basin in the past half century
Onifade et al. (2021)	Renewables as a pathway to environmental sustainability targets in the era of trade liberalization: Empirical evidence from Turkey and the Caspian countries
Moyano-Fuentes et al. (2018)	Process innovation and environmental sustainability engagement: An application on technological firms
Bresciani et al. (2021)	Innovation, environmental sustainability and economic development: DEA-bootstrap and multilevel analysis to compare two regions
Torquati et al. (2014)	Environmental sustainability and economic benefits of dairy farm biogas energy production: A case study in Umbria
Zahan and Chuanmin (2021)	Towards a green economic policy framework in China: Role of green investment in fostering clean energy consumption and environmental sustainability
Iheonu et al. (2021)	Does economic growth, international trade, and urbanization uphold environmental sustainability in sub-Saharan Africa? Insights from quantile and causality procedures
Kremer et al. (2016)	Directions for instilling economic and environmental sustainability across product supply chains
Irfan et al. (2023)	Unleashing the dynamic impact of tourism industry on energy consumption, economic output, and environmental quality in China: A way forward towards environmental sustainability
Niu et al. (2019)	Coordinate the economic and environmental sustainability via procurement outsourcing in a co-opetitive supply chain
Erdogan et al. (2022)	Synthesizing urbanization and carbon emissions in Africa: How viable is environmental sustainability amid the quest for economic growth in a globalized world?
Akadiri et al. (2020)	Does electricity consumption and globalization increase pollutant emissions? Implications for environmental sustainability target for China
Solarin and Bello (2020)	Energy innovations and environmental sustainability in the U.S.: The roles of immigration and economic expansion using a maximum likelihood method
Safdar et al. (2022)	Impact of good governance and natural resource rent on economic and environmental sustainability: An empirical analysis for South Asian economies
Shakib et al. (2022)	Revisiting the energy-economy-environment relationships for attaining environmental sustainability: Evidence from Belt and Road Initiative countries
Lasisi et al. (2020)	The environmental sustainability effects of income, labour force, and tourism development in OECD countries
Okewu et al. (2017)	Optimizing green computing awareness for environmental sustainability and economic security as a stochastic optimization problem
Jahanger et al. (2022)	Going away or going green in NAFTA nations? Linking natural resources, energy utilization, and environmental sustainability through the lens of the EKC hypothesis
Mavhungu et al. (2021)	Environmental sustainability of municipal wastewater treatment through struvite precipitation: Influence of operational parameters
Kesharwani et al. (2019)	Moving second generation biofuel manufacturing forward: Investigating economic viability and environmental sustainability considering two strategies for supply chain restructuring
Ahmad and Satrovic (2023)	Relating fiscal decentralization and financial inclusion to environmental sustainability: Criticality of natural resources
Alatas (2021)	The role of information and communication technologies for environmental sustainability: Evidence from a large panel data analysis
Alola et al. (2019)	Cooling and heating degree days in the US: The role of macroeconomic variables and its impact on environmental sustainability
Chen et al. (2022)	Management of green economic infrastructure and environmental sustainability in one belt and road enitiative economies
Lyu et al. (2021)	Impact of fertilization schemes with different ratios of urea to controlled release nitrogen fertilizer on environmental sustainability, nitrogen use efficiency and economic benefit of rice production: A study case from Southwest China
Li et al. (2020)	Economic and environmental sustainability of maize-wheat rotation production when substituting mineral fertilizers with manure in the North China Plain
Francis et al. (2016)	The environmental sustainability of calcined calcium phosphates production from the milling of eggshell wastes and phosphoric acid
Bui et al. (2019)	Groundwater sustainability assessment framework: A demonstration of environmental sustainability index for Hanoi, Vietnam
Kim et al. (2018)	Economic and environmental sustainability and public perceptions of rooftop farm versus extensive garden
Gargalo et al. (2016)	A framework for techno-economic & environmental sustainability analysis by risk assessment for conceptual process evaluation
Adebayo et al. (2023)	Role of hydroelectricity and natural gas consumption on environmental sustainability in the United States: Evidence from novel time-frequency approaches
Liu et al. (2022)	Environmental benefit of clean energy consumption: Can BRICS economies achieve environmental sustainability through human capital?
Dias (2017)	Environmental sustainability measurement in the Travel & Tourism Competitiveness Index: An empirical analysis of its reliability
Saqib et al. (2023)	Integration of renewable energy and technological innovation in realizing environmental sustainability: The role of human capital in EKC framework
Weimin et al. (2022)	Globalization toward environmental sustainability and electricity consumption to environmental degradation: Does EKC inverted U-shaped hypothesis exist between squared economic growth and CO_2 emissions in top globalized economies

Table A1 (Continued). List of articles included in review

Authors	Title
Khan et al. (2022)	A road map for environmental sustainability and green economic development: An empirical study
Bekun et al. (2020)	Renewed evidence of environmental sustainability from globalization and energy consumption over economic growth in China
Londoño et al. (2019)	Comparing the environmental sustainability of two gold production methods using integrated emergency and life cycle assessment
Weldu and Assefa (2017)	The search for most cost-effective way of achieving environmental sustainability status in electricity generation: Environmental life cycle cost analysis of energy scenarios
Raihan and Tuspekova (2022)	Role of economic growth, renewable energy, and technological innovation to achieve environmental sustainability in Kazakhstan
Shobande and Ogbeifun (2022)	The criticality of financial development and energy consumption for environmental sustainability in OECD countries: Evidence from dynamic panel analysis
Uche and Effiom (2021)	Financial development and environmental sustainability in Nigeria: Fresh insights from multiple threshold nonlinear ARDL model
Gao and You (2017)	Can modular manufacturing be the next game-changer in shale gas supply chain design and operations for economic and environmental sustainability?
Liu and Yang (2020)	An empirical analysis of dynamic changes in ecological sustainability and its relationship with urbanization in a coastal city: The case of Xiamen in China
Mahmood et al. (2019)	Chemical pollutants from an industrial estate in Pakistan: A threat to environmental sustainability
Quek et al. (2018)	Challenges in environmental sustainability of renewable energy options in Singapore
Segarra-Oña et al. (2017)	Testing the social innovation construct: An empirical approach to align socially oriented objectives, stakeholder engagement, and environmental sustainability
De Giacomo and Bleischwitz (2020)	Business models for environmental sustainability: Contemporary shortcomings and some perspectives
Casson Moreno et al. (2020)	Techno-economic and environmental sustainability of biomass waste conversion based on thermocatalytic reforming
Cuéllar-Franca et al. (2019)	Utilising carbon dioxide for transport fuels: The economic and environmental sustainability of different Fischer-Tropsch process designs
Joshua and Alola (2020)	Accounting for environmental sustainability from coal-led growth in South Africa: The role of employment and FDI
Luna et al. (2019)	Integration of environmental sustainability and product quality criteria in the decision-making process for feeding strategies in seabream aquaculture companies
Eltayeb et al. (2010)	Green business among certified companies in Malaysia towards environmental sustainability: Benchmarking on the drivers, initiatives and outcomes
Ahmed et al. (2022)	Towards environmental sustainability: Do financial risk and external conflicts matter?
D'Inverno et al. (2021)	Environmental sustainability and service quality beyond economic and financial indicators: A performance evaluation of Italian water utilities
Dong et al. (2021)	Dynamic assessment of ecological sustainability and the associated driving factors in Tibet and its cities
Akadiri et al. (2020)	The role of ecological footprint and the changes in degree days on environmental sustainability in the USA
Hawkins et al. (2016)	Balance between local economic development and environmental sustainability: A multi-level governance perspective
Zhen et al. (2022)	How do renewable energy consumption, financial development, and technical efficiency change cause ecological sustainability in European Union countries?
Christoforidis and Katrakilidis (2021)	The dynamic role of institutional quality, renewable and non-renewable energy on the ecological footprint of OECD countries: Do institutions and renewables function as leverage points for environmental sustainability?
Wang (2021)	Determinants of ecological and carbon footprints to assess the framework of environmental sustainability in BRICS countries: A panel ARDL and causality estimation model
Samie et al. (2020)	Examining the impacts of future land use/land cover changes on climate in Punjab Province, Pakistan: Implications for environmental sustainability and economic growth
Dunuwila et al. (2018)	Financial and environmental sustainability in manufacturing of crepe rubber in terms of material flow analysis, material flow cost accounting and life cycle assessment
Malik et al. (2016)	Tourism in Austria: Biodiversity, environmental sustainability, and growth issues
Hossain et al. (2023)	Natural resource dependency and environmental sustainability under N-shaped EKC: The curious case of India
Gyamfi et al. (2022)	Beyond the environmental Kuznets curve: Do combined impacts of air transport and rail transport matter for environmental sustainability amidst energy use in E7 economies?
Alfalih and Hadj (2022)	Financialization, natural resources rents and environmental sustainability dynamics in Saudi Arabia under high and low regimes
Musah et al. (2022)	Financial development and environmental sustainability in West Africa: Evidence from heterogeneous and cross-sectionally correlated models
Ahmad et al. (2021)	Investigating the myth of smokeless industry: Environmental sustainability in the ASEAN countries and the role of service sector and renewable energy
Torquati et al. (2016)	Using tree crop pruning residues for energy purposes: A spatial analysis and an evaluation of the economic and environmental sustainability
Fernández-Tirado et al. (2016)	Life cycle assessment of biodiesel in Spain: Comparing the environmental sustainability of Spanish production versus Argentinean imports
Selomane et al. (2015)	Towards integrated social-ecological sustainability indicators: Exploring the contribution and gaps in existing global data
Panepinto et al. (2013)	Production of green energy from co-digestion: Perspectives for the Province of Cuneo, energetic balance and environmental sustainability
Muhammad et al. (2022)	Does environmental sustainability affect the renewable energy consumption? Nexus among trade openness, CO2 emissions, income inequality, renewable energy, and economic growth in OECD countries
Tahmasebi et al. (2018)	Trade-off between productivity and environmental sustainability in irrigated vs. rainfed wheat production in Iran

Table A1 (Continued). List of articles included in review

Authors	Title
Benedetto et al. (2014)	Rebound effects due to economic choices when assessing the environmental sustainability of wine
Akhayere et al. (2023)	Role of energy consumption and trade openness towards environmental sustainability in Turkey
Ni et al. (2022)	How do natural resources, digitalization, and institutional governance contribute to ecological sustainability through load capacity factors in highly resource-consuming economies?
Yang et al. (2022)	Ecological sustainability and its driving factor of urban agglomerations in the Yangtze River economic belt based on three-dimensional ecological footprint analysis
Singh et al. (2021)	Assessment of global sustainable development, environmental sustainability, economic development and social development index in selected economies
Shen et al. (2019)	An improved emergy evaluation of the environmental sustainability of China's steel production from 2005 to 2015
Wu et al. (2018)	A regional strategy for ecological sustainability: A case study in Southwest China
Liang et al. (2013)	Clustering economic sectors in China on a life cycle basis to achieve environmental sustainability
Shahzad et al. (2023)	The role of biomass energy consumption and economic complexity on environmental sustainability in G7 economies
Alhassan et al. (2022)	The interrelationships among financial development, economic growth and environmental sustainability: Evidence from Ghana
Amin et al. (2022)	Dynamic linkages of financial inclusion, modernization, and environmental sustainability in South Asia: A panel data analysis
Alonso et al. (2021)	Digitalization, circular economy and environmental sustainability: The application of artificial intelligence in the efficient self-management of waste
Qi et al. (2018)	The environmental sustainability evaluation of an urban tap water treatment plant based on emergy
Baloch et al. (2023)	Impact of tourism development upon environmental sustainability: A suggested framework for sustainable ecotourism
Ahmed et al. (2022)	Investigating the role of economic complexity in sustainable development and environmental sustainability
Villanthenkodath and Mahalik (2021)	Does economic growth respond to electricity consumption asymmetrically in Bangladesh? The implication for environmental sustainability
Koyuncu et al. (2021)	Environmental sustainability statement of economic regimes with energy intensity and urbanization in Turkey: A threshold regression approach
Kamah et al. (2021)	Inclusive growth and environmental sustainability: The role of institutional quality in sub-Saharan Africa
Khan et al. (2023)	Embracement of industry 4.0 and sustainable supply chain practices under the shadow of practice-based view theory: Ensuring environmental sustainability in corporate sector
Fang et al. (2023)	Life cycle assessment of integrated Bioelectrochemical-constructed wetland system: Environmental sustainability and economic feasibility evaluation
Ghosh et al. (2022)	Modelling an empirical framework of the implications of tourism and economic complexity on environmental sustainability in G7 economies
Chatti and Majeed (2022)	Investigating the links between ICTs, passenger transportation, and environmental sustainability
Zhang et al. (2020)	Is environmental sustainability taking a backseat in China after COVID-19? The perspective of business managers
Bay (2010)	Towards a fourth ecology: Social and environmental sustainability with architecture and urban design
Alola et al. (2022)	The role of economic freedom and clean energy in environmental sustainability: Implication for the G-20 economies
Su et al. (2021)	Do higher education research and development expenditures affect environmental sustainability? New evidence from Chinese provinces
Arnaut and Lidman (2021)	Environmental sustainability and economic growth in Greenland: Testing the environmental kuznets curve
Ali et al. (2021)	Dynamics of international trade, technology innovation and environmental sustainability: Evidence from Asia by accounting for cross-sectional dependence
Awais et al. (2019)	The sustainable development of the China Pakistan Economic Corridor: Synergy among economic, social, and environmental sustainability
Wang et al. (2016)	The environmental sustainability of synthetic wollastonite using waste from zirconium oxychloride production
Musah (2022)	Financial inclusion and environmental sustainability in Ghana: Application of the dynamic ARDL estimator
Imran et al. (2021)	Achieving pro-poor growth and environmental sustainability agenda through information technologies: As right as rain
Obiora et al. (2020)	Impact of banking and financial systems on environmental sustainability: An overarching study of developing, emerging, and developed economies
Weldu and Assefa (2016)	Evaluating the environmental sustainability of biomass-based energy strategy: Using an impact matrix framework
Xin et al. (2022)	Toward next-generation green solar cells and environmental sustainability: Impact of innovation in photovoltaic energy generation, distribution, or transmission-related technologies on environmental sustainability in the United States
Ali et al. (2022)	The nexus between remittances, natural resources, technological innovation, economic growth, and environmental sustainability in Pakistan
Philip et al. (2021)	Foreign direct investment amidst global economic downturn: Is there a time-varying implication for environmental sustainability targets?
Rahman et al. (2020)	The use of biotechnologies in textile processing and environmental sustainability: An emerging market context
Tuni and Rentizelas (2019)	An innovative eco-intensity-based method for assessing extended supply chain environmental sustainability
Salim et al. (2019)	Assessing the environmental sustainability of glucose from wheat as a fermentation feedstock
Lombardi et al. (2018)	Toward urban environmental sustainability: The carbon footprint of Foggia's municipality
Li et al. (2011)	An inexact-stochastic with recourse model for developing regional economic-ecological sustainability under uncertainty
Ángel et al. (2022)	Can a country's environmental sustainability exert influence on its economic and financial situation? The relationship between environmental performance indicators and country risk
Hussain and Zhou (2022)	Globalization, industrialization, and urbanization in belt and road Initiative countries: Implications for environmental sustainability and energy demand
Akam et al. (2021)	Linking external debt and renewable energy to environmental sustainability in heavily indebted poor countries: New insights from advanced panel estimators
Ravichandran et al. (2021)	An assessment of the influence of local conditions on the economic and environmental sustainability of drain water heat recovery systems

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Authors	Title
Li et al. (2019)	Has the high-tech industry along the belt and road in China achieved green growth with technological innovation efficiency and environmental sustainability?
Raufirad et al. (2018)	Relationship between socioeconomic vulnerability and ecological sustainability: The case of Aran-V-Bidgol's rangelands, Iran
Papa et al. (2017)	On the relationship between the promotion of environmental sustainability and the increase of territorial competitiveness: The Italian case
Shah et al. (2023)	Technology, urbanization and natural gas supply matter for carbon neutrality: A new evidence of environmental sustainability under the prism of COP26
Bashir et al. (2023)	Does geothermal energy and natural resources affect environmental sustainability? Evidence in the lens of sustainable development
Erdogan et al. (2022)	Does military expenditure impact environmental sustainability in developed Mediterranean countries?
Garud et al. (2022)	Energy, exergy, environmental sustainability and economic analyses for automotive thermoelectric generator system with various configurations
Le et al. (2022)	Environmental sustainability of an integrate anaerobic digestion-composting treatment of food waste: Analysis of an Italian plant in the circular bioeconomy strategy
Zafar et al. (2021)	Globalization, financial development, and environmental sustainability: Evidence from heterogenous income groups of Asia
Pérez-Gladish et al. (2021)	MCDM/A studies for economic development, social cohesion and environmental sustainability: Introduction
Salmoral et al. (2020)	Reconciling irrigation demands for agricultural expansion with environmental sustainability–A preliminary assessment for the Ica Valley, Peru
Kamilaris et al. (2020)	Modelling alternative management scenarios of economic and environmental sustainability of beef finishing systems
Jain and Nagpal (2019)	Relationship between environmental sustainability and human development index: A case of selected South Asian nations
Das and Cabezas (2018)	Tools and concepts for environmental sustainability in the food-energy-water nexus: Chemical engineering perspective
Bickford et al. (2017)	Evaluating the role of CSR and SLO in ecotourism: Collaboration for economic and environmental sustainability of arctic resources
Somogyi (2015)	A framework for quantifying environmental sustainability
Thomsen et al. (2013)	Assessment of a novel alder biorefinery concept to meet demands of economic feasibility, energy production and long term environmental sustainability
Bildirici and Ersin (2023)	Nexus between Industry 4.0 and environmental sustainability: A Fourier panel bootstrap cointegration and causality analysis
Akadiri et al. (2022)	Impacts of globalization and energy consumption on environmental degradation: What is the way forward to achieving environmental sustainability targets in Nigeria?
Kavga et al. (2021)	Research on innovative training on smart greenhouse technologies for economic and environmental sustainability
Etokakpan et al. (2021)	Natural gas consumption-economic output and environmental sustainability target in China: An N-shaped hypothesis inference
Khan (2021)	Environmental sustainability: A clean energy aspect versus poverty
Collins and Kumral (2020)	Environmental sustainability, decision-making, and management for mineral development in the Canadian Arctic
Tseng et al. (2019)	Sustainable agritourism in Thailand: Modeling business performance and environmental sustainability under uncertainty
DiMaria (2019)	An Indicator for the economic performance and ecological sustainability of nations
Jabeen et al. (2023)	Combined role of economic openness, financial deepening, biological capacity, and human capital in achieving ecological sustainability
Yu et al. (2023)	Green growth and environmental sustainability in China: The role of environmental taxes
Saud et al. (2023)	Articulating natural resource abundance, economic complexity, education and environmental sustainability in MENA countries: Evidence from advanced panel estimation
Chen et al. (2022)	Nexus between natural resources, financial development, green innovation and environmental sustainability in China: Fresh insight from novel quantile ARDL
Chen et al. (2022)	Dynamic influence of natural resources, financial integration and eco-innovation on ecological sustainability in EKC framework: Fresh insights from China
Oyebanji et al. (2022)	Patents on environmental technologies and environmental sustainability in Spain
Zhong et al. (2021)	Effects of land urbanization and internet penetration on environmental sustainability: A cross-regional study of China
Chen et al. (2021)	Toward environmental sustainability, health, and equity: How the psychological characteristics of college students are reflected in understanding sustainable development goals
Mishra et al. (2020)	Fast-changing life-styles and ecotoxicity of hair dyes drive the emergence of hidden toxicants threatening environmental sustainability in Asia
Ahmad et al. (2023)	Towards environmental sustainability in E?7 countries: Assessing the roles of natural resources, economic growth, country risk, and energy transition
Ali et al. (2023)	Modeling the economic viability and performance of solar home systems: A roadmap towards clean energy for environmental sustainability
Dada et al. (2023)	On the shadow economy-environmental sustainability nexus in Africa: The (ir)relevance of financial development
Sowah and Kirikkaleli (2022)	Investigating factors affecting global environmental sustainability: Evidence from nonlinear ARDL bounds test
Ekwueme et al. (2022)	Environmental sustainability in Asian countries: Understanding the criticality of economic growth, industrialization, tourism import, and energy use
Yin et al. (2021)	The potential benefits of dietary shift in China: Synergies among acceptability, health, and environmental sustainability
Sierra et al. (2021)	Understanding economic, social, and environmental sustainability challenges in the global south
Lai and Chen (2020)	A research on the relationship between environmental sustainability management and human development
Berlese et al. (2019)	Environmental sustainability assessment of buffalo mozzarella cheese production chain: A scenario analysis
Schismenos et al. (2019)	Environmental sustainability and ecotourism of riparian and deltaic ecosystems: Opportunities for rural Eastern Macedonia and Thrace, Greece
Capobianco et al. (2018)	Assessment of the environmental sustainability of a treatment aimed at soil reuse in a brownfield regeneration context

Table A1 (Continued). List of articles included in review

Authors	Title
Eregha et al. (2023)	Economic growth, environmental regulations, energy use, and ecological footprint linkage in the next-11 countries: Implications for environmental sustainability
Verbic et al. (2022)	Assessing the driving factors of carbon dioxide and total greenhouse gas emissions to maintain environmental sustainability in Southeastern Europe
Khan and Ximei (2022)	Digital economy and environmental sustainability: Do information communication and technology (ICT) and economic complexity matter?
Obrecht et al. (2022)	Assessment of environmental sustainability integration into higher education for future experts and leaders
Yu et al. (2022)	A bibliometric analysis of end-of-life vehicles related research: Exploring a path to environmental sustainability
Mohsin et al. (2022)	Does energy use and economic growth allow for environmental sustainability? An empirical analysis of Pakistan
Law et al. (2022)	Multi-criteria assessment of the economic and environmental sustainability characteristics of intermediate wheatgrass grown as a dual-purpose grain and forage crop
Apinran et al. (2022)	The role of electricity consumption, capital, labor force, carbon emissions on economic growth: Implication for environmental sustainability targets in Nigeria
Collins et al. (2022)	Economic and environmental sustainability analysis of seaweed farming: Monetizing carbon offsets of a brown algae cultivation system in Ireland
Zheng et al. (2021)	How to achieve the ecological sustainability goal of UNESCO global geoparks? A multi-scenario simulation and ecological assessment approach using Dabieshan UGGp, China as a case study
Lucas et al. (2021)	Optimising diets to reach absolute planetary environmental sustainability through consumers
Amowine et al. (2021)	Towards ecological sustainability: Assessing dynamic total-factor ecology efficiency in Africa
Engez et al. (2021)	Urban living lab as a circular economy ecosystem: Advancing environmental sustainability through economic value, material, and knowledge flows
Shruti et al. (2021)	Evaluating the environmental sustainability of smart cities in India: The design and application of the Indian smart city environmental sustainability index
Li et al. (2020)	Assessment of ecological efficiency and environmental sustainability of the Minjiang-source in China
Ahmad and Satrovic (2023)	How do transportation-based environmental taxation and globalization contribute to ecological sustainability?
Li et al. (2022)	Turning points for environmental sustainability: The potential role of income inequality, human capital, and globalization
Castellano et al. (2022)	Exploring antecedents of innovations for small- and medium-sized enterprises' environmental sustainability: An interpretative framework
Saunders et al. (2020)	Addressing economic/environmental sustainability trade-offs in procurement episodes with industrial suppliers
Udeagha and Muchapondwa (2023)	Green finance, fintech, and environmental sustainability: Fresh policy insights from the BRICS nations
Li et al. (2022)	What is the asymmetric influence of natural resource rent and green innovation on the ecological sustainability of the ARCTIC region
Tóthová and Heglasová (2022)	Measuring the environmental sustainability of 2030 Agenda implementation in EU countries: How do different assessment methods affect results?
Ren et al. (2022)	Socioeconomic barriers of nitrogen management for agricultural and environmental sustainability
Tahir et al. (2022)	Terrorism and environmental sustainability: Empirical evidence from the MENA region
Li et al. (2022)	Estimating ecological sustainability in the Guangdong-Hong Kong-Macao Greater Bay Area, China: Retrospective analysis and prospective trajectories
Schneider (2022)	Population growth, electricity demand and environmental sustainability in Nigeria: Insights from a vector auto-regressive approach
Duodu et al. (2021)	Foreign direct investments and environmental quality in sub-Saharan Africa: The merits of policy and institutions for environmental sustainability
Wei et al. (2021)	Economic growth, fiscal imbalance, and environmental sustainability: What is desirable and undesirable for developing economies?
Sakcharoen et al. (2021)	Factors affecting technology selection, techno-economic and environmental sustainability assessment of a novel zero-waste system for food waste and wastewater management
Dogan and Kirikkaleli (2021)	Does gender equality in education matter for environmental sustainability in sub-Saharan Africa?
Giagnorio et al. (2021)	Environmental sustainability of forward osmosis: The role of draw solute and its management
Doyle et al. (2020)	Dichotomous impacts on social and environmental sustainability: Competitiveness and development levels matter
Gorman and Dzombak (2019)	An assessment of the environmental sustainability and circularity of future scenarios of the copper life cycle in the U.S.
Laurent et al. (2017)	Co-construction of an assessment method of the environmental sustainability for cattle farms involved in a protected designation of origin (PDO) cheese value chain, Cantal PDO
Zhao et al. (2012)	Establishment of environmental sustainability assessment indicators based on material flow and ecological footprint model in Tongling city of Anhui Province
Ahmed et al. (2022)	Nexus between cyclical innovation in green technologies and CO_2 emissions in nordic countries: Consent toward environmental sustainability
Hussain and Rehman (2022)	How CO_2 emission interacts with livestock production for environmental sustainability? Evidence from Pakistan
Ghorbal et al. (2022)	Do renewable energy and national patents impact the environmental sustainability of Tunisia?
Boekaerts et al. (2021)	Assessment of the environmental sustainability of solvent-less fatty acid ketonization to bio-based ketones for wax emulsion applications
Nawi et al. (2020)	Strategic orientations and absorptive capacity on economic and environmental sustainability: A study among the batik small and medium enterprises in Malaysia
Uddin (2020)	Does financial development stimulate environmental sustainability? Evidence from a panel study of 115 countries
Chen and Hu (2020)	Determining whether trade can affect regional environmental sustainability from the perspective of environmental pollution
Lipovina-Božovic et al. (2019)	A support vector machine approach for predicting progress toward environmental sustainability from information and communication technology and human development

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Authors	Title
Moretti et al. (2014)	Economic and environmental sustainability of forestry measures in Apulia Region rural development plan: An application of life cycle approach
Sissa (2012)	An agent based approach for sustainable ICT services toward environmental sustainability: The use of agent based models to explain the ICT-driven (societal) behavioural changes and their effects on environmental sustainability
Ruiz-Molina et al. (2012)	Environmental sustainability in hotels: A matter of category?
Ahmad et al. (2023)	Is achieving environmental sustainability dependent on information communication technology and globalization? Evidence from selected OECD countries
Ahmed et al. (2023)	The impact of economic development on environmental sustainability: Evidence from the Asian region
Alhassan and Kwakwa (2023)	The effect of natural resources extraction and public debt on environmental sustainability
Hou et al. (2023)	Exploring the role of fossil fuels and renewable energy in determining environmental sustainability: Evidence from OECD countries
Adebayo (2023)	Assessing the environmental sustainability corridor: Linking oil consumption, hydro energy consumption, and ecological footprint in Turkey
Luo and Mabrouk (2022)	Nexus between natural resources, globalization and ecological sustainability in resource-rich countries: Dynamic role of green technology and environmental regulation
Yan et al. (2022)	Exploring adaptive approaches for social-ecological sustainability in the belt and road countries: From the perspective of ecological resource flow
González-García et al. (2022)	Environmental sustainability performance of a membrane-based technology for livestock wastewater treatment with nutrient recovery
Sharafizad et al. (2022)	The influence of local embeddedness on the economic, social, and environmental sustainability practices of regional small firms
Anser et al. (2021)	Innovative carbon mitigation techniques to achieve environmental sustainability agenda: Evidence from a panel of 21 selected r&d economies
Anser et al. (2021)	Does improvement in the environmental sustainability rating help to reduce the COVID-19 cases? Controlling financial development, price level and carbon damages
Escribano et al. (2020)	A typology of ecological intentional communities: Environmental sustainability through subsistence and material reproduction
Jia et al. (2020)	Modeling urban eco-environmental sustainability under uncertainty: Interval double-sided chance-constrained programming with spatial analysis
Qiao et al. (2020)	Analysis of the environmental sustainability of a megacity through a cobenefits indicator system–The case of Shanghai
Samaie et al. (2020)	Environmental sustainability policy on plug-in hybrid electric vehicle penetration utilizing fuzzy TOPSIS and game theory
Yuan et al. (2017)	Assessing the impacts of the changes in farming systems on food security and environmental sustainability of a Chinese rural region under different policy scenarios: An agent-based model
Akhtar et al. (2015)	Permaculture approach: Linking ecological sustainability to businesses strategies
Pulido-Fernández et al. (2013)	On the role of environmental sustainability in the transformation of tourism growth into economic development
Lei et al. (2023)	Environmental innovations, energy innovations, governance, and environmental sustainability: Evidence from South and Southeast Asian countries
Lucchi (2023)	Regenerative design of archaeological sites: A pedagogical approach to boost environmental sustainability and social engagement
Hamid et al. (2023)	Do better institutional arrangements lead to environmental sustainability: Evidence from India
Shayanmehr et al. (2023)	How do environmental tax and renewable energy contribute to ecological sustainability? New evidence from top renewable energy countries
Dickson et al. (2022)	Global transportation of green hydrogen via liquid carriers: Economic and environmental sustainability analysis, policy implications, and future directions
Guo (2022)	Evaluation and prediction of ecological sustainability in the upper reaches of the Yellow River based on improved three-dimensional ecological footprint model
Nwani (2022)	Financing low-carbon growth in Africa: Policy path for strengthening the links between financial intermediation, resource allocation and environmental sustainability
Samarasinghe and Wijayatunga (2022)	Techno-economic feasibility and environmental sustainability of waste-to-energy in a circular economy: Sri Lanka case study
Mughal et al. (2022)	Economic, social, and political determinants of environmental sustainability: Panel data evidence from NEXT eleven economies
Alola (2021)	Risk to investment and renewables production in the United States: An inference for environmental sustainability
Molocchi (2021)	Circular economy and environmental sustainability: A policy coherence analysis of current italian subsidies
Menezes et al. (2020)	An adaptation of servqual for events evaluation: An environmental sustainability addon
De Silva et al. (2020)	The impact of accountability mechanisms on public sector environmental sustainability performance: A case study of Sri Lanka
Manaf and Abbas (2019)	Economic and environmental sustainability of low-carbon power generation: Relevancy in the Malaysia green technology master plan (GTMP)
Lee et al. (2013)	Environmental sustainability assessment of biofuel production from oil palm biomass
Mackenzie et al. (2013)	Future socio-economic and environmental sustainability of the Irish Sea requires a multi-disciplinary approach with industry and research collaboration, and cross-border partnership
Ahmad and Satrovic (2023)	Modeling combined role of renewable electricity output, environmental regulations, and coal consumption in ecological sustainability
Karlilar et al. (2023)	Environmental sustainability in the OECD: The power of digitalization, green innovation, renewable energy and financial development
Asif et al. (2023)	Assessing eco-label knowledge and sustainable consumption behavior in energy sector of Pakistan: An environmental sustainability paradigm
Oyebanji and Kirikkaleli (2023)	Green technology, green electricity, and environmental sustainability in Western European countries