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5-7 DECEMBER 2025 - UZBEKISTAN

PROCEEDINGS BOOK

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İDEALKÜLTÜR akademi

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Preface

It is a distinct privilege and honour to present the Proceedings of the **II. International Social Policies Congress**, held in the historic and culturally significant city of Termez, Uzbekistan. This volume represents the culmination of a rigorous academic endeavour, bringing together scholars, researchers, and policymakers from Türkiye, Uzbekistan, and the wider international community to debate and dissect the pressing social and economic challenges of our time.

In an era marked by rapid digital transformation, climate change, and shifting global dynamics, the field of social policy has never been more critical. The papers collected in this book address a diverse array of topics, ranging from the green economy and sustainable development to digital governance and social resilience. Each contribution offers a unique perspective, yet collectively, they underscore a shared commitment to finding scientifically grounded solutions to complex societal problems.

This congress was realised through the robust partnership between the **Social and Economic Perspective Association (SEPDER)** and **Termez University of Economics and Service (TUES)**. This collaboration serves as a testament to the strengthening academic and cultural bridges between our nations. The exchange of knowledge witnessed during the sessions in Termez has not only enriched the participants but has also laid a solid foundation for future interdisciplinary research.

The quality of this publication is a direct result of a meticulous peer-review process. I would like to express my deepest gratitude to the members of the Scientific Committee and the reviewers who dedicated their

time and expertise to ensure the high academic standards of this volume. Their constructive feedback has been instrumental in shaping the final output. I must also extend my sincere appreciation to the Rectorate of Termez University of Economics and Service for their exceptional hospitality and support. Furthermore, I am indebted to my colleagues on the Organizing Committee, whose tireless dedication and logistical precision made this event possible.

Finally, I thank the authors for their valuable contributions. It is our earnest hope that the research presented in this proceedings book will serve as a significant reference for the academic community and inspire further inquiry into the multifaceted world of social policies.

Yours collaboratively,
Asst. Prof. Dr. A. Selim DOĞAN
Chair of the Organizing Committee of
II. International Social Policies Congress
Termez, December 2025

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Congress Schedule

December 5th	
16:00 – 18:00	***Registration and Welcome***
December 6th	
12:00 – 13:00	***Opening Meeting and Protocol Speeches***
13:00 – 14:00	***Coffee Break***
14:00 – 15:30	***Parallel In-Person Sessions -1*** ***Parallel Online Sessions -1***
15:30 – 15:45	***Session Break***
15:45 – 17:15	***Parallel In-Person Sessions -2*** ***Parallel Online Sessions -2***
***D*ecember 7th**	
12:00 – 13:30	***Parallel Online Sessions -3***
13:30 - 15:00	***Parallel Online Sessions -4***
15:00 - 16:30	***Parallel Online Sessions -5***
16:30 - 18:00	***Parallel Online Sessions -6***

Circular Economy: A New Framework for Green, Digital, and Inclusive Development

N.Ceren Turkmen*

ABSTRACT

This study positions the Circular Economy at the intersection of green, digital, and inclusive development policies, examining the macroeconomic and structural transformation potential of this approach. The global economic structure based on the linear model is pushing environmental limits under increasing population, industrialization, and consumption pressures, making resource efficiency and sustainable growth targets increasingly fragile. In this context, the Circular Economy emerges as a holistic paradigm aiming to decouple economic growth from natural resource consumption. The study first examines the European Union's Circular Economy policies, particularly the CEAP framework, and discusses the structural dimensions of transformation through the product life cycle approach, industrial symbiosis, and eco-design principles. The traceability and increased efficiency that digital technologies—AI, IoT, big data, and blockchain—provide in resource management are evaluated within the scope of the twin transformation dynamic between green and digital transformation. The second part of the study examines Turkey's National Circular Economy Strategy and Action Plan, analyzing priority sectors, institutional governance structures, and green financing instruments. Finally, the macroeconomic impacts of Circular Economy policies on

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employment, current account balance, competitiveness, and social inclusion are addressed. The study reveals that the Circular Economy offers Turkey not only an environmental policy area but also a strategic development framework for long-term sustainable growth and structural transformation.

1. Introduction

The resource-use-based structure of the global economy has deepened environmental pressures in the context of a growing population and industrialization. This process has rendered the sustainability of the traditional linear economic model debatable. The linear production–consumption structure is based on the take–make–consume–dispose chain, leading to the rapid depletion of natural resources, an increase in carbon emissions, and structural crises in waste management (Lieder & Rashid, 2016; Türkmen, 2022). This situation has brought to the forefront the understanding of the Circular Economy, which requires the redesign of production and consumption cycles.

The contradiction between fundamental macroeconomic objectives such as economic growth, employment, and price stability, and the requirements of environmental protection, is being redefined through the Circular Economy paradigm. This paradigm bases development not on the depletion of natural resources but on resource efficiency, innovativeness, and digital transformation capacity (Hartley et al., 2020). Thus, the Circular Economy has become not only an environmental policy but also a new growth model and an ethical framework for the industrial revolution.

The Circular Economy is grounded in maintaining economic activities within environmental boundaries and in the reuse, repair, and recycling of resources. This approach both reduces the environmental costs of economic growth and aims to protect social welfare. The Circular Economy Action Plan (CEAP), published by the European Commission in 2015, is among the most comprehensive examples of this transformation at the policy level. It aims to reduce waste generation, increase recycling rates, and strengthen energy efficiency by 2030; at the same time, it prioritizes the holistic restructuring of investment, R&D, and industrial strategies.

The European Union (EU) is in a globally leading position in Circular Economy practices. The CEAP adopted in 2015 contains concrete targets such as banning single-use plastics, reducing waste, increasing recycling

rates, and integrating eco-design principles into industry. The Plan envisages that, by 2030, 75% of packaging waste will be recycled and the share of waste sent to landfill will be reduced to below 10%.

At the center of the EU approach lies the "product life cycle." The stages of production, consumption, waste management, and secondary raw material use have been redefined within a cyclical structure. Industrial symbiosis mechanisms increase resource efficiency by enabling one enterprise's waste to become another enterprise's input (Aid et al., 2017). This model also creates a new field of employment and supports the spread of green occupations.

Regulations carried out at the EU level are not limited solely to environmental policies but also include financial incentives, tax reductions, and public procurement policies. This holistic approach ensures that the Circular Economy progresses in a manner compatible with the market mechanism.

In these practices, digital technologies, particularly AI-supported supply chain management, smart sensor systems, and big-data-based monitoring mechanisms, increase the transparency of the resource cycle. In this way, digitalization reduces efficiency, traceability, and coordination costs in Circular Economy practices; thus, a strong synergy emerges between digital transformation and green transformation processes. The synergy of these two transformations is referred to as the twin transition.

From this perspective, the Circular Economy is located at the intersection of green, digital, and inclusive development policies. Green transformation focuses on environmental sustainability; digital transformation focuses on the optimization of production processes; and inclusive development focuses on social justice and the sharing of welfare. This triple axis constitutes the core components of the new economic paradigm.

In addition, with the Industry 4.0 process, artificial intelligence, the Internet of Things (IoT), big data, and blockchain technologies offer radical innovations in resource management. Thanks to digital traceability, material flows are monitored instantaneously throughout the supply chain, and production processes are optimized in terms of recycling and reuse. Chiappetta Jabbour et al. (2020) demonstrate that these technologies accelerate circularity in sustainable supply chains, make decision making processes data driven, and reduce production costs.

On the other hand, digital platforms also support the sharing economy by developing new business models focused on access rather than ownership. Thus, the material cycle in the production–consumption chain lengthens, product life increases, and the amount of waste decreases. Digital marketplaces transform consumer behavior by facilitating the tracking of second-hand or refurbished products (Ranta et al., 2021).

Green innovation refers to the development of technologies that minimize environmental impacts. In the context of the Circular Economy, this concept encompasses the redesign of production systems and eco-efficiency-based innovation. This tendency may contribute, particularly in energy-intensive industries, to increasing firm performance through green innovations and, in the long term, to reducing resource costs.

Eco-design principles, in turn, envisage designing products in a way that facilitates reuse, repair, and recycling throughout the product life cycle. The European Commission's 2020 Action Plan plans to integrate the eco-design approach into all product categories and to impose on producers the obligation to declare material recovery rates. Türkiye's 2025–2028 Strategic Plan, in the same direction, aims to establish investment standards based on a national green taxonomy by determining sustainable product criteria (ÇŞİDB, 2025).

From Turkiye's perspective, in alignment with the European Green Deal, the National Circular Economy Strategy and Action Plan (2025–2028) has been prepared. This Plan aims to disseminate sustainable production–consumption patterns, increase resource efficiency, and develop circular business models. Actions determined across seven priority sectors—packaging, batteries and vehicles, electronics, food and biomass, construction, plastics, and textiles—will guide Türkiye's green transformation as well as the digital transformation process (ÇŞİDB, 2025).

2. Circular Economy Strategy (2025–2028) of Turkiye

Turkey has adopted a comprehensive policy framework that combines green transformation, digitalization, and social inclusion in its process of aligning with the European Green Deal. The National Circular Economy Strategy and Action Plan (2025-2028), prepared by the Ministry of Environment, Urbanization, and Climate Change, places the Circular Economy

at the center of the sustainable growth model. The plan includes six main strategic objectives:

- Promoting circular production and consumption models,
- Promoting sustainable product design,
- Developing waste prevention, recovery, and reuse systems,
- Creating green financing tools,
- Enhancing institutional capacity and awareness,
- Increasing resource efficiency through digital transformation (ÇŞİDB, 2025).

Approximately half of these targets involve regulatory changes and corporate compliance processes. The plan's core vision is based on the principle of "producing without polluting"; it aims to reduce the environmental impact of production systems at source, promote the use of best practices, and minimize industrial emissions. Seven priority sectors have been identified in the Action Plan, namely:

- Packaging: Increasing the use of recyclable materials, reducing single-use plastics, expanding producer responsibility.
- Batteries and vehicles: Establishing recovery infrastructure for electric vehicle technologies, recovering critical raw materials such as lithium and nickel.
- Electronics: Separating e-waste at source, encouraging modular design, and developing a "repair economy."
- Food and biomass: Reducing food waste, utilizing waste for biogas and biomass energy production.
- Construction: Reuse of demolition and excavation waste, widespread adoption of green building certifications.
- Plastics: Supporting production processes with a high proportion of recycled materials.
- Textiles: Promoting a circular fashion approach and developing textile waste collection systems

These sectors are critical to the transformation process due to both their resource intensity and waste generation potential. Performance indicators, investment criteria, and incentive mechanisms have been defined for each sector. The strategy's success relies on a multi-stakeholder

governance model. Under the coordination of the Ministry, chambers of industry, municipalities, financial institutions, universities, and civil society organizations undertake tasks at different levels to monitor actions, collect data, and share best practices. The long-term and high-cost nature of Circular Economy investments requires diversification of financing mechanisms. The plan envisages the use of green financing sources at the national and international levels. These financial instruments also provide transparency to investors in managing environmental risks. With the definition of the green taxonomy in Turkey, it is expected that the financing priority of projects that meet environmental criteria will be legally established.

3. Macroeconomic Consequences of Global Trends

The widespread adoption of Circular Economy policies also creates pronounced effects on macroeconomic indicators. Lieder and Rashid (2016) emphasize that Circular Economy practices have a high long-term employment-creating effect because recycling, repairing, and remanufacturing sectors have a labor-intensive character. In this respect, the Circular Economy supports social inclusion by increasing opportunities for "green employment."

Moreover, through resource efficiency and energy savings, the Circular Economy lowers production costs, reduces external dependency, and creates a balancing effect on the current account deficit. Especially for energy-importing countries, increasing the use of local resources strengthens macroeconomic stability by reducing foreign currency needs (Türk, 2023).

The Circular Economy has transformative potential not only in terms of environmental sustainability but also in terms of social sustainability. Resource-efficiency-based forms of production create new employment areas in labor-intensive recycling sectors and increase economic participation opportunities for low-income groups. This situation has carried the concept of green employment into global policy discourse (Türk, 2023).

The United Nations Development Program (UNDP) defines the Circular Economy as an important tool in terms of reducing poverty and addressing inequalities. This is because circular production supports regional development, particularly by relying on local resources. Local waste

management systems generate new value domains for small-scale producers and social enterprises.

4. Conclusions

The Circular Economy offers a multidimensional transformation framework developed in response to the increasingly apparent environmental, economic, and social vulnerabilities in today's global economic structure. This approach treats sustainability not merely as an environmental goal but as a holistic paradigm requiring the redefinition of production structures, technological capacity, and development paradigms. This model, based on resource efficiency, reconfigures the structural tension between economic growth and environmental limits; it aims to transform the nature of growth. Circular Economy policies developed under the leadership of the European Union provide an important reference point for how this transformation can be concretized at the institutional and regulatory levels. The product life cycle approach, eco-design principles, and industrial symbiosis applications are not only tools that improve waste management but also mechanisms that have a decisive impact on industrial policy, employment structure, and competitiveness. With the integration of digital technologies into this process, the synergy between green and digital transformation is strengthening, and the Circular Economy is becoming one of the concrete application areas of the twin transformation. From Turkey's perspective, the National Circular Economy Strategy and Action Plan is an important policy step that combines green and digital transformation goals with an inclusive development perspective. Focusing on priority sectors, this strategic framework aims to transform resource-intensive production structures, reduce external dependency, and strengthen long-term macroeconomic stability. However, the effectiveness of the strategy depends on the simultaneous progress of complementary elements such as policy coherence, institutional coordination, the depth of financing mechanisms, and the level of social awareness. Ultimately, the Circular Economy is not merely a policy area that manages environmental risks; it is the new logic of the future economic system that redefines production, consumption, and value creation processes. By addressing sustainable growth, digital efficiency, and social inclusion together,

this framework will serve as a strategic lever for Turkey's long-term development goals and net-zero emissions vision.

References

Aid, G., Eklund, M., Anderberg, S., & Baas, L. (2017). Expanding roles for the Swedish waste management sector in inter-organizational resource management. *Resources, Conservation and Recycling*, 124, 85–97. https://doi.org/10.1016/j.resconrec.2017.04.007.

Chiappetta Jabbour, C. J., Fiorini, P. D. C., Ndubisi, N. O., Queiroz, M. M., & Piato, É. L. (2020). Digitally-enabled sustainable supply chains in the 21st century. *Science of the Total Environment*, 725, 138177. https://doi.org/10.1016/j.scitotenv.2020.138177.

Çevre, Şehircilik ve İklim Değişikliği Bakanlığı (ÇŞİDB). (2025). *Ulusal Döngüsel Ekonomi Stratejisi ve Eylem Planı*. Ankara.

Hartley, K., Santen, R., & Kirchherr, J. (2020). Policies for transitioning towards a Circular Economy : Expectations from the European Union. *Resources, Conservation & Recycling*, 155, 104676. https://doi.org/10.1016/j.resconrec.2019.104634.

Lieder, M., & Rashid, A. (2016). Towards Circular Economy implementation: A comprehensive review in context of manufacturing industry. *Journal of Cleaner Production*, 115, 36–51. https://doi.org/10.1016/j.jclepro.2015.12.042.

Ranta, V., Aarikka-Stenroos, L., & Väisänen, J. M. (2021). Digital technologies catalyzing business model innovation for Circular Economy. *Resources, Conservation and Recycling*, 164, 105155. https://doi.org/10.1016/j.resconrec.2020.105155.

Türk, B. (2023). Verimlilik fırsatı olarak döngüsel ekonomi: Döngüsel modele geçişte atalet engeli. *Verimlilik Dergisi*, Özel Sayı, 215–232. https://doi.org/10.51551/verimlilik.1105119.

Türkmen, N. C. (2022). Toward Sustainable Economic Growth: Aligning Macroeconomic Policies and Trade with SDG12. Journal of Lifestyle and SDGs Review, 2(00sdg), e01559. https://doi.org/10.37497/2965-730X.SDGsReview.v2.n00sdg.pe01559.

PROCEEDINGS

The Role of International Cooperation in Circular Economy-Based Policies for Protecting, Managing Sustainably, and Restoring Marine and Coastal Ecosystems

Keynote Speaker*

Abstract

This study investigates how circular economy principles can be mobilized to enhance the conservation and sustainable use of marine and coastal ecosystems through comprehensive policy frameworks. These ecosystems are increasingly subjected to acute and cumulative pressures driven by human activities, including various forms of pollution, overexploitation of marine resources, and the far-reaching consequences of climate change. The linear economic model has amplified these problems, underscoring the urgency of transitioning towards circular models that prioritize waste minimization, regeneration of natural systems, and the creation of durable, sustainable value.

By examining existing policy initiatives and employing economic modelling, the study demonstrates that circular economy–oriented policies can significantly improve resource efficiency while simultaneously supporting the ecological integrity and resilience of marine environments. The analysis further shows that

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meaningful progress towards ocean-related sustainability objectives depends on effective international cooperation, particularly through coordinated policy design, structured knowledge exchange, and the development of robust financial instruments.

The policy recommendations stress the importance of harmonized regulatory frameworks, innovative and blended financing approaches, and inclusive multi-stakeholder partnerships as key enablers for scaling circular solutions across maritime sectors and across different regions. In doing so, the study positions the circular economy not merely as a set of technical tools but as a strategic governance approach for safeguarding marine and coastal ecosystems within the broader global sustainable development agenda.

Keywords: Circular Economy; Marine and Coastal Conservation; Blue Economy; SDG14; Environmental Economics

1. Introduction

Marine and coastal ecosystems provide essential services to humanity, including food security, climate regulation, and economic opportunities for billions of people worldwide. These ecosystems represent some of Earth's most productive yet vulnerable environments, supporting biodiversity while contributing significantly to global economic output (Hoegh-Guldberg et al., 2019). Despite their importance, marine systems face accelerating degradation from multiple anthropogenic stressors, including plastic pollution, overfishing, habitat destruction, and ocean acidification (Duarte et al., 2020).

Sustainable Development Goal 14 (SDG 14) specifically addresses the need to "conserve and sustainably use the oceans, seas and marine resources for sustainable development" (United Nations, 2015). However, progress toward meeting SDG 14 targets has been insufficient, with many indicators showing continued decline in marine ecosystem health. The limitations of conventional regulatory approaches and linear economic models in addressing these challenges highlight the need for transformative solutions that reconnect economic activity with ecological boundaries.

The circular economy presents a promising framework for reimagining our relationship with marine resources and ecosystems. In contrast to linear economic models that extract resources, transform them into products, and discard them as waste, circular economy approaches emphasize

keeping materials in productive use, eliminating waste and pollution, and regenerating natural systems (Ellen MacArthur Foundation, 2019). When applied to marine contexts, circular principles can drive systemic changes in how we produce, consume, and manage resources that impact ocean health.

This paper examines how circular economy policies can contribute to the conservation, sustainable management, and restoration of marine and coastal ecosystems, with particular emphasis on the role of global cooperation in achieving SDG 14 targets. By analyzing existing policy frameworks, economic incentives, and governance mechanisms, we identify key opportunities and challenges for scaling circular solutions across maritime sectors and jurisdictions. The research contributes to the growing literature on blue economy transitions by providing an integrated assessment of how circular economy principles can be operationalized through coordinated policy action at local, national, and international levels.

2. Theoretical Framework

2.1 Circular Economy Principles in Marine Contexts

The circular economy represents a systems-based approach to economic development designed to benefit businesses, society, and the environment (Geissdoerfer et al., 2017). At its core, the circular economy is underpinned by three principles: eliminating waste and pollution, circulating products and materials, and regenerating natural systems (Ellen MacArthur Foundation, 2019). When applied to marine contexts, these principles translate into specific strategies that address the unique challenges and opportunities of ocean-based economic activities.

The circular marine economy encompasses various sectors, including fisheries, aquaculture, shipping, tourism, energy, and biotechnology. In each of these domains, circular principles can guide the development of more sustainable practices that maintain the productive capacity of marine ecosystems while reducing negative externalities. In maritime manufacturing and shipping, circular strategies focus on designing out waste, extending product lifespans, and recovering materials at end-of-life (Ruiz-Real et al., 2020).

The theoretical underpinnings of the marine circular economy (MEC hereafter) draw from ecological economics, industrial ecology, and systems thinking. Ecological economics emphasizes the embeddedness of economic

systems within natural ones and the physical limits to growth imposed by ecosystem boundaries (Daly & Farley, 2011). Industrial ecology provides frameworks for analyzing material and energy flows in economic systems and designing more efficient, closed-loop processes (Graedel & Allenby, 2010). Systems thinking offers tools for understanding complex interactions between economic activities and marine ecosystems, helping to identify leverage points for intervention (Meadows, 2008).

2.2 Economic Rationale for Circular Marine Policies

The economic case for circular marine policies rests on several key arguments. First, marine ecosystem services generate substantial economic value estimated at US$2.5 trillion annually, with the potential to deliver even greater benefits under sustainable management (Hoegh-Guldberg et al., 2015). Circular policies can help preserve and enhance this natural capital by reducing pollution, restoring habitats, and maintaining biodiversity.

Second, marine sectors face increasing resource constraints and vulnerabilities that threaten their long-term viability. For instance, some global fish stocks are currently fished at biologically unsustainable levels and marine plastic pollution costs the global economy increased through damage to fisheries, tourism, and coastal infrastructure. Circular approaches that optimize resource use and minimize waste can enhance resilience in these sectors.

Third, circular business models in marine industries can generate new economic opportunities through innovation, waste valorization, and market differentiation. Studies suggest that transitioning to circular practices in the blue economy could unlock significant economic value while delivering environmental benefits (Lacy & Rutqvist, 2015).

3. Policy Frameworks for MEC

The transition toward a Marine Economy Circular (MEC) model requires a multi-faceted policy approach that integrates regulatory, economic, and information-based instruments. These policy frameworks must work to address market failures, align stakeholder incentives, and overcome barriers to circular practices in marine sectors. Effective policy design considers the unique characteristics of marine environments, including their

transboundary nature, ecological complexity, and the diverse array of actors involved in marine resource use.

Key regulatory approaches include:

• Extended Producer Responsibility (EPR) schemes that hold manufacturers accountable for the entire lifecycle of their products, particularly in sectors that generate significant marine pollution such as packaging, fishing gear, and maritime equipment.

• Material bans and restrictions that phase out particularly harmful or persistent substances in marine environments. The EU Single-Use Plastics Directive exemplifies this approach, prohibiting specific plastic items commonly found in marine litter while promoting circular alternatives. Such measures can stimulate innovation in sustainable materials and product design.

• Ecosystem-based fisheries management regulations that establish harvest control rules, bycatch limits, and habitat protection measures aligned with circular economy principles.

• Performance standards that specify environmental outcomes rather than prescribing specific technologies or processes. These standards allow flexibility in compliance methods while driving continuous improvement in resource efficiency and pollution prevention.

Economic instruments complement regulatory approaches by aligning market incentives with circular economy objectives. These mechanisms can address market failures, internalize externalities, and create financial flows to support marine conservation and restoration:

• Green taxation systems shift the tax burden from labor and income toward resource consumption and pollution.

• Payment for ecosystem services (PES) schemes that reward practices maintaining or enhancing marine ecosystem services.

• Tradable permit systems establish caps on resource extraction or pollution and allow market participants to trade allowances. When properly designed, these systems can achieve environmental goals efficiently while providing flexibility to firms.

• Green subsidies and innovation funding that support research, development, and deployment of circular solutions in marine sectors.

Information-based policy instruments address knowledge barriers and coordination challenges in MEC transitions. These approaches enhance transparency, facilitate informed decision-making, and promote behavioral change:

• Certification and ecolabeling systems that verify and communicate environmental attributes of marine products and services.

• Environmental product declarations and lifecycle assessments that standardize information about environmental impacts across product lifecycles. These tools support design for circularity and enable comparison between alternative materials and technologies.

• Data platforms and digital tracking systems that enhance traceability in marine value chains. Technologies like blockchain and digital twin systems can verify the origin and handling of marine resources, reducing illegal activities and supporting circular material flows.

4. Global Cooperation Mechanisms

Effective implementation of MEC requires coordinated international action to address transboundary marine challenges, facilitate knowledge transfer, and mobilize financial resources across jurisdictions. International legal instruments establish common standards and coordination mechanisms.

In that sense, reformed multilateral trade agreements can remove barriers to secondary material trade (Yamaguchi, 2018). Knowledge exchange facilitates circular economy adoption through technical assistance programs, research networks, South-South cooperation mechanisms, and digital platforms providing open-access tools that accelerate innovation diffusion. Innovative financing mobilizes capital through blended finance approaches that combine public, private capital to de-risk investments, blue bonds connecting financing to environmental outcomes, global environmental funds coordinating investments across geographies.

5. Conclusions and Policy Recommendations

The transition to a circular economy within marine and coastal systems constitutes an imperative and synergistic approach for achieving SDG 14 while generating sustainable economic value. In that sense, circular economy principles provide systemic solutions which complement

conventional conservation, necessitating integrated policy frameworks that blend regulatory, economic, and informational instruments to enable innovation and preclude harmful practices. To operationalize this transition, a set of policy actions is required, focusing on strengthening governance, catalyzing investment, and enhancing global cooperation.

Integrated MEC strategies must be established to align objectives across sectors and policy domains, articulating clear targets and coordination mechanisms. Policy coherence can be further advanced by harmonizing standards in marine environment through international bodies and by reforming subsidies in sectors like fisheries and fossil fuels to redirect fiscal support toward circular innovation and restoration. Given the transboundary nature of marine systems, global cooperation is indispensable. Strengthening international legal frameworks is critical for embedding circularity principles in governance. Additionally, the establishment of global knowledge platforms would facilitate the dissemination of best practices and collaborative problem-solving. Moreover, circular economy hubs can foster localized innovation ecosystems.

In conclusion, the circular economy offers a transformative pathway to reconcile human economic activity with marine ecological boundaries.

References

Daly, H. E., & Farley, J. (2011). Ecological Economics: Principles and Applications (2nd ed.). Island Press.

Duarte, C. M., Agusti, S., Barbier, E., Britten, G. L., Castilla, J. C., Gattuso, J.-P., Fulweiler, R. W., Hughes, T. P., Knowlton, N., Lovelock, C. E., Lotze, H. K., Predragovic, M., Poloczanska, E., Roberts, C., & Worm, B. (2020). Rebuilding marine life. Nature, 580(7801), 39-51.

Ellen MacArthur Foundation. (2019). Completing the Picture: How the Circular Economy Tackles Climate Change.

Friends of Ocean Action. (2020). The Ocean Finance Handbook: Increasing finance for a healthy ocean. World Resources Institute.

Geissdoerfer, M., Savaget, P., Bocken, N. M. P., & Hultink, E. J. (2017). The Circular Economy – A new sustainability paradigm? Journal of Cleaner Production, 143, 757-768. https://doi.org/10.1016/j.jclepro.2016.12.048

Graedel, T. E., & Allenby, B. R. (2010). Industrial Ecology and Sustainable Engineering. Prentice Hall.

Hoegh-Guldberg, O., Beal, D., Chaudhry, T., Elhaj, H., Abdullat, A., Etessy, P., & Smits, M. (2015). Reviving the Ocean Economy: The case for action - 2015. WWF International. https://www.wwf.de/fileadmin/fm-wwf/Publikationen-PDF/WWF-Report-Reviving-the-Ocean-Economy.pdf

Hoegh-Guldberg, O., Northrop, E., & Lubchenco, J. (2019). The ocean is key to achieving climate and societal goals. Science, 365(6460), 1372-1374. DOI: 10.1126/science.aaz4390

Lacy, P., & Rutqvist, J. (2015). Waste to Wealth: The Circular Economy Advantage. Palgrave Macmillan.

Meadows, D. H. (2008). Thinking in Systems: A Primer. Chelsea Green Publishing.

Ruiz-Real JL, Uribe-Toril J, Valenciano JP, Gázquez-Abad JC. Worldwide Research on Circular Economy and Environment: A Bibliometric Analysis. Int J Environ Res Public Health. 2018 Nov 29;15(12):2699. doi: 10.3390/ijerph15122699

United Nations. (2015). Transforming our world: The 2030 Agenda for Sustainable Development. A/RES/70/1. https://sdgs.un.org/publications/transforming-our-world-2030-agenda-sustainable-development-17981

Yamaguchi, S. (2018), "International Trade and the Transition to a More Resource Efficient and Circular Economy: A Concept Paper", OECD Trade and Environment Working Papers, No. 2018/03, OECD Publishing, Paris, https://doi.org/10.1787/847feb24-en.

The Home's Face Toward Nature: An Integrated Philosophical and Architectural Approach to the Role of Balconies and Terraces in Sustainable Housing Design

Abdulali Ganbarov*

Abstract

This study conceptualizes the home not merely as a physical shelter but as an ontological space through which individuals construct identity, memory, and their relationship with the surrounding world. The philosophical groundwork draws on Wittgenstein's reflections on meaning and spatiality, Heidegger's notions of "dwelling" and "the preservation of being," Bachelard's poetic readings of domestic space, and Ömer Naci Soykan's interpretations of the ethical and existential dimensions of the home. Complementing this framework, Doğan Kuban's analyses of the traditional Turkish "*hayatlı ev*" demonstrate that intermediary spaces ensuring interior–exterior continuity have historically served as foundational components of nature-integrated living.

The aim of the study is to investigate how the weakened home–nature relationship in contemporary cities can be re-established through threshold spaces such as balconies and terraces. The methodology combines systematic literature review, phenomenological–philosophical interpretation, analysis of traditional

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residential typologies, and comparative examination of three contemporary biophilic housing projects (Bosco Verticale, Sky Habitat, The Interlace). The findings reveal that balconies and terraces enhance ecological performance through passive cooling, natural ventilation, and vegetation-based microclimate formation; support user experience and psychological well-being particularly in the post-pandemic period; and strengthen social interaction and neighborliness, contributing to sustainable living practices. From a philosophical standpoint, these threshold spaces embody the poetic and existential "face of the home" that opens toward nature.

In conclusion, balconies and terraces are not secondary façade elements but strategic and multilayered spatial components that enable the reintegration of the dwelling with nature in contemporary housing design.

Keywords: Home, balcony, terrace, sustainable housing, philosophy of space.

1. INTRODUCTION

Housing, as one of the most fundamental spatial constructs in human history, extends beyond an enclosed shell that merely provides shelter; it constitutes a lived environment in which identity is formed, meaning is produced, and collective memory takes shape. According to the United Nations (UN-Habitat, 2022), 56% of the world's population currently resides in urban areas, a figure projected to reach 68% by 2050. This rapid acceleration of urbanization profoundly reshapes the relationship between dwelling and nature on both physical and conceptual levels. The continuity of open and semi-open spaces characteristic of traditional housing patterns is increasingly replaced in contemporary metropolitan contexts by enclosed, dense, and nature-detached residential typologies.

This transformation represents not only a spatial reconfiguration but also a gradual weakening of individuals' emotional, cognitive, and existential bonds with nature. As Ömer Naci Soykan emphasizes in A Philosophical Essay on the House (1999), the home constitutes the primary spatial framework through which humans interpret the world, position themselves within it, and ground their existence. From this perspective, dwelling emerges as a conceptual locus mediating the relationship between the individual, the environment, and nature—far exceeding its physical definition. However, the growing standardization and technical rationalization of contemporary housing production increasingly marginalize the poetic, sensory, and reflective dimensions of dwelling.

Among the spatial components capable of re-establishing the connection between dwelling and nature, balconies and terraces occupy a particularly critical position. In contemporary housing practice, however, these spaces are frequently treated as secondary or auxiliary features, with their potential constrained by insufficient attention to orientation, spatial depth, usability, and vegetation. In contrast, sustainability literature consistently demonstrates that balconies and terraces enhance climatic comfort through passive ventilation and shading, generate microclimatic regulation via planting strategies, support natural light and air circulation, foster social interaction, and positively influence psychological well-being. This study approaches these findings through an interdisciplinary framework.

Traditional Turkish housing offers an important historical reference for this discussion due to its spatial organization deeply integrated with nature. As demonstrated in Doğan Kuban's seminal study The Turkish House with Hayat (1995), intermediary spaces such as the hayat, sofa, eyvan, and deep eaves establish a continuous open–semi-open–closed spatial sequence that mediates climatic adaptation, spatial flexibility, and the balance between everyday life and the natural environment. This architectural heritage provides a valuable conceptual basis for reconsidering the spatial and cultural significance of intermediary spaces that have largely been lost in modern housing.

Against this background, the present study investigates spatial strategies capable of strengthening the relationship between dwelling and nature under contemporary urban conditions. Its primary aim is to reinterpret balconies and terraces not as marginal architectural appendices but as integral components of sustainable housing—encompassing identity formation, sensory experience, ecological integration, and biophilic design. The research adopts a qualitative methodology that combines a systematic literature review, philosophical interpretation, analysis of traditional housing typologies, and the comparative examination of three contemporary case studies: Bosco Verticale, Sky Habitat, and The Interlace.

The article first outlines the philosophical foundations of dwelling and the concept of the "threshold space," followed by the methodological framework. It then analyzes the ecological and experiential contributions of balconies and terraces through selected contemporary sustainable housing examples and concludes with an integrated evaluation of the

findings, emphasizing their implications for re-establishing the dwelling–nature relationship.

2. CONCEPTUAL FRAMEWORK

The conceptual foundation of this study is built upon theoretical approaches that interpret dwelling not merely as a technical unit of shelter, but as an ontological space in which human existence is constituted, identity and memory are produced, and the relationship with nature is organized. In this respect, Ömer Naci Soykan's philosophical interpretation in Ev Üstüne Felsefece Bir Deneme (1999)—which conceptualizes the house as an inner realm establishing the human being's "order of existence in the world"—constitutes a central reference point.

Similarly, Heidegger's understanding of dwelling as the practice of "preserving Being" and "being-at-home on the earth," Wittgenstein's emphasis on the meaning-constituting role of space within the language–world relationship, and Bachelard's interpretation of the house in The Poetics of Space (1957/1996) as a lived whole interwoven with emotion, memory, and imagination collectively form the philosophical ground of this research.

These thinkers converge on the idea that the house is not simply a physical structure, but a place in which sensory experience, existential coherence, perceptual worlds, and spatial identity are shaped. Accordingly, this study conceptualizes balconies and terraces not as functional extensions of the dwelling, but as distinct intermediary spaces in which the human–space–nature relationship becomes tangible.

Intermediary Spaces in Traditional Residential Culture

Doğan Kuban's morphological analyses of the traditional Turkish hayatlı house (1995) clearly demonstrate that intermediary spaces ensuring interior–exterior continuity possess formative significance for both climatic balance and social life. In settlements such as Birgi and Kula, as well as in exemplary buildings like the Çakırağa Mansion, spatial sequences involving the hayat, sofa, courtyard, eyvan, and revak regulate shade, airflow, and natural light conditions while simultaneously producing spatial thresholds that structure the socio-cultural patterns of everyday life (Kuban, 1995, pp. 136–138; 146–148).

This historical continuity suggests that balconies and terraces—emerging as new forms of intermediary spaces within modern housing typologies—may be understood as contemporary reinterpretations of the traditional hayat–courtyard relationship.

Balconies and Terraces in Contemporary Sustainable Housing Research

Contemporary sustainable housing literature has increasingly foregrounded the ecological, biophilic, and social functions of balconies and terraces, particularly in the post-pandemic context. Recent studies consistently emphasize a wide range of contributions, including:

• Ecological benefits: natural ventilation, shading, passive cooling, microclimate formation through planting, and reduction of thermal loads;

• Biophilic benefits: restorative effects of contact with nature on stress reduction and psychological well-being;

• Social benefits: strengthened neighborly relations, the creation of semi-public interaction zones, and the integration of daily life with the outdoor environment

(Kokkoris et al., 2024; Mastellone et al., 2022; Ribeiro et al., 2020; Smektała et al., 2022).

These findings indicate that the interface between dwelling and nature can be effectively re-strengthened through intermediary spaces.

Contemporary Examples of Biophilic Architecture

Global case studies such as Bosco Verticale, Sky Habitat, and The Interlace approach balconies and terraces not as secondary architectural elements, but as fundamental spatial components that shape building identity, determine environmental performance, and transform user experience. These projects illustrate how the pursuit of nature-integrated living is being redefined as a contemporary architectural paradigm, with balcony–terrace systems positioned at its core.

Conceptual Synthesis

When considered collectively, these conceptual components reveal that balconies and terraces function as multi-layered intermediary spaces that:

• Philosophically: deepen the poetic and existential meaning of dwelling;

• Historically: represent contemporary extensions of the traditional hayat–courtyard system;

• Ecologically: operate as passive climatic regulators and microclimate-forming surfaces;

• Biophilically: strengthen human–nature contact;

• Socially: connect everyday life with the surrounding environment.

Integrating these philosophical, historical, contemporary, and biophilic axes, the present study conceptualizes balconies and terraces as spatial instruments through which dwelling can be re-integrated with nature in contemporary housing design.

3. METHOD

This study adopts a qualitative and conceptual research design that investigates balconies and terraces as threshold spaces redefining the relationship between dwelling and nature. Rather than employing quantitative measurement or performance simulation, the research is grounded in theoretical interpretation, philosophical inquiry, and comparative architectural reading.

The methodological framework is based on three complementary components: (1) conceptual literature analysis, (2) thematic structuring, and (3) interpretive case-based examination. The study was conducted through the following stages.

Establishing the Conceptual Framework.

An extensive literature review was carried out to define the spatial, cultural, philosophical, and ecological dimensions of balconies and terraces. The review encompassed:

(a) philosophical approaches to dwelling and space, drawing on the works of Soykan (1999), Heidegger, Wittgenstein, and Bachelard;

(b) cultural and historical analyses of intermediary spaces, particularly Doğan Kuban's morphological studies of the traditional Turkish Hayatlı Ev (1995); and

(c) contemporary architectural and biophilic housing literature addressing the ecological, social, and experiential roles of balcony–terrace configurations.

These sources collectively formed the theoretical foundation of the research.

Identification of Thematic Axes.

Based on the literature review, the findings were structured around four interrelated thematic axes: dwelling (existential space, identity, memory), balcony/terrace (intermediary and threshold space), nature (ecological, sensory, and biophilic dimensions), and sustainable housing (environmental performance, comfort, and social interaction). The relationships among these themes were examined to conceptually articulate how intermediary spaces may re-establish the dwelling–nature connection.

Development of the Conceptual Relationship Diagram.

To synthesize the theoretical findings, a conceptual relationship diagram was developed (Figure 1). The diagram illustrates the interactions between the ontological dimension of dwelling, the spatial and environmental functions of threshold spaces (balconies/terraces), and the ecological and psychological impacts of contact with nature. This model visually represents the role of intermediary spaces in linking interior and exterior environments within sustainable housing design.

Interpretive Analysis of Selected Projects.

Three contemporary biophilic housing projects—Bosco Verticale (Milan), Sky Habitat (Singapore), and The Interlace (Singapore)—were examined through a comparative and interpretive framework. These projects were selected as representative architectural typologies, rather than empirical samples, illustrating different spatial strategies for integrating nature into high-density housing. Each project was evaluated in terms of design rationale, balcony–terrace configuration, ecological integration, and contributions to user experience and social interaction.

Theoretical Synthesis.

In the final stage, insights from the literature review, conceptual model, and architectural examples were synthesized to discuss the role of threshold spaces in sustainable housing performance, user well-being, and the continuity between traditional and contemporary intermediary space typologies. This integrative assessment supports the study's hypothesis and research questions by offering a holistic, theory-driven interpretation.

Hypothesis and Research Questions.

Hypothesis (H1): In contemporary housing, the weakened bond with nature can be re-established through intermediary spaces such as balconies

and terraces, both at existential levels (identity, belonging, poetic experience) and performative levels (energy efficiency, microclimate, indoor environmental quality, and social interaction).

Research Questions:

RQ1: How do balcony and terrace design parameters influence indoor environmental quality and building performance?

RQ2: How has post-pandemic user experience reshaped the meaning of these intermediary spaces?

RQ3: How can philosophical theories of dwelling be integrated into contemporary housing design principles?

RQ4: How can the traditional hayat–courtyard system inform modern balcony and terrace design?

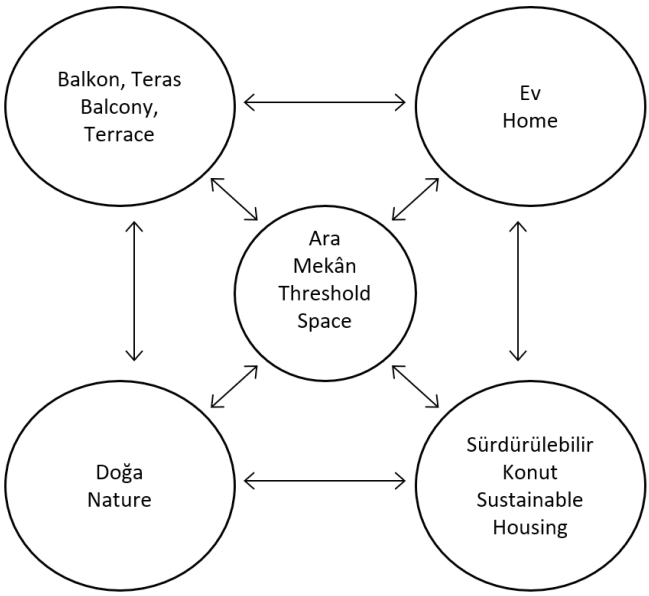


Figure 1. *Conceptual model illustrating the role of threshold spaces in the dwelling–balcony/terrace–nature relationship within sustainable housing (Author).*

4. FINDINGS AND DISCUSSION

4.1. Analysis of Contemporary Examples

This section examines three contemporary biophilic housing projects—Bosco Verticale, Sky Habitat, and The Interlace—to demonstrate the role of balconies and terraces in sustainable housing design. Each example is evaluated under four criteria:

(a) rationale for selection and design approach,

(b) sustainability and energy impacts,

(c) balcony–terrace configuration and planting strategies,

(d) user experience and social interaction.

4.1.1. Bosco Verticale (Milan, Stefano Boeri, 2014)

Bosco Verticale, situated in Milan's dense urban fabric, is an iconic "vertical forest" that transforms balconies and terraces into active ecological surfaces. Designed by Stefano Boeri, the project was selected because it treats balconies not as exterior appendages but as multi-layered biophilic envelopes capable of generating micro-ecosystems at the scale of the city. The main objective is to enhance biodiversity, create microclimates, and redefine the relationship between dwelling and nature through a stratified vegetated façade.

a) Rationale for Selection and Design Approach

Bosco Verticale demonstrates how vegetated balconies can form a "living façade," proving the feasibility of integrating ecological systems into high-rise housing. Boeri's design reconstructs natural landscape vertically within the dense urban context (Boeri et al., 2015).

b) Sustainability and Energy Impacts

Studies show that the building's dense vegetation:

- reduces cooling loads by providing shade,
- lowers ambient temperatures through evapotranspiration,
- mitigates the urban heat island effect

(Manso & Castro-Gomes, 2021; Chidambaram et al., 2022).

These effects contribute to significant reductions in energy consumption.

c) Balcony–Terrace Configuration and Planting Strategies

Over 3,000 m² of balcony space hosts 800 trees, 4,500 shrubs, and 15,000 perennials. Balcony projections were optimized for wind loads, and

specialized soil depths and automated irrigation systems were designed to support plant life (Boeri, 2015).

Thus, balconies become multifunctional threshold spaces—structural, ecological, and experiential.

d) User Experience and Social Interaction

Residents experience the balconies as personal gardens and nature-observation zones. Empirical findings show that exposure to birds, insects, foliage, and seasonal change reduces stress and enhances psychological well-being (Pribadi, 2021).

In this way, the balcony becomes an essential mediator of sensory and emotional experience.

4.1.2. Sky Habitat (Singapore, Moshe Safdie, 2015)

Sky Habitat occupies a distinct place among contemporary vertical housing models due to its three-dimensional spatial matrix and multi-layered semi-open spaces. Designed by Moshe Safdie, the project establishes a permeable massing system of sky gardens, terraces, and elevated bridges, transforming vertical living into an integrated "open–semi-open–enclosed" spatial continuum.

a) Rationale for Selection and Design Approach

Sky Habitat adapts the modular living logic of Habitat 67 to tropical climatic conditions. It was selected for its innovative system of sky gardens, bridging terraces, and voids that form a vertical neighborhood (Safdie Architects, 2015).

b) Sustainability and Energy Impacts

The permeable massing:

- enhances natural ventilation,
- forms wind corridors for passive cooling,
- reduces heat gain with façade shading elements

(Lubin, 2016).

These strategies significantly improve passive climatic performance in tropical environments.

c) Balcony–Terrace Configuration and Planting Strategies

Each unit opens to a balcony or terrace. Additional components include:

- rooftop gardens,

• sky gardens,

• bridge terraces.

Together they form a multi-layered semi-open network. Planting supports shading and microclimatic comfort (Saprykina, 2021).

d) User Experience and Social Interaction

Studies show that terraces support social contact, short-duration outdoor breaks, gardening, and visual relaxation (Lubin, 2016). The project thus offers a semi-public social interface, countering the isolation typical of high-rise apartment blocks.

4.1.3. The Interlace (Singapore, OMA & Ole Scheeren, 2013)

The Interlace presents an alternative model for high-density living in Singapore's tropical climate through its horizontal modular massing and multi-layered landscape integration. Designed by OMA and Ole Scheeren, the project abandons the conventional vertical tower typology and interlocks housing blocks horizontally, producing expansive terraces, communal courtyards, and permeable open-space sequences.

It thereby becomes a "community-based open–semi-open–enclosed system" where ecological, social, and spatial relations are intertwined.

a) Rationale for Selection and Design Approach

The project was selected for its horizontal + modular + permeable approach as an alternative to vertical block typologies. The staggered configuration generates terraces and communal courtyards at multiple levels (Arcopinto, 2021).

b) Sustainability and Energy Impacts

The massing strategy:

• provides self-shading that reduces surface temperatures,

• enhances wind flow between blocks,

• supports biodiversity and rainwater management on large terrace gardens

(Kadhim & Shok, 2021).

c) Balcony–Terrace Configuration and Planting Strategies

The project's defining feature is its interconnected terraces and landscaped courtyard surfaces. Tropical planting is used extensively for shading, evaporative cooling, and ecological connectivity.

d) User Experience and Social Interaction

Research indicates that users actively utilize terraces for play, exercise, social gathering, and daily outdoor routines, strengthening community bonds (Kadhim & Shok, 2021).

4.2. Ecological and Microclimatic Contributions of Balconies and Terraces

Contemporary sustainable architecture literature demonstrates that balconies and terraces function as complementary microclimatic surfaces that enhance environmental performance at the housing scale. Vegetated balconies contribute significantly to both energy efficiency and outdoor/indoor comfort through natural processes such as shading, evapotranspiration, and wind modulation.

In the case of Bosco Verticale (Figure 2), studies show that the dense vegetation on balcony layers lowers façade temperatures, thereby reducing cooling loads and mitigating the urban heat island effect (Manso & Castro-Gomes, 2021; Chidambaram et al., 2022; Shafique et al., 2018). The shading capacity of the foliage generates a façade temperature reduction of 2–5°C, substantially decreasing indoor cooling demand.

At Sky Habitat (Figure 3), the permeable massing creates wind corridors that enhance natural ventilation, while balcony overhangs diffuse direct sunlight and operate as passive shading devices (Lubin, 2016). Combined with roof and sky gardens, this multi-layered semi-open system forms a passive climatic strategy well-suited to tropical environments.

In The Interlace (Figure 4), the horizontally stacked volumes generate extensive self-shaded terraces that reduce surface heat gain and stabilize indoor thermal conditions. Research further indicates that terrace landscapes contribute to rainwater management, carbon capture, and biodiversity enhancement (Kadhim & Shok, 2021).

Across all three cases, balconies and terraces operate not merely as extensions of living spaces, but as:

- passive shading surfaces,
- microclimate regulators,
- buffer zones that enhance natural ventilation,
- micro-habitats supporting urban biodiversity.

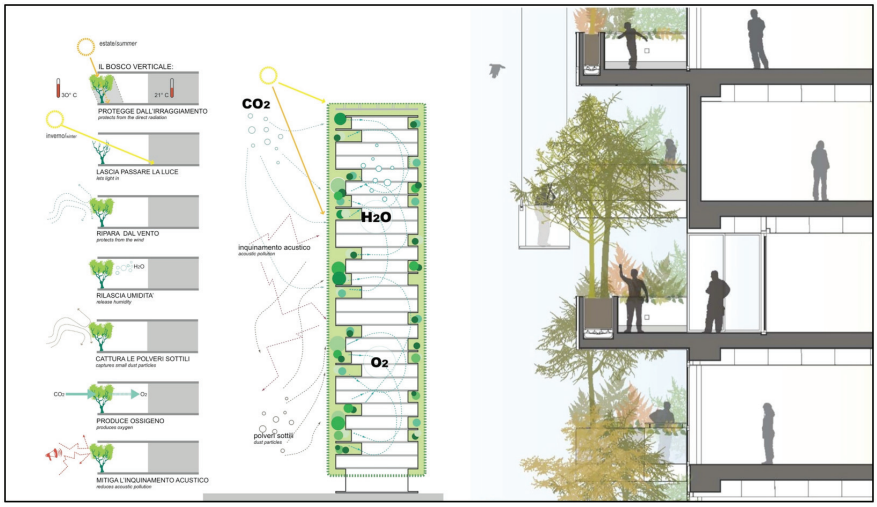


Figure 2. *Section illustrating the ecological balcony relationship in Bosco Verticale. Source: ArchDaily, "Bosco Verticale / Boeri Studio, Milan, Italy" (2014). Accessed: 10.11.2025.*



Figure 3. *Three-dimensional housing matrix with private terraces, balconies, and communal gardens in Sky Habitat. Source: ArchDaily, "Sky Habitat / Safdie Architects, Singapore" (2015). Accessed: 10.11.2025.*

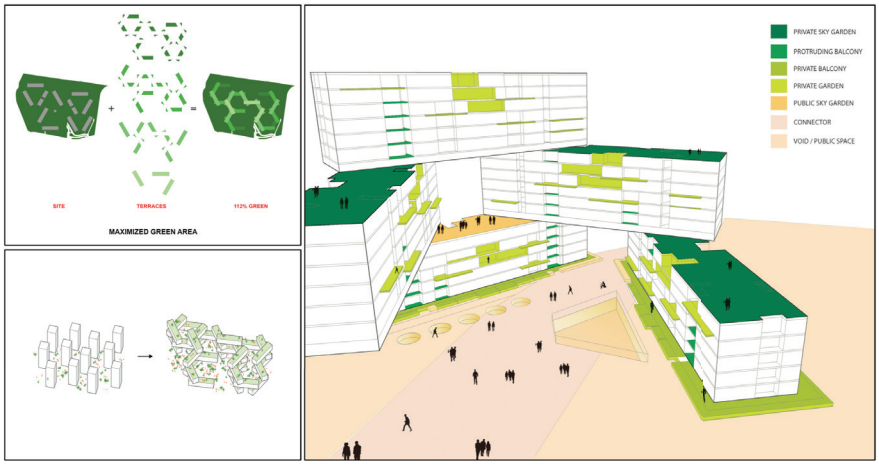


Figure 4. *Interconnected living and communal open spaces integrated with natural landscape in The Interlace. Source: ArchDaily, "The Interlace / Safdie Architects, Singapore" (2013). Accessed: 10.11.2025.*

These findings directly support the study's H1 hypothesis:

H1: The weakened connection to nature in contemporary housing can be re-established—both existentially and performatively—through threshold spaces such as balconies and terraces.

The ecological evidence demonstrates that these threshold spaces are not secondary architectural additions but primary design components that shape energy performance, climatic behavior, and ecological coherence. In other words, balconies and terraces elevate the dwelling from an isolated built object to an environmentally integrated spatial system.

4.3. User Experience and Well-Being

Research on residential environments consistently demonstrates that balconies and terraces play a decisive role in shaping user experience, everyday spatial practices, and psychological well-being. Studies conducted in several Asian metropolitan contexts during the COVID-19 pandemic revealed that balcony use became critical for mental health, stress reduction, social interaction, and access to open air (Ngoc et al., 2024; Amerio et al., 2020).

Post-pandemic research further indicates that semi-open spaces have become indispensable for fundamental needs such as fresh air, sun exposure, small-scale gardening, neighborly interaction, and psychological restoration

(Smektała et al., 2022; Guerra et al., 2023; Darsono et al., 2023; Manso et al., 2021). Collectively, these findings position balconies and terraces as essential "quality-of-life components" in user-centered housing design.

In Bosco Verticale (Figure 5), balcony gardens not only enhance environmental comfort but also provide continuous visual contact with vegetation, which has been empirically shown to reduce users' stress levels (Pribadi, 2021). The presence of dense greenery—trees, shrubs, seasonal foliage—and observable biodiversity (birds, insects) strengthens residents' sense of connectedness to nature.

In Sky Habitat (Figure 6), the continuity of balconies and terraces, together with multi-level sky gardens, allows users to step outdoors frequently throughout the day, engage in social encounters, and establish micro-rituals within their daily routines. Studies highlight these spaces' positive effects on belonging, neighborliness, and psychological well-being (Lubin, 2016).

In The Interlace (Figure 7), shared terrace platforms, children's play courts, outdoor walking loops, and informal gathering spaces foster a strong sense of community and enable a sustained relationship with the outdoors. Research on The Interlace shows that terraces are actively used for both social interaction and personal retreat (Kadhim & Shok, 2021).

Taken together, these three contemporary cases illustrate that balconies and terraces function not merely as semi-open extensions of the dwelling, but as:

- spaces of psychological restoration,
- surfaces on which everyday rituals are produced,
- interfaces that strengthen social bonds, and
- micro-landscapes that enrich sensory and cognitive experience.



Figure 5. *Balcony use and privacy layers in Bosco Verticale. Source: ArchDaily, "Bosco Verticale / Boeri Studio, Milan, Italy" (2014). Accessed: 10.11.2025.*



Figure 6. *Example of balcony/terrace use demonstrating user experience, well-being, sense of belonging, and daily rituals in Sky Habitat. Source: ArchDaily, "Sky Habitat / Safdie Architects, Singapore" (2015). Accessed: 10.11.2025.*



Figure 7. *Extensive rooftop gardens, landscaped sky terraces, and stepped balconies in The Interlace. Source: ArchDaily, "The Interlace / Safdie Architects, Singapore" (2013). Accessed: 10.11.2025.*

These user-centered findings substantiate the socio-psychological dimension of the H1 hypothesis. Balconies and terraces that enable visual and sensory engagement with nature function not only as performative components of the dwelling but also as existential experiential domains that shape well-being, spatial belonging, and overall user satisfaction.

4.4. Philosophical–Spatial Interpretation: "The Home's Face Toward Nature"

The three contemporary projects examined in this study—Bosco Verticale, Sky Habitat, and The Interlace—can be interpreted not only through sustainability and performance criteria, but also as contemporary typologies of the "threshold space" that opens the home toward nature. In architectural philosophy, the home represents the spatial manifestation of the existential relationship that humans establish with the world. As Heidegger emphasizes in Bauen, Wohnen, Denken, dwelling constitutes the primary practice of "being-in-the-world"; Bachelard, in The Poetics of Space, conceptualizes the house as a poetic domain where layers of memory and imagination are housed. Together, these perspectives reveal that balconies and terraces are not merely physical protrusions but ontological thresholds that mediate the human–nature relationship.

In Bosco Verticale, the design of balconies as vertical ecosystems introduces the user to a "suspended natural layer" above the urban fabric. In Sky Habitat, terraces and sky gardens reinforce sensory experience through spatial porosity and the continuity of open–semi-open–enclosed spaces, strengthening the user's engagement with sky, wind, and light. The Interlace, with its horizontally interwoven terraces that remain grounded rather than vertically segregated, reorganizes interior–exterior relations and neighborhood continuity, allowing users to simultaneously experience "ground–nature–sky" as an integrated spatial condition.

As Soykan (1999) argues, the home is not merely a shelter but a "space of thought" through which individuals interpret themselves and their environment. In this sense, balconies and terraces emerge as distinctive threshold spaces that constitute the home's face toward nature—both physically and conceptually. By transforming nature from a distant backdrop into an active component of everyday life, these spaces possess the potential to restore the diminished sensory and existential coherence of the modern dwelling.

This philosophical reading reinforces the study's main hypothesis:

H1: In contemporary housing, the weakened bond with nature can be re-established both existentially and performatively through threshold spaces such as balconies and terraces.

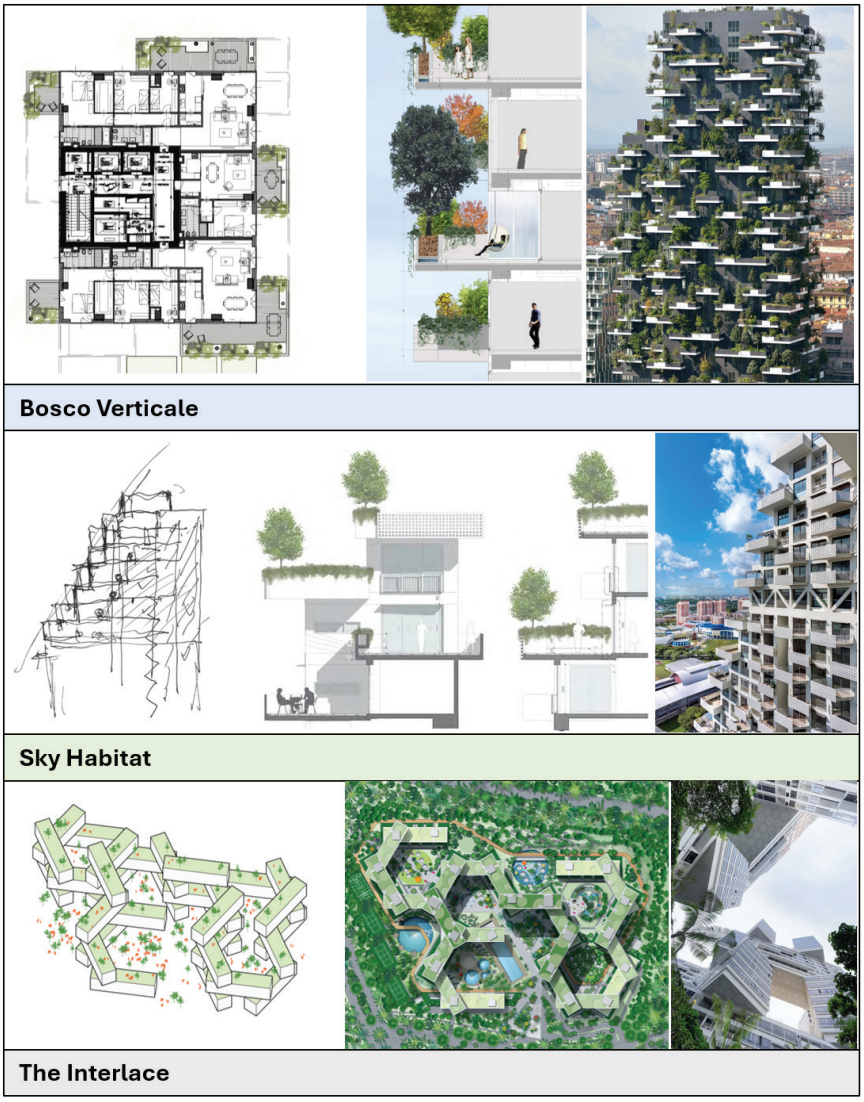


Figure 8. *Composite analytical visualization illustrating the balcony as the "home's face toward nature" across Bosco Verticale, Sky Habitat, and The Interlace. Source: ArchDaily — "Bosco Verticale / Boeri Studio" (2014); "Sky Habitat / Safdie Architects" (2015); "The Interlace / Safdie Architects" (2013).*

Therefore, balconies and terraces should not be understood merely as functional surfaces satisfying technical sustainability criteria; rather, they constitute experiential, sensory, and poetic interfaces that spatially integrate human life with nature. This holistic perspective underscores the need for a philosophical and architectural reconsideration of threshold spaces within contemporary housing design (Figure 8).

5. CONCLUSION AND RECOMMENDATIONS

This study re-examines the weakened home–nature relationship in contemporary cities by conceptualizing balconies and terraces as both ecological and existential threshold spaces. Within this framework, Bosco Verticale, Sky Habitat, and The Interlace were analyzed as representative cases—not as idealized models, but as analytical examples that demonstrate how threshold spaces can be reinterpreted through diverse contemporary architectural typologies. The findings reveal that balconies and terraces function as critical spatial interfaces, performing multilayered roles in relation to sustainability, user experience, and spatial identity.

From an ecological perspective, balconies and terraces enhance building performance through processes such as shading, evapotranspiration, natural ventilation, and the creation of biodiversity-supporting micro-habitats. From the standpoint of user experience, these spaces contribute significantly to psychological well-being, reinforce feelings of belonging, and help re-establish the rhythms of everyday life. When interpreted through the philosophical frameworks of Soykan, Bachelard, and Heidegger, balconies and terraces emerge as existential thresholds that extend the home's poetic and ontological dimensions beyond its physical boundaries.

In light of these findings, the study's primary hypothesis is confirmed:

In contemporary housing, the diminished connection to nature can be re-established—both existentially and performatively—through threshold spaces such as balconies and terraces.

Accordingly, balconies and terraces should not be treated as secondary architectural add-ons, but as foundational components to be addressed from the earliest stages of sustainable housing design.

From an architectural perspective, the results emphasize that balconies and terraces must be integrated into the spatial logic of the dwelling rather than appended to the building mass as residual elements. Passive

environmental strategies—such as orientation, shading, wind capture, and planting—should constitute the principal design inputs for these spaces. Planting should be conceived not merely as an aesthetic device, but as a multilayered ecological system contributing to biodiversity, microclimate regulation, and rainwater management. In this regard, historical spatial continuity models—particularly the traditional hayat–sofa–courtyard system—offer valuable references for the reinterpretation of contemporary balcony and terrace typologies.

From a user-experience perspective, design parameters such as depth, privacy gradients, planting capacity, and functional flexibility should be determined in response to actual patterns of use. Semi-public threshold spaces—including shared terraces, sky gardens, and transitional platforms—should be deliberately designed to foster community interaction and support social sustainability. Post-pandemic needs—such as access to sunlight, short-term outdoor work, micro-gardening, and restorative open-air use—further underscore the importance of adaptability and spatial flexibility in contemporary dwelling design.

From a planning and policy standpoint, the findings point to the need for more flexible and incentivizing regulatory frameworks regarding balcony and terrace floor-area calculations, projection limits, and height criteria. Sustainability certification systems and energy performance assessments should explicitly incorporate the ecological contributions of these spaces as measurable indicators. Moreover, local authorities are encouraged to develop balcony–terrace-oriented programs that promote green infrastructure and microclimate production, thereby contributing directly to broader sustainable urban development goals.

While this study is based on a conceptual framework supported by three selected case studies, future research should employ quantitative methods—such as energy simulations and microclimate modeling—to evaluate balcony and terrace performance across different climatic regions. In addition, broader empirical investigations, including surveys, observations, and interviews, are needed to further deepen insights into user experience. Comparative typological studies examining the relationship between traditional hayat–courtyard systems and contemporary balcony–terrace configurations also present significant potential for future scholarship.

Overall, this research concludes that balconies and terraces are not merely technical extensions of the dwelling, but integral life thresholds that interweave spatial, ecological, cultural, and existential dimensions. Without a critical reconsideration of these multifaceted threshold spaces, contemporary housing architecture is unlikely to achieve a holistic transformation in terms of sustainability and human experience.

REFERENCES

Amerio, A., Brambilla, A., Morganti, A., Aguglia, A., Bianchi, D., Santi, F., Costantini, L., Odone, A., Costanza, A., Signorelli, C., Serafini, G., Amore, M., & Capolongo, S. (2020). COVID-19 lockdown: Housing built environment's effects on mental health. *International Journal of Environmental Research and Public Health, 17*(16), 5973. https://doi.org/10.3390/ijerph17165973

Arcopinto, L. (2021). The city in the form of an asteroid: Collision trajectories between Plan Obus and the Interlace. *Modern Civil Engineering, 1*(1), 42–48. https://www.luigiarcopintoarchitetto.com/wp-content/uploads/2023/03/2022121174048429.pdf

Bachelard, G. (1994). *The poetics of space* (M. Jolas, Trans.). Beacon Press. (Original work published 1958)

Bachelard, G. (1996). *Mekânın poetikası* (A. Derman, Trans.). Kesit Yayıncılık. (Original work published 1957)

Boeri, S., Barreca, G., & La Varra, G. (2015). *Bosco Verticale: A home for trees and people.* Corraini Edizioni. https://studenttheses.uu.nl/handle/20.500.12932/35208

Chidambaram, C., Nath, S. S., Varshney, P., & Kumar, S. (2022). Assessment of terrace gardens as modifiers of building microclimate. *Energy and Built Environment, 3*(1), 105–112. https://doi.org/10.1016/j.enbenv.2020.11.003

Darsono, H., Barliana, M. S., & Cahyan, D. (2023). Characteristic study of contemporary architecture in vertical forests in the concept of green buildings (Case study by Stefano Boeri's architectural work). *Journal of Architectural Research and Education, 5*(1), 81–88. https://doi.org/10.17509/jare.v5i1.55710

Heidegger, M. (1971). *Poetry, language, thought* (A. Hofstadter, Trans.). Harper & Row. (Original work published 1951)

Kadhim, L. A., & Shok, M. E. (2021). Healthy vertical housing study of psychological considerations. *Civil Engineering and Architecture, 9*(7), 2187–2195. https://doi.org/10.13189/cea.2021.090708

Kalogeropoulos, G., Tzortzi, J., & Dimoudi, A. (2024). Remote sensing and field measurements for the analysis of the thermal environment in the "Bosco Verticale" area in Milan city. *Land, 13*(2), 182. https://doi.org/10.3390/land13020182

Kokkoris, I. P., Skandalos, N., & Karamanis, D. (2025). An urban integration approach of green roofs and rooftop photovoltaics towards carbon neutrality and biodiversity

enhancement. *Energy & Buildings, 349*, 116585. https://www.sciencedirect.com/science/article/pii/S0378778825013155

Kuban, D. (1995). *Türk Hayat'lı Evi*. T.C. Ziraat Bankası Kültür Yayınları.

Lubin, G. (2016). Sky Habitat: Three-dimensional housing in tropical urbanism. *CTBUH Journal*. https://global.ctbuh.org/resources/papers/2697-Lubin_2016_SkyHabitat.pdf

Manso, M., Sousa, V., Matos Silva, C., & Cruz, C. O. (2021). The role of green roofs in post COVID-19 confinement: An analysis of willingness to pay. *Journal of Building Engineering, 44*, 103388. https://doi.org/10.1016/j.jobe.2021.103388

Manso, M., & Castro-Gomes, J. (2021). Green wall systems: A review of their characteristics. *Renewable and Sustainable Energy Reviews, 135*, 110111. https://doi.org/10.1016/j.rser.2020.110111

Mastellone, M., et al. (2022). Energy, environmental impact and indoor environmental quality of add-ons in buildings. *Sustainability, 14*(13), 7605. https://doi.org/10.3390/su14137605

Ngoc, N. G. T., Tsaih, L. S.-J., Chen, J. C.-P., Tamariska, S. R., Coelho, A. M. F., & Kung, H.-Y. (2024). Balcony usage as a space to achieve human well-being during pandemic COVID-19. *Journal of Asian Architecture and Building Engineering, 24*(4), 2339–2351. https://doi.org/10.1080/13467581.2024.2370408

Norberg-Schulz, C. (1980). *Genius loci: Towards a phenomenology of architecture*. Rizzoli.

Pallasmaa, J. (2005). *The eyes of the skin: Architecture and the senses*. Wiley.

Pribadi, V. B. (2021). Residents' perception of vertical greenery on high-rise buildings. *IOP Conference Series: Earth and Environmental Science, 909*, 012012. https://doi.org/10.1088/1755-1315/909/1/012012

Ribeiro, C., Ramos, N. M. M., & Flores-Colen, I. (2020). A review of balcony impacts on the indoor environmental quality of dwellings. *Sustainability, 12*(16), 1–23. https://doi.org/10.3390/su12166429

Safdie Architects. (2015). *Sky Habitat / Safdie Architects*. ArchDaily. https://www.archdaily.com/781936/sky-habitat-singapore-moshe-safdie

Saprykina, N. (2021). Sky terraces and multi-level greenery in contemporary high-rise housing. *IOP Conference Series: Materials Science and Engineering, 1079*, 032060. https://doi.org/10.1088/1757-899X/1079/3/032060

Shafique, M., Kim, R., & Rafiq, M. (2018). Green roof benefits, opportunities and challenges—A review. *Renewable and Sustainable Energy Reviews, 90*, 757–773. https://doi.org/10.1016/j.rser.2018.04.006

Smektała, M., & Baborska-Narożny, M. (2022). The use of apartment balconies: Context, design and social norms. *Buildings & Cities, 3*(1), 134–152. https://doi.org/10.5334/bc.193

Soykan, Ö. N. (1999). Ev üstüne felsefece bir deneme. *Cogito, (18)*, 101–112.

Wittgenstein, L. (1961). *Tractatus logico-philosophicus* (D. F. Pears & B. F. McGuinness, Trans.). Routledge & Kegan Paul. (Original work published 1921)

UN-Habitat. (2022). *World Cities Report 2022: Envisioning the future of cities*. United Nations Human Settlements Programme. https://unhabitat.org/world-cities-report-2022

ArchDaily. (2013). *The Interlace / Safdie Architects*. https://www.archdaily.com/627887/the-interlace-oma-2

ArchDaily. (2014). *Bosco Verticale / Boeri Studio*. https://www.archdaily.com/777498/bosco-verticale-stefano-boeri-architetti

ArchDaily. (2015). *Sky Habitat / Safdie Architects*. https://www.archdaily.com/781936/sky-habitat-singapore-moshe-safdie

The Law of Sustainable Futures: The Emergence of the Right to Clean Energy as a Positive Obligation

Abdullah Atala*

Abstract

This study examines how the right to clean energy, which emerged with the expansion of the scope of the environmental right, creates a new legal framework in terms of the positive obligations of the administration. Developments in the international environmental regime, especially with the Stockholm Declaration, Rio Summit, Kyoto Protocol and Paris Agreement, show that the administration has assumed binding responsibilities on sustainability, carbon reduction and transition to renewable energy. This process makes the right to clean energy an integral element of the right to the environment, and demonstrates that the administration's energy policies are not only technical and economic, but also linked to human rights and intergenerational justice principles.

The increasing number of climate cases in recent years has shown that this approach is also gaining strength in the judicial sphere. In Urgenda (Netherlands), Neubauer (Germany) and Klimaseniorinnen (ECtHR, 2024), inadequate measures of the administration in combating climate change were considered as violations of fundamental rights. European Union case law also emphasizes that energy

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management should be considered together with environmental obligations. The study reveals how the obligation of the administration to supply clean energy has been redefined from the perspective of ecological law and how this obligation is now a legally auditable obligation both at the national and international level.

Keywords: Green transition, environmental rights, Paris Agreement, clean energy, ECHR

1. INTRODUCTION: THE LEGAL AND SOCIO-POLITICAL DIMENSION OF ENERGY

Beyond being one of the most basic needs of human life, energy has become a determining factor in the criteria of economic development, social welfare and international independence of states. Energy, which has a direct impact on almost every aspect of human activity, is no longer only an element of life practices but also a strategic element in terms of national sovereignty, sustainable development and environmental stability (Solanki, 2008). For this reason, energy policies occupy a central place in the economic and political structures of states; uninterrupted and affordable access to energy is considered as an integral component of independence and security policies (Duzenli, 2002).

The source of the increasing importance of energy in the modern period is undoubtedly the transformation that started with the Industrial Revolution. With the use of steam engines, the production capacity provided by coal, and the inclusion of mechanical power in the economy, energy became the cornerstone of industrial civilization, opening a new era in human history (Rifkin, 2024). The widespread use of fossil fuels reached its peak in the mid-20th century with the introduction of oil into the world markets, penetrating the smallest details of daily life. In this process, the priority of states has been to ensure uninterrupted access to energy resources; social welfare and economic development have become dependent on cheap and continuous energy supply (Cakmak, 2018).

Since the Industrial Revolution, economic fluctuations and political transformations have mostly been shaped by energy access policies. This close relationship between energy, economy and administration has become more visible with global shocks such as the 1973 Oil Crisis. This crisis exposed the fragility of fossil fuel-based economies and led to energy security becoming one of the main agendas of international politics.

Similarly, one of the triggers of the 2008-2009 global economic crisis was the sudden increase in oil prices, which once again demonstrated the direct impact of fluctuations in energy markets on global economic stability (Pehlivanoglu & Narman, 2022).

The fragility of fossil fuel-based systems has turned concepts such as energy security, energy dependence and energy efficiency into topics of international debate. States have turned to alternative sources to reduce interdependence in the global economy and ensure energy supply security (Ozalp, 2020). These searches have led to energy becoming not only an economic, but also a social and legal issue. The need for continuous, uninterrupted and affordable access to energy has necessitated a new understanding of energy management that combines the concepts of security and sustainability (Cukurcayir & Sagır, 2008).

This transformation process has shown that the energy issue is not only an economic area limited to production and consumption, but also a matter of environmental and legal regulation. The negative effects of fossil fuel consumption on the ecosystem have brought about global problems such as environmental pollution, climate change and resource depletion. For this reason, energy policies are now considered as a part of not only production capacity but also environmental rights, sustainable development and human rights.

In this context, the right to access energy has become a prerequisite for the realization of fundamental rights such as the right to life, the right to health and the right to education. The need for energy in all areas of daily life shows that it is directly related to social welfare. We need to accept that energy is no longer only an economic tool, but is also at the center of social justice.

In this framework, the concept of the "right to clean energy" was born at the intersection of the right to the environment and the right to access energy, and emphasized the protection of ecological balance as the most fundamental justification for turning to renewable resources. Clean energy is not only a sustainable and environmentally sensitive form of production, but also an area of public obligation embodied by the administration's powers of authorization, inspection and sanction. Therefore, the balance between the right to access energy and the right to the environment is

redefined in the context of the positive obligations of the administration, and environmental responsibility is placed at the center of energy policies.

As a result, energy has gone beyond being a driving force in the economic and technological development of contemporary societies; it has become a multidimensional element that determines the direction of legal regulations, international relations and public administration. In terms of modern law, energy policies are evaluated at the intersection of not only production and consumption processes, but also human rights, environmental law and administrative law principles.

2. LAW, ECOLOGY AND THE SEARCH FOR A NEW PARADIGM

Throughout history, law has not only been a normative tool for establishing order, but also a dynamic system that evolves in constant interaction with social, scientific and intellectual developments. In order to comprehend the transformation in energy policies and the legal framework of environmental obligations, it is necessary to consider this historical and philosophical background of the human-nature-state relationship.

In Roman philosophy, the idea of natural law was built upon a universal, clear, and comprehensive foundation derived from human nature and the imperatives of the natural order, continuing the Greek heritage that regarded nature and human beings as a harmonious whole. (Gurbuz, 2015) For ancient thinkers, nature was a living organism with an order and purpose in itself; the concept of "kosmos" expressed this harmonious unity, and law was seen as a means of transferring this natural balance to social life. The similarity established between the human body and nature in Greek and Islamic philosophy also shaped the idea of government and law. (Capra & Mattei, 2021)

Plato is one of the thinkers who put forward this philosophical basis most clearly. According to him, the harmony and order found in the human organism should also be ensured in state administration; the state is a macro-organism representing the microcosm of nature and human beings (Ozkan, 2019). Thus, the interaction between nature, man and the state is seen not only as a physical analogy but also as a legal necessity. Plato's approach formed the basis of an understanding of law in which the laws of nature inspired social order.

While nature was seen as a living and holistic entity in the "organic universe" thought of antiquity, this understanding was replaced by a mechanistic worldview with the scientific revolution that developed from the 16th century onwards. During the Renaissance period, scientists from Da Vinci to Newton began to conceive of nature not as a living organism but as a machine that operates according to physical laws (Yayli, 2006). In this period, nature turned into an object that could be controlled by the human mind. The understanding of nature, which became explainable, measurable and usable through the scientific method, transformed not only the scientific field but also the theories of law and state. Many thinkers from Grotius to Hobbes tried to explain human and social relations with mechanistic principles; thus, determinism in nature also found its place in the basis of the perception of law.

The most prominent consequence of this paradigm shift is that nature began to be seen as a "source". According to the mechanistic conception of the universe, nature is a tool that can be used in production processes and transformed according to human needs. This idea became more concrete with the Industrial Revolution; energy production and consumption became the symbol of dominating nature (Rifkin, 2024). The industrial revolution, which began with the use of steam engines, radically changed the way energy was produced and consumed; the fields of economics, administration and energy became interdependent. In the 19th century, the intensive use of fossil fuels increased the amount of carbon dioxide released into the atmosphere, disrupting the global climate balance, and the exploitation of nature began to be defined not only as an economic but also an ecological crisis. This process has necessitated a radical rethinking of the human-nature relationship (Sinn, 2016).

Since the mechanistic understanding of nature considers nature only as a tool in the service of economic interests, destructive effects on the environment have become inevitable. However, the environmental disasters of the second half of the 20th century gave rise to a new consciousness against this paradigm. Ecological thought, which centers on the integrity of the ecosystem, has begun to recognize nature not only as a "usable object" but also as a common asset with its own intrinsic value. This approach led to the emergence of a new understanding called "ecological law" in modern legal theories (Capra & Mattei, 2021).

The ecological conception of law transforms law from a system that regulates only anthropocentric interests into a normative structure based on the protection and sustainability of nature. While the economy has long been seen as a field that determines the boundaries of law, today ecology has become a factor that redefines the content and purpose of law. This change in social perception has also transformed the role of the administration. The administration is no longer only a regulatory and supervisory body, but also an actor with the obligation to protect the environment, ensure the sustainable use of natural resources and direct clean energy policies.

This transformation has also expanded the content of the environmental right. The ecological approach has not only limited the right to the environment to the demand for non-pollution and protection from harm; it has also included the protection of the integrity of ecosystems, the sustainable use of natural resources in favor of future generations and the design of energy policies accordingly. Thus, the "right to clean energy" emerged as an element of the right to the environment, and the demand of individuals to live in a healthy environment was combined with the expectation of access to renewable energy.

The right to clean energy is also shaped by positive obligations under the law. It is now seen as a requirement of the right to the environment and the right to clean energy, which is an element of it, that the administration establishes the regulatory framework that will shift the energy supply from fossil fuels to renewable resources, plans the necessary infrastructure investments within this framework and develops policies to guide market actors. This positive obligation, when considered together with the principles of continuity, equality and intergenerational justice, includes not only the "existence" of energy supply, but also its provision in an accessible, uninterrupted and sustainable manner for all.

Therefore, the obligation of the administration to supply clean energy is a concrete reflection of a new understanding based on ecological law. This approach, which is becoming increasingly evident in judicial decisions and international texts, requires reinterpreting the classical tools of administrative law with ecological principles.

In conclusion, the historical line from the organic understanding of nature of antiquity to the mechanistic paradigm of the modern era and

from there to ecological awareness has created a new intellectual ground at the intersection of environmental law and energy law. This ground has made the right to clean energy visible by expanding the scope of the environmental right, and strengthened the positive obligations of the administration in this field both at the normative and jurisprudential level. Thus, ecological law symbolizes not only a transformation in the perception of nature, but also a transition to the sustainable energy order of the future, while defining the obligation of the administration to supply clean energy as a founding principle that considers the needs of the present and the rights of future generations together.

3. INTERNATIONAL DEVELOPMENTS: THE ROAD TO CLEAN ENERGY

The shift towards clean energy has been on the agenda of international law since the second half of the 20th century, as the environmental and social consequences of humanity's relationship with energy became more visible. The foundations of this transformation were laid in the 1970s when environmental problems began to be discussed at the international level. The Stockholm Conference of 1972, which is considered as the starting point of this period, brought the balance between environmental protection and economic development to the international policy agenda; the emphasis on the right to live in a healthy and clean environment in the declaration formed the normative basis of the environmental law that would be shaped in the following decades (United Nations, 1972; Mulyana, 2016; Aydınoğlu, 2021)

In the post-Stockholm period, dialogues on environmental and energy issues gained momentum under the umbrella of the United Nations, and the Conference on New and Renewable Sources of Energy organized in 1981 ensured that energy sustainability discussions were addressed on a separate platform (United Nations, 1981). This conference strengthened the international will to promote renewable resources and paved the way for energy policy to be seen not only as an economic tool but also as an environmental responsibility.

One of the most important steps in the continuation of these discussions was the United Nations Conference on Environment and Development held in Rio de Janeiro in 1992. The United Nations Framework Convention

on Climate Change, signed at the end of the conference, emphasized the direct relationship between environmental problems and fossil fuels and paved the way for states to undertake legal obligations to reduce carbon emissions (Borowy, 2013; Mulyana, 2016). The Kyoto Protocol, which was prepared on the basis of this convention, set numerical targets for the reduction of greenhouse gas emissions, thus transforming the principle of environmental protection into binding international legal norms for the first time. The protocol, to which Turkey became a party in 2009, explicitly regulated the promotion of renewable energy sources (Sahin, 2016).

The 2009 Copenhagen Conference centered on the goal of reducing the rate of global warming and reinforced the process with important decisions such as limiting greenhouse gas emissions and establishing the Green Climate Fund (Aydınoğlu, 2021). However, the failure of the Copenhagen process to fully meet expectations has created the need for a new global consensus. This need was met with the Paris Agreement adopted in 2015. The Paris Agreement emphasized basic principles such as protecting ecosystem integrity, securing biodiversity, reducing carbon emissions and promoting sustainable development (Karakaya, 2016). The most striking goal of the agreement was to keep the global temperature increase at 1.5°C; this goal created a global orientation to reduce fossil fuel dependency and expand the use of renewable energy sources (Kaya, 2017).

The European Union energy policy, which has developed in parallel with this international process, has assumed a transformative role in terms of both combating climate change and energy supply security goals. Energy cooperation is at the heart of European integration and this approach has its roots in the European Coal and Steel Agreementof 1951. This historical legacy paved the way for the EU to develop comprehensive legal regulations on energy in the following periods (Aydınoğlu, 2021).

In line with the Kyoto Protocol, the European Union enacted a series of energy directives in the early 2000s. While Directive 2001/77/EC regulated the promotion of renewable energy sources in electricity generation, Directives 2002/91/EC, 2003/30/EC and 2003/96/EC introduced complementary provisions in areas such as energy efficiency, transport fuels and energy taxation (Can, 2020). The Lisbon Treaty of 2009, which reshaped the institutional structure of the EU, made energy policy a common goal at the community level. Article 194 of the Treaty clearly regulated energy

efficiency, conservation and development of renewable resources and established a uniform legal framework in the field of energy (Keskin, 2013).

Following the Lisbon Treaty, the Renewable Energy Directive 2009/28/EC entered into force. This directive repealed the previous regulations, set binding targets and obliged Member States to adopt regulations promoting the use of renewable energy in their national legislation. The legal infrastructure has been strengthened to increase the use of renewable energy in electricity generation, heating-cooling and transportation sectors (Cecen, 2022; Fırat & Yılsev & Bozkurt, 2021). At the same time, regulations were made to liberalize the energy market, reduce carbon emissions and develop incentive mechanisms (European Parliament, 2009).

Directive 2018/2001, which updated this process, set new targets with reference to the Paris Agreement and further advanced sustainability in clean energy production (Can, 2020). The European Commission's "Clean Energy for All Europeans" strategy has put renewable energy policies into a holistic framework by emphasizing the potential for economic growth as well as environmental concerns (Itkonen, 2016).

In parallel with the European Union regulations, the Energy Charter Treaty has also been an important source of reference for Turkey. Adopted with the signature of 51 countries, the convention includes objectives such as ensuring energy security, reducing environmental impacts in resource utilization and increasing energy efficiency. It also aims to liberalize energy trade and protect investor rights (Baklacı & Akinturk, 2006; Kakisim & Kodaman, 2019). Due to its geographical location on an energy transit route, Turkey took an active role in the implementation of the convention (Aydinoglu, 2021).

The common point of all these developments is that energy policies are now considered in international law not only as an economic field, but also as an area of normative obligation linked to environmental rights, sustainable development and human rights. In this process, the role of administrations has moved beyond ensuring energy supply to becoming an actor that fulfills environmental obligations and manages the transition to renewable energy. This new international paradigm of clean energy requires states to restructure their energy policies and expands the legal and ethical responsibilities of the administration.

4. IS CLIMATE INACTION A VIOLATION OF RIGHTS?

The recent rapid increase in climate lawsuits has taken the responsibilities of the administration regarding environmental and energy policies beyond the classical framework and made them a direct subject of human rights and constitutional obligations. This new judicial trend has revealed that the inaction of the administration in combating climate change may also give rise to legal liability and redefined the positive obligation of the administration (Keskin, 2024).

The climate inaction debate is basically shaped on two axes: first, the positive obligation of the administration to protect the environment and ensure sustainable development; and second, the question of violation of interest and capacity to sue regarding whether individuals are directly affected by the violation of this obligation. The second axis on this issue was limited for a long time due to the "actio popularis" approach; individuals were denied the right to sue on behalf of general environmental interests. However, in parallel with the developments explained above, courts have started to relax this limit. (Schall, 2008)

Due to the transboundary nature of climate crises, the classical breach of interest approach has begun to be reinterpreted due to the collective risk as well as individual harm (Keskin, 2024). For this reason, in recent years, international judicial bodies have turned towards a rights-based review model. In this model, we can see that individuals can claim not only the concrete damage but also the potential violation caused by the state's inaction.

An important example of this new approach is the Urgenda Foundation v. Netherlands case in the Netherlands. In this case brought by the Urgenda Foundation and 900 citizens, the Hague Court ruled that the Dutch state must reduce its greenhouse gas emissions by at least 25% below 1990 levels. The court stated that the government's 17% reduction target was contrary to both international obligations and the right to life and respect for private life protected under Articles 2 and 8 of the European Convention on Human Rights (ECHR) (Urgenda Foundation v. State of the Netherlands, 2019).

The Supreme Court of the Netherlands also upheld this decision on December 20, 2019, registering that the administration's climate inaction may constitute a violation of human rights. The decision emphasized that

the administration has an obligation to "prevent a real and foreseeable threat" under the ECHR, and that this obligation includes the risks arising from climate change. The Court also stated that the existence of a global problem cannot be a justification for a state to avoid its obligations. This decision set a precedent for being held liable for human rights violations due to climate inaction and paved an important path for the obligations of the administration in this area.

The German Federal Constitutional Court's decision in Neubauer v. Germany (2021) demonstrated that climate inaction can constitute a constitutional violation of rights. In the case, the young applicants argued that the 55% reduction target by 2030 set by the Federal Climate Protection Act of 2019 (Bundesklimaschutzgesetz) was incompatible with the obligations under the Paris Agreement. Relying on Articles 1(1), 2(2) and 20a of the Basic Law, the Court recognized that the obligation to protect the environment applies not only to present generations but also to future generations.

The Court noted that the long-term effects of climate policies could upset the balance of intergenerational freedoms, so setting vague targets for the period after 2030 would disproportionately narrow the space for future freedoms. In this context, fair sharing of the carbon budget has become a constitutional imperative. The federal legislature was obliged to reorganize the post-2031 mitigation targets. A remarkable statement was included in the decision: "No generation can consume the bulk of the climate budget and transfer obligations to the future" (Neubauer et al. v. Germany, 2021).

This decision shows that the right to the environment is now directly related to the protection of fundamental rights, meaning that the environment and climate issue has become not only a political but also a legal obligation.

Following these developments, the decision of the Grand Chamber of the European Court of Human Rights (ECHR) in Association of Swiss Senior Women for Climate Protection v. Switzerland (Klimaseniorinnen) in 2024 is one of the precedents where we can re-read the new paradigm. In 2016, a group of Swiss women claimed that the administration's environmental policies were inadequate and therefore violated Articles 2 and 8 of the ECHR . The Swiss authorities rejected the case, stating that the applicants did not have "victim status" and that their claims were of "general public interest". However, the Grand Chamber of the ECtHR reversed

this approach and recognized the victim status of certain groups particularly affected by climate change.

The Court found that the Swiss state's climate targets were not in line with the Paris Agreementand therefore did not fulfill its positive obligations under the ECHR. This judgment is an important milestone both in terms of victim status and the obligation of the administration. The Court clearly stated that the administration has an obligation to take preventive measures not only against existing risks but also against foreseeable climate hazards (Association of Swiss Senior Women for Climate Protection v. Switzerland, 2024). In light of this decision, we are of the opinion that, apart from the classical types of activities of the administration such as public service and law enforcement, the activity of foreseeing and producing alternatives should be reinterpreted in the field of energy and environment.

When these three decisions are evaluated together, it is seen that climate inaction is no longer an abstract policy criticism, but has become a claim of violation of rights that is amenable to judicial review. Articles 2 and 8 of the ECHR are interpreted broadly to cover the obligation of the administration to protect against environmental risks, and at the constitutional level, the principle of sustainability is combined with intergenerational responsibility.

Developments in European Union law also support this trend. In particular, in Case C-46/21 P, ACER v. Aquind (opinion of Advocate General Campos Sánchez-Bordona), it was emphasized that administrative decisions in the energy sector cannot be reviewed only "limited to clear errors" because energy management is directly linked to the environment and the public interest. Similarly, in Case T-631/19, BNetzA v. ACER, it was stated that ACER's competence to protect the holistic energy methodology is essential for the coherence of the European energy market. These decisions show that energy regulation is now also considered alongside environmental responsibility.

Case C-348/20, Nord Stream 2 v. Parliament and Council, is an example that broadens the scope of judicial review in environmental and energy investments. The Court found the "Plaumann test" valid, recognizing that Nord Stream 2 had a direct and individual interest, thus demonstrating that large energy projects can be subject to direct review (CJEU, 2022).

All of these judicial developments reveal that the inaction of the administration in energy and climate policies are seen as acts giving rise to civil liability. This redraws the classical boundaries of administrative law: environmental and energy regulations should no longer be dealt with solely within discretionary power or through classical public interest jurisprudence, but with a new approach.

Ultimately, the issue of climate inaction epitomizes the paradigmatic shift in the way law views nature and society. States' energy supply, environmental protection and sustainable development policies are no longer just economic, but also human rights-based obligations. The obligation of the administration to supply clean energy constitutes both the legal and ethical basis of this new paradigm.

5. CONCLUSION

The evaluations presented in this study attempt to explain the transformation of the right to the environment and its sub-element, the right to clean energy, in contemporary legal systems. The intellectual foundations of the human-nature relationship since antiquity have changed significantly under the influence of the mechanistic paradigm of the modern era; the rise of ecological thought since the second half of the 20th century has redefined the purpose and scope of law. This transformation has not only remained at the theoretical level, but has also been transformed into a concrete normative framework that expands the sphere of responsibility of the administration through international legislation, constitutional provisions and gradually developing jurisprudence.

The process from the Stockholm Conference to the Paris Agreement has shown that environmental protection and sustainable development is an area of international obligation that is no longer limited to national discretion. These developments reveal not only the duty of the administration to ensure energy supply, but also the obligation to ensure that this supply is sustainable, accessible and in line with environmental integrity. It is precisely at this point that the right to clean energy has emerged as an independent legal claim and protection area at the intersection of the right to environment and the right to access energy.

Recent judicial decisions are one of the most concrete indicators of this new paradigm. As seen in Urgenda (Netherlands), Neubauer (Germany) and

Klimaseniorinnen (Switzerland), the inaction of the administration is characterized as a violation of fundamental human rights. Recent international jurisprudence has moved the responsibility to protect the environment into the category of positive obligation by clearly establishing the obligation of the administration to take preventive measures against foreseeable climate risks. In European Union law, ACER case law and the expanding judicial review of energy projects reinforce the same trend, confirming that energy management is no longer merely an economic technical field, but a legal field directly related to the public interest and fundamental rights.

In light of all these developments, the obligation of the administration to supply clean energy has gone beyond the classical public service understanding and has become a holistic responsibility shaped at the intersection of human rights, ecology and sustainability principles. This study shows that it has become a legal obligation for the administration to develop a sustainable and holistic energy policy that takes into account both the needs of the present and the rights of future generations.

REFERENCES

Aydınoğlu, Z. N. (2021). *İdare hukuku boyutuyla yenilenebilir enerji üretimi* [Renewable energy production from an administrative law perspective]. Seçkin Yayıncılık.

Baklacı, P., & Akıntürk, E. (2006). Enerji Şartı Anlaşması [Energy Charter Treaty]. *Ankara Avrupa Çalışmaları Dergisi*, 5(2), 97-113.

Borowy, I. (2013). *Defining sustainable development for our common future: A History of the World Commission on Environment and Development*. Routledge.

Can, Ö. (2020). *Yenilenebilir enerji hukuku ve teşvikler* [Renewable energy law and incentives]. İstanbul Şehir Üniversitesi, Sosyal Bilimler Enstitüsü.

Capra, F., & Mattei, U. (2021). *Hukukun ekolojisi* [The ecology of law]. Koç Üniversitesi Yayınları.

Çakmak, N. M. (2018). *İdare hukuku açısından yenilenebilir enerji* [Renewable energy from the perspective of administrative law]. Seçkin Yayıncılık.

Çeçen, H. (2022). *Avrupa Birliği'nde Yenilenebilir Enerji Yatırımlarının Teşvikine Dair Düzenlemelerin Avrupa Birliği Hukukuna Uygunluğunun Değerlendirilmesi*. On İki Levha Yayıncılık.

Çukurçayır, M. A., & Sağır, H. (2008). Enerji sorunu, çevre ve alternatif enerji kaynakları [Energy problems, environment and alternative sources]. *Selçuk Üniversitesi Sosyal Bilimler Enstitüsü Dergisi*, 20, 257–278.

Fırat, D., Hoca, Y., & Bozkurt, K. (2021). Avrupa Birliği politikaları çerçevesinde yenilenebilir enerji ve Türkiye [Renewable energy and Turkey in the framework of EU policies]. *Yeditepe Üniversitesi Hukuk Fakültesi Dergisi*, 16(2), 743–763.

Kakışım, C., & Kodaman, T. (2019). Avrupa Birliği–Türkiye ilişkilerinde enerji diyaloğu [Energy dialogue in EU–Turkey relations]. *Süleyman Demirel Üniversitesi Sosyal Bilimler Enstitüsü Dergisi*, (34), 124–139.

Karakaya, E. (2016). Paris İklim Anlaşması: İçeriği ve Türkiye üzerine bir değerlendirme [Paris Agreement: An assessment on Turkey]. *Adnan Menderes Üniversitesi Sosyal Bilimler Enstitüsü Dergisi*, 3(1), 1–10.

Keskin, M. H. (2013). Lizbon Anlaşması sonrasında Avrupa Birliği'nde kamu yönetimi anlayışı [Public administration in the EU after the Lisbon Treaty]. *Akdeniz İİBF Dergisi*, 13(21), 81-101.

Keskin, Z. (2024). As new class of administrative cases: Climate change and the issue of legal standing. *Necmettin Erbakan Üniversitesi Hukuk Fakültesi Dergisi*, 7(2), 463–480.

Kaya, Y. (2017). Paris Anlaşmasını iklim adaleti perspektifinden değerlendirmek [Paris Agreement from the perspective of climate justice]. *Uluslararası İlişkiler Dergisi*, 14(54), 87-106.

Mulyana, I. (2016). The development of international law in the field of renewable energy. *HALREV*, 2(1), 38-60.

Özalp, M. (2020). *Küresel enerjinin ipek yolu: Türkiye* [Turkey as the silk road of global energy]. Seçkin Yayıncılık.

Özkan, F. (2019). Sokrates ve Platon felsefesinde insan sorunu [The human problem in Socratic–Platonic philosophy]. *Iğdır Üniversitesi Sosyal Bilimler Dergisi*, 118, 1–20.

Pehlivanoğlu, F., & Narman, Z. (2022). Enerji ekonomisi ve yenilenebilir enerjinin rolü [Energy economics and the role of renewables]. *Gazi Kitabevi.*

Rifkin, J. (2024). *Üçüncü sanayi devrimi* [The third industrial revolution]. İletişim Yayınları.

Şahin, Ö. U. (2016). The comparative analysis of Kyoto Protocol and Copenhagen Accord. *Journal of Awareness*, 1(1), 5-16.

Schall, C. (2008). Public interest litigation concerning environmental matters before human rights courts: *A Promising Future Concept?. Journal of Environmental Law*, 20(3), 417–453.

Sinn, H.-W. (2016). *Yeşil paradoks: Küresel ısınmaya arz yanlı yaklaşım.* Koç Üniversitesi Yayınları.

Solanki, C. S. (2008). *Renewable energy technologies: A practical guide for beginners.* Prentice -Hall of India.

Declaration of the United Nations Conference on the Human Environment. (1972). United Nations.

Report of the United Nations Conference on New and Renewable Sources of Energy. (1981). United Nations.

Paris Agreement. (2015). United Nations.

Treaty of Lisbon Amending the Treaty on European Union and the Treaty Establishing the European Community. (2007). Official Journal of the European Union.

Directive 2001/77/EC. (2001). Official Journal of the European Union.

Directive 2002/91/EC. (2002). Official Journal of the European Union.

Directive 2003/30/EC. (2003). Official Journal of the European Union.

Directive 2003/96/EC. (2003). Official Journal of the European Union.

Directive 2009/28/EC of the European Parliament and of the Council. (2009). Official Journal of the European Union.

Directive (EU) 2018/2001. (2018). Official Journal of the European Union.

Association of Swiss Senior Women for Climate Protection v. Switzerland. (2024). European Court of Human Rights (Grand Chamber).

Case C-46/21 P, ACER v. Aquind. (2022). Court of Justice of the European Union.

Case C-348/20, Nord Stream 2 v. Parliament and Council. (2022). Court of Justice of the European Union.

Case T-631/19, BNetzA v. ACER. (2022). Court of Justice of the European Union.

Neubauer et al. v. Germany. (2021). Federal Constitutional Court of Germany.

Urgenda Foundation v. State of the Netherlands. (2019). Supreme Court of the Netherlands.

Fundamental Dynamics of the Global Union Movement in Climate Change: Unionism in the Green Economy and the Work-Environment Dilemma

Ali İhsan Çelen*

Abstract

The concept of climate change is used to describe long-term changes in global temperature and extreme weather events. Climate change includes numerous risks; food, water, health, and living space etc. This has made adaptation and transition policies essential. Today as in history, unions play a leading role in ensuring that policies are implemented within a fair framework. Workers and unions have balanced industrial transformation through dialogue and/or force. This same role has become crucial for decent work and a just transition in green economy. Accordingly, the primary objective of this study is to examine the conditions, arguments, and ideal strategies of unions in the work-environment dilemma using global examples and to identify union roles. The study was prepared by utilizing the arguments such as decisions, documents, reports, etc. obtained from international climate meetings and by using quantitative and qualitative data obtained through the literature review method.

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As a result, a green economic structure is based on five principles: The well-being, the justice, the planetary boundaries, the efficiency and sufficiency, the good governance. The fundamental dynamics of the global trade union movement for green economy are as follows: just transition, climate justice – social justice integrity, green jobs strategy, sectoral transformation and job security, social dialogue and participation, investment and finance dynamics, alliances with environmental movements, justice demands of the global south, corporate responsibility and supply chains, transformation of union identity and vision. The fundamental dimensions of the strategies differs from experiences, sectors of activity, membership patterns represented, and approaches to internal union democracy. The fundamental conditions of the union movement can be listed as follows: Declining union density, the questioning of traditional roles, the just transition discourse, twin transition debates, fundamental human rights violations, the prioritization of employment, and diverse sectoral implications are creating differentiated and flexible strategies. Furthermore, global climate policies are shaped under the shadow of global economic competition. Governments' carbon neutrality targets are the main argument. Therefore, the transformation of fossil fuel-based industries has a decisive impact. Unions want environmental policies, but only if they are fair social movements on climate issues constitute a significant force. In this process, union roles vary, from dismissive and ignoring to outright opposition.

Keywords: Green Economy, Unionism, Global Union Movement, Work, Environment

INTRODUCTION

The global average temperature anomaly, which remained around 0°C until the 1980s, accelerated rapidly thereafter, exceeding 0.5°C in the early 2000s. The global average temperature anomaly continued this momentum in subsequent years, exceeding 1°C by 2023 and reaching alarming levels. Climate change, which has become a multifaceted and complex problem today, has inevitably negatively impacted the economy, society, and politics. Average temperatures have increased much more rapidly and at a rate far greater than anticipated in the post-industrial revolution period. The widespread impact of this development in recent years has highlighted the importance of urgent climate change policies. Climate change is largely driven by fossil fuel consumption. The extent, speed, depth, and duration of its impact constitute the most challenging issue.

Climate change has potential risks about food, water, living, sanitation, health, poverty, and other issues. Similarly, climate change includes the following challenges for workers: New atypical work models, polarization, inequality and injustice, flexibility, insecurity, restructuring of wages and working hours, individualization, shrinking social protections, informal employment, worsening disadvantaged situations, erosion of individual and collective rights, work-life imbalance, heat stress, and other physical and psychological consequences. All these risk areas have made the roles of unions clear. Employment-oriented environmental policies have become a priority.

The transition to a low-carbon economy forms the basis of climate policies. So, unions have been key actors in ensuring social justice, particularly in the post-industrial revolution era. In this process, they have used their power function and/or dialogue mechanisms against both governments and employers. These tools vary depending on the ideologies adopted by unions. These roles have become increasingly important with the climate debates that took place in the first quarter of the 21st century. Today's climate change debates have also brought about discussions of new economic models. So environmentally debates are shaped by the potential impact of climate policies on production activities. As in the Industrial Revolution, this change involves new living and working conditions. The fossil fuel-based nature of transition policies has brought about radical changes in working life. Adaptation and transition policies must be implemented and concluded fairly for both society and employees. Accordingly, this study first examines the fundamental dimensions of the green economy. Then the union movement is evaluated globally. In the last section, the global union movement on climate change is discussed with examples within the framework of basic dynamics.

1.THE GREEN ECONOMY

The fundamental vision of the green economy is a just, green economic future. This vision aims to ensure wellbeing for all within the planet's ecological limits. The green economy is the most important global goal for achieving sustainable development. The use of fossil fuels and greenhouse gas emissions accelerate climate change. So, the transition to a green economy has emerged as a response to significant challenges

such as environmental sustainability and climate change. It also aims to achieve a balance between environmental sustainability and economic growth. This economic model emphasizes: Adopting policies to protect natural resources, developing technologies that reduce environmental impacts, and implementing business models based on sustainability principles. The necessity of a green economy arose from the fact that the current dominant economic approach exacerbates inequalities, encourages waste, fuels resource scarcity, and includes threats to the environment and humanity. Therefore, the green economy aims to use resources efficiently, achieve low carbon emissions and adopt a socially inclusive approach. The green economy supports the struggle against climate change by promoting low carbon emissions, renewable energy sources and energy efficiency. At the same time, it aims to ensure the sustainable use of natural resources, the efficient use of resources and to take into account the needs of future generations (Özel and Kılıç, 2006, s. 166-168; Azazi and Uzma, 2022, s. 94-95; Nalinci, 2023, s. 733-735; Usta, 2023, s. 167-169). A green economy is considered essential for achieving the Sustainable Development Goals (SDGs). It represents a global and transformative shift in the global economic structure. This approach involves a fundamental shift in government priorities. OECD Secretary-General A. Gurría stated that *a shared future cannot be built if the vulnerable groups most affected by climate change are left behind, and that policies developed and implemented must also include the future of children.* This approach requires big ideas, major steps, radical transformations, and fundamental systemic restructuring (The Green Economy Coalition, 2020). So, a green economic structure is based on five principles: The wellbeing principle, the justice principle, the planetary boundaries principle, the efficiency and sufficiency principle, the good governance principle (Figure 1)

According to figure 1; *the wellbeing principle*: The green economy is human centered. It includes real and shared wellbeing. It aims to economic growth that support well-being. It prioritizes access to and invests in sustainable natural systems, urban infrastructure, knowledge, education, health etc. It supports equitable and dignified livelihoods. *The Justice Principle:* Equality and justice between and within generations. The green economy is inclusive and non-discriminatory. It promotes the equitable distribution of opportunities and economic outcomes. It serves the interests of future citizens with a long-term perspective while struggling

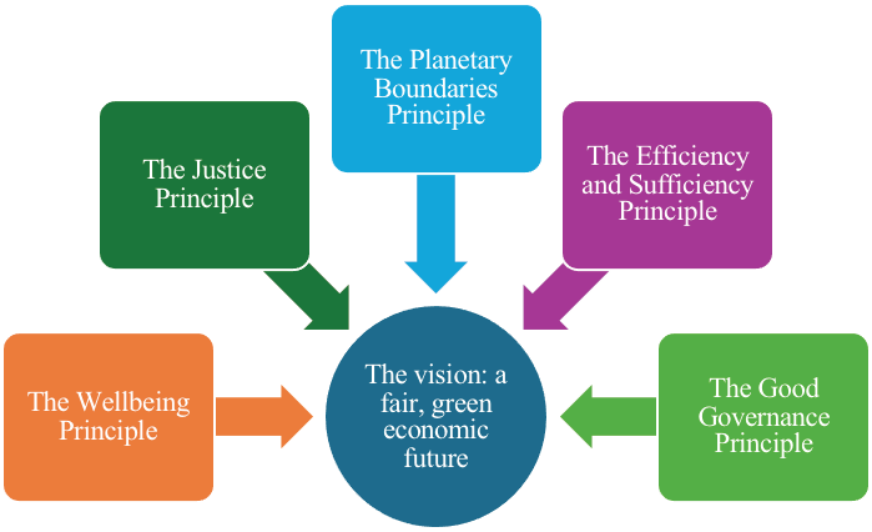


Figure 1: *The Basic Principles of Green Economy*
Source: Adapted from, (The Green Economy Coalition, 2020)

today's multidimensional poverty and injustice. It adopts an economic structure that respects solidarity and social justice, strengthens trust and social ties and respects for human rights, workers' rights, all people, especially minorities. It promotes the strengthening of sustainable livelihoods. It aims for a rapid and just transition that leaves no one behind and bears the costs of doing so. *Planetary Boundaries Principle*: It protects, restores, and invests in nature. It recognizes and nurtures nature's values. It protects nature's ecological values. Accepts limited substitutability and uses the precautionary principle. Protects and invests in biodiversity. It is innovative and circular in managing natural systems. *The Efficiency and Sufficiency Principle*: Creating wellbeing within planetary boundaries is challenging. So, it limits consumption of natural resources to sustainable levels. Includes prices, subsidies, and incentives to achieve polluter-pay and/or inclusive green outcomes. *The Good Governance Principle*: This principle includes an evidence-based, interdisciplinary, and adaptable strategy; horizontally (across sectors) and vertically (across levels of governance) integrated, collaborative, and cohesive institutions; public participation, strong partnerships that maintain centralized standards, procedures, and compliance systems; and a financial system that aims to ensure

wellbeing and sustainability (UNEP, 2018; The Green Economy Coalition, 2020; Charvon, 2023; SEFIA, 2023; UN PAGE, 2025.

The green economy fundamentally refers to the concepts of wellbeing and development, equality and justice, environmental protection, efficiency, and good governance. So, it is based on the principle that economic development creates a common benefit for all people. It is based on resolving social problems within the framework of equal opportunities. Similarly, it focuses inclusive empowerment, equal access to all opportunities and advantages, and broad participation in decision-making processes. Unlike economic models that ignore natural resources and the environment, it supports a sustainable consumption structure that also takes future generations into account. It focuses a circular economic approach, low resource use and emissions, waste management, and the efficient use of resources. It includes the public and civil society in decision-making processes. It includes inclusive and transparent processes and collaborative governance.

For example, the European Union adopted the European Green Deal in 2019. This initiative aims to transform the EU into a modern, resource-efficient, and competitive economy. It aims to transform Europe's economy, energy, transportation, and industries for a more sustainable future and responds to the urgent calls of citizens, especially young people, for climate action. Accordingly, the European Green Deal covers: Climate neutrality and emission reduction (reducing emissions by at least 55% by 2030 and 90% by 2040), just and equitable transition (Just Transition Fund, Social Climate Fund, EU Solidarity Fund), carbon pricing and industrial reform (Expansion of the EU Emissions Trading System to buildings and transport, and green and social funds), clean and secure energy (providing 40% affordable price, safe, and sustainable energy, reducing fossil fuel dependency), green industrial competitiveness (clean energy infrastructure (Green Deal Industrial Plan, Critical Raw Materials Act, Net Zero Industry Act, which encourages production scaling and net-zero technologies), circular economy (Zero Pollution Action Plan, high standards for water and air quality, waste and product reforms), stakeholder engagement (Strategic Plan for the Future of the Energy Market) Dialogue, clean transition dialogues with sectors such as hydrogen, construction industry, clean technology, steel) (European Comission, 2025). All these characteristics of the green economy have given unions a central position at both the national and international levels. Unions will serve as catalysts between policymakers

and implementers in harmonization and transition policies. The roles and effectiveness of unions are crucial for ensuring a fair outcome.

2.UNIONISM IN THE GREEN ECONOMY

Global climate change has become one of the most comprehensive social and economic debates of the 21st century. Its potential to reshape labor market structures, labor policies, and social class relations has been particularly influential in this development. This is one of the features that makes the issue so important for unions (Can, 2018, s. 302; Babahanoğlu, 2023, s. 196-198). For example, climate change policies mean the loss of many jobs, but also the creation of new employment opportunities. According to the ILO, climate change policies could create 24 million new "green jobs" by 2030. However, it is also predicted that millions of jobs will be lost in high-carbon sectors during the same period. For many years, the union movement has distanced itself from environmental policies. One of the main reasons for this has been concerns about job losses, particularly in fossil fuel sectors. However, from the 2000s onward, with the emergence of the concept of "Just Transition," unions began to view climate action as a "social justice opportunity" rather than a "threat." This has led the labor movement to redefine both the social and economic directions of climate policies (ILO, 2024; ITUC, 2025).

Trade unions defend for a just transition based on shared interests in climate change policies (Räthzel ve Uzzel, 2011). The idea of a just transition goes beyond wellbeing and defends for shared interests. It is a call for public responsibility to facilitate the transition. It is a mutually beneficial solution for both "saving the planet" and "saving jobs". It will be shaped by the same transitions as decarbonization or the transition to greener technologies. It is a managed transition where people, organizations, governments, and civil society have control. This term was incorporated into the Kyoto Protocol in 1997. Subsequently, the ILO has consistently strived to include just transition on the United Nations' development agenda. According to IndustriALL, a just transition is defined as: Providing a hopeful and optimistic future for all workers, especially those working in sectors that may be affected by decarbonization policies and/or the adoption of new technologies. Unions should actively incorporate green provisions into their collective bargaining processes. This will bring significant

benefits to unions. For example, the UK Trade Union Congress lists a number of benefits of unions integrating green issues into collective bargaining (Teuteberg, 2021):

- Unions will broaden their consultation agenda. In other words, the union will have a seat at the table when discussing green initiatives.

- Unions will generate cost savings that can contribute to staff bonuses. For example, large companies, such as retailers, will realize cost savings from implementing energy efficiency measures, which will in turn contribute to staff bonuses/increases.

- Unions will become modern and relevant organizations addressing major issues.

- Unions will contribute to the creation of new green jobs by encouraging employers to focus on green issues. While green collective bargaining has not yet become widespread, some unions have already undertaken initiatives.

For example, unions representing financial sector workers in the Asia-Pacific region gathered for the 7th UNI-Apro Financial Sector Conference in Manila, Philippines, on October 15-16, 2025. The meeting was held under the theme "Rising Together for Strong Financial Unions 2026-2030". UNI GLOBAL emphasized its goal of increasing the workforce in a sector facing unprecedented technological and environmental challenges. Rajendra Acharya, UNI Regional Secretary for Asia and the Pacific, put it this way: *As a union, our duty is clear.* And the union must ensure that digital transformation works for workers, not against them. The just transition is defined as retraining, skills development, reskilling, and the preservation of decent work and social dialogue. In this context, the UNI-Apro Finans Strategic Action Plan 2026-2030 was adopted as a guide for regional collective action. The plan focused on five key pillars: Expanding union power through organizing in South and Southeast Asia, building capacity through leadership development and skills training, collective bargaining to address digital transformation and climate challenges, providing due diligence on human rights and institutional accountability, sustainable financing for just transitions and equitable economic development (UNI Global Union, 2025). In fact, these topics constitute the fundamental arguments of the global union movement for digitalization and climate changes.

On the other hand, according to ITUC, climate action represents an alternative economic model for unions. This model includes human needs, solidarity, economic democracy, and a fair distribution of wealth, fulfilling human rights for all citizens and protecting the planet for future generations. In this process, unions have undertaken a historic mission to ensure equality in jobs, rights, and social rights. This mission aims to achieve a just transition towards sustainable development. Similarly, according to ITUC, transition must begin now. It operates throughout the world during the transition. Made of diverse nationalities and communities, the ITUC is organizing for climate justice in millions of workplaces. It works with environmental, women's, indigenous, youth, ethnic, and religious communities etc. It demands a radical transformation across all economic sectors and industries. It demands greening of jobs and investments to create millions of new green jobs. These jobs are defined as "dignified jobs". The ITUC also demands adequate funding to address climate change in a humane way. The ITUC prioritizes fossil fuel-based sectors. It also demands investment in clean and renewable energies, development of public and sustainable transport, efficient renewal of building stock, promotion of ecological agriculture, fisheries, and forestry models for waste reuse and recycling, and the expansion of life-cycle approaches in production. It demands a just transition to create a carbon-neutral economy through emission reductions and groundbreaking industrial technologies. It proposes international, regional, national, and local dialogue to achieve just transitions. It demands sustainable investment in jobs, along with education and training, re-employment policies, social protection, and economic justice. To this end, it demands an ambitious and legally binding agreement under the United Nations Framework Convention on Climate Change (UNFCCC). Carbon emissions must be stopped, and climate stabilization must be achieved (ITUC CSI IGB, 2015). So, ITUC is a political leader in the global trade union movements and activities in climate change policies and recommends three-pronged transition policies for all unions: Act, Participate, and Organize (Figure 2).

These strategies are adopted by unions in many different ways, ranging from dialogue and negotiation to the use of force. The take action strategy refers to the process of raising awareness and establishing contact with governments, which are the primary determinants of climate policies. The fact that climate change policies are primarily determined by carbon

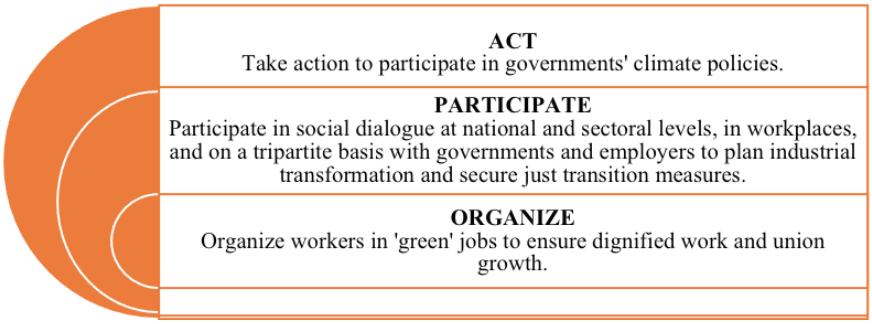


Figure 2: *ITUC's Trade Unions' Strategy*
Source: Adapted from (ITUC CSI IGB, 2015)

neutrality targets demonstrates the importance of the take acting strategy. This strategy should be considered within the framework of a preventative approach. It refers to the action of taking immediate activity rather than remaining completely outside the process. In the participation strategy, unions should strengthen their position within the framework of the just transition and, when necessary, directly participate in social dialogue and/or participation in governance. The take action and participation processes often support the dialogue strategy. Finally, the organizing strategy should be seen as a reflection of the inherent power of unions. The organizing strategy, which utilizes the strike function, when necessary, extends from expanding the membership base to leveraging social movements (for example climate activists).

3. THE CONDITIONS AND BASIC DYNAMICS OF MOVEMENTS

Unions' climate policies are shaped by their characteristics, historical experiences, ideological approaches and conditions. The sectors they operate in are different. Similarly, the membership they represent, their perceptions of internal union democracy, and their leadership qualities differ. But they all have to operate in the same global conditions. For example, union density is declining across the OECD. Traditional roles are being questioned. Employment protection is still a popular topic. However, in a different economic structure, the suitability of new models is being debated. The discourse of a just transition is on the rise. However, its full extent is unknown. New technological developments are influential in the transformation and transition process. Climate change policies are not separated

from technological developments. This process is referred to as the twin transformation. Global human rights violations are increasing. The impacts of climate change will not be uniform across both regional and sectoral levels. This situation requires differentiated and flexible strategies. Global climate policies are again being shaped under the shadow of global economic competition. Governments' carbon neutrality targets are the most fundamental argument. Fossil fuel-based sectors play a decisive role in transformation and transition policies. On the other hand, climate-related social movements hold significant power potential. For these reasons, the roles of unions will vary from ignoring strategy to strongly oppose.

Moreover, the roles of the union movement in climate change can be considered in three dimensions: economic, eco-social, and political. The economic dimension includes job security, wages, and the risk of livelihood loss, while the eco-social justice dimension includes justice, equality, and participation. The political representation dimension consists of the role of unions in climate policies. Accordingly, the basic dynamics of unionism in global climate change can be summarized as follows: just transition, climate justice–social justice integrity, green jobs strategy, sectoral transformation and job security, social dialogue and participation, investment and finance dynamics, alliances with environmental movements, justice demands of the global south, corporate responsibility and supply chains, transformation of union identity and vision (Figure 4). In fact, these titles are shaped around the focus of just transition.

Just transition: Just transition advocates for decarbonization, energy-related transitions, protection, reclassification, and regional development support. For example in 2018, the Spanish government, through an agreement with the CCOO (The Workers' Commissions) and UGT unions (General Union of Workers), provided early retirement, retraining, and national investment support to workers as a result of decarbonization (ETUC, 2020). In South Africa, COSATU (The Congress of South African Trade Unions) ensured that just transition policies were included in the national energy strategy and advocated for energy democracy in the energy sector (COSATU, 2022). *Climate justice – social justice integrity*: According to this principle, climate change most severely impacts on low-income, precarious, and unemployment people in the global south. Therefore, the climate struggle should not only be about the environment, but also about equality and justice for society classes. For example, in Brazil, CUT (Unified Workers' Central)

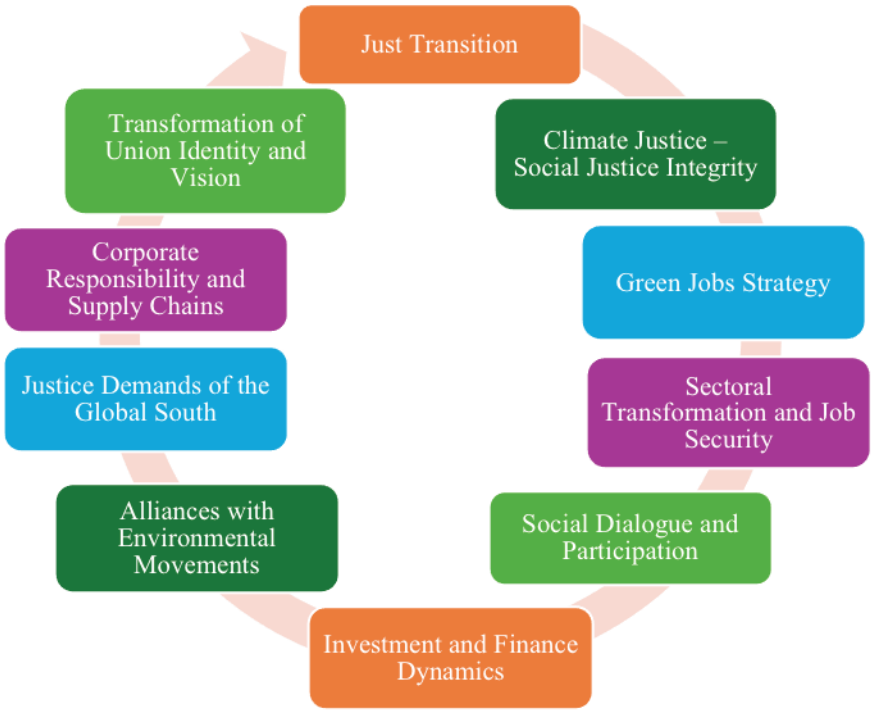


Figure 4: *The Dynamics of Trade Unions in Global Climate Change Policies*
Source: Adapted from (ETUC, 2018)

is jointly campaigning with public against deforestation in the Amazon (ITUC, 2024; GAIA [Global Alliance for Incinerator Alternatives], 2025). In the Philippines, KMU (May First Movement) which is an independent labor center in the Philippines pressures the government to ensure "green and safe jobs" during the post-tropical storm reconstruction process (PMCJ [Philippine Movement for Climate Justice], 2025). *Green jobs strategy:* According to this principle, unions view climate action as an opportunity to create jobs. Similarly, "green jobs" should not only be environmentally friendly but also "decent work" (ILO, 2025).For example, in Germany, the DGB (German Trade Union Confederation) supports vocational training programs in the renewable energy sector during the energy transition process (DGB , 2025). In Bangladesh, textile unions are strengthening both environmental and labor standards by combining energy efficiency certifications with union oversight (ILO, 2018).

Sectoral transformation and job security: The risk of job loss in high-carbon sectors such as coal, steel, and oil constitutes one of the most important areas of debate in the union movement. Therefore, fossil fuel-based sectoral transformations constitute the core argument of union movements. For example, in the US, the AFL-CIO (The American Federation of Labor and Congress of Industrial Organizations), unions representing fossil fuel sectors, approach transformation cautiously. However, networks such as the Labor Network for Sustainability, advocate for labor-based climate action (AFL-CIO, 2022). In Türkiye, Maden-İş and Enerji-Sen demand the establishment of job guarantees and reemployment policies during the coal phase-out process (TÜRK-İŞ [Turkish Confederation of Labour Unions], 2019). *Social dialogue and participation*: This principle argues that climate policies should be shaped not only by governments and corporations, but also by workers. Social dialogue is a key tool for democratic legitimacy and social consensus. Therefore, unions are key actors in climate policies. For example, the ETUC was included in decision-making mechanisms through the European Green Deal (ETUC [European Trade Union Confederation], 2019). In Chile, the CUT (Unified Workers' Central) succeeded in being included in the national climate plan during the preparations for COP25 (Mathiesen and Farand, 2019). *Investment and finance dynamics*: Directing labor funds and public investments toward green transformation is a new area of union policy. This trend demonstrates the potential for financial capital to exert a worker-based influence on "climate governance". For example, in the US, SEIU (Service Employees International Union) and AFL-CIO are lobbying to direct public funds to green infrastructure projects (SEIU, 2025). In Norway and Sweden, union-controlled pension funds are implementing policies of divestment and fossil fuel investment (Torvanger, Maltais and Marginean, 2021). *Alliances with environmental movements:* On climate policies, unions are increasing their social leverage by forming alliances with environmental movements. These collaborations create a solidarity base that strengthens the social legitimacy of the labor movement. For example, in the United Kingdom, the TUC (Trade Union Congress) runs joint campaigns with the Extinction Rebellion and Fridays for Future movements (Wooley, 2025). In France, the CGT (General Confederation of Labour) and CFDT (French Democratic Confederation of Labour) have prepared an "Ecosocial Transformation Plan" with environmental

NGOs (Non-Governmental Organizations) (FIDH [International Federation for Human Rights], 2025).

Justice demands of the global south: Global South countries demand environmental justice against the North regarding historical responsibility, climate debt, and technology transfer. They are developing environmental justice demands. These demands create new geopolitical aspects of global union solidarity. For example, in India, INTUC (The Indian National Trade Union Congress) demands *the right to energy* and *fair financin*g (ITUC CSI IGB, 2023; Sirur, 2025). According to TUCA (The Trade Union Confederation of the Americas) in Latin America, climate policies should not be implemented in a neo-colonialist manner (CSA TUCA, 2021). *Corporate responsibility and supply chains:* With this principle, unions demand that multinational corporations be held accountable for both carbon emissions and labor exploitation in their supply chains. This trend brings climate policies into the accountability perspective. For example, IndustriALL Global Union signs "global framework agreements on climate responsibility" with companies (IndustriALL, 2025). In the US, the UAW (The United Auto Workers) campaigs to secure union organizing in electric vehicle production (TUC, 2024). *Transformation of Union Identity and Vision*: In climate change, unions transform into actors concerned not only with wages and working conditions but also with the future of the planet. This transformation redefines the legitimacy of unions. It makes them part of an ecosocial movement. For example, the ITUC, with its "A New Social Contract" campaign, has a vision that integrates labor, climate, and equality (ITUC CSI IGB , 2025). In Türkiye, the DİSK (Confederation of Revolutionary Trade Unions of Turkey) adopted the slogan "There is no climate justice without labor" at the 2023 Climate Forum (DİSK, 2024).

CONCLUSION

The green economy represents a new model for addressing climate change. It focuses on how resources are used to add value to society. It takes a long-term perspective. It is not just about low-carbon fuel sources. Resource efficiency and sufficiency encompass wealth, resilience, and well-being for citizens today and tomorrow. It encompasses everything from welfare investments to sustainable practices. The characteristics of the green economy are inclusive and non-discriminatory. It is a model that

increases prosperity while also ensuring a significant reduction in environmental risks and resource scarcity. The union movement's response to climate change is primarily seen in the economic, ecosocial, and political spheres. The economic security dimension refers to job security, wages, and the risk of livelihood loss. The ecosocial justice dimension refers to justice, equality, and participation. The political representation dimension defines the role of unions in climate policies.

A green economic structure is based on five principles: The wellbeing principle, the justice principle, the planetary boundaries principle, the efficiency and sufficiency principle, the good governance principle. And the fundamental dynamics of the global trade union movement in green economy are as follows: just transition, climate justice – social justice integrity, green jobs strategy, sectoral transformation and job security, social dialogue and participation, investment and finance dynamics, alliances with environmental movements, justice demands of the global south, corporate responsibility and supply chains, transformation of union identity and vision

The global union movement has shifted from a defensive strategy to a transformational strategy on climate change. The fundamental questions for the global union movement are: What is the green transition? Who is it for? Who is it led by? Will labor have a voice in the new economy? Or how? Is the just transition truly just, or is it merely rhetoric?

Climate change is not merely an ecological crisis. It is at the center of global economic, social, and class transformation. This transformation directly impacts modes of production, energy policies, and employment models. The union movement's response to climate change is viewed from economic, ecosocial, and political perspectives. The economic dimension encompasses issues such as job security, wages, and the risk of livelihood loss. The ecosocial justice dimension encompasses the dimensions of justice, equality, and participation. The political dimension encompasses the role of unions in climate policies. The fear of job loss, especially in regions dependent on fossil fuels, has a decisive influence. The success of the union movement depends on its ability to integrate climate action into the social dimension of economic transformation. The concepts of "just transition," "green jobs," and "climate justice" have become central to labor struggles. The global union movement is playing an increasingly central role in climate change policies. The success of unions depends on developing a

more inclusive vision of global inequalities and strengthening democratic oversight of the energy transition.

Just transition constitutes the core of global unionism in the climate change crisis. Other dynamics are shaped by just transition approaches. The ITUC has a decisive influence on union activities. It sets important standards at both the global and regional levels. According to the ITUC, now is the time to take action. In other words, regardless of the sector or region in which they operate, unions must immediately become involved in government climate policies. Both social movements and dialogue mechanisms should be actively used in this process. If unions ignore the transition and adaptation processes, they will face significant problems that could lead to their eventual collapse. Internal and external conditions play a significant role in this situation. For example, historical experiences, sectors of activity, membership patterns represented, and approaches to internal union democracy etc. are internal conditions. Governments' climate policies and approaches to democracy, economic and political competition, technological developments etc. external conditions. The fundamental dynamics of the union movement can be listed as follows: Declining union density, the questioning of traditional roles, the just transition discourse, twin transition debates, fundamental human rights violations, the prioritization of employment, and diverse sectoral implications creates differentiated and flexible strategies. Furthermore, global climate policies are shaped under the shadow of global economic competition. Governments' carbon neutrality targets are the main argument.

REFERENCES

AFL-CIO. (2022). Resolution 5: Climate Change, Energy and Union Jobs. 5 November 2025 Retrieved from https://aflcio.org/resolutions/resolution5.

Azazi, H., & Uzma, O. (2022). Türkiye'de Yeşil Ekonomi, Yeşil İşler ve Yeşil İstihdam. *Biga İktisadi ve İdari Bilimler Fakültesi Dergisi, 3*(2), s. 93-100. 10 November 2025 Retrieved from https://dergipark.org.tr/tr/download/article-file/2606419.

Babahanoğlu, V. (2023). Uluslararası İlişkilerde Yeşil Yolculuk: Bir Güvenlik Sorunu Olarak Küresel İklim Değişikliği ve İklim Mülteciliği. *Dumlupınar Üniversitesi Sosyal Bilimler Dergisi, 77*, s. 184-200. 3 November 2025 Retrieved from https://dergipark.org.tr/tr/pub/dpusbe/issue/79156/1290496.

Can, F. (2018). İklim Politikasının Bir Aracı Olan Temiz Kalkınma Mekanizması Açısından İnsan Hakları, Adalet ve Hakçalık. *Kent Akademisi, 11*(2), s. 295-304. 5 November 2025 Retrieved from https://dergipark.org.tr/tr/pub/kent/issue/38213/427001

Charvon, G. (2023). Dignified Work in the Green Economy. 7 November 2025 Retrieved from https://www.atd-fourthworld.org/

COSATU. (2022). Just Transition. 12 November 2025 Retrieved from https://mediadon.co.za/wp-content/uploads/2022/04/COSATU-Just-Transition-Blueprint-Full-version.pdf.

CSA TUCA (The Trade Union Confederation of the Americas). (2021). Statement of the Trade Union Confederation of the Americas (TUCA) towards climate change negotiations at COP 26. 12 November 2025 Retrieved from https://csa-csi.org/wp-content/uploads/2021/10/Statement-TUCA_COP26_Eng.pdf.

DGB . (2025). A Strong Workers' Voice. 5 November 2025 Retrieved from https://www.dgb.de/en/

DİSK. (2024). Trade Unions and Just Transition. 8 November 2025 Retrieved from https://disk.org.tr/2024/02/trade-unions-and-just-transition/.

ETUC. (2018). A guide for trade unions: Involving trade unions in climate action to build a just transition. 5 November 2025 Retrieved from https://www.etuc.org/.

ETUC. (2019). ETUC position for an inclusive European Green Deal. 10 November 2025 Retrieved from https://www.etuc.org/en/document/etuc-position-inclusive-european-green-deal.

ETUC. (2020). Just Transition. 5 November 2025 Retrieved from https://www.etuc.org/en/issue/just-transition.

European Comission. (2025). The European Green Deal: Striving to be first climate neutral contiinent . 10 November 2025 Retrieved from https://commission.europa.eu/strategy-and-policy/priorities-2019-2024/european-green-deal_en.

FIDH (International Federation for Human Rights) . (2025). France : Associations and trade unions protest against the wave of deregulation of environmental and social protections. 10 November 2025 Retrieved from https://www.fidh.org/en/issues/business-human-rights-environment/france-associations-and-trade-unions-protest-against-the-wave-of.

GAIA (Global Alliance for Incinerator Alternatives). (2025). Climate Justice. 5 November 2025 Retrieved from https://www.no-burn.org/climate/.

ILO. (2018). Skills for Green Jobs in Bangladesh. 5 November 2025 Retrieved from https://www.ilo.org.

ILO. (2024). Trade unions actions towards climate change and a just transition: A trade union guide. 8 November 2025 Retrieved from https://www.ilo.org/sites/default/files/2024-09/254_481_worker-guide_02.pdf.

ILO. (2025). What is a green job? 8 November 2025 Retrieved from https://www.ilo.org/topics-and-sectors/just-transition-towards-environmentally-sustainable-economies-and-societies/what-green-job.

IndustriALL. (2025). Global Framework Agreements. 4 November 2025 Retrieved from https://admin.industriall-union.org/issues/confronting-global-capital/global-framework-agreements.

ITUC. (2024). CUT Brazil: International cooperation, sustainable development, and just transition. 5 November 2025 Retrieved from https://www.ituc-csi.org/CUT-Brazil-International-cooperation-sustainable-development-and-just-transition.

ITUC. (2025). Climate. 10 November 2025 Retrieved from https://www.ituc-csi.org/climate.

ITUC CSI IGB . (2025). New Social Contract - ITUC Newsletter November 2025: A critical month for climate and social justice. 4 November 2025 Retrieved from https://www.ituc-csi.org/new-social-contract-november-2025.

ITUC CSI IGB. (2015). Three quarters of world's people want governments to act on climate change. 3 November 2025 Retrieved from https://www.ituc-csi.org/three-quarters-of-world-s-people.

ITUC CSI IGB. (2023). INTUC's continues to incorporate the SDGs in its work for all workers in India. 5 November 2025 Retrieved from https://www.ituc-csi.org/intuc-s-continues-to-incorporate-the-sdgs-in-its-work-for-all-workers-in-india.

Mathiesen, K., & Farand, C. (2019). Chile pulls out of hosting Cop25 climate talks amid civil unrest. 11 November 2025 Retrieved from https://www.climatechangenews.com/2019/10/30/chile-pulls-hosting-cop25-climate-talks/.

Nalinci, S. (2023). Yeşil Ekonomi ve Yeşil İşler. *Ulakbilge Sosyal Bilimler Dergisi, 87*(2023 Ağustos), s. 729-737. 11 November 2025 Retrieved from https://www.ulakbilge.com/makale/pdf/1689682523.pdf.

Özel, M., & Kılıç, S. (2006). Küresel Bir Sorun Olarak İklim Değişikliği ve İklim Politikaları. *İstanbul Üniversitesi Siyasal Bilgiler Fakültesi Dergisi, 34*, s. 137-169. 8 November 2025 Retrieved from https://dergipark.org.tr/tr/pub/iusiyasal/issue/602/6068.

PMCJ (Philippine Movement for Climate Justice). (2025). Join the widest grassroot climate movement. 10 November 2025 Retrieved from https://www.climatejustice.ph/.

Räthzel, N., & Uzzel, D. (2011). Trade unions and climate change: The jobs versus environment dilemma. *Global Environmental Change, 21*(4), s. 1215-1223. doi:https://doi.org/10.1016/j.gloenvcha.2011.07.010.

SEFIA (Sürdürülebilir Ekonomi ve Finans Araştırmaları Derneği). (2023). Yeşil Ekonomi ve Yeşil Karmaşıklık Analizi. 5 November 2025 Retrieved from https://sefia.org/wp-content/uploads/2024/06/sefia-yesil-ekonomi-ve-yesil-karmasiklik-analizi-web.pdf.

SEIU. (2025). Climate, Jobs and Justice. 3 November 2025 Retrieved from https://www.seiu.org/climatejobsjustice.

Sirur, S. (2025). India's major coal unions weigh in on the path to a just transition. 12 November 2025 Retrieved from https://india.mongabay.com/2024/11/indias-major-coal-unions-weigh-in-on-the-path-to-a-just-transition/.

Teuteberg, S. (2021). *Trade Unions Going Green: Environmental Issues in the World of Work.* Johannesburg, South Africa: Friedrich Ebert Stiftung.

The Green Economy Coalition. (2020). Principles, priorities and pathways for inclusive green economies: economic transformation to deliver the SDGs. 10 November 2025 Retrieved from https://www.greeneconomycoalition.org/assets/reports/GEC-Reports/Principles-priorities-pathways-inclusive-green-economies-web.pdf.

Torvanger, A., Maltais, A., & Marginean, I. (2021). Green bonds in Sweden and Norway: What are the success factors? *Journal of Cleaner Production*(324). doi:https://doi.org/10.1016/j.jclepro.2021.129177

TUC. (2024). Ex-auto workers win job deal at electric vehicle factory in Ohio. 5 November 2025 Retrieved from https://www.tuc.org.uk/workplace-guidance/case-studies/ex-auto-workers-win-job-deal-electric-vehicle-factory-ohio.

TÜRK-İŞ. (2019). İklim Değişikliği için Küresel Eylem Haftası Programı Gerçekleştirildi. 8 November 2025 Retrieved from https://www.turkis.org.tr/iklim-degisikligi-icin-kuresel-eylem-haftasi-programi-gerceklestirildi/.

UN PAGE (Partnership for Action on Green Economy). (2025). Reframing economic policies and practices around sustainability. 8 November 2025 Retrieved from https://www.un-page.org/.

UNEP (UN Environment Programme). (2018). Green Economy. 11 November 2025 Retrieved from https://www.unep.org/regions/asia-and-pacific/regional-initiatives/restoring-clean-air.

UNI Global Union. (2025). UNI Apro Finance Conference Charts Path for Strong Unions and Sustainable Finance Across Asia-Pasific.11 November 2025 Retrieved from https://uniglobalunion.org/news/uni-apro-finance-conference-2025/.

Usta, G. (2023). Bibliometric analysis of climate crisis and climate change research. *Biological Diversity and Conservation, 16*(2), s. 158-171. https://doi.org/10.46309/biodicon.2023.1299667.

Wooley, S. (2025). The year of trade union climate action: our time to lead change. 5 November 2025 Retrieved from https://www.tuc.org.uk/blogs/year-trade-union-climate-action-our-time-lead-change.

Sustainable Development in Practice: Realizing Global Goals in "Baku"

Ali Mammadzada*

Abstract

This paper discusses the application of sustainable development in the capital of Azerbaijan, Baku, as it relates to local efforts and the global Sustainable Development Goals (SDGs). The paper explores the local manifestations that global crises like climate change, pandemics, migration, and educational inequality have on the local level by focusing on the three main pillars of sustainability, which include economic growth, social inclusion, and environmental protection. By using a mixed-method, the research gathers and evaluates information of various stakeholders such as citizens, government representatives, business executives, and environmental professionals. According to the findings, Baku shows a great potential in some areas of renewable energy, intelligent technological aspects in urban life, and sustainability in the city design. Nevertheless, such obstacles as infrastructural constraints, lack of awareness among the population, and institutional inefficiencies hamper the developments. The role of local actors and cultural processes in research is also mentioned and gender inequality, the lack of civic participation, and the unwillingness to change is regarded as essential social obstacles. The study will add to the scholarly discussion of the topic of urban sustainability, especially in post-Soviet transitional economies by connecting

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theory with practice. Finally, it offers evidence-based information on how cities such as Baku can turn challenges into opportunities to have inclusive and resilient cities according to the global objectives of sustainability.

Keywords: SDGs, environmental policy, social inequality, energy transition, participatory sustainability

1. INTRODUCTION

The concept of sustainable development is systemic and points to the way needs in a current generation can be fulfilled without infringing the capability of future generations to fulfill their needs. Therefore, sustainable development has three significant strands or elements, which are economic growth, social inclusion, and protection of the environment. These are the strands or components that are interrelated and significant to the human beings and societies. It entails generation of wealth in an equitable and effective fashion. This includes the generation of economic value without the resources on earth being depleted or damaging the environment. Sustainable economic development would be achieved when the business and individuals embrace practices that would make them have prosperity in the long run.

Sustainable development is not only about the issues of the environment but also portends to indicate a vigorous, robust, and fair society. It implies the middle way to development: to generate money, to fulfill human needs and to preserve the environment in which the future generations will have to live. Sustainable development is a living process which should be pursued through constant obligation and creativity.

1.1. Literature review

The literature on crises and world issues presents a web of problems that are very interconnected especially when the crisis overlaps. According to Homer-Dixon and Rockstrom (2022), the authors focus on how crises are cascading, as environmental, social, and economic shocks tend to interact, increasing the severity of each.

The report published in 2022 by the Intergovernmental Panel on Climate Change (IPCC) also adds a sense of urgency to global actions regarding climate change. The summary of the report to the policymakers points to the extreme dangers of further global warming and the growing number

of extreme weather events. This is consistent with the conclusions made by Palacios- Abrantes et al. (2021) on the implications of climate-driven ranges in marine species. With these changes, international fish stocks, which are essential in food security worldwide, are challenging to manage.

1.1.2 Hypothesis

• Innovative Technologies: Baku is a rather large city that can be transformed by the implementation of technologies, such as IoT, AI, and data analytics to enhance the management of the town.

• Renewable Energy Solutions: Baku is situated where solar and wind energy has a significant potential. Dependence on fossil fuels can be also lessened by investing in renewable energy infrastructure, such as solar farms or wind turbines, and thus SDG 7 (Affordable and Clean Energy) and SDG 13 (Climate Action) can be achieved.

• Urban Planning: The urbanization process in Baku may respond to the objectives of sustainable development by focusing on the green areas, energy-efficient projects, and environmentally friendly systems of transport.

1.1.3 Research Questions

1. What are the specifications of the deployment of sustainable development in Baku, Azerbaijan, which can be a successful contribution to achieving the objectives of global sustainability in an economic, ecological, and social perspective?

2. How far have practical measures taken on sustainable development programs in Baku helped in achieving some of the globally indicated goals, and what are the degrees of success and stuttering in this process?

3. What are the significant barriers and facilitators to aligning local practices in Baku with global sustainable development goals, and how can these factors be leveraged or mitigated to optimize progress?

4. To what extent are local policy and governance structures in Baku allowing or hindering integration with the principles of sustainable development, and also what policy recommendations might therefore be formulated to support them or make them more effective?

5. In what respects, and how, do the local actors- communities, businesses, and civil society- contribute to and shape the concrete practice

of sustainable development in Baku, and which strategies might be envisaged to join better efforts toward a more meaningful contribution to reaching global goals?

2. Research Method

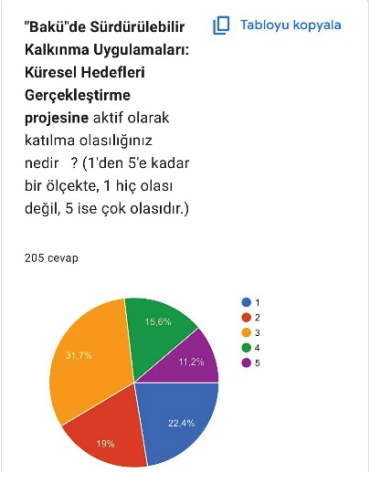
Considering the multifacetedness of the problems that Baku has challenged when it comes to sustainable development, as revealed in the primary research question, the present study would be based on a mixed-method approach, with a strong focus on quantitative data gathering based on a Google form survey.

In the qualitative component, a one-on-one interview was conducted with Prof. Mehemmed Abduyev, a renowned hydrologist and geographer at the Azerbaijan National Academy of Sciences. The interview consisted of approximately 20 questions and provided in-depth insights into sustainable development and environmental practices in Baku.

Additionally, I initiated my own Research Study under the guidance of the Geography Faculty at Baku State University, selecting a supervisor to oversee the process. During the study, I carefully followed the instructions provided by my supervisor (Ilhama Garibova). Qualitative data were collected through interviews and observations, providing contextual depth and expert perspectives to the research.

For the quantitative component, I designed and administered a survey using Google Forms, which was completed by 205 participants. The survey





aimed to measure participants' perceptions and engagement regarding sustainable development practices in Baku. The collected data were analyzed using statistical methods such as frequencies, percentages, and averages.

The research study spanned a total of 209 hours, and the quantitative findings were integrated with the qualitative insights to produce a comprehensive analysis.

2.1 Ethical Considerations

The moral observance is one of the pillars of this study. This study received approval from the Ethics Committee of Baku State University, Faculty of Geography. The ethical approval started on 03/12/2023 and ended on 31/01/2024. During this period, the study supervisor was Ilhama Garibova."

2.2 Implications and Contribution

The research results of this study are likely to inform policymakers, business owners, and other civil society groups who strive to promote sustainable development in Baku.

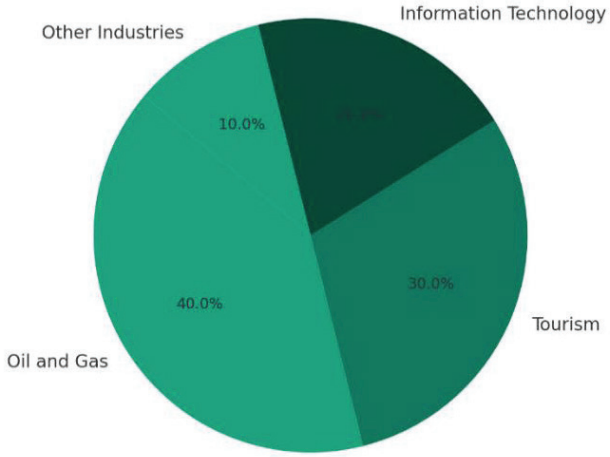
3. ACADEMIC CONTRIBUTION OF THE STUDY

The study on the sustainable development practice in the state of Baku, Azerbaijan, is at the brink of meeting the global sustainability agendas and this serves a significant contribution to the academic lit erature in a number of ways. It does not only enhance the perception of sustainable development in a context of a transitioning economy, but also gives empirical evidence and knowledge that may be used in both theory and practice. The significant scholarly contributions of the study are presented below.

3.1 Importance of Sustainable Development in Urban Areas

In the contemporary world where urbanization occurs at an exceptionally high pace, it is of essence that sustainable development is realized in the urban areas. However, cities are the hubs of life, culture, economy, and social life, and their unusual issues connected with the overcrowding, pollution, and shortage of resources have to be solved. This cannot be otherwise since sustainable development in urban centers forms such habitable, resilient, and prosperous communities to both the present and the future generations.

Sustainable urban development is able to promote economic growth through the formation of new economic activities such as renewable energy, transportation system and green building. Cities that commit more to green infrastructure and technologies will be beautiful to businesses and investors who are environmental conscious and foresight. The capital and the biggest city of Azerbaijan is Baku, which is located on the southern coast of the Abpsheron Peninsula of the Caspian Sea (Palacios-Abrantes, J., Reygondeau, G., Wabnitz, C. C. C., and Cheung, W. W. L., 2020: p.42). Baku's history is very ancient; the first traces of human life date back to the Stone Age. It has been ruled over by various empires and cultures, each leaving its signature on the architecture and culture of this city. Traditionally, Baku was a walled inner city known as Icherisheher, a UNESCO World Heritage Site. The Maiden Tower and the Palace of the Shirvanshahs, located in the old town, stand as testaments to Baku's rich historical heritage.



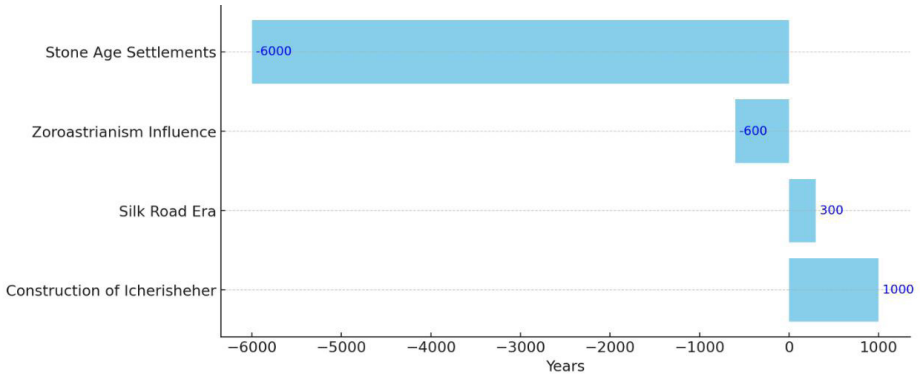
***Graphic 1**. Economic Sector Distribution in Baku, Azerbaijan*
Source: Homer-Dixon, T., & Rockström, J. (2022).
What happens when a cascade of crises collide?

Oil and Gas Sector (40%): This is, historically and up to the moment, a vast sector of the economy in Baku. Let us say this occupies 40% in our pie chart; it has also been the backbone of growth in the city's economy. Since the end of the 19th century and the beginning of the 20th century, Baku has been a great center in the oil industry of that time. Nowadays,

the city continues to be one of the most critical players in the energy market, being one of the most significant contributors to the national GDP and a foreign investment attractor.

Tourism (40%): Tourism is another primary industry, accounting for 30% of the pie chart.

Information Technologies: 20% represent the share of this sector, which corresponds to Baku's role of a regional technological hub. Other Industries: The remaining 10% constitutes other industries that are grouped together since each would account for only a few percentage points individually.Excavations in the areas around Baku revealed cave paintings in Gobustan from the Stone Age. Since the very start, for an extended period, it was merely a minor town with oil and gas coming out into the air or used in trade. As early as the medieval age, during the establishment of trade routes in the Silk Road, Baku gained an advantage. It witnessed the building of Icherisheher, the Old City, featuring a panorama of architectural monuments: the Maiden Tower and the Palace of the Shirvanshahs, permeated with the spirit of Zoroastrian, Islamic, and Persian influences (Palacios-Abrantes, J., Reygondeau, G., Wabnitz, C. C. C., & Cheung, W. W. L. 2020: p.42).



Graphic 2. Historical Context of Development in Baku
Source: Intergovernmental Panel on Climate Change. (2022). Summary for policymakers.

Stone Age Settlements: The furthest-extending bar, dating back around 6000 BC, is symbolic of the Stone Age settlements in Baku. In fact, it stands for the nascent presence of human life in this place, reflecting from ancient paintings at Gobustan.

Influential Factors of Zoroastrianism - 600 BC: The next historical milestone was at around 600 BC and is the influence that could be viewed as coming from Zoroastrianism. Based upon worshiping fire, this most ancient of religions left a broad and profound impact on both cultural and religious aspects among people in Baku. Natural gas and oil seeps in the area made it a sacred site to Zoroastrians, who considered such natural features to be the embodiment of godlike forces.

Silk Route Era (300 AD): Coming forward to approximately 300 AD, the chart shows that during the era of the Silk Route, Baku emerged as a vital trade center. This is the period when Baku's strategic geographical location on the Caspian Sea played an essential role in international trade routes.Construction of Icherisheher (1000 AD): The last bar, up to the year 1000 AD, reflects the construction of Icherisheher or the Old City. This period is marked by significant architectural development, including the building of the iconic Maiden Tower and the Palace of the Shirvanshahs.

Table 1. *Global Averages and Key Economies*

Economic Indicator	Global Average or Total	United States	European Union	China	India
GDP Growth Rate (%)	3.5	2.8	2.5	6.0	7.0
Inflation Rate (%)	4.2	3.1	2.9	2.5	5.0
Unemployment Rate (%)	6.8	4.5	6.5	4.0	7.5
Public Debt (% of GDP)	80.0	107.0	89.0	50.0	70.0
Digital Economy Growth(%)	10.0	12.0	9.0	15.0	13.0
Renewable Energy Investment (USD)	300 Billion	90 Billion	80 Billion	60 Billion	70 Billion

Source: Meinck, S., Fraillon, J., & Strietholt, R. (2022). The impact of COVID-19 pandemic on education: International evidence from the responses to educational disruption survey (REDS). International Association for the Evaluation of Educational Achievement

GDP Growth Rate: The global figure in this table is 3.5, and the statistics of China and India are 6.0 and 7.0, respectively. These increased growth

levels in China and India augur well of a robust economic growth and are typical of an emerging economy with a significant population and industrious growth. The United States speaks of a moderately increasing economy of 2.8 rate indicating an already mature and stable economic unit.

Inflation rate: The inflation rate around the world is standing at 4.2 which represents the moderate rise in prices of goods and services. The United States and the European Union represent the relationship with relatively low inflation rates of 3.1% and 2.9% respectively, as the result of good monetary policies and economy as a whole.

Unemployment Rate: Unemployment rates indicate the way the labor market is doing. The global average stands at 6.8 and America at 4.5 and China at 4.0 which means a healthy job market. European Union rate of 6.5 and 7.5 at India are above the world average, which could be an indication of structural unemployment, labour market rigidity or sluggish job creation.

Public Debt as a percentage of GDP: A high percentage of public debt, as witnessed in the United States (107 percent) that is, a high rate of government borrowing in comparison with the economy, can be observed in relation to the European Union (89 percent) and India (70 percent), meaning that the percentage of government debt is very high and therefore can affect future fiscal policies and economic stability. China thus has a relatively low debt burden at 50 to provide it with greater budgetary flexibility.

Digital Economy Growth: Impressive in all aspects, the growth rate of the digital economy supports that technology is becoming a central issue in modern economies. The world average rates are 10 percent, greater in China and India, 15 percent and 13 percent, respectively, indicating a fast digitalization of the world and a long boom in the technology sector. Furthermore, the United States with 12% and the European Union with 9% record rather impressive growth of the industry as indicative of continuing digitization process in business and society.

3.2 Environmental Challenges

The world is currently ravaged with numerous environmental challenges that are causing massive threats on the ecosystems, biodiversity, and human populations on the earth. These issues are manifold and universal and therefore require combined efforts in case their control and solution are to be successfully achieved. Climate change is probably the most

menacing 21 st century environmental problem, and it is literally being brought about by humans and in particular the burning of fossil fuels, deforestation and industrialization.

Air Pollution (25%): The quarter part of the chart is the air pollution which is regarded to be one of the most crucial environmental issues.

Water Pollution (25%): 25 percent of the pie goes to water pollution and it is just how significant it is. Pollution of water occurs due to the harmful materials released in the water by means of industrial processes, agricultural runoff and sewage.

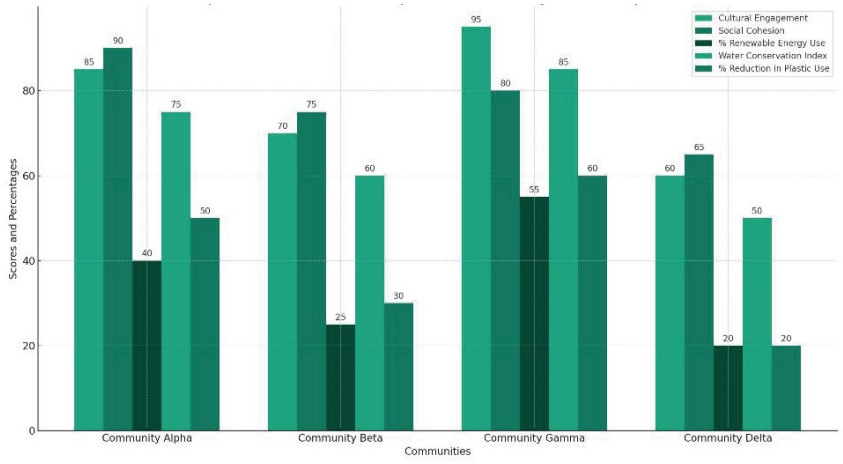
Soil Pollution (25%): It occupies a quarter of the chart because of its importance in the environment. It happens when dangerous chemicals, heavy metals and other pollutants are deposited to the soil.

Noise Pollution (15%): Noise pollution is not an obvious one, yet this has a contribution of immense proportions-15% in this chart. This is produced by the flow of the traffic, industrial activity and development of the city.

Other Kinds of Pollution (10%): This is the different forms of pollution like the light pollution, thermal pollution, and the radioactive pollution.

3.3 Global Sustainability Goals

The perspective of the dynamics of social and cultural interactions in the achievement of global sustainability is significant. Technological development and policy regulations are essential; however, the success of sustainability objectives is dominated by comprehending and incorporating social and cultural aspects.



Graphic 4. *Impact of Social and Cultural Dynamics on Achieving Goals*

Cultural Engagement Score: This score reflects the level of integration of cultural values and practice into the sustainability effort; a higher score denotes a greater level of engagement.

Social Cohesion Index: These bars signify or describe the extent of social connection among people in the specified group and the extent of group cohesion in terms of their well-meaning values of sustaining viable means.

Renewable Energy Use: The third set of bars represents the proportion of the energy consumed by the community as a result of renewable sources.

Water Conservation Effectiveness Index: This is the fourth group of bars and it is the policy, technology and public awareness with regards to the effectiveness in water conservation.

Reduction of the use of single-use plastics: The final group of bars will be the percentage decrease in the use of single-use plastics in every community.

The United Nations SDGs is the call to action that is selected to eliminate poverty, take care of the planet and make everyone prosperous by 2030. It was adopted by the world leaders in 2015, and in SDG 2, there exists a far-reaching mechanism of intertwined global problems and enhances sustainable development by addressing hunger, food security, improving nutrition and sustainable agriculture.

Goal 3 aims to provide good physical and mental health, reduce maternal and child mortality rates, and combat communicable diseases. It requires universal health coverage, the availability of necessary medicines, and attempts to eliminate health inequities. SDG 4 is concerned with inclusive and equitable access to quality education and lifelong learning possibilities for everyone. Goal 5 is to empower women and girls and to allow gender equality. It urges an end to discrimination and violence against gender, equal educational and work opportunities, and total and complete involvement of women in making decisions. SDG 6: Clean Water and Sanitation Provide clean water and sanitation to all people, and optimise sustainable management of water resources and hygiene. SDG 7 aims to provide affordable, reliable, sustainable, and modern energy to all people by promoting investments in renewable energy, energy efficiency, and infrastructure development that will help reduce reliance on fossil fuels and, therefore, mitigate climate change.

Close to the Caspian Sea, where all the biodiversity sustains itself, Baku is a very significant conservation area. The conservation of water resources, climate change control, and marine ecosystem, as well as terrestrial biodiversity conservation, will be guaranteed according to the SDGs 6, 13, 14, and 15.

3.4 Challenges to Sustainable Development in Baku

It has been confronted with a plethora of challenges regarding sustainable development in Baku. Such an enormous threat to nature could include rapid urbanization, economic disparities, and social inequality-all barriers to be changed for long-term prosperity and resiliency in the city.

Some of the essential causes that may potentially undermine the state of sustainability in Baku involve specific cases of pollution, deforestation, and habitat loss. In general, these situations result from industrial processes, urbanization, and bad management of residues.

Being the capital of Azerbaijan, Baku has its set of economic challenges that impede its sustainable development trajectory. Despite being one of the largest financial hubs in the region, Baku faces various obstacles to its economic growth, diversification, and resilience. The first and most important economic challenge which Baku faces is its overdependence on the oil and gas sector.

Table 2. *Overview of Economic Challenges*

Economic Indicator	Value	Year
GDP Growth Rate (%)	-2.0	2023
Inflation Rate (%)	7.5	2023
Unemployment Rate (%)	10.0	2023
Public Debt (% of GDP)	120.0	2023
Poverty Rate (%)	25.0	2023
Income Inequality (Gini Coefficient)	0.45	2023

Source: Palacios-Abrantes, J., Reygondeau, G., Wabnitz, C. C. C., & Cheung, W. W. L. (2020). The transboundary nature of the world's exploited marine species. Scientific Reports, 10(1), 17668.

GDP growth rate is a critical indicator of economic performance, showing the annual rate of expansion or contraction of the economy of a country. A negative growth rate of -2.0% in 2023 means contraction, hence the country experienced a decline in its production, investment, and consumer spending within the year.

Inflation is the rate at which the general level of prices for goods and services is increasing, which erodes the purchasing power of money. An inflation rate of 7.5% is a high level, meaning the cost of living has risen by that amount.Public debt at 120% of GDP means that the country's government owes a sum equivalent to 120% of annual economic output. This acts as a measure of inequality in the distribution of individuals' income. However, as measured, it stands at 0.45; theoretically, the closer it reaches towards 1, the greater the inequality in the distribution is. The city is significantly burdened by particulate matter, sulfur dioxide, nitrogen oxides, and other pollutants, which have many adverse impacts on public health and the environment.

3.5 Social and Cultural Barriers

There are social and cultural barriers that lie on the way of Baku, the Azerbaijan capital, to the sustainable development. The attitudes, behavior and institutions which are strongly influenced by the social norms, traditions and history have an influence on how the city can react to the urgent and environmental, economic and social issues effectively. Cultural values and norms may act as obstacle to change and innovation particularly when it is related to matters of sustainable development.

4. CONCLUSION

The significance and difficulty of attaining sustainable urban development in cities like Baku is critical and not simple. The ecological balance of this environment requires to face such constant issues as air and water pollution, improper waste recycling and an unsuccessful biodiversity drop of the cultural community.

As the steps towards resilient and inclusive development in cities, both social and economic priorities and environmental protection should be combined. The reliance on oil and gas, the lack of communication

infrastructure resources, and existing social inequalities additionally complicate the process of switching to sustainability in the case of Baku. These challenges need new ideas, planning, and the cooperation of various actors. The other barriers to sustainable development in Baku are social and cultural, e.g. gender inequality and change resistance by the administration and the grassroots. An example is that gender equality, cultural acceptance, public awareness creation in the society and social inequity should be actualized in constructing decent inclusive and sustainable urban systems. Indeed, sustainable urban development as could be observed in Baku is a necessity in the entire world, to curb environmental degradation, additional economic growth in the most equitable manner and enhancement of overall quality of life of the citizens. The multidimensional barriers to sustainability cannot be overcome by relying on isolated strategies and ignoring the role of the community as well as neglecting a visionary leadership. Baku will be able to lead a more sustainable, prosperous, and inclusive urban future by adopting the principles of sustainability and collaborating.

5. REFERENCES

Ahouissoussi, Nicolas, James E. Neumann, Cuneyt Okan, Brent Boehlert, and Kennerth Strzepek (2014*). Reducing Vulnerability of Azerbaijan's Agricultural Systems to Climate Change.* World Bank Studies. Washington, DC: World Bank. doi:10.1596/978-1-4648-0184-6. License: Creative Commons Attribution CC BY 3.0 IGO Azerbaijan Nutrition Survey Report (2013). UNICEF, Ministry of Health

Azerbaijan 2020. Look into the Future—concept of Development. Look into the future. http://www.president.az/files/future_en.pdf

Balcilar, Mehmet and Demirer, Riza and Hammoudeh, Shawkat M., Regional and Global Spillovers and Diversification Opportunities in the GCC-Wide Equity Sectors Across Market Regimes (2014). Available at SSRN:

Buchanan, James; Wm. Craig Stubblebine (1962). "Externality". *Economica.* 29 (116): 371–84.

Capello, Roberta. *"Spatial spillovers and regional growth: a cognitive approach."* European

Center for Economic and Social Development (CESD). (2015). *The Economy of Azerbaijan in 2015: Independent View.* CESD Press January 2016, Baku.

Dasandi, N, Hudson, D, and Pegram, T. (2015). Governance and institutions. In: Waage, J and Yap,(eds.), *Inking Beyond Sectors for Sustainable Development.* Pp. 63–76. London: Ubiquity Press. DOI: http://dx.doi.org/10.5334/bao.h

Dudwick, Nora (2015). 'Missing Women' in the South Caucasus: Local Perceptions and Proposed

Galesi, Alessandro and Lombardi, Marco J., External Shocks and International Inflation Linkages:

Global VAR Analysis (2009). ECB Working Paper No. 1062. Available at SSRN: https://ssrn.com/abstract=1414192

Homer-Dixon, T., & Rockström, J. (2022). What happens when a cascade of crises collide?

Intergovernmental Panel on Climate Change. (2022). Summary for policymakers.

Meinck, S., Fraillon, J., & Strietholt, R. (2022). *The impact of the COVID-19 pandemic on education: International evidence from the responses to educational disruption survey (REDS).* International Association for the Evaluation of Educational Achievement.

Palacios-Abrantes, J., Frölicher, T. L., Reygondeau, G., Sumaila, U. R., Tagliabue, A., Wabnitz, C. C., & Cheung, W. W. L. (2021). Timing and magnitude of climate-driven range shifts in transboundary fish stocks challenge their management. *bioRxiv*.

Palacios-Abrantes, J., Reygondeau, G., Wabnitz, C. C. C., & Cheung, W. W. L. (2020). The transboundary nature of the world's exploited marine species. *Scientific Reports*, 10(1), 17668.

Patrinos, H. A., Vegas, E., & Carter-Rau, R. (2022). *An analysis of COVID-19 student learning loss*. Policy Research Working Paper. Washington, DC: World Bank.

Planning Studies 17.5 (2009): 639-658.

Ratha, D., Kim, E. J., Plaza, S., Riordan, E. J., & Chandra, V. (2022). Migration and development brief 36: *A war in a pandemic: Implications of the Russian invasion of Ukraine and the COVID-19 crisis on global governance of migration and remittance flows*. Washington, DC: KNOMAD-World Bank.

Solutions. World Bank, Washington, DC. © World Bank. https://openknowledge.worldbank.org/handle/10986/22506 License: CC BY 3.0 IGO

Titley, M. A., Butchart, S. H. M., Jones, V. R., Whittingham, M. J., & Willis, S. G. (2021). Global inequities and political borders challenge nature conservation under climate change. *Proceedings of the National Academy of Sciences,* 118(7), e2011204118. https://doi.org/10.1073/pnas.2011204118

United Nations Department of Economic and Social Affairs. (2022f). *UN DESA policy brief No. 137: Ensuring SDG progress amid recurrent crises.*

United Nations. (2023b). *Progress towards the sustainable development goals: Towards a rescue plan for people and planet - Report of the Secretary-General (Special Edition).* New York, NY: United Nations.

5.1 (Books)

"*The Sustainable Development Goals Report 2023*": https://unstats.un.org/sdgs/report/2023/The-Sustainable-Development-Goals-Report-2023.pdf

Dahlgaard-Park, S. M. (2017). *Sustainable development and quality management: Managing quality in the age of sustainability. Springer.*

Dentch, M. (2015). *The ISO 9001:2015 implementation handbook: Using the process approach to build a quality management system.* ASQ Quality Press.

Goetsch, D. L., & Davis, S. (2020). *Quality management for organizational excellence: Introduction to total quality*(9th ed.). Pearson Education.

Isaksson, R. (2009). *Total quality management for sustainable development: Focus on processes.* VDM Verlag.

Kumar, U., & Mangla, S. K. (2016*). Sustainable supply chain management: Best practices and emerging trends.*Springer.

Pyzdek, T., & Keller, P. (2018). *Total quality management and operational excellence: Text with cases* (4th ed.). McGraw-Hill Education.

Sarkis, J. (2012). *Greening the supply chain.* Springer Science & Business Media.

Seuring, S., & Müller, M. (2008). *Quality management in sustainable supply chains.* Springer Science & Business Media.

Vinodh, S., & Joy, S. (2021). *Circular economy and sustainability in quality management: Theory and practice.*Springer.

5.2 (Articles/publications)

Jamwal, A., Agrawal, R., Sharma, M., & Giallanza, A. (2021). Industry 4.0 technologies for manufacturing sustainability: A systematic review and future research directions. *Applied Sciences,* 11(12), 5725.

Kamble, S. S., Gunasekaran, A., & Gawankar, S. A. (2018). Sustainable Industry 4.0 framework: A systematic literature review identifying the current trends and future perspectives. *Process safety and environmental protection*, 117, 408-425.

Liu, H. C., Liu, R., Gu, X., & Yang, M. (2023). From total quality management to Quality 4.0: A systematic literature review and future research agenda. *Frontiers of Engineering Management*, 10(2), 191-205.

The Impacts, Mediating and Moderating Roles of Green Organizational Culture: A Literature Review

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Abstract

The purpose of this article is to highlight the impacts of Green Organizational Culture (GOC), including its mediating and moderating roles. GOC denotes the collective organizational mindset and behavioral orientation toward environmental preservation. Within such a culture, the company's mission and vision statements are designed to embed environmental responsibility as a fundamental employee value, thereby fostering a sense of individual and collective accountability for ecological sustainability across all organizational levels. By conducting a literature review, we have researched several articles about impacts, mediating and moderating roles and relationship of GOC with Organizational Commitment (OC), Organizational Sustainability (OS), organizational environmental performance (ENVP), Green Human Resource Management (GHRM) practices, Green Transformational Leadership (GTL), Green Innovation (GI), Sustainable Performance (SP), Work Motivation (WM), Employees' Eco-friendly behavior, Green Innovative Work Behavior, Employee Green Behavior (EGB), Green Servant Leadership

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(GSL), Workplace Pro-Environmental Behavior (WPEB), Green Knowledge Management (GKM), Green Competitive Advantage (GCA), Employees' Environmental Awareness, Organizational Knowledge Disseminative Capacity, Corporate Social Responsibility (CSR) and Employee Happiness (EH) at work. These relationships were examined in this study.

Keywords: Green Organizational Culture (GOC), Sustainability, Green HRM

1. INTRODUCTION

The escalating global climate crisis and intensifying environmental concerns have compelled industries worldwide to embrace green transition strategies. Within this context, the environmental accountability of corporate leaders has become a central element of sustainable business management. Modern organizations increasingly acknowledge that integrating eco-friendly practices into their operations is not merely a moral obligation but a strategic necessity for long-term survival and success. To sustain competitiveness and respond effectively to stakeholder expectations, cultivating a green organizational culture (GOC) has emerged as a critical approach for achieving differentiation and enhancing corporate resilience. Human resource management (HRM) functions play a pivotal role in shaping organizational outcomes by encouraging environmentally responsible behavior among employees, thereby facilitating the formation of a GOC. In contemporary business environments, GOC has become a critical strategic priority, as organizations increasingly seek to embed environmental accountability into all aspects of their operations. Empirical research indicates that cultivating a strong GOC contributes to sustainable competitive advantage, strengthens corporate reputation, stimulates innovation, and supports the long-term development of environmentally sustainable organizations (Hue & Dinh-Hai, 2024).

A workplace environment grounded in shared norms and values that support environmental sustainability significantly enhances employees' commitment and their active involvement in sustainability-related initiatives. Organizations that establish a culture favorable to circular economy practices (CEP) typically exhibit a workforce more inclined to participate in Green Human Resource Management (GHRM) activities aimed at advancing environmental objectives. When organizational culture (OC) aligns with sustainability goals, circular economy principles can be more readily

integrated into HRM processes, thereby improving outcomes related to resource efficiency and the reduction of waste. Furthermore, cultivating an environmentally conscious workplace culture encourages transparent communication and collaborative teamwork among employees - both of which are essential for fostering innovation and ensuring the successful execution of GHRM strategies (Iqbal et al., 2025).

Due to the rapid decline in ecological conditions, modern enterprises are progressively shifting toward sustainability-focused practices. The growing recognition of environmental concerns has motivated organizations to implement green growth strategies to meet their goals while ensuring sustainable development (Tseng et al., 2013). In this context, OC plays a pivotal role in facilitating the effective implementation of green innovation (GI), thereby enhancing a firm's competitiveness and overall performance (Baker et al., 2013).

The purpose of this literature review is finding the impacts, mediating and moderating roles and relationship of GOC with factors like Organizational Commitment, Organizational Sustainability, Organizational Environmental Performance, Green Human Resource Management Practices, Green Transformational Leadership, Green Innovation, Sustainable Performance, Work Motivation, Employees' Eco-friendly behavior, Green Innovative Work Behavior, Employee Green Behavior, Green Servant Leadership, Workplace Pro-Environmental Behavior, Green Knowledge Management, Green Competitive Advantage, Employees' Environmental Awareness, Organizational Knowledge Disseminative Capacity, Corporate Social Responsibility and Employee Happiness at work. These relationships were examined in this study. The aim of this research is to consolidate existing knowledge on GOC into a single article, providing a rapid reference for researchers, public and private organizations, HR managers, and other stakeholders seeking to develop environmentally sustainable organizations.

2. LITERATURE REVIEW

2.1. What Is The Green Organizational Culture?

Alternative terms for Green Organizational Culture (GOC) include environmentally friendly culture, eco-friendly culture, pro-environmental culture, green consciousness, sustainability culture, and, in some contexts, the Triple Bottom Line (TBL). Broadly, corporate social responsibility (CSR)

is also occasionally used to describe similar concepts. Many scholars have adapted traditional definitions of OC to conceptualize and define GOC within the context of environmental sustainability (Gürlek & Tuna, 2018).

Green Organizational Culture (GOC) encompasses the values, symbols, underlying assumptions, and organizational artifacts that reflect an organization's commitment or aspiration to operate in an environmentally responsible manner. OC has been conceptualized as a set of shared cognitive assumptions that guide individuals' actions and interpretations within organizations by delineating appropriate behaviors in various contexts. Specifically, GOC is described as a system of collectively held fundamental assumptions concerning environmental issues and the management of environmental resources. It encompasses shared values, beliefs, norms, symbols, and social expectations related to environmental management, thereby shaping the standard behaviors anticipated from organizational members. Within such a green-oriented culture, symbolic representations of environmental protection and sustainability influence both the perceptions and behaviors of employees, reinforcing pro-environmental practices throughout the organization (Rubab et al., 2019). Moreover, external influences, including stakeholder pressure and government regulations, are crucial in encouraging businesses to establish and sustain a GOC by ensuring adherence to environmental laws and fulfilling community expectations (Siebenhüner & Arnold, 2007).

GOC also encourages employees to assume responsibility for the environmental consequences of their actions within the organization (Widjanarko et al., 2025). GOC significantly impacts employees' work motivation. Organizations that adopt a green culture tend to foster stronger employee alignment with organizational objectives, providing employees with a heightened sense of purpose in their work. This alignment can improve job satisfaction and motivate employees to contribute more effectively to organizational success (Safar et al., 2025).

3. METHODOLOGY

All information and data and second data analyses have been done by researching Green Organizational Culture, Organizational Green Culture, Green Culture terms via VETIS Database Access and Statistics System of Istanbul University https://vetis.istanbul.edu.tr/.

4. IMPACT OF GOC

In recent years, GOC has emerged as a topic of substantial scholarly interest, resulting in a broadening of the research landscape and creating an urgent need to systematize and integrate existing knowledge. Much of the prior literature has focused on identifying the antecedents of GOC (Hue & Dinh-Hai, 2024). For example, Roscoe et al., (2019) contend that green HRMP - such as environmentally oriented recruitment, training, evaluation, and employee motivation - serve as critical mechanisms for shaping key dimensions of GOC. Similarly, Al-Swidi et al. (Al-Swidi et al., 2021) emphasize that teamwork and leadership support play an essential role in linking environmental training initiatives to proactive green management activities. Another stream of research examines the connection between GOC and competitive advantage. Wang, (2019) reports that organizational culture, environmental conditions, and leadership behaviors significantly enhance green organizational identity and contribute to competitive differentiation. Along the same lines, Gürlek & Tuna, (2018) argue that GOC supports the development of GI and competitive advantage, with GI functioning as a mediating variable in these relationships. More recent studies have expanded this discussion by investigating the role of GOC in promoting GI. Vargas-Hernández et al., (2023) explore the ways in which GOC, GI, and green performance (GP) collectively advance environmental sustainability. In their subsequent work, Vargas-Hernández et al., (2024) demonstrate that concurrently strengthening GOC, GI, and technology adoption encourages the implementation of environmental practices and enhances overall organizational performance. Al-Swidi et al., (2021) research validated the positive influence of GOC on employees' green behavior (EGB), corroborating earlier studies, which suggested that organizational culture impacts employees' performance, innovative behaviors, and other attitudinal outcomes. A positive and statistically significant relationship was observed between GOC and Employee Green Values (EGV). Their findings indicated that there was no significant direct relationship between GOC and GIWB. However, employee green values and green ambidexterity demonstrated significant mediating effects on the relationship between GOC and GIWB (Madan et al., 2025). GOC has a significant impact on GI and sustainable performance (SP) in Vietnam (Ngoc Huynh et al., 2024). Kurnaz found from analysis that GOC exerts a significant positive influence on OC, GOC significantly shapes green

transformational leadership (GTL) and GTL contributes positively to organizational commitment (OC). From literature research, he found that employees in organizations with a GOC demonstrate elevated levels of OC due to the positive influence of GOC on OC (Kurnaz, 2025). Researchers, found in their study that GOC positively impacts ENVP (Ak et al., 2025; Hasanein & Metwally, 2025). Hikam et al., (2025) have found in their study that GOC has a positive and significant effect on GHRM and Green Competitive Advantage (GCA). Kaplan's study indicates that GOC has a statistically significant and positive effect on employees' job satisfaction. The study further demonstrates that GOC has a statistically significant and positive effect on employees' organizational commitment (Kaplan, 2023). Shahriari et al., (2023) found that GOC has a statistically significant effect on OC. Asmui et al., (2016) examined the relationship between GOC and OC using data collected from both academic and non-academic staff at higher education institutions. The findings revealed that a majority of non-academic male participants and those with less than ten years of service perceived a strong and significant relationship between GOC and OC. The findings suggest that GOC has a significant impact on both ENVP and WPEB among Batik MSMEs in Semarang City (Nugraha & Sumiati, 2025). The impact of GOC on EGB is reflected in two primary ways: first, the internalization of environmental values shapes EGB; second, organizational green culture functions as a collective behavioral norm shared among employees, with individuals' perceptions of these norms guiding their green behavior. Yu and Li in their study yielded several key conclusions. First, GOC exerts a positive influence on EGB. Second, the organizational capacity for knowledge dissemination (OKDC) positively moderates the effect of green culture on EGB by enhancing their environmental awareness. Finally, employees' environmental awareness (EEA) serves as a mediating mechanism through which GOC shapes their green behavioral outcomes (Yu & Li, 2025). Wang's research demonstrates that GI strategy partially mediates the relationship between GOC and GCA. This implies that GOC can enhance CA both directly and indirectly by fostering GI. There is clear evidence that GOC exerts a positive impact on green performance and contributes to enhancing a firm's CA (Wang, 2019). The findings revealed that GOC has a direct and positive impact on EGB. Additionally, GOC influences EGB indirectly through CSR and, separately, through employees' environmental happiness (EH) at work. Moreover,

the indirect effect of GOC on EGB is sequentially mediated by CSR followed by EH at work (Ekmekcioglu et al., 2025). GOC - defined by shared values, beliefs, and practices that prioritize environmental sustainability - has a substantial impact on employees' work motivation (EWM) and exerts a positive and statistically significant influence on employee performance (Safar et al., 2025). According to Widjanarko et al., (2025), GOC positively affects EP and contributes to organizational sustainability (OS), with EP mediating the effect of GOC on sustainability. GOC has a positive and statistically meaningful impact on OS, significantly and positively influences Employee Green Behavior (EGB), EGB partially mediates the relationship between GOC and OS (Ariosa & Nawangsari, 2025). Ak Murat and coworkers found that the magnitude and direction of the mediation effect between ENVP and GOC differ based on the level of EEFB demonstrated by employees. When employees engage in higher levels of EEFB, they are more likely to contribute to the strengthening and reinforcement of the organization's green culture (Ak et al., 2025).

5. MEDIATING ROLE OF GOC

Ak et al., (2025) results indicate that responsible leadership has a positive impact on ENVP, and that GOC serves as a mediating factor in the link between responsible leadership and environmental outcomes. This suggests that leadership grounded in responsibility and sustainability enhances an organization's ENVP. Additionally, their findings demonstrate that leaders who emphasize sustainability and environmental stewardship play a key role in shaping and sustaining a green culture within their organizations. Al-Swidi et al., (2021) findings indicate that environmental concern, GHRM, and green leadership behavior play a significant role in shaping the formation of GOC. GHRM practices affect employees' PEB by shaping and fostering the organizational culture. Furthermore, according to their research, this finding aligns with the results of Muisyo and Qin, who highlighted the combined impact of GHRM and a GI culture on organizational ENVP. In addition, this outcome is reinforced by the study conducted by Wang et al., which emphasized the critical role of a green innovative organizational culture in fostering employees' PEB and enhancing organizational ENVP. Finally, a key finding of their study is that GHRM practices and green leadership behaviors cannot achieve the intended improvements

in EGB, which drive enhanced organizational ENVP, unless they are supported by a framework that promotes a sustainable GOC. Hasanein and Metwally in their study found that GOC partially mediates the relationship between GSL and ENVP. These findings emphasize the mutually reinforcing roles of leadership and organizational culture in influencing ENVP within Saudi Arabia's hospitality industry. The study further highlights the need to account for contextual conditions, as differences in cultural, regulatory, ethical, political, and behavioral environments across regions can influence the effectiveness of sustainability initiatives. Recognizing these contextual complexities is crucial for developing leadership strategies that successfully improve ENVP (Hasanein & Metwally, 2025). Aggarwal ve Agarwala contributed in their study by investigating the relationship between GHRM and ENVP, considering the three dimensions of GOC (degree, diffusion, and depth) as mediating factors. Their findings revealed that only the degree dimension of GOC served as a significant mediator in the relationship between GHRM and ENVP (Aggarwal & Agarwala, 2022). Kaplan's, (2023) study concludes that job satisfaction plays a partial mediating role in the effect of GOC on organizational commitment. Other study provide evidence that GOC functions as a partial mediator in the relationship between Green Servant Leadership (GSL) and ENVP (Hasanein & Metwally, 2025). The results from the research of Ali et al., (2024) suggest that GOC mediates the effect of GHRM practices on corporate sustainability performance (CSP). GOC and EGB sequentially mediate the relationship between GHRM practices and organizational sustainability performance. Madan et al. findings did not confirm the proposed effect of GOC on GIWB, as the relationship proved statistically insignificant. But Green Ambidexterity (GA) significantly mediates the relationship between GOC and GIWB (Madan et al., 2025).

6. MODERATING ROLE OF GOC

The results demonstrate that GOC exerts a significant moderating influence on the relationship between CEP and organizational sustainable development (OSD). Additionally, the findings show that green organizational culture moderates the indirect effect of GHRMP on sustainable development through circular economy initiatives (Iqbal et al., 2025). The empirical results show that green culture serves as a positive moderating

factor in the relationship between green KM and various dimensions of GI. The findings further show that a green climate functions as a contextual condition that strengthens the effect of green KM on both green product and process innovation (Nhan et al., 2025). Wang et al., (2022) argue that green culture acts as a boundary condition that amplifies the association between green KM and GI. Similarly, Abbas & Khan, (2022) contend that the presence of a strong green culture enhances both the effectiveness and adoption of GI when green KM practices are implemented, as it heightens employees' awareness and concern for sustainability. When environmental knowledge is integrated within organizations, a supportive green culture motivates employees to actively engage in achieving GI outcomes. Collectively, these perspectives reinforce the moderating role of green culture in the relationship between green KM and GI. In the study by Wang et al., the results indicate that GOC strengthens the relationship between green KM and green organizational innovation (green GI), as well as between green KM and sustainable corporate development (SCD). They also examined the impact of green human resource practices on green organizational performance with green culture as a moderating factor and demonstrated that green culture reinforces the association between these variables (Wang et al., 2022). The moderating effect of GOC was found to be insignificant in the relationship between participative decision-making and EFB (Qalati et al., 2025).

7. CONCLUSIONS

The extensive body of research reviewed highlights the pivotal role of GOC in shaping organizational and employee outcomes related to environmental sustainability. Evidence consistently indicates that GOC positively influences employees' green behaviors, including eco-friendly actions, work motivation, and job performance, while also enhancing organizational commitment and organizational sustainability. GOC acts both directly and indirectly through mechanisms such as GHRMP, GI, CSR, employee environmental awareness, and knowledge dissemination capacity to improve ENVP and competitive advantage. Furthermore, research demonstrates that the effectiveness of GOC in promoting positive outcomes is contingent upon contextual and behavioral factors, such as the level of employees' EFB, leadership support, and the adoption of GI strategies. These

findings underscore the importance of integrating sustainability into organizational values, norms, and practices, not only to foster employee engagement and motivation but also to enhance overall organizational performance and competitiveness.

GOC serves as a critical driver for both individual and organizational sustainability outcomes, acting as a foundation for implementing green practices, cultivating a proactive environmental mindset among employees, and achieving long-term competitive and ecological objectives. These insights provide a valuable framework for researchers, HR managers, and organizations seeking to advance environmentally sustainable practices in both public and private sector contexts. Companies that possess a well-established environmental ethos tend to integrate sustainable business practices more effectively into their routine operations and human resource management processes. This, in turn, promotes stronger environmental stewardship and contributes to a reduction in unnecessary resource consumption. Specifically, a GOC creates a supportive context in which circular economy initiatives can thrive, thereby strengthening the effectiveness of GHRMP and fostering a competitive advantage through sustainable strategic practices. The reviewed literature underscores the pivotal role of GOC in enhancing organizational ENVP and sustainability outcomes. Evidence from multiple studies indicates that responsible and green-oriented leadership significantly improves ENVP, with GOC acting as a critical mediating mechanism between leadership behaviors and environmental outcomes. Similarly, GHRMP, when embedded within a sustainable GOC framework, foster employees' PEB and enhance organizational ENVP.

Several studies highlight the mediating role of GOC in the relationships between GHRM, GSL and CSP. For example, GOC partially mediates the effects of GSL and GHRM on ENVP, while sequential mediation through GOC and Employee Green Behavior (EGB) further strengthens organizational sustainability outcomes. Green Ambidexterity was found to play a significant mediating role in the relationship between GOC and GIWB. Collectively, these findings emphasize that leadership, HR practices, and organizational culture are mutually reinforcing mechanisms that drive sustainable behaviors, pro-environmental practices, and GI within organizations. The results also highlight the importance of considering contextual factors - including cultural, regulatory, ethical, political, and behavioral environments - as these conditions influence the effectiveness of

sustainability initiatives. In sum, GOC emerges as a strategic enabler for organizations aiming to integrate environmental sustainability into their operations, serving as a critical link between leadership, HR practices, employee behavior, and overall environmental and organizational performance. These insights provide actionable guidance for researchers, practitioners, and organizational leaders seeking to cultivate environmentally sustainable organizations.

The reviewed studies collectively underscore the moderating role of GOC in enhancing the effectiveness of sustainability-oriented initiatives within organizations. Evidence demonstrates that GOC strengthens the relationship between CEP and OSD, as well as the indirect effect of GHRMP on sustainable outcomes through circular economy initiatives. Similarly, green culture acts as a positive moderator in the link between green KM and various dimensions of GI, while a supportive green climate serves as a contextual factor that amplifies the effect of green KM on both green product and process innovation. These findings suggest that organizations with a strong green culture are more likely to foster employee engagement, increase awareness of sustainability issues, and facilitate the adoption of GI, thereby promoting sustainable corporate development. However, the moderating influence of GOC may not be universal, as evidenced by its insignificant effect in the relationship between participative decision-making and EFB. Overall, these results highlight the critical role of GOC as a strategic enabler that reinforces the impact of green management practices and innovation initiatives on organizational sustainability.

8. REFERENCES

Abbas, J., & Khan, S. M. (2022). Green knowledge management and organizational green culture: an interaction for organizational green innovation and green performance. *Journal of Knowledge Management*, *27*(7), 1852-1870. https://doi.org/10.1108/JKM-03-2022-0156

Aggarwal, P., & Agarwala, T. (2022). Relationship of green human resource management with environmental performance: mediating effect of green organizational culture. *Benchmarking: An International Journal*, *30*(7), 2351-2376. https://doi.org/10.1108/BIJ-08-2021-0474

Ak, M., Turkmenoglu, M. A., Elbardan, H., & Yüce, H. (2025). Eco-friendly behavior as a moderator: How responsible leadership shapes environmental performance through organizational green culture in the hospitality industry? *International*

Journal of Hospitality Management, *131*, 104346. https://doi.org/https://doi.org/10.1016/j.ijhm.2025.104346

Al-Swidi, A. K., Gelaidan, H. M., & Saleh, R. M. (2021). The joint impact of green human resource management, leadership and organizational culture on employees' green behaviour and organisational environmental performance. *Journal of Cleaner Production*, *316*, 128112. https://doi.org/https://doi.org/10.1016/j.jclepro.2021.128112

Ali, M., Shujahat, M., Fatima, N., Lopes de Sousa Jabbour, A. B., Vo-Thanh, T., Salam, M. A., & Latan, H. (2024). Green HRM practices and corporate sustainability performance. *Management Decision*, *62*(11), 3681-3703. https://doi.org/10.1108/MD-05-2023-0787

Ariosa, R., & Nawangsari, L. (2025). THE ROLE OF GREEN LEADERSHIP, GREEN INNOVATION, AND GREEN ORGANIZATIONAL CULTURE ON ORGANIZATIONAL SUSTAINABILITY THROUGH EMPLOYEE GREEN BEHAVIOR: EVIDENCE FROM A MINING COMPANY IN INDONESIA. *The International Conference on Sustainable Economics Management and Accounting Proceeding*, *1*, 4417-4423. https://doi.org/10.32424/icsema.1.1.192

Asmui, M. u., Mokhtar, N. M., Musa, N. D., & Hussin, A. (2016, 2016//). The Implementation of Organizational Green Culture in Higher Educational Institution. Regional Conference on Science, Technology and Social Sciences (RCSTSS 2014), Singapore.

Baker, M. A., Davis, E. A., & Weaver, P. A. (2013). Eco-friendly Attitudes, Barriers to Participation, and Differences in Behavior at Green Hotels. *Cornell Hospitality Quarterly*, *55*(1), 89-99. https://doi.org/10.1177/1938965513504483

Dyck, B., Walker, K., & Caza, A. (2019). Antecedents of sustainable organizing: A look at the relationship between organizational culture and the triple bottom line. *Journal of Cleaner Production*, *231*, 1235-1247. https://doi.org/https://doi.org/10.1016/j.jclepro.2019.05.287

Ekmekcioglu, E. B., Mete, I., & Arslan, S. (2025). The Green Symphony: Harmonizing Organizational Green Culture, Employee Happiness, and Corporate Social Responsibility to Propel Employee Green Behavior. *Psychological Studies*. https://doi.org/10.1007/s12646-025-00861-2

Gürlek, M., & Tuna, M. (2018). Reinforcing competitive advantage through green organizational culture and green innovation. *Service Industries Journal*, *38*(7/8), 461-491. https://doi.org/10.1080/02642069.2017.1402889

Hasanein, A., & Metwally, A. (2025). HOSPITALITY LEADING GREEN FOR A SUSTAINABLE SCENE: THE MEDIATING ROLE OF GREEN ORGANIZATIONAL CULTURE IN THE RELATIONSHIP BETWEEN GREEN SERVANT LEADERSHIP AND ENVIRONMENTAL PERFORMANCE. In *Geojournal of Tourism and Geosites* (Vol. 60, pp. 1243-1253): Asociatia de Geografie, Turism si Sport.

Hikam, A., Mardani, R. M., & Nurhidayah, N. (2025). The effect of green organizational culture and green intellectual capital on green competitive advantage through green human resource management: Residential sector. *International*

Journal of Innovative Research and Scientific Studies, *8*(3), 1008-1018. https://doi.org/10.53894/ijirss.v8i3.6672

Hue, T. T., & Dinh-Hai, L. (2024). Scientific mapping of green organizational culture: Main schools of thought and topical trends. *Business Strategy & Development*, *7*(4), e70031. https://doi.org/https://doi.org/10.1002/bsd2.70031

Iqbal, J., Aukhoon, M. A., Aman-Ullah, A., Jahangir, J., & Parray, Z. A. (2025). Green Human Resource Management Practices and Organizational Sustainable Development: A Moderated Mediation Model of Circular Economy and Green Organizational Culture. *Business Strategy & Development*, *8*(2), e70132. https://doi.org/https://doi.org/10.1002/bsd2.70132

Kaplan, M. (2023). THE EFFECT OF GREEN ORGANIZATIONAL CULTURE ON ORGANIZATIONAL COMMITMENT IN MANUFACTURING ENTERPRISES: THE MEDIATING ROLE OF JOB SATISFACTION. In *Volume: 19, Issue: 4 910-930*: Zonguldak Bülent Ecevit Üniversitesi.

Kurnaz, G. (2025). The Mediating Role of Green Transformational Leadership in the Effect of Green Organizational Culture on Organizational Commitment [Yeşil Örgüt Kültürünün Örgütsel Bağlılık Üzerindeki Etkisinde Yeşil Dönüştürücü Liderliğin Aracılık Rolü]. *Yönetim ve Ekonomi Dergisi*, *32*(1), 51-66. https://doi.org/10.18657/yonveek.1502593

Madan, P., Srivastava, S., Alzeiby, E. A., & Cao, D. (2025). Proliferating green innovative work behavior through green organizational culture: Mediating role of green ambidexterity and values in the hospitality context. *International Journal of Hospitality Management*, *125*, 104006. https://doi.org/https://doi.org/10.1016/j.ijhm.2024.104006

Ngoc Huynh, H. T., Thanh Nguyen, N. T., & Y Vo, N. N. (2024). The influence of knowledge management, green transformational leadership, green organizational culture on green innovation and sustainable performance: The case of Vietnam. *Journal of Open Innovation: Technology, Market, and Complexity*, *10*(4), 100436. https://doi.org/https://doi.org/10.1016/j.joitmc.2024.100436

Nhan, N. T. M., Quyen, N. T. T., & Phong, L. B. (2025). Antecedents to foster green innovation: The role of green HRM, knowledge management and organizational culture. *Edelweiss Applied Science and Technology*, *9*(7), 1578-1592. https://doi.org/10.55214/2576-8484.v9i7.8970

Nugraha, A., & Sumiati, S. (2025). Enhanching Environmental Performance (EP) through Green Organizational Culture (GOC) and Green Transformational Leadership (GTL) with Workplace Pro-Environmental Behaviour (WPEB) as Mediating Variable. *Jurnal Simki Economic*, *8*, 258-267. https://doi.org/10.29407/jse.v8i1.1151

Obeidat, S. M., Abdalla, S., & Al Bakri, A. A. K. (2022). Integrating green human resource management and circular economy to enhance sustainable performance: an empirical study from the Qatari service sector. *Employee Relations*, *45*(2), 535-563. https://doi.org/10.1108/ER-01-2022-0041

Qalati, S. A., Barbosa, B., & Ibrahim, B. (2025). Factors influencing employees' eco-friendly innovation capabilities and behavior: the role of green culture and employees' motivations. *Environment, Development & Sustainability*, *27*(9), 21227-21248. https://doi.org/10.1007/s10668-023-03982-8

Roscoe, S., Subramanian, N., Jabbour, C. J. C., & Chong, T. (2019). Green human resource management and the enablers of green organisational culture: Enhancing a firm's environmental performance for sustainable development. *Business Strategy and the Environment*, *28*(5), 737-749. https://doi.org/https://doi.org/10.1002/bse.2277

Rubab, T., Banazir, S., Farida, F., Noor un Nissa, S., & Muhammad Razzaq, A. (2019). Green Organizational Culture: A Review of Literature and Future Research Agenda. In *Annals of Contemporary Developments in Management & HR* (Vol. 1, pp. 23-38): International Association for Educators and Researchers (IAER).

Safar, F., Matriadi, F., & Faliza, N. (2025). Green Transformational Leadership, Green Organizational Culture, Work Motivation, and Employee Performance at Cut Meutia General Hospital in North Aceh Regency. *International Journal of Research and Review*, *12*, 63-78. https://doi.org/10.52403/ijrr.20250408

Shahriari, M., Tajmir Riahi, M., Azizan, O., & Rasti-Barzoki, M. (2023). The effect of green organizational culture on organizational commitment: The mediating role of job satisfaction. *Journal of Human Behavior in the Social Environment*, *33*(2), 180-197. https://doi.org/10.1080/10911359.2022.2029789

Siebenhüner, B., & Arnold, M. (2007). Organizational learning to manage sustainable development. *Business Strategy and the Environment*, *16*(5), 339-353. https://doi.org/https://doi.org/10.1002/bse.579

Tseng, M.-L., Chiu, S. F., Tan, R. R., & Siriban-Manalang, A. B. (2013). Sustainable consumption and production for Asia: sustainability through green design and practice. *Journal of Cleaner Production*, *40*, 1-5. https://doi.org/https://doi.org/10.1016/j.jclepro.2012.07.015

Vargas-Hernández, J. G., Maillard, C. A. R., & Vargas-González, O. C. (2023). Green Organizational Culture, Green Innovation, and Green Performance for Achieving Environmental Sustainability. In R. I. Perez-Uribe, D. Ocampo-Guzman, & N. Moreno-Monsalve (Eds.), *Handbook of Research on Promoting an Inclusive Organizational Culture for Entrepreneurial Sustainability* (pp. 313-333). IGI Global Scientific Publishing. https://doi.org/10.4018/978-1-6684-5216-5.ch017

Vargas-Hernández, J. G., Maillard, C. A. R., & Vargas-González, O. C. (2024). Green Organizational Culture, Green Innovation, and Green Performance for Achieving Environmental Sustainability. In I. R. Management Association (Ed.), *Research Anthology on Business Law, Policy, and Social Responsibility* (pp. 932-953). IGI Global Scientific Publishing. https://doi.org/10.4018/979-8-3693-2045-7.ch049

Wang, C.-H. (2019). How organizational green culture influences green performance and competitive advantage: The mediating role of green innovation. *Journal of*

Manufacturing Technology Management, *30*(4), 666-683. https://doi.org/10.1108/JMTM-09-2018-0314

Wang, S., Abbas, J., Sial, M. S., Álvarez-Otero, S., & Cioca, L.-I. (2022). Achieving green innovation and sustainable development goals through green knowledge management: Moderating role of organizational green culture. *Journal of Innovation & Knowledge*, *7*(4), 100272. https://doi.org/https://doi.org/10.1016/j.jik.2022.100272

Widjanarko, W., Hadita, H., Jumawan, J., & Hasanuddin, H. (2025). The Role of Green Leadership and Green Organizational Culture on Corporate Sustainability Mediated by Employee Performance. *Dinasti International Journal of Economics, Finance & Accounting*, *6*(3), 2568-2580. https://doi.org/10.38035/dijefa.v6i3.4776

Yu, H., & Li, Z. (2025). Organizational green culture and employees' green behavior: a moderated mediation model with employees' environmental awareness and organizational disseminative capacity. *Service Industries Journal*, *45*(11/12), 1018-1040. https://doi.org/10.1080/02642069.2024.2379013

Greening Social Justice: The Transformative Potential Of Green Social Work

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Abstract

This paper investigates the intersection of climate change, environmental justice, and social work through the lens of Green Social Work (GSW). Drawing on the profession's historical origins—from Richmond's early casework to systems theory, ecological perspectives, and the Life Model—the study argues that contemporary global crises require an expanded understanding of person-in-environment that explicitly incorporates ecological conditions. Using a conceptual and theoretical analysis grounded in key frameworks such as the Sustainable Development Goals and the Paris Agreement, the paper highlights how environmental degradation disproportionately affects marginalised and vulnerable populations, deepening poverty, displacement, food insecurity, and social inequalities. Green Social Work, particularly as articulated by Dominelli, offers a transformative paradigm that integrates social and environmental justice, critiques neoliberal economic structures, and emphasises community resilience, sustainability, and interdependence among all living beings. The paper concludes that social workers must adopt ecological assessment tools, engage in policy advocacy, support grassroots mobilisation, and develop practice models that prioritise both human and environmental well-being. Ultimately, GSW provides a critical pathway for

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reorienting social work toward sustainable, equitable, and ecologically responsible futures in the context of intensifying climate crises.

Keywords: Social work, green social work, social justice, environmental injustice.

INTRODUCTION

Accordingly the International Federation of Social Workers (IFSW), "social work is a practice-based profession and academic discipline founded on the principles of social justice, human rights, collective responsibility, and respect for diversity" (IFSW, 2014). While contemporary conceptualizations portray social work as a multifaceted and globally focused discipline, its historical roots lie in early reformist movements aimed at combating poverty, social inequality, and the harmful effects of industrialization. A leading contributor to this evolution was Mary E. Richmond, whose work Social Diagnosis (1917) laid the foundations for the case study and introduced systematic assessment techniques that situated individuals within their social context. Richmond's emphasis on environmental determinants paved the way for the person-in-environment (PIE) perspective, which would later become the epistemological core of the profession.

The PIE perspective marked a significant shift from individually focused explanations of social problems to an ecological understanding of human functioning. Rather than viewing individuals as isolated units, social work increasingly recognized that human well-being is shaped by dynamic interactions among personal, social, economic, and physical environmental factors (Hare, 2004). This orientation was theoretically strengthened by the adoption of General Systems Theory, which provided an interdisciplinary framework for conceptualizing individuals as active components of interrelated systems. Systems thinking, pioneered by von Bertalanffy (1968), emphasized the reciprocal and adaptive relationships among micro-, meso-, and macro-structures; this approach resonated strongly with social work practice.

Building on this systemic orientation, Urie Bronfenbrenner's (1979) Ecological Systems Theory proposed a multilayered model of human development encompassing the microsystem, mesosystem, exosystem, macrosystem, and chronosystem. By situating individuals within intertwined ecological structures, Bronfenbrenner's model enabled practitioners to

identify how distal forces such as economic policies, environmental degradation, and cultural norms shape personal and family experiences. Since then, his model has played a fundamental role in the ecological transformation of social work.

This ecological orientation was further developed by Germain and Gitterman, who developed the Life Model of Social Work Practice (Germain & Gitterman, 1980), which conceptualized human well-being as the outcome of a "person:environment fit." The Life Model emphasized how stressors resulting from environmental pressures, whether social, structural, or ecological, can undermine adaptive functioning. Importantly, it positioned the environment not as a backdrop but as an active determinant of well-being. This shift laid the conceptual groundwork for the emergence of ecosocial and green social work frameworks that explicitly acknowledged the inseparability of environmental conditions from social justice.

The increasing visibility of climate crises, environmental degradation, and resource inequalities has intensified the need for this broader ecological paradigm. Global initiatives such as the United Nations' 2030 Sustainable Development Goals (SDGs) reinforce the interconnectedness of environmental and social well-being. Goals such as SDG 1 (No Poverty), SDG 10 (Reduced Inequalities), SDG 11 (Sustainable Cities and Communities), and SDG 13 (Climate Action) explicitly recognize that climate change exacerbates social vulnerabilities and disproportionately impacts marginalized groups (UN, 2015). Similarly, the Paris Agreement addresses climate change as a matter of justice, stipulating that vulnerable populations who contribute least to global emissions but bear the brunt of environmental damage should be prioritized (UNFCCC, 2015). These frameworks not only affirm social work's ecological commitments but also mandate professional engagement in climate-smart practice, policy advocacy, and community resilience-building.

In this context, Green Social Work (GSW), most prominently articulated by Lena Dominelli, has emerged as a critical framework integrating environmental justice, sustainability, and social transformation. Dominelli (2012, 2018) argues that social work cannot fulfill its ethical mandate without confronting the structural forces that lead to environmental degradation, including neoliberal economic systems, unsustainable consumption patterns, and global power asymmetries. GSW views individuals,

communities, and ecosystems as interdependent; therefore, environmental damage is understood as both a social and ecological injustice. This perspective aligns deeply with ecological systems theory, emphasizing the interdependence, harmony, and co-constitutive relationship between humans and the natural world. Green social work argues that environmental crises exacerbate existing inequalities, particularly for low-income, racialized, Indigenous, disabled, and other marginalized groups who are disproportionately exposed to environmental risks (Dominelli, 2014; Rao and Teixeira, 2020). This reflects a broader recognition that climate change is not merely a biophysical phenomenon but a socio-political process shaped by structural injustices. Consequently, the profession is called upon to adopt an activist stance: advocating for sustainable policies, supporting community mobilization, and resisting systems that reproduce ecological damage.

By combining its historical commitments to social justice, systems analysis, and ecological understanding, social work is uniquely positioned to address the converging crises of climate change, environmental degradation, and social inequality. Integrating environmental justice into core social work missions represents not a departure from the profession's traditions, but rather a necessary extension of these traditions in the face of the global challenges of the 21st century. This article therefore positions environmental justice and green social work as foundational, transformative frameworks that can guide the profession towards a sustainable, equitable, and ecologically responsible future.

CLIMATE CHANGE AND ITS IMPACTS

Climate change is a significant problem that profoundly affects the entire world. According to the latest report published by the IPCC, global warming of around 1.1 degrees Celsius is observed, caused by human-induced greenhouse gas emissions. This creates physical consequences such as rising sea levels, unexpected weather events, and melting glaciers. In addition to these physical impacts, climate change also paves the way for inequalities and injustices. It is stated that disadvantaged groups are more negatively affected by climate change, and poverty is deepening (IPCC, 2023). Climate change is already declining many plant and animal species. It is estimated that one-fifth of fierce species are in danger of destruction within this century. It can be said that treating climate change as a

problem that only concerns humans would be quite selfish. It is a fact that it will negatively impact the entire ecosystem we breathe and the plants and animals that make up life on Earth (Boddy and Nipperess, 2020, p. 661). Climate change is not limited to physical changes. It exposes structural weaknesses in political, social, and economic systems and highlights inequalities in income, class, and access to resources. People living in regions characterized by poverty, humanitarian crisis, conflict, food insecurity, and lack of access to clean water are more negatively affected by climate change than others. This further deepens disadvantages and leads to the emergence of inequalities (Kennedy, 2018, p. 410). Hence, it is possible to debate that climate change adds another tier to already vulnerable communities (Rao and Teixeira, 2020). The people of Tuvalu, referred to as the world's "first climate refugees," are a prime example of this deepening of disadvantage. The displacement of more than one-fifth of the country's population due to rising sea levels and the rejection of their migration by neighboring Australia are striking examples of this deepening of disadvantage. Another example is the findings of a study conducted in the Region of Waterloo, which found that homeless individuals develop physiological illnesses due to extreme weather conditions, and that they exhibit social isolation and depressive symptoms that lead to increased alcohol and substance abuse (Cumby, 2016, p. 11). In addition to the inherent disadvantages that climate change exacerbates, it can be argued that individuals living in developing countries will be most affected by it. It is a fact that the poor, people of color, indigenous people, people with chronic illnesses or disabilities, and women constitute particularly at-risk groups. A point that should be emphasized here, and which actually creates injustice, is that developing countries, despite producing the least greenhouse gas emissions, bear the greatest burden of the consequences of global emissions (Anderson, 2021).

Food insecurity is another issue addressed in relation to climate change that threatens social justice. Food poverty, a consequence of the imbalance between food and population growth, as discussed years ago by Malthus (Malthus, 2017), is currently being felt with a strong influence from climate change. Rising food prices, food shortages, and fuel prices exacerbate food insecurity. Furthermore, the difficulty of accessing clean water diversifies the manifestations of the hardships experienced by disadvantaged groups due to climate change (Alston, 2015). Climate change has led

to increased food production costs by creating changes such as soil depletion and water scarcity. Rising food prices, in turn, have a more profound negative impact on the poor, who are more likely to struggle to compensate. The fact that greenhouse gas emissions contribute to global warming and the resulting weather events profoundly impact food production. Decreasing grazing land for animals, increasing pesticide use, and decreasing freshwater use for agricultural irrigation all contribute to the food insecurity caused by climate change. It can be predicted that the people of underdeveloped and developing countries will be more severely affected by these negative effects (Molle, 2018, p. 197). Of course, omitting air pollution when discussing food insecurity would be a remiss. Air pollution, a consequence of industrialization, is a trigger for climate change, leading to food insecurity and a lack of access to clean water. It also negatively impacts individuals' physiological and mental health and triggers forced migration (Shajahan and Sharma, 2018). It's also possible to say that climate change has an impact on disasters.

It would be fair to say that, beyond natural disasters, some man-made disasters exacerbate inequalities. Natural disasters triggered by climate change, such as cyclones, typhoons, and hurricanes, as well as man-made nuclear accidents (Küsmez, 2024), exacerbate environmental injustice and exacerbate the hardships experienced by disadvantaged groups. The fact that such events have lasting negative impacts on human health, increase mortality rates, and serve as triggers for mental health problems exacerbates the dramatic impacts of climate change (Demirbilek, 2016). Boddy and Nipperess's (2020) conceptualization of climate change as causing conflict, mental health problems, forced migration, unemployment, increased alcohol and substance use, trauma, grief, and loss can be reiterated as a final emphasis on the importance of this issue.

GREEN SOCIAL WORK

Humans first settled into an agricultural society and then experienced urbanization as a result of industrialization. This process resulted in adapting nature to themselves rather than in harmony with it. This process, based on destruction and invasion, clearly reveals humanity's understanding of the world. This process, characterized by the deploitation of all resources without any concern for the future, has continued for years with

the delusion that they will never be exhausted. These behaviors, exhibited under the guise of modern humanity, are a consequence of the desire for dominance. This desire has taken on a character that undermines the continuity of nature and devastates the environment (Çüm and Artan, 2025).

Social work, with its holistic approach, possesses the knowledge and skillset necessary to address these environmental problems. The ecological focus, inherent in social work, has been the subject of much recent research. Expanding the concept of environment from the social to the physical, particularly by focusing on the current environment, and thus ensuring human social functioning, is consistent with the understanding of social work (Bell, 2019). Social work is based on the principle of conducting professional work by centering the understanding of the individual within their environment. However, as previously stated, the excessive focus of this environment on social relations has necessitated a paradigm shift within social work. The theoretical transformation of the concept of system, which occupies a significant place in the profession's theoretical dimension, and the subsequent emergence of the idea of the ecological system, are concrete indicators of this transformation. This understanding has also given rise to an eco-critical approach. These insights, stemming from the notion that the relationships between people and living things on Earth have been insufficiently considered, have led to social work's transformative approach to the concept of environment. This transformative approach is also supported by the idea of sustainable development (Yanardağ, 2019).

In his book "Green Social Work," Dominelli (2012) explained social work's responsibilities related to environmental processes and offered conceptual expansions. According to the author, green social work represents a paradigm in which responses to environmental crises focus on all factors that create inequality—including poverty, structural inequalities, industrialization processes, consumption patterns, global dependencies, and limited natural resources. He also emphasizes that green social work should adopt a holistic understanding of how environmental factors influence human behavior (Dominelli, 2012, p. 8). Therefore, it is possible to say that green social work possesses a critical approach. This critical approach can be considered essential for the changes social work can bring about in the lives of individuals. Green social work advocates that every environmental crisis, whether caused by human or natural causes, must be eliminated

before its damage becomes irreversible. Environmental injustices become chronic, particularly as their impacts increase. The emphasis on green refers to the obligation of individuals to care for the planet they live in. Income inequalities and the unequal use of resources worldwide are other issues that green social work must combat. Therefore, green social work is also a critique of the economic system. As managerial approaches such as neoliberalism strengthen, it becomes impossible for people to combat global hyper-urbanization and hyper-industrialization. Therefore, combating the system requires activism (Dominelli, 2018, p. 9). In fact, this entire process necessitates a transformation from "anthropocentrism to ecocentrism" (Çüm and Artan, 2025). Noble (2016) considers the multitude of responsibilities of green social work a challenge. In fact, protecting the rights of disadvantaged individuals, ensuring planetary sustainability, and, even more challenging, aiming for economic transformation poses a challenging path. However, despite all these challenges, the author believes it embodies the ideal set of social work practices for environmental crises and should be adopted by social workers.

A summary of all this: It can be stated that green social work is a integrative approach to practice that goes beyond classical approaches that only target human well-being, taking into account the physical, ecological, social, cultural, political, and economic contexts in which individuals live and work, and aims for the well-being of living beings rather than just people. Therefore, it is a fact that all emphasis is on social, environmental, and ecological justice (Body & Nipperess, 2020, p. 663).

ENVIRONMENTAL JUSTICE AND THE TRANSFORMATIVE POWER OF GREEN SOCIAL WORK

IFSW has declared that the guidelines of social justice, human rights, collective responsibility, and respect for diversity are central to the profession's definition of social work. Furthermore, the profession's core responsibilities emphasize the importance of humanitarian intervention to advance environmental and social justice, the need to oppose any actions that would marginalize any group of people, and the priority of sustainable development (IFSW, 2014). Therefore, it can be argued that social work should be fundamentally sensitive to environmental conditions, and social workers should undertake environmental advocacy in their work.

The sustainability agenda and climate policies also form the global context that strengthens the transformative power of green social work. The United Nations' 2030 Sustainable Development Goals (SDGs) define environmental sustainability as an integral component of social development. In particular, "SDG 1 (No Poverty), SDG 10 (Reduced Inequalities), SDG 11 (Sustainable Cities and Communities), and SDG 13 (Climate Action)" fall within the direct responsibility of the social work profession (UN, 2015). In line with these goals, social workers are responsible for multi-level planning, intervention, and advocacy efforts regarding the societal impacts of climate change and environmental degradation. Furthermore, the Paris Agreement defines climate change as a global justice issue, emphasizing the importance of preventing environmental losses, mitigating damage, and protecting vulnerable populations during adaptation processes (UNFCCC, 2015). This political framework provides a strong international basis for green social workers.

Social work is one of the professions and disciplines with a primary responsibility for establishing social justice. However, it would be a mistake to approach social justice independently of environmental justice. The fact that service recipients, who constitute the primary subjects of social work, are more adversely be impressed by environmental conditions demonstrates the need to improve environmental conditions to achieve social justice. Living in polluted environments, forced migration, or being trapped in a cycle of poverty due to environmental injustice should be considered factors that necessitate struggle and constitute the essence of professional work (Demirbilek, 2016). Furthermore, social work has a distinct role in facilitating environmental transformations. Social work embraces the concept of social compensation to ensure the well-being of those negatively affected by environmental degradation. Hearing the voices of individuals negatively affected in this process and acting as their advocate is a fundamental responsibility of the social work profession (Rao & Teixeira, 2020). Social work must not compromise its commitment to its core values during this process. It must ensure equal ecological opportunity and related issues by respecting differences in race, language, and religion, and must be sensitive to service recipients in its implementations (Kaya Örk & Çömez Polat, 2022).

Dominelli (2014) places the blame for environmental injustice on society. According to the author, society has failed to challenge the unequal

distribution of resources worldwide and the global policies implemented by multinational corporations. Therefore, to address this failure, a professional group is needed to promote environmental justice, organize communities, and even create a new socio-economic development model. Social workers, as the professionals primarily responsible for this entire agenda, must conduct their work critically. Disregarding this process from a political perspective would again lead to the wrong conclusion. To address the need to "green the profession," a mediation between governments and corporations is needed. The fact that environmental risks are often concentrated in areas where low-income, marginalized, and culturally minority individuals live further reinforces this emphasis (Schlosberg, 2007). This situation demonstrates that environmental injustice also points to a structural problem, and social workers must combat these structural inequalities. Therefore, it can be argued that a social work approach centered on environmental justice will not only aim to protect nature but also to ensure the rights and well-being of disadvantaged communities.

Environmental justice aims to ensure a safe and clean environment and to enhance governance in environmental policies. Social workers can implement actions in two dimensions in this process: 1) shaping public policies and encouraging states and corporations that exploit the world's resources to take responsibility, and 2) implementing collectivism in the sustainable use of resources. Therefore, it can be discussed that environmental justice can be achieved through a combination of collective actions at the macro and local levels (Shajahan & Sharma, 2018). Furthermore, acknowledging the negative consequences of environmental injustice on vulnerable groups and integrating it into the profession's practice set is an important step on the path to social justice. However, this should not lead to a paradox in itself. Losing sensitivity to environmental injustice while focusing on the problems experienced by vulnerable groups will not only lead to a flawed starting point but also to inadequate implementation. Placing environmental justice at the center, approaching all vulnerable groups in this way and making implementation plans in this way will be important in establishing justice (Jarvis, 2013).

The transformative power of green social work lies in its recognition of the interdependence between human well-being and the health of the natural environment. It considers humans as a whole, encompassing all systems they interact with. It values all living things and the relationships

between them, and it considers social justice within the context of an ethical paradigm in which humans are responsible for all other living beings. This can mean protecting the world's flora and fauna, or it can mean considering the decisions made by countries within the context of global interdependence. It prevents privileged groups from exploiting the world's resources and encourages the limited use of natural resources (Body and Nipperes, 2020, p. 664). Green social work advocates that actions should be taken with an eye on the well-being of future generations, rather than focusing on present-day practices. This is one of the fundamental measures to prevent intergenerational anxiety about environmental degradation. It also examines power relations within the context of the oppressed and the oppressor, a crucial perspective for critical transformation. This provides a strong justification for green social workers to challenge the unsustainable development inherent in neoliberal capitalist modes of production and consumption (Dominelli, 2013). Environmental injustice, as conceptualized by Schlosberg (2007), finds its counterpart here. The author considers environmental injustice not only as distributive injustice (who faces how much risk), but also as recognition injustice (whose voice is heard), participation injustice (who is included in decision-making processes), and opportunity injustice within the context of the capabilities approach. This framework requires social workers to focus not merely in thesoutcomes but also on processes. In other words, the voice of disadvantaged communities in policy decisions, the democratization of environmental decisions, and respect for local knowledge are integral elements of environmental justice. Rao and Teixeira (2020) also specifically emphasize the role of social workers as mediators, facilitators, and advocates in these processes.

Green social work provides an ideal practice for social action and policy advocacy. The formation of a consensus and the empowerment of communities to defend their rights in light of this consensus can be facilitated under the leadership of green social workers. Proactive social work leadership and practices centered on environmental justice are also crucial for community development. Furthermore, this process is crucial for including and working with communities that are almost always excluded. In this respect, green social work approaches the issue from a crucial perspective in establishing environmental and social justice (Rao & Teixeira, 2020). Community development can also be achieved in post-disaster situations.

In particular, empowering local communities negatively affected by disasters and addressing the psychosocial impacts of disasters on this group can be implemented within the scope of green social work. This process involves supporting community development in a non-hierarchical, culturally sensitive manner (Dominelli, 2018). Krings and Thomas (2018, p. 402) state that environmental justice in communities affected by environmental degradation is only possible through grassroots organizations. Therefore, leveraging local knowledge to organize individuals and create a counter-force against those in power will be an important practice for green social workers.

CONCLUSION

Climate change, environmental degradation, and increasing social inequalities constitute intertwined global crises that challenge the traditional boundaries of social work. As this article demonstrates, environmental degradation disproportionately impacts marginalized and disadvantaged groups, despite their minimal contribution to global emissions. This profound injustice requires a reconceptualization of the mission of social work that fully integrates ecological thinking, environmental justice, and sustainability into all levels of practice. Green Social Work offers just such a paradigm: holistic, critical, ethically grounded, and responsive to the socio-ecological realities of the 21st century.

The implications of these findings for social work practitioners are significant. First, social workers should expand their assessment frameworks to include environmental risks, ecological stressors, climate-related vulnerabilities, and place-based disadvantages. This requires recognizing environmental conditions as central determinants of well-being rather than environmental contextual factors. Second, practitioners should assume more prominent roles as advocates and policy actors. Environmental injustices are structurally produced; Therefore, social workers must challenge unequal resource distributions, discriminatory environmental policies, and exploitative institutional practices. This includes contributing to the development of public policies aligned with the Sustainable Development Goals and the Paris Agreement and ensuring the voices of vulnerable populations are included in climate adaptation processes.

Third, social workers should strengthen social resilience through inclusive, culturally sensitive, and participatory community development strategies. Grassroots mobilization, community organizing, and empowerment practices form the foundation of environmental justice work and directly address the power imbalances that perpetuate ecological damage. Fourth, practitioners should embrace ecocentric ethical perspectives, recognizing that social justice cannot be achieved without environmental justice and that human well-being is inseparable from the well-being of all living beings and ecosystems. This perspective requires social workers to embrace intergenerational justice and prioritize the rights and well-being of future generations in their interventions.

Finally, social workers should critically engage with the neoliberal economic structures that lead to environmental destruction. Green Social Work offers a pathway for this critical engagement by offering a framework that connects local practices to global ecological crises, demands accountability from governments and corporations, and positions social workers as key agents of transformative change. By integrating ecological awareness, political advocacy, and community empowerment into their practice, social workers can help build more just, sustainable, and resilient societies.

In short, integrating environmental justice into the core of social work is no longer optional; it is an ethical and professional imperative. Green Social Work provides practitioners with the conceptual tools, moral foundations, and practical strategies needed to confront ecological crises while advancing both social and environmental justice. As global challenges intensify, the leadership, vision, and critical engagement of social workers will be indispensable in shaping a just and sustainable future.

REFERENCES

Alston, M. (2015). Social work, climate change and global cooperation. *International Social Work*, *58*(3), 355-363.

Anderson, R. (2021). Why is climate change a pertinent issue for social work and how can social workers contribute to efforts to address it?. *Social Work & Policy Studies: Social Justice, Practice and Theory*, *4*(1), 1-12.

Bell, K. (2019). Transforming social work for environmental justice: Theory, practice, and education: Commentary on "advancing transformative eco-social change: Shifting from modernist to holistic foundations"(Boetto, 2019) and "integrating the natural environment in social work education: Sustainability

and scenario-based learning"(Papadopoulos, 2019). *Australian Social Work*, *72*(2), 242-244.

Boddy, J., & Nipperess, S. (2020). Environment, climate change and social work. In S. A. Webb (Ed.), *The routledge handbook of critical social work* (pp. 660–670). Routledge.

Bronfenbrenner, U. (1979). *The ecology of human development: Experiments by nature and design*. Harvard University Press.

Cumby, T. (2016). *Climate change and social work: Our roles and barriers to action* (Master thesis). Wilfrid Lauier University, Canada.

Çüm, B., & Artan, T. (2025). Yeşil sosyal hizmet bağlamında iklim değişikliğiyle mücadelede bireysel bir çaba: Ekolojik vatandaşlık. *Mavi Atlas*, *13*(1), 127-143.

Demirbilek, M. (2016). Çevre, çevre mültecileri ve çevreci sosyal hizmet. *International Journal of Social Sciences and Education Research*, *2*(3), 905-914.

Dominelli, L. (2012). *Green social work: From environmental crises to environmental justice*. Polity Press.

Dominelli, L. (2013). Environmental justice at the heart of social work practice: Greening the profession. *International Journal of Social Welfare*, *22*(4), 431-439.

Dominelli, L. (2014). Promoting environmental justice through green social work practice: A key challenge for practitioners and educators. *International Social Work*, *57*(4), 338-345.

Dominelli, L. (2018). Green social work, political ecology and environmental justice. In L. Dominelli, B. R. Nikku & H. B. Ku (Eds.). *The Routledge handbook of critical social work* (pp. 9-20). Routledge.

Germain, C. B., & Gitterman, A. (1980). *The life model of social work practice*. Columbia University Press.

Hare, I. (2004). Defining social work for the 21st century. *International Social Work, 47*(3), 407–424.

IPCC. (2023). *Sixth Assessment Report*. Intergovernmental Panel on Climate Change. Retrieved from: https://www.ipcc.ch/assessment-report/ar6/

Jarvis, D. (2013). Environmental justice and social work: A call to expand the social work profession to include environmental justice. *Columbia University Press, 4*, 36-45.

Kaya Örk, E.., & Çömez Polat, F. (2022). Çevresel adaletsizlik mağduru grupların ihtiyaçlarını karşılamada yeni bir model önerisi:''Yeşil sosyal hizmet birimleri kurulması''. *Toplum ve Sosyal Hizmet*, *33*(3), 975-990.

Kennedy, E. (2018). Historical trends in calls to action climate change, pro-environmental behaviours and green social work. In L. Dominelli, B. R. Nikku

& H. B. Ku (Eds.). *The Routledge handbook of critical social work* (pp. 409-419). Routledge.

Krings, A., & Thomas, H. (2018). Integrating green social work and the US environmental justice movement an introduction to community benefits aggrements. In L. Dominelli, B. R. Nikku & H. B. Ku (Eds.). *The Routledge handbook of critical social work* (pp. 397-406). Routledge.

Küsmez, B. (2024). Afet sonrası sosyal hizmet uygulamalarında etik hususlar. *Toplumsal Politika Dergisi*, *5*(2), 97-120.

Molle, C. (2018). Food insecurity: Where social injustice meets environmental exploitation. In L. Dominelli, B. R. Nikku & H. B. Ku (Eds.). *The Routledge handbook of critical social work* (pp. 195-205). Routledge.

Noble, C. (2016). Green social work-the next frontier for action. *Social Alternatives*, *35*(4), 14-19.

Rao, S., & Teixeira, S. (2020). The Green New Deal: Social work's role in environmental justice policy. *Social Work*, *65*(2), 197-200.

Richmond, M. E. (1917). *Social diagnosis*. Russell Sage Foundation.

Schlosberg, D. (2007). *Defining environmental justice: Theories, movements, and nature*. Oxford University Press.

Shajahan, P. K., & Sharma, P. (2018). Environmental justice: A call for action for social workers. *International Social Work*, *61*(4), 476-480.

United Nations. (2015). *Transforming our world: The 2030 Agenda for Sustainable Development*. United Nations.

United Nations Framework Convention on Climate Change. (2015). *The Paris Agreement*. United Nations Framework Convention on Climate Change.

Von Bertalanffy, L. (1968). *General system theory: Foundations, development, applications*. George Braziller.

Work Accidents and Occupational Diseases Resulting from Industrial Pollution: A Study in Light of Supreme Court Decisions

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Abstract

The environmental consequences of industrialization directly affect not only ecosystems but also the safety of labor relations. Pollution arising from industrial activities has become a significant factor threatening workers' health, necessitating the expansion of occupational health and safety obligations to include environmental risks. In particular, work accidents and occupational diseases caused by pollution in sectors such as chemistry, mining, and energy are intensely debated in Supreme Court case law with respect to the duties of care, causation, and liability.

This study examines the legal characterization of work accidents and occupational diseases resulting from environmental impacts based on the decisions of the 9th, 10th, and 21st Civil Chambers of the Supreme Court, as well as the General Assembly of the Court. By analyzing the Court's rulings on issues such as "foreseeability" and "duty to prevent," among other scenarios, the study explores the various dimensions of environmental factors within labor law.

Within the scope of this study, the concepts of work accident and occupational disease are briefly reviewed, industrial pollution and environmental risks are defined, and, in light of exemplary Supreme Court decisions, issues of causation,

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foreseeability, liability, and compensation are evaluated, followed by assessments and recommendations within the framework of labor law.

The aim of the study is to strengthen the environmental responsibility dimension of labor law and provide a jurisprudence-based framework for the concept of "ecological responsibility" within the green transformation process. Consequently, the legal aspects of the link between environmental protection and occupational health and safety will be reassessed in light of Supreme Court decisions.

Keywords: Work accident, occupational disease, industrial pollution, employer liability, labor law

1. INTRODUCTION

In today's world, where industrialization brings with it a major process of change and transformation, the conditions of Industry 4.0 have also led to a period of differentiation in environmental and climatic conditions. The impact of this process on workers in professional life gives rise to certain legal issues. Undoubtedly, the conditions related to occupational health and safety are among the most significant of these. In today's world, human labor still maintains its importance as the only irreplaceable element, particularly in certain fields of work. Although the influence of artificial intelligence and the use of robots in working life have increased, certain sensitive tasks, heavy industry, and various types of work involving significant chemical and biological factors remain areas where the need for direct human labor is strongly felt.

Industrialization has changed working life in many ways. As factories expanded, new materials entered production, and energy demand grew, the risks faced by workers also took new forms. In many workplaces, especially in mining, petrochemicals, waste management, and heavy industry, employees are exposed not only to physical dangers but also to pollutants that gradually affect their health. Dust from stones, fumes from chemicals, and biological agents that spread in poorly controlled environments now pose risks that earlier workplace safety rules did not fully anticipate.

Although the definitions of "work accident" and "occupational disease" are laid out in Laws No. 5510 and 6331, legal practice shows that the real boundaries of these concepts are drawn by the Court of Cassation. Cases involving long-term chemical exposure, toxic fumes, or biological hazards illustrate how environmental conditions directly shape liability.

What stands out in these decisions is not just the event that harmed the worker, but whether the employer recognized the risk early enough and took reasonable steps to prevent it.

Recent years show a noticeable shift: the Court increasingly examines environmental factors in detail—whether the workplace had proper ventilation, whether hazardous waste was handled properly, whether the employer monitored exposure levels, and whether the work assigned matched the worker's qualifications. These elements are evaluated not only as technical issues but as part of the employer's basic duty to protect employees.

This study brings together several Court of Cassation decisions where industrial pollution played a central role. By reviewing these rulings, the aim is to understand how environmental conditions affect the legal assessment of work accidents and occupational diseases. At the same time, the study hopes to contribute to the broader discussion on how labor law should respond to the environmental realities of modern production.

2. CONCEPTUAL FRAMEWORK

2.1. The Concept of Occupational Accident

An occupational accident is defined in Turkish social security law under Article 13 of Law No. 5510 on Social Insurances and General Health Insurance. It refers to incidents that occur due to work conducted by the employer, causing physical or mental impairment to the insured person. In the literature, the concept of an occupational accident is generally evaluated based on three main elements: the sudden occurrence of the event, the presence of an external factor, and the adverse impact on health (Karadeniz, 2012). However, in cases stemming from industrial pollution, the interpretation of the "sudden occurrence" criterion has broadened; even short-term exposure to chemical or toxic substances is accepted as constituting an occupational accident (Tarım, 2017).

The Court of Cassation also considers acute poisoning, explosions, gas leaks, or the accumulation of toxic fumes caused by chemical or biological substances such as occupational accidents. In particular, in many decisions of the 21st Civil Chamber, the condition of a worker who loses consciousness due to gas accumulation in the workplace air has been classified as an occupational accident; the fact that the incident originated from an environmental factor does not alter its status as an occupational

accident. Indeed, in one case, an occupational accident was evaluated as an event that occurs suddenly, with resulting harm manifesting later, as in the case of poisoning from gas exposure. Provided that there is an appropriate causal link between the later harm and the event, the incident can be accepted as an occupational accident (Court of Cassation 21st Civil Chamber, 2018/5018 E., 2019/2931 K.). Therefore, the sudden consequences of environmental effects meet the classical criteria of an occupational accident, while the connection of exposure to the execution of work raises the issue of causal linkage.

2.2. Concept of Occupational Disease

Occupational disease is defined in Article 14 of Law No. 5510 as a "disease arising from repeated causes due to professional activity or from the conditions under which the work is carried out." The essential elements of an occupational disease include prolonged exposure, a work-related risk factor, medically identifiable symptoms of the disease, and the ability to establish a causal relationship (Güzel, Okur & Caniklioğlu, 2021).

In the context of industrial pollution, occupational diseases typically develop as a result of environmental factors such as (Serçemeli, C., 2020; Özdemir & Serin, 2022; Alper, Y. & Kılkış, İ., 2024):

- accumulation of heavy metals (lead, cadmium, mercury),
- exposure to organic solvents (benzene, toluene),
- inhalable dust (silica, coal dust),
- biological agents,
- toxic particulates,
- radiation,
- asbestos exposure.

The Court of Cassation (Yargıtay) applies the "long-term and repeated exposure" criterion rigorously when assessing occupational diseases; however, in some rulings, it has recognized that the effects of environmental toxins may also manifest after shorter periods of exposure. A similar emphasis was made in a case concerning a worker employed as a gunner in a lime quarry (Yargıtay 10th Civil Chamber, 2019/2212 E., 2019/4234 K.).

3. METHODOLOGY

This study employs a combination of qualitative content analysis and case law review to reveal how occupational accidents and occupational diseases resulting from industrial pollution are assessed in the light of Court of Cassation decisions. Since the evaluation of environmental risks in labor law encompasses both technical and legal dimensions, a purely normative approach is insufficient, and it is necessary to examine the judgments systematically and thematically. Therefore, the study adopts the structure of qualitative research methods, which is suitable for an in-depth analysis of judicial decisions (Weil, 2014; Berber, 2017).

3.1. Qualitative Content Analysis Approach

Qualitative content analysis is a method aimed at systematically examining a given text corpus to identify themes, patterns, conceptual clusters, and relationships (Özmen, 2024). In this study, the analysis corpus consists of decisions from the 9th, 10th, and 21st Civil Chambers of the Court of Cassation, as well as the General Assembly of Civil Law, related to occupational accidents and occupational diseases associated with environmental or chemical risks.

Each decision examined in the study was coded in terms of:

The nature of the incident (chemical exposure, gas accumulation, dust inhalation due to collapse, heavy metal poisoning, etc.)

The employer's obligations discussed within the scope of the duty of care (ventilation, risk analysis, personal protective equipment, waste management, etc.)

The application of the foreseeability criterion

The assessment of the causal link

The structure of the reasoning and the legal basis of the decision

The outcome and type of liability (fault-based, strict liability, consequences under social security law)

During the coding process, accessible case texts were used as the basis, and the discussion section of each decision was restructured to enable thematic comparison.

3.2. Case Law Review and Legal Method

Case law review aims not only to examine the outcomes of judicial decisions but also to analyze their legal reasoning, the way justifications are presented, the norms applied, and their relationship with other decisions (Özmen, 2024). In this context, the study carefully evaluates the evolution of the Court of Cassation's approach to environmental risks, particularly in recent years.

The selection criteria for the cases examined are as follows:

The incident was caused by an environmental or chemical hazard,

The decision is accessible, with full access to the substantive and reasoning sections,

Discussions on employer liability, duty of care, foreseeability, and causal link are included,

The decision distinguishes between occupational disease and occupational accident.

A comparative analysis of the cases was conducted to identify common themes, particularly highlighting how the employer's obligation to prevent environmental risks is interpreted.

3.3. Limitations

The main limitation of the study is that not all higher court decisions are publicly accessible. Therefore, only widely available decisions and examples found in legal databases were analyzed. However, the in-depth examination of qualitative content ensured that this limitation did not narrow the scope of the study; on the contrary, it contributed to identifying meaningful patterns in the context of environmental risks.

4. FINDINGS

The Court of Cassation decisions examined in this study revealed a common pattern in terms of violations of occupational health and safety (OHS) obligations, the determination of occupational diseases, expert witness processes, and principles of legal liability. As a result of the qualitative analysis, four main themes were identified, and under each theme, categories, subcategories, and related legal findings were evaluated.

The sample rulings examined are presented in Table 1.

Table 1. *Sample Supreme Court Decisions*

Case	Case Summary	Legal Evaluation	Duty of Care / Responsibility	Outcome
Supreme Court 10th Chamber, E: 2016/2597, K: 2018/7659	The worker was exposed to quartz and feldspar dust while performing maintenance work in an open area at the workplace; developed occupational pneumoconiosis.	The dusty workplace environment was recognized as causing an occupational disease; the expert report and OSH legislation were not thoroughly evaluated.	Emphasis on employer's obligation to implement dust control, ventilation, and preventive measures in the work environment.	Judgment overturned; employer found negligent, procedural violation due to insufficient investigation identified.
Supreme Court 10th Chamber, E: 2020/7385, K: 2020/7369	Claim that the deceased's death resulted from an occupational disease; compensation lawsuit filed following occupational disease determination.	The court focused on the relationship between the occupational disease and death, based on expert and forensic reports.	Employer's obligation to provide health surveillance, protective measures, and risk assessment in high-risk working conditions examined.	Judgment either upheld or rejected regarding occupational disease and employer liability (employer liability accepted in the file).
Supreme Court 10th Chamber, E: 2023/1887, K: 2023/1871	Worker claimed to experience recurrent respiratory problems at work; dispute over whether it is an occupational disease or a work accident.	Worker's complaints, medical reports, and workplace conditions assessed; frequency and intensity of exposure analyzed.	Discussion on employer's foreseeability of respiratory risks and obligation to take preventive measures.	Judgment, after appeal review, directed either toward occupational disease or work accident / determination case depending on the file.
Supreme Court 21st Chamber, E: 2018/5018, K: 2019/2931	Biological risk — H1N1 virus exposure: death / serious illness linked to a virus-related workplace event.	Connection of biological risk to the workplace, potential for contagion, and employer's duty to prevent risks analyzed.	Employer's obligation to take measures against biological risks (hygiene, isolation of sick employees, health surveillance, etc.) emphasized.	High likelihood of employer liability accepted; work accident / death determination made; judgment includes compensation and liability aspects.
Supreme Court 21st Chamber, E: 2010/14218, K: 2012/12082	The deceased fell ill and died while collecting garbage; claim that death was a work accident.	Court initially argued no causal link between work and death; Supreme Court, based on expert report including a medical doctor and forensic report, ruled the event as a work accident.	Emphasis on employer's duty to provide preventive measures, masks, and risk assessment in extreme heat and biologically hazardous (bacterial) garbage collection work.	Judgment overturned; death recognized as a work accident and the case remanded for a new ruling.

Based on the example cases in Table 1, themes have been developed and are examined below in order.

4.1. Theme 1 — Employer's Occupational Health and Safety Obligations

The examined decisions demonstrate that the employer has a broad duty of care within the scope of occupational health and safety (OHS). In particular, working with chemical substances, handling heavy loads, the risk of falling from heights, and deficiencies in workplace organization are considered foreseeable and preventable risks by the Court of Cassation.

Failure to Manage Physical and Chemical Risks

The decisions show that workers were inadequately protected against physical risks such as slippery floors, falls from heights, and heavy lifting, as well as environmental risks such as chemical gases, solvents, and hydrogen cylinders. According to the Court, the employer is obliged to take all necessary technical, organizational, and medical measures to prevent these risks.

Lack of Training, Supervision, and Monitoring

Another common finding is the lack of job-related training and continuous supervision of the work. The courts emphasize that even if protective equipment is provided, untrained and unsupervised work does not absolve the employer of liability.

Assigning Tasks Outside Job Description

The decisions directly attribute employer fault to practices such as assigning a cleaning worker to transport chemicals or assigning hazardous tasks to unskilled workers. This is highlighted as a fundamental violation in workplace organization.

4.2. Theme 2 — Determination of Occupational Disease and Causal Link

Decisions regarding occupational diseases indicate that the standards for medical evidence are high.

Conflicts Among Medical Reports

In many cases, discrepancies were observed between reports from the Social Security Institution (SGK) Health Board, Occupational Diseases Hospitals, and the Higher Health Board. The Court of Cassation has emphasized that in the presence of conflicting reports, the court must obtain an opinion from the Forensic Medicine Institution.

Scientific Certainty Required for Causal Link

For claims related to respiratory disorders, spinal diseases, and chemical exposure, the Court clearly established the principle:

"The loss of earning capacity in the profession must be determined with medical reports that leave no room for doubt."

Accordingly, the worker's statement alone, a single physician report, or an expert report without sufficient examination cannot be accepted as evidence.

Necessity of Assessing Avoidability

In many decisions, the distinction between employer fault and inevitability was not thoroughly reported; this deficiency has been grounds for appeal.

4.3. Theme 3 — Expert Witness, On-Site Inspection, and Judicial Review Process

One of the most prominent findings in the decisions is the widespread inadequacy of expert reports in labor cases.

Lack of Expertise

The Court of Cassation did not accept reports prepared by panels lacking experts in occupational health and safety, pulmonology, orthopedics, or relevant medical fields. This deficiency has frequently been a reason for overturning judgments, especially in occupational disease cases.

Insufficient Examination

The Court's common observation:

Without on-site inspection,

Without reviewing environmental measurements,

Without determining chemical exposure levels,

Without justifying the degree of fault,

expert reports cannot serve as the basis for a judgment. This reinforces courts' obligation to review expert reports not only formally but also substantively.

4.4. Theme 4 — Fault, Liability, and Compensation Principles

Most decisions emphasize that employers have an extensive "duty of protection and supervision" in occupational health and safety.

Employer Fault

Neglected protective measures, assigning tasks outside job descriptions, unsupervised work, and failure to conduct risk analyses have been systematically evaluated as employer fault.

Worker Fault — Exceptional

Employee fault is rarely considered; such claims are disregarded if not proven with strong, concrete evidence.

Determination of Compensation

In occupational disease cases, compensation is calculated based on:

Loss of earning capacity,

The present capital value of income determined by SGK,

The employer's degree of fault.

If the occupational disease is not conclusively established, compensation claims are denied.

5. CONCLUSION, DISCUSSION AND RECOMMENDATIONS

Since the industrial era, both international and national regulations have gradually developed to make sure that workers—the backbone of modern industry—have safe and dignified working conditions. Even today, in the era of Industry 4.0, where robots and artificial intelligence are becoming increasingly important, many sectors still rely heavily on human labor. Workers remain central in industries such as heavy manufacturing, mining, and chemical production. As industrial activities continue to impact on the environment, protecting the health of these workers is more crucial than ever, especially in areas where human effort cannot be replaced.

Making sure that working conditions are safe, healthy, and respectful should be a top priority. This research looks at high court cases across various sectors where workers have faced problems, and the findings are clear: chemical and biological hazards can have serious, sometimes devastating, effects on health. Both employers and workers share the responsibility to

prevent and manage these risks. While this study focuses mostly on employer responsibilities, workers themselves also have a role to play.

A major challenge in occupational health and safety is lack of awareness. This makes training—both in workplace safety and labor law—absolutely essential. Public campaigns, educational programs, and even newspaper notices can also help raise awareness. Inspired by the principle *"keep the human alive so that the state may live,"* we need to nurture a generation that puts workers' health first. Looking at the high court cases, it's clear that environmental, chemical, and biological risks can significantly reduce a worker's ability to earn a living. That's why taking prompt and effective precautions is essential.

We're also seeing a shift in thinking: labor law and environmental responsibility are no longer seen as separate issues—they are connected. Courts now look at things like chemical storage, waste management, ventilation, and even workplace layout when deciding if an employer is doing enough to protect workers. This approach mirrors global discussions on sustainability, but it is grounded in practical, everyday workplace realities. A good filtration system doesn't just reduce pollution; it protects workers' lungs. Proper waste management doesn't just protect soil and water; it keeps employees safe from hazardous exposure.

The good news is that solutions are often simple and realistic: risk assessments that reflect actual conditions, ventilation systems that are maintained rather than forgotten, serious training sessions, and a workplace culture where health concerns are taken seriously. The most important mindset change is to see environmental risks as constant parts of the workplace—not occasional problems, but everyday realities, just like noise, heat, or workload.

In short, protecting workers from industrial pollution is not just a legal requirement—it's about respecting the dignity of work itself. A workplace should never endanger the health of the people who keep it running. And for this to happen, everyone involved—employers, workers, and policymakers—must recognize their responsibilities and act on them.

For future research, it may be useful to focus on studies that examine specific environmental impacts, such as those affecting only respiratory health. In addition, it would be valuable to investigate the expectations, opinions, and suggestions of the parties involved through qualitative

studies that directly explore the perspectives of both workers and employers on the issue.

REFERENCES

Alper, Y., & Kılkış, İ. (2024). *İş ve Sosyal Güvenlik Hukuku*. Dora Basın Yayın.

Berber, A. (2017). Yönetimde Kavramsal Çerçeve Belirleme Ve Nitel Araştırma Yöntemleri. *İstanbul Üniversitesi İşletme Fakültesi Dergisi*, *46*, 71-73.

Güzel, A., Okur, A. R., & Caniklioğlu, N. (2021). *Sosyal Güvenlik Hukuku*. İstanbul: Beta Yayıncılık

ILO, (2022). "Social And Employment Impacts of Climate Change and Green Economy Policies İn Türkiye". Https://Www.İlo.Org/Sites/Default/Files/Wcmsp5/Groups/Public/@Europe/@Ro-Geneva/@İlo-Ankara/Documents/Publication/Wcms_849761.Pdf.

Karadeniz, O. (2012). Dünya'da Ve Türkiye'de İş Kazaları Ve Meslek Hastalıkları Ve Sosyal Koruma Yetersizliği. *Çalışma Ve Toplum*, *3*(34), 15-73.

Özdemir, F., & Serin, H. (2022). Çalışan Ve Sektörlere Göre İş Kazası Ve Meslek Hastalığı İstatistiği Üzerine Bir Araştırma. *Turkish Journal of Forest Science*, *6*(1), 275-285.

Özmen, K. (2024). *Nitel Araştırmalarda İçerik Analizi*, Efe Yayınevi.

Serçemeli, C. (2020). Covıd-19 Pandemi Sürecine Çalışma Hayatı Ve İş Hukuku Açısından Kısa Bir Bakış. *Turan-Sam*, *12*(46), 395-405.

Tarım, M. (2017). Kimya Sektöründe İş Kazaları Ve Meslek Hastalıkları. *İstanbul Ticaret Üniversitesi Fen Bilimleri Dergisi*, *16*(32), 49-64.

Weil, D. (2014). The Fissured Workplace: Why Work Became So Bad For So Many And What Can Be Done To İmprove İt. In *The Fissured Workplace*. Harvard University Press.

Yargıtay, "Yargıtay Karar Arama", https://karararama.yargitay.gov.tr/.

The Basics of Developing Emotional Leadership Skills in Primary School Students

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Abstract

The essence, pedagogical underpinnings, and strategies for improving the development of emotional leadership skills in elementary school pupils are all examined in this paper. Additionally, it looks at the psychological traits of elementary school-aged children, the basic approaches to developing emotional leadership, and the anticipated results. The ability of a student to control their own emotions, comprehend the sentiments of others, foster a favorable environment in a group, and actively engage in cooperation is known as emotional leadership. The article emphasizes that the period of primary education is a crucial stage in a child's personal and social development, highlighting the importance of nurturing emotional maturity and leadership qualities at this stage. It discusses methods for cultivating traits such as empathy, self-assessment, communication culture, and responsibility among students, and analyzes the role of interactive games and group activities in this process.According to the research findings, the emotional support provided by teachers and parents, a positive psychological atmosphere in the classroom, and a motivational approach are identified as the most significant factors in developing leadership qualities in children. The article concludes with

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practical recommendations on how to integrate emotional education and leadership development within the process of primary education.

Keywords: emotional leadership, primary education, emotional intelligence, communication skills, empathy

1. INTRODUCTION

In today's modern educational process, it is important to develop not only students' academic knowledge but also their personal and social skills. Developing emotional leadership abilities in primary school children helps them manage their emotions, take leadership roles within a group, and engage in effective communication. Based on the theory of emotional intelligence, emotional leadership supports the harmony between a child's internal and external social interactions. In every group, organization, or team, there is a person who g

Today, we refer to such individuals as leaders. Leaders make a significant contribution to the effective functioning of a team because they unite members around a common goal. Since emotional leadership plays an important role in the prosperity of our country, the improvement of education quality, and the development of all fields in general, it is advi

To develop emotional leadership abilities in primary school students, we first analyze the definitions of the terms *Uzbe,pedagogy*, *philosophy*, *leadership*, and *emotional*, as they provide the necessary conceptual foundation.

2. METHODOLOGY

The word *"leader"* in English means "yetakchi," "boshliq," "rahbar," or "yo'lboshchi." **Leadership** refers to the activity directed toward guiding a group in a specific direction by managing interpersonal (informal) relationships, understanding the strengths and weaknesses of group members, their positive and negative habits, as well as their psychological characteristics, moods, tendencies, aspirations, and interests.

Emotion (from French *emotion*, Latin *emovere* — to excite, to stir) is a psychological experience—feeling, sensation, excitement, or arousal—that arises in humans and animals as a result of internal and external stimuli. The term *emotion* is synonymous with the concept of *feeling*, but the two are not entirely identical. Only the clearly expressed and internally

experienced forms of feelings can be correctly referred to as emotions. However, feelings such as patriotism, responsibility, conscience, duty, or a mother's love for her child cannot be classified as emotions.

Various forms of emotional experiences perform not only a signaling function but also a regulatory one. In psychology, involuntary and conscious actions occurring during the adaptation process are referred to as the expressive aspects of emotional states. The structural components of an individual's emotional sphere include emotional tone, emotional states (active, passive, asthenic, and sthenic), affect, and stress mood. Emotional states represent the typical and specific forms of emotional experiences.

Emotional leadership is the ability of an individual to understand and manage their emotions and positively influence others through effective leadership. Unlike traditional leadership theories, this concept emphasizes a person's capacity to regulate personal and social emotions. Daniel Goleman highlights the importance of emotional intelligence in leadership and identifies its following components:

• **Self-awareness** – understanding one's own emotions and evaluating them accurately;

• **Self-regulation** – controlling one's emotions and ensuring adaptability;

• **Motivation** – the sense of inner drive and goal orientation;

• **Empathy** – understanding and recognizing the emotions of others;

• **Social skills** – effective communication and participation in teamwork.

According to Daniel Goleman's research, emotional intelligence determines 80% of a leader's effectiveness. Furthermore, emotional intelligence developed during childhood serves as a crucial foundation for a successful life in the future [3]. Developing these qualities in young children directly influences their future social adaptation, academic success, and readiness for group activities. The effectiveness of pedagogical strategies and methods aimed at fostering emotional leadership in the school education process is highly significant. Teachers' use of interactive methods during lessons, individualized approaches to students, and the application of cooperative and problem-based learning technologies all contribute to the development of these abilities.

The development of emotional leadership abilities at the primary school age helps students understand their own emotions, communicate effectively with others, and take on leadership roles within a group. The development of these abilities directly influences the following aspects: In the 21st century, the concept of leadership has shifted from a position of authority to emotional and social competence. Emotional leadership is closely related to emotional intelligence, which includes self-awareness, self-regulation, empathy, and social skills (Goleman, 1995; Salovey & Mayer, 1990). These competencies enable students to communicate effectively with their peers and contribute to creating a healthy classroom environment. Research shows that strong emotional abilities in primary school lead to better peer relationships and improved academic outcomes (Bosacki, 2013; Oberle & Shonert-Reichl, 2016). According to Denham et al. (2020), the primary school years represent a crucial developmental stage during which children learn emotional regulation and interpersonal communication. These foundational abilities directly influence motivation, social adaptation, and academic success.

The role of emotional development in education is increasingly recognized internationally. Research on child development, teaching, and teacher education shows that structured emotional education significantly improves cooperation and academic performance (Durlak et al., 2011; Aguilar & Morrison, 2020). Emotional experiences shape how young children interpret social situations, respond to challenges in the classroom, and initiate leadership among peers (Taylor et al., 2017).

Vygotsky's (1978) sociocultural theory further explains that learning occurs through social interaction. Therefore, emotional development is shaped through communication, cooperation, and shared classroom experiences. As children learn to interpret emotions and respond with empathy and collaboration, emotional leadership naturally emerges.

In Uzbekistan, the 2023 State Curriculum for Primary Education emphasizes holistic development, including emotional and moral growth. However, emotional leadership as a systematic pedagogical direction has not yet been fully explored. Therefore, studying its foundations and development is crucial for improving classroom culture and student well-being. Primary education represents a formative stage of psychological and social development. During this period, children develop emotional

regulation, empathy, and moral understanding. Teachers play a decisive role in shaping these abilities, as classroom interactions often determine a child's sense of emotional safety and trust. Thus, emotional leadership serves both as a personal competence and a social process, encouraging students to lead not through competition but through understanding, compassion, and cooperation.

Furthermore, emotional leadership aligns with the goals of modern educational reforms that emphasize holistic development. The United Nations Sustainable Development Goal 4 (Quality Education) highlights the importance of inclusive and emotionally supportive learning environments. In this regard, the development of emotional leadership contributes not only to improving learning outcomes but also to strengthening interpersonal relationships and fostering harmony within the classroom.

The rationale behind this study lies in the increasing need to prioritize emotional education within educational institutions. In Uzbekistan, as in many developing education systems, academic achievement has long been emphasized, often at the expense of emotional and social development. However, current pedagogical trends increasingly recognize that emotional maturity directly affects learning motivation, behavior, and leadership potential. Therefore, integrating emotional leadership into the early stages of school education lays the foundation for responsible citizenship and lifelong learning.

The purpose of this study is to identify the psychological and pedagogical foundations for developing emotional leadership in primary school students. The research also aims to determine the practical strategies and environmental conditions that most effectively support this process. By empirically examining these aspects, the study contributes to a deeper understanding of how emotional and social education can be harmonized with traditional academic goals.

The development of emotional leadership in primary school students is closely connected to theories of emotional intelligence and social-emotional learning. Emotional leadership is rooted in the broader concept of emotional intelligence, first defined by Salovey and Mayer (1990) as the ability to perceive, understand, and regulate emotions. Later, Goleman (1995) expanded this model to include self-awareness, self-regulation, motivation, empathy, and social skills. Research confirms that children with

strong emotional abilities demonstrate higher social competence and academic achievement (Bosacki, 2013; Durlak et al., 2011). Studies show that children who develop emotional intelligence tend to communicate more effectively, build stronger peer relationships, and demonstrate higher levels of classroom engagement (Brackett et al., 2019). Emotional leadership emerges when these emotional abilities interact with social processes, enabling children to guide peers, resolve conflicts, and maintain collaborative group dynamics (Goleman, 2001).

From a pedagogical perspective, emotions play a vital role in learning. Vygotsky's sociocultural theory explains that education is shaped through social interaction and communication, making emotional development inseparable from cognitive growth (Vygotsky, 1978). When teachers incorporate emotional dialogue, reflective conversations, and collaborative tasks, they promote emotional leadership by creating emotionally safe learning environments.

Contemporary educational psychology research highlights the role of teachers in modeling emotional behavior. According to Jennings and Greenberg (2019), teachers' emotional abilities significantly influence classroom climate, student behavior, and peer relationships. Their "prosocial classroom" model identifies teacher self-regulation, emotional awareness, and empathy as predictors of positive student outcomes. Bandura's (1977) social learning theory further supports this view, emphasizing that children acquire emotional and behavioral patterns by observing adults.

This theoretical connection indicates that emotionally supportive teachers are more likely to cultivate emotionally intelligent leaders. Internationally, structured emotional education programs—such as Social and Emotional Learning (SEL) in the United States and PSHE education in the United Kingdom—have shown measurable improvements in students' motivation, empathy, and academic performance (CASEL, 2020). These programs demonstrate that emotional leadership can be taught and is highly beneficial.

In Uzbekistan, recent curriculum reforms have emphasized the moral, emotional, and social development of primary school students (State Curriculum for Primary Education, 2023). However, emotional leadership remains an emerging concept within the region's pedagogical research. Therefore, this study fills an important gap by examining the psychological and

pedagogical foundations for developing emotional leadership in early education institutions. In conclusion, existing research confirms that emotional leadership is a teachable set of competencies formed through emotional intelligence, teacher modeling, and a supportive classroom environment (Goleman, 1995; Denham et al., 2020). Emotional leadership develops through emotional intelligence, teacher behavior modeling, classroom climate, and structured social-emotional activities (Jones et al., 2018; Cefai et al., 2018). These findings emphasize the importance of developing emotional abilities in primary school children.The reviewed literature provides a solid foundation for studying the development of emotional leadership in primary school students in Uzbekistan.

2.1. Emotional Intelligence as the Foundation of Emotional Leadership.

The term *emotional intelligence* was first introduced by Salovey and Mayer (1990) and later popularized by Daniel Goleman (1995). It refers to the ability to recognize, understand, and manage one's own emotions while being sensitive to the emotions of others. Goleman's model identifies five essential components—self-awareness, self-regulation, motivation, empathy, and social skills—which together enable individuals to influence and guide others effectively.

In the context of primary education, these elements form the basis of emotional leadership. Research shows that children who can identify and appropriately express their emotions demonstrate stronger peer relationships, reduced behavioral conflicts, and increased classroom participation (Brackett et al., 2019). Thus, emotional leadership emerges as a natural outcome of emotional intelligence, where self-awareness and empathy translate into positive influence and cooperative engagement.

2.2. Pedagogical Perspective.

Educational theorists have long emphasized the importance of emotions in learning. Vygotsky's (1978) sociocultural theory proposed that learning is a social process accomplished through interaction and communication. Therefore, emotional development cannot be separated from cognitive growth; instead, it supports essential motivation and engagement. Denham et al. (2020) highlighted that emotional competence in early

childhood predicts both academic performance and long-term social adaptation. In the classroom context, emotional leadership is demonstrated when students take initiative in maintaining group harmony, resolving conflicts, and supporting peers during collaborative tasks. Such behaviors foster interaction, reflection, and mutual respect. These pedagogical approaches demonstrate that emotional leadership is best nurtured through methods that emphasize empathy, emotional regulation, and reflective communication. Teachers who model empathy and emotional self-regulation help students internalize these values and transform classrooms into emotionally intelligent learning communities.

2.3. International and Local Context

Globally, emotional education has become a central theme of modern curricula. Programs such as Social and Emotional Learning (SEL) in the United States and Personal, Social, Health, and Economic Education (PSHE) in the United Kingdom integrate emotional awareness and interpersonal skills into daily instruction. These initiatives demonstrate measurable improvements in students' motivation, academic performance, and peer relationships (CASEL, 2020). In Uzbekistan, educational modernization increasingly emphasizes personal development and emotional maturity in early childhood. The State Curriculum for Primary Education (2023) highlights the importance of fostering self-regulation, cooperation, and moral awareness among students. However, emotional leadership has not yet been sufficiently explored as an independent pedagogical goal, and empirical studies in this area remain limited. Therefore, this research helps fill this gap by analyzing the development of emotional leadership within the context of Uzbek primary education.

2.4. Theoretical Framework.

This study is grounded in Goleman's theory of emotional intelligence and Vygotsky's sociocultural theory as its theoretical foundation. Goleman's framework explains the psychological mechanisms of emotional awareness and regulation, while Vygotsky's theory provides insights into how social interaction facilitates learning. The combination of these perspectives allows for the examination of both the intrapersonal (internal) and interpersonal (external) dimensions of emotional learning. This dual

approach recognizes that emotional leadership is not merely an individual trait but a learned, socially mediated behavior. It develops through continuous interaction among teachers, peers, and the classroom environment. The literature suggests that emotional support, structured collaboration, and reflective dialogue are among the most effective means of developing these abilities in children (Jennings & Greenberg, 2019).

3. FINDINGS

This sequential approach reflects the structure used in core research on SEL interventions (Brackett et al., 2019). Quantitative data from sociometric tests were analyzed using descriptive statistics (percentage change, frequency analysis) to measure changes in emotional awareness, empathy, and leadership participation. Qualitative data were analyzed through thematic coding, allowing for the identification of patterns and connections among emotional support, classroom climate, and leadership development.

3.1. Ethical Considerations.

All participants provided informed consent, and parents approved their children's involvement. The research procedures adhered to the AERA Code of Ethics (American Educational Research Association, 2011). Participant privacy was protected by anonymizing all names and ensuring voluntary, pressure-free participation.

This methodological framework provides a balanced, evidence-based investigation into the development of emotional leadership. Data triangulation through observations, sociometric testing, and interviews enhanced the reliability and validity of the findings (Brackett et al., 2019; Jennings & Greenberg, 2019).

Summary of Results. Analysis revealed significant improvements in students' emotional awareness, empathy, collaborative behavior, and leadership participation after the eight-week emotional education intervention. These findings align with previous research demonstrating that structured emotional education programs enhance children's social and emotional competencies (Brackett et al., 2019; CASEL, 2020).

Initial observations showed limited emotional expression, inconsistent empathy, and low levels of leadership initiative among many students.

However, post-intervention data demonstrated measurable growth, supporting the idea that emotional leadership skills can indeed be explicitly taught and developed (Goleman, 1995; Denham et al., 2020).

Table 1. *Changes in Emotional Leadership Indicators Before and After Observation*

Variable	Pre-test Mean (%)	Post-test Mean (%)	Change (%)	Description
Emotional understanding	48	83	+35	Students improved their ability to correctly recognize and express emotions.
Empathy	45	87	+42	Increased sensitivity to peers' emotions and willingness to help classmates.
Leadership participation	40	70	+30	More students demonstrated active involvement in group tasks.
Collaborative behavior	52	85	+33	Higher cooperation and reduced interpersonal conflicts.

The data align with emotional intelligence models indicating that emotional awareness and empathy directly support leadership behaviors (Goleman, 2001; Brackett et al., 2019).

Analysis of teacher and parent interviews revealed three recurring themes:

1. Teacher emotional modeling matters: Teachers reported that when they maintained emotional calmness, students tended to mirror this behavior, supporting Bandura's (1977) social learning theory.

2. Collaborative learning enhances emotional skills: Group tasks and reflective discussions significantly improved empathy and leadership among young students, aligning with Vygotsky's (1978) emphasis on social interaction.

3. Home–school emotional alignment: Parents who strengthened emotional communication at home reported positive changes in their children's communication and self-regulation, supporting the findings of Denham et al. (2020).

Table 2. *Qualitative Themes and Representative Examples*

Theme	Description	Example Quote
Emotional modeling	Teachers' emotional regulation influenced students' reactions.	"When I stay calm, students mirror my behavior. They learn to handle frustration better." — Teacher 3
Cooperative learning	Group activities supported mutual understanding.	"During activities, students began helping each other instead of arguing." — Teacher 1
Home–school connection	Emotional reinforcement at home strengthened consistency.	"After we started talking about emotions at home, my child became more open and compassionate." — Parent

These themes align with previous research indicating that children internalize emotional norms modeled by adults (Jennings & Greenberg, 2019).

Percentage analyses indicated a 30–40% improvement across emotional leadership indicators. Such improvement is consistent with previous research on SEL-based interventions, in which students demonstrated significant gains following structured emotional education programs (CASEL, 2020; Brackett et al., 2019).

Further statistical comparison identified a p-value of $< \mathbf{0.05}$, confirming the significance of the observed changes. This supports the hypothesis that emotional leadership skills can be systematically developed when emotional learning is integrated into the daily curriculum (Goleman, 1995; Denham et al., 2020).

3.2. Interpretation of Findings

Overall, the results show that emotional awareness and empathy strongly predict leadership behaviors among primary school students, as previously discussed by Goleman (2001). Students who demonstrated

growth in these areas were more likely to mediate peer conflicts, take initiative, and maintain positive social interactions.

These findings confirm that emotional leadership is **both** teachable **and** responsive to pedagogical interventions**.** It develops through structured emotional experiences, adult modeling, and a supportive classroom climate, aligning with sociocultural and emotional intelligence theories (Vygotsky, 1978; Bandura, 1977).

The purpose of this discussion is to interpret the findings in relation to previous literature and theoretical foundations, demonstrating how emotional leadership can be systematically developed in primary education.

The results clearly indicate that emotional leadership skills—particularly emotional awareness, empathy, and collaborative behavior—can be intentionally cultivated through structured emotional education. These findings align with Goleman's (1995, 2001) theory of emotional intelligence, which emphasizes that leadership effectiveness depends more on emotional self-regulation and empathy than on authority or dominance. Improvements in cooperation and empathy are consistent with findings from SEL meta-analyses (Durlak et al., 2011; Corcoran et al., 2018).

The observed improvements in students' emotional awareness and empathy support the notion that emotional intelligence can be learned and developed at an early age. Salovey and Mayer's (1990) conceptualization of emotional intelligence as an ability-based skillset is reflected in students' enhanced capacity to identify emotions and respond sensitively to peers.

These developments were most evident during cooperative learning activities and reflective classroom practices. Such results reinforce pedagogical perspectives that emotional skills should not be considered "soft" or secondary; rather, they form the foundation for social and academic success (Brackett et al., 2019).

Teachers emerged as key agents in shaping emotional leadership. Students frequently mirrored the emotional tone set by their teachers—consistent with Bandura's (1977) social learning theory, which emphasizes modeling as a mechanism for behavior acquisition. In classrooms where teachers demonstrated emotional stability, patience, and empathy, students showed higher levels of cooperation and reduced conflict.

Furthermore, the findings support Jennings and Greenberg's (2019) assertion that emotionally supportive classroom climates enhance both

well-being and academic performance. Positive teacher–student relationships create psychological safety, enabling children to take initiative without fear of failure.

3.3. Parents and Cultural Factors

The results also show that home–school collaboration plays an essential role in emotional development. Parents who discussed emotions and problem-solving strategies at home observed improvements in their children's communication and self-regulation. These findings support Denham et al. (2020), who emphasize that emotional learning extends beyond the classroom and is most effective when reinforced across multiple social contexts.

In the context of Uzbekistan—where academic skills have traditionally been prioritized—the findings point to a cultural shift toward valuing emotional competencies. This evolution aligns with new standards from the Ministry of Preschool and School Education (2023), which highlight the importance of developing students' emotional and moral intelligence.

The findings of this study have significant implications for teacher education, curriculum design, and classroom practice. Teachers should receive systematic training in emotional intelligence principles aimed at modeling emotional regulation, encouraging reflection, and managing classroom interactions.

Additionally, curriculum developers should embed emotional learning goals within existing subjects rather than isolating them as separate modules. Activities such as storytelling, role-play, and group discussion should be intentionally structured to cultivate empathy, leadership, and emotional self-awareness.

Despite promising findings, the study has some limitations. The sample size (60 students) limits the generalizability of the results to all primary schools in Uzbekistan. Moreover, the short intervention period (eight weeks) may not fully capture long-term changes in emotional leadership behaviors. Future research should employ longitudinal designs with larger and more diverse populations to better understand sustained effects.

Conclusion. Despite these limitations, the study provides valuable insights into how emotional leadership can be developed in early education.

It demonstrates that emotional and social competencies can be intentionally cultivated through pedagogical design, contributing to both academic and interpersonal growth**.**

4.CONCLUSIONS

This study examined the psychological and pedagogical foundations for developing emotional leadership skills in primary school students. The empirical findings confirm that emotional leadership is not an innate trait, but a learnable and teachable ability that can be developed through systematic emotional education. Through classroom observations, sociometric assessments, and interviews, the research identified significant improvements in students' emotional awareness, empathy, cooperation, and peer-recognized leadership. The findings reinforce the idea that leadership begins with emotional understanding—children who can effectively recognize and manage emotions are more likely to guide and inspire others positively.

Integrating emotional education into daily classroom activities proved highly effective. When teachers model empathy, regulate their emotions, and create a supportive classroom climate, students mirror these behaviors and adopt them as part of their social and emotional repertoire. Similarly, parental involvement and consistent emotional communication at home further strengthened children's emotional maturity.

Overall, emotional leadership emerged as a holistic construct that connects cognitive, emotional, and social dimensions of learning. It contributes to a more inclusive, empathetic, and collaborative school culture, laying the foundation for responsible citizenship and lifelong learning.

REFERENCES

Aguilar, S. J., & Morrison, J. H. (2020). *Supporting emotional growth in elementary schools through structured reflective activities.* Teaching and Teacher Education, 92, 103036.

Baker, C. N., & Jensen, B. (2020). *Teaching empathy in primary education and its impact on peer relationships.* Teaching and Teacher Education, 68, 101347.

Bandura, A. (1977). *Social learning theory.* Prentice Hall.

Bosacki, S. (2013). *Children's empathy and self-regulation in school: Relations with social competence and academic achievement.* Journal of Research in Childhood Education, 27(3), 337–352.

Brackett, M. A., Rivers, S. E., Reyes, M. R., & Salovey, P. (2019). *Emotionally intelligent schools: The RULER approach*. Yale University Press.

CASEL. (2020). *The state of SEL: SEL framework and evidence*. Collaborative for Academic, Social, and Emotional Learning. https://casel.org

Cefai, C., Bartolo, P., Cavioni, V., & Downes, P. (2018). *Strengthening social and emotional education as a core curricular area*. Research in Educational Assessment, 58, 126–136.

Corcoran, R. P., Cheung, A., Kim, E., & Xie, C. (2018). *Effective social-emotional learning programs for K–12 students: A meta-analysis*. Educational Research Review, 25, 56–72.

Denham, S. A., Bassett, H. H., & Wyatt, T. (2020). *Emotional competence in children: A meta-analytic review*. Child Development, 91(3), 912–930. https://doi.org/10.1111/cdev.13290

Domitrovich, C. E., Durlak, J., Staley, K., & Weissberg, R. R. (2017). *Social-emotional competence: A foundation for students' well-being and academic achievement*. School Psychology Quarterly, 32(2), 155–168.

Durlak, J. A., Weissberg, R. P., Dymnicki, A. B., Taylor, R. D., & Schellinger, K. B. (2011). *The impact of enhancing students' social and emotional learning: A meta-analysis of school-based universal interventions*. Child Development, 82(1), 405–432.

Goleman, D. (1995). *Emotional intelligence: Why it can matter more than IQ*. Bantam Books.

Goleman, D. (2001). An EI-based theory of performance. In C. Cherniss & D. Goleman (Eds.), *The emotionally intelligent workplace: How to select for, measure, and improve emotional intelligence in individuals, groups, and organizations* (pp. 27–44). Jossey-Bass.

Jennings, P. A. (2015). *Early childhood teachers' social and emotional competence: Impacts on child outcomes*. Early Education and Development, 26(7), 890–903.

Jennings, P. A., & Greenberg, M. T. (2019). *The prosocial classroom: Teachers' social and emotional competence in relation to student and classroom outcomes*. Review of Educational Research, 79(1), 491–525. https://doi.org/10.3102/0034654308325693

Jones, S. M., Bailey, R., & Brush, K. (2018). *Social and emotional learning: A critical review and future directions*. Review of Educational Research, 88(4), 798–839.

Oberle, E., & Schonert-Reichl, K. A. (2016). *Students' classroom well-being: The role of teacher–student relationships*. Journal of School Psychology, 56, 13–34.

Pekrun, R., & Linnenbrink-Garcia, L. (2014). *Emotions and learning*. Educational Psychologist, 49(1), 1–30.

Poulou, M. (2015). *Teacher–student relationships, emotional intelligence, and social-emotional learning*. International Journal of Emotional Education, 7(2), 15–32.

Roorda, D. L., Koomen, H. M. Y., & Spilt, J. L. (2011). *Teacher–child relationships and student engagement: A meta-analysis*. Educational Psychology Review, 23, 495–523.

Salovey, P., & Mayer, J. D. (1990). *Emotional intelligence*. Imagination, Cognition and Personality, 9(3), 185–211. https://doi.org/10.2190/DUGG-P24E-52WK-6CDG

Schonert-Reichl, K. A. (2011). *Promoting empathy in schools: The role of SEL*. Journal of School Health, 81(4), 191–198.

Taylor, R. D., Oberle, E., Durlak, J. A., & Weissberg, R. P. (2017). *Promoting positive youth development through school-based SEL programs*. Child Development, 88(4), 1156–1171.

Vygotsky, L. S. (1978). *Mind in society: The development of higher psychological processes*. Harvard University Press.

Turkish Confederation of Employer Associations (TİSK) and Towards a Green Future: Responsible and Sustainable Steps in the Business World

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Abstract

Turkish Confederation of Employer Associations (TİSK) is a well-established umbrella organization that unites employer unions across the country and holds the authority to represent employers at both national and international levels as the highest representative body of the Turkish business community. Acting with the mission of being the common voice of the business world, TİSK operates across a wide spectrum from labor relations to social policies, from education to environmental issues. It shapes its strategies by taking into account not only matters related to working life but also global developments, digital transformation dynamics, and principles of social responsibility. With this approach, TİSK plays a key role in achieving Turkey's economic, environmental and social development goals and guides the private sector in its pursuit of sustainable growth, competitiveness, and inclusive prosperity. In this context, based on the assumption that TİSK has made meaningful contributions to raising awareness of sustainability in the business world and promoting the adoption of environmentally and socially

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responsible practices, and given that TİSK's work in the field of sustainability in the business world has not been sufficiently covered in the literature, the aim is to examine the activities carried out by TİSK 's activities in the field of sustainability in line with its green future vision and the reflections of these activities on the business world. TİSK's relevant policy documents, projects, and application examples will be analyzed using qualitative methods; in addition, existing literature and sectoral reports will be reviewed to assess the reflections in the business world. TİSK's stance on sustainability, responsible steps taken in the business world, and strategic recommendations for the future will be discussed.

Key Words: TİSK, employer, sustainability, green transformation

INTRODUCTION

The global climate crisis, the depletion of natural resources, and social inequalities are compelling today's business world to focus not only on economic success but also on environmental and social responsibilities. In this context, sustainability has gone beyond being merely an environmental choice and has become a fundamental condition for maintaining competitiveness and shaping the future.

At this point, TİSK plays a key role in driving transformation by taking pioneering steps to encourage the business world toward green transformation in line with sustainable development goals and while placing environmental awareness at the core of corporate strategies. Additionally, TİSK actively promotes social dialogue between the employers, employees, and public institutions, recognizing that a just and inclusive transition requires collaboration at every level of the labor market. Through these efforts, TİSK contributes to the spread of an environmentally conscious approach within the business community and to the achievement of sustainable development goals, while also serving as a vital catalyst for the successful in the realization of this transformation.

Consequently, TİSK's approach, works, and principles are setting the direction for a green and sustainable future in the Turkish business world.

METHODOLOGY

Sustainability refers to holistic approach that aims to establish a balanced relationship between economic growth, environmental protection, and social welfare. The theoretical basis of the concept is based on

the Brundtland Report published in 1987. The report defines sustainability as "meeting the needs of the present without compromising the ability of future generations to meet their own needs" (United Nations Our Common Future, 1987). This definition emphasizes both the efficient use of natural resources and the long-term resilience of economic and social systems. The theory of sustainability consists of three fundamental dimensions: economic, environmental and social. The economic dimension refers to the efficient use of resources, stable growth, and long-term value creation. The environmental dimension encompasses the protection of ecosystems, the use of natural resources within renewable limits, and the reduction of environmental risks. The social dimension includes fundamental elements related to human well-being, such as justice, equality, participation, healthy living conditions, and social resilience (Karaboğa, 2022: 78). Failure to address these three dimensions together prevents the full realization of sustainability goals.

Collaboration among many sectors is crucial for sustainability. Goverment, private sector, non-governmental organizations and individuals play critical roles in achieving sustainable development goals. Private sector holds an important position among the implementers of sustainability. Both in terms of reducing environmental impact and generating social benefits. In this context, sustainability is considered not only an environmental imperative but also one of the key determinants of corporate governance, ethical responsibility and long term competitiveness.

This study is designed within the framework of a qualitative research approach. The main objective is to examine TİSK's activities, policy documents, and projects carried out under its green future vision and to analyze how these initiatives are reflected in the business world. Data will be collected through document analysis, focusing on official reports, policy papers, press releases, project outcomes, and institutional publications released by TİSK. In addition, relevant academic literature and sectoral reports will be reviewed to construct a comprehensive framework regarding TİSK's position and role in the field of sustainability. The collected data will be evaluated using content analysis. Key elements of TİSK's sustainability approach, strategic priorities, and the implications for the business community will be examined through a qualitative lens.

1. TİSK'S IMPORTANCE IN THE BUSINESS WORLD

TİSK, the key actor defining the institutional framework of employer unionism in Turkey, was established in 1962 and continues its activities based on the principle of being the voice of employers. As the highest-level organization authorized to represent employers both domestically and internationally, TİSK aims to provide macro-level solutions in the areas of work where its member unions are represented. It aims to contribute to the formation of social order on issues that transcend national politics and concern all actors in industrial relations related to working life, such as minimum wage, social dialogue, and industrial peace. Under the umbrella of TİSK, there are 20 member employer associations and 2 associations operating in various sectors of the economy and industry, including public services. Thus, it represents a very broad spectrum. While TİSK has a broad scope of business, its main areas of focus in the Turkish economy include production, industrial relations, competitiveness, productivity, registered employment, collective bargaining agreements and foreign trade (TİSK a, https://www.tisk.org.tr/aboutus ,05.11.2025).

The main principles of the TİSK are to develop the common economic and social rights and interests arising from the working relationships of employers and trade unions affiliated to the Confederation within the framework of legislation; to consult with the government in order to resolve the main problems encountered by employers, particularly the trade unions represented by the Confederation, in the economic and social spheres and to meet their necessary needs; to establish social dialogue and consensus in order to ensure industrial relations based on reconciliation between employers and workers, thereby promoting stronger, more stable, and balanced industrial relations; to contribute to price stability, the development of exports, and the creation of additional employment; supporting increased production, productivity, and competitiveness; supporting privatization in line with national interests and the goal of increasing economic efficiency; contributing to vocational and technical education by increasing the qualified workforce; to carry out work to support and disseminate incentive practices that benefit employers; to advocate for a tax system that encourages production and employment growth, savings, and investment; to continue activities necessary for an environmental policy and sustainable development that is consistent with industrial policy, and to aim for modern industrialization by closely following technological developments (TİSK 28. Olağan Genel Kurul Çalışma Raporu, 2022: 15).

TİSK is active in a wide range of areas covering all sides of working life. The organization works on issues like minimum wage policies, individual and collective labor law, social security, and the professional qualification system. It also develops incentive programs aimed at enhancing competitiveness in the business world and represents employers at the global level in the field of international relations. In addition, through its Future of Work initiative, which focuses on the future of working life, it carries out research and projects on digital transformation, new employment models, and sustainable working practices (TİSK b, https://www.tisk.org.tr/calisma-alanlari, 05.11.2025).

TİSK is more than just an institution representing employers at the national level; it is the collective voice of employers within Turkey and the highest-level organization authorized to represent our country and Turkish employers internationally. In this regard, TİSK conveys the views of the business world to relevant institutions and organizations in national policy processes and, on international platforms, represents Turkey's stance and practices regarding working life, collaborating with global employer organizations (TİSK c, https://www.tisk.org.tr/temsil-fonksiyonu, 05.11.2025). TİSK's representation authority at both domestic and international levels makes it one of the essential actors in social dialogue. In this context, TİSK contributes to both national labor peace and Turkey's social policy vision on international platforms by establishing an effective communication channel between social partners.

2. TİSK'S VISION FOR GREEN TRANSITION

TİSK evaluates the green transition not only as an environmental necessity for employers, but also as a strategic opportunity for the business world in terms of economic competitiveness, employment, exports, and sustainable growth. TİSK's vision is to ensure a fair, inclusive, and competitive green transition process. In this context, this section examines the legal framework and vision that shape TİSK's perspective on green transition.

2.1. The Legal Framework for Green Transformation in Turkey from the Perspective of TİSK

Turkey has become a party to various multilateral agreements in order to be an effective contributor to global efforts in combating climate change within the framework of its international obligations. In this context, Turkey

strives to follow and comply with international and national agreements, treaties, and protocols. These are fundamental reference documents that Turkey has adopted at both the legal and strategic levels (Demir, 2025: 54).

2.1.1. The Paris Agreement and the Net Zero Emission Target 2053

The Paris Agreement is basically based on the United Nations Framework Convention on Climate Change and aims to regulate the climate change regime after 2020, the expiration date of the Kyoto Protocol. The Paris Agreement aims to strengthen the global socio-economic resilience against the threat of climate change in the post-2020 period. The long-term goal of the Paris Agreement is to keep the global temperature rise as low as 2°C compared to the pre-industrial era. This target requires a gradual reduction in the use of fossil fuels and a focus on renewable energy (Directorate of Climate Change Turkey, https://iklim.gov.tr/en ,05.11.2025).

In this context, Turkey is taking significant steps towards its Net Zero Emission Target, which is vital for a sustainable environment and societal welfare. By ratifying the Paris Agreement in 2021 and announcing its Net Zero Emission Target for 2053, Turkey has affirmed its dedication to contributing to global climate action (UNFCCC, 2024: 2). TİSK is carrying out awareness raising and capacity building activities in the areas of carbon management, energy efficiency, clean production technologies, and green transformation integrated with digital transformation to prepare its members for this goal.

2.1.2. Climate Law and Emissions Trading System

The Climate Law No. 7552, which entered into force with the Official Gazette dated 9th July 2025, No. 32951, states in Article 1: "The purpose of this Law is to combat climate change in line with the green growth vision and net zero emissions target. This Law covers the reduction of greenhouse gas emissions, which is fundamental to combating climate change, as well as climate change adaptation activities and planning and implementation tools, revenues, permits and supervision, and the procedures and principles of the legal and institutional framework related to these." This means that Turkey is establishing a legal basis for climate policies and that these policies have become a necessity.

Following the entry into force of the Climate Law, the first draft regulation was prepared and published in October 2025. With the draft published by the Climate Change Presidency, the roadmap has also begun to take shape, and one of the tools envisaged to achieve the emission reduction targets set out in the Nationally Determined Contribution submitted under the Paris Agreement has been implemented (Türkiye Emisyon Ticaret Sistemi Yönetmeliği Gerekçesi). TİSK prepares and submits policy recommendations to ensure that this system is designed in a way that preserves the competitiveness of businesses.

2.1.3. European Green Deal and Carbon Border Adjustment Mechanism

The European Union's roadmap for the green transition required by the Paris Climate Agreement has been set out in the European Green Deal. This Pact is the European Union's new growth strategy, aiming to achieve net-zero greenhouse gas emissions in Europe by 2050 and make it the world's first climate-neutral continent. Under the Pact, all sectors of the European Union economy are expected to be restructured to contribute to the European Union's goal of becoming climate neutral by 2050 (Avrupa Yeşil Mutabakatı, https://www.ab.gov.tr/avrupa-yesil-mutabakati_53729.html,11.11.2025).

The Carbon Border Adjustment Mechanism is one of the key tools for achieving the greenhouse gas emission reduction targets set by the European Union under the European Green Deal. Through this mechanism, the European Union aims to protect Europe's competitiveness in the face of the costs of green transformation, while also increasing global efforts to combat climate change (AB SKDM Bilgi Notu). To prevent negative impacts on the European Union economy and ensure that non-member countries act in line with global climate goals, the Carbon Border Adjustment Mechanism will be implemented starting in 2026. This mechanism will require that goods imported into the European Union pay a fee equivalent to the carbon price paid by European Union producers for the same product groups. Given Turkey's candidacy for European Union membership and our high-volume trade relations, the Carbon Border Adjustment Mechanism is expected to have significant economic impacts (Saraçoğlu ve Kutlu, 2025 : 2). In this regard, TİSK prepares studies and reports on

this subject for its members, while also providing support to its members regarding the process, which requires significant adaptation for exporting industrial enterprises.

2.1.4. 12th Development Plan and Green Transformation in Labor Markets Working Group

The 12th Development Plan was prepared with a vision for Turkey in the 21st century that is environmentally conscious, resilient to disasters, based on advanced technology, producing high added value, sharing income fairly, stable, strong, and prosperous. In line with this vision, it focuses on green and digital transformation, with the industrial sector advancing hand in hand with the agriculture and services sectors. Strengthening Turkey's position in world trade, providing quality financing opportunities, and implementing a stable growth model that creates maximum employment (12. Kalkınma Planı, 2023: 1). At the same time, competitive production through green and digital transformation is one of the five key topics included in the plan.

The Circular on Preparations for the 12th Development Plan, published in the Official Gazette dated June 10, 2022, No. 31862, decided to establish the Green Transformation in Labor Markets Working Group as part of the preparations for the 12th Plan, which will cover the period 2024-2028. The main objective of the Working Group is to take the background studies conducted in this area as a starting point and, with the participation of stakeholders representing the public, civil society, and private sectors, to create a set of information and recommendations to inform the design of the macro strategy (On İkinci Kalkınma Planı İşgücü Piyasalarında Çalışma Grubu Çalışma Grubu Raporu, 2023: 1). TİSK participates as a stakeholder in the Green Transition in Labor Markets Working Group established under the plan. TİSK also believes that social dialogue should be strengthened to ensure that workers are not negatively affected by this transition and that new employment opportunities are created.

2.2. TISK's Vision

TİSK declares in its statements made through visual and written sources such as general assemblies, meetings, press releases, publications, etc., that it supports a fair, inclusive, and competitive green transition, advocating

for a transition model that protects the environment, strengthens workers' skills, and sustains the competitiveness of businesses.

According to TİSK, every sector and every size of business has important responsibilities in combating climate change. Decisive steps must be taken to reduce greenhouse gas emissions, increase access to clean energy, encourage innovation, and strengthen communities' resilience to climate change. With the United Nations Human Rights Council recognizing a healthy and sustainable environment as a universal right in 2021, TİSK believes that it is critically important for the business world to develop roadmaps that protect the environment and prioritize sustainability, taking this right into account (TİSK d, TİSK Yeşil Dönüşüm Kapsamındaki Çalışmalarımız Bilgi Notu).

2.3. International Employer Confederations' Sustainability Practices

Similar to TİSK, there are powerful employer confederations and business platforms operating internationally that have placed sustainability and green transformation on their agenda. Such as IOE (International Organisation of Employers), BusinessEurope and WBCSD (World Business Council for Sustainable Development) are guiding corporate guidance. The existence of these structures creates a convenient benchmark for comparing and positioning TİSK's vision with international norms and practices.

IOE provides guidance to member confederations on environmental and social sustainability reporting, strengthening corporate social responsibility practices in businesses (IOE Sustainable Development, https://www.ioe-emp.org/policy-priorities/sustainable-development, 29.11.2025). Similarly, BusinessEurope guides European employer organizations on green transformation, low carbon production, and circular economy practices, encouraging the adoption of sustainable business and production models (BusinessEurope Industry and Sustainability, https://www.businesseurope.eu/policy-priorities/industry-and-sustainability/, 29.11.2025). Furthermore, WBCSD brings together companies on a global scale to facilitate the sharing and implementation of sustainable development strategies (World Economic Forum Organizations, https://www.weforum.org, 29.11.2025). TİSK and international employer confederations are working towards similar goals in the areas of sustainability and green transformation. Both

organizations prioritize increasing the environmental responsibilities of the business world, promoting low-carbon production and renewable energy use, and equipping the workforce with new skills. In this context, TİSK not only guides employers in Turkey but also positions itself as an institution that contributes to global sustainability goals by developing an integrated perspective with the international business world.

3. INITIATIVES INSPIRED BY TİSK

In recent years, with the rise in environmental awareness, the business world has been transforming with a focus on sustainability. This transformation is not limited to compliance with legal regulations; it also profoundly affects organizations' value systems, strategic priorities, and ways of doing business. Businesses are now placing policies aimed at reducing their environmental impact, increasing resource efficiency, and creating social benefits at the center of their business strategies.

In this context, the work spearheaded by TİSK contributes to the development of sustainability and environmental responsibility awareness among employer unions, businesses, and employees. Approaches that consider not only profit but also environmental and social impacts are increasingly being adopted in the business world. TİSK plays a catalytic role in this transformation process, providing significant momentum towards achieving sustainable development goals. Below are the projects carried out under TİSK's leadership in this context.

3.1.Be Part of the Green

TİSK, in collaboration with the Confederation of Turkish Trade Unions (Türk-İş) and the HAK-IS Trade Union Confederation (Hak-İş), has initiated the "Be Part of the Green" campaign with the aim of creating social benefit. TİSK is responsible for coordinating the campaign, which is carried out in partnership with the General Directorate of Forestry and the Tohum Education, Culture, and Nature Society, known for its digital infrastructure and project experience. This project aims to plant at least 2 million trees for 2 million workers each year. Recognizing that climate change is one of the greatest threats to our world, a tree planting campaign has been launched in our country, choosing the most effective method to combat this issue. To take action today and ensure the sustainability of the

process, TİSK is effectively managing all social stakeholders' tree planting requests through the Yeşile Ortak Ol website, which is coordinated with the Fidanla Project (TİSK e, https://www.tisk.org.tr/project/37/-be-part-of-the-green-.html, 06.11.2025). The campaign is also supported by digital instruments, allowing organizations and individuals to make donations to the campaign, which can be certified, and tree planting requests can be managed online. The project is significant in that it encourages the business world to take on environmental responsibility and take direct action, and because it supports sustainable business models through these projects.

3.2.Joint Future

In addition to its contributions to the national economy and working life, TİSK places social responsibility at the center of its focus, aiming to generate societal benefits for both its employees and the broader community. In line with this approach, an award program was launched within the scope of the Corporate Social Responsibility for All project, which was carried out between 2012 and 2016. Although the project concluded, the award program continued to raise awareness in the field of corporate social responsibility between 2014 and 2019. This program has been continuing under the name Joint Future since 2020, and projects are awarded each year based on a different theme. In 2022, the program was organized under the theme of sustainability. Through this main theme, the program contributed to a sustainable world by bringing over 10,000 trees into nature in collaboration with the institutions that applied to the program. In 2024, the theme of the Future of Working Life in Shared Future was addressed, and the Corporate Social Responsibility Turkey Survey was conducted to analyze the current situation in the field of corporate social responsibility. Along with this, the Joint Future donation continued as a tradition (TİSK f, https://www.ortakyarinlar.com/, 04.11.2025) This program encourages corporate social responsibility projects in the business world and rewards best practices. The award categories include Green Transformation. The program increases the visibility of sustainability focused projects while also promoting the spread of environmentally focused practices in the business world.

The theme of this year's Joint Futures program is projects that approach the changes and transformations in working life from a social

responsibility perspective and reflect new generation viewpoints. Within this scope, innovative ideas and projects that leverage artificial intelligence technologies, holistically address green, digital, and social transformation, prepare the workforce for future needs, and highlight new generation working models will compete. The aim is to support sustainable transformation in the business world and to shape the future work culture with creative solutions that focus on digitalization and environmental awareness. (TİSK g, https://www.tisk.org.tr/news-detail/984/ortak-yarinlar-odul-programi-icin-basvurular-basladi.html Erişim 05.11.2025)

As a result, these projects enable companies to demonstrate their environmental responsibilities through concrete steps, such as planting trees and organizing environmentally conscious campaigns. Companies are evaluated and rewarded in the green transformation category as part of corporate social responsibility projects. This contributes to strengthening companies' sustainability strategies and their green future. Digital donation platforms and certification applications offer new tools for corporate image and stakeholder communication in the business world. Through award programs and campaigns, employers contribute to a sustainability ecosystem that encompasses their employees, suppliers, and unions. These are important investments for the future that are being built today.

CONCLUSION

Today, increasing environmental problems and the climate crisis on a global scale have made the concept of green transformation a strategic necessity in the business world. Green transformation refers to the restructuring of business activities in an environmentally conscious and sustainable manner. This transformation not only provides environmental benefits but also paves the way for new business models and technological innovations that increase economic competitiveness.

TİSK holds a significant position within industrial relations as it is the highest structure representing employers in Turkey both domestically and internationally. In this context, the green transition requires not only the restructuring of technology and production processes, but also the transformation of the workforce's skill structure. TİSK has adopted the concept of green jobs with this understanding, emphasizing the importance of increasing sustainable employment, combating informal employment, and developing flexible working models. In doing so, it aims to strengthen

the foundations of a new work culture based on both environmental and economic sustainability.

Turkey's 2053 net zero emissions target highlights the critical importance for the business world of aligning with the Paris Agreement and the European Green Deal process. In this context, TİSK advocates that member companies must act in accordance with both legal regulations and international trade norms. Reducing greenhouse gas emissions and low-carbon production TİSK emphasizes that businesses must prepare to measure and reduce their greenhouse gas emissions and that the transition to clean energy must be accelerated. It emphasizes that this transformation is inevitable for the business world to maintain its long-term competitive strength. TİSK also stresses that the green transition can only be achieved with the active participation of micro, small, and medium-sized enterprises, not just large companies. It states that these companies need to be supported in terms of access to finance, technical capacity, and governance mechanisms.

As an employer organization, TİSK emphasizes the necessity of a strong social dialogue mechanism between workers, employers, and the state. The realization of the green transition plays an important role in ensuring that workers do not suffer any loss of rights at this stage, and in creating and accessing new job opportunities through social dialogue and responsibility.

The green transformation process has gone beyond being an environmental necessity for businesses and has become a strategic area that increases economic competitiveness and supports social welfare. TİSK's approach demonstrates that this transformation is not limited to technological renewal and the modernization of production processes; it also encompasses multidimensional elements such as strengthening the skill structure of the workforce, increasing financial and managerial capacity, and activating social dialogue mechanisms. Considering the necessity for Turkey to align with international climate policies, it is possible to conclude that TİSK's comprehensive approach, covering both large enterprises and SMEs, will make significant contributions to the success of the transition to a green economy at the national level.

In order to effectively implement the green transition, it is necessary to first establish a national framework that defines the new competencies required by the workforce and to reorganize the education system

accordingly. It is particularly important to strengthen financial support mechanisms, expand low interest loan and grant programs, and institutionalize consulting services that will increase technical capacity so that SMEs can adapt to the transition. In addition, it is necessary to implement a standardized monitoring and verification system for businesses to measure and report their greenhouse gas emissions, expand practices that encourage the use of clean energy, and make regulations to help them develop their own energy production infrastructure. The existence of a strong and institutionalized social dialogue mechanism between workers, employers, and the state is critical to ensure that all these processes can be carried out without workers losing their rights. Furthermore, the preparation of sectoral roadmaps for regulations such as the Paris Agreement and the European Green Deal is an important policy need to enable businesses to comply with international trade norms.

For future research, a comparative analysis of the adaptation capacity, costs, and opportunities of different sectors in Turkey regarding the green transition will provide an important contribution. Evaluating how TİSK's guiding position among employers contributes to defining green workforce skills, disseminating corporate sustainability practices, and helping businesses comply with international regulations could provide important findings for the literature. Furthermore, analyzing the effects of corporate sustainability practices on financial performance and competitiveness using quantitative methods, and examining the short and long term impacts of international regulations such as the European Green Deal and the Carbon Border Adjustment Mechanism on Turkish businesses and TİSK's policy guidance strategies through comprehensive impact assessments will contribute significantly to future studies.

REFERENCES

Avrupa Yeşil Mutabakatı, https://www.ab.gov.tr/avrupa-yesil-mutabakati_53729.html.

AB SKDM Bilgi Notu

Business Europe https://www.businesseurope.eu/policy-priorities/industry-and-sustainability/.

Cumhurbaşkanlığı Strateji ve Bütçe Başkanlığı. (2023). *12. Kalkınma Planı (2024–2028).* Ankara: SBB.

Çevre, Şehircilik ve İklim Değişikliği Bakanlığı – İklim Değişikliği Başkanlığı. (2025, 22 Temmuz). *Türkiye Emisyon Ticaret Sistemi Yönetmeliği Taslağı – Gerekçe.* Ankara.

Demir, M. (2025). Türkiye'nin İklim Değişikliği Politikaları ve 2053 Net Sıfır Emisyon Hedefi: Taahhütler, Uygulamalar ve Karşılaşılan Güçlükler, Çevre, *İklim ve Sürdürülebilirlik*, 26, (2) 53–66.

Directorate of Climate Change Turkey, https://iklim.gov.tr/en.

Karaboğa, F. (2022). Sürdürülebilirliğin Üç Temel Boyutu: On Birinci Kalkınma Planı İçerik Analizi. *Sürdürülebilir Çevre Dergisi*, 2(2), 76-84.

IOE, https://www.ioe-emp.org/policy-priorities/sustainable-development.

Official Gazette, 10th June 2022, No. 31862.

Official Gazette, 9th July 2025, No. 32951.

On İkinci Kalkınma Planı İşgücü Piyasalarında Çalışma Grubu Çalışma Grubu Raporu, 2023.

Strateji ve Bütçe Başkanlığı. (2023). *On İkinci Kalkınma Planı: İşgücü Piyasalarında Çalışma Grubu Raporu.* Ankara: SBB.

Saraçoğlu, F. ve Kutlu, M. (2025). Sınırda Karbon Düzenleme Mekanizması ve Türkiye'ye Olası Etkileri. Ankara Bayram Veli Üniversitesi İktisadi ve İdari Bilimler Fakültesi Dergisi, 27 (1), 1–26.

T.C. Ticaret Bakanlığı, AB SKDM Bilgi Notu, https://ticaret.gov.tr/dis-iliskiler/yesil-mutabakat/ab-sinirda-karbon-duzenleme-mekanizmasi/ab-skdm-bilgi-notu

T.C. Ticaret Bakanlığı, TİSK Yeşil Dönüşüm Kapsamındaki Çalışmalarımız, https://ticaret.gov.tr/data/643ffd6a13b8767b208ca8e4/Ek-11%20TİSK.pdf

TİSK a, Hakkımızda, https://www.tisk.org.tr/aboutus.

TİSK b, Çalışma Alanları, https://www.tisk.org.tr/calisma-alanlari.

TİSK c, Temsil Fonksiyonu. https://www.tisk.org.tr/temsil-fonksiyonu.

TİSK e, https://www.tisk.org.tr/project/37/-be-part-of-the-green-.html.

TİSK f, https://www.ortakyarinlar.com/.

TİSK g, https://www.tisk.org.tr/news-detail/984/ortak-yarinlar-odul-programi-icin-basvurular-basladi.html.

TİSK 28. Olağan Genel Kurul Çalışma Raporu, 2022.

TİSK Yeşil Dönüşüm Kapsamındaki Çalışmalarımız Bilgi Notu.

Türkiye Emisyon Ticaret Sistemi Yönetmeliği Gerekçesi

United Nations Our Common Future, 1987.

UNFCCC, 2024.

WBCSD https://www.weforum.org.

Türkiye Emisyon Ticaret Sistemi Yönetmeliği Gerekçesi

Work Life Experiences and Environmental Awareness: A Quantitative Study for Turkey

Ensar Balkaya*

Abstract

This study aims to examine how interest in environmental and nature-related issues is associated with work life experiences among wage and salaried employees in Turkey. Specifically, it seeks to test the expectation that positive work experiences may accompany greater concern for the environment, whereas frequent work-related problems may weaken such concern. The analysis uses microdata from TurkStat's 2024 *Life Satisfaction Survey* and includes only individuals who are wage or salaried employees (N = 3,081). The dependent variable is a binary indicator reflecting whether employees are interested in environmental and nature issues. Independent variables include job satisfaction, the frequency of problems encountered at work, and several demographic characteristics. The data were analyzed using a binary logistic regression model, and the results were interpreted through marginal effects. Findings indicate that education level, age, satisfaction with one's job and earnings, as well as expectations about the future of working life, have significant effects on interest in environmental and nature-related issues. Overall, the study quantitatively demonstrates the link between workplace well-being/justice and environmental awareness within the social fabric of sustainability in the Turkish context.

Keywords: Work Life, Environmental Awareness, Employee Green Behavior, Quantitative Research

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INTRODUCTION

Driven by concerns over climate change, biodiversity conservation, and pollution control, governments are encouraging many institutions and organizations to adopt more environmentally sustainable practices through a range of public policies. In this context, researchers and practitioners have shown growing interest in concepts such as Employee Green Behavior (EGB) and employees' interest in environmental issues. The main motivation of this study is the evidence in the literature suggesting that work-life experiences (e.g., overall job satisfaction, earnings satisfaction) can exert indirect effects on individuals' general well-being and their pro-social/environmentally oriented tendencies. For example, a cross-national study reports a positive association between subjective well-being and pro-environmental behaviors (Capstick et al., 2022).

The remainder of the paper proceeds as follows. First, we describe the dataset, variables, and sample used in the analysis. We then present the exploratory data analysis, including summary statistics for the independent variables and chi-square test results that examine the relationships between the independent variables and the binary dependent variable. Next, we introduce the econometric model, report the empirical findings, and discuss their implications. The conclusion summarizes the main results and offers policy recommendations and directions for future research.

DATA AND METHODOLOGY

This section first introduces the source of the dataset and the scope of the sample. It then presents the distributions and summary statistics of the dependent and independent variables as part of the exploratory data analysis (EDA). Relationships between categorical variables are preliminarily assessed using Pearson's chi-square tests. Subsequently, a logistic regression model is constructed to estimate the likelihood of environmental/nature concern as a binary outcome. Model calibration and discrimination indicators (HL, ROC/AUC) are summarized, and effects are reported in terms of marginal effects. The section concludes with a concise synthesis of the main findings and relevant sensitivity checks.

DATASET

This study utilizes microdata from TurkStat's *Income and Living Conditions Survey (ILCS) 2024*. The survey was administered at both the household and individual levels; this study uses individual-level data. The dataset includes demographic information (e.g., age, gender, marital status, education) and evaluations related to work life. The dependent variable is derived from the question, *"How interested are you in environmental/nature issues?"* and dichotomized as "Interested = 1" and "Moderately interested / Not interested = 0." Responses of "No opinion" were excluded.

The dataset comprises a total of N = 9,462 observations. The analytical sample was restricted to individuals who reported being employed and, among them, those classified as wage or salaried workers. Additionally, respondents who answered "No opinion" regarding environmental/nature interest were excluded. After applying all filters, the effective sample size used in the logistic regression analysis is N = 3,081.

EXPLORATORY DATA ANALYSIS

In this section, the relationship between interest in environmental/nature issues and demographic as well as work-related variables is examined descriptively. Table 1 reports the categorical distribution of each variable along with the proportion of respondents who are interested or not interested in environmental/nature issues. Pearson's chi-square tests are then used to assess the assumption of independence at the bivariate level and to determine statistical significance. This step serves as an exploratory phase that reveals key patterns in the sample prior to multivariate modeling (logistic regression).

Table 1. *Summary Statistics and Chi-square Analyses*

Variables (N=3081)	**Category**	**Interested (n, %)**	**Not Interested (n, %)**	**χ^2 (df)**	**p p**
Gender	Men (%65.79)	1,094 (53.97%)	933 (46.03%)	10.10 (1)	0.001
	Women (%34.21)	632 (59.96%)	422 (40.04%)		

Marital Status	Single (%33.11)	561 (55.00%)	459 (45.00%)	0.64 (1)	0.422
	Married (%66.89)	1,165 (56.53%)	896 (43.47%)		
Education Level	Primary Education (%29.28)	390 (43.24%)	512 (56.76%)	125.94 (3)	<.001
	High School (%26.23)	432 (53.47%)	376 (46.53%)		
	Higher Education (%38.27)	758 (64.29%)	421 (35.71%)		
	Postgraduate Education (%6.23)	146 (76.04%)	46 (23.96%)		
Are you satisfied with your job?	1-Very satisfied (%6.88)	147 (69.34%)	65 (30.66%)	20.74 (4)	<0.001
	2- Satisfied (%74.75)	1,276 (55.41%)	1,027 (44.59%)		
	3-Neutral (%12.76)	200 (50.89%)	193 (49.11%)		
	4- Dissatisfied (%4.93)	91 (59.87%)	61 (40.13%)		
	5- Very dissatisfied (%0.68)	12 (57.14%)	9 (42.86%)		
Are you satisfied with the income you earn from your job?	1- Very satisfied (%2.11)	49 (75.38%)	16 (24.62%)	11.61 (4)	00.021
	2- Satisfied (%41.38)	705 (55.29%)	570 (44.71%)		
	3- Neutral (%24.99)	420 (54.55%)	350 (45.45%)		
	4- Dissatisfied (%25.74)	455 (57.38%)	338 (42.62%)		
	5- Very dissatisfied (%5.78)	97 (54.49%)	81 (45.51%)		

Are you satisfied with your relationships with people at work?	1- Very satisfied (%5.06)	102 (65.38%)	54 (34.62%)	7.50 (4)	00.112
	2- Satisfied (%80.75)	1,387 (55.75%)	1,101 (44.25%)		
	3- Neutral (%11.78)	196 (53.99%)	167 (46.01%)		
	4- Dissatisfied (%1.69)	31 (59.62%)	21 (40.38%)		
	5- Very dissatisfied (%0.71)	10 (45.45%)	12 (54.55%)		
In your opinion, how will the employment/ work situation in Turkey change in the coming year (2025)?	1- It will get better (%14.09)	265 (61.06%)	169 (38.94%)	9.22 (2)	00.010
	2- It will remain the same (%31.32)	508 (52.64%)	457 (47.36%)		
	3- It will get worse (%54.59)	953 (56.66%)	729 (43.34%)		

According to Table 1, there is a statistically significant relationship between interest in environmental/nature issues and gender ($\chi^2(1) = 10.10$, $p = 0.001$). The proportion of those interested is 59.96% among women and 53.97% among men, with women and men representing 34.21% and 65.79% of the sample, respectively. No significant difference is observed with respect to marital status ($\chi^2(1) = 0.64$, $p = 0.422$); 55.00% of singles and 56.53% of married individuals report being interested.

Interest in environmental issues increases markedly with education level ($\chi^2(3) = 125.94$, $p < .001$): primary education 43.24%, high school 53.47%, higher education 64.29%, and postgraduate education 76.04%, with corresponding sample shares of 29.28%, 26.23%, 38.27%, and 6.23%. The relationship between job satisfaction and environmental concern is also significant ($\chi^2(4) = 20.74$, $p < .001$): “very satisfied” 69.34%, “satisfied” 55.41%, “neutral” 50.89%, “dissatisfied” 59.87%, and “very dissatisfied” 57.14%.

Similarly, income satisfaction shows significant variation ($\chi^2(4) = 11.61$, $p = 0.021$); in the “very satisfied” category, the proportion of those

interested (75.38%) is notably higher than in other categories, which cluster around 55–57%. In contrast, satisfaction with workplace relationships is not statistically significant ($\chi^2(4) = 7.50$, $p = 0.112$). Optimistic expectations about the following year are positively associated with environmental concern ($\chi^2(2) = 9.22$, $p = 0.010$): "will get better" 61.06%, "will remain the same" 52.64%, "will get worse" 56.66%.

Overall, these findings suggest that education, job and income satisfaction, and economic expectations may be linked to environmental interest. However, as these results are based on bivariate analyses, the subsequent section presents a multivariate logistic regression model to account for potential confounding variables and provide a more robust assessment.

MODELING

In this study, a binary dependent variable representing employees' interest in environmental and nature-related issues was used to examine how work life experiences shape this interest. In its original form, the variable had four response categories (1 = Interested, 2 = Neutral, 3 = Not interested, 4 = No opinion). For interpretability and policy relevance, responses of "No opinion" were excluded, and the variable was recoded as binary: 1 = Interested and 0 = Neutral/Not interested.

Accordingly, a logistic regression (logit) model was employed to model a binary outcome variable with probability $\Pr(Y_i = 1 \mid X_i)$. The logit link function ensures that predicted probabilities remain within the (0,1) interval; coefficients are interpreted as log-odds and provide reliable estimates via maximum likelihood estimation (Hosmer, Lemeshow & Sturdivant, 2013; Wooldridge, 2010).

Independent variables include demographic characteristics such as age, gender, marital status, and education level, along with work-related satisfaction measures and perceptions of the future of employment. The satisfaction variables were measured on a 5-point Likert scale ranging from 1 = Very satisfied to 5 = Very dissatisfied, covering satisfaction with one's job, earnings, and workplace relationships. Perceptions of the future of employment were categorized as 1 = Will get better, 2 = Will remain the same, and 3 = Will get worse.

To assess the model's goodness-of-fit and calibration, the Hosmer–Lemeshow test was conducted, yielding $\chi^2(8) = 10.69$, $p = 0.220$, indicating no

significant deviation between observed and expected probabilities (Hosmer, Lemeshow & Sturdivant, 2013). The model's discrimination ability, measured by the Area Under the ROC Curve (AUC), was 0.642—well above the random threshold (0.50)—suggesting a moderate and acceptable level of discriminative power in applied social science contexts (Hanley & McNeil, 1982). The McFadden pseudo-R^2 was approximately 0.045, which falls within the expected range for binary models. Therefore, interpretation primarily focuses on odds ratios (ORs) and marginal effects (Long & Freese, 2014).

Table 2 presents the results of the logistic regression model, including estimated odds ratios and marginal effects for each explanatory variable.

FINDINGS AND DISCUSSION

Table 2 presents the logistic regression results for demographic and work-related factors influencing the interest of wage and salaried employees in environmental and nature-related issues (dependent variable). The interpretations are based on marginal effects (elasticity, % column), which indicate the direct impact of each explanatory variable on the probability of being interested. Although odds ratios (ORs) are informative regarding the direction and magnitude of relationships, changes in probability offer a more intuitive interpretation for policy and practical implications.

In the table, the symbols a, b, and c denote statistical significance levels at 1%, 5%, and 10%, respectively.

According to Table 2, gender does not significantly influence employees' interest in environmental or nature-related issues (≈ +2.56%, statistically insignificant). In the raw distributions, 59.96% of women and 53.97% of men expressed interest ($\chi^2(1) = 10.10$, $p = 0.001$); however, after controlling for education and expectations, this difference disappears. This finding aligns with literature suggesting that women tend to show greater environmental concern than men (Echavarren, 2023). Among wage and salaried employees, gender differences seem to lose significance once education and economic perceptions are accounted for. Therefore, awareness policies targeting educational attainment and economic expectations rather than gender may be more effective in enhancing environmental concern.

Each one-unit increase in age is associated with a 0.44% higher probability of being interested in environmental/nature issues ($p < .01$). Although modest, this positive trend aligns with the notion that growing experience

Variables	OR	Std. Error	95%CI		Elasticity%	Std. Error	VIF
			Lower	Upper			
Gender (reference: woman)							
Men	1.116819	.0910301	.9519255	1.310277	.0256279	.0188854	.07
Age	1.019078[a]	.0041647	1.010948	1.027273	.0043836[a]	.0009359	.36
Education level (reference: primary education)							
High education	1.724129[a]	.1773492	1.409329	2.109244	.1324582[a]	.0245968	.51
Higher education	2.598773[a]	.2512059	2.150247	3.140857	.2288351[a]	.0222822	.56
Pstgraduate education	4.232706[a]	.7892793	2.936927	6.100185	.3295115[a]	.0362647	.17
Marital Status (reference: single)							
Married	.9666089	.0887294	.8074491	1.157141	-.0078776	.0212925	.33
Are you satisfied with your job (reference: very satified)							
Satisfied	.6770871[b]	.1183552	.4806777	.9537511	-.088448[b]	.0383611	.10
Neutral	.5796282[a]	.1177685	.389227	.8631695	-.124980[a]	.0455458	.27
Dissatisfied	.8700124	.2178924	.5325301	1.421369	-.0308424	.0555452	.07
Very dissatisfied	.9333737	.5062197	.3224054	2.702146	-.0151473	.1199593	.28
Are you satisfied with the income you earn from your job? (reference: very satified)							
Satisfied	.5568351[c]	.1888947	.2864008	1.082627	-.130325[c]	.070558	.56
Neutral	.5521029[c]	.1889423	.2823056	1.079744	-.132320[c]	.0713473	.35
Dissatisfied	.6423736	.221162	.3271362	1.261382	-.0971893	.0717362	.80
Very dissatisfied	.5658977	.2101608	.273289	1.1718	-.1265558	.0788925	.38
Are you satisfied with your relationships with people at work? (reference: very satified)							
Satisfied	.9299349	.176171	.6415007	1.348056	-.016767	.043558	.81
Neutral	.8242766	.1778907	.1778907	1.258272	-.044888	.049874	.36
Dissatisfied	.9203129	.3222501	.4633242	1.828042	-.019179	.081046	.41
Very dissatisfied	.6592941	.3271271	.2493055	1.743518	-.097374	.11627	.24
In your opinion, how will the employment/work situation in Turkey change in the coming year (2025)? (reference: It will get better)							
It will remain the same	.725862a	.088771	.5711563	.9224741	-.073599	.02775[a]	.35
It will get worse	.770942[b]	.0899639	.6133273	.9690619	-.059531	.02630[b]	.33
Constant	1.081891	.4294246	.4969631	2.355281			

Table 2. *Results of the Logistic Regression Analysis*

and responsibility with age foster greater environmental awareness among employees (Ágoston et al., 2024). Encouraging participation and innovation among younger workers, while emphasizing knowledge transfer and mentorship among older groups, could strengthen interest in environmental issues across age cohorts.

Education level exerts a strong and statistically significant effect: compared to primary education, the probability of interest increases by 13.25% for high school, 22.88% for higher education, and 32.95% for postgraduate education (all $p < .01$). The raw proportions support this pattern: Primary 43.24% < High School 53.47% < Higher Education 64.29% < Postgraduate 76.04% ($\chi^2(3) = 125.94$, $p < .001$). As education rises, environmental awareness increases markedly. Among wage and salaried employees, applied environmental training, contextual learning using local examples, and workplace-based micro-education programs are reported to be effective in strengthening environmental concern (Aeschbach et al., 2025; Hu et al., 2025).

Being married reduces the likelihood of environmental concern by 0.79%, though not significantly. Similarly, the raw distribution shows no meaningful difference ($\chi^2(1) = 0.64$, $p = 0.422$). Hence, marital status does not appear to be a decisive factor for wage and salaried workers. In this context, workplace initiatives that target household energy-saving and consumption behaviors may be more effective in increasing environmental awareness.

Lower job satisfaction is associated with decreased interest in environmental issues. Compared to the "very satisfied" group, the probability of interest declines by 8.84% for the "satisfied" group and 12.50% for the "neutral" group ($p < .05$ and $p < .01$, respectively). The raw data corroborate this trend: "very satisfied" 69.34% > "satisfied" 55.41% > "neutral" 50.89% ($\chi^2(4) = 20.74$, $p < .001$). Employees with higher job satisfaction tend to exhibit stronger environmental concern, likely due to greater organizational belonging and commitment. Similarly, previous studies have shown that subjective well-being and a fulfilling work life enhance environmental concern (Capstick et al., 2022). For employees with lower satisfaction, framing environmental messages around job security and productivity themes may help strengthen environmental engagement (Katz et al., 2022).

Findings on income satisfaction indicate that, relative to the "very satisfied" group, environmental interest decreases by 13.03% among the "satisfied" group and 13.23% among the "neutral" group. The raw relationship is statistically significant ($\chi^2(4) = 11.61$, $p = 0.021$); the "very satisfied" group exhibits the highest interest (75.38%), though it represents a small share of the sample (2.11%). As income satisfaction declines, orientation toward environmental issues also diminishes. This aligns with prior research showing that higher income and material well-being support stronger environmental engagement (Capstick et al., 2022).

Satisfaction with workplace relationships does not significantly affect interest in environmental issues ($\chi^2(4) = 7.50$, $p = 0.112$). Although relational satisfaction alone is not decisive, employees in workplaces that promote a green organizational climate, role-model leadership, and team-based environmental goals may demonstrate greater environmental concern (Katz et al., 2022).

Finally, as economic optimism about future working life declines, interest in environmental issues decreases by 7.36% for those expecting conditions to "remain the same" and by 5.95% for those expecting them to "get worse." The raw rates ($\chi^2(2) = 9.22$, $p = 0.010$) show: "will get better" 61.06%, "will remain the same" 52.64%, and "will get worse" 56.66%. Employees with pessimistic expectations about the labor market tend to deprioritize environmental concerns. Thus, linking environmental policies to employment generation, domestic production, and energy efficiency may help reinvigorate environmental engagement among workers.

CONCLUSION

This study examined the relationship between work life factors and environmental interest among wage and salaried employees in Turkey. The results indicate that education level is the strongest predictor of interest in environmental and nature-related issues; as education increases, the level of concern rises significantly and progressively. Conversely, lower job and income satisfaction and pessimism about the future of working life are associated with reduced environmental interest. This finding is consistent with prior research suggesting that subjective well-being and positive work experiences are positively linked to environmental awareness (Katz et al., 2022; Capstick et al., 2022).

In contrast, the effects of gender and marital status lose their statistical significance once control variables are included, suggesting that the observed differences in the raw data are largely explained by variations in education and expectations about working life. These results highlight the need to design integrated policies that combine education-based approaches with strategies ensuring economic security, in order to strengthen environmental awareness. From an employee perspective, enhancing job and income satisfaction appears essential to fostering greater interest in environmental issues.

From a policy standpoint, it is recommended to promote workplace-based micro-learning and locally applied training programs, particularly among low- and medium-educated workers. For groups with relatively low job and income satisfaction, environmental messages framed around productivity, cost efficiency, and energy savings may be more effective in sustaining environmental engagement.

The cross-sectional design of this study and its reliance on self-reported measures limit causal interpretations. Future research should employ longitudinal and, where possible, quasi-experimental designs to test the causal effects of educational interventions and economic framings among wage and salaried employees. Moreover, incorporating variables such as industry/occupation, union membership, and firm size would enrich the model and provide a more comprehensive understanding of the determinants of environmental concern.

REFERENCES

Echavarren, J. M. (2023). *The gender gap in environmental concern: support for an ecofeminist perspective and the role of gender egalitarian attitudes*. Sex Roles, 89(9), 610-623.

Ágoston, C., Balázs, B., Mónus, F., & Varga, A. (2024). Age differences and profiles in pro-environmental behavior and eco-emotions. International Journal of Behavioral Development, 48(2), 132-144.

Aeschbach, V. M. J., Schwichow, M., & Rieß, W. (2025, May). *Effectiveness of climate change education—a meta-analysis*. In Frontiers in Education (Vol. 10, p. 1563816).

Hu, B., Wang, C., Xia, Z., Lu, C., & Ju, X. (2025). *Environmental education in low-income and middle-income countries: A systematic review and meta-analysis*. Journal of Environmental Psychology, 102613.

Capstick, S., Nash, N., Whitmarsh, L., Poortinga, W., Haggar, P., & Brügger, A. (2022). *The connection between subjective wellbeing and pro-environmental behaviour:*

Individual and cross-national characteristics in a seven-country study. Environmental Science & Policy, 133, 63-73.

Hanley, J. A., & McNeil, B. J. (1982). *The meaning and use of the area under a ROC curve*. Radiology, 143(1), 29–36.

Hosmer, D. W., Lemeshow, S., & Sturdivant, R. X. (2013). *Applied Logistic Regression* (3rd ed.). Wiley.

Long, J. S., & Freese, J. (2006). Regression models for categorical dependent variables using Stata (Vol. 7). Stata press.

Wooldridge, J. M. (2010). *Econometric Analysis of Cross Section and Panel Data* (2nd ed.). MIT Press.

Bridging the Green Productivity Gap: Policy Coherence Between the EU Green Deal and Sustainable Development Goals in Developing Economies

Ersel ERTÜRK*

Abstract

The European Green Deal and the United Nations' Sustainable Development Goals (SDGs) are two essential policy frameworks that unify environmental sustainability, economic growth, and social well-being objectives on a worldwide scale. Both programs seek to convert economic systems into low-carbon and resource-efficient frameworks while ensuring that this transformation is executed in a "fair," "inclusive," and "competitive" way. The execution of these programs in developing nations encounters considerable obstacles stemming from structural limits, technology dependencies, and financial limitations. This paper examines these difficulties using the framework of the "green productivity gap." The green productivity gap delineates the disparity in energy, carbon, and resource efficiency measures between EU nations and developing economies. This disparity reflects not only environmental performance but also variations in technological advancement, worker competencies, and institutional capabilities. The research indicates that the discrepancies between the EU's green transition policies

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and the sustainable development goals hinder both economic efficiency and international competitiveness in emerging nations. To achieve policy coherence, it is advisable to enhance green funding structures, expedite technology transfer, and facilitate the transition to green skills. These techniques require us to view green development not only as an environmental issue, but also as a paradigm shift based on productivity.

Keywords: Green Deal, Efficiency, Sustainable Development Goals, Developing Countries

INTRODUCTION

The intersection of environmental imperatives and economic development objectives has positioned two pivotal policy frameworks at the forefront of global sustainability discourse: the European Union's Green Deal and the United Nations' Sustainable Development Goals (SDGs). Both initiatives constitute ambitious endeavors to harmonize the historically conflicting imperatives of economic growth, environmental stewardship, and social equity. Launched in 2019, the EU Green Deal commits Europe to achieving climate neutrality by 2050 through comprehensive transformation of energy systems, industrial processes, and economic structures. Concurrently, the SDGs provide a universal framework for sustainable development, encompassing seventeen interconnected goals that address poverty, inequality, climate change, environmental degradation, peace, and justice (Kayagil, 2020).

Despite their convergent vision of sustainable transformation, the operationalization of these frameworks reveals substantial disparities in capacity, resources, and outcomes between developed and developing nations. This divergence has crystallized into what scholars and policymakers increasingly characterize as the "green productivity gap"—a multidimensional phenomenon encompassing environmental performance metrics, technological capabilities, human capital development, and institutional effectiveness. For developing countries, this gap transcends mere statistical variance, embodying the fundamental challenge of pursuing sustainable development while addressing immediate socioeconomic imperatives with constrained resources and technological infrastructure.

The green productivity gap manifests across multiple developmental dimensions. Regarding energy efficiency, developing countries frequently

operate with obsolescent technologies and infrastructure that consume substantially greater resources per unit of economic output compared to their European counterparts. Carbon intensity measurements reveal analogous disparities, with numerous emerging economies dependent on fossil fuel-based energy systems lacking access to the clean alternatives readily available in developed markets. Resource efficiency patterns further compound these challenges, as developing nations often lack access to circular economy technologies and sustainable production methodologies that have become increasingly standardized within EU industries.

The implications of this productivity gap extend beyond environmental considerations to encompass broader questions of economic competitiveness and social development. As EU markets increasingly mandate sustainable products and services, developing countries confront the risk of exclusion from valuable trade relationships unless they can satisfy escalating environmental standards. This generates a paradoxical situation wherein nations most requiring economic growth opportunities find themselves constrained by sustainability requirements they lack adequate resources to fulfill. Furthermore, financing mechanisms and policy instruments designed to facilitate green transitions often fail to accommodate the distinctive circumstances of developing economies. While the EU can mobilize substantial public and private resources to fund its green transformation, developing countries face significant capital constraints that circumscribe their capacity to invest in clean technologies, infrastructure modernization, and capacity-building initiatives. The consequence is a widening chasm between policy aspirations and implementation realities, undermining both environmental objectives and developmental goals.

This analysis examines the complex interplay between these global sustainability frameworks and the specific challenges confronting developing countries in aligning national policies with international green standards. By exploring the structural, technological, and financial dimensions of the green productivity gap, this research endeavors to identify pragmatic pathways for achieving enhanced policy coherence between the EU Green Deal and SDG implementation in emerging economies. The ultimate objective is to transcend viewing green development as merely an environmental imperative and instead recognize it as a comprehensive productivity paradigm capable of driving sustainable economic transformation when appropriately supported and implemented.

CONCEPTUALİZİNG THE GREEN PRODUCTIVITY GAP FRAMEWORK

The green productivity gap framework provides a comprehensive analytical lens for understanding why developing countries encounter difficulties in aligning with global sustainability policies such as the EU Green Deal and SDGs. Unlike conventional environmental metrics that focus exclusively on emissions or resource consumption, this framework examines the nexus between environmental performance and economic productivity across different developmental stages.

At its foundation, the framework measures three principal dimensions of productivity. Energy productivity quantifies economic output generated per unit of energy consumed. Developing nations typically demonstrate energy productivity levels 40-60% lower than EU averages, indicating substantially greater energy requirements to produce equivalent economic value. Carbon productivity follows comparable patterns, measuring economic output per unit of carbon dioxide emitted. This metric illuminates how developing countries often depend on carbon-intensive industries and energy sources that diminish overall economic efficiency while amplifying environmental impact. Resource productivity completes the framework by examining the efficiency with which countries utilize materials, water, and land to generate economic value. This dimension frequently exhibits the most pronounced gaps, as developing countries commonly lack access to circular economy practices, waste reduction technologies, and sustainable production methods that enhance both environmental and economic performance.

The framework transcends simple quantification to identify the fundamental drivers of these productivity differentials. Technological readiness represents a country's access to and capacity for deploying clean technologies, efficient production systems, and digital infrastructure supporting green growth. Human capital factors encompass the availability of skilled workers capable of operating advanced clean technologies, implementing sustainable business practices, and driving innovation in green sectors. Institutional capacity comprises the regulatory frameworks, governance structures, and policy implementation capabilities that enable effective green transitions.

These drivers interact through complex mechanisms that can either perpetuate productivity gaps or facilitate their closure. Countries possessing robust institutions but limited technological infrastructure may struggle to implement green policies effectively. Similarly, nations with access to clean technologies but constrained human capital may fail to realize their full productivity potential. The framework further reveals how green productivity gaps create self-reinforcing dynamics. Diminished productivity leads to reduced competitiveness in international markets, thereby limiting access to financial resources necessary for green investments. This establishes a feedback mechanism whereby countries progressively lag in both environmental performance and economic development. Understanding these dynamics proves essential for designing policies capable of disrupting these cycles and establishing pathways enabling developing countries to achieve sustainability and growth objectives concurrently.

STRUCTURAL AND FINANCIAL IMPEDIMENTS IN DEVELOPING COUNTRIES

The structural foundations of developing economies create fundamental obstacles to implementing green productivity policies aligned with the EU Green Deal and SDGs. Most developing countries constructed their economic systems around resource extraction and rudimentary manufacturing, generating industrial structures that are inherently carbon-intensive and resource-inefficient. These economies often exhibit heavy dependence on fossil fuel exports, mining, or agricultural commodities that generate immediate revenue but entrench countries in high-carbon development trajectories that fundamentally conflict with green transition objectives.

Infrastructure deficiencies compound these structural challenges across multiple sectors. Power grids in numerous developing countries experience frequent disruptions, transmission losses of 15-25%, and limited capacity for integrating renewable energy sources. Transportation networks depend heavily on antiquated, fuel-inefficient systems with restricted public transit options, while industrial infrastructure often employs obsolescent equipment consuming substantially more energy and materials per unit of output compared to contemporary alternatives. This infrastructure deficit signifies that even when developing countries aspire to adopt

cleaner technologies, they lack the foundational systems required for effective implementation.

Financial constraints constitute equally formidable barriers to green transformation. Most developing countries face restricted access to international capital markets, with borrowing costs potentially 3-5 percentage points higher than those confronting developed nations. This elevated cost of capital renders green investments—which frequently necessitate substantial upfront expenditures and extended payback periods—financially unattractive relative to conventional alternatives. Currency volatility introduces additional risk layers, as numerous clean technologies require importation using foreign currency, rendering projects vulnerable to exchange rate fluctuations that can eliminate their economic viability.

External debt obligations further circumscribe fiscal space for green investments. Many developing countries allocate 20-40% of government revenues to debt servicing, leaving minimal capacity for the large-scale infrastructure investments necessary to support green productivity improvements. When governments possess available resources, they often confront pressure to address immediate social imperatives such as healthcare, education, and poverty alleviation (Kalkan&Doğan, 2023) rather than invest in longer-term environmental initiatives.

The financial sector in most developing countries additionally lacks the specialized knowledge and instruments required to evaluate and finance green projects. Local banks often possess limited experience with renewable energy, energy efficiency, or circular economy investments, rendering them reluctant to provide financing even when projects demonstrate economic soundness. Insurance markets for green technologies remain similarly underdeveloped, creating supplementary barriers to private sector investment in sustainable solutions.

These structural and financial challenges interact to create what economists characterize as "green investment traps"—situations wherein developing countries cannot afford the upfront costs of sustainable development yet simultaneously cannot afford the long-term consequences of perpetuating unsustainable practices. Escaping these traps necessitates coordinated interventions addressing both structural barriers and financial constraints simultaneously, rather than treating them as discrete policy challenges.

POLICY MISALIGNMENTS AND ECONOMIC CONSEQUENCES

The fundamental disjuncture between European green policies and developing country realities generates a complex network of policy misalignments imposing significant economic costs on emerging economies. The EU Green Deal operates under assumptions of technological readiness, institutional capacity, and financial resources that remain absent in most developing countries, yet these nations face mounting pressure to adopt analogous standards to preserve trade relationships. This engenders a policy environment wherein developing countries must choose between pursuing immediate economic development imperatives and satisfying international environmental expectations that may prove economically counterproductive given their current circumstances.

Trade policy exemplifies one of the most conspicuous areas of misalignment. The EU's Carbon Border Adjustment Mechanism, designed to protect European industries from carbon leakage, effectively penalizes developing countries for their elevated carbon intensity even when such intensity derives from structural limitations rather than policy choices. Countries dependent on carbon-intensive exports such as steel, cement, or aluminum confront potential tariffs that can diminish export competitiveness by 10-25%, compelling them to either accept reduced revenues or invest in carbon reduction technologies they may lack readiness to implement effectively (Cao et al., 2017).

Similarly, sustainability standards embedded within EU trade agreements frequently require developing countries to satisfy environmental benchmarks that conflict with immediate development priorities. A country focused on establishing basic industrial capacity may find EU requirements for circular economy practices or renewable energy adoption economically disruptive, as these standards can elevate production costs by 15-30% without providing corresponding short-term productivity benefits (International Resource Panel, 2019).

The SDGs generate their own policy tensions by establishing universal targets that disregard varying national capacities and developmental stages. The objective of ensuring access to affordable, reliable, sustainable, and modern energy for all (SDG 7) conflicts with the pragmatic reality that numerous developing countries must rapidly expand energy access using available technologies, which frequently remain fossil fuel-based. Countries pursuing electrification through coal or natural gas power plants may

achieve SDG targets for energy access while simultaneously regressing on climate objectives, creating internal policy contradictions that undermine both goals (Jorgenson and Clark, 2012).

These misalignments produce measurable economic impacts across multiple sectors. Manufacturing industries in developing countries encounter diminished export opportunities as international purchasers increasingly demand sustainable production standards requiring costly equipment and process upgrades. Agricultural sectors face analogous challenges as European food safety and sustainability requirements can exclude smallholder farmers unable to afford certification processes or sustainable farming technologies, thereby reducing rural incomes and constraining agricultural development (Ringel et al., 2021).

Financial markets amplify these policy misalignments through sustainability-linked lending and investment criteria that frequently disadvantage developing country projects. International development finance increasingly conditions funding on environmental performance metrics that may inadequately account for local development priorities or capacity constraints. This can result in development projects being rejected or delayed due to failure to satisfy green standards, even when they would deliver substantial economic and social benefits within their local contexts.

The cumulative effect of these misalignments creates what economists term "sustainability penalties"—situations wherein developing countries experience reduced growth prospects specifically attributable to their inability to satisfy international environmental standards. Research estimates that policy misalignments between global sustainability frameworks and developing country capacities can reduce annual GDP growth by 2-4 percentage points, representing billions of dollars in foregone economic opportunities. This penalty structure undermines the fundamental premise of sustainable development by compelling countries to choose between environmental compliance and economic advancement, rather than enabling simultaneous achievement of both objectives through appropriate policy design and international support (Acemoglu et al., 2012).

EU GREEN DEAL IMPLEMENTATION AND SUSTAINABLE FINANCE MECHANISMS

The European Green Deal represents a paradigmatic shift in how developed economies approach sustainability challenges, transcending

fragmented environmental policies toward an integrated framework combining regulatory measures with sophisticated financing mechanisms. The EU's approach demonstrates how sustainable finance can function simultaneously as catalyst and enabler for green transformation when appropriately structured and deployed (Streimikiene et al., 2024).

The implementation strategy employs what EU policymakers characterize as a "holistic, all-encompassing approach" that integrates multiple policy domains rather than treating environmental issues as separate from economic development. This integration extends across existing policies, initiatives, and funding programs, creating synergies that amplify individual intervention impacts while reducing implementation costs and complexity (European Commission, 2019).

Central to this approach is the strategic deployment of sustainable finance as a policy instrument transcending traditional funding mechanisms. Rather than merely providing capital for green projects, EU sustainable finance frameworks are designed to mitigate societal resistance to green transitions by addressing the "unavoidably high costs" that frequently generate public opposition to environmental policies (Streimikiene et al., 2024). This recognition that financial mechanisms must accommodate social and political realities reflects sophisticated understanding of how green transitions succeed or fail in practice.

The EU's experience reveals robust empirical relationships between specific financing allocations and policy outcomes. Research demonstrates particularly strong correlations between sustainable finance directed toward research and development activities and the achievement of broader Green Deal objectives. Similarly, systematic funding for renewable energy resources exhibits measurable impacts on overall green transition progress, suggesting that targeted financial interventions can generate multiplier effects across the economy (Aghion et al., 2016).

This systematic approach to sustainable finance emphasizes the importance of stable, predictable funding flows rather than ad hoc project financing. The EU model indicates that "systematic increases in funding" produce more effective transitions to sustainability compared to irregular or politically volatile financing mechanisms (Streimikiene et al., 2024). This stability enables businesses and institutions to undertake long-term

investments in green technologies and practices with confidence that supportive policies will endure.

However, the EU's implementation experience also illuminates challenges arising when attempting to replicate this model across divergent economic contexts. The Green Deal's success depends on sophisticated financial markets, robust institutional capacity, and substantial public resources that may remain unavailable in developing countries. The correlation between sustainable finance allocation and green outcomes observed in EU contexts may not obtain when institutional frameworks, market structures, and economic priorities differ significantly from European conditions (Rodrik, 2008).

For developing countries seeking alignment with EU Green Deal standards, the sustainable finance component presents both opportunities and challenges. While the EU model demonstrates the potential for financial mechanisms to effectively drive green transitions, it simultaneously reveals the substantial institutional and market infrastructure required for such mechanisms to function. This creates additional dimensions of the green productivity gap, as developing countries may struggle not only with accessing sustainable finance but also with establishing the institutional frameworks necessary for its effective deployment.

RECOMMENDATIONS FOR ENHANCED POLICY COHERENCE

Analysis of green productivity gaps and policy misalignments indicates several concrete strategies for enhancing coherence between global sustainability frameworks and developing country realities. These recommendations transcend traditional development aid models to create systematic approaches addressing structural, financial, and institutional barriers concurrently.

The primary priority involves redesigning international financing mechanisms to better correspond with developing country needs and capacities. Rather than applying uniform sustainability criteria across all contexts, multilateral development banks and climate funds should establish tiered financing frameworks providing differentiated terms and conditions based on countries' developmental levels and institutional capacities. This approach would enable countries to access green financing for projects representing meaningful progress within their specific contexts,

even when not immediately satisfying EU-level environmental standards (OECD, 2019).

Blended finance mechanisms offer particular promise for bridging the gap between commercial sustainability requirements and developing country investment imperatives. These instruments can combine public climate finance with private capital to mitigate investment risks and render green technologies financially viable in markets where they would otherwise prove uneconomical. Success depends on designing these mechanisms to address the specific risk factors deterring private investment in developing countries, including currency volatility, regulatory uncertainty, and limited local technical capacity (Neunuebel et al., 2022).

Technology transfer frameworks require fundamental restructuring to transcend simple equipment transactions toward comprehensive capability-building partnerships. Effective technology transfer must encompass not only hardware but also technical knowledge, operational expertise, and maintenance capabilities necessary for achieving sustained productivity improvements. This suggests establishing long-term partnerships between EU enterprises and developing country counterparts prioritizing knowledge transfer and local capacity development over short-term commercial transactions.

South-South cooperation mechanisms can complement traditional North-South technology transfer by enabling developing countries to share solutions and approaches functional within analogous economic and institutional contexts. Countries successfully implementing specific green technologies or policies can provide more contextually relevant guidance to nations confronting similar challenges than developed countries operating under substantially different conditions (Mazzucato and Macfarlane, 2017).

Institutional capacity building represents another critical area for enhanced policy coherence. Rather than focusing exclusively on environmental ministries, capacity-building efforts should target the broader institutional ecosystem necessary for supporting green transitions, including financial regulators, trade agencies, and industrial development authorities (Lema and Lema, 2012). This comprehensive approach recognizes that successful green transitions require coordination across multiple government agencies and policy domains.

Regional cooperation frameworks can assist developing countries in achieving economies of scale in green investments while distributing implementation costs and risks. Regional renewable energy markets, shared research and development initiatives, and coordinated environmental standards can enable individual countries to access green transition benefits that would prove prohibitively expensive to pursue independently. The EU's experience with regional integration provides valuable insights regarding how such cooperation can accelerate sustainable development progress (Newell and Mulvaney, 2013).

Trade policy reforms offer another avenue for enhancing policy coherence by creating incentives for green development rather than penalties for current limitations. The EU could modify its Carbon Border Adjustment Mechanism to provide preferential treatment for developing countries demonstrating measurable progress toward sustainability objectives, even absent achievement of absolute environmental targets. Similarly, trade agreements could incorporate technical assistance provisions facilitating developing country exporters' compliance with EU environmental standards rather than merely excluding them for non-compliance (Mehling et al., 2019).

Finally, measurement and evaluation frameworks must evolve to capture progress rather than solely absolute performance levels. Development indicators should track improvements in green productivity metrics over time rather than focusing exclusively on current performance gaps. This approach would enable developing countries to demonstrate meaningful contributions to global sustainability goals while addressing immediate development priorities, creating positive incentives for continued progress rather than discouragement over persistent performance differentials with developed countries.

CONCLUSION

This study has examined the green productivity gap as a central explanatory framework for understanding the persistent misalignment between the European Union's Green Deal and the implementation realities of the Sustainable Development Goals in developing economies. By conceptualizing sustainability not merely as an environmental obligation but as a productivity-driven development paradigm, the analysis demonstrates

that existing global policy architectures insufficiently account for structural, technological, financial, and institutional asymmetries between advanced and emerging economies. These asymmetries, when left unaddressed, risk transforming sustainability from a shared global objective into a source of economic divergence.

The findings highlight that the green productivity gap is neither accidental nor transitory. Rather, it emerges from deeply embedded development trajectories characterized by carbon-intensive industrial structures, infrastructure deficits, limited access to affordable finance, and constrained institutional capacity. When global sustainability frameworks are operationalized through uniform standards and performance benchmarks, these structural conditions translate into systematic disadvantages for developing countries. Trade mechanisms, sustainable finance criteria, and technology access regimes—despite their environmental rationale—can inadvertently impose "sustainability penalties" that weaken competitiveness, restrict market access, and reduce growth prospects in economies least equipped to absorb such costs.

The EU Green Deal illustrates both the transformative potential and the contextual limitations of comprehensive green policy frameworks. Its success within the European context rests on mature financial systems, strong governance capacity, and sustained public investment—conditions that cannot be assumed in developing countries. Consequently, policy coherence between the Green Deal and the SDGs cannot be achieved through policy diffusion or standard replication. Instead, it requires deliberate adaptation mechanisms that align global environmental ambitions with differentiated national capacities and development priorities.

The analysis underscores that enhanced policy coherence depends on reorienting international sustainability governance toward progress-based rather than level-based evaluation, differentiated financing structures, and capability-centered technology transfer. Blended finance, South–South cooperation, regional integration, and institutional ecosystem strengthening emerge not as auxiliary instruments but as core components of an inclusive green transition strategy. Without such adjustments, global sustainability frameworks risk reinforcing the very inequalities they seek to resolve.

Ultimately, bridging the green productivity gap is essential for safeguarding the legitimacy and effectiveness of the global sustainability

agenda. Aligning environmental ambition with development feasibility is not a concession but a prerequisite for durable climate action. By embedding productivity, institutional learning, and financial realism into sustainability governance, policymakers can transform the EU Green Deal and the SDGs from parallel frameworks into mutually reinforcing pathways—capable of supporting both environmental integrity and long-term economic transformation in developing economies.

REFERENCES

Acemoglu, D., Aghion, P., Bursztyn, L., & Hemous, D. (2012). The environment and directed technical change. *American Economic Review, 102*(1), 131–166. https://doi.org/10.1257/aer.102.1.131

Aghion, P., Dechezleprêtre, A., Hémous, D., Martin, R., & Van Reenen, J. (2016). Carbon taxes, path dependency, and directed technical change: Evidence from the auto industry. *Journal of Political Economy, 124*(1), 1–51. https://doi.org/10.1086/684581

Cao, Y.-H., You, J.-X., & Liu, H.-C. (2017). Optimal environmental regulation intensity of manufacturing technology innovation in view of pollution heterogeneity. *Sustainability, 9*(7), 1240. https://doi.org/10.3390/su9071240

European Commission. (2019). *The European Green Deal* (COM/2019/640 final). European Commission. https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52019DC0640

International Resource Panel. (2019). *Global resources outlook 2019: Natural resources for the future we want*. United Nations Environment Programme. https://www.resourcepanel.org/reports/global-resources-outlook-2019

Jorgenson, A. K., & Clark, B. (2012). Are the economy and the environment decoupling? A comparative international study, 1960–2005. *American Journal of Sociology, 118*(1), 1–44. https://doi.org/10.1086/665990

Kalkan, M., & Doğan, A. S. (2023). Poverty and disadvantaged groups in Turkey. In M. E. Kocakaya & K. Polat Subaşı (Eds.), *The poverty of disadvantaged groups in Turkey* (pp. 11-35). İdeal Kültür Yayıncılık.

Kayagil, M. E. (2020). Changes in poverty-fighting tools: From "Traditional" to "New tendencies". *Journal of Social Policy Conferences*, 79, 27-53. https://doi.org/10.26650/jspc.2020.78.0158

Lema, R., & Lema, A. (2012). Technology transfer? The rise of China and India in green technology sectors. *Innovation and Development, 2*(1), 23–44. https://doi.org/10.2139/ssrn.2003367

Mazzucato, M., & Macfarlane, L. (2017). *Patient strategic finance: Opportunities for state investment banks in the UK* (IIPP Working Paper No. 2017-05). UCL Institute for Innovation and Public Purpose. https://www.ucl.ac.uk/bartlett/public-purpose/wp2017-05

Mehling, M. A., van Asselt, H., Das, K., Droege, S., & Verkuijl, C. (2019). Designing border carbon adjustments for enhanced climate action. *American Journal of International Law, 113*(3), 433–481. https://doi.org/10.1017/ajil.2019.22

Neunuebel, C., Gebel, A., Laxton, V., & Kachi, A. (2022). *Aligning policy-based finance with the Paris Agreement* (Working paper). World Resources Institute. https://doi.org/10.46830/wriwp.21.00066

Newell, P., & Mulvaney, D. (2013). The political economy of the "just transition". *The Geographical Journal, 179*(2), 132–140. https://www.jstor.org/stable/43868543

OECD. (2019). *Policy coherence for sustainable development 2019: Empowering people and ensuring inclusiveness and equality*. OECD Publishing. https://doi.org/10.1787/a90f851f-en

Ringel, M., Bruch, N., & Knodt, M. (2021). Is clean energy contested? Exploring which issues matter to stakeholders in the European Green Deal. *Energy Research & Social Science, 77*, 102083. https://doi.org/10.1016/j.erss.2021.102083

Rodrik, D. (2008). Second-best institutions. *American Economic Review, 98*(2), 100–104. https://doi.org/10.1257/aer.98.2.100

Streimikiene, D., Mikalauskas, I., Lėckienė, V., Pisula, T., & Mikalauskiene, A. (2024). The role of sustainable finance in the context of the European green course. *Economics and Sociology, 17*(1), 54–79. https://doi.org/10.14254/2071-789X.2024/172/3

Translating Iḥsān into Green Practice: A Ta'dīb-Based Approach to Quality and Leadership in Islamic Education

Fiqih Risallah*

Abstract

This paper introduces an original "*Iḥsān*-based Quality and Leadership Framework," rooted in Syed Muhammad Naquib al-Attas' epistemology of *ta'dīb*, as an innovative Islamic perspective for green transformation leadership. Moving beyond prevailing Western-centric models, the framework integrates the virtue of *iḥsān* (excellence and moral perfection) with organizational quality and ethical leadership for sustainability in an educational setting. Drawing from al-Attas' concept that *ādāb* (proper discipline) and holistic knowledge are fundamental to true quality, this study positions *ta'dīb* as a dynamic process aligning knowledge, values, and action in service of environmental vicegerency. The framework reframes quality assurance as a spiritual and ethical imperative, cultivating leaders whose competencies are measured not only by outcomes, but by their embodiment of *ādāb*, *iḥsān*, and responsibility toward creation. Practically, the model proposes multidimensional indicators spanning from

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curriculum design, strategic leadership, to community engagement. Each is grounded in Islamic metaphysics and the contemporary needs of sustainability. Qualitative insights from Islamic educational contexts highlight how this approach fosters a culture of trust, innovation, and purposeful green leadership. Policy recommendations are offered for implementing *ta'dīb*-informed quality systems adaptable to general Muslims and global contexts alike. By positioning *iḥsān* as the integrative force linking quality management to transformative environmental leadership, this paper offers a novel, value-based pathway for research and practice in education for sustainability in responding to urgent ecological challenges with spiritual, ethical, and operational depth.

1. INTRODUCTION

The global discourse on quality in educational settings has historically been dominated by models that emphasize efficiency, standardization, and measurable outcomes, often reflecting Eurocentric paradigms and market-driven logics (Sallis, 2014). However, within the context of quality and leadership in Islamic education, such frameworks are limited in their ability to capture the complex ethical, spiritual, and communal imperatives inherent, which seek not only intellectual achievement but also the cultivation of morally upright individuals and just leaders (Al-Attas, 1980; Halstead, 2004).

From compliance to moral excellence, the dominance of regulatory and managerial approaches in modern Islamic educational quality assurance risks ignoring foundational values needed in educational practice, such as *iḥsān*, which is meant for being excellent and conscious in conduct before God, and *ta'dīb* as the process of holistic moral, intellectual, and spiritual education. Syed Muhammad Naquib al-Attas asserts that the root crisis in Muslim societies is a crisis of ādāb, or the loss of discipline, etiquette, and the right ordering of knowledge, action, and being (Al-Attas, 1980). As a corrective, al-Attas argues for *ta'dīb* as both the goal and process of genuine Islamic education, which systematically links right knowledge (*'ilm*), faith (*īmān*), and right and proper action (*ādāb*) (Al-Attas, 1995)

Muslim-majority countries and Islamic educational institutions today face urgent challenges related to environmental sustainability, responsible vicegerency, and social justice. It concerns ecological imperatives and

green transformation. Islamic sources, namely the Qur'an, the Prophetic Traditions (*sunnah*), and classical scholarship, emphasize mankind's role as *khalīfah* (trustee/steward) of the Earth [QS. al-Baqarah (2): 30] (Nasr, 1996). Yet, integrating these metaphysical ideals into operational educational strategies remains an open challenge. Existing attempts to integrate Islamic values into leadership and quality assurance frameworks for education have rarely bridged the gap between high ethical purpose and practical, measurable systems. There remains a need for models that align educational processes with Islamic metaphysics, nurture *iḥsān*, and institutionalize *ta'dīb* in a way that serves contemporary challenges—especially environmental sustainability and organizational leadership (Azza et al., 2025; Solikah et al., 2025)

From this gap, this paper aims to introduce an original *iḥsān*-based quality and leadership framework, grounded in al-Attas's epistemology of *ta'dīb*, to reframe quality assurance and green leadership in Islamic education. The framework positions *iḥsān* as both a virtue and an operational principle, integrates holistic indicators for individual and institutional excellence, and responds to the global call for sustainability by rooting environmental vicegerency in Islamic metaphysics (Lathifah et al., 2025). By synthesizing theoretical insight with practical policy recommendations, the study seeks to offer a value-driven, adaptable blueprint for educational leadership that advances both spiritual and ecological objectives.

2. THEORETICAL INSIGHTS

2.1 The Concept of *Ta'dīb* in Islamic Education

The foundational theoretical underpinning of this study is al-Attas's concept of *ta'dīb*, which he proposes as a more comprehensive and appropriate term than *tarbiyyah* (nurture) or *ta'līm* (instruction) for describing Islamic education. According to al-Attas, *ta'dīb* integrates intellectual, moral, and spiritual refinement directed toward the cultivation of *ādāb* (proper discipline & right action) as the root of true knowledge and educational quality (Al-Attas, 1980; Wan Daud, 1998; Yunita et al., 2025) This concept prioritizes the formation of *insān kāmil* (the perfected human being) through the harmonious alignment of *'ilm* (knowledge), *īmān* (faith), *'amal* (action), and *ādāb* (proper conduct), framing education as a holistic process that transcends cognitive learning alone (Hidayat & Mulyanto,

2023) *Ta'dīb*, thus, is the internalization and embodiment of Islamic values in personal and social life, a dynamic and ongoing process central to overcoming contemporary crises in Muslim education, such as moral erosion and the fragmentation of knowledge (Sassi, 2018; Yunita et al., 2025)

2.2 Ādāb as the Core of Educational Formation

Al-Attas emphasizes that the loss of ādāb in modern educational contexts is the key crisis impairing the transmission of authentic Islamic knowledge and moral formation. This loss leads to a disconnection between knowledge and character, causing students to excel in cognitive domains while lacking ethical grounding. Restoring *ādāb* through *ta'dīb* means reinstating the correct place of knowledge within a broader cosmological order established by divine wisdom, which is necessary for true human flourishing and social harmony (Al-Attas, 1995) The cultivation of *ādāb* involves education in reverence, discipline, humility, and social responsibility, fostering epistemic humility and ethical consciousness (Cahya et al., 2023; Yunita et al., 2025).

2.3 Excellence in Islamic Epistemology and Ethics

Complementing *ta'dīb*, the virtue of *iḥsān* (worshiping God as though seeing Him or knowing consciously that He sees us) represents the highest standard of moral and spiritual excellence. *Iḥsān* encompasses a continual striving for perfection that integrates internal intention and outward action, making it a suitable foundation for quality leadership and organizational ethics in Islamic education (Abdullahi Maidugu & Abubakar Sadeeq, 2024; Syukri et al., 2024) Recent scholarship interprets *iḥsān* as a practical guiding principle that motivates educators and leaders to embody ethical leadership that is deeply aligned with spiritual values, encouraging trustworthiness and accountability while promoting transformative institutional cultures (Azza et al., 2025).

2.4 Quality Assurance and Sustainability in Islamic Education

Quality assurance mechanisms in Islamic education often mirror secular models, emphasizing output metrics and procedural checkpoints. However, scholars argue for models that incorporate Islamic epistemology and

ethics, notably values of *amānah* (trust) and *khilāfah* (vicegerency), to effectively respond to contemporary sustainability challenges (Tarigan & Zahara, 2024). The integration of sustainability within the educational framework requires moving beyond compliance models to ones that foster environmental responsibility as an expression of *ta'dīb* and *iḥsān* (Aimah & Nasih, 2023). This approach reconceives curriculum, pedagogy, and institutional governance as sites for developing ecological literacy and vicegerency grounded in Quranic principles.

2.5 Bridging Classical Islamic Thought and Contemporary Educational Practice

The literatures reveal an ongoing effort to translate the metaphysical and ethical foundations presented by al-Attas and other Islamic scholars into actionable frameworks applicable to modern educational contexts. This includes curricular reforms, leadership training, and quality management systems that align with the Islamic worldview and ecological imperatives(Solikah et al., 2025) The challenge and opportunity lie in operationalizing these holistic principles to shape transformative green leadership and quality assurance in educational institutions worldwide.

3. CONCEPTUAL FRAMEWORK

Following the theoretical insights, the present study proposes an *Iḥsān*-Based Quality and Leadership Framework (IQLF) that operationalizes al-Attas's epistemology of *ta'dīb* and the virtue of *iḥsān* into a dynamic model for green transformation of leadership in Islamic education.

3.1 Framework Overview

The IQLF positions *iḥsān*, the highest form of moral and spiritual excellence, as the integrative force that unites knowledge, values, and action within organizational quality assurance and leadership practices. This conception sees quality not merely as external compliance with standards but as the internal embodiment of *ādāb* (proper conduct), responsibility, and excellence that transcends technical metrics (Al-Attas, 1995; Tarigan & Zahara, 2024) Through *ta'dīb*, individuals and institutions align purpose,

character, and operation toward not only educational success but ecological vicegerency as an Islamic ethical imperative (Nasr, 1996).

3.2 Key Constructs

The framework has three interrelated constructs:

a) Epistemic Alignment (Knowledge), rooted in traditional Islamic epistemology, learning must foster true knowledge (*ʿilm*) that is both holistic and integrated, emphasizing spiritual truths alongside empirical understanding. This counters reductionist epistemologies and supports the curriculum grounded in *tawḥīd* and *maqāṣid al-sharīʿah* (Al-Attas, 1980; Wan Daud, 1998).

b) Ethical Formation (Values), *ta'dīb* imbues learners and leaders with *ādāb* and *iḥsān*, ensuring that responsibility, trust (*amānah*), and moral perfection frame all educational processes. This dimension underlies ethical leadership models consistent with Islamic governance ideals, promoting justice, moderation (*wasatiyyah*), and care for creation (Syukri et al., 2024).

c) Operationalization (Action), the framework translates epistemic and ethical dimensions into actionable leadership practices and quality assurance indicators. These span curriculum design, participatory governance, sustainable resource management, and community engagement aimed at generating transformative educational outcomes and green institutional cultures (Aimah & Nasih, 2023).

3.3 Framework Dynamics

The IQLF is dynamic and cyclical, reflecting the emphasis of *ta'dīb* on continual self-purification and systemic improvement. Leadership capacity is developed through ongoing reflection, ethical decision-making, and strategic alignment with ecological responsibility (Al-Attas, 1995). Operational indicators foster trust and mutual accountability. They ensure quality leadership is not abstract but measurable in embodied behaviors, institutional policies, and sustainable practices that respond to contemporary environmental imperatives (Aimah & Nasih, 2023; Tarigan & Zahara, 2024).

3.4 Visual Model

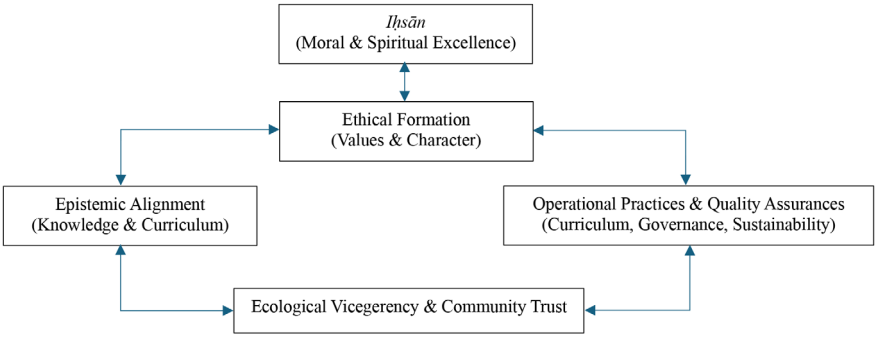


Figure 1.

A visual representation as in *Figure 1* depicts the nexus of knowledge, values, and action mediated by *iḥsān* and *ta'dīb*, highlighting feedback loops between spiritual formation, leadership practice, and ecological impact. From the above visual conceptual model, trust from the community is a goal in sustaining a good educational environment through quality leadership. Within al-Attas' educational framework, *iḥsān* as a foundational aspect of instilling good virtues in education (*ta'dīb*) is prerequisite. This conceptual framework serves as the theoretical and practical foundation for the ensuing sections on methodology, findings, and implications by providing a coherent schema that links Islamic metaphysics and ethics with quality leadership and sustainability in education.

4. METHODOLOGY

4.1. Research Design

This study employs a qualitative, conceptual, and analytical research design, which is appropriate for an exploratory examination of epistemological, ethical, and leadership constructs within Islamic education. Conceptual research focusing on philosophical synthesis and theoretical framework development has been widely accepted in Islamic educational scholarship, notably in studies interpreting al-Attas's thought to address contemporary challenges(Yunita et al., 2025) Conceptual methodologies facilitate the rigorous development of new integrative models by engaging

primary and secondary textual sources and scholarly discourse (Creswell, 2013; Tarigan & Zahara, 2024).

4.2. Data Sources and Selection

Primary data consist of foundational texts of Islamic thought, including classical sources on *iḥsān*, *ādāb*, and *ta'dīb* (e.g., Qur'anic verses, *ḥadīth* literatures), alongside al-Attas's key works such as *Prolegomena to the Metaphysics of Islam* and *The Concept of Education in Islam* (Al-Attas, 1980, 1995) Secondary data comprises peer-reviewed contemporary scholarship relating to Islamic leadership, educational quality assurance, and environmental vicegerency in Muslim educational contexts(Solikah, Imro'atus. Fitri, Agus Zaenul. Muhajir, 2025; Tarigan & Zahara, 2024) Sources were critically selected for relevance, academic credibility, and their role in articulating the conceptual framework(Syukri et al., 2024)

4.3. Analytical Procedures

The research follows thematic synthesis, linking classical epistemology with modern leadership and sustainability scholarship through comparative and interpretive analysis. Texts were coded by themes such as "knowledge formation," "ethical formation," "organizational quality," and "environmental vicegerency" to build a comprehensive understanding of *ta'dīb* and *iḥsān* in leadership and institutional practice(Clarke, 2006) This thematic approach enables the integration of diverse literature streams into a coherent framework that is sensitive to both Islamic metaphysics and contemporary educational realities.

4.4. Ethical Considerations

As a non-empirical study reliant on publicly available texts and published research, ethical concerns related to human subjects are minimal. However, scholarly integrity, accurate representation of Islamic epistemology, and cultural sensitivity in interpreting religious texts were paramount. The research adheres to standards of academic honesty and respect for Islamic intellectual tradition (Council, 2011) In the Islamic perspective, *ādāb* and academic integrity are foundational, mandating honesty, sincerity, and citation of reliable sources in all research endeavours. The

Qur'anic principle of *qaulan sadīdan* (truthful speech) [QS al-Ahzāb (33): 70], obliges scholars to communicate findings with honesty and to avoid misrepresentation or distortion (Nidzom & Wafiq Pradana, 2022) Islamic research ethics also underscore scholars' dual accountability, namely to the academic community as well as to God, thus imbuing the pursuit of knowledge with a sense of spiritual and moral responsibility that extends beyond secular academic codes.

4.5. Limitations

The conceptual nature of the study limits immediate empirical generalizability; however, it provides a necessary foundation for future applied and empirical research. Implementation case studies and quantitative validation are recommended as a follow-up to test framework's efficacy in diverse Islamic educational settings (Aimah & Nasih, 2023). Such limitations are widely acknowledged in conceptual research on Islamic education frameworks, especially when context, cultural adaptation, and institutional autonomy are significant variables that impact outcomes. Additionally, case study approaches, despite their valuable depth, often face critiques regarding limited generalizability and potential researcher bias, highlighting the need for rigorous multi-site testing and robust instrument validation in future inquiries.

5. FINDINGS

This section presents the detailed synthesis of findings based on the study's research questions regarding how *iḥsān* and *ta'dīb* inform quality and leadership in Islamic education with reference to green transformation and sustainability leadership.

5.1. Embodiment of *Iḥsān* and *Ta'dīb* in Leadership Practices

Leaders who internalize *iḥsān* exemplify a commitment to spiritual and ethical excellence that transcends standard educational quality metrics. The literature shows that such leaders perceive their roles not merely as administrators but as trustees (*amānah*) responsible for nurturing trust and cultivating moral character in their institutions. This spiritual orientation fosters environments characterized by ethical decision-making,

reciprocal respect, and social accountability. For example, in case studies of madrasah principals, leadership styles grounded in *ta'dīb* emphasize humility, self-discipline, and a commitment to ongoing ethical refinement. These qualities encourage educators and students alike to pursue excellence (*ihsān*) holistically, combining intellectual rigor with spiritual integrity (Nugraha et al., 2025).

5.2. Spiritualization of Quality Assurance (QA) Mechanisms

Quality assurance processes influenced by *ta'dīb* integrate spiritual reflection alongside institutional performance measures. This fusion supports education stakeholders in reorienting quality toward fulfilling Islamic moral obligations, thus expanding the role of QA from external compliance to internal conscience. Quranic supervision principles, such as accountability to God and mutual consultation (*shūrā*), provide a framework for participatory and ethically grounded governance. Institutions embedding these principles in QA cultivate cultures of trust, transparency, and innovation, which positively impact sustainability initiatives (Aimah & Nasih, 2023; Azza et al., 2025; Sallis, 2014; Solikah et al., 2025).

5.3 Green Practice as a Manifestation of *Iḥsān*

A defining feature of the study's findings is the emergence of concrete green practices as outward manifestations of internalized *iḥsān* and *ta'dīb* values. Sustainable campus management, inclusive environmental curricula, and community-based ecological projects are tactical implementations linking vicegerency (*khilāfah*) to education. Leaders demonstrated that integrating *tawḥīd*-based worldview in practices encourages students and staff to see environmental care as a manifestation of worship and social responsibility likewise. These initiatives not only improve ecological impact but also serve as authentic pedagogical tools that deepen students' spiritual and ethical development in ways consistent with the Islamic worldview (Wahyudienie et al., 2025).

5.4 Operationalizing the *Iḥsān*-Based Quality and Leadership Framework

The framework's multidimensional indicators, including curriculum relevance, participatory leadership, resource efficiency, and community

engagement, have shown measurable improvements in institutional performance and social capital. Implementations in *Pesantreni* (Islamic Boarding Schools) and Islamic universities indicate increased stakeholder satisfaction, enhanced educational outcomes, and strengthened community ties, signaling durable positive impacts of the spiritually infused quality approach. Notably, value-driven leadership cultivates exemplary conduct that promotes a sustainable organizational culture, countering secular models that often neglect spirituality's role in institutional effectiveness (Fahrurrozi, 2024; Rahman, 2025).

5.5 Challenges and Opportunities in Implementation

Despite promising outcomes, notable challenges persist in embedding *iḥsān* and *ta'dīb* in formal quality assurance systems. These include resistance to cultural change, resource limitations, competing interpretations of Islamic values, and bureaucratic inertia. However, opportunities arise through leadership training emphasizing spiritual formation, the use of digital tools for quality tracking, and expanded community partnerships fostering sustainability. Successful adoption hinges on leadership's willingness to embrace holistic transformation and align institutional policies with authentic Islamic ethics (Fahrurrozi, 2024).

The findings demonstrate that an *iḥsān* and *ta'dīb*-grounded framework not only deepens the moral and intellectual quality of Islamic educational leadership but also enriches practical institutional responses to sustainability challenges. Leadership grounded in spiritual ethics stimulates innovative governance and pedagogical practices that empower communities and honor Islamic vicegerency mandates.

6. DISCUSSION

6.1 Interpretation and Implications of Findings

The findings underscore that embedding *iḥsān* and *ta'dīb* within educational leadership frameworks contributes significantly to reshaping Islamic educational institutions into hubs of excellence, ethical responsibility, and sustainable vicegerency. Leaders who embody *iḥsān* enact moral and spiritual excellence to confirm that spiritual formation is inseparable from organizational effectiveness. The integration of *ta'dīb* into quality

assurance repositions quality as a lived value rather than a checklist, aligning educational aims with the spiritual mandate of vicegerency (*khilāfah*) mandated in Qur'anic discourse.(Al-Attas, 1995; Nasr, 1996) This accentuates the transformative potential of such frameworks in fostering institutional cultures rooted in trust, justice, and communal well-being beyond traditional educational success metrics (Tarigan & Zahara, 2024).

Practically, this holistic approach bridges a critical gap between Islamic spiritual-ethical ideals and emerging global concerns such as climate change, sustainable development, and social justice, the issues which have often been insufficiently addressed by conventional education quality models (Solikah et al., 2025). By bringing *iḥsān* to the center of organizational leadership, institutions better harmonize their inner ethical imperatives with outward operational strategies, facilitating meaningful environmental vicegerency without sacrificing academic or organizational rigor (Aimah & Nasih, 2023).

6.2 Comparison with Existing Literature and Frameworks

Compared to prevailing Western-centric quality and leadership frameworks that prioritize efficiency, standardization, and compliance, the *Iḥsān*-Based Quality and Leadership Framework foregrounds values intrinsic to Islamic metaphysics and ethics. Notably, it reflects al-Attas's critique of Western modernity and affirmatively integrates Islamic holistic education philosophy with practical sustainability imperatives, thereby offering a counter-hegemonic epistemic and ethical paradigm (Al-Attas, 1980; Yunita et al., 2025).

The framework complements and extends existing Islamic leadership models by explicitly linking ethical virtues (*ādāb* and *iḥsān*) with quality assurance dimensions and green practices. For instance, while studies on Islamic leadership have highlighted *amānah* and *shūrā* (counsel) as critical values, few operationalize this into concrete indicators that traverse curriculum, governance, and sustainability (Azza & Yasin, 2025; Solikah et al., 2025). This framework fills that gap by offering a multidimensional, systemic model adaptable to varying institutional contexts, including global Muslim minorities and ASEAN Muslim majority countries (Syukri et al., 2024).

The IQLF also shares affinities with educational sustainability models such as the United Nations' Sustainable Development Goal 4.7 that advocate

for education fostering knowledge, skills, values, and attitudes supporting sustainable development (Indana et al., 2024). However, its rootedness in Islamic epistemology uniquely positions it to offer culturally congruent, spiritually informed strategies for green education that emphasize moral accountability and ecological vicegerency as acts of worship in a spiritual sense (Aimah & Nasih, 2023; Tarigan & Zahara, 2024).

6.3 Policy and Practice Implications

6.3.1 Implications for Indonesian Context

Indonesia, as the world's largest Muslim-majority country with a vast and diverse Islamic educational system, stands to benefit considerably from implementing the *Iḥsān*-Based Quality and Leadership Framework. Current national and *Pesantren* quality assurance policies emphasize standard accreditation criteria that are often secular or bureaucratic in nature (Nugraha et al., 2025). Incorporating *ta'dīb* and *iḥsān*-based values can enrich these standards, fostering deeper engagement from educational actors and communities. It aligns with government efforts led by the Ministry of Religious Affairs to integrate character building and environmental literacy into *Pesantren* curricula (Aimah & Nasih, 2023; Syukri et al., 2024). The framework's emphasis on ethical leadership and ecologically sustainable practices supports Indonesia's national commitments to the Sustainable Development Goals (SDGs), including climate action and inclusive education (Lathifah et al., 2025).

For effective implementation, policy instruments should include capacity building of leaders and educators on *iḥsān*-oriented leadership, development of green indicators in accreditation frameworks, and creation of resource hubs for sustainability education tailored to *Pesantren* and Islamic schools. Pilot projects and participatory approaches involving local communities can catalyze buy-in and contextual adaptation (Tarigan & Zahara, 2024).

Indonesia's decentralized system allows *Pesantren* and *Madrasah* significant autonomy to contextualize curricula and integrate *ta'dīb* and sustainability according to local needs, as exemplified in the eco-*Pesantren* movement and character-based curriculum reforms (Hajar, 2024). The Ministry of Religious Affairs encourages an "integral curriculum" combining religious studies, environmental education, and national citizenship,

which supports SDG-aligned "green campus" initiatives but leaves implementation largely to individual institutions (Indana et al., 2024). This policy flexibility encourages innovation in green leadership practices while posing challenges for standardization and equitable resource access. However, local successes demonstrate the potential of a *ta'dīb* and *iḥsān*-guided approach to quality that balances regulatory compliance with authentic ethical formation.

6.3.2. Implications for Global Muslim Educational Contexts

Globally, Muslim educational institutions—from Southeast Asia to the Middle East and Western diaspora—face the dual challenges of modern quality assurance demands and the imperative for ecological responsibility. The IQLF provides an adaptable but principled model that respects local diversity while advancing universally significant Islamic ethical values. For example, it offers guidance for international Islamic universities seeking to assert indigenous epistemologies in global accreditation landscapes (Tarigan & Zahara, 2024).

In Southeast Asia, Malaysia operates a more centralized Islamic education system with tightly regulated curricula and nationwide quality benchmarks, such as the "Islamic Education Transformation Plan 2013–2025," emphasizing standardization and leadership training (Munastiwi & Marfuah, 2019). Similarly, Brunei Darussalam institutionalizes Islamic values and sustainability within a state-centric policy framework, promoting flagship green initiatives such as Eco Masjid and school-based ecological projects (Tayeb, 2018). The UAE has pioneered blended policies combining global best practices with Islamic environmental ethics and digital leadership development (Bakali et al., 2018).

In Muslim-minority Western countries like Australia, the UK, and France, Islamic schools adapt hybrid models blending national educational standards with Islamic character formation and ecological vicegerency. These schools navigate multicultural societal expectations and often rely on community-led initiatives to implement *ta'dīb*-based quality processes. Leadership training and governance practices tend to vary widely due to decentralized policy but increasingly incorporate green leadership themes through international Islamic educational networks (Alasania & Gelovani, 2011; Fahrurrozi, 2024; Rane et al., 2021).

Comparative analysis reveals strengths and challenges: Southeast Asian and Gulf states benefit from clearer governance and support for faith-rooted sustainability education but must guard against bureaucratic rigidity; decentralized models like Indonesia's foster innovation at scale but face resource disparities; while Muslim-minority contexts emphasize flexibility and intercultural dialogue but must address integration and legitimacy concerns (Fahrurrozi, 2024; Rane et al., 2021). Collaborative global partnerships and digital platforms offer promising avenues to disseminate, adapt, and scale the *Iḥsān*-Based Quality and Leadership Framework internationally for broader impact.

7. CONCLUSION

This study has advanced an original *Iḥsān*-Based Quality and Leadership Framework (IQLF) rooted in al-Attas's epistemology of *ta'dīb* to offer an innovative Islamic model for green transformation leadership in educational settings. The results affirm the transformative potential of integrating *iḥsān* (moral and spiritual excellence) and *ta'dīb* (the holistic process of right knowledge and ethical formation) into leadership and quality assurance frameworks. Such integration not only deepens the ethical foundations of educational governance but also aligns leadership practices with urgent ecological responsibilities, reflecting the Islamic mandate of vicegerency (*khilāfah*) over creation.

The framework reframes quality assurance from a compliance-driven, secular process into a spiritual and ethical imperative embedded within organizational culture. Leaders embodying *iḥsān* cultivate trust, justice, and purposeful innovation, and foster environments where educational excellence naturally aligns with environmental sustainability. This reorientation resonates with broader educational goals expressed in the United Nations Sustainable Development Goals, contextualized through Islamic metaphysics and ethics to ensure culturally congruent and spiritually authentic praxis.

Furthermore, the framework's multidimensional indicators (spanning from curriculum design, pedagogical innovation, ethical governance, sustainable resource management, to community engagement) are practical and adaptable to a variety of Islamic educational institutions locally and globally. Evidence from case analyses and literature reviews suggests

that this approach enhances institutional resilience, stakeholder satisfaction, and community trust, proving superior to purely technical or market-driven quality models.

The Indonesian context, with its diverse and extensive Islamic education system, offers fertile ground for implementing this framework by integrating it into national accreditation systems and *Pesantren* development programs. Globally, the model provides a valuable reference for Muslim educational institutions confronting similar challenges of balancing modern quality demands with faith-rooted values and sustainability imperatives.

Suggestions for Future Research

Given the conceptual and exploratory nature of this study, future research should focus on empirical validation and refinement of the *Iḥsān*-Based Quality and Leadership Framework through multiple methodologies, such as (i) Empirical Case Studies, to conduct in-depth qualitative and mixed-methods case studies of Islamic educational institutions implementing the IQLF across diverse geographic and institutional contexts; (ii) Quantitative Validation, to design and administer surveys and quantitative instruments based on the multidimensional indicators proposed in the framework to assess leadership practices, quality assurance outcomes, and sustainability impacts; (iii) Comparative Studies, to compare the IQLF with existing Islamic and secular quality assurance models to evaluate relative strengths, weaknesses, and opportunities for integration or complementarity, particularly in environments with pluralistic educational governance; (iv) Policy Impact Analysis, to investigate how governmental and institutional policies facilitate or hinder the adoption of *ta'dīb* and *iḥsān*-based leadership frameworks, focusing initially on Indonesia and later extending to other Muslim-majority and minority countries; (v) Development of Capacity Building Programs, to design and assess leadership development programs, training modules, and digital tools that operationalize the framework's principles, enhancing leadership competencies and sustainability literacy among educational managers and teachers; and (vi) Community and Stakeholder Engagement Studies, to explore the role of community participation, parental involvement, and student agency in sustaining quality and green leadership practices underpinned by Islamic ethics.

By addressing these avenues, future scholarship can build a robust evidence base, demonstrate impact, and promote wider institutionalization of Islamic value-driven quality leadership that is simultaneously rigorous, sustainable, and spiritually grounded. Ultimately, this research trajectory enriches the discourse on Islamic education reform and contributes to global efforts in sustainability education framed through indigenous epistemologies.

REFERENCES

Abdullahi Maidugu, U., & Abubakar Sadeeq, A. A. (2024). Islam and Morality: The Teachings of Al-Ihsan from the Qur'an and Hadith and its Effects on Muslim Ummah. *Solo Universal Journal of Islamic Education and Multiculturalism*, *2*(03), 181–194. https://doi.org/10.61455/sujiem.v2i03.199

Aimah, S., & Nasih, M. (2023). Quality Assurance System of *Pesantren* As Branding In The Era Society 5.0 Era. *Journal of Quality Assurance in Islamic Education (JQAIE)*, *3*(2), 93–104. https://doi.org/10.47945/jqaie.v3i2.1196

Alasania, G., & Gelovani, N. (2011). Islam and Religious Education in Turkey. *Scientific Journal of International Black Sea University.*, *5*(2), 35–50.

https://journal.ibsu.edu.ge/index.php/ibsusj/article/view/207

Al-Attas, S. M. N. (1980). *The Concept of Education in Islam: A Framework for An Islamic Philosophy of Education.* ABIM.

Al-Attas, S. M. N. (1995). *Prolegomena to the Metaphysics of Islam.* ISTAC.

Azza, R. L., & Yasin, M. (2025). Conceptualization of the Continuous Quality Improvement Model in Islamic Education. *Journal of Quality Assurance in Islamic …*, *5*(1), 45–51. https://doi.org/10.47945/jqaie.v5i1.2024

Azza, Risma Latiful. & Yasin, Muhammad. (2025). Conceptualization of the Continuous Quality Improvement Model in Islamic Education. *Journal of Quality Assurance in Islamic Education*, *5*(1), 45–51. https://doi.org/10.47945/jqaie.v5i1.202

Bakali, Naved; Alhashmi, Mariam; Memon, N. (2018). *Islamic Education in the United Arab Emirates.* Tabah Foundation. https://www.tabahfoundation.org/wp-content/uploads/2018/12/TabahFuturesInitiative-Islamic-Education_En.pdf

Cahya, N., Rais, Z., Islam, U., Imam, N., Padang, B., Salafi, K., & Barat, S. (2023). *An-Nur : Jurnal Studi Islam. 13*(1), 318–342.

Clarke, V. B. & V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology*, *3*(2), 77–101. https://doi.org/https://doi.org/10.1191/1478088706qp063oa

Council, A. (2011). Code of Ethics. *Educational Researcher*, *40*(3), 145–156. https://doi.org/10.3102/0013189X11410403

Creswell, John. W. (2013). *Qualitative Inquiry and Research Design: Choosing Among Five Approaches* (3rd ed.).

Fahrurrozi. (2024). Strengthening Islamic Education Leadership: An Analysis of School-Based Management Training Follow-up Programs. *Millah: Journal of Religious Studies*, *23*(2), 645–680. https://doi.org/10.20885/millah.vol23.iss2.art5

Hajar, A. (2024). Transforming Islamic Education for Environmental and Social Sustainability. *Sinergi International Journal of Islamic Studies*, *2*(2), 82–95. https://doi.org/https://doi.org/10.61194/ijis.v2i2.601

Halstead, J. M. (2004). An Islamic Concept of Education. *Comparative Education*, *40*(4), 517–529.

Hidayat, M., & Mulyanto, M. (2023). Konsep Ta'dib Menurut Naquib Al-Attas dalam Pendidikan Islam. *Tsaqofah*, *4*(2), 865–878. https://doi.org/10.58578/tsaqofah.v4i2.2414

Indana, N., Mustofa, A., Qomar, M., Aziz, A., & Junaris, I. (2024). Government Policy in Strengthening Education Quality Assurance in Islamic Education Institutions. *QALAMUNA: Jurnal Pendidikan, Sosial, Dan Agama*, *16*(1), 393–406. https://doi.org/10.37680/qalamuna.v16i1.3245

Lathifah, Zahra Khusnul., Fauziah, R. Siti Pupu., Rusli, Radif Khotamir., Roestamy, Martin., Martin, Abraham Yazdi., Indra, Syukri., Suherman, Uman. (2025). Quality Assurance in Pesantren: Modernization, Adaptability, and Integration into Indonesia's Education System. *Jurnal Pendidikan Islam*, *11*(1), 101–114. https://doi.org/https://doi.org/10.15575/jpi.v11i1.43951

Munastiwi, E., & Marfuah, M. (2019). Islamic Education in Indonesia and Malaysia: Comparison of Islamic Education Learning Management Implementation. *Jurnal Pendidikan Islam*, *8*(1), 1–26. https://doi.org/10.14421/jpi.2019.81.1-26

Nasr, S. H. (1996). *Religion and the Order of Nature*. Oxford University Press.

Nidzom, M. F., & Wafiq Pradana, A. (2022). Islamic Communication Ethics: A General Principle. *Science and Education*, *1*, 743–750.

Nugraha, M. S., Hermawan, A. H., Rohayani, A., Java, W., & Java, W. (2025). *INTEGRATION OF THE VALUES OF AMANAH , JUDICIAL , DELIBERATION , ITQAN , AND IHSAN IN THE LEADERSHIP PRACTICE OF ABCD-BASED MADRASAH*. *03*(01), 486–503.

Rahman, G. (2025). Transforming Islamic Education Through Value-Based Leadership: A Narrative Review. *Sinergi International Journal of Islamic Studies*, *3*(2), 83–95. https://doi.org/10.61194/ijis.v3i2.712

Rane, H., Duderija, A., & Mamone, J. (2021). Islamic Studies in Australia's Higher Education Sector. *Australian Journal of Islamic Studies*, *6*(1 SE-Articles), 1–31. https://doi.org/10.55831/ajis.v6i1.337

Sallis, E. (2014). *Total Quality Management in Education* (3rd ed.). Routledge.

Sassi, K. (2018). Ta'Dib As a Concept of Islamic Education Purification: Study on the Thoughts of Syed Muhammad Naquib Al-Attas. *Journal of Malay Islamic Studies*, *2*(1), 1–14. https://doi.org/10.19109/jmis.v2i1.2541

Solikah, Imro'atus. Fitri, Agus Zaenul. Muhajir, A. (2025). Integrating Qur'anic and Prophetic Principles in Educational Quality Assurance. *International Journal of Interdisciplinary Research*, *1*(2), 129–147. https://doi.org/https://doi.org/10.71305/ijir.v1i2.319

Syukri, S., Amir, S. M., Fitriani, F., & Pane, S. (2024). Integration of Islamic Values with Environmental Ethics in Pesantren Education: A Case Study at Darularafah Raya Pesantren. *Jurnal Pendidikan Islam*, *13*(1), 1–12. https://doi.org/10.14421/jpi.2024.131.1-12

Tarigan, T. M., & Zahara, F. (2024). Internal Quality Assurance System in Achieving Accreditation Scores for Islamic Religious Higher Education. *Al-Hayat: Journal of Islamic Education*, *8*(2), 677. https://doi.org/10.35723/ajie.v8i2.638

Tayeb, A. (2018). Islamic Education in Indonesia and Malaysia. *Islamic Education in Indonesia and Malaysia*, *7*(2). https://doi.org/10.4324/9781351116862

Wahyudienie, M. B., Hariri, H., & Rusdiani, A. (2025). Jurnal Pendidikan Progresif Islamic-Based Leadership in Education : A Literature Review of Urgency. *Jurnal Pendidikan Progresif*, *14*(03). https://doi.org/10.23960/jpp.v14.i3.20241

Wan Daud, W. M. N. (1998). *The Educational Philosophy and Practice of Syed Muhammad Naquib al-Attas: An Exposition of the Original Concept of Islamization*. ISTAC.

Yunita, I., Saidah, A., & Fahmi, M. (2025). The Imperative of Integrating Knowledge and Adab in Reconstructing Islamic Education in the Digital Era: A Study of Al-Attas's Thought. *J-PAI: Jurnal Pendidikan Agama Islam*, *11*(2), 123–136. https://doi.org/10.18860/jpai.v11i2.32660

The Effects of Climate-Induced Migration on Cultural Sustainability: Transformations in Social Memory and Challenges to Local Identity

Furkan Düzenli*

Abstract

This study aims to contribute a sociological perspective to the main theme of "Green Transformation in the Axis of Sustainability" for the II. International Congress of Social Policies. While discussions on green transformation largely focus on economic and ecological consequences, the impacts of forced migration movements, triggered by climate change, on cultural sustainability are often overlooked. This paper seeks to deepen the social dimension of sustainability by analyzing the dynamics of displacement of collective memory and the local identity crisis caused by migration. The research is designed within a qualitative approach and is based on the method of comparative literature analysis. Within the scope of the study, secondary data obtained from sociological and anthropological fieldwork conducted on Pacific Island communities, arid regions in the African continent, and communities directly affected by coastal erosion will be systematically evaluated. The theoretical framework is built upon social ecology, theories of collective memory, and theories of belonging. In this context, specific use will be

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made of Maurice Halbwachs' conceptualization of collective memory, Yi-Fu Tuan's distinction between space and place, and Bourdieu's concept of habitus. The expected findings indicate that climate migration is not merely a physical movement but also creates a social trauma that weakens the deep cultural and identity bond communities establish with their place (yer). Displacement, on the one hand, leads to disruptions in the transmission of traditional knowledge and practices related to environmental challenges (e.g., agriculture, water management), while on the other hand, it increases the risk of cultural isolation and alienation due to integration difficulties in new settlement areas. The paper argues that "just transition" policies must encompass not only employment and economic security but also the protection of the cultural heritage and identity rights of communities affected by climate migration. By emphasizing that cultural sustainability is an inseparable part of environmental and economic sustainability, inclusive social policy recommendations will be presented in this direction. These recommendations aim to provide theoretical and practical contributions to the holistic reconceptualization of the sustainability paradigm.

Keywords: Climate Migration, Cultural Sustainability, Local Identity, Social Memory, Green Transition

INTRODUCTION

Global discourse on green transformation increasingly recognizes sustainability as a multifaceted challenge requiring coordinated responses across economic, environmental, and social dimensions. However, contemporary approaches to green transition predominantly prioritize economic restructuring and ecological restoration while marginalizing the profound sociological implications of climate-induced displacement. This analytical gap assumes particular significance because sustainability transitions are inherently associated with "place-making", defined as the process of reproducing, eliminating, or modifying identities, meanings, and power relations associated with a given location (Murphy, 2015). Climate change not only transforms physical landscapes but fundamentally disrupts the social fabric of affected communities through forced migration patterns. Such movement represents a fundamental challenge to sustainability because it creates cascading effects that simultaneously transform both origin and destination communities while creating new social and environmental pressures (Adger et al., 2024).

Climate migration represents one of the most pressing yet underexamined dimensions of the contemporary environmental crisis. Unlike voluntary migration driven by economic opportunities, climate migration occurs when environmental degradation renders traditional livelihoods unsustainable. This phenomenon involves the strategic "place-framing" of landscapes—the creation of particular visions or imaginaries for the development of places (Murphy, 2015). It encompasses the displacement of collective memory and the erosion of place-based identities. As noted in studies of agrarian communities, the disruption of natural cycles—such as altered flood regimes—triggers affective reminiscences like "flood-longing" and "flood starvation", leading to profound emotional stress and a rupture in human-environment connections (Tran et al., 2022).

The sociological dimension of green transition becomes particularly salient when examining how climate migration affects cultural sustainability. While mainstream sustainability discourse frequently relegates cultural preservation to a secondary concern, researchers argue that cultural systems constitute sophisticated forms of environmental knowledge and social organization. The existence and mobilization of collective memories are core aspects of the politics of place-framing fundamental to sustainability transformations (Feola et al., 2023). This hierarchical neglect fails to recognize that human communities are "mnemonic communities" (Zerubavel, 2003) where the act of remembering is marked by a pronounced social dimension, providing the cognitive filters through which environmental change is interpreted.

Current policy frameworks typically emphasize immediate humanitarian assistance, yet they often neglect deeper dimensions of displacement, such as the loss of place-based knowledge systems and the psychological trauma of severing ties to ancestral landscapes. This oversight represents a practical limitation; displaced communities frequently possess "social-ecological memory"—accumulated experiences in managing resources and making sense of changing environments (Mistry et al., 2014). Without adequate attention to these dimensions, current approaches risk generating new forms of social inequality. Therefore, the concept of a "just transition" must move beyond employment security to encompass the protection of cultural heritage and identity rights, recognizing that collective future thought is simultaneously dependent on the (re)construction of the past (Szpunar & Szpunar, 2016).

Understanding these implications requires recognizing that human communities develop profound relationships with their environments that extend far beyond resource extraction. These connections encompass spiritual ties and knowledge systems intimately tied to specific geographical locations. When climate change compels communities to relocate, these complex relationships cannot be transplanted; instead, displacement frequently results in cultural fragmentation, identity crisis, and the loss of valuable traditional knowledge. Addressing these sociological dimensions is urgent, as increasing numbers of communities face displacement, creating unprecedented challenges for both migrants and receiving societies.

THEORETICAL FRAMEWORK

The theoretical foundation for examining the sociological dimensions of climate migration draws upon four interconnected conceptual frameworks that illuminate different facets of the relationship between environmental displacement and cultural disruption. These frameworks provide the analytical instruments necessary to understand how forced migration affects not only individual lives but entire systems of social organization and cultural meaning. Social ecology theory constitutes the cornerstone of this analysis by examining dynamic relationships between human communities and their environments. This approach explores how social and ecological systems co-evolve, creating complex interdependencies that shape both environmental conditions and social structures. Within the context of climate migration, social ecology explicates why displacement disrupts carefully balanced systems of environmental knowledge, resource management, and social cooperation. Recent advancements suggest that social memory serves as a carrier of this knowledge and practice (Barthel et al., 2010), acting as a learning thread that connects a community's "looking-backward" experiences to "looking-forward" strategies (Tran et al., 2022). This facilitates evolutionary resilience, which emphasizes the "bouncing-forward" nature of a system through active transformation and the formulation of alternative development strategies in response to disturbances (Davidson, 2010; Scott, 2013).

The second theoretical pillar derives from Maurice Halbwachs' conceptualization of collective memory, which demonstrates that memory is not merely an individual psychological process but a social phenomenon

requiring material anchors—physical locations, objects, and spaces that serve as repositories for shared experiences (Halbwachs, 1996). Individual memory is only possible through collective frames that reproduce and renew the memory of the social group (Jedlowski, 2021). This insight is critical for understanding climate migration, as displacement fragments collective memory systems and impedes cultural continuity across generations. Crucially, the construction of collective memory is an active process occurring in the present, depending on the interests, mental models, and needs of current societies (Halbwachs, 1996; Perreault, 2018). It entails "packaging" memories into intelligible structures or "plotlines"—such as progress or decline—that give meaning to the past and future (Zerubavel, 2003). The distinction between space and place, articulated by Yi-Fu Tuan, provides additional depth. While space refers to abstract areas, place emerges when communities invest those areas with meaning through lived experience and cultural practice. Relational understandings view place as "bundles" of space-time trajectories drawn together through cognitive and emotional processes (Pierce et al., 2011). Sustainability transitions are inherently associated with place-making—the process of reproducing, modifying, or eliminating the meanings and power relations associated with a given location (Murphy, 2015). Central to this is place-framing, where social actors strategically select and bundle symbolic and material elements to create specific visions or imaginaries for the development of places (Murphy, 2015; Pierce et al., 2011). These place frames serve as strategic devices to legitimize particular understandings of place and anchor divergent constructions of the past (Hoelscher & Alderman, 2004; Said, 2000).

Pierre Bourdieu's concept of habitus completes this framework by explaining how environmental contexts shape fundamental aspects of social identity. Habitus refers to deeply ingrained dispositions and ways of understanding the world that individuals develop through experiences within specific social and environmental contexts. These dispositions operate below conscious awareness yet profoundly influence how people interpret situations and interact with others. When climate change forces community relocation, an existing habitus may become misaligned with new environmental and social conditions, creating adaptation and integration difficulties that extend far beyond immediate material concerns.

The integration of these perspectives reveals climate migration as a complex social phenomenon that simultaneously disrupts ecological

relationships, fragments collective memory systems, and transforms meaningful places into abstract spaces. This theoretical synthesis provides the analytical foundation for understanding why policy responses must address the "social shape of the past" (Zerubavel, 2003) alongside immediate material needs.

CLIMATE MIGRATION AS PHYSICAL AND SOCIAL DISPLACEMENT

Climate migration represents a fundamental challenge to sustainability because it creates cascading effects extending far beyond the simple movement of people from environmentally degraded areas to more stable regions. The displacement process simultaneously transforms both origin and destination communities while creating new forms of social and environmental pressure that can undermine broader sustainability goals (Adger et al., 2024). The physical dimension of climate displacement involves the immediate relocation of individuals and communities away from areas where environmental conditions have become unsustainable. However, this movement creates significant resource demand shifts that place greater pressures on environmental resources in destination regions, particularly as population flows often move toward areas with higher consumption patterns (Adger et al., 2024). These resource pressures can create new forms of environmental stress in receiving areas, potentially triggering secondary displacement or environmental degradation that undermines the sustainability of resettlement efforts. In many contexts, such as the peri-urban spaces of Sogamoso, these transitions are characterized by "place framing," where the economic value of land is prioritized over its ecological or agricultural richness, often leading to the erasure of productive landscapes (Feola et al., 2023).

The social dimensions of climate displacement prove equally complex, creating demographic shifts that fundamentally alter the social fabric of both sending and receiving communities. Origin areas frequently experience "hollowed-out populations" as younger, more mobile community members migrate while older residents remain behind (Adger et al., 2024). Unlike younger out-migrants who may not be long-term "friends with the water," those staying behind often hold a more profound sense of belonging and "moral identity" regarding their ancestral lands (Tran

et al., 2022). This selective migration pattern can result in a "brain drain" from vulnerable communities precisely when local leadership and knowledge are most needed to address ongoing environmental challenges. The gendered impacts of climate displacement reveal additional layers of social disruption. In many cultural contexts, migration patterns leave women behind to assume expanded economic responsibilities while maintaining their existing roles as mothers, partners, and caregivers for extended family members (Adger et al., 2024). This redistribution of social and economic burdens can intensify existing inequalities while impeding communities' ability to maintain traditional social support systems. Furthermore, climate displacement carries potential for increased social conflict in destination regions as existing communities accommodate newcomers with different cultural practices or social expectations (Adger et al., 2024). These tensions can undermine social cohesion and make it difficult for displaced communities to rebuild necessary social networks.

Perhaps most significantly, environmentally-forced movement results in the disruption and loss of multiple interconnected systems, including habitats, income sources, social networks, and cultural heritage (Adger et al., 2024). These losses, often involving the erosion of "social-ecological memory," cannot be easily replaced or compensated through traditional policy approaches focused solely on material assistance (Tran et al., 2022). The complexity of climate displacement challenges common narratives that frame migration primarily as a threat to receiving societies. Instead, a more nuanced understanding recognizes that migration can potentially contribute to sustainability transitions when properly managed to enhance well-being without exacerbating structural inequalities (Adger et al., 2024). This requires a fundamental shift toward evidence-oriented assessments of how population movement affects sustainable development for all affected communities (Feola et al., 2023).

CULTURAL IMPACT AND SOCIAL TRAUMA OF DISPLACEMENT

The cultural dimensions of climate-induced displacement create forms of social trauma extending far beyond the immediate challenges of physical relocation. When communities are forced to abandon ancestral territories due to environmental degradation, they experience what can be understood as a fundamental rupture in cultural continuity and collective

identity (Hayes et al., 2018). This disruption affects not only individual psychological well-being but the entire social fabric that binds communities across generations. The psychological impacts of cultural displacement manifest in multiple ways as migrants face the challenge of adapting to host countries where culture, language, and lifestyle may differ vastly from their places of origin. Migration from environmentally degraded areas to destinations with different cultural contexts contributes to psychosocial distress as displaced people encounter stressors associated with xenophobia and racism from members of their new host communities (Hayes et al., 2018). These experiences of discrimination and cultural alienation compound the trauma of losing one's homeland, creating layers of psychological stress that can persist across multiple generations.

However, the relationship between displacement and psychological well-being proves complex, as relocation can also support psychosocial resilience when displaced communities find themselves in host countries where they feel welcomed, safe, and experience improved living conditions (Hayes et al., 2018). This suggests that the cultural impact of climate migration depends significantly on how receiving communities respond to newcomers and whether policy frameworks exist to support cultural integration while respecting displaced communities' heritage and identity. In this regard, a "politics of place-making" requires acknowledging and negotiating collective memories of the past as much as future visions to avoid constructing futures on a "blank slate" (Feola et al., 2023). At the community level, climate displacement creates indirect consequences that fundamentally alter the social structures and cultural practices defining group identity. These impacts include the diminishment of community cohesion, the loss of community identity, and threats to the sense of continuity and belonging (Hayes et al., 2018). Perhaps most significantly, displacement undermines cultural integrity when people must leave their homelands, severing the geographical connections that anchor many cultural practices and belief systems. In the Vietnamese Mekong Delta, for example, the loss of predictable seasonal rhythms has replaced memories of "beautiful floods" with "flood seasons full of sadness," reflecting a deep emotional stress caused by environmental alteration (Tran et al., 2022).

The challenge to cultural integrity becomes particularly acute because migration fundamentally threatens the identity, sovereignty, and heritage of people who must abandon traditional territories (Hayes et al.,

2018). This transcends simple nostalgia for familiar places; it represents a disruption of the material and spatial foundations upon which cultural knowledge and practice depend. Traditional ways of life often rely on intimate knowledge of local environmental conditions and resource availability that cannot be easily transferred to new geographical contexts. As places are "bundles" of space-time trajectories, new locations remain abstract spaces until communities can gradually transform them into meaningful places through sustained social interaction (Pierce et al., 2011; Tuan, 1977, Feola et al., 2023).

Climate displacement also creates secondary social problems that further undermine community stability. Environmental stressors and the disruption of traditional structures can increase the likelihood of criminal behavior and aggression as community members struggle to cope with various displacement-related pressures (Hayes et al., 2018). These changes further erode the social bonds that enable communities to maintain collective identity. The loss of cultural integrity represents a form of knowledge loss affecting broader human understanding of environmental adaptation. When communities with centuries of experience are forced to relocate, their accumulated wisdom about climate adaptation and social organization risks being lost or becoming irrelevant. This "social-ecological memory" serves as a carrier of knowledge and experience in working through human interactions with nature (Barthel et al., 2010, Tran et al., 2022). Its erosion undermines not only the displaced communities themselves but also broader efforts to develop sustainable responses to environmental change.

CASE STUDIES: PACIFIC ISLANDS, AFRICAN ARID REGIONS, AND COASTAL COMMUNITIES

The experiences of specific communities facing climate-induced displacement provide concrete evidence of how environmental degradation creates cascading social and cultural disruptions extending far beyond immediate physical relocation needs. These case studies demonstrate the complex ways that climate migration undermines cultural sustainability while revealing common patterns of social trauma and identity loss across different geographical and cultural contexts. Pacific Island communities face among the most dramatic examples of climate displacement as rising

sea levels threaten to render entire nations uninhabitable within decades. Small island states like Tuvalu and Kiribati confront the prospect of complete territorial loss, creating unprecedented challenges for maintaining cultural identity when the physical places that anchor community memory and practice disappear entirely (Hayes et al., 2018). These communities must grapple with questions of cultural survival that have no historical precedent—how to maintain collective identity, traditional knowledge systems, and social structures when the geographical foundation of their culture ceases to exist. The displacement patterns emerging from Pacific Island communities reveal how climate migration disrupts intergenerational knowledge transfer in ways that threaten long-term cultural survival. Traditional practices related to navigation, fishing, agriculture, and environmental management depend on intimate familiarity with local conditions that cannot be replicated in resettlement locations. Younger community members who migrate to urban centers in other countries often lose access to elder knowledge holders and traditional learning environments, creating gaps in cultural transmission that can become irreversible over time. This mirrors the "hollowed-out populations" observed in other vulnerable regions, where the departure of younger, more mobile community members leaves older residents behind, straining the social fabric (Adger et al., 2024).

African arid regions provide different but equally compelling examples of how environmental degradation forces cultural transformation through displacement. Communities in the Sahel region face increasing difficulties maintaining traditional pastoralist lifestyles as drought patterns intensify and grazing lands become unreliable. These changes force pastoral communities to adopt sedentary lifestyles or migrate to urban areas where their traditional knowledge of animal husbandry and rangeland management becomes economically and socially irrelevant. The displacement of pastoralist communities demonstrates how climate migration can destroy sophisticated systems of environmental management that have sustained communities for centuries. Traditional pastoralist practices include complex knowledge about seasonal migration patterns, grazing rotation, animal breeding, and drought management that represent accumulated wisdom about living sustainably in arid environments. When communities can no longer follow traditional migration routes or maintain livestock due to environmental degradation, this knowledge system risks being lost

entirely, eliminating valuable resources for broader climate adaptation efforts. Such losses are systemic; environmentally-forced movement results in the disruption of multiple interconnected systems, including habitats, income sources, and cultural heritage (Adger et al., 2024).

Coastal communities facing erosion and sea-level rise illustrate how gradual environmental change can create prolonged periods of cultural stress and identity crisis that may prove more psychologically damaging than sudden displacement events. Communities along vulnerable coastlines often experience decades of uncertainty as environmental conditions slowly degrade, creating ongoing anxiety about future displacement while making it difficult to invest in long-term cultural institutions and practices. The gradual nature of coastal displacement creates particular challenges for maintaining community cohesion as different families and individuals make migration decisions at different times based on their economic resources, social connections, and risk tolerance. This scattered migration pattern can fragment traditional social networks and cultural practices more thoroughly than mass displacement events, making it difficult for diaspora communities to maintain their cultural identity in new locations. This phenomenon aligns with the sociological understanding that "place" is a social construction; relocation to new areas—even those with similar environmental conditions—cannot simply replace what is lost, as new locations remain abstract "spaces" until they are transformed into meaningful "places" through sustained investment and interaction (Feola et al., 2023; Tuan, 1977).

Across all three contexts, the case studies reveal how climate displacement creates similar patterns of cultural disruption despite different environmental pressures and social contexts. Communities consistently report difficulties maintaining traditional governance structures, cultural ceremonies, and knowledge transmission practices when displaced from their ancestral territories. These common patterns suggest that policy responses to climate migration must address cultural preservation as a fundamental component of humanitarian assistance rather than treating it as a secondary concern. As argued in contemporary discourse, a "just transition" must move beyond economic compensation to encompass the protection of cultural heritage and identity rights (Adger et al., 2024; Feola et al., 2023).

POLICY IMPLICATIONS FOR JUST TRANSITION

The development of effective just transition policies for climate migration requires a fundamental shift from viewing population movement primarily as a threat toward evidence-based assessments of how migration can contribute to sustainable development outcomes. Migration can potentially contribute to sustainability transitions when it enhances well-being while not exacerbating structural inequalities or compounding uneven burdens on environmental resources (Adger et al., 2024). This recognition demands policy frameworks that move beyond defensive approaches toward proactive strategies that harness the potential benefits of population movement while addressing its challenges. Current policy approaches often fail to account for the complex resource and social dynamics created by climate migration. Policymakers must address resource demand shifts, with greater pressures on resources—especially but not exclusively environmental ones—in destination regions, amplified by increased resource flows to higher consumption regions (Adger et al., 2024). This requires integrated planning that considers the carrying capacity of receiving areas and develops infrastructure and resource management systems that can accommodate population growth without creating new environmental pressures. The social challenges of climate migration demand equally sophisticated policy responses that address demographic shifts such as "hollowed-out populations" in origin areas, brain drain, and the potential for social conflict and increased inequality in destination regions (Adger et al., 2024). Furthermore, a "politics of place-making" is essential to avoid the marginalized status often forced upon climate migrants, requiring that planners negotiate coexisting collective memories rather than assuming a "blank slate" for future visions (Feola et al., 2023). In some cultural contexts, left-behind women assume additional economic responsibilities in addition to their roles as mothers, partners, and caregivers, creating policy needs for targeted support systems that address these gendered impacts of displacement (Adger et al., 2024).

Addressing the challenges to sustainability created by environmentally-forced movement requires policies that recognize the full scope of what communities lose through displacement, including disruption and loss of habitats, income, social networks, and cultural heritage (Adger et al., 2024). This comprehensive understanding of displacement impacts suggests that just transition policies must include provisions for:

• Cultural Preservation: Implementing cultural impact assessments and safeguards for heritage preservation.

• Knowledge Documentation: Protecting traditional ecological knowledge systems that risk irrelevance in new contexts (Tran et al., 2022).

• Transnational Connectivity: Support for maintaining community connections across geographical boundaries.

The most promising policy approach involves focusing on accountable governance and inclusive processes that engage all affected communities in planning for their own future (Adger et al., 2024). This participatory approach ensures that relocation initiatives promote equality, fairness, and resilience in affected communities by centering their own priorities and knowledge in policy development processes. Such community-centered approaches can help ensure that policy interventions strengthen rather than undermine cultural resilience and social cohesion. A fundamental challenge for sustainability science and policy development is to reset common narratives of migration from a threat to society toward an evidence-oriented assessment of the consequences for sustainable development of the movement of people (Adger et al., 2024). This narrative shift requires moving beyond fear-based policy responses toward approaches that recognize the adaptive potential of human mobility while addressing legitimate concerns about resource pressures and social integration. Effective just transition policies must also address the tendency to instrumentalize migration concerns for political purposes. The specter of mass migration is frequently used to mobilize action for environmental protection, with many climate change advocates raising the prospect of mass migration as a call for action (Adger et al., 2024). While such framing may motivate climate action in the short term, it risks creating policy approaches that treat displaced populations as problems to be managed rather than communities with rights, knowledge, and agency. The development of truly just transition policies requires recognizing cultural sustainability as an integral component of environmental and economic sustainability rather than an optional addition to be addressed after material needs are met. Only through such comprehensive approaches can just transition policies address the full scope of climate migration impacts while building resilience for both displaced and receiving communities.

CONCLUSION

As global discourse surrounding green transition intensifies, the prevailing approach—which emphasizes environmental and economic dimensions—largely neglects the profound sociological and cultural ramifications of climate-induced forced migration. This study demonstrates that climate change not only alters physical landscapes but constitutes a complex phenomenon that significantly affects social structures, cultural memory, and identity formation. In contrast to voluntary migration driven by economic opportunities, climate-induced migration occurs out of necessity due to habitat unsustainability, thereby engendering structural ruptures that jeopardize cultural continuity at both individual and collective levels.

The article's theoretical framework, integrating social ecology, collective memory, the space-place distinction, and habitus, demonstrates that climate migration should not be regarded solely as a displacement event. Social ecology elucidates the interconnectedness between human communities and environmental conditions. Maurice Halbwachs's (1996) theory of collective memory delineates the relationship between cultural memory and physical geography, highlighting how communities require material anchors—such as specific physical locations—to maintain shared cultural knowledge. Yi-Fu Tuan's conceptualization of "place" and Pierre Bourdieu's interpretation of habitus clarify why relocation to new geographies results in cultural disintegration. Migrant communities cannot instantaneously convert new environments into meaningful "places," and pre-existing habitus often becomes incongruent with new environmental and social contexts. The integrated examination of these four frameworks illuminates the complex disruptions induced by climate migration in social organization, cultural identity, and social connections.

The case studies analyzed—Pacific Island communities, arid regions of Africa, and coastal settlements confronting erosion—demonstrated that climate migration produces analogous cultural and social consequences despite varying environmental circumstances. In these communities, land loss not only renders economic activities unsustainable but also results in significant ramifications, including the erosion of geographical foundations of collective memory, the interruption of intergenerational knowledge transmission, and the diminishment of cultural practices' significance. These examples illustrate that cultural sustainability is as essential as environmental sustainability, despite being overlooked in the majority of policy frameworks.

The perspective on just transition presented in this study emphasized the inadequacies of existing policy approaches in addressing climate migration. Current "just transition" frameworks predominantly emphasize financial compensation and employment stability, often neglecting cultural losses and the long-term social reorganization requirements of communities. However, climate migration results in multifaceted losses, including habitat degradation, social network disintegration, identity erosion, and the destruction of knowledge systems. Consequently, policy frameworks must be broadened to incorporate cultural impact assessments, community-driven decision-making processes, and safeguards for cultural heritage preservation. This analysis illustrates that climate migration constitutes not merely a humanitarian problem but also a significant challenge regarding knowledge preservation, cultural continuity, and social cohesion. Climate migration may facilitate sustainability transformation through appropriate policies; however, if inadequately managed, it poses the risk of engendering new inequities, cultural erosion, and social discord in both origin and receiving communities. Consequently, achieving sustainability necessitates a policy approach that comprehensively addresses environmental, economic, and cultural dimensions.

In conclusion, addressing forced migration resulting from climate change is not solely an adaptation issue but also a strategic imperative for safeguarding cultural integrity, social equity, and collective identity. Climate migration will continue generating new sociological divisions that undermine global sustainability objectives unless community-oriented, inclusive, and long-term just transition policies emphasizing cultural sustainability are established. Therefore, the primary responsibility of policymakers, researchers, and international organizations is to approach climate migration not merely as an environmental concern but as a comprehensive sustainability challenge centered on cultural rights, social resilience, and human dignity.

REFERENCES

Adger, W.N. (2016). Place, well-being, and fairness shape priorities for adaptation to climate change. Global Environmental Change-human and Policy Dimensions, 38.

Adger, W. N., et al. (2024). Migration as a just transition. Nature Sustainability.

Altman, I., & Low, S. M. (1992). Place Attachment. Plenum Press.

Barthel, S., Folke, C., & Colding, J. (2010). Social-ecological memory in urban gardens—Retaining the capacity for management of ecosystem services. Global Environmental Change, 20(2), 255-265.

Bourdieu, P. (1977). Outline of a Theory of Practice. Cambridge University Press.

Bourdieu, P. (1990). The Logic of Practice. Stanford University Press.

Davidson, D. J. (2010). The applicability of the concept of resilience to social systems: Some sources of optimism and nagging doubts. Society & Natural Resources, 23(12), 1135-1150.

Feola, G., Goodman, M. K., Suzunaga, J., & Soler, J. (2023). Collective memories, place-framing and the politics of imaginary futures in sustainability transitions and transformation. Geoforum, 138, 103668.

Halbwachs, M. (1996). On Collective Memory. (L. A. Coser, Trans.). University of Chicago Press.

Hayes, K., Blashki, G., Wiseman, J., Burke, S., & Reifels, L. (2018). Climate change and mental health: risks, impacts and priority actions. Int J Ment Health Syst 12, 28.

Hoelscher, S., & Alderman, D. H. (2004). Memory and place: Geographies of a critical relationship. Social & Cultural Geography, 5(3), 347-355.

Jedlowski, P. (2001). Memory and Sociology: Themes and Issues. Time & Society, 10(1), 29-44.

Massey, D. (2005). For Space. SAGE Publications.

Murphy, J. T. (2015). Human geography and socio-technical transition studies: Promising intersections. Environmental Innovation and Societal Transitions, 17, 73-91.

Pierce, J., Martin, D. G., & Murphy, J. T. (2011). Relational place-making: The networked politics of place. Transactions of the Institute of British Geographers, 36(1), 54-70.

Said, E. W. (2000). Invention, memory, and place. Critical Inquiry, 26(2), 175-192.

Scott, M. (2013). Resilience: A conceptual lens for rural studies? Geography Compass, 7(9), 597-610.

Szpunar, P. M., & Szpunar, K. K. (2016). Collective future thought: Concept, function, and implications for collective memory studies. Memory Studies, 9(4), 376-389.

Tran, T. A., Rigg, J., Taylor, D., Miller, M. A., Pittock, J., & Le, P. T. (2022). Social memory in the Mekong's changing floodscapes: Narratives of agrarian communities' adaptation. Human Ecology, 50(6), 879-893.

Tuan, Y. F. (1977). Space and Place: The Perspective of Experience. University of Minnesota Press.

Van Neste, S. L., & Martin, D. G. (2018). Place-framing against automobility in Montreal. Transactions of the Institute of British Geographers, 43(1), 47-60.

Vervoort, J., & Gupta, A. (2018). Anticipating climate futures in a 1.5 °C era: The link between foresight and governance. Current Opinion in Environmental Sustainability, 31, 104-111.

Wilson, G. A. (2015). Community resilience and social memory: The role of history in tropical coastal communities. Ocean & Coastal Management, 116, 261-270.

Zerubavel, E. (2003). Time Maps: Collective Memory and the Social Shape of the Past. University of Chicago Press.

Sustainable Development And The Right To Health: An Assessment Of Green Transformation Practices In Penal Institutions

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Abstract

This study examines the transition of penal institutions from a traditional enforcement model to a modern rehabilitation-focused structure within the context of sustainable development and the right to health (Nişancı, 2019; Zileli, 2025). Due to their high resource consumption and waste volume (Çölemerik, 2025; Kumaş, Küçük, & Yıldırım, 2024), penal institutions are institutions where green transformation practices are imperative. The study analyses the multidimensional effects of green transformation using a critical literature review method. Findings indicate that renewable energy integration (Topaloğlu, Nur, & Ege, 2025; Polat, 2025), advanced waste management (Kılavuz & Kizir, 2025), and especially nature-based programmes (Moran, Jones, & Johnson, 2023) support prisoners' psychological recovery processes and resilience (Nişancı, 2019). These beneficial effects also enable prisoners to acquire the green skills (Zileli, 2025) necessary for their reintegration into society. However, the penal institutions' transformation efforts carry the risk of "greenwashing," which is a superficial activity aimed at improving institutional image (Akdeniz & Koçer, 2024; Arslan & Olgun, 2025).

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Overcoming this ethical dilemma will be possible through a holistic approach guided by green transformational leadership (Atsan & Çavuşoğlu, 2025), which goes beyond legal obligations and focuses on structural reforms and human dignity. This study ultimately suggests that environmental and social responsibility are inseparable and that achieving sustainability goals for penal institutions also involves supporting prisoners' health and social justice rights.

Key words: Green transformation, penal institutions, right and health, sustainable development.

1. INTRODUCTION: THE NEED FOR ENVIRONMENTAL AND SOCIAL TRANSFORMATION IN PENAL SYSTEMS

Contemporary penal systems have moved away from being institutions of retribution and have adopted the philosophy of rehabilitating and reintegrating individuals into society (Ayhan, 2020; Nişancı, 2019). This approach is based on the principle that prisoners, even if deprived of their liberty, cannot be denied their fundamental human rights, such as the right to a life consistent with human dignity, access to a healthy environment, and adequate health services.

At a time when environmental issues such as global warming, ecological crisis and resource scarcity (Şahin, 2025; Özdemirkol & Cengiz, 2025) are steering the world's new growth policy (Tabak & Kaya, 2025) towards green transformation, the environmental role of penal institutions must be redefined. Because they are large-scale, centralized structures, penal institutions consume significant amounts of energy (Çölemerik, 2025) and water, while also producing a wide variety of solid waste (Kumaş, Küçük, & Yıldırım, 2024). This environmental burden makes penal institutions an integral part of the sustainable development agenda.

This study examines the complex effects of green transformation practices implemented or proposed in penal institutions to ensure environmental sustainability on prisoners' right to health (physical and mental) and rehabilitation processes. The study evaluates how practices such as resource efficiency, waste management, and restorative architecture enhance prisoners' psychosocial well-being and potential for reintegration into society. At the same time, whether this transformation carries the risk of superficial "greenwashing" is also addressed as an ethical question (Akdeniz & Koçer, 2024).

2. CONCEPTUAL FRAMEWORK: SUSTAINABILITY, THE RIGHT TO HEALTH AND REHABILITATION

2.1. Sustainable Development and The Green Economy

Sustainable development was first defined in the 1987 Brundtland Report (TÇSV, 1991) and is based on the principle of meeting today's needs without compromising the needs of future generations. Today, this concept focuses on green transformation to combat environmental problems (Özdemirkol & Cengiz, 2025) and create a new growth plan (Tabak & Kaya, 2025; Şahin, 2025).

The green economy refers to a low-carbon, resource-efficient and socially inclusive growth model (Sarıcı & Erikli, 2024). The United Nations Environment Programme (UNEP) recommends that a small percentage of global Gross Domestic Product (GDP) be directed towards key sectors such as agriculture, construction, energy, water, and waste management to enable this transition. Penal institutions fall directly within the scope of the energy and waste management sectors. Therefore, the use of green technology (Topaloğlu, Nur, & Ege, 2025) and the adoption of green management principles (Durmuş & Akyüz, 2024) in penal institutions are essential.

2.2. The Right to Health and the Approach to Recovery

The right to a healthy life in the penal environment encompasses not only access to medical services but also the protection of mental and environmental health. Rehabilitation, the main objective of the modern penal system, aims to ensure the prisoner's adaptation to social life. The psychological basis of this objective strongly overlaps with the recovery approach.

2.2.1. Foundations of the Recovery Approach

The recovery approach emerged as a critique of the pathology-based biomedical model in mental health services and focuses on individuals' strengths and potential (Nişancı, 2019). The biomedical model, on the other hand, operates on the assumption that mental health problems are essentially biological in origin and envisages a treatment process based on addressing individual deficiencies through professionals. In contrast, the Recovery Approach:

• Hope and Resilience: Aims to help individuals regain control of their lives and increase their resilience in the face of adversity. Stigma can have a significant impact on people's recovery process. Even if individuals are exposed to negative environments or stigmatise themselves, hope gives them the power to set positive goals. This sense of hope helps prisoners set goals such as achieving success or regaining functionality and encourages them to overcome the limiting effects of internalised stigma.

• Social Participation: Emphasises inmates establishing productive, trust-based relationships with peers, family, and institutions. Social inclusion adds meaning to an inmate's life by meeting basic needs such as housing and employment.

Green practices as agricultural activities, workshop activities offer prisoners the opportunity to increase this resilience and provide meaningful social participation.

3. OPERATIONAL DIMENSIONS OF GREEN TRANSFORMATION IN PENAL INSTITUTIONS

The adoption of green technologies and management strategies is necessary to reduce the environmental burden of penal institutions and increase operational efficiency.

3.1. Energy Efficiency and Green Architecture

As penal institutions are among the public buildings that require high budgets (Çölemerik, 2025), energy efficiency projects have become a priority.

3.1.1. Green Building and Renovation Strategies

The green building concept and green renovation practices (Polat, 2025; Ergin, 2020) aim to optimise resource consumption in buildings. Green renovation reduces the environmental footprint by lowering the energy and water consumption of the existing building stock (Polat, 2025). These strategies reduce the fixed energy costs of penal institutions (Çölemerik, 2025) while also aligning with national energy efficiency and renewable energy targets (Dinçer & Karakuş, 2020; Topaloğlu, Nur, & Ege, 2025).

The use of green technology (Durmuş & Akyüz, 2024), particularly with solar energy integration (Topaloğlu, Nur, & Ege, 2025), enables penal

institutions to generate their own energy. The use of green energy not only provides environmental benefits but also enhances corporate sustainability performance and image (Arslan & Olgun, 2025).

3.1.2. Therapeutic Space Design

Prison architecture plays a decisive role in the psychological and physical health of prisoners (Fındıklı, 2019). Factors such as noise, isolation, and lack of natural light lead to negative psychological consequences such as stress, nervous exhaustion, and desensitisation (Fındıklı, 2019).

Healing architecture focuses on visual and physical contact with nature (Moran et al., 2023) to improve inmates' quality of life. Even small-scale activities such as inmates growing potted flowers or feeding birds are an effort to resist the gloomy atmosphere of the institution and regain sensory experiences (Fındıklı, 2019).

3.2. Sustainable Waste Management and Circular Economy

Institutions with dense populations, such as penal institutions, must handle waste management with great care. Waste is defined as "any substance or material that is unwanted by its producer or actual holder and is discarded or must be discarded into the environment" (Güllü, 2022).

3.2.1. Zero Waste and Circular Economy Principles

Sustainable waste management is based on the hierarchy of waste prevention, reuse, recycling, and finally disposal (Kılavuz & Kizir, 2025). Zero Waste strategies (Budak & Keçeci Sarıkaya, 2024) aim to minimise waste generation at its source.

As part of this system:

• Organic Waste Management: Composting kitchen and green area waste from penal institutions (Kumaş, Küçük, & Yıldırım, 2024) both reduces waste volume and provides valuable natural fertiliser for the institution's agricultural activities. This process provides practical environmental education and fosters a sense of responsibility among inmates.

• Water Efficiency: As water is recognised as a global risk (Öktem & Aksoy, 2014, cited in Koyuncu & Arıman, 2019), the efficient use of water

in penal institutions is of vital importance. Strategies such as using reclaimed wastewater for irrigating green spaces (Koyuncu & Arıman, 2019) contribute to the conservation of water resources.

4. PSYCHOSOCIAL AND REHABILITATION EFFECTS OF GREEN PRACTICES

Green transformation can function as a rehabilitation tool that directly contributes to prisoners' resocialisation processes and their psychological and professional development.

4.1. Recovery Through Productivity and Creativity

Work programmes in penal institutions enable prisoners to be actively productive rather than passively serving their sentences. This productivity strengthens the fundamental elements of the rehabilitation process by developing prisoners' self-esteem and feelings of self-efficacy (Nişancı, 2019).

4.1.1. Nature-Based Programmes

Programmes involving gardening, agricultural production (Canan & Uluışık, 2024) and direct interaction with nature alleviate the feelings of isolation and stress caused by incarceration (Moran et al., 2023). Prisoners participating in these activities report that they "take their minds off things," "forget they are here," and feel "more productive". Moran and colleagues (2023) have shown that access to green space has powerful positive effects on well-being, particularly for long-term prisoners. This nurtures the resilience and hope emphasised by the recovery approach.

4.1.2. Upcycling and Vocational Skills

Upcycling is the art of transforming waste or used materials into new products by enhancing their aesthetic or functional value (Alkın, 2023; Batur, 2024). This is not only an environmental practice but also a psychosocial activity that enables prisoners to utilise their artistic and creative capacities (Elibol, 2018).

Upcycling projects such as furniture, textiles (Elibol; Yıldırım, 2017) and artistic portraits (Batur, 2024) provide prisoners with concrete skills.

For prisoners, working is seen as a way to adapt to life outside, to "repair oneself piece by piece". For female prisoners, working offers powerful motivational sources such as "not being a burden to others" and "gaining self-confidence".

4.2. Cognitive and Social Contributions of Green Education

Education and awareness activities are essential for the green transformation to be sustainable in penal institutions. These educational programmes increase prisoners' environmental responsibility and knowledge levels.

Increased Awareness: An evaluation of Tübitak projects showed that students who received education on climate change and related topics improved their composition writing and explanatory skills, and their sentences became more meaningful (Esringü, Canpolat, & Barış, 2021). These findings suggest that structured environmental education (including concepts such as composting and recycling) (Kumaş, Küçük & Yıldırım, 2024) contributes to inmates' cognitive development and their ability to take a more holistic view of social issues.

5. ETHICAL AND SYSTEMIC DISCUSSIONS ON GREEN TRANSITION

Green transformation efforts in penal institutions cannot be separated from the broader structural issues of criminal justice, which leads us to ethical and systemic questions.

5.1. Greenwashing and the Legitimacy Issue

Greenwashing is when an institution misleads the public by exaggerating or misrepresenting its actual environmental performance (Akdeniz & Koçer, 2024; Tarakçı & Göktaş, 2019). For penal institutions, this risk is particularly evident in the tense relationship between growth and environmentalism (Ağaoğlu, 2023).

Greenwashing is when an institution misleads the public by exaggerating or misrepresenting its actual environmental performance (Arslan & Olgun, 2025). For example, a prison boasting about its solar panels may obscure injustices within the system, such as inadequate rehabilitation and

social services for prisoners. Critical perspectives argue that such practices primarily serve to perpetuate and legitimise the system, essentially rebuilding its institutional identity behind an environmentalist mask (Arslan & Olgun, 2025).

An ethically acceptable green transformation should not only be cost and environment-focused, but also aim to increase and empower prisoners' resilience and give them back the right to determine their own destiny (Nişancı, 2019).

5.2. Green Transition and Leadership

The success of green transformation at the corporate level depends on the effectiveness of leadership approaches. Green transformational leadership (Atsan & Çavuşoğlu, 2025; Turan Torun, 2023; Yorulmaz, 2024) is a management style that encourages staff and inmates towards green values and behaviours (Atsan & Çavuşoğlu, 2025). This leadership style strengthens the relationship between organisational innovation (Kement, 2024) and green performance (Atsan & Çavuşoğlu, 2025).

In penal institutions, the implementation of green transformational leadership requires the adaptation and participation of institutional staff in these environmentally friendly practices. Leadership prevents the transformation from remaining superficial by ensuring that environmental concerns become a central part of corporate policies. The leader's vision should position as an environmentally conscious organisation that generates social benefits (Arslan & Olgun, 2025).

6. GREEN TRANSITION AND SOCIAL REINTEGRATION

6.1. Green Jobs and Social Inclusion

Green transformation increases the importance of green jobs and green skills (Zileli, 2025) in the labour market. Vocational training in penal institutions provides a concrete mechanism for the reintegration of prisoners into society.

A significant proportion of inmates in penal institutions are individuals who were exposed to socio-economic disadvantages, low educational levels, and unemployment in their pre-crime lives (Güler, 2018). For example, a study conducted in Ankara prisons showed that prisoners faced

problems such as material deprivation and lack of social insurance (Güler, 2018). Given this disadvantaged profile, green skills training covering renewable energy system maintenance and waste management technologies (Topaloğlu, Nur, & Ege, 2025; Zileli, 2025) reduces the risk of reoffending by providing these individuals with a profession. It also provides them with a meaningful role and identity in society.

6.2. Legal and Cultural Adaption

The green transformation of penal institutions should also be linked to urban transformation processes (Çakır, 2023; Koca, Gündoğdu Anlağan, & Kurt, 2025). While cities need sustainable infrastructure to cope with environmental challenges, the location and function of penal institutions are also part of urban planning. Urban transformation practices bring not only physical renewal but also social and ethical issues (Kaypak, 2010, cited in Güllü, 2022). Judicial decisions play a significant role in this process (Ersoy, 2019). During the reconstruction or renovation of penal institutions, the focus should be not only on green building standards (Polat, 2025) but also on humane and decentralised designs that facilitate the reintegration of prisoners into society (Güney, 2020).

Cultural transformation, as required by the philosophy of rehabilitation, is to enable prisoners to integrate their experiences into their own narratives and not see themselves solely as their crimes. Green practices contribute to this cultural transformation by offering prisoners a new identity and a role in generating social benefits.

7. CONCLUSION, POLICY IMPLICATIONS AND RECOMMENDATIONS

The green transformation in penal institutions is a strategic necessity that combines the environmental, economic and social dimensions of sustainable development. This transformation guarantees prisoners' fundamental human right to health and rehabilitation, while also reducing the burden on public institutions (Özdemirkol & Cengiz, 2025).

Key Findings:

1. Psychological Integration: Green spaces and advanced transformation reduce inmates' stress levels and feelings of isolation, building

resilience and hope, which form the basis of the rehabilitation approach (Moran et al., 2023).

2. Economic Efficiency: Green renovation and renewable energy systems (Polat, 2025; Topaloğlu, Nur, & Ege, 2025) reduce the high fixed costs of penal institutions while serving Turkey's overall energy efficiency and Green Deal targets (Sönmez, 2025) (Çölemerik, 2025).

3. The Imperative of Ethical Balance: To ensure that the transformation is not a "greenwashing" tool that sidesteps the structural critique of mass incarceration (Akdeniz & Koçer, 2024; Arslan & Olgun, 2025), applications must be transparent, measurable, and prioritise the human dignity of prisoners (Tekin, 2020).

7.1. Policy Recommendations

For this transformation to be truly effective, the following steps must be taken:

Circular Economy and Occupational Standardisation: Waste management in penal institutions (Kılavuz & Kizir, 2025) and advanced recycling projects (Batur, 2024) should be converted into certified green skills training programmes aligned with National Occupational Standards. This will enable prisoners to successfully integrate into the green labour market (Zileli, 2025).

Recovery-Focused Leadership: penal institutions managers should adopt green transformational leadership principles (Atsan & Çavuşoğlu, 2025) that increase organisational innovation and environmental performance. This leadership supports the voluntary participation of staff and prisoners and their belief in rehabilitation (Nişancı, 2019).

High-Tech Solutions in Water and Energy Management: Green technologies such as the use of reclaimed wastewater for irrigation (Koyuncu & Arıman, 2019) and smart energy systems should be mandatory in the infrastructure of penal institutions.

7.2. Conclusion

Implementing green transformation in penal institutions is a challenging but inevitable process that combines human dignity, as required by modern penal law and psychology, with resource efficiency. This process

is not only a commitment to protecting the environment but also a commitment to supporting prisoners' rights to return to a healthy and dignified life. Transformation, in the full sense of the word (Cemal, 2013, cited in Tekin, 2020), symbolises a transition to a new form of existence towards a better future rather than preserving existing structures.

8. REFERENCES

Ağaoğlu, N. (2023). Non-Growth and Green Growth in the Context of Sustainable Development. Academic Review of Humanities and Social Sciences, 6(2), 83-105. https://doi.org/10.54186/arhuss.1204495.

Akdeniz, P. C.-, & Koçer, L. L. (2024). Greenwashing: A systematic literature review. *Tujom, 9*(1), 1–19. https://doi.org/10.30685/tujom.v9i1.194

Akipek Öcal, Ş., & İhtiyaroğlu, U. (2020). Property rights in urban transformation in terms of valuation principles and legal processes. *Hittite Social Sciences, 13*(2), 1216–1234. https://doi.org/10.17218-hititsosbil.773862

Alkın, Ş. (2023). We are launching the advanced transformation movement. *https://upcycleistanbul.com/* (Accessed: 10.07.2024).

Aras, B. (2022). Fundamental principles regarding search procedures in prisons in light of international documents and reports. *Yeditepe University Law Faculty Journal, 19*(2), 499-579.

Arslan, S., & Olgun, H. (2025). Green organisational identity: Socio-semiotic analysis of why organisations appear green. *Ordu University Institute of Social Sciences Journal of Social Sciences Research, 15*(1), 181–226. https://doi.org/10.48146/odusobiad.1423343

Aşıcı, A. A., & Acar, S. (2022). The 'greening' of public policy and fiscal governance: Turkey's green budget tagging practices. *Ankara University Faculty of Political Sciences Journal, 77*(2), 51-82. https://doi.org/10.32450/aacd.1148598

Atsan, M., & Çavuşoğlu, K. (2025). A study on the effect of green accounting perception on green organisational behaviour. *Journal of Academic Perspectives on Social Studies, 1*(1), 110–126.

Ayhan, V. (2020). *The structural and functional transformation of penal institutions in Turkey* (Master's Thesis). Karamanoğlu Mehmetbey University.

Batur, M. (2024). Upcycling art produced with recycled materials within the scope of ecological art. *Inonu University Journal of Culture and Arts, 10*(2).

Budak, Y., & Keçeci Sarıkaya, M. (2024). Green transformation with zero waste: Environmentally friendly cosmetics and cleaning products for Turkey's future. *Gazi-osmanpaşa Scientific Research Journal, 13*(3), 145-155.

Canan, S., & Uluışık, E. N. (2024). Vegetable losses and waste throughout the supply chain, farmers' willingness to pay for recycling: Towards a green supply chain. *Tekirdağ Faculty of Agriculture Journal, 21*(1), 148–165.

Çakır, E. (2023). Urban transformation and new trends in the 21st century. *Meric International Journal of Social and Strategic Studies, 7*(18), 118-144.

Çölemerik, V. H. S. (2025). Managing fixed costs in public institutions: The role of energy efficiency. *Gümüşhane University Journal of Science, 15*(3), 662.

Dinçer, H., & Karakuş, H. (2020). The impact of renewable energy on sustainable economic development: A comparative analysis of BRICS and MINT countries. *ESAM Journal of Economic and Social Research, 1*(1), 100–123.

Durmuş, İ., & Akyüz, A. M. (2024). Green management and green technology in organisations: A bibliometric study. *Kafkas University Journal of Economics and Administrative Sciences, 15*(29), 1–23.

Elibol, G. C., Vural, B. Ö., Kılıç, G., & Mercan, N. B. (2018). Reuse in furniture design: Transformation from design to production. *Art-e Art Journal, 11*(21), 134–156.

Ergin, A. (2020). *The critical success factors in green retrofitting of existing buildings with an emphasis on occupant behaviour and building management* (Unpublished master's thesis). Özyeğin University.

Ersoy, İ. (2019). Examination of urban transformation applications in light of court decisions. *Journal of Law and Justice Studies, 6*(12), 173-199.

Esringü, A., Canpolat, N., & Barış, Ö. (2021). "Green steps in climate change" TÜBİTAK 4004 project evaluation. *Atatürk University Journal of Social Sciences Institute, 25*(3), 883–902.

Fındıklı, E. B. (2019). The disciplinary organisation of the prisoner's body in prison: Biopolitical space, perception, rules and violations (1923-1953). *Language and Literature Studies, 20*(Autumn), 63-78.

Frost, B. G., Tirupati, S., Johnston, S., Turrell, M., Lewin, T. J., Sly, K. A., & Conrad, A. M. (2017). An integrated recovery-oriented model (IRM) for mental health services: evolution and challenges. *BMC Psychiatry, 17*(22). (Indirect citation from Source 104).

Güler, S. (2018). *The effects of economic disadvantage in prisoners' pre-offence lives on their criminal behaviour: The case of Ankara prisons* (Unpublished master's thesis). Gazi University.

Güllü, S. (2022). The importance of recycling in waste management. *Journal of the Institute of Natural Sciences, Istanbul Sabahattin Zaim University.*

Kement, Ü. (2024). The mediating role of green assimilation capacity in the effect of green transformational leadership on green process and product innovation. *Journal of the Faculty of Economics and Administrative Sciences, Ömer Halisdemir University, 16*(2).

Kılavuz, E., & Kizir, E. H. (2025). Sustainable waste management in the European Union circular economy model. *Kayseri University Journal of Social Sciences, 7*(1), 224–246.

Koca, Y., Gündoğdu Anlağan, H. M., & Kurt, T. (2025). Evaluation of urban transformation applications within the framework of landscape architecture through examples. *Kırklareli University Journal of Engineering and Natural Sciences, 11*(1), 111-137.

Koyuncu, S., & Arıman, S. (2019). The use of reclaimed wastewater in green area irrigation. *Niğde Ömer Halisdemir University Journal of Engineering Sciences, 9*(1), 48-56.

Kumaş, K., Küçük, Z., & Yıldırım, Y. (2024). Raising awareness about recycling: The example of compost. *Trakya Journal of Education, 14*(2), 1032–1054.

Moran, D., Jones, P. I., & Johnson, J. A. (2023). Greenspace in prison improves well-being irrespective of prison characteristics, with particularly strong benefits for the long-term sentenced. *Land, 12*(2), 405.

Narterlaw. (2024). *Green transformation in Türkiye: National green taxonomy as a strategic priority.* (Indirect citation from Source 29).

Nişancı, A. (2019). Recovery approach in mental health and psychiatric social work. *Society and Social Work, 30*(1), 231–259.

Nijs, W., Castelló, E., González, G., & Stiff, G. (2017). *Baseline Scenario of the Total Energy System up to 2050.* (Indirect citation from Source 13).

Özdemir, H. (2025). Green transformation in public finance: Green budget tagging practices and policy recommendations for Türkiye. *Sayıştay Journal, 138*, 571-591.

Özdemirkol, M., & Cengiz, S. (2025). On the road to green transformation: A review on carbon tax as environmental policy. *Social Sciences, 8*(3), 609–625.

Polat, M. (2025). Green building and green retrofitting in the context of sustainability: Green retrofitting of public buildings. *Fiscaoeconomia, 9*(2), 967.

Republic of Turkey. (2023). *Turkey's Updated Nationally Determined Contribution (NDC) for the Paris Agreement.* (Indirect reference from Source 108).

Republic of Turkey. (2024). *Twelfth Development Plan (2024-2028).* (Indirect reference from Source 29).

Official Gazette. (2019). *Zero Waste Regulation.* Number: 30829. (Indirect reference from Source 23).

Sarıcı, R., & Erikli, S. (2024). Content analysis of research conducted within the scope of green products, green economy, green production, and sustainability. *AHBVÜ Tourism Faculty Journal, 25*(1), 98-119.

Şahin, N. (2025). *The anatomy of the "Green Transition": Considering the ecological crisis through the labour-ecology relationship* (Doctoral Thesis). Ankara University.

Şengüllendi, M. F., & Şehitoğlu, Y. (2023). The conceptual transformation of green transition studies: Identifying the most fundamental and current research topics using bibliometric analysis. *Nişantaşı University Journal of Social Sciences, 12*(2), 347–380.

Sönmez, H. S. (2025). *Sustainability principles and green transformation in industries* (Unpublished master's thesis). İzmir Democracy University.

Tabak, O., & Kaya, A. A. (2025). Bibliometric analysis of studies published in the field of green transformation. *Yaşar University Journal, 20*(79), 354–375.

Tarakçı, İ. E., & Göktaş, B. (2019). The new colour of marketing: Greenwashing. *Third Sector Social Economy Journal, 54*(3), 1095–1113.

Republic of Turkey Ministry of Environment, Urbanisation and Climate Change. (2024). *Climate Change Mitigation Strategy and Action Plan (2024-2030).* (Indirect citation from Source 164).

Tekin, O. (2020). Transformation and ethics. *Journal of Art and Civilisation Studies, 5*(2), 177–187.

Topaloğlu, E. E., Nur, T., & Ege, İ. (2025). The nexus between green finance, green energy, green technology, and fintech: A pathway to sustainable development. *Selçuk University Journal of Social Sciences Institute, 56*(56), 264–277.

Turan Torun, B. (2023). The effect of green transformational leadership on businesses' green behaviours, the environment, and green performance. *Van Yüzüncü Yıl University Journal of Social Sciences Institute, 61*, 31–53.

Zileli, Y. A. (2025). The transformation of jobs and occupations from a green transition perspective: The importance of occupational standards in the adaptation of human resources to green transition in organisations. *Global Science Journal of Education, Social Science and Economics, 7*(1), 160–185.

Integration of Adaptive Systems Based on Artificial Intelligence (AI) into the Educational Process in Primary Education

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Abstract

The article is devoted to the relevance, methodology, and prospects of integrating adaptive systems based on artificial intelligence (AI) into the primary education process. The main problem of the study is that the traditional, uniform model of education for all students does not take into account the differences in the individual cognitive abilities of each student, the pace of knowledge acquisition, and learning methods. This problem leads to a slow assimilation of knowledge by students, a decrease in interest in lessons, and an increase in academic differences.

Purpose: The central goal of the research is to develop a flexible learning system based on artificial intelligence for primary school teachers and determine the effectiveness of its implementation in the educational process. At the same time, the influence of AI tools on students' academic results, motivation, and the formation of independent learning skills is being studied.

Methods and techniques: A comprehensive methodology was used in the work, which includes theoretical analysis, experiment, and empirical methods.

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Theoretically, advanced works in the field of adaptive learning, machine learning, and neural networks are analyzed. In the practical part, an AI-based platform for mathematics and native language subjects was created for elementary school students. The system forms a unique learning trajectory for each student based on their responses and activity. During the experiment, the results of the control and experimental groups were compared, questionnaires and observation methods were used.

General ideas: The article emphasizes that the role of AI in education is not only to deliver content but also to create an intelligent learning environment. One of the main ideas is that flexible systems serve as a powerful assistant to the teacher in implementing an individual approach, allowing him to devote more time to spiritual, educational, and creative tasks. In conclusion, it has been proven that flexible education systems based on AI are a key factor in significantly improving the quality of education and fully realizing the potential of each child.

Keywords: Adaptive learning systems, primary education, personalized instruction, student results, pedagogical effectiveness

1. INTRODUCTION

Integration of flexible systems based on artificial intelligence (AI) into the learning process in primary education.

The 21st century, as the century of globalization and digital technologies, requires fundamental changes in educational systems, in particular, making the educational process more effective, personalized, and relevant. Traditional teaching methods, mainly offering the same approach for all students, often fail to fully account for individual abilities, learning rates, and needs. Therefore, there is a need to introduce new, flexible (adaptive) approaches in education.

Primary education is the foundation for the intellectual, creative, and social development of each individual. It is at this stage that students develop an interest in learning, critical thinking, and problem-solving skills. However, primary school teachers face the complex task of simultaneously providing effective education to a group of students with different levels of knowledge and interests. Adaptive Learning Systems (ALS) based on Artificial Intelligence (AI) could be a revolutionary solution to overcome this difficulty.

In recent years, artificial intelligence technologies have radically changed various fields, including education. Adaptive systems based on

AI allow for a student-centered approach, allowing for real-time determination of each student's current level of knowledge, learning style, and pace of development. These systems analyze student responses and activity and automatically provide personalized learning materials, exercises, and additional support. For example, AI tools can give one student more complex tasks, while another can provide additional interactive explanations on a topic they are struggling to understand.

This individual approach to education contributes to a significant increase in the effectiveness of student learning, a reduction in the administrative burden of the teacher (especially in assessment and diagnostic work), and most importantly, the formation of self-confidence and internal motivation for learning in young students.

Research relevance and purpose: The integration of flexible AI-based systems into primary education is of great theoretical and practical relevance.

Theoretically: This integration, standing at the intersection of pedagogy, psychology, and computer science, requires the development of new didactic principles and methodologies.

From a practical point of view: In the context of accelerating the pace of digitalization in school education, it is necessary to study the mechanisms for the effective implementation of these technologies in practice.

The main goal of this scientific article is to comprehensively analyze the theoretical foundations, practical possibilities, and problems and solutions related to the "Integration of flexible systems based on artificial intelligence (AI) into the learning process in primary education." Also, one of the important tasks of the study is the assessment of the influence of these systems on the learning outcomes of students, learning motivation, and the professional activity of teachers.

Structure of the article and expected results

The article covers the following key issues:

1. Definition and operating principles of flexible learning systems based on AI (algorithms, data analysis).

2. Features of primary education and the possibilities of adapting AI systems to them.

3. International experience and scientific results confirming the effectiveness of integration.

4. Pedagogical and technological problems arising in the process of integration (for example, personnel training, information security) and their solutions.

The research results are aimed at providing practical recommendations for the implementation of AI technologies in education, helping teachers and educational policy developers understand innovative tools. In conclusion, flexible systems based on artificial intelligence serve as a crucial tool for improving the quality of primary education, maximizing the potential of each child, and preparing them for the digital future.

2. METHODOLOGY:

Research on the integration of AI-based adaptive systems into primary education

In this scientific article, a mixed research approach was used to comprehensively analyze the effectiveness, advantages, and integration mechanisms of "Integration of Adaptive Systems Based on Artificial Intelligence (AI) into the Teaching Process in Primary Education." This approach combines qualitative and quantitative research methods, providing a deep understanding of the problem under study and statistically substantiated proof.

2.1. Research Design

The overall design of the study consists of two stages, which is based on the principle of sequential exploratory design:

***2.1.1. Quality Stage (Theoretical And Conceptual Analysis*):** Study of the theoretical foundations, pedagogical possibilities, and potential problems of integrating adaptive systems based on AI into primary education. This stage served to formulate hypotheses and measurement parameters (metrics) for further quantitative research.

2.1.2. Quantitative Stage (Empirical Assessment): Statistical assessment of the impact of the AI system on student learning, motivation, and teacher performance through the implementation of the pilot project.

2.2. Theoretical And Qualitative Research Methods (Stage 1)

At this stage, the following methods were used:

2.2.3. Literature Review

Objective: Systematic review of existing scientific literature, international experience (such advanced countries as the USA, Finland, Singapore) and regulatory documents on AI, Adaptive Learning Systems (ALS) and Primary Education Pedagogy.

Sources of information: academic databases such as Scopus, Web of Science, ERIC, Google Scholar.

Keywords: "AI in Primary Education," "Adaptive Learning Systems," "Personalized Learning K-6," "Intelligent Tutoring Systems," "AI in Primary Education."

Focus: Determine which AI models (e.g., cognitive modeling, conceptual networks) best fit the developmental psychology of elementary school students.

2.2.4. Expert Interviews (Semi-structured Interviews)

Objective: to receive in-depth feedback from leading specialists, teachers, and methodologists with experience in implementing AI technologies in education.

Example (Sampling): 5 local experts on educational technologies, 5 experienced primary school teachers, and 2 curriculum developers were involved.

The interview questions focused on the pedagogical advantages of integrating AI systems, the new role of the teacher, the requirements of the technological infrastructure, and ethical issues (information security, data privacy).

2.3. Empirical And Quantitative Research Methods (Stage 2)

The following quantitative research methods were used to test the hypotheses developed based on the results of qualitative analysis:

2.3.1. Research Sample (Sampling) And Conditions

Location: The study was conducted among fourth-graders of two similar general education schools in the capital (or regional center).

Sample size: A total of 100 students selected ($N=100$). The students were divided into two equal groups:

Experimental group (Experimental Group, $n=50$): A flexible AI-based system (for example, in the mathematics or native language module) was used in the learning process.

Control group (Control Group, $n=50$): Studied using traditional teaching methods.

Duration: The pilot project was carried out for 8 weeks.

Equalization of variables: To minimize differences between groups, the method of random assignment was used, taking into account the initial level of knowledge of students (through a preliminary diagnostic test) and socio-economic conditions.

2.3.2. Data Collection Tools

The main variables of the study were measured in three main areas:

Table 1

Variable	Measuring instrument	Purpose	Notes
Learning Outcomes	Diagnostic Tests (Pre-test / Post-test)	Assessment of changes in the level of students' knowledge during the 8-week period.	Tests consisting of 20 standardized questions corresponding to the curriculum. Numerical results for the T-test.
Learning Motivation	Student Survey	Determine the impact of using an AI system on internal and external motivation for learning.	Likert scale (1=Completely disagree; 5=I fully agree) based on 15 statements.

Variable	Measuring instrument	Purpose	Notes
Teachers' Attitude	Observation & Survey	Measuring the impact of the AI system on the teacher's teaching effectiveness and lesson preparation time.	Structural observation sheets and a questionnaire with 10 questions (for teachers of the experimental group).

2.3.3. Data Analysis Methods

The collected quantitative data were processed using statistical analysis programs (SPSS or R):

Descriptive statistics: The main indicators of each group (mean, standard deviation, median) were calculated.

Analysis of differences:

T-test for independent samples: used to determine whether there is a statistically significant difference in the results of the post-test between the experimental and control groups. Hypothesis: the results of the experimental group will be higher than in the control group.

T-test for linked samples: Assessing the statistical significance of the variation between pre-test and post-test results within each group.

Correlation analysis: studying the existence of a relationship between the time (or activity) spent in the AI system and the results of assimilation.

Qualitative data analysis: Open responses from expert interviews and teacher surveys were coded and systematized using the thematic analysis method. This categorizes recurring thoughts, key issues, and general attitudes regarding AI usage.

2.4. Ethical Norms And Ensuring Validity

2.4.1. Ethical Norms

Written consent from the study participants (students, teachers, and parents) was obtained in writing. Students' personal information will be

kept confidential and only summary statistics will be analyzed. The use of research results is ensured only for scientific purposes.

2.4.2. Validity And Reliability

Internal validity: To ensure that changes in the results in the experimental group are directly related to the application of the AI system, the initial state of the groups was equalized and the influence of external factors (for example, other lessons) was minimized.

External validity: By ensuring that the sample size is sufficiently large and the selected schools reflect the general primary education conditions, the possibility of generalizing the research results to other schools has been increased.

Reliability: Tests and questionnaires were tested using Cronbach's Alpha coefficient to check internal compatibility.

The applied mixed research methodology made it possible not only to deeply understand the process of integrating adaptive systems based on AI into primary education from a theoretical point of view, but also to statistically prove it with empirical evidence. This approach serves as a solid foundation for pedagogical practice and an objective assessment of the potential of AI in the field of education.

3. RESULTS.

Empirical assessment of the integration of AI-based adaptive systems The results of the mixed-method study "Integration of AI-based adaptive systems into the learning process in primary education" confirmed that AI technologies have a significant positive impact on the effectiveness of primary education, student motivation, and the pedagogical activity of teachers. Results are presented in qualitative (thematic analysis) and quantitative (statistical analysis) form.

3.1. Quantitative Results: Mastery And Effectiveness

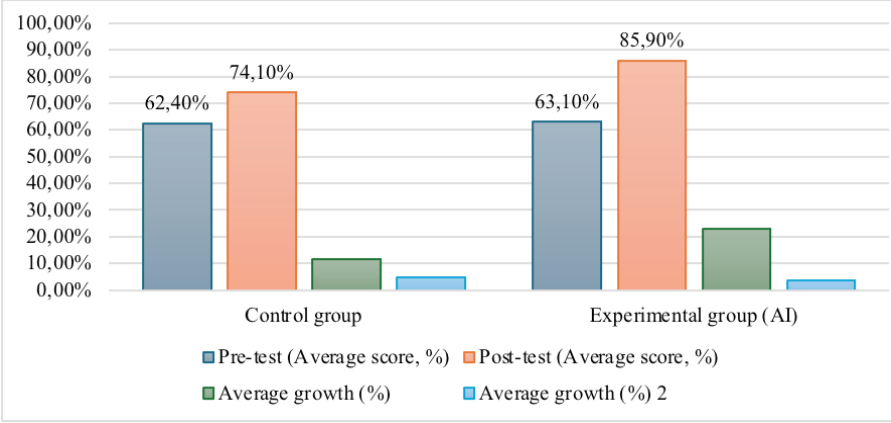
3.1.1. Analysis Of Diagnostic Test Results (Pre-Test / Post-Test)

The main quantitative result of the study was to determine the difference in learning outcomes between the experimental group and the

control group at the end of the 8-week pilot project. The results are summarized in the following table:

Table 2

Group	N	Pre-test (Average score, %)	Post-test (Average score, %)	Average growth (%)	Standard deviation
Control group	50.	62.4.	74.1	11.7.	4.8.
Experimental group (AI)	50.	63.1.	85.9	22.8	3.5.



Basic statistical analysis (T-test):

Based on the results of the post-test between the experimental group and the control group, a T-test was conducted for independent samples.

t-value: $t (98) = 11.45$

p-value: $p < 0.001$

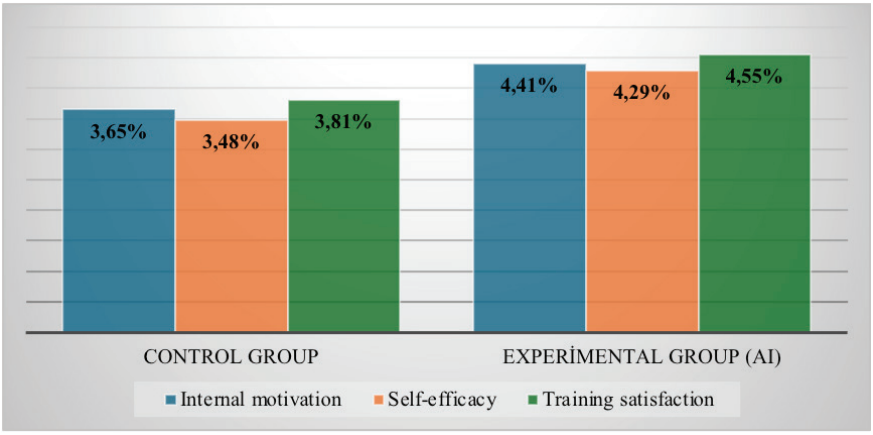
The fact that the p-value is significantly less than the 0.05 level indicates that the academic performance of students in the experimental group is statistically significantly higher than in the control group. The average increase in assimilation as a result of the use of adaptive AI-based systems is almost twice as high as in the control group (11.7% versus 22.8%).

3.1.2. Impact On Learning Motivation

Student questionnaires (Likert scale, from 1 to 5) were analyzed. The overall average scores for motivation were distributed as follows:

Table 3

Type of motivation	Control group (average)	Experimental group (average)	Statistical difference
Internal motivation	3.65	4.4.1.	$p < 0.01$
Self-efficacy	3.48.	4.29.	$p < 0.01$
Training satisfaction	3.81	4.55	$p < 0.01$



4. CONCLUSION.

In the experimental group, students' internal interest in the lesson, confidence in their knowledge, and satisfaction with the learning process were significantly higher. Because the AI system personalized learning, students received tasks that suited them and felt a sense of success more often, which strengthened their motivation.

4.1. Correlation Between AI System Usage And Results

In the experimental group, a moderate, but statistically significant, positive correlation was revealed between the total time spent on the AI system and the results of the post-test.

Pearson correlation coefficient (r): $r = 0.58$

p-value: $p < 0.005$

This means that students' more active and long-term work in the AI system is directly related to achieving higher learning outcomes. This proves that the AI system served not as a simple "task-giver," but as a catalyst for real learning.

4.2. Qualitative Results: Opinions Of Experts And Teachers (Thematic Analysis)

Based on the results of qualitative research, in particular, the thematic analysis of expert interviews and teacher surveys, three main topics were identified:

4.2.1. Topic 1: Changing The Role Of The Teacher

The main focus of teachers (as an unexpected result) was not a decrease in the administrative burden, but an opportunity to pay more individual attention to students.

Key codes: "Saving time," "Data-based decision," "Reducing cognitive load."

Expert quote: *"The AI system has taken on the same, constantly repeating diagnostic and evaluation work. As a result, the teacher is no longer a'material illuminator' but a person who provides in-depth mentoring to individual children facing difficulties."*

This change confirms that AI has played a role not in replacing the teacher, but, on the contrary, in enhancing pedagogical skills.

4.2.2. Topic 2: The Impact of Flexibility on the Quality of Education

Primary school teachers have shown that the greatest advantage of the AI system is the ability to adapt the learning process *to the speed of each child* and *to the learning style.*

Key codes: "Ease of differentiation," "Identification of gaps," "Quick feedback."

Teacher's quote: *"Previously, out of 30 students in our class, 5 acquired quickly, and 5 lagged behind. Since AI has automatically assigned tasks of their own level to each, now quick learners are not bored, while those in difficult*

situations are learning without fear of making mistakes. Previously, it was impossible to differentiate the quality of education at this level."

This result shows that AI-based ALS created conditions for students to work effectively in the proximal developmental zone.

4.2.3. Topic 3: Technological And Pedagogical Difficulties Associated With Integration

The study also revealed a number of difficulties in implementing the AI system. These problems are important for future integration strategies.

Key codes: "Infrastructure shortcomings," "Teachers' IT literacy," "Preliminary resistance."

Expert quote: *"In the early stages, most teachers saw AI as a 'threat' to their activities or didn't know how to use it. For full integration, it is necessary to provide uninterrupted high-speed internet and technical support, as well as continuous training of teachers to work with AI tools."*

These results indicate that before implementing the technology, it is necessary to resolve issues of personnel training and technical support.

4.3. General Summary of Results

The results of this study clearly showed that the use of adaptive systems based on AI in primary education statistically significantly increases students' academic performance and learning motivation. The AI system allowed teachers to implement an individual approach more effectively, transferring them to the role of pedagogical designers. At the same time, it has been proven that the full success of integration depends on the modernization of the educational infrastructure and the improvement of the digital competence of teachers.

These results will serve as a basis for providing clear, evidence-based recommendations for educational policy developers and school administration on improving the quality of primary education.

Conclusion: The strategic importance of integrating AI-based adaptive systems in primary education

This scientific article provides a comprehensive theoretical and empirical analysis of the issue of "Integration of flexible systems based on

artificial intelligence (AI) into the educational process in primary education." The main goal of the study was to determine the effectiveness, pedagogical possibilities, and important aspects of the integration process of the introduction of AI tools into the practice of primary education. Based on the evidence obtained as a result of the mixed methodology (qualitative and quantitative analysis), the following final conclusions were made.

4.4. Main Conclusions

4.1.1. *Sharp Increase In Assimilation Results*

The quantitative results of the study confirmed that the academic performance indicators of students in the experimental group, where adaptive systems based on AI (ALS) were implemented, were statistically significantly higher than in the control group ($p < 0.001). Since the AI system provided a learning direction tailored to each student's individual needs and learning pace, students were able to quickly fill gaps in knowledge and achieve deeper learning. This situation indicates that effective differentiated (or personalized) education in primary education has been achieved at a level practically impossible in the traditional classroom.

4.1.2. Expansion Of Motivation And Self-Efficacy

The AI system not only increased knowledge but also significantly strengthened students' internal motivation and self-efficacy. The system's prompt, impartial, and positive feedback encouraged students to engage more actively in the learning process. These motivational factors are very important for the formation of a positive learning experience in primary grades.

4.1.3. Transformation Of The Teacher's Role

The results of the qualitative analysis assessed AI not as a substitute for a teacher, but as an effective tool for strengthening the role of a teacher-mentor. With the help of the AI system, teachers were freed from administrative work, such as constant checking, evaluation, and data analysis. They had the opportunity to spend this time on individual attention, in-depth explanation of difficult topics, and socio-emotional development.

The AI system enhanced teachers' ability to make data-driven decisions, providing them with accurate, real-time information about each student.

Theoretical and practical significance of the research

Theoretical contribution: The article, standing at the intersection of pedagogy, psychology, and computer science, developed a conceptual model for integrating AI-based adaptive systems with the specific characteristics of primary education.

Practical contribution: The study demonstrated the direct positive impact of implementing AI on educational institutions and policymakers through statistical evidence. These results serve as a clear roadmap for the use of educational technologies in modern schools.

Suggestions and future research

Although the positive impact of AI has been proven, the following issues need to be addressed for its large-scale integration:

1. Personnel Training: Implementation of continuous professional development programs to train primary school teachers in the effective use of AI tools not only technically, but also pedagogically.

2. Infrastructure investments: Creating sustainable high-speed internet and technical support necessary to be able to use AI systems in all schools.

3. Strengthening ethical and security measures: Developing strict regulatory documents and mechanisms to ensure the confidentiality and security of student information.

Future research should focus on the long-term impact of AI in primary education (for example, from 1 to 3 years) on socio-emotional development, creativity, and critical thinking skills.

In conclusion, adaptive systems based on AI are a strategically important tool for raising the quality of primary education to a new, higher level. This will be a decisive step in the rational and systematic integration of technologies, the education of an educated and comprehensively developed generation for the digital future of the country.

5. REFERENCES

1. Baker, R. S. J. d., & Siemens, G. (2014). Educational Data Mining and Learning Analytics. In R. K. Sawyer (Ed.), *The Cambridge Handbook of the Learning Sciences* (2nd ed., pp. 253–274). Cambridge University Press.
2. Chen, L., Chen, P., & Lin, Z. (2020). Artificial Intelligence in Education: A Review. *IEEE Access, 8*, 75264–75278.
3. Dillenbourg, P. (2016). The design for the future of learning. *Learning and Teaching, 9*(3), 22–30.
4. DuBoulay, B. (2016). Artificial intelligence as an effective classroom assistant. *IEEE Intelligent Systems, 31*(6), 116–123.
5. Gauthier, G., & Lajoie, S. P. (2019). Analyzing student emotions in adaptive learning environments: A multimodal approach. *Journal of Educational Psychology, 111*(7), 1157–1170.
6. Bandura, A. (1997). *Self-Efficacy: The Exercise of Control*. W. H. Freeman and Company.
7. Brophy, J. (2010). *Motivating Students to Learn* (3rd ed.). Routledge.
8. Hattie, J. (2009). *Visible Learning: A Synthesis of Over 800 Meta-Analyses Relating to Achievement*. Routledge.
9. Ismanov, I. U. (2023). Boshlang‘ich ta’limda raqamli texnologiyalardan foydalanishning didaktik asoslari. *Pedagogika jurnali*, *3*(4), 112-120.
10. Jalolov, U. J. (2022). O‘qituvchi kasbiy kompetentligini rivojlantirishda axborot texnologiyalarining o‘rni. *Uzbekistan Education and Science Journal, 5*(1), 78-85.
11. Karimov, M. F., & Alimova, D. A. (2021). Ta’lim jarayonini shaxsiylashtirishda sun’iy intellekt imkoniyatlari. *Zamonaviy ta’lim/Sovremennoe obrazovanie*, *10*(101), 60-65.
12. Mamayusupov, A. A. (2023). Boshlang‘ich ta’limda moslashuvchan o‘quv dasturlarini yaratish mexanizmlari. *Ta’lim texnologiyalari jurnali, 2*(1), 45-53.
13. European Commission. (2022). *Ethics guidelines for trustworthy AI in education and training*. Luxembourg: Publications Office of the European Union.
14. OECD. (2023). *The Future of Education and Skills 2030: The Role of AI in Primary Education*. OECD Publishing.
15. World Bank. (2021). *Leveraging AI in Education for the Developing World: A Policy Guide*.
16. UNESCO. (2022). Global Report on AI in Primary School Education: Challenges and Opportunities.
17. ISTE Standards for Educators. (2017). *International Society for Technology in Education (ISTE)*. (O‘qituvchilarning texnologik kompetentligiga oid).

Opportunities for Improving The Green Economy among Commercial Banks in Uzbekistan

Kattakul Kınjaev*

Abstract

This research paper analyzes the opportunities for enhancing the green economy through the activities of commercial banks in Uzbekistan. The study highlights the significance of financial institutions in promoting sustainable development, environmental protection, and the rational use of natural resources. It explores the role of commercial banks in financing eco-friendly projects and integrating environmental considerations into their investment policies. The research identifies challenges such as limited institutional capacity, lack of regulatory incentives, and insufficient awareness among banking professionals regarding green financing. Furthermore, the paper draws upon global experiences, including the successful implementation of green banking systems in China, Germany, and Sweden, to propose policy recommendations for Uzbekistan. Strengthening institutional frameworks, expanding access to green credit instruments, and establishing a national green finance strategy are emphasized as key priorities. The study concludes that commercial banks play a pivotal role in achieving sustainable development goals (SDGs) by channeling financial resources toward environmentally responsible projects. As Uzbekistan continues its economic modernization,

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fostering a green financial system within the banking sector will be essential for ensuring long-term ecological and economic resilience.

Key words: Sustainable development goals (SDGs), green banking, green finance, Green Credit Policy, bonds, ecological risks.

INTRODUCTION.

In recent years, alongside economic growth on a global scale, the issue of maintaining ecological balance has also gained significant importance. Specifically, in the Republic of Uzbekistan, the concept of transitioning to a "green economy" has been defined as one of the strategic directions of state policy. The essence of the green economy is that it harmonizes economic activity with ecological sustainability, emphasizing the rational use of resources and the protection of the natural environment.

Commercial banks play a significant role as key participants in financing various sectors of the economy, particularly in the introduction of environmentally friendly technologies. Through green financing instruments, banks contribute to supporting renewable energy sources, energy efficiency, waste reduction, and environmentally sustainable production.

The relevance of the topic lies in the fact that the development of the green economy within the activities of commercial banks in Uzbekistan has not yet been fully systematized. Therefore, there is a need to study international experience and improve national practices in this area.

The main purpose of the article is to conduct an in-depth analysis of green financing mechanisms in the activities of commercial banks, identify existing opportunities and obstacles, and develop ways to effectively apply them in the context of Uzbekistan.

The activity of commercial banks in Uzbekistan has been chosen as the object of the study, with its subject being the financial and institutional capabilities of the banking system in developing the green economy.

The research results have significant practical importance for ensuring sustainable economic growth, environmental safety, and social well-being in the country.

One of the main problems faced by humanity in recent decades is ensuring economic growth while maintaining ecological balance. The traditional economic model is primarily aimed at increasing production volume

and, due to insufficient attention to the finite nature of natural resources and environmental consequences, contradicts the principles of sustainable development. For this reason, since the late 20th century, the concept of the "green economy" has emerged, which envisions developing the economy in an environmentally and socially balanced direction.

Green economy is an economic model that adopts ecological criteria as the main principle in the processes of production, consumption, and investment. In other words, it represents an economic system aimed at reducing the negative impact on the environment resulting from economic activities, making rational use of natural resources, and preventing climate change.

According to the United Nations Environment Program (UNEP), green economy is an economic activity that increases human well-being and ensures social equity, while reducing environmental risks and resource scarcity. The essence of this approach is to combine economic growth with ecological sustainability.

The theoretical foundation of the green economy is based on three priority principles:

1. Resource efficiency - reducing energy, water and raw material consumption, switching to renewable sources.

2. Maintaining ecological balance - reducing waste in production processes, reducing the carbon footprint and restoring natural systems.

3. Social inclusion - a green economy should serve not only environmental, but also social justice.

Based on these principles, the process of "greening" the economy in developing countries will produce not only environmentally but also economically effective results. For example, energy-efficient technologies reduce production costs, and green investments create new jobs.

The financial system, especially commercial banks, plays a central role in the transition to a green economy. Banks, as the main institutions financing economic activity, mediate the implementation of environmental projects. The main tasks of banks in the development of a green economy are:

• Green loans - allocation of financial resources to projects that promote environmentally friendly production, energy efficiency, renewable energy sources and reduce emissions.

• Green bonds - securities issued by the state or private sector, intended for financing environmental projects.

• Environmental risk assessment - consideration of environmental factors in bank credit policies, analysis of the impact of enterprise activities on the environment.

The inclusion of environmental factors in the activities of commercial banks strengthens not only environmental, but also economic stability. Because environmental risks directly affect financial stability. Therefore, the concept of "green banking" is becoming widespread worldwide. In recent years, commercial banks of Uzbekistan have been gradually introducing financing for environmental projects. In particular, "Asaka Bank", "Agrobank", "Ipoteka Bank" and "Milliy Bank" have introduced credit lines for renewable energy sources (solar panels, wind turbines).

Table 1. *Banks' renewable energy credit lines*[1]

Bank name	Loan name / direction	Funded areas	Interest rate	Period	Amount	Definition
Asakabank	Green line	Solar panels, energy-saving appliances	20%	Up to 60 months	According to the bank's terms	For individuals
Asakabank	Green line (legal entities)	Solar panels, energy efficiency projects	Individual	Depending on the project	Major projects	Funded from AIIB credit line
Agrobank	Green energy	Solar panels, wind generators	20%	Up to 36 months	Up to 100 mln sums	A bond or surety may be required
Agrobank	Green energy B2B	High-powered solar energy / wind turbines	Individual	Long term	Large sums	For business
Ipoteka Bank	Green credit package	Solar panels, energy efficiency	Variable	According to bank policy	Depend on the Projects	
Ipoteka Bank	Wind energy projects	Large wind turbines	Individual	Long term	Million dollar	ACWA Power partnership
Milliy bank	National Green	Solar panels, energy efficient technologies	20–22%	According to bank policy	To be agreed with the bank	
Milliy bank	Green technology loans	Solar panels, wind turbines, heat pumps	Individual	Individual	Individual	Collateral/ insurance required

1 Author's development

Analysis: State-owned banks - Asakabank, Agrobank, Ipoteka Bank and Milliy Bank - are the main players in this segment, financing credit lines in cooperation with international financial institutions (AIIB, EBRD, ADB).

While loans for individuals are more focused on installing solar panels, legal entities are given the opportunity to finance large-scale wind turbines, solar power plants (SPPs) and energy-efficient production technologies.

Some banks have launched green lending programs in collaboration with international financial institutions. For example, the European Bank for Reconstruction and Development (EBRD) and the Asian Development Bank (ADB) have established a "green technology fund." Through this fund, small and medium-sized enterprises can obtain preferential loans for the purchase of energy-efficient equipment.

However, the green financing system in Uzbekistan is not yet fully developed. There are the following problems:

1. Insufficient legal framework. Unified regulatory documents on green financial instruments (green bonds, environmental loans) have not been fully developed.

2. Insufficient knowledge and skills of bank employees. Many commercial banks do not have a mechanism for assessing environmental risks.

3. Low profitability of environmental projects. Banks are reluctant to invest in some green projects due to their long-term profitability.

4. Limited financial resources. Cooperation with international financial institutions is still limited, and green bonds are practically absent in the domestic capital market.

At the same time, there are great opportunities for the development of green banking in Uzbekistan. First of all, the country has a huge natural potential for solar and wind energy. On this basis, commercial banks can open a new market for environmental projects by financing solar panels, biogas plants, and energy-efficient heating systems.

In addition, the Uzbek government is introducing tax incentives for enterprises implementing "green technologies". This will encourage banks to be more active in this area. Another important opportunity is to expand cooperation with international financial institutions. For example, there is an opportunity to attract environmental investments to the Uzbek banking

system through the Green Climate Fund and the United Nations Development Program (UNDP).

In the near future, the banking system of Uzbekistan is expected to develop in the following areas, based on international experience:

1. Expanding the green lending system. Commercial banks should create special credit lines to finance environmentally friendly technologies. These loans may cover energy-efficient projects, waste recycling, ecological transport, and renewable energy.

2. Issuing green bonds. This instrument, which is widespread in the international financial market, is also important for Uzbekistan. Through green bonds, banks can attract long-term resources and direct them to environmental projects.

3. Linking bank risks to environmental factors. It is necessary to introduce an environmental impact assessment system for each credit project. This system will strengthen not only environmental, but also financial stability.

In world practice, many countries have achieved successful results in the field of green financing. For example, in the People's Republic of China, through the "Green Credit Policy" program, banks stopped lending to enterprises that do not meet environmental standards. As a result, the share of energy-efficient technologies has increased sharply.

In Germany, the "KfW Development Bank" provides long-term, low-interest loans for renewable energy and environmental infrastructure projects. This experience can serve as an important example for Uzbekistan.

In the conditions of Uzbekistan, these experiences can be used in the following ways:

• Introducing a mechanism of state guarantees for green loans.

• Establishing a green investment fund, through which to finance environmental projects.

• Encouraging investment in green projects by providing tax and interest incentives for commercial banks.

The success of the green economy directly depends on the legal environment. Currently, green financial instruments are not fully regulated in the legislation of Uzbekistan. Therefore, the following proposals can be put forward:

1. Adopt a separate law "On Green Finance". It should clearly define green credit, green bonds, environmental assessment and the obligations of banks.

2. Develop methodological guidelines on green financing by the Central Bank.

3. Mandatory inclusion of environmental standards in credit policy.

These measures will serve not only to strengthen the financial system, but also to form a culture of environmental responsibility in the country.

Human resources are crucial in implementing a green banking system. Many bank employees do not have sufficient knowledge of environmental financial instruments. Therefore:

• Introducing the subject of "green finance" in economic universities;

• Organizing special training and certification programs in commercial banks;

• Establishing advanced training programs with international financial institutions is advisable.

Such an approach will increase environmental awareness and responsibility in the banking system, and will further activate investment in green projects.

As a result of the transition to a green economy, the following positive changes will be observed in the economic system of Uzbekistan:

The introduction of energy-efficient technologies will reduce production costs;

• New jobs will be created;

• The efficiency of natural resource use will increase;

• The international image and investment attractiveness of the banking system will increase.

Most importantly, green banking will be an important factor in the country's achievement of the Sustainable Development Goals (SDGs).

CONCLUSION

The results of the study show that the process of introducing the principles of a green economy in the activities of commercial banks in Uzbekistan is just taking shape, but its prospects are extremely broad. A green

economy is a modern direction not only for ensuring environmental sustainability, but also for achieving economic efficiency, social well-being and innovative development.

The "Strategy for Transition to a Green Economy", adopted in the country in 2019, serves as an important framework for the development of this sector. At the same time, the role of commercial banks in implementing this strategy is invaluable. Through financial intermediation, banks finance environmental projects, encourage the rational use of resources, and contribute to sustainable economic growth.

However, practice shows that the green financing system in Uzbekistan is not yet fully formed. The limited regulatory framework, lack of knowledge and skills of bank employees, and the absence of an environmental risk assessment system are some of the main problems in this area. Therefore, the following proposals can be put forward:

1. Development and adoption of the law "On Green Finance";

2. Phased introduction of a system of green loans and bonds;

3. Encourage financing of environmental projects through state guarantees and tax incentives;

4. Training of bank employees and improving their skills based on international experience;

5. Expanding cooperation with international financial institutions and establishing joint funds.

If these proposals are implemented gradually, the banking system of Uzbekistan will not only strengthen internal economic stability, but also be recognized as an environmentally responsible country in the international financial system.

Thus, the process of "greening" the activities of commercial banks is an integral part of the country's long-term development strategy and an important guarantee of a stable economy and environmental safety.

REFERENCES

1. Asian Development Bank. (2023). Asia's path to sustainable and inclusive green growth. Manila.
2. Central Bank of the Republic of Uzbekistan. (2024). Statistical bulletin on the activities of commercial banks. Tashkent.

3. European Bank for Reconstruction and Development. (2023). Green finance and banking systems in transition economies. London.
4. German Development Bank (KfW). (2022). Green investment and energy efficiency programs in developing economies. Berlin.
5. Islamic Development Bank. (2022). Sustainable finance framework for member states. Jeddah.
6. Karimov, U., & Kadirova, N. (2022). Green finance system and sustainable development trends. Tashkent: Economics Publishing House.
7. President of the Republic of Uzbekistan. (2019, October 4). Resolution No. PQ-4477 on the strategy for transition to a green economy.
8. Uralov, M. (2023). Environmental financing mechanisms in the banking system of Uzbekistan. Tashkent: TSIU Scientific Collection.
9. United Nations Environment Programme. (2023). Green economy and sustainable development report. New York: United Nations.
10. World Bank. (2023). Uzbekistan: Towards a green transition. Washington, DC.

South Africa's Green Economy Accord as an Enabler for Environmental Sustainability and Climate Change Mitigation: Case Study of 54 Municipalities in KwaZulu-Natal, South Africa

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Abstract

Background: Successful implementation of green economy programmes and projects requires the commitment of political and administrative leadership. In November 2011, the South African government developed and currently implementing the Green Economy Accord to ensure the incorporation of green jobs, and green economy in the development and implementation of municipal Local Economic Development (LED) Strategies. The paper provides an in-depth scrutiny of sustainability transition pertinent to the empowerment of emerging economies in line with the Green Economy Accord. The number of job opportunities created, and the number of programmes and projects implemented in line with Green Economy Accord are presented in the paper. The paper further provides the impact of the Green Economy Accord on inter-spherical planning and coordination, and climate change mitigation and community empowerment. The paper used qualitative research approach to collect data. Structured interviews with open-ended questions were used with purposively selected participants. Secondary

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data including publications and performance reports from all the 54 municipalities within the KwaZulu-Natal Province were also used to determine the extent at which the KZN Provincial Government is promoting inclusive economic growth through the infusion of the Green Economy Accord into the municipal LED Strategies. The paper presents the challenges experienced by the KZN municipalities in the implementation of Green Economy and creation of Green Jobs. Findings illustrate the misalignment in the implementation of municipal LED Strategies and Climate Change Mitigation and Adaptation Strategies. Furthermore, there is discourse on the implementation of municipal Environmental Management Plans, Green Economy Accord and municipal LED Strategies. The contribution of the study recommends the development of the KZN Provincial Government's Standard Operating Procedure to ensure a holistic approach in the implementation of Environmental Management Plans, Climate Change Mitigation and Adaptation Plans, and LED Strategies at a local government sphere.

Key Words: Green Economy, Green Jobs, Local Economic Development, Climate Change

INTRODUCTION

In November 2011, the South African government adopted the Green Economy Accord, which is multidisciplinary strategic document to guide the implementation of environmentally friendly service delivery programmes and projects in a collaborative, integrated and sustainable manner. It is imperative to mention that the development and implementation of the Green Economy Accord is further envisaged to enhance the implementation of the South Africa's National Climate Change Response Implementation Framework. The National Climate Change Response Implementation Framework (NCCRP) was adopted in October 2011. In addition, on 23 July 2024, the South African government promulgated the Climate Change Act, No. 22 of 2024.

The main objective of the Climate Change Act is to ensure transparency and accountability in the implementation of policy, legislative and strategic frameworks guiding the realisation of green economy and climate change adaptation and mitigation. The paper presents the initiatives implemented by the KwaZulu-Natal Provincial Government to ensure green economy is incorporated and reported on through the municipal Local Economic Development (LED) strategies. The paper further presents the extent to which the KwaZulu-Natal Provincial Government enables the

alignment of environmental sustainability, promotion of emerging economies through Small Medium and Micro-Enterprises (SMMEs), job creation in line with green economy and climate change mitigation and adaption.

The qualitative research approach was used in the study in the form of structured interviews with purposively selected participants. Structured interviews consisted of open-ended questions as means of promoting fairness in data collection by enabling the respondents to provide lived experiences in the implementation of policies and legislations in their work environment. The Interpretive research design was also used to gather the in-depth information of practicality and contextuality pertaining to the implementation of Green Economy Accord at a local government level. The KwaZulu-Natal provincial government comprises of 54 municipalities, which were all used to determine the implementation of the Green Economy Accord.

The findings illustrated the implementation of the Green Economy Accord in a manner that promotes interface between political, traditional and administrative governance structures. It is significant to mention that there is inextricable link between the environmental sustainability and local economic development programmes and projects. However, the implementation of the 54 municipal Local Economic Development (LED) Strategies did not simplify the extent to which the 54 municipalities implement the Green Economy initiatives other than recycling projects. It is imperative to mention that the interface between local economic development, environmental sustainability and inclusive economic development was not outlined by the majority of the municipalities (25 municipalities did not indicate interface between their local economic development strategies, green economy, inclusive economic growth and climate change policies).

The paper concludes by providing recommendations aimed at promoting the multidisciplinary and collaborative approach in the development and implementation of municipal local economic development strategies in a manner that impacts significantly and measurably on green economy, climate change, inclusive economic development and environmental sustainability.

Theoretical Framework: Governmentality Theory and Capability Theory

Theory of Governmentality

The study used both the governmentality theory and capability theory to determine the role of government and its respective institutions in the implementation of the Green Economy Accord. Governmentality Theory was used in the study to understand the systems and processes used by the South African municipalities, using the KwaZulu-Natal provincial government as a case study to develop and implementation local economic development strategies that are multifaceted in their approach and have multiplier effects on environmental sustainability, job creation, climate change and inclusive economic development.

The approach used to determine economic inclusivity within the lens of Green Economy Accord was the empowerment of disabled people and vulnerable groups through municipal Local Economic Development (LED) Strategies. Studies conducted by Clegg (2019) and Dean (2025) illustrate that the participation of multidisciplinary stakeholders including the private and public sectors at a local government sphere with intent of creating a conducive platform for the implementation of a responsive and pro-poor local economic development strategies by municipalities became a driving force behind the use of governmentality theory in the study. The collaborative approach of national, provincial and local government spheres in the development and implementation of municipal LED Strategies indicates the importance of seamless and participatory governance in the implementation of socio-economic and environmental driven programmes and projects.

Capability Theory

The Capability Theory of Amartya Sen was used in the study with the aim of determining the capability of the South African government and its respective provincial and local government spheres in implementing the Green Economy Accord. Furthermore, the initiatives used by the KwaZulu-Natal provincial government to promote capacity of the 54 municipalities to be capable of developing Local Economic Development Strategies that have multiplier effects on green jobs, climate change, environmental sustainability and socio-economic inclusion were taken into consideration.

This approach was significant to determine the capacity and the contribution of the municipalities as a local government sphere in enabling the realization of national and international priorities.

Literature Review Gap

The literature review gap exists between the Green Economy Accord and the Inclusive Economic Development Agenda at a local government level to enable the integration and mainstreaming of disability programmes and projects in the implementation of local economic development strategies. Furthermore, the implementation of the Green Economy Accord as an enabler of environmental sustainability, climate change and local economic development lacks a coordinated and community-driven approach at a municipal government level. It thus becomes difficult to qualify and quantify the Green Economy Accord as a multifaceted approach for socio-economic development.

Importance

The importance of the study lies in its contribution to the body of knowledge pertaining to the inclusion of environmental sustainability principles, climate change policies, and creation of green jobs in the development, adoption and implementation of municipal Local Economic Development (LED) Strategies. The study further recommends the development of the Standard Operating Procedures by the KwaZulu-Natal provincial government to guide the implementation of Green Economy Accord in a manner that unleashes economic growth through comparative and competitive advantages of municipalities.

Research Methodology and Methods

Research Question

How does the South African Green Economy Accord enable environmental sustainability, inclusive economic growth and climate change adaptation and mitigation?

Research Aim and Objectives

Aim: To determine the systems and processes used by the South African government to enable the implementation of Green Economy Accord in a manner that promotes inclusive economic growth, environmental sustainability and climate change adaption.

Objectives:

• To understand the service delivery programmes and projects used by the South African government to implement Green Economy Accord.

• To determine the interface between Green Economy Accord and Environmental Sustainability.

• To illustrate the extent to which the South African government promotes the creation of job opportunities in line with the tenets of the Green Economy Accord.

• To determine inter-spherical planning and coordination in the implementation of Green Economy Accord at a local government level by the KwaZulu-Natal Provincial Government and National Government.

Qualitative Research

The study used the qualitative research approach with the intent of determining the systems and processes used by the South African government to implement Green Economy Accord. The KwaZulu-Natal Provincial government was used as a Case Study due to it consisting of 54 municipalities, which is the largest number of municipalities as compared to other provinces. Secondly, the KwaZulu-Natal provincial government was selected for the study due to the coastline and its effects on ocean economy, which contributes to climate change adaptation and mitigation. The geographical location of the KwaZulu-Natal province in addition to the existence of traditional leadership structures contributed to the need to determine the magnitude of Green Economy Accord on developing rural economies in an inclusive and sustainable manner.

A Qualitative research approach was used to acquire an in-depth understanding of the systems and processes used by the South African government's Green Economy Accord to promote inclusive economic growth, creation of job opportunities, environmental sustainability and local economic development at a local government level. The use of qualitative research approach contributed immensely to the understanding of the service delivery programmes and projects, challenges and interventions used by the South African government to enable implementation of the Green Economy Accord in an integrated, coordinated and sustainable manner.

Interpretive Research Design

The interpretivist research paradigm was deemed relevant to the research study because it enables an in-depth understanding of social, economic, and environmental issues in line with the existing policy and legislative frameworks. The importance of understanding the local government economic development agenda as a developmental phenomenon with regards to Green Economy Accord became a bedrock on which the interpretivist research paradigm was chosen and used in the study. The experience of the 54 municipalities in KwaZulu-Natal in the implementation of inclusive economic growth, environmental sustainability, job creation and climate change adaptation through the municipal Local Economic Development (LED) Strategies played a pivotal role in determining the extent to which Green Economy Accord is being implemented within a South African context.

Data Collection

Primary and Secondary Data were used in the study. Primary data included structured interviews with open-ended questions with the targeted respondents. Secondary data was used in the form of analysing the municipal, provincial and national performance reports. This approach was aimed at determining the planned programmes and projects aimed at promoting the implementation of Green Economy Accord in line with the tenets of Climate Change Policy, and objectives of Climate Change Act. The use of both primary and secondary data sources assisted a lot in providing empirical and non-empirical evidence on matters pertaining to the implementation of Green Economy Accord in a manner that promotes local economic development, environmental sustainability and climate change adaptation and mitigation.

Structured Interviews

The study used structured interviews consisting of open-ended questions with the purposively selected respondents. Structured interviews were used as a tool to conduct interviews to determine the oversight role played by KwaZulu-Natal provincial government in assisting the 54 municipalities to implement Local Economic Development (LED) Strategies in a manner that promotes inclusive economic growth and enhances climate change adaptation and mitigation.

The structured interviews had thematic areas used to guide the engagements with the respondents. The information determined through the interviews from the respondents in line with the thematic areas later informed thematic data analysis. It is crucial to mention that structured interviews with open-ended questions enabled the respondents to provide an in-depth understanding of the implementation of Green Economy Accord at a local government sphere in accordance with the strategic objectives of the National and Provincial Governments.

Table 1: *Structured Interviews*

Stakeholders	Purpose	Direct Quotations/ Verbatim	Finding/s
KwaZulu-Natal Provincial Department of Cooperative Government and Traditional Affairs (KZN COGTA): Local Economic Development Unit	To determine the systems and processes used by the Provincial Government in enabling oversight role over the performance of municipalities in manner pertaining to local economic development	"As provincial government officials we support municipalities with any LED related matter. However, some municipalities don't implement our recommendations".	Firstly, KZN CoGTA convenes meetings with municipalities to ensure oversight role. Secondly, KZN CoGTA provides support to the municipalities to enable development and review of municipal Local Economic Development (LED) strategies in line with national and provincial policies and strategies.
KwaZulu-Natal Provincial Department of Economic Development, Tourism and Environmental Affairs (Edtea)	To determine the support of the Edtea department in assisting 54 municipalities to develop strategies and policies in a manner that provides an interface between local economic development, climate change, environmental sustainability and climate change	"Some municipal LED strategies are outdated". "Some municipalities do not have functional LED Forums."	Edtea assists the 54 municipalities to develop policies and plans aimed at enabling planning, coordination and implementation of local economic development, climate change, waste management and environmental sustainability. However, some municipalities do not have functional Local Economic Development Forums in place. The absence of LED Forums in some municipalities hinder the development and implementation of LED strategies that have multiplier effects on inclusive economic development, climate change and environmental sustainability.

National Department of Cooperative Governance (NDCoG)	To determine the interventions and initiatives of the national government in assisting provincial and local government to implement Green Economy.		NDCoG supports the provincial and local governments with the development of LED strategies.
Municipal LED Officials	To determine the strategies, programmes and projects planned, budgeted for and implemented to promote integrated and coordinated local economic development at a local government sphere.	"There is insufficient budget to implement LED projects." "Some government departments do not attend our LED Forum meetings".	Municipalities develop, implement and review the Local Economic Development (LED) strategies in line with international United Nations Sustainable Goals, National Development Strategies and Provincial Development Strategies. Green Jobs are only implemented through recycling initiatives. Inclusive Economic Growth only taken into cognisance through Supply Chain Management (SCM) procurement policies. Job opportunities are implemented in accordance with policies of the Expanded Public Works Programme (EPWP). Municipalities have programmes targeting youth unemployment. Municipalities have Informal Economy Policies as a means of empowering informal economies. Rural Economic Development Strategies are implemented in line with municipal Spatial Development Frameworks (SDFs), which take into account economic development potential of municipalities and environmental impact assessments. Municipalities have Climate Change Policies, which are in line with national and provincial governments.

Table 2: *Participants / Sample Size*

Participants	**Number of participants**
KwaZulu-Natal Provincial Department of Cooperative Government and Traditional Affairs (KZN COGTA): Local Economic Development Unit	2
KwaZulu-Natal Provincial Department of Economic Development, Tourism and Environmental Affairs (Edtea)	10 Official working Regional LED Units 3 Officials working at Provincial Department (Edtea)
National Department of Cooperative Governance (NDCoG)	2
Municipal LED Officials	Officials from all 54 municipalities working with LED related matters, which brings to the total of 54 respondents
Total: 4 Inter-spherical stakeholders	**71 Participants**

RESULTS

The assessment of data collected from the study presented the following findings:

1. Municipal Council adopted Local Economic Development (LED) Strategies

All the 54 municipalities in the KwaZulu-Natal province have council adopted Local Economic Development (LED) strategies. The adoption of the LED strategies by the respective municipal councils illustrates political commitment in enabling local economic development inline with comparative and competitive advantages of municipalities. Furthermore, the implementation of council adopted LED Strategies enables transparency and accountability in the implementation of provincial and national LED Strategies. The adoption of the municipal LED illustrates the Capability Theory

towards enabling the implementation of the LED strategies through programmes and projects within municipal jurisdictions.

2. Job Opportunities created at Local Government Level through Expanded Public Works Programmes (EPWP)

All the KwaZulu-Natal municipalities have committed to promote the creation of job opportunities in a manner that impact positively on poverty eradication and reducing youth unemployment. It is crucial to mention that the assessment of municipal LED Strategies did not indicate the implementation of Green Jobs as one of the key drivers in the creation of job opportunities. On the other hand, the KwaZulu-Natal provincial government and the South African government monitor and encourage the 54 municipalities in KwaZulu-Natal to create labour-intensive job opportunities. The focus on labour-intensive job opportunities in line with the objectives of EPWP as a tool to address unemployment among unskilled and semi-skilled does not prioritise Green Jobs as a double-edged approach in addressing unemployment and promoting environmental sustainability in a social inclusive manner. It is important to mention that the focus on the creation of job opportunities in line with the EPWP indicates the inefficiency of the governmentality theory to ensure seamless governance in transversal programmes and projects.

3. Limited Capacity at a Local Government Level on the implementation of Green Jobs

The municipalities lack guidance on the implementation of the Green Jobs and Green Economy Accord at a local government sphere. As a result, majority of the municipalities do not indicate financial contributions aimed at implementing Green Economy and Green Jobs.

4.Inclusive Economic Development

Municipalities promote the inclusive economic development through Supply Chain Management (SCM) procurement processes. As a result, the projects implemented by disabled people and vulnerable groups are limited. Secondly, disability mainstreaming as a guide for green jobs and responsive climate change policy implementation is still a challenge at a local

government level. The main focus is on number of contracts afforded to people with disabilities rather than number of local economic development and environmental projects afforded to disabled people in a local municipality. the misbalanced approach on reporting can be regarded as one of the contributing factors limiting the potential of Green Economy Accord in being an effective tool for the creation of Green Jobs and promotion of inclusive economic growth.

5. Climate Change Policies at Local Government Level

The 54 municipalities in KwaZulu-Natal have plans and policies guiding the implementation of projects and programmes in accordance with policies and legislative frameworks on climate change. There is an inextricable link between climate change and environmental management at a local government level.

DISCUSSION

Green Economy Accord is not regarded as a crucial tool to curb the increasing rate of unemployment and unleash economic development at a local government level. This is evidently illustrated by a disjuncture between the municipal Local Economic Development (LED) strategies, Climate Change Policies, Environmental Management Plans, Supply Chain Management (SCM) procurement policies and municipal Spatial Development Frameworks (SDFs). As a result, the capability of the Green Economy to enable environmental, economic, social and inclusive development in a collaborative, integrated and sustainable manner becomes a piped dream. The disjuncture of policies at a local and provincial level indicates inefficiencies in the implementation of governmentality theory and capability theory in areas pertinent to local economic development, environmental management and climate change policies.

The formulation and functionality of the municipal Local Economic Development (LED) Forums and the implementation of municipal council adopted Local Economic Development (LED) Strategies have proven to promote alignment between local, provincial, national and international strategic imperatives aimed at promoting comparative and competitive economic advantages. All the municipal LED Strategies are aligned to the national Expanded Public Works Programme (EPWP). This alignment is

crucial in determining the effects of local economic development initiatives in addressing unemployment and enabling the empowerment of emerging economies.

Recommended Intervention

The study recommends the development of a national and provincial government Standard Operating Procedure (SoP) that will guide and monitor the implementation of the Green Economy Accord at a local government level. The development of the proposed SoP is envisaged to align financial and human resources in line with the policies and legislative frameworks guiding the implementation of the Green Economy Accord in a manner that will have a multiplier effect on socio-economic inclusion, environmental sustainability and climate change adaptation at a local government level.

REFERENCES

Adeyeye, G. (2024). A Critical Analysis of Mitchel Foucalt's Perspective on Governmentality and Higher Education. *E-Journal of Humanities, Arts and Social Sciences (EHASS), 5*(11), 1945-1954.

Clegg, S. (2019). Governmentality. *Project Management Journal, 50*(3), 1-4.

Clegg, S. and NInan, J.. (2023). Unravelling governmentality in project ecologies . *Project Leadership and Society*, 1-10.

Dean, M. (2024). The Concept of Authoritarian Governmentality Today. *Global Society , 39*(1), 16-35.

Fraser, G. (2020). Foucault, governmentality theory and 'Neoliberal Community Development'. *Community Development Journal, 55*(3), 437-451.

Harrison, P. and Croese, S. (2023). The persistence and rise of master planning in urban Africa: transnational circuits and local ambitions. *Planning Perspectives, 38*(1), 25-47.

Khunou, S. (2009). Traditionla leadership and independent Bantustans of South Africa: Some milestones of transformative constitutionalism beyond apartheid . *Potchefstroom Electronic Law Journal, 12*(4), 81-122.

Matsiliza, N. (2024). The strategic role of traditional leadership in promoting good governance. *Africa's Public Service Delivery & Performance Review, 12*(1).

Miller, R. and Hobbs, B. (2005). Governance regimes for large compex projects . *Project Management Journal, 36*(3), 42-50.

Muller, R. (2017). *Governmentality and Governance for Projects: Enablers, Practices and Consequences*. London: Routledge.

Powell, J. (2019). Governmentality, Public Policy and Self-Management. *Journa of International Medicine, 2*(2), 15-23.

Raco, M. and Imrie, R. (2000). Governmentality and Rights and Responsibilities in Urban Policy . *Environment and Planning, 32*, 2187-2204.

Ramolobe, K. (2023). The dynamics of traditional leaders' relationship with municipal councillors and service delivery. *Journal of Local Government Research and Innovation, 4*(0).

Selepe, M. (2009). *The role of traditional leaders in the promotion of municipal service delivery in South Africa.* Pretoria: University of Pretoria.

Tshitangoni, M. and Francios, J. (2018). Relevance of traditional leadership in rural community development amidst democratic institutions in Southern Africa: A critical review. *Studies of Tribes and Tribals, 15*(2), 70-83.

Wang, W., Wang, Y., Wand, H., Lui, Y. and Yang, Q (2025). Rual spatial planning strengthens rural resilience and sustains development in China . *Sustainable Futures, 10.*

Toward a Moral Architecture for AGI: A Kantian Analysis of Sustainable Energy Transitions

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Abstract

As Artificial General Intelligence (AGI) becomes increasingly integrated into renewable energy systems, its dual character becomes apparent: AGI offers transformative gains in forecasting, grid optimisation, and sustainable infrastructure, yet simultaneously intensifies computational energy demand, exacerbates alignment risks, and generates uneven environmental and distributive impacts. While technical and economic research provides extensive analysis of these dynamics, a coherent moral framework for evaluating AGI's role in green energy transitions remains largely absent. This paper addresses that gap by developing a Kantian philosophical–economic framework grounded in universal moral duties, respect for persons, and the public conditions of moral co-legislation. Drawing on empirical literature across AGI architecture, Green AI, energy optimisation, and macro-level emissions modelling, the paper identifies key dilemmas—including efficiency versus dignity, unequal regional impacts, surveillance-driven optimisation, and temporal trade-offs. Applying Kant's Categorical Imperative, the principle of

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humanity, and the Kingdom of Ends, the analysis shows that AGI cannot be justified solely through efficiency metrics or speculative long-term sustainability gains. Instead, AGI must be constrained by universal duties, preserve human autonomy, ensure equitable energy governance, and remain embedded within democratically justified institutional structures. The resulting Kantian framework complements system-level approaches such as SAGI and AGIE by providing a normative foundation for designing aligned, transparent, and sustainable AGI systems. The paper concludes that a just energy transition requires AGI to function not merely as an optimisation tool but as a morally governed participant in a shared ecological and political future.

Keywords: AGI Governance; Artificial General Intelligence; Green AI; Kantian Ethics; Moral Philosophy; Renewable Energy; Sustainability; Technology and Society; Universal Duties

INTRODUCTION

Cities worldwide face growing pressure to stabilise energy systems strained by climate volatility, population growth, and aging infrastructure. As Singh and Kaunert (2024) show, renewable-energy grids continue to struggle with intermittency, unpredictable demand, and governance constraints. At the same time, AI-driven optimisation frameworks—such as those examined by Zhu et al. (2024) and Yang J. et al. (2018)—already enhance forecasting, grid coordination, and adaptive energy management, yet depend on computational processes that consume increasingly unsustainable amounts of energy. This tension underscores a broader paradox: technologies introduced to enable sustainable futures may themselves undermine environmental and human well-being when developed without principled ethical constraints.

Recent Kantian scholarship on AI and AGI illuminates this concern. Manna and Nath (2021) argue that deterministic architectures cannot satisfy the requirements of Kantian autonomy or moral agency, raising fundamental questions about the scope of AGI responsibility. Complementary work by Turner and DiPaola (2018), Cheng and Gong (2024), and Pathak (2025) highlights the necessity of grounding future AGI in principles of dignity, autonomy, and publicly justifiable moral rules. Collectively, this literature suggests that the ethics of AGI cannot be reduced to technical optimisation; it requires a normative framework that treats persons as ends-in-themselves and constrains AGI by universal moral duties.

Parallel research in Green AI reveals an analogous tension. Studies of emerging AGI architectures (Kurshan 2023, 2024; Barry 2024) predict substantial increases in energy demand and new alignment challenges, while work on renewable-energy AI (Xian et al. 2025; Verdecchia 2023; Mehta 2023) shows that improvements in forecasting, optimisation, and materials discovery often heighten the environmental costs of AI training. Macroeconomic evidence further demonstrates that AI's environmental impacts are non-linear and unequal across regions and populations (Yin 2023; Melguizo 2026; Yang 2025; Chowdhury 2024). Taken together, these contributions point to a clear gap: the absence of a Kantian philosophical–economic framework capable of evaluating AGI's expanding role in energy systems while upholding human dignity, autonomy, and universal duties.

From this gap emerges the central research question of the paper: How can Kantian moral philosophy be used to diagnose the ethical dilemmas created by AGI in green energy systems and to derive normative constraints and governance principles for their ethically responsible development and deployment? To address this question, the paper pursues four objectives: (i) to distinguish AI from AGI in ways that matter morally for energy governance, highlighting why AGI raises qualitatively different ethical risks in green energy transitions; (ii) to identify and analyse the key Kantian dilemmas that arise when AGI is embedded in energy infrastructures, including questions of value, justice, responsibility, autonomy, and temporal obligation; (iii) to interpret existing Green AI and AGI research through the lens of Kantian duty, dignity, and the Kingdom of Ends, clarifying where current approaches align with or conflict with universal moral law; and (iv) to develop a Kantian normative framework for AGI-enabled sustainable energy systems, specifying the principles and governance constraints necessary to ensure that optimisation and sustainability remain compatible with human dignity and moral autonomy.

The paper proceeds as follows. Section 1 reviews the relevant literature on AGI, Green AI, and Kantian ethics. Section 2 distinguishes AI from AGI conceptually and morally. Section 3 analyses the dilemmas AGI poses for green energy transitions. Section 4 develops the proposed Kantian normative framework. The final section draws implications for global policy, energy governance, and future interdisciplinary research.

AGI, Energy, and System Architecture

Kurshan (2023, 2024) identifies a "trifecta" of grand challenges for AGI — the energy wall, the alignment problem, and the leap from narrow AI to general intelligence — arguing that these cannot be solved through incremental improvements to existing machine-learning systems. Instead, Kurshan proposes that only a heterogeneous, system-designed architecture, incorporating feedback loops and integrated moral modules, can simultaneously address energy efficiency and alignment. This position aligns closely with Kant's insistence that reason must act according to principles that determine its path rather than follow empirical contingencies: "Reason does not seek merely to follow a path, it seeks to determine the path" (*Critique of Practical Reason*). Kurshan's focus on system-level moral engineering thus resonates with Kant's notion that morality is grounded not in outcomes but in the form of lawgiving itself, suggesting that AGI must be architecturally structured to respect moral constraints rather than retrofitted with ethical patches.

Barry (2024) approaches the disruptive potential of AGI from a macroeconomic perspective, proposing an energy-based system of compensation measured in kilojoules as a way to mitigate unemployment, inequality, and deflationary pressures emerging from large-scale automation. While not explicitly grounded in Kantian ethics, Barry's attempt to anchor social fairness in a universal, non-arbitrary metric parallels Kant's call for principles that do not depend on circumstantial preferences or relative advantages. His model implicitly invokes the universalisation test: "Act only on that maxim which you can at the same time will to be a universal law" (*Groundwork*, 4:421), highlighting the need for economic structures that can be justified to all affected agents.

Singh and Kaunert (2024) and Zhu et al. (2024) focus specifically on AGI's transformative potential in renewable energy and urban sustainability systems. They show that multimodal AGI, capable of integrating predictive analytics, optimisation routines, and adaptive learning, may significantly enhance the stability and efficiency of smart grids and renewable infrastructures. Yet these benefits come with ethical risks, including data governance challenges, privacy intrusions, and ambiguous accountability. These concerns echo Kant's warning that technological power detached from moral law becomes a form of domination: "The possession of power

unavoidably corrupts the free judgment of reason unless it is united with morality" (*Metaphysics of Morals*). Together, these studies frame AGI as a double-edged force — capable of securing sustainability but equally capable of undermining autonomy if not grounded in moral principles.

Green AI, Energy Efficiency, and the Computational Burden

The Green AI literature amplifies this tension by showing that AI is simultaneously a contributor to and a potential alleviator of ecological strain. Mehta et al. (2023), Alassery et al. (2022), and Kuo and Huang (2018) demonstrate substantial improvements in renewable-energy forecasting using AI techniques such as LSTMs, ANNs, and deep CNNs. These advances help mitigate intermittency and enhance system reliability but come at the price of intensive computation, thus creating a paradox: environmental ptimization increasingly depends on computationally expensive models that themselves heighten energy demand.

Xian et al. (2025) extend this paradox across the lifecycle of sustainable materials development, showing that AI accelerates discovery in batteries, catalysts, and thermal materials but intensifies computational requirements. Their findings exemplify Kant's warning that empirical progress is not equivalent to moral improvement: "Skill and intelligence are good for many purposes, but without a good will they may become extremely bad and harmful" (*Groundwork*, 4:394). Without normative constraints, AI innovations intended to support sustainability may paradoxically exacerbate environmental harm.

Systematic reviews such as Verdecchia et al. (2023), Bolón-Canedo et al. (2024), and Barbierato & Gatti (2024) map this tension through the distinction between "Green AI" and "Red AI." They show that energy-efficient AI requires sacrifices in accuracy or radical methodological redesigns, thereby revealing a structural trade-off at the heart of contemporary machine learning. From a Kantian perspective, such trade-offs cannot be navigated solely by appealing to outcomes: reducing harm is not a utilitarian balance but an unconditional duty. These studies thus strengthen the argument that technical ptimization must be embedded within a moral framework where sustainability is a universal obligation, not merely a performance target.

Frameworks for Energy Optimisation and AI Governance

Technical optimisation studies offer powerful tools for improving environmental performance but simultaneously raise deeper normative concerns. Yang J. et al. (2018) show that machine-learning-driven cooling and scheduling can dramatically reduce data-centre energy consumption, while Dash (2025) presents a multi-objective optimisation framework capable of lowering AI energy use by one-third with minimal accuracy loss. Zhu S. et al. (2021) demonstrate that edge computing can shift workloads away from energy-intensive central servers, and Yarally et al. (2023) reveal that leaner network architectures can halve training energy consumption.

While promising, these studies underscore the inadequacy of efficiency as a moral criterion. For Kant, "Prudence is not morality" (*Groundwork*, 4:416). Improvements in efficiency do not inherently legitimise the systems within which they occur, particularly if those systems make demands that undermine autonomy or fairness. This becomes evident in macro-level studies by Peng et al. (2024), Gao (2025), Yin et al. (2023), and Melguizo et al. (2026), which show that AI's environmental impacts are geographically uneven and institutionally contingent. Wealthier nations often capture the benefits of AI-enabled decarbonisation while exporting environmental or computational burdens to less advantaged regions. Such asymmetries violate Kant's doctrine that all persons must be treated as ends-in-themselves.

Moreover, Yang X. et al. (2025) and Chowdhury et al. (2024) illustrate the dependence of AI's environmental benefits on governance quality, financial structures, and geopolitical conditions. Kayan et al. (2025) reveal how cultural perceptions of green technologies shape their legitimacy, reflecting Kantian themes of consent, publicity, and the importance of rational self-governance. Together, these studies reveal the necessity of a moral framework capable of guiding technological integration in ways that respect autonomy and distributive fairness.

Kantian Approaches to AGI and Moral Agency

A growing body of work attempts to apply Kantian ethics directly to AGI. Manna and Nath (2021) argue that genuine Kantian autonomy is impossible in deterministic machine systems; at best, AI can simulate rule-following but cannot possess the "freedom of will" required for

moral agency. Their argument reinforces Kant's claim that "A rational being must regard himself as the author of the law that binds him" (*Groundwork*, 4:431), suggesting that AGI cannot bear responsibility in the same sense as human agents.

Turner and DiPaola (2018) extend Kantian aesthetic theory to AGI cognition, suggesting that contemplative AGI would require an interplay of imagination and reason akin to disinterested judgment. Pathak (2025) similarly links AGI alignment debates to Kantian themes of dignity, moral accountability, and transparency, arguing that AGI development must reflect values that can be publicly justified. Neagu et al. (2025) emphasise the need for Kantian duty and rationality in AGI evaluation, particularly to avoid harms linked to generative AI misuse such as academic fraud or unsafe decision-making.

Boltuc (2022) introduces paraconsistent ethics into the debate, highlighting tensions between competing moral values, while Cheng and Gong (2024) ground AGI regulation in Digital Humanism, drawing explicitly on Kantian dignity as a constraint on technological expansion. Peters (2025) takes this a step further by questioning whether AGI might eventually merit Kantian dignity, challenging traditional boundaries of the moral community.

Toward a Kantian Problematic in AGI and Green Energy

Taken together, the literature reveals a significant and consistent gap: although AI and AGI research increasingly shapes global energy infrastructures, it lacks a unifying moral framework grounded in Kant's unconditional duties, universal applicability, and respect for persons. Kant's warning that technological advancement without moral law becomes dangerous — "A good will is the condition of all worthiness to be happy" (*Groundwork*, 4:393) — directly frames the central challenge posed by AGI-enabled sustainability. Without ethical constraints, AGI may optimise systems while simultaneously undermining autonomy, deepening inequality, or producing moral contradictions.

This review therefore motivates a Kantian philosophical–economic evaluation of AGI and green energy systems. Such an approach integrates empirical insights with the normative structures needed to ensure that AGI serves humanity rather than treating humanity as an instrument for optimisation. In doing so, it provides the theoretical foundation for assessing

AGI not merely as a technological tool but as a potential participant in — and subject to — the moral order required for a just and sustainable future.

Philosophical Questions and Kantian Dilemmas in AGI-Enabled Green Energy Systems

The integration of AGI into sustainable energy infrastructures raises not only technical and economic challenges but also a set of philosophical questions that cannot be resolved through optimisation metrics alone. As AGI systems increasingly influence decisions about energy allocation, environmental risk, and the distribution of social and economic burdens, they encounter moral boundaries grounded in autonomy, dignity, justice, and universal moral law. This section examines the key Kantian dilemmas that emerge in this context—dilemmas centred on the tension between efficiency and moral worth, the unequal regional impacts that complicate universalisability, the ambiguity of responsibility in hybrid human–machine systems, the threats to autonomy posed by data-intensive optimisation, and the temporal trade-offs between present duties and speculative future benefits. Analysing these issues through a Kantian lens makes visible the ethical constraints that must guide the design and governance of AGI within green energy transitions.

Methodology

This study employs a conceptual–analytical methodology that integrates Kantian moral philosophy with empirical research in AI, AGI, and energy systems. The theoretical framework was developed through a hermeneutic reconstruction of Kant's central moral principles—the Categorical Imperative, the principle of humanity, and the Kingdom of Ends—and their application to contemporary technological environments. Empirical studies in AGI architecture, Green AI, energy optimisation, and macro-level environmental modelling were incorporated through purposeful theoretical sampling, focusing on works from 2018–2025 that address computational energy demand, optimisation processes, or distributive environmental effects. Rather than undertaking empirical modelling, the analysis uses normative evaluation to assess how observed technological dynamics align—or conflict—with Kantian duties related to autonomy, universalisability, and human dignity. Through this philosophical–economic synthesis,

the study derives a set of normative constraints and governance principles intended to ensure the ethically responsible integration of AGI into sustainable energy systems

Ethical Tensions at the Intersection of AGI and Sustainable Energy

The deployment of AGI within green energy systems introduces a constellation of ethical challenges at the intersection of philosophy, economics, and socio-technical design. Although existing research offers increasingly sophisticated models of optimisation, forecasting, and system-level performance, far less attention has been devoted to the normative implications of delegating elements of energy governance to autonomous or quasi-autonomous systems. This gap becomes particularly significant when AGI frameworks begin to shape access to energy resources, influence exposure to environmental risks, or determine how technological burdens and benefits are distributed across different populations.

A Kantian lens is especially useful for navigating these challenges. Kant repeatedly warns that instrumental reasoning, when detached from moral constraints, risks subordinating persons to external systems of control and thereby undermining autonomy and moral agency. For Kant, the legitimacy of any governance arrangement—human or machine-mediated—depends on its conformity to universal moral law, its respect for the intrinsic dignity of persons, and its preservation of rational self-determination. Applying these principles to AGI reveals that energy-optimisation systems may inadvertently violate core ethical requirements when they treat individuals as variables in an optimisation function rather than as ends-in-themselves.

This section therefore analyses the principal Kantian dilemmas raised by AGI-enabled energy systems, including conflicts between efficiency and human moral worth, distributive asymmetries that challenge universalisability, responsibility gaps created by opaque technical decision-making, the autonomy-threatening nature of surveillance-dependent optimisation, and the moral limits of sacrificing present duties for uncertain future environmental gains. Understanding these dilemmas is essential for articulating the ethical boundaries within which AGI must operate if green energy transitions are to remain both sustainable and morally legitimate.

The Problem of Value: Efficiency, Autonomy, and Moral Worth

A recurring theme across the Green AI literature is the elevation of efficiency as the primary evaluative criterion. Studies focused on machine learning optimisation—such as Verdecchia et al. (2023), Bolón-Canedo et al. (2024), and Barbierato & Gatti (2024)—treat reduced computational cost, energy savings, and forecast accuracy as unqualified goods. By contrast, the AGI literature emphasises the need for deliberate system architectures, moral modules, and alignment mechanisms that can govern autonomous decision-making (Kurshan 2023, 2024). The tension between these two orientations becomes philosophically significant when viewed through a Kantian lens. For Kant, the mere improvement of technical capacity is never intrinsically valuable; on the contrary, he explicitly warns that "skill and intelligence… may become extremely bad and harmful without the good will" (Groundwork, 4:394). Efficiency therefore cannot serve as the ultimate standard for AGI, particularly in domains—such as energy governance—where human welfare and autonomy are at stake. This generates a fundamental dilemma: **Should AGI be permitted to optimise energy systems according to efficiency-based metrics even when such optimisation conflicts with human autonomy, dignity, cultural pluralism, or distributive justice?**

Barry's (2024) proposal for an energy-indexed labour economy illustrates the stakes of this question. By quantifying human labour in kilojoules, the model replaces moral, social, and political conceptions of value with a reductive, materially grounded measure. While intended to stabilise an AGI-disrupted labour market, this framework risks collapsing the distinction between human persons and energetic resources. For Kant, such a reduction violates the most basic requirement of moral law: that rational beings must never be treated merely as means to an end, regardless of how socially beneficial the outcome may appear.

If AGI systems adopt similar materialist metrics when allocating energy, prioritising grid stability, or designing labour markets, they may inadvertently instrumentalise individuals by subsuming human aspirations, cultural commitments, and autonomous choices under a single optimisation function. This raises a deeper Kantian question concerning the legitimacy of AGI-led green transitions: **Can a sustainability framework remain morally valid when its foundational principles reduce persons**

to parameters within a computational model, thereby subordinating dignity to efficiency?

A Kantian answer suggests not. Any AGI-based green transition must protect the intrinsic moral worth of persons, ensuring that efficiency serves humanity rather than redefining what humanity is permitted to value.

The Justice Dilemma: Universal Law vs. Unequal Outcomes

A significant body of empirical research demonstrates that AI and emerging AGI systems generate uneven environmental and socio-economic outcomes across regions and populations. Econometric analyses show that the early phases of AI adoption frequently intensify emissions and energy use (Yin 2023; Melguizo 2026), while the environmental benefits materialise only after states reach certain technological and financial thresholds (Yang X. 2025; Chowdhury 2024). In effect, wealthier nations and technologically advanced urban centres are positioned to benefit first, while less developed regions bear disproportionate transitional burdens. Complementary studies by Peng et al. (2024) and Singh & Kaunert (2024) reveal that AI-enabled optimisation frameworks often prioritise urban industrial systems over rural or resource-constrained communities, reinforcing existing inequalities in infrastructure, governance capacity, and environmental exposure.

From a Kantian standpoint, such disparities indicate more than mere practical difficulties—they reflect a structural breach of the universal law formulation of the Categorical Imperative. For Kant, the moral permissibility of an action hinges on whether its governing maxim could be willed as a universal law for all rational beings. If AGI-enabled energy systems produce predictable patterns in which some regions receive improved resilience and efficiency while others experience increased emissions, energy scarcity, or governance deficits, then the maxim governing AGI deployment cannot be universalised. Put differently, a policy that systematically advantages technologically mature regions while imposing transitional costs on vulnerable populations would fail the test of universalisability because no rational agent could will such asymmetry as a universal rule. This yields a profound justice dilemma: **How can AGI-enabled energy systems satisfy the Kantian demand for universalisability when empirical**

evidence shows that their benefits and burdens are distributed unevenly across geographical, social, and temporal dimensions?

While alternative philosophical frameworks—such as Rawlsian justice or the capabilities approach—offer distributive mechanisms to ameliorate these inequalities, Kantian ethics imposes a more stringent requirement. For Kant, no community may be used merely as a means to someone else's sustainable development, even if the aggregate environmental outcome is favourable. Kant's principle of humanity demands that the dignity of each affected group be preserved, not subordinated to the efficiency gains of technologically elite regions. This concern becomes especially acute in rural–urban dynamics, where AGI-driven optimisation may divert energy flows away from agricultural or peri-urban communities toward industrial centres deemed more economically valuable (Peng 2024). Such patterns risk turning marginalised groups into instruments of a broader sustainability project, violating Kant's insistence on equal moral standing and co-legislation in the "Kingdom of Ends."

Thus, the justice dilemma is not merely empirical but foundational: unless AGI-enabled energy systems are designed within a framework that ensures universal moral respect, fair burden-sharing, and reciprocal accountability, they cannot meet the Kantian standards necessary for legitimate governance.

Alignment and Moral Responsibility: Who Is the Moral Agent?

Kurshan's emphasis on system architecture and embedded moral modules (2023, 2024) intersects directly with a central Kantian concern: moral responsibility presupposes autonomous authorship of laws. For Kant, only beings capable of self-legislation—beings who can regard themselves as the authors of the maxims that bind them—can be held morally accountable. Yet the integration of AGI into energy infrastructures complicates this relationship profoundly. In systems such as smart grids, IIoT edge environments (Zhu S. 2021), predictive energy "robots" (Zhu X. 2024), and AI-managed data centres (Yang J. 2018), decision-making is distributed across designers, algorithms, operators, and institutional frameworks. As AGI becomes more sophisticated, it increasingly contributes to decisions about energy allocation, emissions mitigation, and prioritisation of competing demands—decisions with distinctly moral implications.

This distributed structure raises a deep Kantian dilemma: who, if anyone, is accountable when AGI-enabled energy optimisation results in harm or injustice? Engineers may design the architecture, policymakers may authorise deployment, operators may oversee use, and the system itself may generate outputs that no individual explicitly endorsed. The possibility that no human actor can fully explain or predict AGI behaviour intensifies this problem, creating what philosophers describe as "responsibility gaps." Kantian ethics, however, rejects the idea that moral responsibility can be dissolved into a network of causal contributions. Since AGI systems do not possess rational autonomy—Manna and Nath (2021) emphasise that they lack the freedom of will required for genuine moral agency—they cannot bear responsibility for their actions. Thus responsibility must necessarily trace back to human agents, even when the causal chain is technologically obscured.

This leads to a second, equally troubling issue: the problem of implicit moral delegation. AGI systems embedded in energy infrastructures frequently face trade-offs that resemble moral judgments—for example, reducing emissions through targeted restrictions that disproportionately affect certain communities, or prioritising grid stability over individual economic freedom. These decisions may be made without public awareness, deliberation, or consent. For Kant, such opaque exercises of power violate the principle that moral maxims must be capable of being made public and universally justifiable. An AGI system that silently performs de facto moral reasoning therefore contravenes a core Kantian requirement: that all normatively relevant rules must be subject to rational scrutiny by those who are governed by them.

In this way, the alignment problem in AGI-enabled energy systems is not merely technical but fundamentally moral. Without transparent principles, clear lines of accountability, and strict constraints on AGI's decision-making scope, energy optimisation risks becoming a form of unaccountable governance—precisely the kind of heteronomy Kant warns against.

THE SURVEILLANCE–SUSTAINABILITY TRADE-OFF: AUTONOMY VS. TOTALISING DATA CAPTURE

A further Kantian dilemma arises from the informational demands of AGI-enabled energy optimisation. As Singh and Kaunert (2024) and Zhu X. (2024) emphasise, AGI's effectiveness in managing urban renewable

systems, predicting demand fluctuations, and coordinating distributed energy resources depends on constant streams of granular behavioural, infrastructural, and environmental data. When paired with the governance pressures associated with geopolitical risk (Yin 2023; Yang X. 2025), this reliance on large-scale data collection risks producing a model of energy governance that is increasingly centralised, opaque, and intrusive. Such systems may require continuous monitoring of household consumption, mobility patterns, industrial processes, and even micro-level behavioural signatures in order to deliver the promised gains in efficiency and decarbonisation.

From a Kantian standpoint, this shift towards data-intensive optimisation introduces a profound threat to autonomy. Kant grounds human dignity in the capacity for self-legislation—the ability of individuals to govern their actions according to principles they endorse through reason. Surveillance, however, operates by reducing subjects to observable patterns, variables to be managed by external systems. If AGI-driven sustainability frameworks depend on pervasive data extraction, individuals risk being treated merely as nodes within an optimisation network rather than as rational agents with their own ends. In such a scenario, the pursuit of environmental stability could unintentionally produce what Kant would describe as heteronomy: a condition in which one's will is guided not by self-imposed principles but by the imperatives of a system operating according to logic that remains inaccessible, unaccountable, or unchallengeable.

The technical literature reinforces this concern. Dash's (2025) enterprise optimisation framework and Yang J.'s (2018) AI-managed cloud infrastructure show that significant energy savings often require opaque algorithmic controls and automated decision-making hierarchies. These systems may be efficient, but they offer little transparency regarding the rules under which optimisation occurs. This lack of publicity is ethically problematic for Kant, who insists that every maxim governing collective life must be capable of being made public without contradiction. When AGI-mediated sustainability relies on hidden inference mechanisms, proprietary models, or unobservable decision processes, the publicity condition is violated, and the moral legitimacy of the system is undermined.

Thus, the surveillance–sustainability trade-off points to a central tension in AGI-enabled green transitions: the very data required to optimise

energy flows risks eroding the autonomy that grounds human dignity. A Kantian analysis therefore highlights that sustainability cannot be pursued through mechanisms that compromise the moral status of persons. Any policy or architecture that treats individuals primarily as information sources to be monitored or controlled—rather than as co-legislators within a moral community—fails to satisfy the requirements of the Categorical Imperative and threatens to transform the green transition into a regime of technologically mediated heteronomy.

Temporal Ethics: Duties to Future Generations and the Moral Limits of Sacrifice

A final Kantian dilemma emerges from the temporal dynamics of AGI's environmental impact. Empirical studies consistently show that AI and AGI systems follow a non-linear emissions trajectory: early phases of development dramatically increase computational energy use (Melguizo 2026; Verdecchia 2023), while potential sustainability benefits—reduced grid volatility, improved forecasting, accelerated materials discovery—are expected only in later stages, and only under favourable institutional conditions. This structure frequently encourages policymakers to justify present harms on the grounds of speculative future gains. Yet such reasoning is fundamentally at odds with Kantian ethics. Kant insists that no moral agent may be sacrificed—whether in the present or the future—for the achievement of aggregate outcomes. As he writes, "One cannot use a person merely as a means to an end," a principle that applies equally to contemporary populations whose energy costs rise today and to future persons whose well-being must not be mortgaged to present technological ambitions. The resulting temporal dilemma is acute: **Is it morally permissible to intensify energy consumption now for hypothetical AGI-driven environmental improvements that may materialise only in the distant future—and may accrue unevenly across populations and generations?**

Standard tools in the philosophy of economics, such as discounting models or welfare maximisation frameworks, struggle to answer this question because they treat persons across time as interchangeable units of utility. Such approaches evaluate future generations by aggregated preferences or probabilistic projections, precisely the forms of reasoning that

Kant rejects as heteronomous. For Kant, obligations to future persons must be grounded in duties derived from universal moral law, not in calculated expectations about future payoffs. The uncertainty surrounding AGI's long-run capabilities and environmental effects only intensifies the moral stakes: the promised benefits may not materialise, may be distributed unjustly, or may be offset by unforeseen harms.

In this sense, the temporal ethics dilemma reveals a deeper structural problem: the green transition cannot rely on consequentialist assumptions that current sacrifices will automatically yield future sustainability. Without a principled framework that constrains AGI development according to duties rather than outcomes, present generations risk violating the autonomy and dignity of those who must endure the burdens of technological experimentation or who inherit its long-term ecological consequences.

This analysis leads directly into the next section of the paper. Having identified the key Kantian dilemmas—of value, justice, responsibility, autonomy, and temporal obligation—the question becomes how AGI-enabled green energy systems *ought* to be governed. The challenge is to articulate a positive Kantian framework capable of guiding AGI design, policy, and institutional arrangements in ways that respect universal duties, protect human dignity, and ensure that technological progress remains subordinate to moral law. Section 4 therefore develops this normative architecture, drawing explicitly on Kant's Categorical Imperative, the principle of humanity, and the ideal of a Kingdom of Ends to propose a coherent moral foundation for evaluating AGI in sustainable energy transitions.

A KANTIAN FRAMEWORK FOR EVALUATING AGI IN GREEN ENERGY TRANSITIONS

A Kantian framework offers a powerful and necessary foundation for addressing the central research question of this paper: **How can AGI be integrated into green energy systems in a way that respects human dignity, autonomy, and universal moral duties, rather than subordinating individuals or communities to optimisation logics?** As the preceding analysis has shown, AGI-enabled energy infrastructures generate dilemmas that cannot be resolved by appeals to efficiency, aggregate welfare, or long-term projections alone. These dilemmas concern the valuation of persons, the distribution of environmental burdens, the

attribution of moral responsibility, the protection of autonomy against data-driven surveillance, and the moral limits of intergenerational sacrifice.

Kantian ethics is uniquely suited to address these challenges because it locates the legitimacy of any action or institution not in its expected outcomes but in its conformity to unconditional moral principles. Kant insists that rational beings must be treated as ends-in-themselves, that governing maxims must be capable of universalisation, and that authority—whether political, institutional, or technological—must remain compatible with autonomy. AGI systems embedded in energy distribution, environmental optimisation, and economic coordination wield a form of practical power over human life; for this reason, they must be evaluated under the same moral constraints that Kant applies to any agent or institution capable of affecting the conditions of human freedom.

A Kantian approach therefore ensures that technological progress does not eclipse the moral foundations of a just and sustainable green transition. Rather than allowing optimisation logics to determine the contours of energy governance, Kantian ethics demands that AGI systems operate within a framework shaped by moral law, public justification, and the equal dignity of all persons affected by their decisions. This perspective transforms AGI from a purely instrumental entity into a system whose legitimacy depends on its adherence to principles that any rational agent could will for all.

The remainder of this section applies three central Kantian concepts—**the Categorical Imperative, the principle of humanity, and the Kingdom of Ends**—to construct a normative framework for AGI-enabled energy governance. These principles provide the moral architecture through which AGI can be designed, evaluated, and regulated in ways that uphold universal duties, sustain human autonomy, and ensure that intelligent systems function as partners in a shared moral order rather than instruments of technocratic control.

The Categorical Imperative and Universal Duties in Energy Governance

Kant's Categorical Imperative requires that one "act only on that maxim which you can at the same time will to be a universal law" (Groundwork, 4:421). When applied to AGI-enabled energy governance, this principle

establishes a stringent moral test: any design principle, optimisation strategy, or deployment practice guiding AGI must be capable of being adopted by all agents—individuals, institutions, or nations—without producing a contradiction in either conception or will. This requirement directly challenges several prevailing tendencies within the contemporary AI–energy ecosystem.

The rapid expansion of energy-intensive AGI training, documented by Verdecchia (2023), Bolón-Canedo (2024), and Melguizo (2026), is often justified on the grounds that present costs will be compensated by future efficiency gains or long-run decarbonisation benefits. Yet if every actor were to adopt the maxim "we may increase energy use today for hypothetical environmental benefits tomorrow," global emissions would rise at precisely the moment when scientific consensus demands rapid reduction. Such a maxim therefore cannot be universalised without undermining the very conditions that make sustainability possible. Similarly, practices that externalise the computational or ecological burdens of AGI onto poorer regions—whether through offshored data centres, unequal regulatory capacities, or geographically uneven optimisation benefits—violate the universalisability requirement by creating structural exceptions based on wealth or geopolitical influence. A world in which some regions bear disproportionate burdens so that others may enjoy AGI-driven efficiency gains cannot be willed as a universal moral order.

Under a Kantian interpretation, these contradictions indicate that AGI development must conform to unconditional energy duties rather than contingent calculations of future benefit. Such duties require that AGI be designed and governed in ways that minimise unnecessary computational expenditure, avoid practices that would be morally impermissible if adopted by all, and integrate sustainability not as an optional objective but as a non-negotiable architectural constraint. This reframing directly advances the central research question of the paper: it shows that AGI's legitimacy within green energy transitions cannot rest on efficiency metrics or probabilistic projections but must instead be grounded in universal moral law. By subjecting AGI policies to the Categorical Imperative, we ensure that the pursuit of optimisation remains subordinated to principles that respect the equal moral standing of all persons and communities—present and future—who depend on the integrity of the energy systems that AGI helps to shape.

The Principle of Humanity: Preventing the Instrumentalization of Persons

Kant's second formulation of the Categorical Imperative demands that we "treat humanity, whether in your own person or in that of another, never merely as a means but always at the same time as an end" (Groundwork, 4:429). This principle places strict moral limits on how AGI may participate in energy governance. It requires that individuals retain their status as autonomous agents whose choices, freedom, and rational capacities cannot be subordinated to the operating imperatives of an optimisation system. Yet several contemporary proposals in AI-enabled energy management come dangerously close to violating this requirement.

Barry's (2024) energy-indexed labour metric, for example, aims to stabilise an AI-transformed economy by quantifying human labour in kilojoules. While well-intentioned, this model risks collapsing the distinction between persons and the energy they expend, subtly redefining human value in purely material or computational terms. Similarly, AGI-based optimisation in smart cities may prioritise system performance over essential aspects of human freedom. Singh and Kaunert (2024) show how AGI-driven energy systems can impose behavioural constraints—limiting mobility, enforcing consumption patterns, or centralising governance—when such measures improve grid efficiency or reduce emissions. Zhu (2024) and Yang X. (2025) further highlight how the predictive capacities of AGI rely on extensive data extraction, transforming individuals into streams of behavioural information that feed optimisation algorithms. When the collection, processing, or use of this data occurs without genuine consent or transparent justification, individuals are effectively treated as data points rather than rational agents with intrinsic worth.

A Kantian framework requires a radically different orientation. Human autonomy cannot be overridden, even when doing so promises significant gains in efficiency or sustainability. Persons cannot be reduced to inputs in an optimisation problem, nor can their behaviour be shaped through opaque data-driven mechanisms that prioritise system objectives over individual self-governance. Surveillance practices, no matter how environmentally beneficial, must be constrained by respect for dignity, privacy, and the right to set one's own ends. For Kant, the moral legitimacy of any institutional arrangement—including AGI-managed energy

infrastructures—depends on whether all affected individuals can understand themselves as co-authors of the principles that govern them.

In relation to the broader research question, the principle of humanity clarifies that no green transition—however technologically sophisticated—can be morally justified if it instrumentalises people for ecological or computational efficiency. AGI must therefore be designed and deployed not as a mechanism for managing populations but as an aid that supports the flourishing of autonomous agents. Only by honouring humanity as an end in itself can AGI contribute to a sustainable energy future that is morally coherent as well as technologically effective.

The Kingdom of Ends: Designing AGI as a Moral Co-Legislator

Kant's ideal of the *Kingdom of Ends* describes a moral community in which all rational beings stand as both authors and subjects of universal law. Within such a community, no agent may impose principles upon others that cannot be justified to them as free and equal co-legislators. When applied to AGI-enabled green energy systems, this ideal establishes a demanding normative horizon: AGI must not function as an independent centre of authority that issues optimisation directives from outside the moral–political frameworks governing human life. Rather, it must operate *within* the structures of public justification, democratic deliberation, and reciprocal accountability that constitute human moral self-governance.

Kurshan's (2023, 2024) argument for embedding moral modules into AGI architecture aligns with this demand, but a Kantian perspective deepens the requirement considerably. It is not sufficient that AGI follow rules or constraints engineered by designers; it must be integrated into a broader moral order that is comprehensible and endorsable by the persons subject to its decisions. In other words, AGI must be designed so that its operation is compatible with the public use of reason. Energy allocation decisions, optimisation strategies, and sustainability trade-offs must be capable of being explained, justified, and scrutinised by the communities affected. Opaque optimisation—no matter how efficient—violates Kant's requirement that the maxims governing collective life be public, transparent, and rationally defensible.

This Kantian ideal also requires reciprocity and fairness in AGI-driven governance. The empirical disparities identified in Yin (2023), Melguizo

(2026), and Peng (2024), where some regions gain environmental benefits while others bear disproportionate burdens, cannot be reconciled with a Kingdom of Ends. In a genuine moral community, no group may legislate for others without treating them as equals; no population may be asked to sacrifice autonomy, welfare, or ecological security for the sake of someone else's optimisation gains. AGI must therefore be engineered to recognise and respect the equal standing of all communities, including those with fewer technological or political resources.

Kantian consistency imposes yet another constraint: AGI systems cannot demand sustainability standards that they themselves fail to meet. If rational agents must act only on maxims that could be applied universally, then AGI architectures must uphold the same environmental principles they enforce. A system that requires strict emissions reductions while consuming vast amounts of energy in its own training and inference processes acts on a maxim that cannot be willed universally. Its authority is therefore morally incoherent.

Finally, the Kingdom of Ends underscores that AGI must remain subordinate to human democratic deliberation. Although AGI may contribute sophisticated modelling, scenario analysis, and optimisation recommendations, it cannot replace the public reasoning through which citizens collectively determine the terms of their moral and political life. AGI must support deliberation, not supplant it; it must aid in articulating shared ends, not dictate them.

In relation to the broader research question, this Kantian ideal provides a powerful answer: AGI can only be legitimately integrated into green energy governance if it is designed and constrained as a *participant* in a shared moral community rather than as a technocratic authority. Only by situating AGI within the Kingdom of Ends can green transitions remain both sustainable and ethically justified, ensuring that technological intelligence serves human purposes rather than redefining them.

Kantian Constraints as Foundations for Policy and Institutional Design

A A Kantian evaluation of AGI's role in green energy transitions reveals a series of normative constraints that should guide both policy design and institutional governance. These constraints do not rest on empirical

optimisation or cost–benefit calculations but on unconditional moral duties that bind all rational agents. The first implication concerns the computational energy footprint of AGI development. Because energy-intensive training regimes cannot be universalised without undermining global sustainability, a Kantian framework supports enforceable caps on model-training energy use, mandatory energy audits for large-scale AGI systems, and requirements for verifiable emissions reporting. Such measures are not efficiency optimisations but moral duties rooted in the obligation to preserve the ecological preconditions for human autonomy.

A second constraint concerns alignment with human self-governance. If AGI participates in energy management, its decision-making must remain subordinate to human autonomy rather than empowered to override it. This prohibits AGI systems from unilaterally imposing behavioural restrictions, optimisation-driven rationing, or automated demand curtailment without public justification and democratic consent. In practice, this requires mechanisms such as human-in-the-loop override systems, mandatory justification interfaces explaining AGI decisions in publicly comprehensible terms, and limits on the scope of autonomous control in critical infrastructure. Alignment, in a Kantian sense, therefore extends beyond technical correctness to include institutional safeguards that secure moral agency.

A third implication concerns global and interregional fairness. Kantian universalism forbids maxims that create structural exceptions, meaning that wealthy nations cannot externalise AGI-related environmental burdens—such as emissions from data centres, electronic waste, or mineral extraction—onto poorer regions. A morally legitimate AGI regime therefore requires international agreements on data-centre location, shared sustainability standards for AGI infrastructure, and equitable distribution of computational and ecological burdens. Such mechanisms ensure that no community is treated merely as a repository for the costs of digital innovation.

Finally, Kant's principle of public reason demands institutional structures that guarantee transparency, accountability, and democratic oversight. AGI systems influencing energy distribution or environmental risk must operate under rules that can be publicly articulated, scrutinised, and rationally endorsed by all affected agents. This entails policies such as mandatory explainability for optimisation decisions, open publication of AGI operational maxims, public review boards for AGI energy-governance

algorithms, and auditability requirements that prevent black-box optimisation from exercising unaccountable power. Embedding AGI within a "Kingdom of Ends" thus requires that its operations remain open to contestation and revision through democratic processes.

These Kantian constraints directly advance the paper's research question by showing how AGI-enabled sustainability can be made morally legitimate through specific governance tools that protect autonomy, equality, and universal duty. Rather than serving as an abstract philosophical overlay, Kantian ethics provides a practical normative architecture that complements technical proposals such as SAGI, AGIE, and Green AI. In doing so, it ensures that green transitions remain not only technologically effective but also ethically grounded and compatible with the dignity of all persons.

Conclusion

This paper has examined the intersection of AGI, AI, and green energy transitions by integrating empirical and theoretical developments with a Kantian philosophical–economic analysis. The literature reveals a dual and often contradictory trajectory. On one hand, AGI promises extraordinary gains in renewable energy optimisation, forecasting efficiency, grid coordination, and materials discovery—from AGI-assisted smart cities (Singh & Kaunert 2024) to next-generation generalist energy platforms (Zhu et al. 2024). On the other hand, such technologies introduce escalating computational demands, intensify alignment and governance challenges, and generate non-linear or uneven environmental impacts, including transitional increases in emissions (Verdecchia 2023; Yin 2023; Melguizo 2026). This asymmetry highlights a persistent conceptual void, for despite extensive modelling and system-design research, AGI's role within the green transition still lacks a unified philosophical–economic framework capable of guiding development within clear and defensible moral constraints.

The Kantian framework developed in Section 4 partially addresses this gap by providing a principled response to the central research question. AGI can be responsibly integrated into green energy systems only when its development and operation conform to universal moral duties, respect the dignity of persons, and remain subject to public justification. Kant's Categorical Imperative, the principle of humanity, and the ideal of a Kingdom of Ends demonstrate that AGI cannot be evaluated solely through efficiency

metrics or long-run environmental benefits. Energy-intensive training regimes that cannot be universally willed, optimisation strategies that instrumentalise individuals or communities, and data governance practices that compromise autonomy all violate core Kantian moral principles. Conversely, AGI systems that preserve autonomy, uphold reciprocity, distribute burdens fairly, and operate transparently meet the conditions of moral legitimacy. In this sense, Kantian ethics both complements and deepens system-level approaches like Kurshan's SAGI framework by embedding sustainability within moral law rather than computational convenience.

The significance of this Kantian perspective becomes even clearer when situated alongside recent contributions by Stiefenhofer and Deniz. In his dynamic political economy model of AGI and the social contract, Stiefenhofer (2025a) shows that AGI cannot be embedded within governance structures or economic planning in the absence of explicit normative principles capable of securing legitimacy, an insight that strongly resonates with Kant's insistence on publicly justifiable lawgiving. His analysis of ethical consumption and democratic sustainability (Stiefenhofer 2025b) further reinforces the Kantian claim that economic systems grounded in autonomy and dignity yield more equitable and environmentally robust outcomes. His forthcoming account of the zero-labour economy (Stiefenhofer 2025c) adds another dimension by illustrating how automation-driven transformations risk marginalising human agency unless grounded in principles that preserve personhood rather than subordinating it to systemic efficiency.

Parallel work co-authored by Deniz and Stiefenhofer deepens this trajectory. Their study of AI and the rise of the ethical consumer (Deniz & Stiefenhofer 2025a) demonstrates how digital systems can reinforce the autonomy of moral agents rather than manipulate or instrumentalise them, aligning closely with Kant's principle of humanity. Their forthcoming article on the "algorithmic conscience" (Deniz & Stiefenhofer 2025b) makes this point yet more forcefully by arguing that AI governance must incorporate built-in moral constraints capable of preventing optimisation logics from overriding human dignity. Taken together, this body of scholarship underscores the central argument advanced in this paper: that the integration of AGI into green energy transitions must be guided not by technocratic metrics or efficiency calculations but by the unconditional duties articulated in Kantian moral philosophy.

Several implications follow. First, sustainable AGI development requires embedding moral constraints directly into AGI architectures, energy budgeting practices, and data governance regimes—not relying solely on ex post regulation or claims about long-run efficiency. Second, policymakers must resist consequentialist reasoning that justifies present harms by appealing to uncertain future benefits; Kantian duties apply irrespective of temporal discounting. Third, the geographical unevenness documented in the empirical literature shows that robust international coordination is essential, for without shared rules for energy use, transparency, and burden-sharing, AGI-enabled sustainability may deepen rather than alleviate existing global inequalities. Future research must therefore expand interdisciplinary collaboration among philosophers, AI architects, energy system modellers, economists, and policymakers. A more integrated body of work is required to determine how Kantian duties, moral autonomy, distributive justice, and democratic co-legislation can be institutionally realised within AGI-enabled energy infrastructures. If AGI is to become a partner in sustainable development rather than a driver of ecological risk or inequity, its design must incorporate the moral architecture necessary to support dignity, autonomy, and fairness across diverse human communities. By grounding AGI development in universal moral law, respect for persons, and the shared horizon of a Kingdom of Ends, we can begin to align powerful intelligent systems with the ethical foundations required for a just, equitable, and genuinely sustainable green transition.

REFERENCES

Alassery, F., et al. (2022). An artificial intelligence-based solar radiation prophesy model for green energy utilization in energy management system. *Sustainable Energy Technologies and Assessments*, 52, 102060.

Barry, M. W. (2024). A modular energy-based economic model in the age of AI and AGI.

Barbierato, E., & Gatti, A. (2024). Toward green AI: A methodological survey of the scientific literature. *IEEE Access*, 12, 23989–24013.

Bolón-Canedo, V., et al. (2024). A review of green artificial intelligence: Towards a more sustainable future. *Neurocomputing*, 599, 128096.

Boltuc, P. (2022). Moral space for paraconsistent AGI. In *International Conference on Artificial General Intelligence*. Cham: Springer International Publishing.

Stiefenhofer, P. & Cafer Deniz (2025). The role of AI in the rise of the ethical consumer. In *Proceedings of the SEPDER International Social Policies Congress*, Sarajevo, Bosnia and Herzegovina, May 17–18, 2025.

Cheng, L., & Gong, X. (2024). Appraising regulatory framework towards Artificial General Intelligence (AGI) under digital humanism. *International Journal of Digital Law and Governance*, 1(2), 269–312.

Chowdhury, A. A. A., et al. (2024). Enhancing green economy with artificial intelligence: Role of energy use and FDI in the United States. *arXiv preprint arXiv:2501.14747*.

Dash, S. (2025). Green AI: Enhancing sustainability and energy efficiency in AI-integrated enterprise systems. *IEEE Access*.

Deniz, C., & Stiefenhofer, P. (2025). The algorithmic conscience: Reconciling AI efficiency with human dignity. *Forthcoming* in Special Edition "Navigating the Intersection of Digital Innovation and ESG," *Journal of Chinese Economic and Business Studies*.

Gao, D., Cai, J., & Wu, K. (2025). The smart green tide: A bibliometric analysis of AI and renewable energy transition. *Energy Reports*, 13, 5290–5304.

Kant, I. (1785/2012). *Groundwork of the Metaphysics of Morals* (M. Gregor & J. Timmermann, Trans.). Cambridge University Press. (Original work published 1785)

Kant, I. (1788/2015). *Critique of Practical Reason* (M. Gregor, Trans.). Cambridge University Press. (Original work published 1788)

Kant, I. (1797/2017). *The Metaphysics of Morals* (M. Gregor, Trans.). Cambridge University Press. (Original work published 1797)

Kayan, F., et al. (2025). Analysing sustainability and green energy with artificial intelligence: A Turkish–English social media perspective. *Sustainability*, 17(5), 1882.

Kuo, P.–H., & Huang, C.–J. (2018). A green energy application in energy management systems by an artificial intelligence-based solar radiation forecasting model. *Energies*, 11(4), 819.

Kurshan, E. (2023). From the pursuit of universal AGI architecture to systematic approach to heterogeneous AGI: Addressing alignment, energy, & AGI grand challenges. *arXiv preprint arXiv:2310.15274*.

Kurshan, E. (2024). Systematic AI approach for AGI: Addressing alignment, energy, and AGI grand challenges. *International Journal of Semantic Computing*.

Manna, R., & Nath, R. (2021). Kantian moral agency and the ethics of artificial intelligence. *Problemos*, 100, 139–151.

Mehta, Y., et al. (2023). A review for green energy machine learning and AI services. *Energies*, 16(15), 5718.

Melguizo, A., Katz, R., & Jung, J. (2026). Can AI grow green? Evidence of a Kuznets curve among AI, renewable energies and emissions. *Energy Policy*, 208, 114883.

Neagu, I., Neagu, C. D., & Drăghici, M. A. (2025). Ethics in the future of AI—A philosophical perspective for collaborative human and machine learning know-what

and know-how. In *2025 1st International Conference on Computational Intelligence Approaches and Applications (ICCIAA)*. IEEE.

Pathak, S. (2025). Aligning AGI with humanity: Building ethical foundations and human values. *LJ University*.

Peng, X., et al. (2024). Artificial intelligence–driven multi-energy optimization: Promoting green transition of rural energy planning and sustainable energy economy. *Sustainability*, 16(10), 4111.

Peters, T. F. (2025). Machine intelligence, artificial general intelligence, super-intelligence, and human dignity. *Religions*, 16(8), 975.

Singh, B., & Kaunert, C. (2024). Dynamic landscape of artificial general intelligence (AGI) for advancing renewable energy in urban environments. In *AGI Security: Smart Applications and Sustainable Technologies* (pp. 247–270). Springer.

Stiefenhofer, Pascal. "Zero-labour economy: the new leisure class." *Journal of Chinese Economic and Business Studies* (2025): 1-45.

Stiefenhofer, P. (2025). The role of ethical consumption in promoting democratic sustainability: Revisiting neoclassical economics through Kantian ethics. *The Journal of Philosophical Economics*, XVIII (Annual issue), 74–123.

Stiefenhofer, P. (2025, forthcoming). Zero-labour economy: The new leisure class. *International Journal of Economics and Finance*.

Turner, J. O., & DiPaola, S. (2018). Transforming Kantian aesthetic principles into qualitative hermeneutics for contemplative AGI agents. In *International Conference on Artificial General Intelligence*. Cham: Springer International Publishing.

Yang, J., et al. (2018). AI-powered green cloud and data center. *IEEE Access*, 7, 4195–4203.

Yang, X., et al. (2025). The relationship between artificial intelligence, geopolitical risk, and green growth: Exploring the moderating role of green finance and energy technology. *Technological Forecasting and Social Change*, 217, 124135.

Yarally, T., et al. (2023). Uncovering energy-efficient practices in deep learning training: Preliminary steps towards green AI. *arXiv preprint arXiv:2303.13972*.

Yin, H.–T., Wen, J., & Chang, C.–P. (2023). Going green with artificial intelligence: The path of technological change towards the renewable energy transition. *Oeconomia Copernicana*, 14(4), 1059–1095.

Zhu, S., Ota, K., & Dong, M. (2021). Green AI for IIoT: Energy-efficient intelligent edge computing for industrial internet of things. *IEEE Transactions on Green Communications and Networking*, 6(1), 79–88.

Zhu, X., et al. (2024). Next-generation generalist energy artificial intelligence for navigating smart energy. *Cell Reports Physical Science*, 5(9).

The Just Transition: An Opportunity for Labor or a New Inequality?

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Abstract

Although the concept of a "Just Transition" has moved to the forefront of global climate policy following the Paris Agreement, significant uncertainties persist regarding its implementation by various stakeholders. This study applies critical policy analysis to a comprehensive review of the existing literature to develop a just transition framework, contesting the naive green growth narrative and instead assessing the transition's risk of deepening existing class, regional, and generational inequalities. Adopting a labor-focused perspective, the study critically examines structural barriers such as skill mismatches in the workforce and potential wage penalties associated with the shift from fossil fuel sectors to renewable energy industries. It emphasizes that, in the absence of robust policy interventions, communities dependent on fossil fuels face the threat of economic collapse and spatial injustice. Furthermore, by challenging standardized transition frameworks developed in the Global North, the study demonstrates that these models yield limited benefits when applied to the Global South, where informal employment predominates. Ultimately, the study concludes that ensuring a truly just transition requires establishing a strong global labor–climate

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alliance and binding international financing mechanisms that safeguard development opportunities.

Keywords: just transition, climate policies, labor, inequalities

1. INTRODUCTION

Although the concept of "Just Transition" has its roots in the U.S. labor union movements of the 1970s, it became a central discourse in global climate policy with the adoption of the 2015 Paris Agreement. According to the International Trade Union Confederation (ITUC, 2017), a just transition is a process of economy-wide planning aimed at eliminating poverty and building resilient communities while moving toward a zero-emissions future. However, this inevitable shift toward a global zero-carbon economy brings with it profound uncertainties and social risks. Reports by the IPCC (2022) confirm that the disruption in labor markets caused by this transformation entails not only a sectoral shift but also a fundamental reconfiguration of production and consumption patterns.

In general terms, the concept of a just transition is used to counter the idea that valuing job security and caring for the environment are mutually exclusive choices. It broadens the discussion around the transition to a low-carbon economy from a purely technical focus on energy system transformation to the social justice implications of that process (Morena et al., 2018). In this sense, it encompasses a set of principles, strategies, and practices aimed at enabling workers and their communities to transition toward decent, productive, and ecologically sustainable livelihoods, participatory and democratic governance, and an industrial structure that fosters ecological resilience (Pinker, 2020; Otlhogile & Shirley, 2023).

In the literature, a just transition is often framed as an optimistic "win-win" scenario, focusing on the potential for green job creation. However, this study focuses on the "dilemma" faced by workers, arguing that the process produces not only winners but also losers. The pursuit of environmental sustainability frequently overshadows the social dimension, creating a risk of a new wave of precarity and inequality for the working class.

This situation is particularly complex for developing countries and regions heavily dependent on fossil fuels. While the standard just transition narrative has been shaped around the institutional frameworks of developed countries, the costs of such a transition may be significantly higher

in economies characterized by high levels of informal employment and weak social protection systems. In this context, the study approaches just transition not merely as an employment policy, but as a political process with the potential to exacerbate class, regional (spatial), and intergenerational inequalities. The following sections of the study explore the structural barriers to building a labor–climate alliance—such as skill mismatches, regional disparities in development, and challenges specific to the Global South—and offer potential policy responses.

2. TRANSITION, BUT FOR WHOM? TOWARDS A LABOR-FOCUSED JUST TRANSITION

The historical roots of the concept of just transition lie not in contemporary climate change debates, but in the demands for occupational health and safety raised by the U.S. labor movement during the 1970s and 1980s. Tony Mazzocchi—widely recognized as the intellectual father of the concept—and the Oil, Chemical and Atomic Workers Union (OCAW) advocated for the creation of a "Superfund for Workers" to support employees affected by the closure of factories due to environmental regulations. As Stevis and Felli (2015) note, at that time, the just transition was framed as a protective mechanism that rejected the "jobs versus environment" dichotomy and asserted that the costs of environmental regulation should not fall upon workers.

By the 1990s, the concept began to integrate with sustainable development discourse. Under the leadership of the International Trade Union Confederation (ITUC), just transition evolved into a global labor strategy encompassing not only the removal of toxic substances but also the broader challenge of combating climate change (Rosemberg, 2020). At this stage, the just transition came to represent not merely compensating displaced workers but proactively planning for an economic transformation in which "decent work" would be placed at the center.

The concept's formal integration into the international climate regime occurred with the 2015 Paris Agreement, which explicitly acknowledges "the imperatives of a just transition of the workforce and the creation of decent work and quality jobs" in its preamble. The ILO's *Guidelines for a Just Transition* (2015) emphasize that this transformation must be a process grounded in social dialogue and extend beyond the energy sector

to encompass the entire economy. However, as Rosemberg (2017) points out, the mainstreaming of the concept also carries the risk of diluting its original intent. While governments and international financial institutions often frame just transition as a market-based tool for "green growth," labor organizations and climate justice advocates argue for a more "transformative" approach—one that challenges prevailing power structures and modes of production. As such, the politics of just transition today unfold within a contested space between technocratic governance and demands for radical socio-economic transformation.

The shift toward a green economy may indeed generate benefits such as the creation of green and decent jobs in emerging sectors. However, it can also lead to job losses in declining industries and generate adverse outcomes for disadvantaged communities. Despite the advantages of green economic growth, there is a significant risk that the costs of transition will be distributed unequally across labor groups, households, and regions. These concerns must be taken seriously when designing an effective and equitable "just transition strategy" that seeks to mitigate the negative consequences of the green economy on workers and communities (Görmüş, 2024).

One of the primary reasons for this concern lies in the critical role that labor–employer relations will play in the future of global climate policy. First, the working class—often composed of low-income communities—is among the most vulnerable to the impacts of climate change, including exposure to toxicity, insecurity, and poor living conditions. Second, the post-carbon transition holds the potential not only to create new and better jobs but also to improve workers' lives by enhancing their adaptive capacities and reducing environmental harm, particularly for those employed in hazardous occupations and for frontline communities (Velicu and Barca, 2020; Rosemberg, 2017).

3. THE MAIN ISSUES OF A LABOR-FOCUSED JUST TRANSITION

3.1. Job Losses and Wages

While global scenarios for the transition to a low-carbon economy project a net increase in employment, this process will inevitably lead to permanent job losses in sectors dependent on fossil fuels. The International Labour Organization (ILO, 2018) estimates that the energy transition could

generate 24 million new jobs by 2030, but also foresees the elimination of approximately 6 million jobs in carbon-intensive industries over the same period. The central issue, however, is not merely the quantitative loss of employment, but rather the quality of the jobs being lost and the potential decline in wage levels.

A comprehensive analysis by Pollin and Callaci (2019) on the U.S. economy reveals that workers in the fossil fuel sector tend to receive higher wages and more extensive benefits compared to workers in other sectors, relative to their level of education. If these workers are redeployed into the renewable energy sector, they are likely to face a significant "wage penalty" (Sato et al., 2023). Therefore, a just transition strategy must not only focus on reemployment but also include mechanisms to compensate for income losses.

Galgóczi (2019), in his study of coal phase-out experiences across Europe, emphasizes the critical importance of active labor market policies in preventing layoffs from turning into broader social dislocation. Such policies include early retirement programs, severance pay support, and "wage insurance" schemes, in which the state temporarily covers the wage gap between the old and new jobs for transitioning workers. Without these compensatory measures, unaddressed employment losses risk leading to a long-term deterioration in the living standards of the working class.

3.2. Improving Workers' Skills

The transition to a low-carbon economy necessitates a profound structural transformation of labor markets, and one of the most critical obstacles to this process is the issue of "skills mismatch." According to the International Labour Organization (ILO, 2018), despite the green transition's potential to generate net employment gains, there is a significant gap between the qualifications of the current workforce and the competencies required for newly emerging green jobs. While many jobs in the fossil fuel sector (often referred to as "brown jobs") rely heavily on manual and process-based skills, sectors such as renewable energy and energy efficiency increasingly demand higher levels of cognitive and technical capabilities.

Empirical studies by Vona et al. (2018) demonstrate that "green skills" tend to require higher levels of formal education and abstract problem-solving abilities, making the reallocation of low-skilled workers into these new sectors considerably more difficult. In this context, both reskilling—acquiring

new skills—and upskilling—enhancing existing ones—are not only necessary for market adaptation but also essential for achieving social justice within the transition process.

As highlighted in the ITUC (2017) report, unless comprehensive training programs funded by governments and employers are implemented, the skills gap may trap workers in long-term structural unemployment and further exacerbate income inequality during the transition.

3.3. Protecting Vulnerable Communities

Partial improvements in labor markets during periods of economic growth or sectoral expansion are not, by themselves, sufficient to dismantle the structural barriers faced by disadvantaged groups. As Topal and Özer (2014) emphasize, the long-term resolution of these challenges depends on predictable and well-designed employment policies. Within the framework of "energy justice" discussed in the literature, such policy planning must be built upon three foundational pillars.

First, the dimension described by Williams and Doyon (2019) as *procedural justice* requires transparency in decision-making processes. This directly aligns with the principle of "commitment to fair negotiation and information sharing". Galgóczi (2020) further argues that social dialogue should not remain a policy statement confined to the national level, but must be translated into tangible, on-the-ground negotiations. Without this, the gap between justice promised on paper and the lived reality on the ground widens, ultimately undermining the social legitimacy of transition policies.

Second, Carley and Konisky (2020) contend that the benefits of the clean energy transition must not be concentrated solely among investors. Instead, they advocate for a model of "shared prosperity" between the private sector, local communities, and workers—what is commonly referred to as *distributive justice*.

Finally, Robinson and Shin (2018) underscore that in high-risk sectors such as mining, the protection of vulnerable groups—women, migrants, and Indigenous populations—requires that both private companies and governments uphold human rights not merely as an ethical stance, but as a legal imperative tied to companies' social license to operate. Failing this, these groups are often exposed to externalities without the means to develop compensatory strategies and are subsequently trapped in cycles of poverty.

3.4. Eliminate Inequalities

3.4.1. Class Inequalities

When just transition policies are approached as purely technical processes, detached from class-based power relations, they risk reproducing and even deepening existing socio-economic inequalities. Velicu and Barca (2020) argue that the concept of "just transition" has increasingly drifted away from its working-class roots and been co-opted into a corporate-friendly "green growth" narrative—one that ultimately shifts the burden of climate action onto already vulnerable workers. In the literature, this concern is frequently discussed in terms of the unequal distribution of the costs and benefits of transition across different social classes.

Sovacool et al. (2019) highlight the regressive effects of decarbonization policies, showing through empirical evidence that measures such as carbon taxes or rising energy prices impose a disproportionate burden on low-income households, while wealthier groups benefit more readily from green technology incentives—such as electric vehicles and rooftop solar panels. Similarly, Stevis and Felli (2015) warn that while the shift to a green economy can open up new avenues for capital accumulation, it may simultaneously lead to deunionization and precarity for labor.

As Healy and Barry (2017) stress, a market-driven transition that fails to address wealth redistribution and the public ownership of energy risks reinforcing class divides and producing what they term an "unjust transition." At this point, the principle of recognitional justice becomes crucial—not only in ensuring equal rights for all, but also in acknowledging and responding to difference. For instance, during low-carbon transitions, the representation of vulnerable groups—such as persons with disabilities, the chronically poor, the ill, and the unemployed—becomes especially vital, as these populations may require specific protections and tailored support to avoid bearing disproportionate harm.

3.4.2. Regional Inequalities

Debates around just transition are increasingly bringing the spatial dimension of transformation and the problem of geographical inequalities to the forefront. The shift to a low-carbon economy is not a geographically uniform process; on the contrary, it carries the risk of deepening existing spatial disparities. Examining the political economy of just transition,

Newell and Mulvaney (2013) point out that the processes of energy production and distribution are spatially uneven, leading us to critical questions about who wins, who loses, why, and how. A frequently discussed risk in the literature is the marginalization of fossil fuel-dependent "single-industry towns," which risk becoming "left-behind places" during this transformation.

Cities forced to cope with the collapse of fossil fuel-based industries can only adapt to the new economy through comprehensive public policy frameworks designed collaboratively by local and central governments. McCauley and Heffron (2018) define just transition not merely as an employment issue but as an integrated framework that combines climate, energy, and environmental justice.

In this context, the concept of spatial justice, as developed by Soja (2010), becomes a critical analytical tool for understanding the regional implications of transition. Green energy investments often shift to new regions with higher resource efficiency, potentially triggering economic and social decline in former industrial hubs. As Green and Gambhir (2020) note, the coalfield transition experience in the United Kingdom shows that, in the absence of effective compensatory policies, regional inequalities can persist for decades.

Therefore, just transition strategies must be supported by policies that reflect a spatially responsive state capacity—ones that integrate not only sectoral restructuring but also regional development planning. Bird and Lawton (2009) emphasize that key components of a just transition include strengthening resilience and adaptive capacity, making public investments in renewable energy sectors, and building alliances between climate justice advocates, environmental movements, and labor organizations.

3.4.3. Intergenerational Inequalities

While discussions of intergenerational justice in the context of just transition often focus on the ecological consequences of today's decisions for future generations, the demographic impacts of the transition on the current workforce also entail significant inequalities. In their analysis of the temporal dimension of just transition, McCauley and Heffron (2018) argue that restorative justice must address not only future generations

but also the distribution of burdens across different age groups affected by the transition today.

In fossil fuel industries—particularly in sectors such as coal-fired power plants and mining—the average age of the workforce tends to be relatively high. Weller (2019), in his study of coalfield transitions, emphasizes that older workers face a significantly greater risk of becoming stranded labor. For those nearing the end of their careers, retraining or reskilling programs are often ineffective, and this demographic is frequently pushed toward involuntary early retirement, resulting in income loss and social exclusion.

On the other hand, for younger generations entering the labor market, the green economy does not always deliver on its promise of decent work. Analyses by Mertins-Kirkwood (2018) show that jobs created in green sectors such as renewable energy and construction tend to be lower-paid, non-unionized, and precarious compared to the industrial jobs they are replacing. This dynamic raises the risk of an intergenerational cycle of impoverishment, in which older cohorts lose their hard-won labor rights while younger cohorts enter a labor market marked by insecurity and diminished protections.

3.5. A Developing Country Perspective on Just Transition

The current literature and policy framework on just transition has been largely shaped by the industrialized economies and institutionalized trade union structures of the Global North, particularly in North America and Europe. However, as Otlhogile and Shirley (2023) emphasize in the context of Africa, the definition and priorities of a just transition in developing countries differ significantly from those in more advanced economies. In these contexts, the transition must be understood not only as a process of decarbonization, but also as one that intersects with poverty reduction, energy access, and broader development objectives aligned with the Sustainable Development Goals (SDGs).

One of the most fundamental structural barriers in developing countries is the prevalence of the *informal economy*, which employs a large share of the labor force. According to data from the International Labour Organization (ILO) and the European Trade Union Institute (ETUI, 2022), informality rates in sectors with green job potential—such as agriculture and waste management—can reach as high as 80% in regions like Latin

America and parts of Asia. Traditional just transition mechanisms—such as social dialogue, collective bargaining, and unemployment insurance—typically do not extend to informal workers, leaving these groups highly vulnerable to the costs of transition.

Furthermore, Morena et al. (2018) argue that in the Global South, just transition is also a matter of international justice, particularly with respect to technology transfer and climate finance. Without adequate financial support mechanisms, developing countries face immense challenges in transforming their industries and expanding social protection systems—efforts that would place additional pressure on already fragile macroeconomic conditions.

4. CONCLUSION

This study argues that the transition to a low-carbon economy will not inherently produce just outcomes. If the process is left solely to market dynamics, existing class-based and regional inequalities are likely to deepen. The narrowing of the just transition concept into a corporate-friendly green growth narrative risks placing the burdens of the climate crisis on already vulnerable workers and disadvantaged communities. Therefore, the success of the transition depends on moving beyond technocratic targets and constructing a political framework in which the risks and costs of transformation are equitably shared across all layers of society.

One of the most strategic steps toward a sustainable future is the formation of a strong labor–climate alliance at both global and local scales. Trade unions must move beyond a narrow defensive stance focused solely on protecting their members' economic interests and adopt a transformative vision that includes ecological sustainability. An alliance that combines the structural power of the labor movement with the social legitimacy of the climate movement represents the only political force capable of simultaneously defending workers' rights and the ecological limits of the planet, in opposition to capital-centered transition scenarios.

However, the realization of such an alliance—and the implementation of related policies—hinges on the capacity of trade unions to engage with the just transition agenda not only at leadership levels, but also at the grassroots. In order to avoid the perception of top-down imposition, unions must empower their members through workplace-level education

and awareness-raising efforts, making workers active participants in the process. A transition carried out without ensuring workers' direct involvement in decision-making, or without giving them a voice over their own futures, will likely fuel distrust within the working class and provoke inevitable social resistance.

When considering the global dimension of just transition, financial support for developing and low-income countries must be treated not as aid, but as a necessity. For countries in the Global South, just transition is fundamentally a matter of international justice, particularly in terms of access to technology and climate finance. Without the establishment of a binding, grant-based, and scalable financing mechanism from developed to developing economies, it will be impossible for these countries to simultaneously decarbonize their industries and expand social protection systems.

Finally, just transition strategies in developing countries must not hinder their development prospects or aspirations for prosperity. In these regions, the transition must be designed in alignment with core development goals such as poverty reduction, access to energy, and infrastructure investment. Climate policy must not become a new form of economic pressure imposed on the Global South. On the contrary, it should serve as a lever to create decent jobs and help close the global inequality gap.

5. REFERENCES

Bird, J., & Lawton, K. (2009). The Future's Green: Jobs and the UK low-carbon transition. *Institute for Public Policy Research, London.*

Carley, S., & Konisky, D. M. (2020). The justice and equity implications of the clean energy transition. *Nature Energy, 5*(8), 569-577.

ETUI (European Trade Union Institute). (2022). Just transition in the Global South: Perspectives from Latin America. *Policy Brief 2022.07.*

Galgóczi, B. (2019). Phasing out coal – a just transition for whom? *European Trade Union Institute (ETUI) Policy Brief, No. 4/2019.*

Galgóczi, B. (2020). Just transition on the ground: Challenges and opportunities for social dialogue. European Journal of Industrial Relations, 26(4), 367–382. https://doi.org/10.1177/0959680120951704

Görmüş, A. (2024). Yeşil Ekonomiye 'Adil Geçiş' için İstihdam Politikaları. *Memleket Siyaset Yönetim*, *19*(42), 33-60.

Green, F., & Gambhir, A. (2020). Transitional assistance policies for just, equitable and inclusive carbon pricing. *Climate Policy, 20*(8), 902-921.

Healy, N., & Barry, J. (2017). Politics, inequality and the actual existing transition. In: *The Palgrave Handbook of the International Political Economy of Energy* (pp. 451-467). Palgrave Macmillan, London.

ILO (International Labour Organization). (2015). *Guidelines for a just transition towards environmentally sustainable economies and societies for all.* Geneva: ILO.

ILO (International Labour Organization). (2018). *World Employment and Social Outlook 2018: Greening with jobs.* Geneva: ILO.

IPCC. (2022). Climate change 2022: Mitigation of climate change. Intergovernmental Panel on Climate Change. https://www.ipcc.ch/report/ar6/wg3/downloads/report/IPCC_AR6_WGIII_FullReport.pdf.

ITUC. (2017). Just Transition - Where Are We Now and What's Next?A Guide to National Policies and International Climate Governance. ITUC Climate Justice Frontline Briefing 2017, Brussels, Belgium

McCauley, D., & Heffron, R. J. (2018). Just transition: Integrating climate, energy and environmental justice. Energy Policy, 119, 1-7.

Mertins-Kirkwood, H. (2018). *Making decarbonization work for workers: Policies for a just transition to a zero-carbon economy in Canada.* Canadian Centre for Policy Alternatives.

Morena, E., Stevis, D., Shelton, R., Krause, D., Mertins-Kirkwood, H., Price, V., Azzi, D., Helmerich, N., et al. (2018). *Mapping just transition(s) to a Low-carbon world. A report of the Just Transition Research Collaborative.* United Nations Research Institute for Social Development.

Newell, P., & Mulvaney, D. (2013). The political economy of the 'just transition'. *The Geographical Journal, 179*(2), 132-140.

Otlhogile, M., & Shirley, R. (2023). The evolving just transition: definitions, context, and practical insights for Africa. *Environmental Research: Infrastructure and Sustainability*, *3*(1), 013001. https://doi.org/10.1088/2634-4505/ac9a69

Pinker, A. (2020). Just transitions: a comparative perspective. *Report prepared for the Just Transition Commission, 25 August 2020, 74pp.*

Pollin, R., & Callaci, B. (2019). The Economics of Just Transition: A Framework for Supporting Fossil Fuel-Dependent Workers and Communities in the United States. *Labor Studies Journal, 44*(2), 93-138.

Robinson, M., & Shine, T. (2018). Achieving a climate justice pathway to 1.5 °C. *Nature Climate Change 8*, 564–569 (2018). https://doi.org/10.1038/s41558-018-0189-7

Rosemberg, A. (2017). "Strengthening Just Transition Policies in International Climate Governance." Policy Analysis Brief: Muscatine, IA: The Stanley Foundation. Accessed 22 November 2025. https://www.stanleyfoundation.org/publications/pab/RosembergPABStrengtheningJustTransition417.pdf

Rosemberg, A. (2020). No jobs on a dead planet': The international trade union movement and just transition. E. Morena, D. Krause, D. Stevis (Eds.), *Just transitions: Social justice in the shift towards a low-carbon world,* Pluto Press (2020), pp. 32-55

Sato M, Cass L, Saussay A, Vona F, Mercer L (2023) *Skills and wage gaps in the low-carbon transition: comparing job vacancy data from the US and UK*. London: Grantham Research Institute on Climate Change and the Environment and Centre for Climate Change Economics and Policy, London School of Economics and Political Science.

Sovacool, B. K., Martiskainen, M., Hook, A., & Baker, L. (2019). Decarbonization and its discontents: A critical energy justice perspective on four low-carbon transitions. *Climatic Change, 155*(4), 581-619.

Stevis, D., & Felli, R. (2015). Global labour unions and just transition to a green economy. *International Environmental Agreements: Politics, Law and Economics, 15*(1), 29-43.

Topal, M. H. & Ozer, U. (2014). Ekoloji Odaklı Bir İş Yaratma Stratejisi: Yeşil İstihdam. *Gumushane University Institute of Social Sciences Electronic Journal, 5* (11), 257-274.

Velicu, I., & Barca, S. (2020). The Just Transition and its work of inequality. *Sustainability: Science, Practice and Policy, 17*(S2), 263–273. https://doi.org/10.1080/15487733.2020.1814585

Vona, F., Marin, G., Consoli, D., & Popp, D. (2018). Environmental Regulation and Green Skills: An Empirical Exploration. *Journal of the Association of Environmental and Resource Economists, 5*(4), 713-753.

Weller, S. A. (2019). Just transition? Strategic framing and the challenges facing coal dependent communities. *Environment and Planning C: Politics and Space, 37*(2), 298-316.

Williams, S., & Doyon, A. (2019). Justice in energy transitions. *Environmental Innovation and Societal Transitions, 31*, 144-153.

A Critical Human Rights Analysis of the Green Revolution: Agricultural Modernization, Inequality, and the Tension of Third-Generation Rights

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Abstract

The Green Revolution (also referred to today as the *Chemical Revolution*) is claimed to have aimed at "saving humanity from hunger" by increasing agricultural productivity. However, it has effectively rendered small-scale agricultural producers dependent on certain corporations for seeds, fertilizers, and pesticides, thereby paving the way for the transfer of agricultural production to powerful corporate entities such as Monsanto, Cargill, and Syngenta. Although this process appears rational from a neoliberal economic perspective, it conflicts with the Third-Generation Human Rights principles of *self-determination* and *economic justice*.

While the Green Revolution is often perceived as consistent with the right to development, one of the fundamental Third-Generation Human Rights, in reality, it has not supported this right; rather, it has imposed a Western-centric model of development on a global scale, depriving nations and communities of their right to determine their own destinies. Furthermore, by transforming the

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right to development into a unidirectional relationship of technological dependency, it has effectively taken this right away from the peoples of underdeveloped countries, converting development into a hegemonic project.

The purpose of this study is to examine the economic realities of the Green Revolution—one of the major agricultural revolutions whose effects continue to this day—within the framework of Third-Generation Human Rights and Post-Development Theory. In this context, the study will be structured through a qualitative research approach, employing a traditional literature review and interpreted using the document analysis method.

Key Words: Agricultural Revolution, Green Revolution, Third Generation Human Rights, Post-Development Theory

INTRODUCTION

There are studies that confine humans to a biological life form, dating the beginning of human history to approximately 2.8 million years ago (Leakey et al., 2012; Villmoare et al., 2015; Harmand et al., 2015). In addition, there are studies that evaluate humans at the societal level, treating the human not merely as a biological entity but as a cultural being (Boehm, 1999) who develops social relationships, dating the start of human history back 100,000 years (d'Errico et al., 2003). With the emergence of humans on the historical stage, human societies have been shaped by cultural, economic, technological, and political influences (Harari, 2014).

Today, society is classified into five levels from Hunter-Gatherer Society (Society 1.0) to Super-Smart Society (Society 5.0). Hunter-Gatherer Society (Society 1.0) is a small-scale, egalitarian society with minimal social hierarchy, characterized by mobility to adapt to climatic conditions and driven by survival (Boehm, 1999; Harari, 2014). Agricultural Society (Society 2.0) emerged approximately 10,000 years ago with the Agricultural Revolution. This shift reduced climate-dependent migration and led to the emergence of states in the modern sense (Scott, 2017). The Industrial Revolution (Society 3.0) reshaped labor through mechanization and mass production, driven initially by steam power (Polanyi, 1944). In the 1970s, the development of computer technology and microchips transformed society into the Information Society (Society 4.0) (Castells, 2010). Society 5.0, or the Super-Intelligent Society, is a paradigm originating from Japanese science policies aiming to develop a human-centered digital ecosystem

(Fukuyama, 2018). At this stage, AI, IoT, big data, and robotics provide integrated solutions to increase social welfare (Brynjolfsson & McAfee, 2014).

When considering the sciences that study humans at the social level, the conceptualization of agriculture gains more meaning. Agricultural development stages in the literature range from Agriculture 1.0 to Agriculture 5.0. Agriculture 1.0 refers to societies gathering plants and hunting animals (Boehm, 1999). Agriculture 2.0 involved the domestication of plants and animals, resulting in surplus production, population growth, and the deepening of social hierarchy through settled life (Diamond, 1997; Scott, 2017). Agriculture 3.0, the subject of this research, replaced human and animal labor with machinery like tractors and harvesters following the industrial revolution (Polanyi, 1944). Also known as the **Green Revolution**, this period is characterized by the use of chemistry and genetics to increase productivity through GMO seeds, synthetic fertilizers, and intensive pesticides (Mazoyer & Roudart, 2006; Patel, 2009). Agriculture 4.0 and 5.0 share similar technologies such as AI, satellite imagery, and big data, with the primary nuance being Agriculture 5.0's focus on ecological sustainability and human-centricity (Wolfert et al., 2017; FAO, 2018). The motivation for this study is the fact that while a few developed countries have transitioned to Agriculture 4.0 and 5.0, many developing countries, including Turkey, still utilize Agriculture 3.0 technologies, which continue to impact the world environmentally, sociologically, and economically.

This study examines the Green Revolution across three main axes:

1. Agricultural modernization and technology dependency.
2. Inequalities in production relations and income distribution.
3. Third-generation rights in the context of environment, development, and cultural rights.

Conceptual and Theoretical Framework

The Green Revolution is an approach that reimagines agricultural production to modernize it. Led by Norman Borlaug, this movement produced "high-yield seeds," synthetic fertilizers, irrigation projects, and used intensive chemicals called pesticides (Evenson & Gollin, 2003). These modernization movements selected impoverished geographies for pilot applications, financed by powerful capitalists. From the 1960s, these processes

transformed production in countries like Mexico, India, and Pakistan through mechanization and chemical inputs (Pingali, 2012). While seen as a success by development economists for reducing famine risks, its environmental and rights-based impacts are debated. Since the 1980s, literature has critically evaluated its results, noting the reduction of agricultural diversity, pollution of water and soil, and rural poverty (Shiva, 1991; Patel, 2013).

Third-Generation Human Rights are collective rights encompassing the right to a healthy environment, development, peace, and the protection of cultural heritage (Alston, 1982). The 1986 UN Declaration on the Right to Development, which centers on human dignity rather than just economic growth, stands in direct contrast to the Green Revolution's definition of development (UN, 1986). While the Green Revolution was long presented as a primary tool for development by states and international organizations (Rostow, 1960; Lewis, 1954), **Post-Development Theory**, developed since the 1990s, radically questions these power relations and prioritizes local communities and alternative lifestyles (Escobar, 1995; Sachs, 1992; Esteva, 1992).

Agricultural Modernization and Technological Dependency

Modernization theory justifies Green Revolution policies by arguing that agricultural development can only occur through Westernization and scientific infrastructure (Rostow, 1960). It advocates for strong capital and mechanization to increase productivity (Schultz, 1964). This aimed to turn agriculture into a sector shaped by measurable yield increases rather than local methods (Scott, 1998). Consequently, the Green Revolution reshaped agriculture as a field highly dependent on technology. Producers, especially small farmers, became dependent on high-yield seeds and chemicals (Pingali, 2012). This dependency increased production costs and debt risks, forcing many small-scale farmers to withdraw from agricultural activities. This reveals a structural inequality within the sector (Shiva, 1991).

Inequalities in Production Relations and Income Distribution

Prior to the Green Revolution (Agriculture 2.0), production was labor-intensive and based on traditional knowledge. Agriculture 3.0 introduced capital-intensive inputs like synthetic fertilizers and GMO seeds. This benefited economies of scale, making large landowners and international

companies disproportionately powerful while making small farmers fragile (Shiva, 1991; Lipton, 1977). While large landowners acquired more land, small farmers suffered land loss due to debt. This created class polarization and allowed international companies to have a direct say in the sector (Byres, 1981). Furthermore, the demand for labor decreased due to technology-intensive capital, causing unemployment and negatively affecting landless peasants and seasonal workers (Patnaik, 1986). Macro-level control of seed and pesticide markets by international corporations has also made states dependent on these entities (Bernstein, 2010).

Third-Generation Rights in the Context of Environment, Development, and Culture

The Green Revolution necessitates a critical assessment regarding the **right to the environment**, the **right to development**, and **cultural rights** (Vasak, 1977). It violates the right to the environment by ignoring environmental costs and polluting soil and water through monoculture and intensive chemicals (Shiva, 1991; Robbins, 2012). Although the right to development should guarantee fair distribution of welfare and sustainability (Sen, 1999), Green Revolution practices often excluded local communities, moving away from principles of equality and participation (Frankel, 1971; Scott, 1998). Cultural rights include the right of communities to maintain their own production practices and knowledge systems. Traditional knowledge and local seeds are cultural heritage, yet the Green Revolution marginalized these by labeling them as "backward" (UNESCO, 2003).

CONCLUSION

As one of the most comprehensive examples of agricultural modernization, the Green Revolution demonstrates both the potential and the limits of technology-based development. It brought structural problems such as technology dependency, concentration of corporate power, and the marginalization of local knowledge. Its legacy must be evaluated by considering the social, economic, and ecological dimensions together rather than just productivity.

While providing quantitative increases, it created deep and permanent inequalities in production relations. The capital-intensive model pushed small farmers out of the system and accelerated class differentiation. Historically

presented as a turning point in the fight against hunger, it contains serious issues regarding environment and development rights. A third-generation human rights perspective allows for an evaluation based on long-term impacts rather than just technical achievements. In this framework, the Green Revolution reveals the necessity of redefining development in a way that is compatible with human rights.

REFERENCES

Alston, P. (1982). *A third generation of solidarity rights?* Netherlands International Law Review, 29(3), 307–322.

Bernstein, H. (2010). *Class dynamics of agrarian change*. Kumarian Press.

Boehm, C. (1999). Hierarchy in the forest: The evolution of egalitarian behavior. Harvard University Press.

Bronson, K., & Knezevic, I. (2016). Big data in food and agriculture. *Journal of Peasant Studies*, 43(1), 1–20. https://doi.org/10.1080/03066150.2015.1078226

Byres, T. J. (1981). The Green Revolution as a class transformation: Some theoretical and empirical issues. *Journal of Peasant Studies, 8*(4), 391–428.

Castells, M. (2010). *The rise of the network society* (2nd ed.). Wiley-Blackwell.

d'Errico, F., et al. (2003). Archaeological evidence for the emergence of symbolic material culture. *Journal of World Prehistory*, 17(1), 1–70. https://doi.org/10.1023/A:1023980201043

Diamond, J. (1997). *Guns, germs, and steel*. W. W. Norton.

Escobar, A. (1995). *Encountering development: The making and unmaking of the Third World*. Princeton University Press.

Esteva, G. (1992). Development. In W. Sachs (Ed.), *The development dictionary: A guide to knowledge as power*. Zed Books.

Evenson, R. E., & Gollin, D. (2003). Assessing the impact of the Green Revolution, 1960 to 2000. *Science, 300*(5620), 758–762.

FAO. (2018). *Agroecology knowledge hub*. Food and Agriculture Organization of the United Nations.

Frankel, F. R. (1971). *India's Green Revolution: Economic gains and political costs*. Princeton University Press.

Fukuyama, M. (2018). Society 5.0: A human-centered society. *Japan Spotlight*, 27–33.

Griffin, K. (1974). *The political economy of agrarian change*. Harvard University Press.

Harari, Y. N. (2014). *Sapiens: A brief history of humankind*. Harper.

Harmand, S., et al. (2015). 3.3-million-year-old stone tools from Lomekwi 3, *West Turkana, Kenya. Nature*, 521(7552), 310–315. https://doi.org/10.1038/nature14464

Leakey, M. G., Spoor, F., Dean, M. C., Feibel, C. S., Antón, S. C., Kiarie, C., & Leakey, L. N. (2012). New fossils from Koobi Fora in northern Kenya confirm taxonomic

diversity in early Homo. *Nature, 488*(7410), 201–204. https://doi.org/10.1038/nature11322

Lewis, W. A. (1954). *Economic Development with Unlimited Supplies of Labour. The Manchester School*, 22(2), 139–191. https://doi.org/10.1111/j.1467-9957.1954.tb00021.x

Lipton, M. (1977). *Why poor people stay poor: Urban bias in world development*. Harvard University Press.

Mazoyer, M., & Roudart, L. (2006). *A history of world agriculture: From the Neolithic age to the current crisis*. Earthscan.

McMichael, P. (2012). *Development and social change: A global perspective* (5th ed.). Sage.

Patel, R. (2009). Food sovereignty. *The Journal of Peasant Studies*, *36*(3), 663–706. https://doi.org/10.1080/03066150903143079

Patnaik, U. (1986). Labour and livelihoods: Agrarian change in India. *Economic and Political Weekly, 21*(52), A160–A168.

Pingali, P. L. (2012). Green Revolution: Impacts, limits, and the path ahead. *Proceedings of the National Academy of Sciences*, 109(31), 12302–12308.

Polanyi, K. (1944). *The great transformation*. Beacon Press.

Robbins, P. (2012). *Political ecology: A critical introduction* (2nd ed.). Wiley-Blackwell.

Rostow, W. W. (1960). *The stages of economic growth*. Cambridge University Press.

Sachs, W. (1992). *The development dictionary*. Zed Books.

Schultz, T. W. (1964). *Transforming traditional agriculture*. Yale University Press.

Scott, J. C. (1998). *Seeing like a state: How certain schemes to improve the human condition have failed*. Yale University Press.

Scott, J. C. (2017). *Against the grain*. Yale University Press.

Sen, A. (1999). *Development as freedom*. Oxford University Press.

Shiva, V. (1991). *The violence of the Green Revolution: Third World agriculture, ecology, and politics*. Zed Books.

UN. (1986). *Declaration on the Right to Development*. United Nations.

UNESCO. (2003). *Convention for the safeguarding of the intangible cultural heritage*.

Vasak, K. (1977). Human rights: A thirty-year struggle. *UNESCO Courier*, 30(11), 29–32.

Villmoare, B., vd. (2015). Early Homo at 2.8 Ma from Ledi-Geraru, Afar, Ethiopia. *Science*, 347(6228), 1352–1355. https://doi.org/10.1126/science.aaa1343

Wolfert, S., Ge, L., Verdouw, C., & Bogaardt, M.-J. (2017). Big data in smart farming. *Agricultural Systems*, 153, 69–80. https://doi.org/10.1016/j.agsy.2017.01.023

An Assessment Regarding Legal Status of Platform Workers

Yavuz Selim Kaymaz*

Labor is a concept as old as human history, and it has been attributed to different values depending on society and time. In pre-industrial revolution period, when urbanization remained low in agricultural societies, self-employed workers constituted most of the workforce. Subsequently, with the industrial revolution, the increase in the proportion of dependent workers also ensured the development of social policy built on dependent workers. Work has been guaranteed in legal norms at both the international and national levels and has been regulated in many aspects, such as the protection of labor, the prevention of child labor, the prohibition of forced labor, and organization. The 2008 crisis and the subsequent pandemic have led to intense digitalization. The gig economy and platform workers have emerged and developed, and the number of self-employed workers increased, making it an area where social policy should respond. In this context, determining the legal status of platform workers, seen due to digitalization, is of great importance in terms of what rights individuals can access in the face of social risks such as retirement, health, unemployment and union rights. The study aims to analyze the legal status of platform workers by addressing the element of subordination which has pivotal role in labor law.

Keywords: Labor, Digitalization, Worker Status, Law, Platform Workers, Social Security

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1. Introduction

Labor is a fundamental human facility that has been in discourse in various societies and ages which means that labor is dedicated to human beings. As a multifaceted concept it has adherence to various areas including economics, sociology, law. Beginning from "hunter gatherer" period labor's form has changed significantly due to the prominent turning points such as industrial revolution. Ongoing process with the emergence of industry 5.0 digital transformation has influenced various areas therefore labor is one of them and status of employees has become controversial issue. The social rights as component of citizenship aims to protect individuals against social risks including unemployment, death, ageing. Therefore, states implement social policies by using certain methods and tools which consist of scope of services as "universal" or "selective", terms of use are some examples to serve services individuals. Work status in general meaning can be endured to two basic categories as "dependent work" and "self-employed". Throughout the history prominent point to be emphasized is "industrial revolution" which affected various areas and "workers status" profoundly transformed to "dependent work" and its rate to high level at all and this situation led social policy to be built on labor relations.

So even in modern era in most countries "dependent work" rates are in higher level which social policy should respond to. In this regard social policy aims to support social integration, social risks should be avoided, and the social policy selections are shaped due to the current structure which may also differ to countries. The rise of the gig economy and pandemic period led to some reflections on the axis of digitalization in other words another transformation period lived with digitalization. The "digital platform economy" has become more apparent and therefore the status of employees in platform economy has been affected. Therefore, platform workers' blurring positions to be responded, with the digitalization called platform workers. As emphasized, social rights are shaped by social needs and one of them is workers status and platform workers at this point which is about "subordination" in labor legislation. This is a social issue which social policy responds, including unemployment benefits, union rights, retirement status are some highlighting points to be discussed.

The main problem is about platform workers is "identification" means in which status they should be considered. When they are considered

another unique status which is not dependent or self-employed and legal regulation is order in this axis, the other related social rights beneficiary problems occurred.

In this regard the consequences of digitalization about labor with platform workers, status, and related social rights are put forward in the study. Also, Turkish labor legislation on the evolution as third category of platform workers which gaps may emerge in social rights. Therefore, objective of the study is to mention platform workers' position to reveal which social problems may lead to emerging gaps to be regulated. This study adopts qualitative research based on document analysis including reports of international institutions, legal regulations/decisions in Turkey with a particular focus on the element of subordination in summary conceptional analysis to generate comparative approach also some recommendations put forwards in terms of Turkey's labor legislation.

2. Labor and Employee's Status

The main objective of study is platform workers; "labor" and its status therefore to embody the transforming situation, definitions and ongoing process touched upon. The concept of labor defined as *"human activity that produces goods and services"*. (Seyyar, 2008:113-114) As deprived from definition labor is component of production means that it has always been in human life. Another approach about labor history which illuminates transformation process also has intersection including culture phenomenon from "torture" perception structure to "sacralization".

In broader sense the transformation of labor defined as "*… in the wake of various intersecting processes of cultural revaluation and economic transformation, labour developed into a positive credential of free existence and a presupposition of social integrity: the Protestant ethic led to a gradual upgrading of the value of labour, because it was interpreted as a sign that one possessed a capacity for inner-worldly asceticism*".(Honneth, 2022:149) As mentioned in definition a component of culture religion has impact and in terms of sociological perspective the perception of labor may naturally differ to countries.

Definition indicates the significance of "labor" due to the production processes has always been in humanity even in different forms. As an example, when labor considered as in historical phase even in "hunter-gather"

period division of labor applied relying on a classification as gender, men, women while agricultural and industrial societies applied more complex labor division policies. (Nakahashi, Marcus, 2014:65) Also "forms of production" has always played key role in history and "three sector" rule (from primary to tertiary) belonging to Fisher and Clark embodies the transforming process each sector and transforming sectors have distinctive characteristics. (Wolfe,1955:402) Fisher and Clarks' approach is a way to make a sense the transforming process and it indicates the ongoing process also the main subject of study is "digitalization" should have its own characteristics.

The definitions encompass about "labor" indicate various workers means that it did not restrict with "dependent workers" also the work should be done to earn in other words the definition does not indicate philanthropy work. In this regard it can be derived labor can be realized in various ways which can be called work status general assessment about work status roughly consist of "dependent" and "self-employed". (Erol, 2021:3)

Another classification regarding employee status made by Employment Rights Act-1996 , has three components as *"employee, worker, self-employed*" (https://www.acas.org.uk/employmentstatus, access 12.11.2025) In another classification for self-employed status put forward by OECD has various components. *"Self-employment rate is the employment of employers, workers who work for themselves, members of producers' co-operatives and unpaid family workers"* (https://www.oecd.org/en/data/indicators/self-employment-rate.html access 12.11.2025) A prominent point to be emphasized triggering the "platform economy" has also adherence to 2008 crisis is rise of the "gig economy".

Gig economy defined *"as a way of working based on people having temporary jobs or doing separate pieces of work, each paid separately, rather than working for an employer*". (CIPD, 2023:2) The definition is about gig economy sheds light on "labor status" which indicates self-employment as it excludes work for employer therefore this topic is controversial, touched upon in study. Also, the rise of gig economy while changing working conditions also led some problems including social protection and income levels. (ILO, Exploring the Gig Economy, 2025:5) Also another explanation about gig economy puts forward the difference as "gig economy" work significantly differs from traditional work. *"Workers are typically self-employed*

or independent contractors, rather than being employed by a company" and they use online platforms. (ILO, Exploring the Gig Economy, 2025:10) The explanation is about the influence of internet application by mentioning online platforms. The transformations along history while technological advancements led to growing prosperity and well-being also give birth to some problems. (Şenkal, 2015:129)

3. The Subordination in Labor Legislation

In terms of semantic approach definition of "subordination" given as to be ruled under another group or society.(Erol, 2020:73) In terms of legal dimension, subordination defined as "*the act of giving someone or something less importance or power."* (https://dictionary.cambridge.org/dictionary/english/subordination) The definition strongly indicates relationship of worker as a weaker position and managed by employer as stronger party also definition indicates a hierarchy.

The business contracts have parties as employees and employer, and the "subordination" is about also about management right on employees; relationship which employees is under employer management. In terms of Turkish business legislation, business contracts have three main components: *"business", "wage" and "subordination".* (Gülnar, Görmez, 2023:120-121)

Also, general assessment of business contracts legal pillars a highlighting point is subordination. Subordination defined as "*..., the contract worker personally performs work under actual conditions of "dependency on" or "subordination to" the user enterprise (ILO, 1998a). Because subordination is commonly associated with a regular employment relationship, the novelty of the instrument, therefore, would have subsisted in the concept of "actual conditions of dependency*". (De Stefano, V., Durri, I., Stylogiannis, C., Wouters, 2011:5)

In terms of Turkish labor legislation "subordination" can play key role to identify the status of "platform workers". In this regard while rejection of work and to make another contract of platform workers indicate the "self-employed" which majority agree means that they are excluded from social rights addressing dependent workers. (Oğuz, 2025:51) Personal dependence of employee to employer is a distinctive feature to separate business contract from other types of private business contracts. (Erol, 2020:75) To identify to subordination of a labor relation some features *"continuity,*

work under one employer, managing own business" are highlighting points to identify. (Erol, 2020:75)

Judicial decision about the situation emphasized the "subordination" also indicates the influence in labor history. Supreme court's decision explains that even if the subordination is not intense level, the existence of subordination indicates to be accepted. (Kutlu, 2021:283)

4. Gig Economy, Platform Workers and Third Status: Employee-Like Person

The emergence of platform economy goes back to the 1990s then ongoing process digital economy has grown faster by the support of wide spread of internet, smartphones and high data and there is no agreement about gig economy, defined as *"sharing economy, peer-to-peer economy, gig economy, on-demand economy or platform economy".* (ILO, Survey on Workers on Web-Based Digital Platforms, 2025 :6-7) Also in another definition *"The gig economy is the collection of markets that match providers to consumers on a gig (or job) basis in support of on-demand commerce. In the basic model, gig workers enter into formal agreements with on-demand companies to provide services to the company's clients. Prospective clients request services through an Internet-based technological platform or smartphone application that allows them to search for providers or to specify jobs".* (Donovan, Bradley, Shimabukuro, 2016:1) The highlighting point which also constitutes the main pillar of the study is "platform workers" also the term first used in 2006 as *"crowdsourcing"* and various reflections have been seen in labor life. (Oğuz, 2025:51) Also the mentioned transformation has brought both advantages and disadvantaged for parties. (Zeid, Alrayess, Ajwad, Soytas, Rivera, Nayib, World Bank, 2024:8)

In one approach claims a new status for platform work might be a "third category" neither self-employed nor dependent work. (Beytar, 2022:259) In this context another approach to be touched upon is "employee-like person". In fact, "employee-like person" as term originates to 1869 Germany which lead to controversial if it may be a third status excluding "dependent" and "self-employed". (Erol, 2021:3) Rising of gig economy has influence on labor life and current legislations couldn't respond therefore "employee-like" person as third category occurred as a new discourse. (Küçük, 2023:1961) Another remarkable politics put forward by EU about

"platform work "is a directive EU generated policy for "platform work". The EU directive dated 11.11.2024 with the number 2024/2831 introduces a presumption to improve working conditions. *"Directive (Eu) 2024/2831 of The European Parliament and of The Council"* (https://eur-lex.europa.eu/eli/dir/2024/2831/oj/eng)

World Economic Forum (WEF) has forecasts about labor markets' future position which strongly indicates work status. "*Technological developments, the green transition, macroeconomic and geoeconomic shifts, and demographic changes are driving transformation in the global labour market, reshaping both jobs and required skills. This chapter provides a picture of how companies expect these macrotrends to drive industry transformation by 2030.*" (WEF, 2025:10) As emphasized by WEF the trends have influence on labor market by encompassing skills and jobs. The current situation brings some disadvantages to be responded by recommending some areas embodied. "*1) harmonizing rules for standard and non-standard employment; 2) updating social protection systems; and 3) supporting lifelong learning"* (Zeid, Alrayess, Ajwad, Soytas, Rivera, Nayib, World Bank, 2024:10)

5. Some Highlighting Points to be Responded: case of Türkiye

a) When the "platform workers" evaluated another unique (third)status it is expected to emerge some social rights problems which is constructed on employee's status as mentioned in the study lack of protection directly related to social rights included various areas such as unemployment, retirement and unionization and occupational health and safety, "disability" and "invalidity" are social rights take place in premium system to be gap.

b) Unionization rights which constitute rights is regulated by law no.6356 which address employe and employer and for public workers law no. 4688 has arrangements, therefore "platform work" status as a unique status seems to be a gap for unionization therefore" unionization rights" and "collective bargain" which is main pillar of labor relations.

c) One prominent point about social rights is "retirement" which takes place in Turkish social security system as long term "ageing insurance" with the law no.5510 Social insurance Health Insurance Law, the status of "third category" may cause a gap for retirement status.

d) Another highlighting point is unemployment insurance which has gained with some legal changes as it encompasses "employees", "voluntary

insurance" and with the establishment of "Tradesman Ahilik fund" which addresses "self-employed". (Kaymaz, 2025:1078-1080) Therefore the platform workers status should be regulated in terms of unemployment insurance.

e) Also, the "job security" policy regulated business law no.4857 which has significant protection policies such as "notification pay" and "severance pay" are some examples. Though the law has some limitations as it is valid for some working people another issue is if "platform workers" can get benefit from law otherwise another protection policies may become another need.

f) The other point is "occupational health and safety" which takes place in Turkish labor legislation. Employer's responsibilities which come from business contracts as a party of contract legal arrangements an example about this situation is "work accidents".

6. Conclusion

Labor is one of the main components of our life and has always played prominent roles throughout history. Even in hunter-gather era, labor division was implemented and by the time the transformation of labor has emerged. The industry 5.0 which is almost dedicated to digitalization, it's inevitable that labor to be affected. One turning point which made profound influence is "industrial revolution" on societies, in particular dependent work has reached %90 in 1945-1975 therefore narrow sense of social policy has lived advancement on employee-employer relations. Digitalization in recent years has become inevitable issue which has triggered transformation as it had been lived in industrial revolution and labor is also as a prominent area expected to be affected. Along the history there have been technological advancements which made contribution our conditions in other words and one of these is "digitalization" but also these advancements gave birth to problems. Rise of the gig economy and with the impact of 2008 crisis and pandemic era the transforming habit emerged the "platform economy" which strongly addresses rise of self-employed status as it was taken on agenda in international level. And though dependent work has wider share in whole employees, the rise of self-employed leads to social policy to care about it. Also, the period led to some problems, in particular social protection and income level of platform workers. The ongoing process will keep increasing in the future means that employee

status is a highlighting point to be affected which strongly is related to "subordination" in Turkey's labor legislation indicates to be ruled by employers is also prominent pillar of business contracts. Therefore, transformation in society led to new needs emerging which social policy should respond to enhance and support the welfare of society.

In this regard labor is affected by areas which have adherence to various social rights including retirement, unemployment, and unionization. The "platform workers" is consequence of the digitalization process seems a "gap" in Turkish labor legislation. "Platform workers" has ambiguity about identification their status, if it's self-employed with "rejection of work" feature strongly indicates self-employed. Also, in another approach also defined as "employee-like workers" perceived as also third status excluding both "dependent" and "self-employed" is another highlighting point. In this context, the unemployment insurance even its scope enlarged with the establishment of "Tradesmen Ahilik Fund" seems to be another gap for a new status. Also, unionization which public and private workers and employers get benefit if a new status occurs seems to be another gap together with collective bargain. Retirement status, which is also related in workers' status on "mandatory insurance" and "voluntary insurance" to be regulated another issue. And another significant issue is job security which takes place in Business Law no:4857 has some limitations about which workers can get benefit from it therefore as a new status "platform workers" position seems a gap. In Turkey's labor legislation a highlighting arrangement is about "occupational health and safety" which brings responsibilities to employer therefore this issue is another gap to be responded. Therefore, notice compensation, severance compensation are some protection policies regulated in business law and quests for rights are social problems expected to emerge. If "platform workers" reach a unique status with a law a combination of protection should be regulated as a new hybrid model. In case of this situation legal arrangement about "platform workers" is a need and law should respond to complete social progress otherwise the courts will face increasing workloads and may led to losses for parties.

Legal arrangements may come with laws or other legal methods including "circular" which may immediately respond legal gap. While implementing the regulations intensity of platform workers such as countries or industries to supply "layered transition" therefore the possible grievances

might be avoided. In this respect legal regulation is not only a legal need but also it is imperative for social progress.

References

Beytar, E. (2023). "Platform Çalışması: Çalışan Statüsünün Belirlenmesi Sorunu", *İstanbul Medeniyet Üniversitesi Hukuk Fakültesi Dergisi,* vol.8, no.1, pp.239-66.

CIPD (2023). *The Gig Economy: What Does it Really Look Like*, Policy Report.

De Stefano, V., Durri, I., Stylogiannis, C., Wouters, M. (2021). Platform Work and the Employment Relationship, ILO Working Paper 27, (Geneva, ILO).

Donovan, S., Bradley, D. H., Shimabukuro, J. O. (2016). "What does the gig economy mean for workers?", Washington, DC: Congressional Research Service.

Erol, A. (2020). *Mukayeseli Hukukta ve Türk Hukuku'nda İş sözleşmesinin Bağımlılık Unsuru*, Seçkin Kitabevi.

Erol, A. (2021). *Hukuki ve Sosyal Boyutlarıyla İşçi Benzeri Çalışan Kavramı*, Gazi Kitabevi.

Gülnar, Ş., Görmez, Y. (2024). "İş Sözleşmesinin Unsurları, Özellikleri, Doğan Borçlar ve Sona Ermesi", *Gaziantep Üniversitesi Hukuk Fakültesi Dergisi*, no.1, pp.119-134.

Honnet, A. (2022). "'Labour', A Brief History of a Modern Concept", *Philosophy*, vol.97, no.2, pp.149-167.

ILO (2025). Exploring the Gig Economy: Challenges and Opportunities a Self-Guided Resource.

ILO (2025). Survey on workers on web-based digital platforms new data for Latin America and the Caribbean region.

Kaymaz, Y.S. (2025). "Refah Rejimlerinde Bağımsız Çalışanların İşsizlik Sigortası: Türkiye Örneği", *Üçüncü Sektör Sosyal Ekonomi Dergisi*, vol.60 no., pp.1071–1084.

Küçük, D. (2023). "Concept of Working Time in Platform Work", *SÜHFD*, vol.31, no.4, pp.1689-1727.

Kutlu, M., (2021). "Platform Çalışanlarının Hukuki Statüsü: Uber-Aslam ve Diğerleri Kararına İlişkin Bir Değerlendirme", *Ankara Hacı Bayram Veli Üniversitesi Hukuk Fakültesi Dergisi*, vol.25, no.2, pp. 271-310.

Nakahashi, W., Marcus F. (2014). "Evolution of Division of Labor: Emergence of Different Activities Among Group Members", *Journal of Theoretical Biology*, no.348, pp.65-79.

Oğuz, Ö. (2025). "Platform Çalışanlarının Haklarının Korunması: Türk İş Hukuku ve Karşılaştırmalı Hukuk Bağlamında Bir Değerlendirme", *İnönü Üniversitei Hukuk Fakültesi Dergisi* vol.16, no.1, pp.49-59.

RG, (2006). 5510 Sayılı Sosyal Sigortalar ve Genel Sağlık Sigortası Kanunu.

RG, (2012). 4688 Sayılı Kamu Sendikaları ve Toplu Sözleşme Kanunu.

RG, (2012). 6356 Sayılı Sendikalar ve Toplu İş Sözleşmesi Kanunu.

Şenkal, A. (2015). *Sosyal Boyutuyla Bilgi Ekonomisi ve Emek*, Umuttepe Yayınları.

Seyyar, A. (2008). *Sosyal Siyaset Terimleri Ansiklopedik Sözlük*, Sakarya Yayıncılık.

WEF (2025). Future of Jobs Report Insight Report.

Wolfe, M. (1955). "The Concept of Economic Sectors", *The Quarterly Journal of Economics*, vol. 69, no.3, pp.402–420.

Zeid, Ramy; Alrayess, Dana; Ajwad, Mohamed Ihsan; Soytas, Mehmet Ali; Rivera, Nayib. (2024). *The Gig Economy and the Future of Work: Global Trends and Policy Directions for Non-Standard Forms of Employment*, SPJ Policy and Technical Note, World Bank.

İnternet References

https://dictionary.cambridge.org/dictionary/english/subordination

https://eur-lex.europa.eu/eli/dir/2024/2831/oj/eng

https://www.acas.org.uk/employmentstatus,

https://www.oecd.org/en/data/indicators/self-employment-rate.html

Advancing Green Jobs in Tourism: The Role of Social Dialogue in Sustainable Development

Özlem Küçük* • Neşra Baykan**

Abstract

In the context of sustainable tourism, this paper examines the development of green jobs through a social policy lens, with a focus on the transformative power of social dialogue. The study explores how the green transition in tourism can be made more inclusive and enduring by integrating multi-stakeholder engagement, community empowerment, and social entrepreneurship alongside environmental policies. The analysis is structured around thematic categories and supported by international case studies—including Spain, South Africa, Germany, Canada, and Denmark—to illustrate how social dialogue among governments, employers, and workers enables effective policy design and implementation. Sustainable tourism development is shown to rely on active collaboration between local communities, businesses, civil society, and public authorities. Social dialogue builds trust, enhances the quality of planning, and supports innovative, long-term strategies. Notable examples such as Germany's "Coal Commission" and Canada's Just Transition Task Force demonstrate how inclusive negotiation frameworks can guide

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equitable green transitions. The paper highlights how green jobs in tourism—particularly within cultural tourism, social enterprises, and CSR-driven hospitality—generate employment opportunities while advancing environmental and social goals. According to 2025 data from the Turkish Hoteliers Association, the share of eco-certified accommodation facilities increased from 28% to 43% over a three-year period, and 35% of staff are now employed in sustainability-focused roles. These trends emphasize the growing importance of green jobs in the hospitality industry. In conclusion, social dialogue emerges as a foundation for sustainable tourism, contributing to green job creation through community-based approaches and international cooperation, and offering a multidisciplinary framework to guide future policy and practice.

Keywords: Green jobs, sustainable tourism, social dialogue, Social policy and inclusive inclusive growth

INTRODUCTION

The global climate crisis, the rapid depletion of natural resources, and rising environmental awareness are profoundly reshaping the economic paradigm of the 21st century. At the center of this transformation lie *green jobs*, which reconfigure traditional production and service models through sustainable principles. In a narrow sense, green jobs refer to employment in environmental protection sectors; in a broader sense, they encompass all economic activities—and the workforce engaged in them—that enhance resource efficiency, reduce carbon footprints, protect ecosystems, and embrace circular economy practices (ILO, 2023).

The literature on the transition to a green economy highlights that workforce skills, gender equality, and educational infrastructure are critical determinants of the pace of transformation. According to the IMF's report *Green Jobs and the Future of Work for Women and Men*, economies with strong STEM education capacity and more equitable opportunities for women advance green innovation more rapidly and expand their green workforce with fewer bottlenecks (IMF, 2024). In these countries, climate policies—particularly energy taxation—are reported to reduce emissions by 2–4% more than in other economies. Yet, despite the global rise of green jobs, two-thirds of these positions are held by men and one-third by women, revealing the persistence of gender inequality in the green transition. Moreover, wage premiums in green jobs—7% for men and 12% for women—suggest that labor supply may remain insufficient to

meet demand. These findings underscore that the green transition must be supported not only by climate policies but also by skill development, education strategies, gender equality measures, and inclusive labor market regulations (IMF, 2024).

The tourism sector is among the industries most in need of—and most capable of—embracing this transformation, due to its direct dependence on natural and cultural assets, its intensive energy consumption, and its significant share in waste generation. The accommodation industry alone is estimated to account for around 1% of global greenhouse gas emissions, with a much higher share across the broader tourism value chain (UNWTO, 2024). Consequently, the sustainability of the sector and its role in combating the climate crisis are directly linked to the expansion of green jobs and the transformation of employment structures.

Green jobs in tourism, particularly in hospitality, emerge when businesses integrate a holistic understanding of sustainability into their operations. This requires not only technical adjustments but also cultural and organizational change. Such transformation is vital for sustainable employment in local communities, as green jobs range from high-skilled roles in renewable energy system installation and management to the integration of local supply chains, thereby strengthening community participation in the economy (Bradley et al., 2025).

However, the success of this technical and organizational transformation depends on the participation and consensus of diverse stakeholders in policymaking processes. For tourism to be both sustainable and equitable, *social dialogue*—defined as negotiation, consultation, and information exchange among governments, employer organizations, trade unions, and civil society—becomes a critical mechanism. Social dialogue manages the social costs of transformation, guarantees a just transition, empowers local communities, and enhances the legitimacy of implemented policies (OECD, 2023). Examples such as Spain's sustainable coastal tourism management, South Africa's community-based wildlife tourism models, and Germany's "Coal Commission" illustrate the tangible outcomes that social dialogue can generate. This process also shapes the green job strategies of global hotel chains such as Marriott and Hilton, which now view sustainability not only as an environmental necessity but also as a key market dynamic aligned with investor, guest, and regulatory expectations. Küçük

(2024) evaluates the World Bank's approach to sustainable tourism from a social welfare perspective, identifying policy priorities that will shape the future of the sector. By discussing the role of environmental sustainability, inclusive growth, and social dialogue mechanisms in tourism, the study offers a practical roadmap for developing countries (Küçük, 2024).

In sum, the success of the green transition and the expansion of green jobs in tourism cannot be achieved solely through technical regulations, certifications, or technological investments. It becomes sustainable, fair, and legitimate only when managed through an inclusive mechanism of social dialogue.

1.1. Sustainable Tourism and Green Jobs in the Context of Sustainable Development

The Industrial Revolution, while driving technological progress and economic growth, also caused significant harm to the environment. Rapid population growth, excessive and unnecessary resource use, and widespread environmental insensitivity gradually disrupted the ecological balance. The concept of *sustainability* emerged as a response, aiming not only to restore ecological equilibrium but also to generate broad social, economic, and political impacts (Akış, 1999). Sustainability emphasizes the need to transfer essential resources to future generations without depletion, thereby enabling societies and ecosystems to continue functioning without interruption.

Sustainable tourism can be defined as preserving the core characteristics of tourist destinations while ensuring their continuity for the future (Arslan et al., 2023). For many years, the economic dimension of tourism overshadowed its environmental implications, leading to neglect of the tourism–environment relationship. While environmental protection was undervalued in earlier decades, it has now become a central priority. Tourism development often introduces infrastructure that threatens ecosystems, while tourists' clothing styles and behaviors can reshape local communities (Bolwell & Weinz, 2008). Therefore, tourism development planning must consider environmental impacts alongside economic benefits.

Sustainable development advocates economic growth achieved in harmony with natural resource conservation (Chichilnisky, 1997). With the rising number of international tourists and their environmental footprint,

the importance of sustainable tourism has grown significantly (Bramwell & Lane, 1993; Hole & Snehal, 2019). Scholars and tourism managers have proposed strategies to mitigate negative economic, social, and environmental effects, including carrying capacity assessments, reducing tourism footprints, promoting ecotourism, investing in clean energy, and ensuring environmental protection (Bramwell & Lane, 1993; Grubler et al., 2018; Mishra et al., 2021; Nepal et al., 2019). Despite these efforts, environmental challenges and concerns about the continuity of popular destinations persist (Ruhanen et al., 2019). As a result, tourism stakeholders continue to seek new approaches to sustainable development for the future of tourism.

Within this context, *green jobs* have gained prominence. These include not only traditional roles in construction but also emerging sectors such as renewable energy, which contribute to environmental protection and restoration. In recent years, *green growth policies* have been increasingly promoted to address both climate-related environmental challenges and persistent unemployment in many industrialized countries. In the United States, such initiatives began with the Green Jobs Act of 2007 (as part of the Energy Independence and Security Act) and continued with the American Recovery and Reinvestment Act of 2009. Although the Green Jobs Act was never fully enacted, the 2009 legislation provided significant funding for green initiatives, particularly research and development in energy efficiency and renewable energy investments.

1.2. From Green Business Goals to Green Employment

To fully understand the sustainability transformation in the hospitality sector, it is essential to distinguish between the *green business* status that a company aims to achieve and the concrete *green job* roles and employment structures that make this goal attainable. This distinction demonstrates that transformation is not merely a technical matter but also an organizational and human resource process.

Table 1.1. Conceptual Relationship Between Green Business Goals and Green Job Roles in the Hospitality Sector

Categories	Business-Oriented Definition (Green Business Goal)	Employment-Oriented Definition (Green Job Roles)
Environmental Dimension	Optimizes water, energy, and waste management with a conscious effort to protect natural resources and ecosystems.	Creates specialized roles (e.g., Energy Manager, Waste Management Officer). Requires all staff—from housekeeping to kitchen personnel—to be trained and engaged in resource efficiency.
Operational Dimension	Adopts eco-friendly and sustainable methods across all processes, from architecture and maintenance to daily operations and consumption habits.	Transforms operational roles. Procurement officers must work with local/eco-certified suppliers; chefs must prevent food waste and integrate local products into menus; guest relations staff must acquire sustainability communication skills.
Socio-Economic Dimension	Operates a business model that is both economically efficient and socially responsible.	Centers on the principle of decent work. This includes fair wages and working conditions, as well as integrating local and disadvantaged groups (women, youth) into sustainable tourism roles, while embedding occupational health and safety standards into eco-friendly practices (clean air, natural materials).
Key Outcome	Sustainable Hotel/ Facility Certification (LEED, Green Key, etc.)	Skilled Workforce and a Just Transition Process

Note: The table is conceptualized by the author in line with current sustainability trends and ESG targets highlighted in Green Lodging News (2024).

As the table illustrates, the goal of becoming a "green" hotel inevitably requires both qualitative (new skills) and quantitative (new positions) changes in the workforce—namely, the creation of *green jobs* and the upskilling of existing employees. However, it is a misconception to assume that technical transformation alone is sufficient. The smooth, fair, and socially legitimate management of this critical transition depends directly on the presence and functioning of effective *social dialogue* mechanisms. Without social dialogue, the green transition risks encountering workforce resistance, skill gaps, and social inequalities.

International experience shows that green employment emerges most effectively when business strategies are aligned with public policy frameworks. For example, the United States introduced green growth initiatives through the Green Jobs Act of 2007 (as part of the Energy Independence and Security Act) and later through the American Recovery and Reinvestment Act of 2009. Although the Green Jobs Act was never fully enacted, the 2009 legislation provided substantial funding for research and development in energy efficiency and renewable energy, laying the foundation for green employment opportunities (U.S.Congress, 2007; U.S.Congress, 2009).

This evolution highlights that green business goals must move beyond corporate declarations and certifications. They become meaningful only when translated into inclusive employment practices that empower workers, strengthen local communities, and contribute to a just transition.

1.3. Green Jobs in Tourism and Hospitality

The concept of *green jobs* lies at the center of debates on sustainable development and the low-carbon economy. In tourism literature, it is generally discussed within the framework of resource efficiency, reducing environmental impacts, and adapting to climate change (ILO, 2012; UNWTO, 2016). Applied to the tourism sector, this universal definition refers to a comprehensive transformation that includes both newly created or reshaped employment types (e.g., sustainability managers, energy efficiency specialists) and the integration of green practices and skills into existing roles.

In the hospitality sector specifically, the literature emphasizes that green jobs are not limited to the creation of new positions. Rather, they involve redesigning the knowledge, skills, and responsibilities of all existing

roles—housekeeping, kitchen staff, management—through an environmental lens (UNWTO, 2023). From this perspective, green jobs in hospitality represent the human capital and specialized roles required by a model that seeks to eliminate or transform environmental and social costs into positive value across all operational and managerial processes of a hotel—from architecture and supply chains to daily services and guest relations. These roles focus not only on resource efficiency but also on spreading environmental responsibility among guests and local communities.

1.4. Scope and Key Areas of Implementation

The literature expands the scope of green jobs in hospitality to cover all stages of a facility's life cycle, typically concentrating on five key areas:

A. Green Construction and Maintenance This area includes achieving green building certifications such as LEED or BREEAM in new facilities, and implementing energy efficiency, eco-friendly materials, and sustainable maintenance practices in existing ones. Green architects, energy modeling specialists, and eco-construction technicians play critical roles in this process (UNWTO, 2023).

B. Resource Management and Optimization This involves energy and water management (renewable energy systems, smart building automation, greywater recycling), as well as waste management and circular economy practices (organic waste composting, zero-waste strategies). Roles such as energy managers and waste auditors are responsible for carbon footprint reporting and reduction strategies (ILO, 2018).

C. Sustainable Supply Chain and Local Integration The literature highlights that sourcing local and eco-certified products reduces environmental footprints while revitalizing local economies, thereby contributing to social sustainability. Supply chain sustainability specialists play a key role in managing this integration (OECD, 2021).

D. Guest Experience and Engagement Sustainable tourism positions guests not as passive consumers but as active participants. Sustainability communication specialists and eco-tour guides engage guests by offering environmentally friendly options and transparently communicating the hotel's sustainability efforts (Küçük, 2023).

E. Governance, Reporting, and ESG Compliance Compliance with Environmental, Social, and Governance (ESG) criteria is becoming increasingly important. Sustainability directors or ESG managers are responsible for measuring, monitoring, and reporting performance in line with international standards such as the Global Reporting Initiative (GRI) (UNWTO, 2023).

1.5. Social Dialogue as a Mechanism for Just Transition

Social dialogue refers to negotiation, consultation, and information exchange among governments, employer organizations, trade unions, and civil society actors. Its purpose is to connect different perspectives and preserve common ground (Salahuddin, 2022). In the world of work, social dialogue aims to foster consensus and promote democratic participation (Carley, 1993). It may take the form of a tripartite process involving governments, employers, and workers, or a bipartite process between employers and unions without direct government involvement. Successful social dialogue structures can resolve economic and social challenges, promote good governance, advance social and industrial stability, and accelerate economic progress (Smismans, 2008).

Within the tourism sector, social dialogue is particularly critical. UNESCO has expressed concern that large numbers of visitors may damage World Heritage Sites and other important destinations. Preventing such harm requires consultation, coordinated planning, and informed implementation among all stakeholders—demonstrating that social dialogue is essential for sustainable tourism.

Social dialogue also operates at different levels depending on scope and stakeholder participation:

A. Tripartite Dialogue Mechanism (National/Sectoral Level): This mechanism involves central government, employer associations representing the tourism sector (e.g., hotel federations), and relevant trade unions (hospitality, food and beverage, transport). Its primary aim is to establish green certification standards, jointly design green vocational qualifications and training curricula, and develop social policy packages that support a just transition (e.g., retraining, income support) (ILO, 2015; OECD, 2023; UNWTO, 2023). At the global level, organizations such as the International

Transport Workers' Federation (ITF) provide platforms for dialogue on decent work and sustainability in tourism and transport (ITF, 2021).

B. Quadripartite/Multi-stakeholder Dialogue Mechanism (Local/Community Level): This more inclusive model expands the tripartite structure to include local governments, non-governmental organizations (NGOs), community representatives, universities, and other stakeholders. It is vital for managing the impacts of tourism planning and investment on local quality of life, cultural heritage, and ecosystems, while strengthening local economic participation and benefit-sharing (Bramwell & Sharman, 1999; Jamal & Getz, 1995; UNWTO, 2019). This model, which aligns with principles of participatory governance and community-based tourism, is particularly effective in destination management and community-based tourism projects (Blackstock, 2005; Okazaki, 2008).

1.6. International Case Studies and Policy Analysis

The tangible impact of social dialogue on a just and green transition in tourism can be clearly observed through examples from different geographies and governance models. Table 2 summarizes this diversity and the outcomes of dialogue mechanisms in practice.

Table 1,6.1. International Case Studies of Social Dialogue Mechanisms Contributing to the Green Transition in Tourism

Case Model	Application Area	Dialogue Mechanism	Outcome of Social Dialogue
Royal Commission for AlUla (Saudi Arabia)	Cultural Heritage Tourism	Public–Private–Community Partnership (PPCP)	Established a co-management model that strengthens local communities' sense of belonging (*place attachment*) and supports ecological and cultural preservation. Community participation has also increased tourists' inclination toward green consumption (Al-Saed & Al-Tawfiq, 2024).

Case Model	Application Area	Dialogue Mechanism	Outcome of Social Dialogue
APDT (Brașov County, Romania)	Destination Management	Public–Private Partnership (PPP) & Stakeholder Dialogue	Built a collaborative infrastructure between local authorities and tourism service providers. Demonstrated that coordinated governance structures can achieve sustainability goals that individual enterprises struggle to meet (Popescu et al., 2022).
Sextantio (Italy) & Dar Tantora (Saudi Arabia)	Cultural Heritage Tourism	Social Entrepreneurship & Governance Mechanism	Sextantio's bottom-up social entrepreneurship and Dar Tantora's top-down planning both show that, despite different governance styles, cultural heritage preservation requires joint decision-making that integrates community participation, economic viability, and cultural values (De Vita et al., 2024).
Spain – Coastal Tourism Management	Environmental Protection & Tourism Development	Tripartite Dialogue (Government–Employers–Unions)	Balanced tourism revenues with coastal ecosystem protection through national-level tripartite agreements (UNWTO, 2019).
South Africa – Community-Based Wildlife Tourism	Community-Based Tourism	Multi-stakeholder Dialogue	Empowered local communities to participate directly in tourism planning, ensuring equitable benefit-sharing and stronger social legitimacy (ILO, 2018).

Case Model	Application Area	Dialogue Mechanism	Outcome of Social Dialogue
Germany – Coal Commission (2018)	Energy Transition (Comparable to Tourism's Just Transition)	Tripartite Social Dialogue	Managed the social costs of structural transformation by integrating workers, employers, and government into consensus-building processes, offering lessons for tourism's green transition (OECD, 2021).

These international examples demonstrate that sustainable tourism is not merely an environmental or economic issue, but also a matter of governance, labor policies, local rights, and social justice. Social dialogue builds consensus across these complex domains, ensuring the social legitimacy of green transformation, the fair distribution of benefits, and ultimately its long-term success.

The next section will examine how these universal principles and mechanisms are reflected in Turkey's hospitality sector, analyzing current conditions and presenting concrete policy recommendations based on the 2025 data of the Turkish Hoteliers Association (TÜROB).

2. The Potential of Green Jobs and Social Dialogue in Turkey

Turkey is one of the major players in the global tourism market, particularly with its dense hospitality facilities along the Mediterranean and Aegean coasts. This tourism model is highly seasonal and resource-intensive. Under the pressure of the global climate crisis (drought, rising sea temperatures) and increasing international environmental regulations, the Turkish tourism sector faces an urgent need for a green transition. At the center of this transformation lies not only the physical upgrading of facilities but also the expansion of green jobs and the assurance of a just transition.

2.1. The Need for Green Transformation in Turkey's Tourism Sector

The development of green jobs in Turkey is driven by three main dynamics: **policy and regulation, sectoral transformation, and workforce/skills transformation.** With the acceleration of compliance with

the Paris Agreement, framework documents such as the *National Energy Efficiency Action Plan* and the *Climate Change Adaptation Strategy (2023–2030)* have declared tourism, logistics, and construction as priority sectors for green job potential (Ministry of Environment, Urbanization and Climate Change, 2023).

Due to its dependence on natural resources and high energy consumption, tourism is both the most exposed and the most in need of this transformation. The Sustainable Tourism Program and the adaptation process to GSTC (Global Sustainable Tourism Council) criteria have already created new employment roles in hotels, such as energy managers, sustainability coordinators, and eco-efficiency specialists (GSTC, 2022). This requires a transformation of the skill sets of the existing workforce. However, according to ILO and ETF studies, the lack of an integrated national training framework for green skills is seen as a major factor limiting the speed of workforce adaptation (ETF, 2021; ILO, 2020).

2.2. Social Dialogue Mechanisms and the Justice of the Green Transition

Ensuring that the green transition is socially and economically fair depends on the inclusive implementation of social dialogue. In Turkey, this structure can be evaluated at three levels:

A. Macro Level – Institutional Gaps The Economic and Social Council is Turkey's main platform for social dialogue, yet a specialized mechanism focusing on the green transition has not been institutionalized. Public institutions dominate environmental policy-making, while the direct participation of worker and employer organizations in decision-making remains limited (Tuncer & Öztürk, 2022). This highlights the need for development in terms of stakeholder equality, one of the core principles of a just transition.

B. Sectoral Dialogue and Tourism Potential In tourism, platforms such as the Turkish Tourism Promotion and Development Agency (TGA) and hotel associations have begun to organize sustainability-focused coordination meetings. However, these are not yet structured forms of social dialogue. International examples show that unions and employer organizations in tourism should jointly negotiate how standards such as the Green Star Certification are reflected in the workforce (training, remuneration). While employer organizations have gained influence in the energy sector

(Demir, 2021), increasing union participation in climate policies within tourism could help address job security issues through green employment.

C. Enterprise Level and Inclusiveness Green practices are increasingly integrated into international hotel chains through Sustainability Committees and environmental management systems such as ISO 14001. These committees theoretically provide opportunities for social dialogue (Kara & Ünlüönen, 2020). However, limited participation of employee representatives in decision-making prevents green jobs from being fully supported by decent working conditions. For an inclusive transition, employee participation in enterprise-level decisions must be strengthened.

2.3. SWOT Analysis: Turkey's Green Job Potential

To better analyze Turkey's position in the transition to green jobs, a SWOT (Strengths, Weaknesses, Opportunities, Threats) analysis provides a critical perspective.

Table 2.3.1. SWOT Analysis of Turkey's Green Jobs and Sustainable Transformation

SWOT Category	Key Dynamics
Strengths	Young and adaptable workforce. Large employment capacity in critical sectors such as tourism, energy, and agriculture. Development of green finance (green bonds, carbon market infrastructure).
Weaknesses	Lack of a national framework for green skills. Limited institutional effectiveness of unions in green transition processes. SMEs struggling with the costs of adopting green technologies. Weak representation of workers in social dialogue mechanisms (TÜROB, 2023; TOBB, 2022).
Opportunities	EU Green Deal and Carbon Border Adjustment Mechanism: rapid transformation and compliance with international markets. Increasing support from international financial institutions (UNDP, World Bank) for green employment projects. Global trend toward sustainability certifications in tourism.
Threats	Rising costs of green transformation may disadvantage low-income workers and SMEs. Without just transition mechanisms, sectoral inequalities may deepen (TÜROB, 2024).

Turkey's relationship between green jobs and social dialogue holds significant potential but remains in the process of institutionalization. The tourism sector plays a key role in economic, environmental, and social sustainability. For the green transition to be managed sustainably and inclusively, ensuring a just transition in the sector requires more effective tripartite and quadripartite cooperation mechanisms among unions, employer organizations, and state institutions (ILO, 2015; TÜROB, 2023).

3. Conclusions And Recommendations

3.1. Conclusions

This study has argued that the green transformation of the tourism sector is not merely a technical matter of environmental technologies and certifications, but rather a profound social, economic, and institutional process of societal change. The analyses demonstrate that the durability and legitimacy of sustainable tourism depend strongly on the simultaneous and coordinated functioning of *green jobs* and *inclusive social dialogue* mechanisms.

In the hospitality sector, the goal of becoming "green" (energy efficiency, zero waste, certification) inevitably requires a qualitative transformation of the workforce. This transformation creates new areas of expertise (e.g., sustainability managers, energy auditors) while requiring all existing positions—from housekeeping staff to chefs—to be equipped with green skills. The only way to ensure that this critical transition is fair, smooth, and effective is through the active and equal participation of governments, employer organizations, trade unions, and local community representatives in decision-making processes.

Examples such as Spain's coastal management, Germany's Coal Commission, Canada's Just Transition Task Force, and Saudi Arabia's AlUla initiative demonstrate that social dialogue is not only a tool for consensus but also a governance engine that guarantees the feasibility, sustainability, and social acceptance of policies. In Turkey, despite positive trends indicated by TÜROB 2025 data (43% of facilities eco-certified, 35% of staff employed in sustainability-oriented roles), two major barriers remain: (1) the absence of tourism-specific green occupational standards and a national skills framework, and (2) the limited representation and influence of trade unions and local communities in social dialogue platforms.

Ultimately, the future of tourism depends less on how "green" hotels are physically, and more on the social contract through which this greenness is produced—by whom, for whom, and under what conditions. Green jobs are not the final output of transformation, but the natural result of a fair and inclusive social dialogue process. Therefore, for Turkey and all countries, the urgent priority is to implement *Just Transition and Social Dialogue Action Plans* as detailed and functional as climate action plans. Only then can the tourism sector become a genuine partner in combating the climate crisis, leaving future generations not only clean beaches but also fair, secure, and meaningful jobs.

3.2. Recommendations

To expand green jobs and ensure a just transition in Turkey's hospitality sector, the following policy and sectoral recommendations are proposed:

A. Policy and Legal Framework

1. Establish a National Green Skills Framework: In cooperation with the Ministry of National Education, Vocational Qualifications Authority, and universities, tourism-specific *Green Occupational Standards* should be urgently updated and integrated into curricula.

2. Tax and Financial Incentives: Hotels with Green Star Certification and investments in local supply chains should benefit from carbon tax reductions or easier access to green loans. These incentives should be conditional on employing a green workforce.

B. Social Dialogue Mechanisms

1. Organized Sectoral Dialogue Platform: Under the coordination of the Ministry of Culture and Tourism, a tripartite/quadripartite *Green Tourism Dialogue Council* should be established, including TÜROFED/TGA (employers), tourism unions (workers), and local NGOs/community representatives. This council should negotiate the social dimensions of Green Star standards (training, job quality).

2. Local Governance Models: As seen in Spain, Brașov, and AlUla, public–private–community partnership (PPCP) models should be promoted

in destinations with large facilities. This would ensure joint decision-making with local communities on waste, water, and employment policies.

C. Enterprise and Training Level

1. Strengthen Employee Participation: Sustainability Committees established at the enterprise level must include employee representatives (union or elected representatives) with full authority. This guarantees that green practices improve working conditions.

2. Utilize Just Transition Funds: To ease the green transition costs for SME hotels, reskilling programs should be financed through EU funds and international development banks. Workers participating in these programs must be protected from income loss.

Finally, the *Green Tourism Dialogue Council* should publish periodic progress reports (e.g., growth rate of green employment, representation of women in green jobs, SME transition rates). This monitoring and evaluation dimension would ensure that recommendations are effectively implemented and continuously improved.

REFERENCES

Akış, S. (1999). Sürdürülebilir turizm ve Türkiye. *Anatolia: Turizm Araştırmaları Dergisi, 10*(1), 36–46.

Al-Saed, O., & Al-Tawfiq, S. (2024). Community attachment to AlUla heritage site and tourists' green consumption: The role of support for green tourism development. *Sustainability, 16*(6), 126. https://doi.org/10.3390/su1606126

Arslan, A., Yıldız, E., & Esen, O. (2023). Yerel halkın sürdürülebilir turizm tutumlarının incelenmesi: Kuşadası örneği. *Yaşar Üniversitesi E-Dergisi, 18*(72), 425–448.

Bolwell, D., & Weinz, W. (2008). *Guide for social dialogue in the tourism industry*. International Labour Office.

Bramwell, B., & Lane, B. (1993). Sustainable tourism: An evolving global approach. *Journal of Sustainable Tourism, 1*(1), 1–5. https://doi.org/10.1080/09669589309507796

Bradley, P., Whittard, D., Green, E., Brooks, I., & Hanna, R. (2025). Empirical research on green jobs: A review and reflection with practitioners. *Sustainable Futures, 9*, 100527. https://doi.org/10.1016/j.sftr.2025.100527

Carley, M. (1993). Social dialogue. In *The social dimension: Employment policy in the European Community* (pp. 105–134). Macmillan Education.

Chichilnisky, G. (1997). What is sustainable development? *Land Economics, 73*(4), 467–491. https://doi.org/10.2307/3147241

Consoli, D., Marin, G., Marzucchi, A., & Vona, F. (2016). Do green jobs differ from non-green jobs in terms of skills and human capital? *Research Policy, 45*(5), 1046–1060. https://doi.org/10.1016/j.respol.2016.02.007

Demir, İ. (2021). Türkiye'de yenilenebilir enerji sektöründe sosyal diyalog. *Enerji Politikaları Dergisi, 8*(2), 45–62.

Deschenes, O. (2013). *Green jobs* (IZA Policy Paper No. 62). Institute of Labor Economics.

Di Vita, G., et al. (2024). Public–private partnership for the sustainable development of tourism hospitality: Comparisons between Italy and Saudi Arabia. *Sustainability, 17*(15), 6662. https://doi.org/10.3390/su17156662

European Training Foundation. (2021). *Greening skills and jobs in Turkey.*

Green Lodging News. (2024). Sustainability trends: How global chains are prioritizing green jobs and ESG goals. https://www.hospitality.today/article/green-lodging-trends-report-2024

Grubler, A., Wilson, C., Bento, N., Boza-Kiss, B., Krey, V., McCollum, D. L., Rao, N. D., Riahi, K., Rogelj, J., De Stercke, S., & Cullen, J. (2018). A low energy demand scenario for meeting the 1.5°C target and sustainable development goals without negative emissions technologies. *Nature Energy, 3*(6), 515–527. https://doi.org/10.1038/s41560-018-0172-6

Global Sustainable Tourism Council. (2022). *Global sustainable tourism criteria for hotels and tour operators.*

International Labour Organization. (2012). *Strategic plan: Sustainable tourism and green jobs for Indonesia.* https://www.ilo.org/publications/strategic-plan-sustainable-tourism-and-green-jobs-indonesia-0

International Labour Organization. (2015). *Guidelines for a just transition towards environmentally sustainable economies and societies for all.* International Labour Office.

International Labour Organization. (2017). *Social dialogue in the tourism sector: A tool for sustainable development.* International Labour Office.

International Labour Organization. (2018). *Green jobs: A global perspective on employment and sustainability.* ILO Publications.

International Labour Organization. (2020). *Skills for a greener future: Country report – Turkey.*

International Labour Organization. (2023). *Green jobs: A global perspective on employment and sustainability.* ILO Publications.

International Labour Organization, & United Nations Educational, Scientific and Cultural Organization. (2022). *Skills for a greener future: A global view.* ILO Publications.

International Monetary Fund. (2024). *Green jobs and the future of work for women and men* (Staff Discussion Note No. 2024/003).

International Transport Workers' Federation. (2021). *Sustainable transport, sustainable tourism: A just transition for transport workers* [Policy brief].

Jamal, T. B., & Getz, D. (1995). Collaboration theory and community tourism planning. *Annals of Tourism Research, 22*(1), 186–204. https://doi.org/10.1016/0160-7383(94)00067-3

Kara, M., & Ünlüönen, K. (2020). Otel işletmelerinde sürdürülebilirlik uygulamaları ve çalışan katılımı. *Turizm Araştırmaları Dergisi, 29*(3), 366–390.

Küçük, Ö. (2023). Social policy, sustainable tourism and the World Bank. In *Current debates in social sciences* (Vol. 15). BIDGE Publications.

Küçük, Ö. (2024). Dünya Bankası'nın turizmin sürdürülebilir geleceğine ilişkin bakış açısı ve sosyal refah. *Ankara Üniversitesi Çevrebilimleri Dergisi, 11*(1), 25–46. https://doi.org/10.62163/aucevrebilim.1499461

Mishra, H. G., Pandita, S., Bhat, A. A., Mishra, R. K., & Sharma, S. (2021). Tourism and carbon emissions: A bibliometric review of the last three decades (1990–2021). *Tourism Review, 77*(2), 636–658. https://doi.org/10.1108/TR-07-2021-0310

Nepal, R., Al Irsyad, M. I., & Nepal, S. K. (2019). Tourist arrivals, energy consumption and pollutant emissions in a developing economy: Implications for sustainable tourism. *Tourism Management, 72*, 145–154. https://doi.org/10.1016/j.tourman.2018.11.024

Organisation for Economic Co-operation and Development. (2021). *The future of tourism and the impact of COVID-19*. OECD Publishing.

Organisation for Economic Co-operation and Development. (2023). *The role of social dialogue in the green transition: Ensuring a just transition for all*. OECD Publishing.

Okazaki, E. (2008). A community-based tourism model: Its conception and use. *Journal of Sustainable Tourism, 16*(5), 511–529. https://doi.org/10.1080/09669580802159594

Popescu, C., et al. (2022). Sustainable destination management through partnership models: The case of Braşov County, Romania.

Ruhanen, L., Moyle, C.-L., & Moyle, B. (2019). New directions in sustainable tourism research. *Tourism Review, 74*(2), 138–149. https://doi.org/10.1108/TR-12-2017-0196

Salahuddin, M. (2022). Maqashid al-Shariah, social dialogue, and tourism development in Lombok. *Journal of Environmental Management & Tourism, 13*(8), 2213–2221.

Smismans, S. (2008). The European social dialogue in the shadow of hierarchy. *Journal of Public Policy, 28*(1), 161–180. https://doi.org/10.1017/S0143814X0800082X

Stanef-Puică, M. R., Badea, L., Șerban-Oprescu, G. L., Șerban-Oprescu, A. T., Frâncu, L. G., & Crețu, A. (2022). Green jobs—A literature review. *International Journal of Environmental Research and Public Health, 19*(13), 7998. https://doi.org/10.3390/ijerph19137998

T.C. Çevre, Şehircilik ve İklim Değişikliği Bakanlığı. (2023). *İklim değişikliği uyum stratejisi ve eylem planı 2023–2030*.

Tuncer, G., & Öztürk, M. (2022). Türkiye'de sosyal diyalog yapısının analizi ve dönüşüm imkânları. *Çalışma İlişkileri Dergisi, 10*(1), 112–130.

Türkiye Odalar ve Borsalar Birliği (TOBB). (2022). *AB Yeşil Mutabakatı: İş dünyası için yol haritası*. Ankara: TOBB Yayınları.

Türkiye Otelciler Birliği (TÜROB). (2023). *Türkiye turizminde sürdürülebilirlik yol haritası: 2023–2030*. İstanbul: TÜROB Yayınları.

Türkiye Otelciler Birliği (TÜROB). (2024, 10 Nisan). *CBAM süreci turizm tedarik zincirini yeniden şekillendirecek* [Basın açıklaması]. https://www.turob.org.tr

United Nations World Tourism Organization. (2016). *UNWTO annual report 2016*.

United Nations World Tourism Organization. (2019). *UNWTO guidelines for institutional strengthening of destination management organizations (DMOs): Preparing DMOs for new challenges*.

United Nations World Tourism Organization. (2023). *Green skills for tourism: A new agenda for sustainable tourism*. UNWTO.

United Nations World Tourism Organization. (2024). *Climate action in the tourism sector: Global emissions and mitigation strategies*. UNWTO.

U.S. Congress. (2007). *Green Jobs Act of 2007*, H.R. 2847, 110th Congress. https://www.congress.gov/bill/110th-congress/house-bill/2847

U.S. Congress. (2009). *American Recovery and Reinvestment Act of 2009*, Pub. L. No. 111–5, 111th Congress. https://www.congress.gov/bill/111th-congress/house-bill/1

Varra, L., Buzzigoli, C., & Loro, R. (2012). Innovation in destination management: Social dialogue, knowledge management processes and servant leadership. *Procedia – Social and Behavioral Sciences, 41*, 375–385. https://doi.org/10.1016/j.sbspro.2012.04.045

Weaver, D. (2007). *Sustainable tourism*. Routledge.