iJRASET
International Journal For Research in Applied Science and Engineering Technology

INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Volume: 14 **Issue:** II **Month of publication:** February 2026

DOI: https://doi.org/10.22214/ijraset.2026.77334

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International Journal for Research in Applied Science & Engineering Technology (IJRASET)
ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 7.538
Volume 14 Issue II Feb 2026- Available at www.ijraset.com

Environmental Sustainability: Trends and Challenges

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Abstract: ***Environmental sustainability represents a foundational commitment to ecological stewardship, ensuring that the planet's vital resources remain available for future generations. This paper explores the critical intersection between resource management and socio-economic development, moving beyond traditional "linear consumption" models toward regenerative practices. By evaluating the drivers of environmental degradation—such as industrial resource depletion and climate instability—the study identifies systemic barriers to sustainability, including political inertia and the "information gap" in public literacy. Utilizing a secondary data analysis methodology, the research highlights the necessity of integrating renewable energy, circular economy principles, and ESG (Environmental, Social, and Governance) frameworks into mainstream governance and corporate strategy. The findings suggest that while the transition to a sustainable state involves complex "growth paradoxes" and transition risks, the alignment of technological innovation with ecological limits is the only viable pathway for long-term global stability.***

Keywords: Sustainability, Circular Economy, ESG Frameworks, Renewable Energy, Ecological Resilience, Resource Management.

I. INTRODUCTION – BACKGROUND

This study examines the drivers and consequences of environmental degradation, specifically focusing on the urgent need to mitigate global warming, deforestation, and the thinning of the ozone layer. While the environment is the fundamental provider of human essentials—food, water, and shelter—exponential industrial growth has led to unprecedented resource depletion. This research highlights the necessity of adopting sustainable frameworks, such as regenerative agriculture and green transportation, to reverse current ecological trends.

A. The Critical Need for Sustainability

Beyond mere conservation, environmental sustainability is a prerequisite for human survival. It ensures the stability of the ecosystems that regulate our climate and provide life-sustaining resources. Protecting biodiversity is not just an ethical choice but a functional necessity to maintain the biological cycles that human economies rely upon.

B. Obstacles to Implementation

Achieving a sustainable global state is hindered by several systemic barriers:

1) Political Inertia: Many governing bodies, particularly in emerging economies, prioritize immediate fiscal gains over long-term environmental health due to a lack of policy foresight.
2) Resource Allocation: Transitioning to green infrastructure requires heavy upfront capital and technical expertise, which are often diverted to more traditional sectors.
3) The Information Gap: A lack of public literacy regarding the severity of climate decay slows down the grassroots adoption of sustainable habits.

II. LITERATURE REVIEW: KEY PERSPECTIVES

1) Goni et al. (2015): Conducted an extensive longitudinal analysis of over 29,000 articles, noting that research focus has shifted heavily toward water management and pollution control over the last two decades.
2) K. Ozili (2022): Explored the practical integration of sustainable development into business management, identifying sector-specific hurdles and the benefits of aligning corporate goals with ecological limits.
3) Swain & Wallentin (2015): Utilized structural equation modeling to critique the UN Sustainable Development Goals (SDGs), finding that while developed nations thrive by focusing on social/environmental pillars, developing nations still prioritize economic stability.

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4) Scoones (2016): Investigated the intersection of politics and ecology, arguing that "sustainability" is often a political battleground and that true transformation requires diverse, unpredictable alliances rather than top-down mandates.

III. RESEARCH OBJECTIVES & GAP ANALYSIS

The primary goal of this study is to evaluate the human footprint on the planet and identify scalable strategies for harm reduction.

A. Current Research Gaps Include

1) Granular Data Deficit: A lack of specific data on the localized impacts of certain pollutants.
2) Interdisciplinary Synergy: Insufficient understanding of how economic shifts (like carbon taxes) directly influence social and ecological variables in tandem.
3) The "Transition Risk": Limited study on the unintended consequences of rapid shifts—such as the environmental cost of lithium mining required for a total EV transition.

IV. METHODOLOGY

This study utilizes secondary data analysis. Information was synthesized from peer-reviewed journals, government white papers, internal institutional records, and existing environmental datasets to interpret current trends and provide a comprehensive overview of the sustainability landscape.

A. Core Findings

1) The Climate Reality: The frequency of "extreme weather events"—floods, wildfires, and intensified storms—serves as a tangible indicator that the planet's thresholds are being breached.
2) Planetary Boundaries: The concept of "Planetary Boundaries" (introduced in 2009) highlights that human economic activity is currently operating outside of safe ecological limits.
3) The Growth Paradox: We face a delicate balancing act. Over-regulation can stifle the technology needed for the transition, while under-regulation leads to total resource collapse.

B. Strategic Suggestions & Future Scope

1) Operational Efficiency: Businesses that adopt green practices often see a reduction in overhead through energy-saving tech (e.g., smart sensors and high-efficiency insulation).
2) Human Capital & Investment: Modern talent—particularly Gen Z and Millennials—prefers employers with strong ESG (Environmental, Social, and Governance) scores. Similarly, investors are increasingly screening for "carbon footprints" before committing capital.
3) Circular Waste Management: Moving toward "Zero-Waste" operations is no longer a niche trend but a core business strategy that enhances brand reputation and reduces waste-disposal costs.

V. CONCLUSION

The pursuit of environmental sustainability is no longer an elective ethical choice but a mandatory prerequisite for global survival. This research underscores that the escalating frequency of extreme weather events and the breaching of planetary boundaries serve as urgent signals for a systemic shift in how humanity interacts with the biosphere. While significant obstacles remain—most notably the tension between immediate fiscal growth and long-term ecological health—the transition toward green infrastructure and zero-waste operations offers a path toward "decoupled" growth where economic success does not necessitate environmental destruction. Ultimately, bridging the "Information Gap" and fostering interdisciplinary synergy between policy-makers and the private sector is essential. As this study has demonstrated, the cost of systemic inaction far outweighs the upfront capital required for a green transition. True progress will be defined by our ability to harmonize industrial demand with the natural limits of the Earth, ensuring a resilient and equitable future for all.

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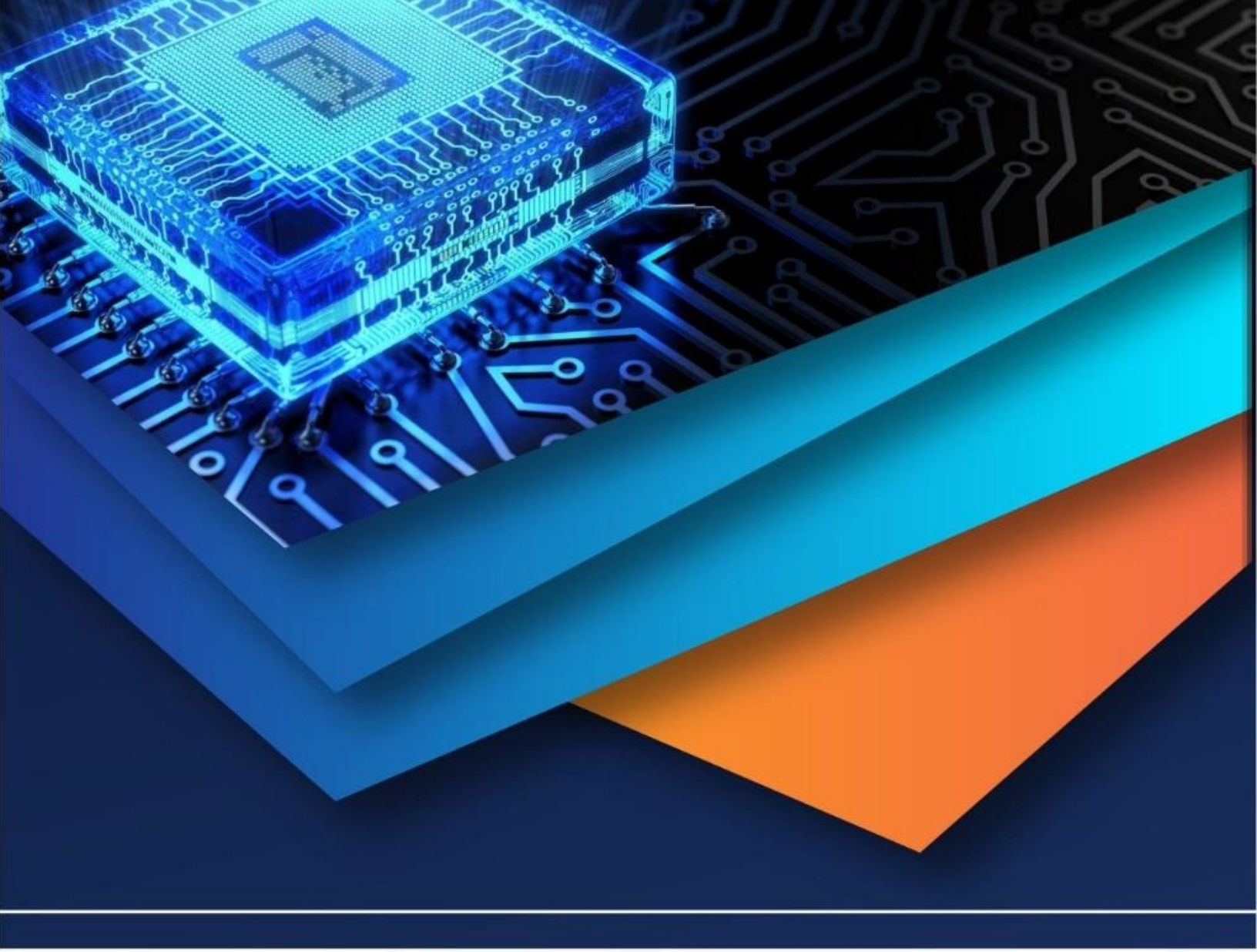

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