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FOREWORD

I am pleased to present this Special Issue of the Journal of Centre for Environmental Law, devoted to the theme "Climate Change and Law." At a time when climate change poses complex legal, economic, and governance challenges across jurisdictions, this Special Issue seeks to critically engage with the evolving role of law in addressing climate-related concerns.

The Journal, through this and its forthcoming issues, aims to provide a platform for rigorous and interdisciplinary scholarship, bringing together diverse perspectives from across legal theory, policy, and practice. The response to the call for papers was both encouraging and intellectually enriching. We received an overwhelming number of insightful and cross-sectoral submissions from scholars and practitioners, reflecting the growing urgency and relevance of climate change within legal discourse.

I extend my sincere gratitude to all the authors for their valuable contributions, as well as to the experts, the in-house editorial team, and the student editors for their dedication, meticulous review, and sustained efforts in bringing this Special Issue to fruition. Their commitment has been instrumental in ensuring the academic quality and coherence of this Volume.

It is our hope that this Special Issue, along with subsequent editions of the Journal, will make a meaningful contribution to the expanding body of literature on climate change and environmental law. We trust that the scholarship presented herein will offer useful insights to researchers, policymakers, practitioners, and all those engaged in understanding and responding to the legal dimensions of climate change.

Prof. (Dr.) Madhuri Parikh
Patron-in-Chief
Director & Dean
Institute of Law, Nirma University

TABLE OF CONTENTS

FROM GLOBAL PLEDGES TO LOCAL ACTIONS: INDIA'S ENGAGEMENT WITH THE PARIS AGREEMENT

Devanshi Bang[*]

Arpit Gupta[**]

ABSTRACT

India has shown a strong commitment to the Paris Agreement by integrating its national policies with international climate goals, making it a significant role in global climate governance. Reducing emissions intensity, raising the proportion of energy derived from non-fossil fuels, and improving carbon sinks are the main goals of the nation's Nationally Determined Contributions. With programs like the International Solar Alliance, State Action Plans on Climate Change, and the National Action Plan on Climate Change, India has made great strides at sustainable development. India still confronts obstacles like its heavy reliance on coal, its limited financial resources, and the requirement for technological transfer in spite of these efforts. Governmental organizations, the commercial sector, and civil society organizations must all be involved in the shift from international commitments to local implementation. Achieving India's climate goals will require bolstering capacity-building initiatives, policy coherence, and climate financing. This essay analyses India's transition from international pledges to local implementation, assessing important policies, advancements, and challenges in the Paris Agreement's implementation. It emphasizes how crucial it is to combine socioeconomic development and climate action in order to ensure a fair and inclusive transition. In ultimately, India's strategy is a template for striking a balance between environmental responsibility and economic growth in the context of emerging countries.

Keywords*: Paris Agreement, Nationally Determined Contributions, Climate Policy, India, Sustainable Development, Renewable Energy.*

I. INTRODUCTION

An unprecedented global issue, climate change poses threats to human health, ecosystems, and the world economy. Climate change is an unprecedented global challenge that threatens ecosystems, human health, and the global economy. With the goal of limiting the increase in

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global temperatures to far below 2°C, and ideally below 1.5°C, over pre-industrial levels, the 2015 Paris Agreement is regarded as an important contribution to mass climate action. A growing consensus that climate change mitigation calls for transparent policies, coordinated actions, and flexible frameworks that take into consideration different national capacities is reflected in the Agreement. The Paris Agreement's inclusive form sets it apart from earlier agreements like the Kyoto Protocol. By encouraging shared responsibility while taking equality and differentiated obligations into account, it requests that each participating nation establish its Nationally Determined Contributions in accordance with its economic capabilities and degree of development. This strategy promotes cooperation and encourages all countries, irrespective of their economic standing, to make significant contributions towards the global climate objectives. India, one of the world's biggest emitters of greenhouse gases and a fast-rising country, is crucial to the fight against climate change. In line with the idea of sustainable development, India has committed to lowering the GDP's emissions intensity, boosting the usage of renewable energy sources, and improving carbon sinks by expanding the amount of forest and tree cover. A long-standing philosophy of environmental care, expressed in both national laws and cultural norms, serves as the foundation for India's policies. In addition to demonstrating greater ambition, the revised NDCs also show a commitment to incorporating climate factors into sustainable development plans. The article explores legislative, policy, and judicial developments that support India's climate ambitions in order to assess the country's progress toward fulfilling its climate commitments under the Paris Agreement. India's climate action framework exemplifies a balanced approach to economic growth and environmental sustainability, from recent changes to energy conservation regulations to court rulings by the Supreme Court and National Green Tribunal (NGT) intended to improve environmental protections. This study examines the success of the Paris Agreement in relation to India's climate initiatives and the contribution of domestic efforts to the advancement of global climate resilience.

II. OVERVIEW OF THE PARIS AGREEMENT

With the historic 2015 Paris Agreement[1], a comprehensive framework for global climate action is formed. Actions to cut greenhouse gas emissions, get ready for the effects of climate change, and promote transparency in reporting and goal-setting are all outlined in the 32-page Agreement. The Paris Agreement, which was nearly unanimously approved by 186 countries

[1] UNFCCC, 'Adoption of the Paris Agreement', 12 December 2015, FCCC/CP/2015/ L.9/ Rev/1.

that produce over 90% of the world's emissions, is a unique multinational commitment to preventing the worst effects of climate change. In terms of its ability to address the pressing threat posed by the issue of climate change, the Paris Agreement is without a doubt a progressive instrument. In order to achieve the goals specified in the UNFCCC, the Agreement is governed by the concepts of equality and common but differentiated responsibilities and respective capacities (CBDR-RC). One of the primary goals of the Paris Agreement is to keep the rise in global temperatures well below 2°C over pre-industrial levels while striving for a 1.5°C limit. The goal's final section, which calls for attempts to keep temperature increases below 1.5°C, demonstrates how seriously the issue is being taken by the international community and demonstrates how genuine the concern is. Countries must aim toward net-zero greenhouse gas emissions in the second part of this century and reach peak emissions as soon as feasible in order to meet this target. This goal is in line with the 2018 IPCC Special Report, which emphasizes the serious dangers of a temperature increase of more than 1.5°C, including a rise in poverty, harsh weather, biodiversity loss, and several ecological and economic difficulties. The Paris Agreement established Nationally Determined Contributions (NDCs), which are customized goals that nations set for themselves according to their economic capabilities and developmental stages, in order to support these ambitious objectives.[2] Every signatory nation submits an NDC outlining precise emission reduction targets and climate resilience initiatives when they join the Agreement. These NDCs are reviewed and updated every five years. This framework allows for a range of approaches, with nations such as China promising to achieve peak emissions by 2030 and India focusing on reducing emissions intensity and expanding the use of renewable energy sources. The Agreement places certain duties on a particular group of countries, even while it permits freedom in defining specific aims. For example, wealthier nations should continue to set the standard by implementing absolute emission reduction targets, while developing nations should continue to improve their mitigation efforts and strive for economy-wide reduction objectives.[3] Additionally, the Paris Agreement creates procedures to guarantee accountability and openness. Progress toward their NDCs must be tracked, confirmed, and made public by nations. This reporting is guided by a standardized transparency framework, with assistance given to countries who lack the infrastructure necessary for effective monitoring systems. Every five years, a worldwide ‘stocktake’ is planned to evaluate accomplishments made collectively, motivating nations to

[2] ibid, art. 3.
[3] ibid, art. 4.

improve their contributions over time and cultivating an accountability culture. The Agreement recognizes the disproportionate impact of climate change on poor nations and emphasizes the importance of climate finance and resource mobilization to help them meet reduction and adaptation commitments. In keeping with earlier pledges such as the $100 billion yearly goal established by the 2009 Copenhagen Accord, developed countries and others 'in a position to do so' are encouraged to provide financial support for initiatives in less-resourced states.[4] The Paris Agreement, in turn, calls for an even higher financial commitment by 2025.

Kyoto Protocol vs. The Paris Agreement

Although addressing global climate change is the goal of both the Paris Agreement and the Kyoto Protocol, there are some significant differences between them. Adopted in 1997, the Kyoto Protocol placed legally enforceable, top-down emissions reduction targets on industrialized countries only, with sanctions for noncompliance.[5] The Paris Agreement, on the other hand, takes a more inclusive stance and mandates that all nations, regardless of economic standing, contribute to the reduction of emissions. In order to take into consideration, the diversity of its members, the Paris Agreement allows each nation to set its own emissions targets, known as Nationally Determined Contributions (NDCs), which are customized to each country's technological capacity and developmental stage.[6] Enforcement is another significant distinction. In contrast to the strict sanctions of the Kyoto Protocol, the Paris Agreement includes a more adaptable and open accountability framework. The Agreement imposes strict monitoring and reporting requirements, but it does not impose any sanctions on nations that do not fulfil their targets. Every five years, countries are supposed to review and reinforce their goals, establishing a systematic, iterative process meant to gradually advance the Agreement's main goals. This five-year review process is different from the Kyoto Protocol, which established objectives without a specific timetable for revaluation, making it less flexible in response to changing economic and scientific advancements.

Importance of Paris Agreement

Beyond only policy, the Paris Agreement is significant because it demonstrates a worldwide agreement to acknowledge human-caused climate change and our shared obligation to lessen

[4] ibid, art. 9.
[5] UNFCCC, 'Kyoto Protocol', 11 December 1997, 2303 UNTS 162, art. 3.
[6] Rhea Suh, 'NRDC President: Climate Change has Met its Match in the will of a United World' (*Natural Resources Defence Council*, 12 December 2015) <https://www.nrdc.org/press-releases/nrdc-president-climate-change-has-met-its-match-will-united-world> accessed 09 March 2025.

its effects. The Paris Agreement is a crucial step toward concerted worldwide action to address the most urgent concerns posed by climate change, with a framework that is adaptable and dynamic enough to accommodate different state capacities and objectives. By setting a long-term temperature target to keep global warming far below 2°C and working toward bringing it down to 1.5°C, the negative effects of climate change can be mitigated. The Paris Agreement, in contrast to earlier climate agreements, takes a bottom-up strategy, letting countries choose their Nationally Determined Contributions while maintaining responsibility and openness through frequent stocktakes. This adaptability promotes worldwide collaboration in fields including climate finance, adaptation, and technology transfer while encouraging widespread participation, including from developing countries. It also acknowledges the diverse capacity of nations in tackling climate change and places emphasis on equity and differentiated responsibilities. By incorporating non-state actors like corporations and local governments into climate action, the Agreement also improves climate governance. Despite its drawbacks, which include uncertain pledges on climate finance and the lack of legally binding emission reduction targets, the Paris Agreement remains the most comprehensive and ambitious global climate framework, encouraging sustainable development and global cooperation in the fight against climate change.

III. INDIA'S PROGRESS TOWARDS MITIGATING CLIMATE CHANGE

The UNFCCC and the Paris Agreement did not inspire India to take action to combat climate change. This nation's long-standing traditions and practices have made it natural for people to respect and value nature for everything it has to offer, as well as to grow and prosper alongside it. To begin with, the Constitution of India sets out a mandate for the state "*to protect and improve the environment and to safeguard the forests and wildlife of the country*" as part of the Directive Principles of State Policy.[7] The Constitution also states that "*it shall be the fundamental duty of each and every citizen of the country to protect and improve the environment*".[8] Therefore, India set a voluntary goal to reduce the emission intensity of its GDP by 20–25% above 2005 levels by 2020, even though the Convention does not impose any legally obligatory mitigation requirements on it.[9] From 2005 to 2010, the government was able to lower its GDP's emission intensity by 12% using a variety of administrative, regulatory, and policy actions. Given this, India is one of the nations that is doing a great job of fulfilling its

[7] The Constitution of India 1950, art. 48A.
[8] Ibid, art. 51A(g).
[9] Government of India, 'India's Intended Nationally Determined Contribution: Working Towards Climate Justice', August 2022.

voluntary climate change mitigation targets, according to the United Nations Environment Programme (UNEP) in its 2014 Emission Gap Report.[10] The foundation of India's robust commitments and initiatives towards climate change adaptation and mitigation on a global scale has been its well-crafted climate policy.

Climate Relevant Legislations in India

To turn international commitments into local action, a number of countries have established legal frameworks to encourage climate action by all parties involved, including the government and the private sector, both practically and financially. 53% of world emissions were covered by the 56 nations that had passed legislation limiting greenhouse gas emissions as a direct goal as of 2022.[11] Five climate laws and eighteen legislative and executive initiatives are included in the LSE database on climate legislation in India.[12]

Legislation	Preamble	Climate Relevance
The Air (Prevention and Control of Pollution) Act, 1981	The act offers a comprehensive strategy for addressing air pollution-related environmental issues.	It establishes emission regulations, although they only cover carbon monoxide (CO) and not carbon dioxide (CO2) or any other greenhouse gas emissions.
The Environment (Protection) Act, 1986	The act establishes guidelines for preventing pollution and safeguarding the environment.	There is no explicit mention of emission reduction in the Act. However, the Act can be interpreted to encompass

[10] UNEP, 'Emission Gap Report', 26 November 2014, DEW/1833/NA, 45.
[11]Anirudh Sridhar, Alina, Olivia Rumble, Navroz Dubash, Catherine Higham, Andrew Gilder, 'Climate Governance functions: Towards context-specific climate laws' (*UK Grantham Institute*, October 2022) <https://www.lse.ac.uk/granthaminstitute/wp-content/uploads/2022/10/Climate-Governance-Functions_17_Nov_22.pdf> accessed 10 March 2025.
[12] Valeriy A. Yakovlev & Gavril A Belyaev, 'Global climate change, its consequences and ways to solve the problem' (2023) 8 E3S WEB OF CONFERENCES 390, 4.

		emissions within the definition of 'pollutants'
Electricity (Amendment) Act, 2023	The act lays down the laws relating to the generation, transmission, distribution, trading, and use of electricity.	It lays special emphasis on the promotion of renewable sources of energy.
The Energy Conservation (Amendment) Act, 2022	The Act promotes energy efficiency and sustainable energy practices. It also established the Bureau of Energy Efficiency (BEE).	The Amendment to the Act in December 2022 included the Carbon Credit Trading Scheme. Based on this, the rules for an Indian Carbon Market were notified in May 2023.

In addition to the aforementioned laws, India has demonstrated a strong commitment to climate action by introducing plans and policies like "the State Action Plan for Climate Change (SAPCC), the National Action Plan for Climate Change (NAPCC), and India's Long-Term Low-Carbon Development Strategy (LT-LEDS)."

India's Updated NDCs

In accordance with the UNFCCC's embedded concepts of equity, CBDR, and respective capacities, India's NDC seeks to create an efficient, collaborative, and just global infrastructure founded on climate justice.[13] The final wording of the Paris Agreement included the two recommendations India made during the Paris COP 21 negotiations: the idea of climate justice and the necessity of encouraging environmentally friendly and environmentally friendly methods of production and consumption among people.[14] Before this, India submitted its "Intended Nationally Determined Contribution to the UNFCCC on October 2, 2015." Three of the eight goals in the 2015 NDC have numerical targets through 2030: reducing GDP emissions intensity by 33 to 35 percent relative to 2005 levels; increasing installed capacity from non-

[13] Ajmal Khan, 'Climate Justice in India' (2023) 32 TAYLOR AND FRANCIS ONLINE 1106-1108, 1107.
[14]Global Forum on sustainable energy, 'Implications of the Paris Climate Agreement', June 2016, 8.

fossil sources to 40 percent; and creating an additional carbon sink of 2.5 to 3 billion tonnes of CO2 equivalent through increased tree and forest cover.

In accordance with the updated NDC, India has now pledged to reduce emissions as a percentage of GDP by 45% by 2030 compared to 2005 levels and to get about 50% of the electrical capacity it has established from non-fossil fuel-based energy sources by the same year.[15] The updated NDC reads "*To put forward and further propagate a healthy and sustainable way of living based on traditions and values of conservation and moderation, including through a mass movement for 'LIFE'– 'Lifestyle for Environment' as a key to combating climate change*." India's highest-level commitment to detaching its economic development from greenhouse gas emissions is demonstrated by the decision on reinforced NDCs. When creating India's updated NDC, the idea of shared but distinct responsibilities and respective capacities, as well as our unique circumstances, were carefully taken into account. Additionally, India's amended NDC reinforces its commitment to pursuing sustainable development goals while working toward a low carbon emission pathway.[16]

At the UNFCCC's COP26 in Glasgow, UK, the Hon'ble Prime Minister of India proposed a 'One-Word Movement' to the international community, acknowledging that lifestyle has a major impact on climate change. This one word is LIFE, or lifestyle for the environment. Living a life that respects and does not harm the environment is the aim of LIFE. This citizen-centric strategy for addressing climate change is also reflected in India's updated NDC. India's shift to greener energy between 2021 and 2030 is also based on the amended NDC.[17] Along with many other government programs, such as tax exemptions and incentives like "the Production Linked Incentive scheme for the promotion of manufacturing and the use of renewable energy, the updated framework will offer a chance to boost exports and expand India's industrial capabilities. Because of the production of low-emission goods like electric automobiles and ultra-efficient appliances, as well as cutting-edge technology like green hydrogen, green jobs will typically rise in industries like renewable energy and clean energy, including the automotive sector. India's modified NDC will be implemented between 2021 and 2030 with the support of States and Union Territories, as well as through the plans and initiatives of

[15] Ministry of New and Renewable Energy, 'Non-fossil fuel sources account for nearly 44 per cent of India's total installed electricity generation capacity', 06 December 2023.
[16] Kaushik Deb & Pranati Cheshta Kohli, 'Assessing India's Ambitious Climate Commitments' (*Centre on Global Energy Policy*, 08 December 2022) <https://www.energypolicy.columbia.edu/publications/assessing-india-s-ambitious-climate-commitments> accessed 11 March 2025.
[17] Kashif Abbass & Muhammad Zeeshan Qasim, 'A review of the global climate change impacts, adaptation, and sustainable mitigation measures' (2022) 29 ENVIRONMENTAL SCIENCE AND POLLUTION RESEARCH 42539-42559, 42549.

relevant Ministries and departments. The government has launched several initiatives to support India's adaptation and mitigation efforts. In a number of areas, 'including waste management, the circular economy, resource efficiency, water, agriculture, forests, energy and enterprise, and sustainable mobility and housing," the right things are being done under these plans and programs.[18]

As a result of the aforementioned initiatives, India has steadily proceeded to disentangle economic growth from greenhouse gas emissions. Emissions will be reduced by 60 million tons per year if Indian Railways meets its Net Zero target by 2030. Similarly, India is cutting emissions by 40 million tonnes a year thanks to its enormous LED bulb program. Until date, most of India's funding for its climate initiatives has come from domestic sources. However, one of the developed nations' obligations under the UNFCCC and the Paris Agreement is to provide new and additional financial resources as well as technological transfer to confront the global climate change calamity. A considerable portion of these international financial and technological resources would also be required by India. Under the NDC, India is not subject to any sector-specific mitigation duties or initiatives. India intends to safeguard its most vulnerable social and economic sectors while gradually increasing energy efficiency and lowering its overall emission intensity.

IV. JUDICIAL DEVELOPMENTS SUPPORTING CLIMATE CHANGE GOALS

Under the National Green Tribunal Act of 2010, the Indian government formed the National Green Tribunal to resolve environmental issues.[19] The NGT has sole jurisdiction over all civil cases involving substantial questions arising from "the implementation of *The Water (Prevention and Control of Pollution) Act, 1974*[20], *The Air (Prevention and Control of Pollution) Act, 1981*[21], *The Indian Forest Act, 1927,*[22] *The Environment (Protection) Act, 1986*[23], *The Biological Diversity Act, 2002*[24] *and Public Liability Insurance Act, 1991*[25]." In addition, the Act provides that the NGT shall apply principles of sustainable development, the precautionary principle, and the polluter pays principle.[26] The Environment Protection Act of

[18] Martin Beniston, 'Climate change and its impacts: growing stress factors for human societies' 92 INTERNATIONAL REVIEW OF THE RED CROSS 879, 560.
[19] National Green Tribunal Act 2010, s. 4.
[20] The Water (Prevention and Control of Pollution) Act 1974, s. 5.
[21] The Air (Prevention and Control of Pollution) Act 1981.
[22] The Indian Forest Act 1927.
[23] The Environment (Protection) Act 1986.
[24] The Biological Diversity Act 2002.
[25] Public Liability Insurance Act 1991.
[26] supra note 20, s.10.

1986 in India is the source of many of the issues before the NGT. Under this Act, project proponents who need to evaluate the environmental impact of their initiatives must notify the public through an Environmental Impact Assessment (EIA). Before the project can start, the MoEFCC must approve the EIA and decide what mitigation measures are required. However, the broader issues surrounding the combined environmental effects of several separate projects are not addressed by individual EIAs. More recently, the NGT has intervened by giving individual project EIAs more attention.

For example, in *Parya varan San Rakshan Sangharsh Samiti, Lippa v. Union of India and Others*[27], the NGT gave careful consideration to the local villagers' appeal against the government's approval of the diversion of 17.7 hectares of forest land for the construction of a 130 MW hydropower facility. There are around 200 hydropower projects under construction in the region. The NGT questioned whether the EIA study considered the cumulative impact assessment of existing hydroelectric facilities in the same region, plants now under construction, and prospective hydroelectric projects. The Scheduled Tribes and Other Forest Dwellers (Recognition of Forest Rights) Act of 2006 mandated that the government submit the entire plan to the affected villages' legislative bodies.

The village governments were instructed to work with the project proponent to negotiate ways to mitigate the negative effects of the project. The coal mining industry has a reputation for obtaining "rubber-stamp" licenses for new projects, as evidenced by the record number of clearances granted by the MoEFCC in the last five years. A federal policy decision to suddenly stop coal mining, the nation's second-largest business after railroads, would affect the livelihoods of many Indians. However, the nation's traditional compliance with the coal business has changed to a more ecologically friendly one in recent years, as seen by the NGT's revocation of permissions for certain projects.

For instance, in 2012, protests brought attention to the ecological vulnerability of the Kutch region of western India, prompting the NGT to postpone the development of a coal-fired thermal energy plant. The NGT halted the construction of a second coal-fired power plant that was supposed to be built in Chhattisgarh's Hasdeo Arand forest later in 2012. After its own Forest Advisory Committee recommended that the land be declared a "no-go" zone because of its forest cover, the MoEFCC first approved the project. Overturning the MoEFCC's authorization, the NGT instructed it to seek a fresh assessment from the Forest Advisory

[27] Parya varan San Rakshan Sangharsh Samiti, Lippa v. Union of India and Others 2013 SCC OnLine NGT 2111.

Committee on all pertinent aspects.[28] In *Sunil Dahiya v. Union of India*[29], according to the NGT, a thermal power plant cannot receive environmental clearance from the MoEFCC until it implements all feasible methods or strategies to satisfy the most recent emissions and water usage regulations. Additionally, the MoEF's request for an extension of the deadline for putting these laws into effect was turned down by the NGT.[30]

Indian courts are also being requested to examine the government's reaction to climate change, following the same pattern as several other nations. In *Ridhima Pandey v. Union of India*[31], Nine-year-old Ridhima Pandey brought a petition against India's National Green Tribunal over climate change, claiming that more robust climate action is necessary due to India's environmental policies, its commitments under the Paris Agreement, and the Public Trust Doctrine. According to the Environment (Protection) Act of 1986, she asserted that climate is an essential part of the environment and that the intergenerational equality principle must be applied to protect her right to a healthy environment as well as the rights of future generations. Using examples from the US, Pakistan, and the Netherlands, she argued that children are disproportionately affected by the effects of climate change, including heat waves, displacement, and malnutrition. The petition demanded measures including "creating a national carbon budget, a national emissions inventory, and environmental impact assessments" that consider climate change, given that India is the third-largest producer of greenhouse gases in the world. However, the NGT dismissed the complaint on January 15, 2019, claiming that India's policies reflect the Paris Agreement and other international climate obligations in its environmental clearances and that climate change is already taken into account in impact assessments under the Environment Protection Act.[32]

Recent rulings by the Indian Supreme Court have favoured stricter environmental regulations and a decrease in greenhouse gas emissions nationwide, especially in the country's most impacted cities. For instance, in *M.C. Mehta v. Union of India*[33], in order to lower vehicle emissions in the highly polluted metropolis, when commercial diesel vehicles were registered outside of Delhi, the court imposed an Environment Compensation Charge. This fee is imposed at the boundaries of Delhi and serves as an entry tax. In the past, the Supreme Court

[28] Sudiep Shrivastava v. Union of India 2021 SCC OnLine NGT 2566.
[29] Deforestation for Mining Resumes in Hasdeo, Locals, Activists Allege Detention in Re 2024 SCC OnLine NGT 729.
[30] Sunil Dahiya v. Union of India 2019 SCC OnLine Del 11300.
[31] Ridhima Pandey v. Union of India 2017 SCC OnLine NGT 187.
[32] Aaditi Anand Sinha, 'Holding the state accountable' (*Vidhi Centre for Legal Policy*, 11 November 2024) <https://vidhilegalpolicy.in/blog/holding-the-state-accountable/> accessed 11 March 2025.
[33] M.C. Mehta v. Union of India (2020) 7 SCC 530.

affirmed the National Green Tribunal's ruling to prohibit gasoline and diesel vehicles in the Delhi area that were older than 15 and 10 years, respectively. In the case of *Association of Radio Taxis v. Union of India*[34], within Delhi, diesel cabs are prohibited by the Delhi High Court. According to the court, development and progress must follow the sustainable development philosophy. In *Gauri Grover v. NCT of Delhi and Others*[35], the Delhi High Court mandated that the city's municipal corporations respond swiftly to address the significant solid waste management issue, which has caused serious health problems for the local populace. Every year, the number of dengue, malaria, and chikungunya cases rises as a result of poor solid waste management in landfills. Enhancing waste collection and disposal would also reduce greenhouse gas emissions from waste decomposition, which is a significant source of methane, a powerful GHG.

Legal Issues Related to The Paris Agreement

A number of significant issues about the Paris Agreement's implementation, compliance, and enforcement are raised by its legal framework. Although the Agreement's fundamental pledges, known as Nationally Determined Contributions (NDCs), are legally binding under international law, this gives countries latitude in determining their emission reduction goals. However, signatories are subject to binding duties due to procedural obligations including transparency, reporting, and review systems. In order to assure adherence, the compliance system uses reputational incentives and peer pressure rather than harsh penalties.[36] The interaction between dwelling legal systems and international commitments is another important legal topic. For many nations to successfully execute their NDCs, national laws or presidential decrees must be passed. This calls into question enforcement and accountability, especially in countries where local law does not always follow international agreements. Furthermore, although the Agreement permits parties to update their NDCs, there is no legal requirement to increase ambition, which might cause international climate efforts to stall. There are legal issues with the Article 28 withdrawal procedure as well. The United States' temporary departure under the Trump administration is one example of how countries might disrupt global climate efforts by leaving the Agreement three years after it enters into force with a one-year notice period.[37] The scenario is further complicated by the legal ramifications of rejoining the

[34] Association of Radio Taxis v. Union of India 2015 SCC OnLine Del 12874.
[35] Gauri Grover v. Government of NCT of Delhi 2016 SCC OnLine Del 6894.
[36] Centre for Climate and Energy Solutions, 'Legal issues related to the Paris Agreement', May 2017.
[37] Marta Torre, Analysing the legal scope of the Paris Agreement and related commitments (*IDDRI*, 24 November 2020) <https://www.iddri.org/en/publications-and-events/billet-de-blog/analysing-legal-scope-paris-agreement-and-related> accessed 12 March 2025.

Agreement and the status of previously submitted NDCs. Additionally, the Agreement creates a shared financial obligation for wealthier countries in particular to assist underdeveloped countries with adaptation and mitigation initiatives. Climate finance is uncertain, though, because financial pledges are still optional. The predictability and sufficiency of funding for vulnerable countries are impacted by the ongoing dispute about the legal enforceability of climate finance obligations. These legal nuances show how international climate governance is changing and underline the necessity of more effective accountability systems, transparent legal requirements, and improved collaboration to guarantee the success of the Paris Agreement.[38]

Is Paris Agreement Effective?

There is ongoing discussion on the Paris Agreement's efficacy, weighing its benefits against its inherent drawbacks. Rather than using a top-down, enforcement-based strategy, it takes a management, bottom-up approach, which is a major change in global climate governance.[39] This strategy does not rely on legally binding carbon reduction objectives, but rather on transparency, norm-building, and volunteer ambition. This flexibility guarantees broad participation, but it also begs the question of whether it can produce enough action to fulfil the long-term climate goals.[40] The Agreement's long-term goal, improved transparency procedures, and the five-year Global Stocktake cycles—which call for countries to submit increasingly ambitious Nationally Determined Contributions are some of its main advantages. Although the Agreement does not specifically commit to ending fossil fuel subsidies or establishing a precise decarbonization timeline, it does lay the groundwork for the phase-out of fossil fuels through its greenhouse gas neutrality target. Furthermore, when political circumstances permit, Article 4.11 permits nations to revise their NDCs at any time, creating chances for more robust commitments.[41]

Nevertheless, the Agreement incorporates a number of restrictions that could reduce its efficacy. It is unclear how equity considerations, human rights, intergenerational justice, and climate justice will actually be included into climate policies because they are only referenced in the preamble. Closing the ambition gap is made more difficult by the inability to agree on a

[38] Christina Voigt, 'The power of the Paris Agreement in international climate litigation' 32 RECIEL 237-249, 243.
[39] Gunningham, 'Environment Law, Regulation and Governance: shifting architectures' (2009) 21 JEL 179-212, 184-188.
[40] Meinhard Doelle, 'The Paris Agreement: Historic Breakthrough or High Stakes experiment?' (2016) SLS 8-11.
[41] ibid 34, art. 4.

year with peak emissions and a clear decarbonization schedule. Furthermore, the Agreement excludes emissions from international shipping and aviation, which are still increasing and present a serious obstacle to the achievement of global climate targets.[42] The fundamental Agreement's exclusion of liability and damages and loss compensation is a serious concern. The final ruling only acknowledges the problem without providing a clear legal framework for addressing loss and harm brought on by climate change, despite the fact that developing countries lobbied for tougher commitments. Similar to this, the climate financing provisions are inadequate because wealthy countries are expected to support developing nations financially, but they are not required by law to do so. This raises questions about whether sufficient funds will be available for mitigation and adaptation initiatives.[43]

The Agreement's treatment of distinctiveness is another important modification. In view of diverse national situations, the UNFCCC eliminated the traditional division between developed and developing countries in favour of self-differentiation based on Respective Capabilities and Common but Differentiated Responsibilities. Although this adaptable strategy made agreement easier, it raises questions about whether developing countries will get enough assistance to fulfil their obligations. The Paris Agreement continues to be a ground-breaking accomplishment in global climate governance in spite of these obstacles.[44] Over time, it fosters progressive ambition, guarantees ongoing state engagement, and offers a framework for accountability and transparency. But in the end, its success hinges on countries' will to fortify their pledges and work together on crucial matters like finance, emissions trading, and compliance. The Agreement's capacity to spur significant climate action is still in doubt in the absence of a more robust top-down enforcement mechanism.

V. CONCLUSION

The Paris Agreement is a major turning point in the global fight against climate change because it encourages a collaborative international plan to cut greenhouse gas emissions and get ready for its repercussions. India's journey to meeting its commitments under the Paris Agreement has been marked by significant progress, challenges, and a shifting legal and regulatory framework intended to achieve a balance between environmental sustainability and economic growth, as this study has demonstrated. India is dedicated to addressing climate change, as seen

[42] Jennifer Allan, 'Summary of the Paris Climate Change Conference: 29 November – 13 December 2015' (2016) 12 ENB 663, 10-11.
[43] Richard Stewart, 'Climate Finance regulatory and funding strategies for Climate Change and Global development' (*NYU Press*, 2009) <http://www.jstor.org/stable/j.ctt9qg9zb> accessed 13 March 2025.
[44] Andrew Guzman, 'A Compliance based theory of International Law' (2002) 90 CLR 1823.

by its attempts to fulfil its Nationally Determined Contributions, despite being a developing nation with pressing socioeconomic problems. India's proactive approach to environmental preservation and climate resilience is exemplified by its numerous legislative frameworks, constitutional mandates, and programs like the National Action Plan on Climate Change. The nation's dedication to coordinating its development objectives with international climate goals is demonstrated by the updated NDCs, which include aggressive targets for lowering emission intensity and boosting the capacity of renewable energy. Additionally, the Indian judiciary has become a vital force in upholding environmental laws and encouraging sustainable activities. The significance of environmental preservation and the need to include climate factors into developmental programs have been emphasized by landmark rulings by the Supreme Court and the National Green Tribunal. The proactive approach taken by the legal system presents a viable way to address environmental issues and hold stakeholders responsible, which will increase the efficacy of the nation's climate action. Nevertheless, difficulties still exist in spite of these encouraging developments. Achieving climate targets is made more difficult by the differences in developed and developing countries' resource allocation, infrastructure, and technology development. Furthermore, the persistent repercussions of climate change, particularly on vulnerable individuals, necessitate a continuous commitment to climate justice and equitable resource allocation. In conclusion, even while the Paris Agreement provides a solid framework for global climate action, its success depends on all countries' sincere commitment to achieving their goals and gradually increasing their contributions, particularly large economies like India. The dynamic character of climate issues necessitates constant communication, creativity, and collaboration on a national and worldwide scale. India can set the path for a resilient future by adopting sustainable practices and enhancing the cooperation between the judiciary, policy, and public involvement. This would show that ambitious climate action and socioeconomic development can, in fact, coexist.

CLIMATE CHANGE AND LAW, POLICY, AND GOVERNANCE

Yash Sharma[*]

ABSTRACT

Climate change represents an essential international problem that demands immediate action from lawmakers and policy-makers alongside governmental authorities. This research paper explores a comprehensive evaluation of climate change management measures by analysing governing protocols at multiple worldwide and national levels and corporate entities. The paper evaluates the development of climate change law through analysis of major international accords starting from the UNFCCC and continuing with the Kyoto Protocol before concluding with the Paris Agreement and examining national laws in multiple territories. Environmental accountability receives its implementation through the work of courts, which also controls the trajectory of climate litigation. The paper evaluates climate governance systems through analysis of their institutional platforms, as well as market-based systems that involve carbon pricing and corporate sustainability requirements. This analysis deals with essential obstacles due to shortcomings in execution of global agreements combined with legal shortcomings and opposition between the economy and the planet's justice in developing countries. The discussion covers new trends on reforming climate laws and increasing technological innovation and establishing ecocide as an international criminal offense. The paper ends by proposing various policy recommendations that aim to improve climate governance and promote compliance with environmental commitments and undertake fair climate action. This research implements integrated perspectives from legal, policy, and governance fields to establish an inclusive approach which deals with climate change problems and develops future climate action plans.

I. INTRODUCTION

Background and Significance of Climate Change

Global warming stands as a major universal problem in the 21st century which endangers natural systems and both financial sectors and the human way of life. Human-caused actions mainly involving fossil fuel burning and deforestation led the IPCC to confirm that greenhouse gas (GHG) emissions have surged, which creates dangerous rapid global temperature

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increases.[1] The effect of climate change such as rising ocean waters, severe weather patterns, and ecological destruction, endanger the very existence of nations regardless of their development levels.[2] Future sustainability requires immediate legal actions supported by policy measures to combat these effects. Global climate change management has occurred primarily through the international agreements starting with the United Nations Framework Convention on Climate Change (UNFCCC) 1992, then the Kyoto Protocol 1997, and continuing with the Paris Agreement 2015.[3] Egregious problems with enforcement and compliance persist as the main obstacles against these legal frameworks, so stronger governance systems and national plan implementation are required. The development of climate policies that connect environmental sustainability goals with economic growth falls under the essential responsibilities of governments and international bodies, as well as corporate entities. Effective legal measures must be deployed now to prevent climate-induced displacement and biodiversity loss as well as economic instability, which are the main issues in today's legal discussions.[4]

The framework of laws, together with policies and governance functions, as the foundation to implement climate action through essential programs of control and both compliance and implementation evaluation. All organizations at national and international levels must fulfil obligations regarding climate change established through international treaties, as well as national laws and court decisions. The Paris Agreement requires countries to establish legally binding measures which aim at restricting global temperature increases below 2°C, but aim to keep it under 1.5°C.[5] Various policies which incorporate carbon pricing and emission trading programs together with renewable energy incentives drive companies toward obeying regulations as well as backing sustainable operations.[6] The institutional structures for

[1] Intergovernmental Panel on Climate Change, Climate Change 2021: The Physical Science Basis. Contribution of Working Group I to the Sixth Assessment Report (Cambridge University Press 2021) ch 3, 287–302.
[2] United Nations Environment Programme, Emissions Gap Report 2022: The Closing Window — Climate Crisis Calls for Rapid Transformation of Societies (UNEP 2022) ch 2, 45–49.
https://www.whitecase.com/insight-alert/us-withdrawal-paris-agreement-impact-and-next-steps?.com.
[3] United Nations Framework Convention on Climate Change (adopted 9 May 1992, entered into force 21 March 1994) 1771 UNTS 107; Kyoto Protocol to the United Nations Framework Convention on Climate Change (adopted 11 December 1997, entered into force 16 February 2005) 2303 UNTS 162; Paris Agreement (adopted 12 December 2015, entered into force 4 November 2016) FCCC/CP/2015/10/Add.1. See arts 3(1) (UNFCCC), arts 2–3 (Kyoto Protocol) and art 4(2) (Paris Agreement).
[4] PCC, Climate Change 2023: Synthesis Report (AR6 SYR) (IPCC 2023) (consult the synthesis chapter on near-term mitigation pathways and risks) <https://villanovaelj.scholasticahq.com/post/1394-what-rejoining-the-paris-agreement-means-for-united-states-climate-policy?.com>
[5] See Paris Agreement (n 3) art 2(1)(a) (temperature goal of "well below 2°C" and "pursuing efforts to limit to 1.5°C").
[6] See Directive 2003/87/EC establishing the EU ETS (consolidated) (for ETS mechanism) and ZhongXiang Zhang, 'Carbon Emissions Trading in China: The Evolution from Pilots to a Nationwide Scheme' (Crawford

implementing climate policies operate at the worldwide and national and regional levels. This concept is known as governance. Through its establishment of the Green Climate Fund (GCF), the role of governance provides financial support to developing countries to build climate adaptation and mitigation capabilities.[7] The interests of economic development continue to challenge the effectiveness of climate law and policy which aims to establish environmental sustainability. Corporate greenwashing is under investigation because it misleads customers regarding environmental propositions, thus calling for stronger federal guidelines with robust enforcement capabilities.[8] The fundamental disagreement on climate responsibility exists between developed and developing nations because developing countries demand that the rule of climate justice receive funding to mitigate the impacts of climate change.

Objectives of the Study

This research paper aims to:

1. Assess both the international laws that regulate climate change and the national climate change legislation.
2. Analyse the success levels of programs that charge carbon and offer benefits for renewable energy.
3. Evaluate how climate governance institutions help develop strategic climate action plans.
4. Reveal the barriers that exist during the implementation of climate laws and policies.
5. Suggest strategies to fortify both legal instruments and policy frameworks dealing with climate change.

Research Questions

This investigation derives its central arguments from multiple existing research studies.

1. Can International laws together with the Paris Agreement show their capabilities in reducing climate change?
2. Do national authorities, together with other public institutions, need to enhance their response mechanisms to achieve the desired results?

School of Public Policy CCEP Working Paper No 1503, April 2015) 3–5 (on China's ETS pilots). <https://www.justsecurity.org/84367/watch-this-space-momentum-toward-an-international-crime-of-ecocide/?.com>

[7] Green Climate Fund (Independent Evaluation Unit), Annual Report 2022 (March 2023) 9–17 (overview of accreditation, funding windows and implementation challenges) <https://en.wikipedia.org/wiki/Paris_Agreement?com>

[8] Jacqueline Peel and Hari M Osofsky, Climate Change Litigation: Regulatory Pathways to Cleaner Energy (Cambridge University Press 2015)

3. Can Carbon pricing act as an example of a policy mechanism contributes how effectively to climate mitigation?
4. What are the main obstacles that impede global and national climate action through effective governance?

   What strategic changes in laws coupled with policies would improve the governance of climate issues?

Methodology and Scope:

The conducted research utilizes a doctrinal legal research methodology to investigate international treaties, as well as national legislation and case law, and secondary resources. The research makes use of comparative legal analysis while studying climate policies in different jurisdictions to identify best practices.

This paper will deal with:

- International climate law emphasizes treaties that starting with the UNFCCC and continue with the Kyoto Protocol and end with the Paris Agreement.
- The research includes an examination of national climate legislation through cases from the USA, EU, and India.
- Judicial precedents focus on Urgenda Foundation v. The Netherlands[9] case alongside Juliana v. United States.[10]
- A study investigates how corporate governance together with environmental responsibility determines business actions for climate protection.

The research study recognizes the evolving nature of climate change law as it proceeds to provide a detailed assessment of amendments through current legislative and policy developments while drawing conclusions from current data.

II. LEGAL FRAME OF CLIMATE CHANGE

The regulation of climate change was developed through the placement of international agreements with national policies and judicial intervention. The worsening climate effects have made it essential to create organized climate governance systems using mandatory and non-compulsory legal documents. Many countries have built their climate law systems through international treaties and established customary international legal practices, but each nation

[9] Urgenda Foundation v The State of the Netherlands (District Court of The Hague, 24 June 2015) C/09/456689.
[10] Juliana v United States 217 F Supp 3d 1224 (D Or 2016).

adopts different levels of commitment in their domestic frameworks when implementing them. Climate litigation now serves as a necessary tool to maintain climate promises by requiring proper actions from governments and corporate entities.

The main source that formed international climate change law emerged through the United Nations Framework Convention on Climate Change (UNFCCC) when states adopted it in 1992 as the basis agreement for worldwide climate management. The UNFCCC established "common but differentiated responsibilities and respective capabilities" (CBDR-RC) as the main principle to demonstrate that developed countries should fulfil their duty for greenhouse gas (GHG) emissions because they have the greater historical responsibility.[11] After the initial framework achieved its goal, it enabled negotiators to develop additional climate action agreements to put global targets into practice. The Kyoto Protocol created from 1997 represented the initial legally enforceable agreement under the UNFCCC to establish emission reduction commitments for industrial nations worldwide.[12] The treaty faced limited effectiveness because two major issues existed: the United States and other key countries withdrew, and developing nations remained exempt from binding emission reduction obligations. The Kyoto Protocol introduced underdeveloped market-based systems that included the Clean Development Mechanism (CDM). Under the Paris Agreement (2015), countries adopted flexible NDCs as replacements for the restrictive policies of the Kyoto Protocol.[13] Through transparency and peer pressure, the Paris Agreement has limited ability to enforce compliance because it does not have strong enforcement tools. The climate targets listed in the Agreement need better execution because states have not made enough climate action commitments and support for vulnerable regions is insufficient. State obligations in climate governance receive influence from two main elements of customary international law which use the precautionary principle and the no-harm rule. The International Court of Justice explicitly stated that environmental protection functions as a vital element of state responsibilities while strengthening the obligation to counter such harm between bordering areas. Different national climate policies differ substantially between countries that are highly developed compared to those that are developing. The Legislation on about climate change in developed nations contains whole systems that enforce carbon pricing schemes and enforce

[11] United Nations Framework Convention on Climate Change (adopted 9 May 1992, entered into force 21 March 1994) 1771 UNTS 107.
[12] See Kyoto Protocol (n 3) (the Kyoto Protocol established binding Annex I reduction commitments for the first commitment period).
[13] See Kyoto Protocol (n 3) art 12 (Clean Development Mechanism) and Paris Agreement (n 3) art 4(2) (nationally determined contributions).

strict emission regulations, while developing nations struggle with economic limitations that affect their ability to achieve their development targets. The Climate Change Act of 2008 represents a remarkable achievement because it established mandatory carbon budgets under supervision from an independent Climate Change Committee to track progress.[14] The EU Green Deal as part of its 2050 climate-neutral objective implements two main policy instruments the EU ETS and the CBAM.[15] The EU implements both regulatory and market-based systems of governance, which establishes a model example for integrated climate control. The majority developing countries adopt separate sectorial policies instead of implementing total climate laws as their main strategy. Through the National Action Plan on Climate Change it utilizes the policy mechanisms to direct climate strategies through renewable energy missions together with missions on energy efficiency and sustainable agriculture.[16] The commitments of India in the Paris Agreement involve cutting the intensity of the emission by 45% from 2005 initial levels before 2030 yet implementing these goals presents difficulties because India mostly depends on coal power and lacks effective mechanisms for enforcement. The EU Green Deal serves as a study in combined policy sequence but exposes difficulties when companies need to keep pace with environmental regulations and continue their competitive status.

Climate litigation now serves as an effective enforcement method that makes authorities and corporations responsible for their insufficient climate measures. Judicial systems around the world now accept climate change as a matter suitable for the courts to decide, which has enabled crucial decisions enhancing climate policy requirements. In Urgenda Foundation v State of the Netherlands, the Dutch Supreme court's Urgenda judgment breaks new ground. It is the first court to order a State to reduce its GHG emissions.[17] The State must reduce its GHG emissions by at least 25% before the end of 2020. The court proceedings from this case established legal foundations for climate change litigation based on rights which spread across national territories. In Juliana v. United States[18] have attempted to gain constitutional rights

[14] Climate Change Act 2008 (UK) c 27, ss 1–5 (legislative framework for carbon budgets and the Committee on Climate Change).
https://www.climatecenter.pitt.edu/news/america-and-paris-agreement-withdrawal-recommitment-and-future-implications?com.
[15] European Commission 'The European Green Deal' COM(2019) 640 final.
[16] Government of India, National Action Plan on Climate Change (Prime Minister's Council on Climate Change, June 2008) (see missions: National Solar Mission; National Mission for a Green India) <https://2017-2021.state.gov/on-the-u-s-withdrawal-from-the-paris-agreement/?safe=1>
[17] Urgenda Foundation v The State of the Netherlands (Hoge Raad) ECLI:NL:HR:2019:2007 (20 December 2019).
[18] Juliana v United States (n 10).

enabling climate stability while facing continuous procedural impediments. Through public interest legal cases in countries such as India Indian courts have expanded environmental protections by referring to Article 21 of the Constitution which guarantees the right to life.[19]

Seven decades of cases brought by M.C. Mehta have formed the basis of modern Indian environmental law, while such legal strategies now apply to climate change litigation. In the case of Milieudefensie v. Shell,[20] Shell succeeded in making private businesses responsible for their emission output. The Hague District Court issued an order that forced Shell to reduce its emissions to 45% of current levels before 2030 as part of a new trend in corporate climate responsibility.

The advancements made in climate law need to overcome numerous persisting difficulties. Climate agreements become less effective because they do not have proper enforcement systems which produce an inconsistency between statements and actual measures. Established legal boundaries between nations create an environment which makes it harder to reach consensus in climate governance because countries maintain different economic and political goals. Climate justice demands that attention must be paid to the unequal distribution of climate change distress between communities because equitable climate policies become vital. The nations currently developing seek increased financial help with modern technology from industrial societies because they face the most significant burden of climate change impacts.

The implementation shortfall of the Loss and Damage Fund at COP27 demonstrates the significant obstacles to secure financial support for nations susceptible to climate change. The implementation of technology in climate governance creates novel ways for addressing policy creation. Such new programs teach students how to create block chain-carbon credit systems and execute digital emission monitoring. International crime recognition of ecocide continues to grow in force while advocates seek to establish its position under the Rome Statute of the International Criminal Court (ICC). Organizations would face increased responsibility for environment-destructive actions with these newly developed legal standards. Law enforcement together with policy structure and governance systems need constant development to address the escalating challenges that arise from climate changes.

[19] Indian Const. art. 21.
[20] Milieudefensie and Others v Royal Dutch Shell plc (District Court of The Hague, 26 May 2021) ECLI:NL:RBDHA:2021:5339, paras 5.3–5.6.

III. CLIMATE POLICY AND GOVERNANCE

The regulation of emissions, along with sustainable practice promotion and global cooperative initiatives, exists through climate governance and policy which take a central role in managing the global climate crisis. Transformation of international climate change awareness enables today's world to implement new legal structures at the governmental, organizational and international levels. Climate governance relies on three main pillars consisting of international institutions together with domestic regulations and company governance systems that support critical responses against climate change.

As the main climate negotiator, the United Nations (UN) primarily uses the framework established by the United Nations Framework Convention on Climate Change (UNFCCC). Since 1992, the UNFCCC has developed to become the founding treaty which enabled progress toward the Kyoto Protocol from 1997 and finally resulted in the Paris Agreement of 2015. NDCs within the Paris Agreement represented an essential shift because they introduced voluntary state-controlled emission reduction goals.[21] The agreement suffers from no enforcement mechanisms that would guarantee compliance, therefore raising concerns about how nations meet their obligations. The primary venue for climate diplomacy exists within Conference of the Parties (COP) meetings, but countries face challenges in forming agreed solutions because of international power conflicts and economic inequality barriers. International climate commitments show weakness when the United States exited the Paris Agreement under Trump administration before the Biden administration re-entered it.[22]

The World Bank along with the International Monetary Fund (IMF) have essential powers in managing climate finance operations. Low-carbon economic transitions of developing countries receive financial support through initiatives launched by the World Bank under Climate Investment Funds (CIFs).[23] The IMF now integrates climate factors into both its economic surveillance programs and its lending schemes by placing importance on financial policies with built-in environmental sustainability standards.[24] The policy conditions imposed by the Fund on developing countries continue to face ongoing critiques because they emphasize

[21] United Nations Framework Convention on Climate Change (n 3) and the Conference of the Parties (COP) process.
[22] Congressional Research Service, U.S. Withdrawal from the Paris Agreement: Process and Potential Implications (CRS R48504) (PDF); UNFCCC, 'UN welcomes US announcement to rejoin the Paris Agreement' (19 February 2021).
[23] The World Bank, 'Climate Investment Funds' (World Bank, 2023) <https://www.worldbank.org/en/topic/climatechange> accessed 5 March 2025.
[24] International Monetary Fund, 'Climate Change and the IMF' (IMF, 2023) https://www.imf.org/en/Topics/climate-change accessed 5 March 2025.

economic transformation above equal climate mitigation strategies. The United Nations Framework Convention on Climate Change established the Green Climate Fund (GCF) to offer aid to vulnerable nations, yet the GCF faces accusations of distribution problems because it contains inefficient procedures and many bureaucratic challenges.[25]

Different approaches to climate action planning and governance emerge at the national level based on political will combined with the economic strengths of each nation. Currently, carbon pricing systems consisting of carbon taxes and emission trading systems serve as fundamental instruments to decrease greenhouse gas emissions. EU ETS stands as one of the most advanced market-based climate policy instruments developed by the European Union since it activates financial opportunities to reduce emissions.[26] India, along with China, combines regulatory methods with market-based climate solutions as part of their dual efforts to achieve their environmental targets.[27] It has become essential for national climate strategies to implement renewable energy policies through which governments offer financial incentives to encourage the adoption of clean energy. The fast growth of solar and wind energy has become possible in Germany and Denmark through consistent regulatory support systems that benefit sustainable energy adoption.[28] Multiple countries continue to support fossil fuels financially through subsidies, thus producing obstacles to climate goals, although they contradict national climate policies.

Increasingly, corporate governance stands vital for climate policy because businesses are responsible for major greenhouse gas emissions. ESG standards have evolved into a prominent investment metric because investors repeat their demand for organizations to ethically document their sustainability practices. Companies must report their climate-related risks and sustainability measures under the Corporate Sustainability Reporting Directive (CSRD) implemented by the EU because this directive serves as a regulatory framework.[29] Corporations can apply the TCFD guidelines to evaluate their climate risks along with similar initiatives for corporate climate disclosure.[30] Multiple companies display noncompliance through

[25] Green Climate Fund (n 7)
[26] European Commission, 'EU Emissions Trading System (EU ETS)' (2023) <https://ec.europa.eu/clima/policies/ets_en> accessed 5 March 2025.
[27] ZhongXiang Zhang (n 6); Government of India, NAPCC (n 12)
[28] Mark Z. Jacobson, 100% Clean, Renewable Energy and Storage for Everything (Cambridge University Press 2020) 112.
[29] European Commission, 'Corporate Sustainability Reporting Directive (CSRD)' (2023) https://ec.europa.eu/info/business-economy-euro/company-reporting-and-auditing accessed 5 March 2025.
[30] See Task Force on Climate-related Financial Disclosures (TCFD), Recommendations of the Task Force on Climate-related Financial Disclosures (2017) (on corporate disclosure regimes) and Jack Ewing, Faster, Higher,

greenwashing, which involves misleading public audiences to believe false sustainable claims regarding their environmental commitments.[31] The lack of proper regulatory oversight allowed Volkswagen to conduct the emissions scandal and continue their destructive practices beyond regulatory boundaries.[32] The practice of greenwashing should face stronger legal penalties according to which businesses would need to exhibit higher compliance standards to maintain transparency and fulfil accountability duties.

The progress made in climate governance continues to face multiple substantial problems. The unwilling participation in multinational climate agreements makes it difficult to enforce them because financial disparities between developing and developed countries lead to unequal climate change mitigation capacity. Fossil fuel companies, together with corporate lobbyists, frequently stop powerful climate policy development at the national and international levels.[33] Governing climate effectively depends on three concurrent strategies between legal change, economic motivations, and institutional oversight mechanisms.

IV. CHALLENGES IN CLIMATE CHANGE LAWS AND POLICES

The worldwide response to address climate change through legal frameworks and policies has experienced major development in recent years through international agreements and national laws, as well as governance systems. Multiple obstacles interfere with the successful implementation of climate law and policy despite all the current progress. The implementation of international climate agreements falls short and laws and policies show widespread holes whereas economic motives frequently fight with environmental obligations, and political institutions together with corporate sectors create obstacles to progress. The present problems in global climate action need immediate solutions, as they work against collective climate objectives.

Climate change law and policy face the primary obstacle of insufficient execution of international climate treaties. The United Nations Framework Convention on Climate Change (UNFCCC) alongside its Kyoto Protocol and Paris Agreement along with their radical objectives face irregular execution standards.[34] Several developing countries face financial

Farther: The Volkswagen Scandal (W. W. Norton & Company 2017) 206–07 (as an example of corporate misconduct and disclosure failure).

[31] Jack Ewing (n 33).

[32] See Jack Ewing, Faster, Higher, Farther (n 33).

[33] Daniel Bodansky, Jutta Brunnée and Lavanya Rajamani, International Climate Change Law (Oxford University Press 2017) 325–27 (on political economy and industry influence).

[34] See n 24.

difficulties together that hinder them along with technological shortages that impede their achievement of their agreement. Climate policies tend to become less potent and implementation delays emerge because domestic politics prevails in established nations. The United States withdrew from the Paris Agreement under Trump,[35] but re-entered it after Biden took over because international climate commitments stand weak against short-lived political intentions more than enduring sustainability goals. Every country can modify its Nationally Determined Contributions without binding rules to enforce compliance through the Paris Agreement, which diminishes global climate management effectiveness.

The problem intensifies because of the insufficient laws and regulations that control climate governance. The absence of tough sanctions in several legal systems allows corporations, together with governments, to bypass their environmental responsibilities. The implementation of carbon pricing strategies in different jurisdictions faces severe enforcement challenges because businesses find ways to sustain emissions without substantial monetary penalties. Several nations enforce economic and industrial policies that select urgency-based financial benefits above environmental sustainability. The inconsistent relationship between environmental legislation and other regulatory guidelines generates an unclear legal space, which reduces the success of climate regulations.

Economic development continues to clash with climate change objectives, creating multiple major implementation challenges. The rise of industrialization, together with economic development throughout history, led to the use of carbon-intensive methods, including fossil fuel extraction and deforestation with large-scale manufacturing. The implementation of strict climate regulations creates conflicts with developing countries because it requires significant funds to develop sustainable energy systems and infrastructure. The situation creates a problem because economic requirements often push aside environmental protection needs. The CBDR principle in climate negotiations shows this conflict because developing countries seek financial aid and technology help from developed nations to establish low-carbon economies. Industries that hold substantial political power regularly fight against climate regulations by predicting financial declines, including employment reductions. The fossil fuel industry works to stop the strictness of climate policies because it opposes needed shifts toward renewable

[35] Executive Order 14162, 'Putting America First In International Environmental Agreements' (5 January 2025) <https://www.whitehouse.gov/presidential-actions/2025/01/putting-america-first-in-international-environmental-agreements/> accessed 9 March 2025.

energy developments. Resistance in the economy limits climate efforts while the sustained use of damaging environmental practices continues.

The pursuit of both climate justice and fair climate policies makes governance of climate change harder to achieve. The effects climate change overwhelmingly harm vulnerable populations in both developing nations along with minor island countries and non-white groups within industrial states. The lack of adaptation resources becomes a serious challenge for low-income populations, which must sustain the impacts of increasing sea levels together with extreme weather situations and reduced food and water availability. The actual conditions of climate change are beyond the current international climate policy capacity to properly handle such inequalities. The provision of climate finance faces criticism between nations because developed countries fail to fulfil their obligation of annual payments worth $100 billion to support developing countries.[36] The principle of climate justice remain absent from the majority legal frameworks because affected communities have minimal access to legal pathways for to demand reparations and support. Climate litigation functions as an instrument to remedy inequities because of its use in cases such as Urgenda Foundation v. The Netherlands.[37] Because litigation requires extensive resources and takes many months to resolve, it becomes an unreachable solution for numerous defenceless communities. Bigger legal guarantees that protect climate justice would break down the global inequalities that still prevail because of weak policies.

The main obstacle to climate action arises from corporate entities combined with political organizations that actively oppose environmental measures. The issue of climate change has become a political debate because political responses are based more on ideology than scientific evidence. The political power transition across various governments causes numerous countries to radically change their climate policy approach, thereby creating unpredictable conditions. Right-wing political groups within many countries work against environmental regulations by depicting them as economic expenses that also endanger national political autonomy. Nations become less capable of passing the necessary reforms and forming strong international partnerships due to ideological politics. Discipline-based interests of

[36] On the $100 billion goal and disappointment over its delivery, see COP decision texts and implementation discussions; see COP27 Sharm el-Sheikh Implementation Plan and Green Climate Fund reviews on delivery and accounting <https://www.congress.gov/crs-product/R48504?.com>
[37] Urgenda (n 20).

corporations create additional complexity in climate policy making because they wage lobbying battles against regulatory approaches that limit their operations.

The solution demands a comprehensive set of approaches that would enhance enforcement capabilities and close regulatory gaps and unite economic plans with environmental measures protect climate justice, and disassemble political along with corporate barriers. International agreements will improve their compliance power through both mandatory pledges and clear tracking systems to enhance their accountability. The national implementation of economic incentives and strict penalties aimed at sustainable behaviour can minimize economic challenges to climate action. All climate policies should follow principles of climate justice by allowing vulnerable groups to obtain adequate assistance and diplomatic involvement in policy creation. The solution to political and corporate opposition to climate action demands increased public support and stricter laws which can stop industrial misinformation and commercial manipulation.

The current set of challenges still acts as the main obstacles to achieving impactful climate action despite the existing progress in climate laws and policies. Breaking these challenges requires combined actions from public authorities, together with international institutions and civil society groups, and the private sector. The weakness in structural climate governance need proper solutions in order to develop effective responses that ensure sustainability across generations.

V. EMERGING DIRECTION

The existence of our planet faces lethal threats due to climate change, which requires strong legal measures along with political and governance mechanisms to reduce its harmful effects. The evolution of climate law produced international agreements, national legislations and judicial case interventions to reduce greenhouse gas pollution alongside fostering sustainable growth. Failure to meet compliance and enforcement goals in climate law requires changes along with technological modernization and new ecocide laws and increasing venues for climate litigation. Climate governance will take a new direction in the future due to current trends focused on strengthening legal systems and enforcement capabilities, as well as strengthened judicial actions.

The enforcement of climate-related laws exists as the key element for meeting global environmental agreements. Despite its international status, the Paris Agreement[38] confronts implementation challenges because it depends on each nation to set and follow their own nationally determined contributions (NDCs). Developing economies along with various other countries face economic hurdles that prevent them from completing their commitments to the climate initiative. The trend supports the development of mandatory enforcement tools that create state responsibility to honour their climate-related agreements. The European Union's Climate Law[39] set a legislative blueprint through which member states must reach climate neutrality before 2050. Climate agreements now undergo discussions about adding compliance systems through planned economic barriers or trade barriers for nations that do not comply. Monitoring bodies whose independence secures the Climate Compliance Mechanism are being examined as a method to boost accountability. The modern emphasis on the implementation of climate laws requires that environmental principles become part of national constitutions. France, alongside Chile, amended their constitutions to establish the right to environmental sustainability and environmental cleanliness, thus strengthening climate commitments at the constitutional level. The new reform measures give evidence of a fundamental change in climate management that places greater emphasis on both accountability enforcement and legal interpretation.

Climate governance benefits extensively from technological progress through new solutions designed to reduce air pollution, track changes in the environment, and enforce regulatory standards. Tracking systems operated by NASA and the European Space Agency now use satellite monitoring which revealed vital environmental data about deforestation, industrial pollution, and disaster situations. Block chain technology produces unalterable emissions records and carbon credit records that minimize environmental fraud and improve business responsibility at all times. Low-carbon economies transition faster because of improved renewable energy technology development, leading legislators to create new regulatory frameworks to handle contemporary innovations. Public authorities across the globe are working on establishing regulatory sandboxes which allow start-ups and corporations to evaluate climate technologies through testing before industrial rollouts. These programs

[38] Paris Agreement (n 3) art 4(2) (design of NDCs).
[39] Regulation (EU) 2021/1119 of the European Parliament and Council (European Climate Law) [2021] OJ L243/1, art 2(1) (climate neutrality by 2050).
<https://www.stopecocide.earth/press-releases-summary/tag/2021?com>

demonstrate how law meets technology requirements to deal with climate problems, thereby demanding modular regulatory institutions.

The fight against climate change has strengthened through a greater legal acceptance of ecocide as a transnational crime. Scientific research defines ecocide as significant environmental devastation that occurs from human behaviour and generates sustained irreparable destruction of natural habitats. Various legal experts along with environmental activists support the worldwide adoption of ecocide as the fifth criminal offense to be added to the Rome Statute of the International Criminal Court (ICC).[40] The establishment of ecocide as a crime under law would make corporate leaders and state representatives criminally responsible for the substantial environmental destruction they cause. Belgium and the Maldives represent two countries that support this initiative, which demonstrates emerging international trends in prosecuting environmental destruction. The newly proposed definition of ecocide contains elements that match fundamental principles of international environmental law because it defines ecocidal acts as deliberate damage to the environment.[41] The future adoption of ecocide guidelines would act as a preventive factor for damaging business activities while pushing companies to establish environmentally friendly business methods. The ICC faces obstacles to achieve member state consensus on the ecocide issue because major economies hold substantial economic power through fossil fuel extraction. The international criminalization of ecocide creates a major advancement in protecting climate justice along with corporate responsibility standards.

The Legal challenges associated with climate issues serve as a forcible method which obliges governments and business organizations to fulfil their environmental commitments while ensuring the proper responsibility for environmental damages. Human rights advocates and legal professionals have intensified their use of constitutional rights and corporate accountability criteria in numerous climate change-related lawsuits over the last ten years. The sensory foundations created by Urgenda Foundation v State of the Netherlands[42] have led courts to step into climate regulation allowing states to pressure governments into developing stronger emission reduction measures. Climate litigation has expanded because public

[40] Independent Expert Panel for the Legal Definition of Ecocide, Commentary and Core Text (Stop Ecocide Foundation, June 2021) 4–6 (proposed core text and mens rea thresholds).
[41] See Stop Ecocide International and related state statements: Belgium has been active in parliamentary and governmental initiatives in favour of ecocide recognition, and early supporters of an ICC ecocide discussion included small island states such as the Maldives. See Stop Ecocide, 'Belgium — Leading States' and Stop Ecocide press materials (statements to ASP/ICC)
<https://www.stopecocide.earth/leading-states/tag/Belgium?.com>
[42] Urgenda (n 20)

institutions around the world have begun to recognise environmental rights are fundamental human rights. Different courts in various jurisdictions established the fundamental human right to environmental health that allows citizens and communities to sue policies that increase climate dangers. The number of climate litigation cases involving multinational corporations that exceed border limits continues to increase. The development presents complex jurisdictional and legal difficulties that need international legal principles to reach harmonization.[43] Climate governance improves when compliance mechanisms receive mandatory frameworks, as they enable better accountability and increase commitment implementation. The embrace of ecocide by the law establishes historical trends in environmental responsibility by making both states and corporations responsible for their environmental destructiveness. Through climate litigation, society will acquire an essential tool for forcing change while filling the gaps which exist between legislative and policy frameworks. Generated effectiveness in global climate action depends on the convergence between law regulation and governance structures as climate change advances toward greater intensity to create a sustainable future.

VI. CONCLUSION

Human existence faces an existential threat from climate change which demands a strong combination of legal systems and, policy structures, and governance frameworks for impact reduction purposes. This inquiry tracked the complicated connection between climate change and regulatory mechanisms at the international and domestic levels, including corporate responsibility to combat the crisis. The implementation of UNFCCC alongside the Kyoto Protocol and the Paris Agreement creates the basis for global climate progress, but their enforcement mechanisms remain weak and the commitments of the members remain insufficient and nations experience resistance to follow these agreements. The laws regarding climate change feature substantial differences among nations, since developed states enforce strict standards, but developing nations face challenges in compliance because of limited financial resources and weak infrastructure. Climate litigation has proven itself as a key instrument which forces public entities and private companies to respond to environmental breakdown, but various court challenges make its widespread achievement difficult. A considerable amount of progress has been made, but multiple obstacles continue to affect climate change governance. At the international level, countries rarely fulfil their climate

[43] Bodansky, Brunnée and Rajamani (n 36).

agreement obligations because enforcement remains non-binding. Economic development conflicts with environmental sustainability create conditions that weaken policymaking authority and result in no action being taken. The most impacted nations, which are today developing countries, must overcome both financial requirements and technological restrictions to create Climate change policies. The challenge of reaching genuine sustainability gets worsened by corporate greenwashing which refers to the false environmental claims made by companies. Socially disadvantaged communities suffer the most from climate change, which proves the necessity of a fair transition along with equal climate policy distribution.

The enhancement of climate governance requires stronger legal structures that need to be developed at national and international standards. The first important move requires international agreements to enact mandatory conditions to ensure compliance accountability. Climate finance arrangements need improvement because they should help developing countries implement their mitigation goals together with adaptation methods. The integration of climate analysis should become mandatory across all policy sectors, including trade activities and industrial operations and infrastructure construction to achieve sustainability across all sectors. The development of climate litigation acts as a supplementary enforcement tool to make corporations and governments responsible for their environmental conduct. The global recognition of ecocide as a separate crime could lead to substantial environmental protection efforts, and it would function as legal procedure for climate criminal offenders. Structural corporate governance rules need enhanced environmental and social and governance (ESG) disclosure standards to block schemes of misinformation. Governments must use emissions trading and carbon taxes more broadly as they encourage carbon emission reduction through proper prize implementation. The deployment of supportive policies and investments should be used to maximize recent technological developments in renewable energy, as well as carbon capture and climate adaptation. To succeed in climate governance, it should receive increased international support that unites different nations to create policy solutions that follow scientific recommendations and serve long-term environmental stability goals. Climate policy development strongly depends on public knowledge and advocacy processes that require improved public participation in government decision-making. Climate justice in policymaking processes guarantees that underprivileged communities will avoid excessive impacts of climate policies. Successful climate change management requires multiple strategies that unify legal systems with appropriate policies along with adequate governance practices. The current

immediate along with sustained action is vital to stop permanent socio-economic along with environmental destruction across the world.

BEYOND THE PIZZA PARADIGM: A LEGAL AND SUSTAINABLE SCRUTINY OF THE PACKAGING INDUSTRY

Anushka Jalan[*]

Apoorv Dubey[**]

ABSTRACT

The rapid rise in food-delivery and e-commerce has brought the world to an unprecedented packaging waste crisis, with India generating over 9.3 million tonnes of plastic waste annually. While cardboard is marketed as a completely harmless alternative by corporations, its "sustainability" is far from reality. Plastic Waste Management (PWM) Rules and Extended Producer Responsibility (EPR) fail to account for externalities. Furthermore, corporate greenwashing is misleading the consumers, and the so-called global north practices "Green Capitalism."

This paper aims to scrutinize the legal and environmental shortcomings of India's packaging industry by comparing it to Global policies. It also explores sustainable alternatives such as, stubble-based, mycelium and seaweed packaging, while addressing challenges and providing recommendations for easier adoption. India's transition to a circular economy can be accelerated through strict enforcement mechanisms by applying polluter pays principle, and incentivizing research & development to foster innovation in sustainability. A shift from voluntary compliance to strict legal mandates is essential to achieve genuine environmental sustainability rather than mere optics.

Keywords: *Sustainable Packaging, Plant-based Packaging, Greenwashing, Food Delivery Waste, Corporate Accountability, Extended Producer Responsibility (EPR).*

I. INTRODUCTION

What we discard in minutes haunts our planet for centuries. Mountains of garbage choke our landfills, poison our waters, and accelerate climate collapse, all under the illusion of recyclability. The question is not whether we need sustainable packaging, but whether we can

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delay its adoption any longer. Despite banning 19 categories of single-use plastic in 2022, India remains a major global producer of plastic waste, recycling only 8% of it.[1]

India continues to generate over 9.3 million tonnes of plastic waste annually, with food packaging being a significant part of it.[2] This entrapment in the cycle of overproduction and under-recycling highlights the lag in India's policies.

The market lacks eco-friendly packaging options despite the desire of consumers to contribute to sustainability. Even though retail & food delivery brands have adapted cardboard as their prime packaging material, a huge amount of cardboard waste ends up unrecycled in India.[3] It is not just our health and well-being that is at stake, but also the survival of wildlife on land and in sea. Hence, the onus is on us to make conscious choices before the damage becomes irreversible.

It's high time that half-measures and voluntary corporate greenwashing are ended. Hence, India must reframe its approach by leveraging legal mandates, providing innovation incentives, and trade policies to build a circular economy where sustainability is not a choice, but a necessity.

II. CLIMATE IMPACT OF PACKAGING WASTE

The concept of "sustainability" refers to maintaining an ecological balance by preventing the depletion of natural resources.[4] Instead of looking for only bio-degradability, we must also evaluate the entire life cycle of a packaging material to understand its environmental implications. While cardboard is widely labelled as a sustainable alternative to plastic, it is actually a villain in disguise. Whereas plastic pollution is visible all around, this so-called green alternative, piles up in landfills and releases methane as it decomposes.

Pizzas are delivered to us in corrugated cardboard boxes because it is convenient and readily available to sellers but these boxes when packed with pizzas get soiled with grease, cheese and sauce, become unrecyclable.[5] This green illusion is fuelled by food delivery platforms and these

[1] CSIRO, "India Generates 26,000 Tonnes of Plastic Waste Every Day. This Is How We Reduce That Number." (*CSIRO*, 7 December 2023) <https://www.csiro.au/en/news/all/articles/2023/december/circular-economy-roadmap-india> accessed 29 March 2025.
[2] Almack A, "Is India the World's Largest Plastic Polluter? Causes and Solutions" *Plastics For Change* (25 September 2024) <https://www.plasticsforchange.org/blog/india-emerges-as-the-worlds-largest-plastic-polluter-what-went-wrong-and-whats-next> accessed 30 March 2025.
[3] Khadka BNS, "Why India Is a World Leader in Waste Paper" (*BBC News,* 12 March 2019) <https://www.bbc.com/news/world-asia-india-46641059> accessed 29 March 2025.
[4] Larose R, "Sustainability: What Does It Mean? – BioSafe Systems" (*BioSafe Systems,* 7 January 2019) <https://biosafesystems.com/news/sustainability-what-does-it-mean/> accessed 29 March 2025.
[5] Rumpke, "Are Pizza Boxes Recyclable?" (*Rumpke,* 19 December 2022) <https://www.rumpke.com/blog/are-pizza-boxes-recyclable> accessed 29 March 2025.

platforms as part of their "green initiative" completely replace plastic with cardboard and showcase themselves as sustainable.

While cardboard can be made from wastepaper-based materials, the industry still heavily relies on virgin wood. It takes around 7000-13000 litres of water per-ton to prepare wood pulp and manufacture cardboard[6] This process being water intensive, strains freshwater resources, making cardboard's water footprint even greater than plastic. Producing 1 ton of cardboard emits 538 kg of CO_2,[7] which is alarming considering the surge in demand. Additionally, using recycled cardboard for food packaging carries the risk of contamination from harmful oils present in inks which can potentially lead to cancer. These degradable boxes are often covered with a shiny coating of PFAS (per- and polyfluoroalkyl substances) also called as *forever chemicals* that never break down and accumulate in human bodies. A pizza box may serve its purpose for 30 minutes but carries an invisible price tag of deforestation, emissions, pollution and water depletion, which is paid after the meal is long gone.

With the rise of quick food delivery services and E-Commerce, consumers place orders for many small meals instead of just one larger order, thereby multiplying packaging waste. Food delivery apps like Zomato & Swiggy and brands like Starbucks & McDonalds charge 'Green Premium' from consumers for the so called 'sustainable' packaging materials.[8] It is easier for corporations to pollute than for innovators to create solutions. While startups face trade barriers and lack of subsidies, corporations adopt tactics to dodge the regulations imposed by the system.

Green Premium = *(Production Cost* + *Transport Cost* + *Marketing Cost)* − *Actual Sustainability Benefit* + *Hidden Environmental Cost*

Where:

- *Production Cost* is the higher cost of paper/cardboard packaging vs. plastic.
- *Transport Cost* is the higher fuel consumption due to heavier packaging (e.g., cardboard).
- *Marketing Cost* is the cost of branding and advertising the product as "eco-friendly."

[6] World Bank, *No Business Growth Without Water Efficiency: The Case of Modern Karton* (World Bank, 2014) <https://documents1.worldbank.org/curated/en/863791548689614159/pdf/134091-No-business-growth-without-water-efficiency-2014-Modern-Karton.pdf> accessed 29 March 2025.

[7] Ukpanah I, "Is Cardboard Bad for the Environment? Stats, Facts and Trends" (*GreenMatch.co.uk,* 28 March 2024) <https://www.greenmatch.co.uk/blog/is-cardboard-bad-for-the-environment> accessed 29 March 2025.

[8] Daftary B, "Convenience at a Cost: The Packaging Waste Problem of Food Delivery" *Medium* (12 February 2025) <https://medium.com/@bansikdaftary/the-packaging-problem-why-does-ordering-in-cause-so-much-waste-75dcb8b0cfc2> accessed 29 March 2025.

- *Actual Sustainability Benefit* is the real environmental impact reduction (often minimal).
- *Hidden Environmental Cost* is the unseen costs like methane from landfilled cardboard, increased deforestation, or water depletion.

III. EXISTING LEGAL FRAMEWORK & CORPORATE POLICIES ON PACKAGING WASTE

In India, waste is broadly classified into solid, liquid and gaseous.[9] Solid waste is further classified into six categories: Municipal Solid Waste, Hazardous Waste, E-waste, Biomedical Waste, and Construction and Demolition Waste. Each category has policy given by the Ministry of Environment, Forest and Climate Change (MoEFCC) for effective waste management.[10]

Among these, plastic waste is a major environmental concern, amplified by rising food delivery apps. India's Plastic Waste Management Rules (PWM), 2016, amended in 2022,[11] regulate plastic waste through Extended Producer Responsibility (EPR) framework and material restriction, however, weak implementation allows the problem to persist.

Fast-Moving Consumer Goods (FMCG), or Consumer-Packaged Goods, refers to low-cost, fast-selling everyday products, such as packaged food and beverages.[12] These are the major contributors to plastic waste. EPR requires FMCG companies and other bulk plastic producers to recover and recycle waste. However, it lacks strict enforcement, particularly for food delivery platforms, which remain loosely regulated.

Current ERP Targets prescribe:

- Producers and importers must recycle 70% of plastic packaging by 2022-23, and it should be increased to 100% by 2023-24.
- Rigid plastic packaging must contain 30% recycled content by 2025-26.

[9] Ministry of Environment, Forest and Climate Change, *Policy on Waste Management* (MOSPI) <https://www.mospi.gov.in/sites/default/files/main_menu/Seminar/Policy%20on%20Waste%20Management%20-%20MOEFCC.pdf> accessed 27 March 2025.

[10] Ministry of Environment, Forest and Climate Change, *Official Website* <https://moef.gov.in/ > accessed 27 March 2025>

[11] Central Pollution Control Board, *Plastic Waste Management (Amendment) Rules 2022* <https://cpcb.nic.in/uploads/plasticwaste/2-amendment-pwmrules-2022.pdf> accessed 27 March 2025.

[12] Deliverect, 'What Is FMCG? Understanding the Fast-Moving Consumer Goods Industry' (*Deliverect Blog*) <https://www.deliverect.com/en/blog/fmcg-and-grocery/what-is-fmcg-understanding-the-fast-moving-consumer-goods-industry> accessed 27 March 2025.

- Flexible Plastic Packaging are required to include 10% recycled content by 2025-26.[13]

Additionally, The Single Use Plastic (Regulation) Bill, 2022 introduced a ban on certain single-use plastic (SUP) items.[14] Certain items like plastic straws, cutlery and PET bottles under a specific capacity should be banned. Multi-layered plastics (MLP), which are largely used in food packaging, remain largely unregulated. The root cause of this is the implementation gaps in the system which allow FMCG and food delivery companies to continue the use of non-recyclable materials. Despite comprehensive regulations, the lack of strict enforcement, the absence of clear penalties for non-compliance, and insufficient municipal capacity further exacerbate the plastic waste crisis. India will continue to struggle with plastic pollution and ineffective waste management without stronger monitoring system and clear penalties for violations.

India is a signatory to the Basel Convention,[15] an international treaty that aims to prevent and minimize plastic waste generation and ensure environmentally sound management of hazardous and other waste. However, loopholes allow import of contaminated "recyclable" waste from developed nations to India.

Imported wastes very often exceed 2% contamination limit, making it unrecyclable and adding to the growing waste crisis. After China's import ban, India become a global "dumping ground," receiving massive waste imports from countries like Canada and USA. Paper recycling mills in Muzaffarnagar, Uttar Pradesh, import 20,000 tonnes of waste every month, much of which is contaminated. The disposal issue leads to waste burning, further deteriorating air quality to 'very poor' levels.[16] This reflects Green Capitalism: shifting burden to poorer nations while carrying on destructive lifestyle behind the label of "sustainability."

Sustainability for the west has become suffocation for the east. Is waste importing a mere tactic to shift responsibilities? Cases like these show the perilous consequences of the collective inefficiency of waste recycling system on a global level.

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[13] Central Pollution Control Board, *Plastic Waste Management (Amendment) Rules 2022* <https://cpcb.nic.in/uploads/plasticwaste/PWM-Amendment-Rules-2022.pdf > accessed 28 March 2025>

[14] Lok Sabha, *The Constitution (Scheduled Tribes) Order (Amendment) Bill, 2022* (Bill No. 127 of 2022) <https://sansad.in/getFile/BillsTexts/LSBillTexts/Asintroduced/127%20OF%202022%20AS12122022113539AM.pdf?source=legislation> accessed 28 March 2025.

[15] Basel Convention, 'Plastic Waste Partnership (PWP)' (*Basel Convention*) <https://www.basel.int/Implementation/Plasticwaste/PlasticWastePartnership/tabid/8096/Default.aspx> accessed 28 March 2025.

[16] Sandeep Rai, 'Tonnes of Plastic Waste from US, Canada Ends Up in Muzaffarnagar' (*The Times of India*, 24 January 2023) <https://timesofindia.indiatimes.com/city/meerut/tonnes-of-plastic-waste-from-us-canada-ends-up-in-muzaffarnagar/articleshow/97267142.cms> accessed 30 March 2025.

Best practices in Global waste management

Counties like Sweden, Germany and South Korea are the best performing counties in terms of plastic waste management.[17] Sweden is a leader in environmental sustainability and has implemented strict regulations on single-use plastics along with efficient waste-to-energy systems that convert non-recyclable plastics into usable form of energy. These initiatives have led to a significant reduction in plastic pollution.

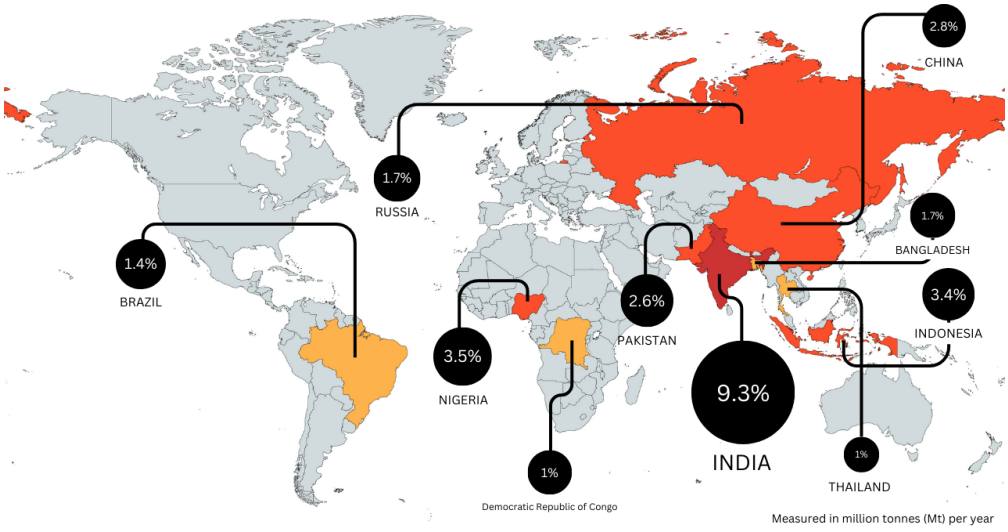

Figure 1: The top 10 plastic pollution hotspots (Source: National History Museum)

Figure 1 Shows waste data from different countries to model how plastic enter the environment every year.[18]

Germany has had a high recycling rate for decades, in 2019, its estimated recycling rate reached 67% for all packaging products, with 42% for plastic packaging specifically.[19] The amended Waste Framework Directive laid down a target of recycling 65% waste by 2035, across European Union. Germany has enforced mandatory waste sorting policies and implemented a Deposit Refund Scheme, under which the bottles that can be recycled are labelled

[17] Plastics Technology, 'Top 10 Countries Leading the Fight Against Plastic Pollution' (*Plastics Technology*) <https://www.plastics-technology.com/articles/top-10-countries-leading-the-fight-against-plastic-pollution#:~:text=Check%20Out%20the%20Top%2010,is%20what%20many%20people%20believe.> accessed 29 March 2025.

[18] Natural History Museum, 'Almost 70% of Plastic Waste Produced by 20 Countries' (*Natural History Museum*, September 2024) <https://www.nhm.ac.uk/discover/news/2024/september/almost-70-of-plastic-waste-produced-by-20-countries.html> accessed 30 March 2025.

[19] Umweltbundesamt, *Data on the Environment: Environmental Monitor 2020* (Umweltbundesamt) <https://www.umweltbundesamt.de/sites/default/files/medien/376/publikationen/data-on-the-environment_environmental-monitor-2020.pdf> accessed 28 March 2025.

accordingly.[20] The Germany's Packaging Act,[21] aims to reduce environmental impact and increase recycling rates, by mandating businesses placing packaging material on the German market, to ensure collection and recycling of packaging materials. The compliance is ensured by enforcing strict penalties, including fines and sales bans.

Till date, several north American and south Australian states and 10 European nations have implemented Deposit Refund Scheme (DRS).[22] While purchasing the bottles consumers pay a deposit amount which is reimbursed once the empty bottles are returned. The price difference between "one-way" bottles and the recyclable bottles after reimbursement is high. This incentivizes people to choose these recyclables bottles and return them rather than using the environmentally damaging plastic bottles. Germany has achieved a 98.4% return rate in the DRS since its adoption, making it an undeniably successful waste management initiative. Such schemes are based on the polluter-pays principle.

Germany introduced The Green Dot System (1991):

- It requires the manufacturers to place a green label outside the packaging indicating that it must be accepted by the recycling facilities.
- A dual waste collection system where both, private companies and already existing municipal companies collect household packaging waste.
- This has been adopted by 130,000 companies across 23 European countries. Today, over 460 billion packages are labelled with Green Dot.[23]

India already follows the polluter-pays principle, but the implementation gaps, inadequate infrastructure for collection, tracking, segregation, recycling of waste, weak enforcement of regulations, and reliance on informal sectors hinders progress. These lead to high levels of uncollected and mismanaged waste. Adoption of schemes and incentives that promote circular economy, and incorporation of successful global models like DRS, The Green Dot System, and waste-to-energy initiatives can significantly reduce environmental impact while enhancing efficiency.

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[20] Earth.Org, 'Waste Management in Germany: A Renewable Approach' (*Earth.Org*) <https://earth.org/waste-management-germany/> accessed 29 March 2025.
[21] Zentrale Stelle Verpackungsregister (ZSVR), *Minimum Standard Pursuant to Section 21 (3) of the German Packaging Act* (2022) <https://www.verpackungsregister.org/fileadmin/files/Mindeststandard/Minimum_standard_Packaging_act_2022.pdf> accessed 30 March 2025.
[22] TOMRA, 'Germany's Deposit Return Scheme' (*TOMRA*) <https://www.tomra.com/reverse-vending/media-center/feature-articles/germany-deposit-return-scheme> accessed 25 March 2025.
[23] ibid 20.

Food Safety and Standards Authority of India

Food Safety and Standards (Packaging) Regulations, 2018,[24] sets hygiene and safety guidelines for packaging materials as well as prescribes the limits of the plastic materials that can be used. It lays down hygienic packaging requirements but does not mandate the use of eco-friendly or sustainable packaging products. There is no enforcement against toxic PFAS (forever chemicals) in food packaging. It also fails to address biodegradability standards of the packaging materials. In the absence of policy-driven mandates or financial benefits, many businesses continue to use non-biodegradable and environmentally harmful packaging materials.

Corporate Policies: The Case of Zomato & Swiggy

Food delivery platforms such as Zomato and Swiggy contribute to India's waste crisis. Despite acknowledging their environmental impact, their sustainability initiatives remain largely voluntary and face minimal regulatory oversight. Both companies have introduced measures to reduce packaging waste, but their effectiveness is limited due to weak enforcement, cost constraints, and absence of mandatory corporate responsibility laws. Strengthening Plastic Waste Management Rules by including food aggregators under Extended Producer Responsibility can mandate eco-friendly packaging, drive sustainable practices and reduce single-use plastics in the food delivery sector.

Zomato has taken steps toward reducing its packaging waste footprint, primarily through climate-conscious delivery options.[25]

- Zomato offers a plastic-free packaging option, but it is not mandatory, leading to continued reliance on single-use plastic.
- The company tried compostable cutlery, but high costs and lack of incentives have reduced adoption, with many restaurants continuing use of conventional plastic cutlery due to its affordability and availability.
- Zomato claims to offset 100% of its plastic waste, however, these claims lack third-party verification, raising concerns about corporate greenwashing.[26]

[24] Food Safety and Standards Authority of India (FSSAI), *Compendium of Food Safety and Standards (Packaging) Regulations* (1 February 2022) <https://fssai.gov.in/upload/uploadfiles/files/Compendium_Packaging_01_02_2022.pdf> accessed 27 March 2025.

[25] Zomato, *ESG Fact Sheet FY2024* (2024) <https://b.zmtcdn.com/investor-relations/esgfactsheetfy2024.pdf> accessed 30 March 2025.

[26] Economic Times, 'Zomato CEO Deepinder Goyal Defends 100% Green Deliveries after Shareholder Challenges the Claim' (*Economic Times*, 7 December 2024) <https://economictimes.indiatimes.com/news/india/zomato-ceo-

- Without external audits and transparency, the effectiveness of sustainable programs remains questionable.

Ultimately, Zomato's sustainability lacks legally binding commitments, reducing their overall impact.

Swiggy has taken steps to promote sustainable packaging, primarily through the adoption of EVs for deliveries.[27]

- Swiggy collaborated with vendors to trial biodegradable and eco-friendly alternatives, but widespread adoption has been hindered by high costs and lacks of regulatory push.
- In the absence of a legal mandate or financial support, most vendors continue to rely on plastic packaging due to its affordability.
- Lack of mandatory corporate responsibility law allows businesses to prioritize cost over sustainability.
- Swiggy markets its sustainability initiatives, but the lack of external oversight or verification raises concerns about greenwashing.

Ultimately, the actual impact of Swiggy's initiatives remains unclear.

Zomato and Swiggy operate without any legal obligations for sustainable packaging, making their sustainability policies primarily marketing-driven, and lacking financial or legal accountability. While voluntary participation has led to some progress, the absence of enforceable mandates has resulted in slow and inconsistent adoption of eco-friendly practices.

IV. RETHINKING AND REINVENTING SUSTAINABLE FOOD PACKAGING

What if the very waste that poisons air, is transformed into something useful? Instead of burning millions of tons of crop residue and polluting the air, we can utilize this 'waste' into packaging material that is sustainable and eco-friendly in a true manner.[28] Being an agrarian economy, stubble waste- an innovation rooted in nature is our untapped gold, in such a way that it not only benefits the environment but also provides additional income for our Farmers. Unlike cardboard, it does not lead to deforestation and high-water footprint but gets easily degraded while preventing methane emissions when designed correctly.

deepinder-goyal-defends-100-green-deliveries-after-shareholder-challenges-the-claim/articleshow/116080442.cms?from=mdr> accessed 27 March 2025.

[27] Swiggy, '*Sustainability*' (Swiggy Corporate, 2024) <https://www.swiggy.com/corporate/sustainability/> accessed 30 March 2025.

[28] Salian P, "Packaging Made From Crop Waste Could Curb India's Pollution" *Bloomberg* (24 April 2018) <https://www.bloomberg.com/news/articles/2018-04-24/packaging-made-from-crop-waste-could-curb-india-s-pollution> accessed 27 March 2025.

According to the Ministry of New and Renewable Energy (MNRE), India generates on an average 500 million tons of crop residue per year.[29] This waste, even after it is utilized as fodder and fuel, 140 million tonnes of it

remains in excess. A substantial part of this excess is burnt every year.[30] This practice of stubble burning is a significant contributor to air pollution, turning the National Capital, Delhi, into a gas chamber during the harvesting season.

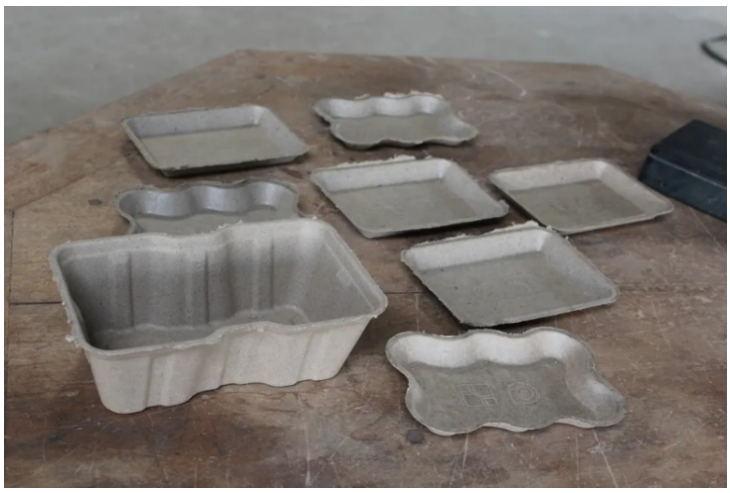

Figure 2: Packaging made from crop waste[31]

To maximize the benefits of stubble-based packaging, it can be designed to be decomposed aerobically (in presence of oxygen) rather than anaerobically (in absence of oxygen). Such design can prevent methane emissions. Specific techniques or process that can be followed are:

- Infusion of biochar (a carbon rich material) to increase oxygen penetration and speed up degradation.[32]
- Creating a thinner and more porous design, allowing microbes to penetrate quickly.

[29] Gorain, Subrata, Ayushman Malakar, and Subhajit Chanda. 2021. "An Analysis of Carbon Market and Carbon Credits in India". *Asian Journal of Agricultural Extension, Economics & Sociology* 39 (2):40-49 <https://doi.org/10.9734/ajaees/2021/v39i230528> accessed 29 March 2025.
[30] Abdurrahman M, Chaki S and Saini G, "Stubble Burning: Effects on Health & Environment, Regulations and Management Practices" (*Elsevier BV,* 1 December 2020) <https://www.researchgate.net/publication/344879198_Stubble_burning_Effects_on_health_environment_regulations_and_management_practices> accessed 27 March 2025.
[31] ibid 28.
[32] Tapia M, "Biochar-Composting Substantially Reduces Methane and Air Pollutant Emissions from Dairy Manure" (*Valley Institute for Sustainability, Technology, and Agriculture*) <https://vista.ucmerced.edu/biochar-composting-substantially-reduces-methane-and-air-pollutant-emissions-from-dairy-manure/> accessed 29 March 2025.

- Coating with biopolymers like Alginate (from seashells) and starch instead of PFAS (forever chemicals) used in cardboard.

Stubble based packaging can be made from residue of crops with high cellulose and fibre content which provide strength and durability. Some of them are:

Table 1: Different materials that can be used to make sustainable packaging

RAW MATERIAL	UTILIZATION
Paddy Straw	Rich in lignocellulose, giving it strength and flexibility.[33]
Wheat Straw	Has long, strong cellulose fibres, making it durable and sturdy for packaging while remaining lightweight.
Barley Straw	High cellulose content, making it an excellent alternative to wood pulp in packaging.
Sugarcane Bagasse	Residue left after juice extraction is naturally moisture-resistant and used in food packaging (plates, cups, trays).
Corn Husks and Stalks	Lightweight yet sturdy, making it ideal for flexible and moulded packaging.
Millet & Sorghum Stalks	Rich in fibres that can be moulded into packaging for electronics and food items.
Bamboo Waste	Naturally strong and fast-growing**.** Can be used for luxurious and eco-friendly packaging.

Innovation in eco-friendly packaging is not limited to stubble waste alone; several other types of plant or natural based materials can be used to create packaging for food and other types of products.[34]

[33] Jeetah P, Golaup N and Buddynauth K, "Production of Cardboard from Waste Rice Husk" (*Journal of Environmental Chemical Engineering*, March 2015) <https://www.sciencedirect.com/science/article/abs/pii/S2213343714002498> accessed 29 March 2025.
[34] ibid 7.

Banana Fiber Packaging

Banana Fibre can be extracted from trunks and stems of banana plants after harvest which is typically waste material. This would need no additional farming, reducing land and water footprint. It can be made into naturally tear resistant, paper like sheets for wrapping or to be used as a bag.

Coconut Husk Fiber Packaging

This can be easily sourced from tropical areas of India and Sri Lanka. It has strong natural lignin and cellulose fibres which makes it lightweight and highly durable. It can serve as a great alternative for Styrofoam, for being tough and impact resistant. Products needing protective boxes can use this material of packaging.

Cornstarch-Based Bioplastics (PLA – Polylactic Acid)

This material is made from fermented corn sugars but is biodegradable only under industrial composting. It is mouldable into bottles or food containers, can withstand heat and moisture making it ideal for fast food packaging[35]. It can also be used to create flexible films for food wrapping. It produces 70% lower CO2, emissions than petroleum-based counterparts.

Mycelium Mushroom-Based Packaging

Mycelium (mushroom root structure), can be grown using existing agricultural waste like stalks, sawdust and husks within days. It is mouldable, lightweight and sturdy, making it ideal for fragile products needing shock absorption. Companies like Ecovative (USA) and MycoWorks (Europe) are currently using Mycelium to make environment friendly packaging.[36]

Seaweed & Algae-Based Packaging

It can be harvested from Ocean-Farms using invasive seaweed species which can also help in recovery of marine ecosystems. It potentially can be used for packaging of single use food wraps and sachets considering its water solubility, oxygen resistance, and ability to extend the

[35] Nicasio F, "9 Biodegradable Packaging Materials That Can Replace Plastic" *noissue* (29 October 2021) <https://noissue.co/blog/biodegradable-packaging-materials-that-can-replace-plastic/> accessed 30 March 2025.
[36] Hyun-Jae Shin, Hyeon-Su Ro, Moriyuki Kawauchi and Yoichi Honda, 'Review on mushroom mycelium-based products and their production process: from upstream to downstream' (10 January 2025) *12 Bioresources and Bioprocessing 3* <https://doi.org/10.1186/s40643-024-00836-7> accessed 30 March 2025.

shelf life of perishable products. It can also be created in edible versions making them ideal for consumable products.[37]

All these materials are made from waste or renewable sources, lowering carbon footprint by eliminating the need for deforestation. Many reasons like, research & development, innovation, extraction of raw materials, lack of supply chain, highly specific use, scalability issues, need of specialised machinery etc. can significantly increase the cost, ultimately leading to the need of surging the price of product itself. An increase like this could be the prime reason for companies being hesitant from adopting these types of packaging materials.

The existing plastic supply chain is too cheap and efficient, so how do we drive companies to transition to sustainable packaging?

V. BREAKING BARRIERS TO SCALING SUSTAINABLE PACKAGING

For inclusion of sustainable packaging practices in the market, we need systemic changes in policy, infrastructure, consumer awareness, and corporate accountability. Some solutions to accelerate transition to sustainable packaging are discussed below:

Government should apply the *Polluter Pays, Innovator Gains model* where businesses sticking to conventional and environment harming packaging practices are required to pay high taxes whereas businesses using eco-friendly and biodegradable packaging for a wide range of their products are awarded tax rebates. This will attract companies with different sizes, working in different sectors, hence promoting a beneficial practice throughout the whole market. Another way to encourage corporations to switch to sustainable packaging is to provide subsidized logistics and reduced import duties. Moreover, companies using imported biodegradable raw materials should be given custom duty exemptions.

To develop Supply Chains, Government or Companies can set up rural collection centres where crop waste can be sold in exchange for credits, redeemable as discount on fertilizers and seeds. A step like this can help to ensure steady supply of raw material to the factories manufacturing packaging materials.

Government should fund research and development (R&D) Programs and startups to innovate new technology or materials. Furthermore, Universities and Companies can co-develop more techniques and materials for the same to share the patents. Such Public-Private partnerships

[37] Khan H, "Seaweed-Based Packaging" (*FutureBridge*, 24 February 2022) <https://www.futurebridge.com/industry/perspectives-food-nutrition/seaweed-based-packaging> accessed 29 March 2025.

can help to significantly lower research costs. The United States has successfully funded bioplastic research grants, leading to advancements in corn-based PLA (polylactic acid) packaging.

True sustainability isn't just about creating and switching to new materials, but it is about revolutionising the entire system. Only if the consumers demand accountability over greenwashing, if the corporations prioritize responsibility over profits, and if policies favour innovation over pollution, then sustainable packaging can shift from an exception to the norm. It is the time for us to lead this transformation before the cost of inaction outweighs the cost of change.

VI. POLICY GAPS & RECOMMENDED REFORMS

India's struggle with food packaging waste persists despite significant policy advancements. This stems from insufficient corporate accountability, infrastructural limitations, and a lack of incentives for sustainable alternatives. While existing policies attempt to regulate plastic waste, loopholes and poor implementation prevent meaningful progress. Addressing these issues requires a multi-pronged approach that strengthens India's legal framework, holds food aggregators accountable, and encourages innovation through policy reforms

Current regulations, such as the Plastic Waste Management (PWM) Rules, 2016 (Amended 2022), which introduced Extended Producer Responsibility (EPR), fail to cover key players like food aggregators.[38] In today's era, with the rise of food delivery apps such as Zomato and Swiggy, it is necessary to bring them within the regulatory framework to ensure they take responsibility for the packaging waste they generate. The lax enforcement of international waste treaties allows contaminated plastic to be imported under the guise of being recyclable, exacerbating India's waste burden. Mandatory eco-friendly packaging rules, incorporating food aggregators into the EPR framework, and encouraging the production of biodegradable materials can drive India towards a circular economy and sustainable waste management.

[38] Organisation for Economic Co-operation and Development (OECD), 'Extended Producer Responsibility and Economic Instruments' (*OECD*) <https://www.oecd.org/en/topics/sub-issues/extended-producer-responsibility-and-economic-instruments.html#:~:text=Extended%20producer%20responsibility%20is%20a,goals%20such%20as%20recycling%20targets.> accessed 26 March 2025.

Mandatory Eco-Friendly Packaging Rules

To reduce the environmental burden of food packaging waste, it should be reduced at the source itself. Government must introduce strict eco-friendly packaging regulations across all food businesses, including restaurants, food delivery platforms and retail sectors.

- Biodegradable or recyclable packaging should be made compulsory for all sectors of food business, including restaurants and food aggregators like Zomato and Swiggy.
- Compostable containers, edible cutlery, fibre-based packaging and other plastic-free alternatives should be adopted. These initiatives should be encouraged through financial incentives and strict enforcement.
- A progressive ban on non-recyclable and multi-layered plastic packaging should be enforced along with stricter product lifecycle assessments for packaging materials.

Countries like France[39] and Canada[40] have successfully introduced nationwide bans on single-use plastics. This demonstrates that government-led initiatives make a significant change in the sustainable packaging practice.

The current Extended Producer Responsibility framework primarily applies to manufacturers, importers and FMCG companies, but it does not include the food aggregators within its ambit.[41]

Food delivery platforms, which significantly contribute to plastic waste generation, are not effectively regulated.

- Zomato, Swiggy and other food aggregators must be held accountable for the collection, segregation, recycling and disposal of plastic packaging generated by their services.
- India should set a mandatory recycling target that the food delivery companies must adhere to. For instance, Australia's 2025 National Packaging Target[42] mandates that 100% of packaging should be reusable, recyclable, or compostable, with 70% of plastic

[39] *Packaging Gateway*, 'France Implements Plastic Ban in Restaurants' (*Packaging Gateway*) <https://www.packaging-gateway.com/news/france-plastic-ban-restaurant/?cf-view> accessed 26 March 2025.
[40] Government of Canada, 'Government of Canada Moving Forward with Banning Harmful Single-Use Plastics' (*Environment and Climate Change Canada*, 20 December 2021) <https://www.canada.ca/en/environment-climate-change/news/2021/12/government-of-canada-moving-forward-with-banning-harmful-single-use-plastics0.html> accessed 30 March 2025.
[41] Enterclimate, 'EPR Recycling Targets' (*Enterclimate*) <https://enterclimate.com/epr-recycling-targets#:~:text=EPR%20Targets%20for%20PIBOs&text=It%20has%20further%20been%20clarified,100%20%25%20from%202023%2D24.> accessed 26 March 2025.
[42] Department of Climate Change, Energy, the Environment and Water (Australia), '2025 National Packaging Targets' (*DCCEEW*) <https://www.dcceew.gov.au/environment/protection/waste/packaging/2025-national-packaging-targets> accessed 29 March 2025.

packaging must be recycled or composted, and 50% of packaging should incorporate recycled content.

- Plastic Credit Systems should be introduced, requiring companies to invest in waste recovery programs proportional to their plastic footprint. Drawing inspiration from India's Green Credit Programme (GCP)[43] under the LiFE initiative and integrating it into the EPR system could further incentivize plastic waste reduction through tradable credits and regulatory compliance.

EPR models in other countries have shown significant improvements in their plastic waste management. Similarly, India can also adopt a "polluter pays" principle for food aggregators. For instance:

- In South Korea, EPR led to a 70% increase in recycling rates for packaging materials between 2003 and 2017.[44]
- In Sweden, the EPR system has achieved 87.6% recycling rate for PET bottles.[45]

Despite being a part of the Basel Convention, India continues to import contaminated plastic waste under the guise of recyclable material. Certain changes in the policy should be made such as:

- A complete ban on contaminated waste imports exceeding the prescribed legal contamination limits,[46] which is 2% should be implemented.
- Customs screening processes at ports should be strengthened to ensure that only genuinely recyclable plastics are imported.
- Harsher penalties and fines should be imposed to deter illegal waste trade.

Countries like Sweden and Switzerland,[47] have zero landfill rates as they have a very strict import regulation and effective waste segregation policies. India can adopt similar strategies to prevent waste mismanagement and promote a sustainable waste management system.

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[43] Ministry of Environment, Forest and Climate Change (MoEFCC), 'About Green Credit Programme' (*MoEFCC*) <https://www.moefcc-gcp.in/about/aboutGCP?utm_campaign=fullarticle&utm_medium=referral&utm_source=inshorts> accessed 29 March 2025.

[44] Plastics for Change, 'From Pollution to Solution: How Extended Producer Responsibility is Reshaping the Future of Plastics' (*Plastics for Change Blog*) <https://www.plasticsforchange.org/blog/from-pollution-to-solution-how-extended-producer-responsibility-is-reshaping-the-future-of-plastics> accessed 28 March 2025.

[45] Pantamera, 'Deposit Statistics' (*Pantamera*) <https://www.pantamera.nu/en/private-citizen/facts--statistics/deposit-statistics> accessed 28 March 2025.

[46] *Waste Dive*, 'India to Enforce Contamination Rate Inspections for Paper Imports' (*Waste Dive*) <https://www.wastedive.com/news/india-enforce-contamination-rate-inspections-paper-imports/570427/>accessed 30 March 2025.

[47] European Environment Agency (EEA), 'Diversion of Waste from Landfill' (*EEA*) <https://www.eea.europa.eu/en/analysis/indicators/diversion-of-waste-from-landfill> accessed 28 March 2025.

Incorporating the idea of *Greenwashing* in Consumer Protection Act 2019, Section 2(28) as "Misleading Advertisement" and strictly defining terms like "Sustainable", "Bio-degradable" and "Green" in laws regulating labelling of products can result in limiting unethical practices by corporations. A rule requiring mandatory certification of "eco-friendly" labels by a third party should also be introduced.

Widening the scope of Corporate Social Responsibility (CSR) for inclusion of Sustainable Packaging Practices can also encourage companies to work towards innovations in the sector. Significant Research & Development in techniques to create sustainable packaging which is accessible to the market to use, can also be termed as CSR. All these should also be backed with proof to make sure that the environment was positively impacted by their efforts.

Mandatory Sustainable packaging for restaurants

Food aggregators generate significant waste, yet they face no mandatory sustainable regulations. Food delivery platforms must ensure that their partner restaurants comply with sustainable standards. Introducing corporate responsibility laws that hold these companies accountable can drive meaningful change in plastic packaging waste reduction.

Eco-friendly packaging should be mandated for all the restaurants listed in the food delivery apps so that they adhere to the use of biodegradable or recyclable packaging materials for delivery purposes. Food aggregators should include sustainable requirements clauses in their partnership agreements, to ensure compliance with government-mandated packaging standards. A Certification system should be introduced, in which restaurants that transition to sustainable packaging are issued with certificates to authenticate their achievement. Furthermore, "Green Restaurant" ratings can be incorporated, which incentivizes customer preference for eco-conscious businesses.

India can replicate a model, successfully adopted by Denmark,[48] in which they implemented strict regulations on takeaway packaging, mandating at least 60% of food packaging to be recyclable.

The EU circular Economy Action Plan[49] has successfully implemented financial incentives for green innovation, and India can adapt to its waste management strategy. A similar strategy to

[48] European Environment Agency (EEA), 'Denmark: Agreement on Recycling of Transport Packaging' (*EEA*, 20 April 2016) <https://www.eea.europa.eu/publications/92-9167-052-9-sum/page009.html> accessed 30 March 2025.

[49] European Commission, 'Circular Economy Action Plan' (*European Commission*, 11 March 2020) <https://environment.ec.europa.eu/strategy/circular-economy-action-plan_en> accessed 29 March 2025.

promote circular economy was introduced in India's Solid Waste Management Rules, 2016[50] draft notification, which should also be taken into consideration when formulating new plastic regulations.

Penalties for Excessive Plastic Use

Even if progressive taxation and penalties is imposed, many FMCG giants and large corporations would often opt to pay fines rather than comply with sustainable practices. For deterrence and ensuring compliance across all business, heavier fines must be imposed on repeated offenders, alongside a three-strike policy that could ultimately lead to revocation of business licence for persistent violations.

These penalties should be accompanied with clear plastic reduction targets, to ensure that food aggregators and restaurant partners steadily decrease their plastic footprint over time. Food delivery platforms should mandatorily publish annual reports with details of plastic footprint, to ensure corporate transparency and accountability.

The United Kingdom, recently introduced a Plastic Packaging Tax (PPT),[51] charging £217.85 per tonne of plastic that contains less than 30% recycled material. India could use a similar framework to reduce the use of virgin plastic.

Encouraging Innovation through Policy

India must reform its intellectual property laws to encourage the rapid adoption of sustainable innovations.

- Patent laws must be reformed to simplify the process of approvals for green technology.
- Eco-friendly packaging solutions should have fast-tracked patent approvals.
- Open-access patents should be introduced for recyclable and compostable packaging materials, to avoid monopoly by a few corporations.

China's green technology patent reforms have significantly boosted investment in the sector of sustainable packaging.[52]

[50] Central Pollution Control Board, *Solid Waste Management Rules, 2016* (CPCB, 2016) <https://cpcb.nic.in/uploads/MSW/SWM_2016.pdf> accessed 20 March 2025.
[51] UK Government, 'Plastic Packaging Tax (PPT) Statistics: Background and References' (*Gov.uk*) <https://www.gov.uk/government/statistics/plastic-packaging-tax-ppt-statistics/plastic-packaging-tax-ppt-statistics-background-and-references> accessed 30 March 2025.
[52] Qingyong Xu, Yuyan Xie, and Haoyuan Ying, 'Exploring the Green Patent System in China from the Perspective of Achieving the Dual Carbon Goal: Development, Challenges and Prospective Enhancements' (*2024*) <https://www.nature.com/articles/s41599-024-04279-5> accessed 30 March 2025.

India should reduce reliance on imported biodegradable packaging materials, as it increases costs, and limits widespread adoption. Establishment of "Make in India" incentives for domestic production of biodegradable packaging would promote self-sufficiency and reduce costs. By encouraging and developing localized production, biodegradable packaging can become a more affordable and viable option for businesses across the country.

VII. CONCLUSION

A trinity of reform in Design, Technology & Law can be a giant leap for India towards sustainability. A circular economy isn't just better recycling but rethinking waste entirely. There is a need to transform policies that are preventive rather than reactive in order to bring this idea to reality. This would not be just a step towards a better future for us, but a better world to live in for the wildlife that continues to suffer at the cost of our actions and inactions. We don't own earth, but we sure do owe the responsibility to handle its resources wisely.

There is an urgent need to evolve from passive regulations that cater to corporate convenience to active enforcement that prioritizes sustainability. Minor adjustments are no longer an option. We require impeccable and collective efforts from Governments, Corporations, & Consumers altogether to turn the tide before it's too late.

*We have two choices—**redesign the system now or be buried under the waste of our own making.** The future won't wait, and neither should we.*

GREEN CRIMES AND GREEN CRIMINOLOGY: COMBATING ECOCIDE FROM ZEMIOLOGICAL PERSPECTIVE

Dr. Sanjukta Ghosh[*]

ABSTRACT

Realizing the need of taking environmental crimes as severe global crimes affecting human and non-human societies, the present research paper delved into why criminology should care about environmental issues and harms, and analyzed the possible avenues within criminology in protecting and conserving the same. An attempt has also been made to examine how endeavors to reconcile zemiology, and criminology can benefit ecological sciences. It analyses how applying criminological principles and interpretations to understand environmental issues can help create a code to safeguard and preserve the environment. Lastly, it links criminology with the environment and zemiology to battle against ecocide and promote environmental justice by ensuring fair ecological treatment.

Keywords: *Green Crime, Zemiology, Environment, Human Behavior, Right to Environment*

I. INTRODUCTION

Kehte hain Ved Puran, bina vriksh ke nahin kalyan[1]

Criminologists, as being the radical and critical thinkers, have often been preoccupied with crimes affecting human bodies, property, and street crimes. The concepts of Green Crimes and Green Criminology have long existed (without being called so) at a close nexus with environmental law, environmental science, sociology, geology, ecological science, social science, eco-sociology and law. The green movement solidified during the eighties and began catching the attention of criminologists (rather than orthodox criminologists) in the early nineties. Recent research and studies have shown that we have stepped into an *"era of global ecological collapse"* due to severe hostile human activities and antagonistic behavioral patterns towards the environment. Growing concerns over environmental degradation have made ecologists, sociologists, environmentalists, scientists and criminologists think beyond strict criminological ideologies and perspectives. As a result, lately, attempts are being made to

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[1]In translation this reads: without trees there's no wellbeing as told by the Hindu sacred texts

reconcile zemiology (predominantly the study of social harms, perceived as a critique of criminology) with criminology.

Over an array of time, the interplay between humankind and the environment has drastically led to irrevocable and irreparable consequences for both.[2] These irrevocable and irremediable consequences spring from illegal and legal activities, making those much more devastating.[3]Green-collar crimes or green crimes, unlike white-collar crimes[4] or blue-collar crimes,[5] are crimes committed against the environment. Following a much narrower and lenient path, traditional criminology defines green crimes as any activity that infringes or circumvents a law protecting the environment. Green criminology, on the other hand, is founded upon environmental rights and environmental justice.[6]Unlike traditional criminology, it is a transgressive criminology type, breaking the boundaries.[7] This divergent thinking was founded upon the urge to visualize environmental harms as damaging the environment and having a 'slow poisoning' effect on human civilization.[8]This *'thought'* established a liaison between preserving the environment and protecting society. The concept of Z*emiology*stems from the Greek word *zemia,* which means harm.[9] So, within the broader notions of the term, zemiology is the study of harms from societal perspectives. Damage done or harm caused to the environment is causing irreversible damage to society. It is often argued that the concepts of 'feminism' and 'zemiology' evolved as an answer to traditional criminological precepts and the notions of crime within the strict legal paradigm. In other words, zemiology is going beyond core criminology. In the latter half of the nineties, several radical thinkers in academics and

[2] Mark Hamilton, *Environmental Crime and Restorative Justice* (palgravemacmillan 2021)

[3] Michael Lynch, 'The Greening of Criminology: A Perspective on the 1990s' (1990)

[4] White collar crime is a non-violent crime where the primary motive is typically financial in nature. According to the FBI, the term white-collar crime came about in 1939. It quickly became synonymous with frauds committed by business and government professionals. White-collar crimes are very elaborate in nature. Examples include public corruption, securities fraud, and money laundering

[5] In criminology, blue collar crimes are crimes committed by an individual from a lower social class. The term blue-collar crime originated in the early 1900s as a term to describe American manual laborers. These jobs are typically messy, so workers would wear dark clothing to mask the dirt and debris. Many of those workers also wore blue shirts and uniforms. They were mainly construction workers, janitors, blacksmiths, and laborers. These types of workers normally received a meager hourly wage; though pay varied greatly according to your niche or industry

[6] Rob White, *Crimes against Nature: Environmental Criminology and Ecological Justice* (Willan Publishing 2008)

[7] Matthew Hall, 'Victims of Environmental Crime: Routes for Recognition, Restitution and Redress' in Toine Spapens, Rob White and Marieke Kluin (eds) *Environmental Crimes and its Victims: Perspectives with Green Criminology* (Routledge 2014)

[8] Rob White & D Heckenberg, *Green Criminology: An Introduction to the Study of Environmental Harm* (Routledge 2014)

[9] Edward J Wright, 'Decolonizing Zemiology: Outlining and Remedying the Blindness to (Post)colonialism Within the Study of Social Harm' (2023) 31(1) *Critical Criminology* 127–144, DOI: 10.1007/s10612-022-09682-5 <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC10025055/> accessed 6 January 2024

sociology developed an idea of social harm as an alternative to the more '*legally sound'* crime., thereby thinking beyond strict legal principles by embracing a more environmental-centric approach.

On the contrary, green criminologists argue that environmental harms should be studied, whether or not there is specific legislation to that effect and irrespective of any apparent violation of criminal laws. It considers crime from an eco-centric point of view and condemns traditional criminology for being too human-centered or anthropocentric.[10]The foundation of the concept of green criminology, which can be called *criminology's extra-disciplinary theoretical engagement*, is actually green criminology's interface with theories and ideas outside criminology or outside orthodox criminology. The concept of green criminology does not go beyond criminology; instead, it can be said to embrace the expanding horizons of criminology within traditional criminology and consequently develop and broaden the premise of radical criminology[11].

Critical or radical criminology, being anthropogenic from its inception, incorporated eco-centrism after much debate and controversy. In the 19thcentury, we witnessed remarkable sociological and legislative reforms to address and redress environmental and animal rights. In the 19th century, they also established a straight nexus between issues of environmental degradation on the one hand and impoverishment, societal hierarchy and social order on the other[12]. Crimes against the environment, recalcitrant and risks pose instantaneous and extensive danger to human health and security.[13]

II. GREEN CRIMINOLOGY, GREEN CRIMES AND GREEN COLLAR CRIMES: WHAT'S IN THE NAME?

The evolution of the notions of green criminology, although not free from paradoxes, owes much to the attempts made by sociologists, scientists, environmentalists and jurists predominantly to analyze the theoretical and pragmatic camaraderie between two very distinct aspects of criminological paradigm- traditional criminology and green criminology. The

[10] Karl Thompson, 'Green Criminology and Green Crime' (ReviseSociology.com, 26 April 2019) <https://revisesociology.com/2019/04/26/green-criminology-and-green-crime-revision-notes> accessed 9 September 2022

[11] Radical criminology, closely linked to critical criminology, is a Marxist approach to crime that looks at criminality in its full social context and specifically considers how the ruling class uses crime to further its own interests. Radical or critical criminologists are interested in the creation of laws, the criminal acts themselves, the societal reaction to the acts, and the long-term consequences of both the acts and the reaction

[12] T Benton, 'Rights and Justice on a Shared Planet' (1998) 2 (2) *Theoretical Criminology* 149-175

[13] C Gibbs, M L Gore, E. F. McGarrell and L Rivers, 'Introducing Conservation Criminology: Towards Interdisciplinary Scholarship on Environmental Crimes and Risks*'* (2009) 49(4) *British Journal of Criminology* 537–555

beginning of the 90s witnessed a crucial development in criminology as its ambit was stretched further to include environmental crimes and harms much with the seminal works of South, White, Lynch and Benton.[14]Moreover, movements in green environmentalism and animal rights surfaced at about the same time, in the early to mid-nineties. However, looking at the present trends of 'environmentalism', can it really be said that environmentalism is itself a by-product (by-philosophy is the correct term though) of environmental degradation?[15]Michael Lynch conceived the term green Criminology or GC[16], as he could not ignore the possibility of radical criminology getting benefitted from its association with an ecological perspective.[17]Even after three decades since the term GC has been coined, there is no general consensus on the definition of GC or green criminology. It is mainly understood as an aspect of criminology dealing primarily with environmental movements. The vagueness in the understanding of GC suggests that its scope and extent are yet to be determined. Expressing concern over this, Michael Lynch, in one of his scholarly works, has stated:

"Although three decades old, GC is marginalized within criminology, treated as if it were a curiosity rather than a field of research focusing on a tremendously important set of global concerns."[18]

With subsequent studies and researches in the field, the extent of GC has been widened enough to take into account environmental laws, their construction, interpretation and execution, the impact of environmental degradation on human lives and non-human living entities, concerns over environmental justice and all the ways by which the living and non-living earth systems are jeopardized.[19]Lately, environmental degradation and changes in climatic conditions have become inevitable and have become accepted realities.[20] The irony is; we cut trees, destroy forests to make roads and buildings and then we paint those streets and buildings with pictures of trees and write *"save trees/save water, save life"*.

[14] Matthew Hall, *Exploring Green Crime* (Palgrave Macmillan 2015)
[15] Ramachandra, *How Much Should A Person Consume?* (Hachette Book Publishing India Pvt Ltd 2006)
[16] Michael Lynch, ' The Greening of Criminology: A Perspective on the 1990s' (1990), *Hereinafter referred to as GC*
[17] A. N Cao and T Wyatt, 'The Conceptual Compatibility Between Green Criminology and Human Security: A Proposed Interdisciplinary Framework for Examinations into Green Victimization' (2016) 24(3) *Critical Criminology* 413-430
[18] Michael J Lynch, 'Green Criminology and Environmental Crime: Criminology That Matters in the Age of Global Ecological Collapse' (2019)
[19] ibid
[20] R Walters, 'Toxic Atmospheres: Air Pollution and the Politics of Regulation' (2010)

III. GREEN CRIMES AND GREEN CRIMINOLOGY: PUTTING IN CONTEXT

Green crimes, at the most abstract of heights, refer to the crimes committed against the environment, including space and against non-human animals & anthropoids[21]. Considering the effects, those are crimes committed against mankind. Green criminology, consequentially, is the study of those crimes and harms committed against humanity, the environment (including space) and non-human animals (including anthropoids) committed by common masses and powerful institutions (including governments). To understand the concept of green crimes through criminological notions, it is imperative to understand the premise of criminology incorporating green crimes as criminology's *'extra-disciplinary'* divergence in the fields of environmental law, environmental science, sociology, eco-sociology[22], geosciences[23], ecological science, social science and law.[24] In the earlier stages, it was thought that environmental issues were important but not as important as state crimes, and criminology should be more concerned with crimes relating to the human body and property.

The Greening of Criminology[25]

Criminologists have started showing interest in environmental issues for the last twenty-five years or so more because of-

- Growing concerns about environmental harm;
- Contemporaneous developments in environmental jurisprudence and activism, environmental politics, green politics[26], ecological sciences and sociological sciences;
- Emerging concepts like conservation criminology[27], eco-global criminology, environmental criminology, bio-piracy and bio-trafficking;

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[21] Resembling a human being in form. A higher primate, especially an ape.

[22] Eco-sociology is also known as ecological sociology or environmental sociology is the study of interactions between societies and their natural environment.

[23] Geoscience also known as Earth Science is the study of Earth. It includes much more than just rocks and volcanoes. It studies processes that form and shape Earth's surface, the natural resources we use, and how water and ecosystems are connected.

[24] Dr Gary Potter, *'Greening Criminology: Combining Criminological and Ecological Sciences in Forming and Enforcing Environmental Law'* (Round Table Discussion, University of Lancaster, 15 May 2017) <https://youtube.com/watch?v=9JghuHI05kA&feature=share> accessed 12 November 2022

[25] I acknowledge Michael J Lynch's (1990) use of the term 'greening of criminology' and the advances offered by him in his research paper *The Greening of Criminology: A Perspective for the 1990s,* but in this paper I have used the term in a different context to show why criminologists have started taking notes of environmental harms seriously alongside crimes against human body and property.

[26] Green politics connects action/activism to political and economic theory that views environmental destruction as an outcome of the structure of modern, industrialized capitalist production and consumption patterns that are protected by corporate ideology, governmental consumption, and tax regulation. *See* Michael Lynch, 'The Greening of Criminology: A Perspective on the 1990s' (1990)

[27] An interdisciplinary science incorporating criminology and crime science risk and decision making and natural resource conservation and management [*details can be found at http://conservationcriminology.com/]*

- Environmental discourses at the international forums.

In sync with the above discussion on the *Greening of Criminology,* it would be more pertinent to find out why criminologists should care about the environment. According to Dr. Gary Poter, criminology and environmental issues are connected at five pitches.[28]

- Identification of the range of crimes, their structural causes and administration of the criminal justice system in the context of environmental issues.
- Traditional criminological concepts like crimes relating to race can be extended to include environmental racism[29] and analyzing the definition of crime and the substance of criminology concerning the environment.
- Environmental, ecological and animal rights are an extension of human rights notions.
- Environmental crimes as a crime against humanity, extension to the zemiological perspective[30].
- Environmental harm is a cause of crime itself.

The fifth connecting line between criminology and environment is, the most important one; '*environmental harm is the cause of crime itself'.*

The Province of Green Criminology

As already discussed, green criminology as a field of study still requires a lot of attention and investigation, including firm clarification of its theoretical pedestals, methodologies, ambit and most importantly, its intended/targeted outcomes. The nomenclature itself suggests an amalgamated approach into its suggested readings and literatures.[31] However legal the concept of green criminology might sound, there are quite a few notional contrasts between 'green crimes', 'environmental risks', 'social harms' and 'environmental justice'.[32] Moreover, the concepts of 'environmental justice' and 'eco-justice' need to be differentiated.

[28]Gary Potter, *'What is Green Criminology?'* (2010) https://www.greencriminology.org/monthly/WhatIsGreenCriminology.pdf accessed 12 November 2022; Gary Potter, *'Greening Criminology: Combining Criminological and Ecological Sciences in Forming and Enforcing Environmental Law'* (Round Table Discussion, University of Lancaster, 15 May 2017) <https://youtube.com/watch?v=9JghuHI05kA&feature=share> accessed 12 November 2022

[29] Environmental racism is a form of institutional racism leading to disposal of hazardous waste being disproportionally placed in communities of color. It also results in indigenous people disproportionately bearing the environmental burdens of mining, and oil or gas extraction.

[30] Zemiology is taken from the Greek word *Zemia,* which means 'harm'. Zemiology is the study of social harms that evolved as a critique of criminology and the notion of crime.

[31] Matthew Hall, Exploring *the Legal, Social and Criminological Contexts of Environmental Harm* (Palgrave Macmillan 2015)

[32] ibid

It took almost seventy years to establish that green criminology not only fits into four-corners of the cardinal principles of criminology, but also stretches its boundaries. Much in this regard, though not in a very pleasant way, can be attributed to major environmental disasters like MIC Gas Leakage incident (1984) in India and BP Oil Spillage (2010) in the Gulf of Mexico- a few amongst many and both being man-made or human triggered. At this point of time, green criminology's intended/targeted outcome becomes more important so as to cure as far as practicable the damage already done, and eliminate as far as feasible the probability of further damages/threats. These incidents call for careful analysis of individual, corporate and state accountability for this rapid deterioration of the global ecological health. In India, Constitutional embodiments in the form of Fundamental Rights[33], Directive Principles of State Policy[34] and Fundamental Duties[35] are there for the holistic development of environment and the Supreme Court of India has been very instrumental with regard to environmental justice[36], but when it comes to the criminal laws those remain in a moribund state. The European Union in the context of protection of the environment directs its member states to apply punitive measures to enforce EU environmental laws.[37] One of the grey areas of green criminology is that a lot of environmental disarrangements are legally done and with societal consensus. Moreover, those are politically safeguarded within the cloak of 'development'. Segregating and classifying green crimes requires a lot of balancing of conflicting interests of individuals, society as whole and of states.[38] This further requires stable, sustainable, and balanced management, allocation and distribution of resources- both ecological and economical. This grey area is rooted within environmental risks, especially those which are mostly unregulated or are very loosely regulated.[39]

Green crimes can take various shapes and forms. There are primary green crimes[40], secondary green crimes (also known as symbiotic green crimes)[41] and tertiary green crimes.

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[33] The Constitution of India, 1950, art 21
[34] The Constitution of India, 1950, art 48A
[35] The Constitution of India, 1950, art 51A, cl (g)
[36] *Vellore Citizens Welfare Forum v Union of India*, [1996] 5 SCC 647; *Ganga River Pollution Case*, [1997] 2 SCC 353; *Indian Council for Enviro-Legal Action. Union of India*, [1996] 3 SCC 212; *Oleum Gas Leakage Case*, [1986] 2 SCC 176
[37] Directive 2008/99/EC of the European Parliament and of the Council of 19 November 2008 on the protection of the environment through criminal law [2008] OJ L 328/28
[38] E Skinnidar, *Victims of Environmental Crime: Mapping the Issues* (International Centre for Criminal Law Reform and Criminal Justice Policy 2011)
[39] C Gibbs, M Gore, E McGarell and L Rivers, 'Introducing Conservation Criminology: Towards Interdisciplinary Scholarship on Environmental Crimes and Risks' (2009) 49(4) *British Journal of Criminology* 537–555
[40] Nigel South and V Ruggiero, 'Green Criminology and Crimes of the Economy: Theory, Research and Praxis' (2013) 14 *Crime, Law and Social Change* 315–336
[41] ibid

Primary green crimes result directly *from destroying or degrading the earth's resources.*[42]Air pollution, deforestation, species decline, water pollution, etc, are the most prominent instances of primary green crimes. Symbiotic green crimes or secondary green crimes include violation of environmental laws, adulteration in food, water, etc. Potter further went *beyond secondary green crimes* to find what, *in the spirit of consistency,* he named *tertiary green crimes,* which were defined as those "committed by environmental victims or as a result of environmental victimization ... [for example] committed as a deliberate or direct response to environmental harm ... [or] exacerbated by the experience of environmental victimization".[43]

IV. GREEN CRIMINOLOGY AND RIGHT TO A HEALTHY ENVIRONMENT: ANALYSING WHAT CRIMINOLOGY CAN SUBMIT TO CONSERVATION AND WHAT CRIMINOLOGY CAN PROCURE FROM THE ENVIRONMENT

Criminology studies human behavioral patterns, which change human behavior and intercept transgressive activities. Almost all environmental discourses examine environmental harms, considering how and to what extent human lives are/have been/could be affected. An efficient and constructive criminal justice system should consider human beings as well as all living creatures, including flora and fauna. It should *'provide justice for all citizens, whether human or non-human animals'*.[44]Benton says, *"it is widely recognized that members of other animal species and the rest of non-human nature urgently need to be protected from destructive human activities."*[45]The criminal justice system and human rights notions are often considered as antithesis. Still, human rights aid environmental protection and criminal justice association does not complicate it; rather, it reinforces environmental rights and justice. Criminology can study the extent of victimization caused by harm done to the environment. It can also formulate rules and regulations by applying criminal laws and other criminological precepts. Substantive criminal laws can define the nature and scope of the term 'crime' in the context of environment and ecology. Procedural criminal laws can prescribe the procedures to be followed while determining the extent of harm and prescribing punishment for the damage done to the

[42] E Carrabine, P Cox, M Lee, K Plummer and N South, *Criminology: A Sociological Introduction.* London (Routledge 2009)

[43] Gary Potter, 'The Criminogenic Effects of Environmental Harm: Bringing a 'Green' Perspective to Mainstream Criminology' in Toine Spapens, Rob White and Marieke Kluin (eds), *Environmental Crime and its Victims: Perspectives within Green Criminology* (Routledge 2014)

[44] Dr Agnus Nurse while delivering the second keynote lecture for the British Society of Criminology's (BSC) 2021 Twitter Conference on 28/01/2021

[45] T Benton,'Rights and Justice on a Shared Planet: More Rights or New Relations?' (1998) 2(2) *Theoretical Criminology* 149–175

environment. They can also collect evidence and conduct a trial process.[46]The mere penalty will not suffice to achieve a complete code for protecting and preserving the environment, as it cannot cure the damage already done; there must be deterring provisions to prevent crimes against the environment. The premise of green criminology is wide enough to include wildlife crimes, too.[47] Crime and violence against animals and wildlife can *'arguably be considered jointly in the context of green criminology's theoretical and practical investigation into criminology's examination of threats and harms that impact beyond the narrow confines of interpersonal violence and property crimes'.*[48]

The right to environment is officially acknowledged juridically by five means[49]-

- ☐ As being acquired from other rights (as in the case of right to life, right to health, etc.),
- ☐ As procedural environmental rights (the right to information, right to access to justice, and the right to public participation),
- ☐ As an autonomous entitlement expressly given under environmental and allied laws,
- ☐ As a constitutionally acclaimed right and,
- ☐ As agreed, upon and mandated by international conferences and conventions and subsequently incorporated by domestic laws and Constitutions.

The right to a wholesome environment as an essential ingredient of the right to health and right to life has been recognized and thus incorporated in a range of international and regional human rights instruments, including the Universal Declaration of Human Rights[50], the International Covenant on Economic, Social and Cultural Rights[51], Convention on the Rights of Child[52].

[46] Zemiology is taken from the Greek word *Zemia,* which means 'harm'. Zemiology is the study of social harms that evolved as a critique of criminology and the notion of crime.
[47] Daan van Uhm, *The Illegal Wildlife Trade: Inside the World of Poachers, Smugglers and Traders* (Springer 2016)
[48] Angus Nurse, 'Masculinities and Animal Harm' (2020) 23(5) *Men and Masculinities* 908–926
[49] Dr Agnus Nurse in *British Society of Criminology's (BSC)* Twitter Conference on 28/01/2021 delivered lecture on Green Criminology and Right to a Healthy Environment. He discussed the first three ways. The fourth and the fifth have been incorporated after a careful study in the context.
[50] UN General Assembly, Universal Declaration of Human Rights, 10 December 1948, UN Doc A/RES/217(III), arts 22, 25(2) and 27(1) <https://www.refworld.org/docid/3ae6b3712c.html> accessed 1 December 2022
[51] UN General Assembly, International Covenant on Economic, Social and Cultural Rights, 16 December 1966, UNTS 993, 3, arts 1, 6, 7, 11, 12, 13 and 15 <https://www.refworld.org/docid/3ae6b36c0.html> accessed 1 December 2022
[52] UN General Assembly, Convention on the Rights of the Child, 20 November 1989, UNTS 1577, 3, arts 24 and 27 <https://www.refworld.org/docid/3ae6b38f0.html> accessed 1 December 2022

The World Charter for Nature manifests five *"principles of conservation by which all human conduct affecting nature is to be guided and judged"*-

- Nature should be respected, and its essential processes must not be damaged.
- The genetic viability of the earth shall not be compromised; the population levels of all life forms, wild and domesticated, must be at least sufficient for their survival, and to this end, necessary habitats shall be safeguarded.
- All areas of the earth, both land and sea, shall be subject to these conservation principles; special protection shall be given to unique areas, to representative samples of all the different types of ecosystems and to the habitat of rare or endangered species.
- Ecosystems and organisms, as well as the land, marine and atmospheric resources that man utilizes, shall be managed to achieve and maintain optimum sustainable productivity, but not in such a way that they co-exist.
- Nature shall be secured against degradation caused by warfare or other hostile activities.[53]

The United Nations Declaration on the Environment[54]proclaims, *"man has the fundamental right to freedom, equality and adequate conditions of life, in an environment of a quality that permits a life of dignity and well-being, and he bears a solemn responsibility to protect and improve the environment for present and future generations"*[55]and also *"the natural resources of the earth, including the air, water, land, flora and fauna and especially representative samples of natural ecosystems, must be safeguarded for future and present generations through careful management as appropriate."*[56]

The Stockholm Declaration brought the world together on a common platform to discuss and take action to restore the environment and prevent further degradation. It also became the cornerstone for the creation of various ministries and agencies regarding the environment.[57] Despite all the efforts and institutional accomplishments, including establishing UNEP, the failure to execute most of its action programmer has induced the United Nations to design follow-up conferences and conventions. The succeeding United Nations Conference on Environment and Development convened in Rio de Janeiro in 1992 (the Rio Earth Summit), the 2002 World Summit on Sustainable Development in Johannesburg and the 2012 United

[53] UN General Assembly, *World Charter for Nature* (28 October 1982)
[54] Declaration of the United Nations Conference on the Human Environment (Stockholm Declaration) (16 June 1972)
[55] UN General Assembly, United Nations Conference on the Human Environment (15 December 1972) UN Doc A/RES/2994, principle 1 <https://www.refworld.org/docid/3b00f1c840.html> accessed 1 December 2022
[56] *ibid.*
[57] Ann Hironaka, *The Origins Of Global Environmental Regime* (Cambridge University Press 2014)

Nations Conference on Sustainable Development (Rio+20) all take their roots in their predecessor- the Stockholm Conference.[58]In 1972, the deliberations of United Nations Economic and Social Council[59], the United Nations Educational and Cultural Organization[60] and the International Union for the Protection of Nature[61], culminated in the United Nations Conference on Human Environment[62] from 5th of June to 16th of June, 1976, at Stockholm in Sweden. Following that, in 1984, an independent group of twenty-two people was constituted by the United Nations, to identify and prepare a report on long term strategies for the environment. The commission was named as the World Commission on Environment and Development (WCED). The commission submitted its report "Our Common Future"[63] in 1987. The report[64] was published in recognition of the former Norwegian Prime Minister, Mr. Gro Harlem Brundtland, who also chaired the Commission. The Brundtland Report solidified the spirit of the Stockholm Declaration towards environmental issues and concerns and concretized the argument in the global political agenda. The Brundtland Report structured the concept of 'sustainable development' in words by defining it as "development that meets the needs of the present without compromising the ability of future generations to meet their own needs". This report, also, laid the foundation of the Earth Summit, the adoption of Agenda 21, the Rio Declaration and establishment of the Commission on Sustainable Development. The Convention on Biological Diversity, 1992, was also agreed at Rio. The Earth Summit paved way for the foundation of United Nations Framework Convention on Climate Change[65]. In 2002, United Nations World Summit on Sustainable Development (WSSD), held at Johannesburg, South Africa, was convened to reinvigorate the global commitment to sustainable development and to review the implementation of Agenda 21. Agenda 21, was a monumental document which was conceived during the United Nations World Conference on Environment and Development[66]as a concrete plan of action for the twenty-first century, to achieve sustainable development for a better future. Agenda 21 was designed to strike a balance between a healthy environment and economic development. The Office of the UN High

[58] B O Linner and S Henrik, 'The United Nations Conference on Sustainable Development: Forty Years in the Making' (2013) 13 *Journal of International Environmental Law* 1–22
[59] Hereinafter referred to as UNECOSOC
[60] Hereinafter referred to as UNESCO
[61] Established on 05/10/1948 in France, later renamed as International Union for Conservation of Nature, IUCN, as it is now known
[62] Also known as the Stockholm Declaration
[63] Also known as the 'Brundtland Report'
[64] Hereinafter referred to as the Brundtland Report
[65] Also known as UNFCCC
[66] Also known as UNCED

Commissioner for Human Rights, while discussing the environment, touched upon the issue by stating-

"If you deliberately dump toxic waste in someone's community or disproportionately exploit their natural resources without adequate consultation and compensation, clearly you are abusing their rights... Changes in the environment can have a significant impact on our ability to enjoy our human rights. In no other area it is so clear that the actions of nations, communities, businesses and individuals can so dramatically affect the rights of others because damaging the environment can damage the rights of people, near and far, to a secure and healthy life".

The Convention on Access to Information, Public Participation in Decision Making and Access to Justice in Environmental Matters[67] identified three core areas in matters of environmental protection and justice-

- Right to know[68]
- Right to participate[69]
- Right of access to environmental justice[70]

At the beginning, environmental harms were connected to criminology, particularly by environmentalists, sociologists, ecologists, and biologists. There was a tendency amongst *critical criminologists* to keep these issues out of the purview of 'core criminology' for reasons best known to them—green criminologists, on the other hand, study violations of the fundamental rights concerning the environment. Green criminology's premise considers sovereignty over natural resources and the obligation not to cause harm. To validate the study of green crimes, it is very important to have a well-formulated definition for every research or analysis that begins with well-defined concepts.[71] Moreover, determining the premise of green

[67] *also known as The Aarhus Convention 1998,* done at Aarhus, Denmark, 25 June 1998

[68] Convention on Access to Information, Public Participation in Decision-Making and Access to Justice in Environmental Matters (Aarhus Convention) (adopted 25 June 1998, entered into force 30 October 2001) arts 4 and 5

[69] Convention on Access to Information, Public Participation in Decision-Making and Access to Justice in Environmental Matters (Aarhus Convention) (adopted 25 June 1998, entered into force 30 October 2001) arts 6, 7 and 8

[70] Convention on Access to Information, Public Participation in Decision-Making and Access to Justice in Environmental Matters (Aarhus Convention) (adopted 25 June 1998, entered into force 30 October 2001) arts 9

[71] Michael J Lynch, 'Green Criminology and Environmental Crime: Criminology that Matters in the Age of Global Ecological Collapse' (2020) 6(1) *Theoretical Criminology* 1–18

crimes is necessary to vindicate the study and research of green crimes.[72] Globally, environmental law is one of the fastest-growing areas of international law.[73]

V. CONCLUSION

Regulation of the environment within criminology is still a new canvas, yet human civilization's history is inextricably tied to the natural resources on which our civilization depends. As the demand of human society has grown, it has shown its impact on the ecosystem around us. Human resource consumption has kept pace with our increasing population augmentation and expansion from small nomadic tribes of hunter-gatherers to settled agriculturalists and industrialists. The growing demand for natural resources and the impacts and outputs of the industrial process have leaked out our national boundaries. States cannot keep up with the domestic resources nor prevent them from escaping the pollutants into neighboring territories, so the concern for natural resources evolved. Development under the cloak of *capitalism* [emphasis supplied] persistently impairs and disorganizes nature as it is in the very essence of capitalism that it continually craves expansion at any cost. [74]Many researchers have suggested that *planet blue* is on the verge of *"global ecosystem collapse".*[75]In the words of Ernest Mandel, "*The capitalist's compulsion is to accumulate"*[7677]- meaning the accumulation of capital is a continuous process, employed to gather profits to accelerate capital.[78]

There are thousands of instances of how green crimes have affected ecosystems locally, regionally, nationally and globally. These crimes are as heinous as street crimes, but

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[72] ibid

[73] P Sands and P Galizzi, *Documents in International Environmental Law,* 1396 (2004) [This Comprises a representative selection of essential international environmental treaties and documents]

[74] Michael J Lynch, M A Long, K L Barrett, and P B Stretesky, 'Is It A Crime to Produce Ecological Disorganization? Why Green Criminology and Political Economy Matter in the Analysis of Global Ecological Harms' (2013) 12 *Critical Criminology* 13–32

[75] C F Sato and D B Lindenmayer, ' Meeting the Global Ecosystem Collapse Challenge. Conservation Letters' (2018) 11(4) *Conservation Letters* e12444

[76] Ernest Mandel, *An Introduction to Marxist Economic Theory* (Resistance Books 2002)

[77] John Eatwell, Murray Milgate and Peter Newman, *Marxian Economics* (Palgrave Macmillan, 1990)

[78] Rachel Carson, a noted biologist in the present context observed: "Only within the moment of time represented by the present century has one species-man-acquired significant power to alter the nature of the world. During the past quarter century this power has not only increased to one of disturbing magnitude but it has changed in character. The most alarming of all man's assaults upon the environment is the contamination of air, earth's rivers and seas with dangerous and even lethal materials. This pollution is for the most part irrecoverable; the chain of evil it initiates not only in the world that must support life but in living tissues is for the most part irreversible. In this now universal contamination of the environment, chemicals are the sinister and little recognised partners of radiation in changing the very nature of the world. It took hundreds of millions of years to produce the life that now inhabits the earth- eons of time .... given time-times not in years but millennia-life adjusts-but in the modern world there is no time."

determining their extent and degree is not as simple as those of street crimes.[79] Also, locating territory or place of occurrence is very difficult in cases of green crimes. Due to their diverse nature, proportionally diverse approaches must be deployed to measure them.[80] Planetary Boundaries[81] have been determined so that human activities within the ecosystem and earth can be delimited and *'safe operating limit'* for survival can be created. PBs comprise nine components[82]-*Climate Change, Rate of Biodiversity Loss, Altered Bio-Geochemical Cycles, Stratospheric Ozone Depletion, Ocean Acidification, Global Freshwater Use, Change in Land Use, Atmospheric Aerosol Loading* and *Chemical and Novel Entities.* Adverse anthropogenic impact on ecosystems can also be calculated using Ecological Footprints[8384].

Considering the global character of environmental crimes, stringent environmental codes must be created alongside incriminating environmental crimes within national penal codes and laws of crimes. Crimes against the environment are crimes against humanity. Whether or not, single acts are criminal might not prove adequate, but the impact of that single act should be considered in the long run. The term 'crime' itself should be expanded to include non-penal laws.[85] Reviewing and reconstructing popular, legal, political, economic, ethical and academic interpretations of 'crime' should be done to evaluate and measure 'crime' in the context of the environment and ecosystem.[86] The present paper tried to answer a few of the numerous questions that encapsulate the philosophy of green criminology. The points this paper specifically attempted to discuss and thereby making room for further deliberations and discourses are-

i. Why should criminology care about environmental issues and harms?
ii. How can criminology help in protecting and conserving the environment?
iii. How the melting point between zemiology and criminology can provide for a theoretical underpinning for eco-justice?

[79] Michael J Lynch, 'Green Criminology and Environmental Crime: Criminology That Matters in the Age of Global Ecological Collapse' (2019) 1(1) *Journal of White Collar and Corporate Crime* 50–61
[80] ibid
[81] Hereinafter referred to as PB
[82] J Rockström, Will Steffen, Kevin Noone, Åsa Persson, et al, 'A Safe Operating Space for Humanity' (2009) 461 *Nature* 472–475
[83] Hereinafter referred to as EFs
[84] EFs measure of the demands made by a person or group of people on global natural resources. It has become one of the most widely used measures of humanity's effect upon the environment and has been used to highlight both the apparent unsustainability of current practices and the inequalities in resource consumption between and within countries.
[85] Steve Tombs and David Whyte, 'Crime, Harm and Corporate Power' in John Muncie, Deborah Talbot and Reece Walters (eds), *Crime Local and Global* (Routledge 2009)
[86] Steve Tombs, 'Violence, Safety Crimes and Criminology' (2001) 41 *British Journal of Criminology* 654–674

iv. How effectively can the principles of criminology be constructed to protect and preserve the environment?

And last but not the least-

v. How criminology and zemiology together combat ecocide and promote environmental justice?

If criminology can be said to be the study of crimes, zemiology is the study of harms. There is always a *cause-effect* connection between the two, hence not bipolar. The concepts of *piracy, trafficking, theft or genocide* are not new to criminology or to the law of crimes, but linking these concepts with environment can give it a whole new dimension. *Bio-piracy, bio-trafficking, theft of nature or ecocide are*, as heinous as any crimes affecting human body and property *directly*. The word directly has been very carefully chosen in this context as crimes committed against the environment affects human body and property directly and indirectly and even remotely (the aftermaths of the Bhopal Gas Disaster can still be felt even today after 40 years).

CLIMATE CHANGE AS A GLOBAL THREAT TO HUMAN HEALTH: EVALUATING THE INTERNATIONAL FRAMEWORK FOR THE PROTECTION OF HEALTH

Mritunjoy Barman[*]

ABSTRACT

Severe weather, air pollution, vector-borne disease, and food and water insecurity are all worsened by climate change, which is an international threat to public health. Climate hazards with heightened health risks due to their heightened frequency disproportionately affect vulnerable populations. This study assesses the effectiveness of international agreements, such as the Paris Agreement, the climate-health activities of the World Health Organization (WHO), and the United Nations Framework Convention on Climate Change (UNFCCC). All of these agreements make health resilience and climate adaptation a priority, but are hindered in their efficacy by poor policy implementation, a lack of sufficient funds, and a lack of coordination. To reduce the health risks linked to climate change, international collaboration must be heightened, health and climate policy must be coordinated, and poor nations must be allocated more funds.

Keywords: *Climate Change, Public Health, International Frameworks, Health Policy*

I. INTRODUCTION

Climate change is now a global public health emergency and no longer an environmental concern. Global public health threats are increasing with rising temperatures and extremeweather events, air pollution, and changing disease patterns. Climate change is having a direct and indirect impact on human health, from the growing number of vector-borne illnesses like dengue and malaria to the rising number of heat-related illnesses[1]. The fact that it disproportionately affects vulnerable groups like low-income communities, the elderly, and the developing world population makes a global response now an imperative[2].The international community has adopted several frameworks to counter the effects of climate change after

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[1] A. Kothari, Understanding Biodiversity (Orient Longman 1997) accessed 02 March 2025).

[2]World Health Organization (WHO), Climate Change and Health(WHO, 2021) <https://www.who.int/news-room/fact-sheets/detail/climate-change-and-health> accessed 02 March 2025.

recognizing the dangers it poses to human health. In order to offset the health effects of climate change, the United Nations Framework Convention on Climate Change (UNFCCC), the Paris Agreement, the World Health Organization's (WHO) climate-health program[3]. The efficacy of these frameworks remains controversial, however, as progress continues to be hampered by weak coordination, lack of finance, and policy loopholes of implementation[4].

Human health is affected by climate change in a multitude of manners. The more frequent occurrence and severity of extreme weather events such as hurricanes, wildfires, flooding, and heat waves are perhaps the most visible impact. Aside from direct trauma and death, most catastrophes have long-term health effects, such as mental illness conditions like depression and post-traumatic stress disorder. In addition to increasing ground-level ozone and particulate matter, warming temperatures also increase air pollution, which drives respiratory disease such as asthma and chronic obstructive pulmonary disease[5].

International regimes' role in protecting the health of human beings from climate change is critically analysed in this research. It analyses the scientific processes by which health hazards are linked to climate change, compares the strengths and weaknesses of current international policy, and offers creative suggestions to frame a more robust and health-oriented climate policy. Finally, addressing climate change as a public health issue requires both localized action focused on the well-being of affected populations and greater international cooperation.[6]

II. CLIMATE CHANGE AND ITS IMPACT ON HUMAN HEALTH:

Effects of Heat Waves

Heat waves are the most frequent weather-related cause of death and can lead to heat stroke and dehydration. Populations in northern latitudes that are less accustomed to withstanding extreme heat are more likely to be affected. Poor individuals, those with poor health who are elderly, and young children are more susceptible to illnesses caused by heat than other individuals. By 2050, the proportion of Americans aged 65 and older is expected to increase

[3] World Health Organization, WHO Climate Change and Health Programme (WHO, 2023) <https://www.who.int/health-topics/climate-change#tab=tab_1> accessed 13 August 2025

[4] United Nations Environment Programme, Emissions Gap Report *2024* (UNEP 2024)

[5]According to the Intergovernmental Panel on Climate Change (IPCC), climate change has increased the frequency and intensity of extreme weather events, leading to severe health impacts, including respiratory diseases, cardiovascular conditions, and mental health disorders. See: IPCC, Sixth Assessment Report: Climate Change 2021 –The Physical Science Basis, <https://www.ipcc.ch/report/ar6/wg1/> Accessed, 03 March 2025

[6] Intergovernmental Panel on Climate Change (IPCC), *Climate Change 2022:* Impacts, Adaptation and Vulnerability (Cambridge University Press 2022) <https://www.ipcc.ch/report/ar6/wg2/> accessed, 02 March 2025.

from today's 12% to 21%, producing a larger vulnerable population[7].The "urban heat island refers to the fact that the local temperature in urban areas is a few degrees warmer than the surrounding environment[8] climate change will most likely result in more frequent, more intense, and longer heat waves during the summer (see 100-degree-days figure), and less intense cold snaps during the winter. a recent evaluation of the science indicates that increases in heat- related mortality due to climate change would outweigh decreases in mortality from cold- snaps. Urban areas are generally warmer than their rural environments. Climate change could make cities even hotter. This would boost the demand for electricity in the summer to power air conditioning, which in turn would boost pollution and greenhouse gas emissions from power plants. The effects of future heat waves could be particularly severe in large metropolitan areas. For instance, in Los Angeles, heat-related deaths per year are expected to double to seven- fold by the end of the 21st century, depending on future growth in greenhouse gas emissions. Heat waves themselves most often also are preceded by spells of stagnant air, which precipitate air pollution and the subsequent ensuing health impacts.

Climate Change Affects Human Health and Welfare

The effects of global climate change on human health and wellbeing were studied in a 2008 report by the U.S. Global Change Research Program. The poor, the elderly, the young, the crippled, and the uninsured will likely feel the effects of most of the projected health effects, according to the analysis. Regional differences in the number of individuals susceptible to the effects and the ability of populations to adapt to climate change, and regional trends in climate change, are projected to lead to regional differences in the impacts of climate change in the United States. Public health infrastructure must first be adapted. Individuals, groups, and government agencies can mitigate the impacts of climate change on human health[9].

Impacts from Extreme Weather Events

Both the severity (rain and wind speeds) of tropical storms and the frequency and intensity of extreme precipitation occurrences are expected to rise in some areas. These severe weather

[7] Population Reference Bureau, The 65-and-Older Age Group in the US Is Projected to Rise from 12% to 21% by 2050, with Numbers Increasing from 58 Million to 82 Million (Population Reference Bureau, 2023) <https://www.prb.org> accessed 12 August 2025.

[8] Thomas R Karl, Jerry M Melillo and Thomas C Peterson (eds), Global Climate Change Impacts in the United States: A State of Knowledge Report from the US Global Change Research Program (Cambridge University Press 2009).

[9] U.S. Climate Change Science Program and the Subcommittee on Global Change Research, Analyses of the Effects of Global Change on Human Health and Welfare and Human Systems: Synthesis and Assessment Product 4.6 (US EPA edn, U.S. Environmental Protection Agency, Washington DC, July 2008) (‘Analyses of the Effects of Global Change on Human Health and Welfare and Human Systems’) ch 2.

conditions have the potential to injure people and, in certain situations, kill them. Similar to heat waves, the poor, elderly, persons with health issues and young children are the groups most at risk. Indirect threats to human health can also come from extreme occurrences in a variety of ways. lowering the quantity of fresh food and water available, interfere with utility, health care, and communication services, increase evacuees' risk of stomach and intestinal illnesses and contribute to carbon monoxide poisoning from portable power generators used during and after storms.[10]

Increases in Ozone

Scientists project that warmer temperatures from climate change will increase the frequency of days with unhealthy levels of ground-level ozone, a harmful air pollutant, and a component in smog. Ground-level ozone can damage lung tissue and can reduce lung function and inflame airways. This can increase respiratory symptoms and aggravate asthma or other lung diseases. It is especially harmful to children, older adults, outdoor workers, and those with asthma and other chronic lung diseases. Ozone exposure also has been associated with increased susceptibility to respiratory infections medication use, doctor visits, and emergency department visits and hospital admissions for increase the risk of premature mortality, and possibly even the development of asthma. Ground- level ozone is formed when certain air pollutants, such as carbon monoxide, oxides of nitrogen (also called NOX), and volatile organic compounds, are exposed to each other in sunlight. Ground- level ozone is one of the pollutants in smog. Because warm, stagnant air tends to increase the formation of ozone, climate change is likely to increase levels of ground-level ozone in already- polluted areas of the most numbers of countries and increase the number of days with poor air quality[11].

III. IMPORTANT INTERNATIONAL ENVIRONMENTAL AGREEMENTS FOR PROTECTION OF HUMAN HEALTH:

Vienna Convention on the Protection of the Ozone Layer, 1985 & Montreal Protocol, 1987

The ozone layer is the shield of protection in the atmosphere. It safeguards the Earth against the Sun's harmful rays. CFCs (chlorofluorocarbons) are known to destroy ozone. Vienna Convention of 1985 and the Montreal Protocol of 1987 aim is to gradually phase out the use

[10]Intergovernmental Panel on Climate Change (IPCC), Climate Change 2014: Impacts, Adaptation, and Vulnerability (Cambridge University Press 2014) <https://www.ipcc.ch/report/ar5/wg2/> accessed 08 March 2025.

and production of ozone-depleting substances. The Montreal Protocol also assigns specific goals to States to phase out CFCs. But it has provided a concession to developing nations to delay putting the treaty into practice it has also provided for the transfer of crucial technologies to developing nations. The sale of ozone-depleting substances is also prohibited under the treaty[12].

Basel Convention (On the control of Trans-boundary Movements of Hazardous Wastes), 1989

Severe harm is caused by hazardous waste. The majority of the time, developed nations export these hazardous wastes to underdeveloped nations. For this reason, this practice holds particular meaning for them. The goal of this convention is to reduce the amount of hazardous waste produced at its source. Without their permission, no export is permitted to nations that forbid the use of hazardous waste. If there is any cause to think that the importer will not manage these wastes in an environmentally responsible and sustainable way, then exports should likewise be prohibited. The availability of disposal facilities in the importing state should be ensured by the exporting state before exporting the Hazardous Waste. State parties should develop and prescribe guidelines for environmentally sound management of Hazardous Waste[13].

Agenda 21

It is a giant 800 page document endorsed by the Rio summit. Included is the Action-Program to attain sustainable development. It sets 115 different programs. While crucial, the document is not enforceable by law. Its recommendations are divided into several different categories, ranging from socioeconomic issues to protect and promote human health, conservation of resources and their management, including avoiding deforestation, desertification, and drought, encouraging sustainable agriculture and rural development, and strengthening networks of women, NGOs, enterprises, the scientific and technological community, and

[12]Vienna Convention for the Protection of the Ozone Layer, adopted 22 March 1985, entered into force 22 September 1988, 1513 UNTS 293; Montreal Protocol on Substances that Deplete the Ozone Layer, adopted 16 September 1987, entered into force 1 January 1989, 1522 UNTS 3 <https://ozone.unep.org> accessed,08 March 2025.

[13]Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal, adopted 22 March 1989, entered into force 5 May 1992, 1673 UNTS 57 <https://www.basel.int> accessed, 07 march 2025.

farmers by means of finance, the exchange of environmentally beneficial technology, education, and international legal tools and mechanisms[14]

Climate Change Convention, 1992

Climate change" refers to long-term changes in temperature and other characteristics caused by the emission of greenhouse gases. Climate change is "a change of climate that is attributed to human activity that alters the composition of the global atmosphere and which is in addition to natural climate variability observed over comparable time periods," according to the United Nations. The convention is attempting to stabilize the GHG emissions, and it imposes general obligations on all (annexed and non-annexed) parties, including decreasing GHG emissions, reporting data on the measures to be implemented, formulating and applying effective measures for complying with the obligations, and cooperation in research and development[15].

IV. INTERNATIONAL FRAMEWORKS ADDRESSING CLIMATE CHANGE AND HEALTH

United Nations Conference on Environment and Development, 1992

The United Nations Conference on Environment and Development (UNCED) or the "Earth Summit" took place at Rio de Janeiro, Brazil in 1992[16]. It is an international conference marking the 20th anniversary of the first Human Environment Conference in 1972 Stockholm, Sweden[17] and it gathered the political leaders, diplomats, scientists, mass media representatives, and non-governmental organizations (NGOs) of 179 countries in a very ambitious effort to tackle the global environmental consequences of human socioeconomic development. At the same time, a record number of representatives of NGOs met in Rio de Janeiro for a 'Global Forum' of NGOs, where they shared their opinions on the prospects of the world in socio-economic development and the environment[18].The Earth Summit concluded that all of us in the world, whether locally, nationally, regionally, or globally, could attain the idea of sustainable development[19]. It also recognized that sustaining human existence on Earth

[14] Agenda 21: United Nations Conference on Environment and Development, Rio Declaration on Environment and Development (UNCED 1992) <https://sustainabledevelopment.un.org/content/documents/Agenda21.pdf> accessed, 06 March 2025.
[15]United Nations Framework Convention on Climate Change (UNFCCC) 1992, art 1 <https://unfccc.int/resource/docs/convkp/conveng.pdf> accessed, 06 March 2025.
[16] United Nations, Report of the United Nations Conference on Environment and Development, Rio de Janeiro, 3–14 June 1992 (Vol I, Resolutions Adopted by the Conference, UN Doc A/CONF.151/26/Rev.1 (1992)) ch I.
[17] United Nations, Report of the United Nations Conference on the Human Environment, Stockholm, 5–16 June 1972 (UN Doc A/CONF.48/14/Rev.1 (1973)).
[18] United Nations, 'United Nations Conference on Environment and Development, Rio de Janeiro, Brazil, 3-14 June 1992' (UN) https://www.un.org/en/conferences/environment/rio1992 accessed, 06 March 2025.
[19] Rio Declaration on Environment and Development (12 August 1992) 31 ILM 874, Principle 1

hinges on combining and harmonizing economic, social, and environmental issues in order to satisfy our needs, and that such an integral strategy is possible. The gathering also recognized that new approaches to how we consume and produce live and work, and make choices were needed to reconcile and balance economic, social, and environmental considerations[20]. In its time, this concept was revolutionary, and it sparked a vigorous debate regarding how to ensure sustainability for development both within and among governments and their people for a brighter future[21].

In the attempt to forge a modern and balanced international partnership, the Rio Conference formulated the following principles. These principles seek to create international agreements that support the integrity of the global developmental and environmental order and consider the interests of all parties. Issues of fair growth are people-focused. They have the right to a productive and healthy life in harmony with nature. The United Nations Charter and international law principles establish that states possess the sovereign right to develop their resources in accordance with their development and environmental policies[22]. They must also ensure that activities within their borders or under their control do not harm the environment of other states or elsewhere outside their national territorial boundaries[23]. To respond responsibly to the development and environmentally-oriented aspirations of current and future generations, the right to development must be realized. Environmental conservation will be an integral part of sustainable development and should not be separated from it. As a precondition to sustainable development, all states and people will cooperate to eliminate poverty in a bid to reduce differences in living standards and meet the needs of the majority of people on earth[24]

Challenges in Implementing Rio Declaration

Governments' lack of legal enforcement and wavering political commitment weaken the Rio Declaration's impact[25] as it is not enforceable by law, states may freely disregard its principles, often prioritising short-term economic growth over environmental sustainability; frequent changes in leadership further undermine sustained investment in long-term development goals.

[20] Agenda 21, UN Doc A/CONF.151/26/Rev.1 (Vol I, 1992) Para 4.3
[21] Philippe Sands and Jacqueline Peel, Principles of International Environmental Law (4th edn, CUP 2018) 213
[22] Charter of the United Nations (adopted 26 June 1945, entered into force 24 October 1945) 1 UNTS XVI art 1; Rio Declaration Principle 2
[23] Rio Declaration Principle 2; Trail Smelter Arbitration (United States v Canada) (1941) 3 RIAA 1905
[24] United Nations Conference on Environment and Development, Rio Declaration on Environment and Development (12 August 1992) UN Doc A/CONF.151/26 (Vol I) Princs 1–5
[25] William K Reilly, 'What Went Wrong at Rio?' (1992) 70 Washington University Law Quarterly 1005, 1006–07

Moreover, economic disparities widen the gap in responsibilities: wealthy nations-though historically more culpable for environmental degradation-frequently fail to provide meaningful support, while poorer states struggle to enforce environmental laws for lack of resources. The ideal of "common but differentiated responsibilities" thus becomes difficult to implement. Businesses and industries resist environmental regulation due to concerns about higher costs, and governments-especially in resource-dependent economies-often side with short-term economic interests, perpetuating pollution, deforestation, and unsustainable industrial practices that stand at odds with the Rio Declaration's ideals[26].

The Paris Agreement, 2015

196 countries agreed to the Paris Agreement on December 12, 2015, at the UNFCCC Conference of the Parties (COP 21) held in Paris, France[27]. The agreement was put into action on November 4, 2016. The purpose of the agreement is reducing and slowing greenhouse gas emissions. Governments were requested to come up with Nationally Determined Contributions (NDCs) before COP 21 was held in Paris. The pledges of various countries changed drastically. India lived up to its image as a responsible nation in the matter of climate change, and it was placed in the list of emerging economies. The US president announced in 2017 that he would withdraw from the agreement[28]. On November 4, 2020, the withdrawal was officially announced. In 2021, the United States rejoined the Paris Agreement after the switch in presidents. The Paris Agreement's purpose cap the rise in world temperature this century at less than 2 degrees above pre-industrial levels, and strive to limit it to 1.5 degrees. Establish mechanisms to support and help countries that are most vulnerable to the adverse impacts of climate change[29]. Sea level increase is a threat to countries such as the Maldives, for example

[26] The bindingness and legal status of the Rio Declaration (and related instruments): see the United Nations Conference on Environment and Development, Rio Declaration on Environment and Development (13 June 1992) Principle 2 (reaffirming sovereign rights over natural resources subject to developmental and environmental policies), and noting that the Declaration lacks legal enforceability and relies on soft-law commitments; further, see discussion concerning the principle of "common but differentiated responsibilities" in the United Nations Framework Convention on Climate Change (1992) Article 3(1) and its legal weight as interpreted in practice-e.g. debates over its non-prescriptive nature and guiding function rather than binding force

[27] Paris Agreement, adopted 12 December 2015, 21st Conference of the Parties to the UNFCCC, Paris (Decision 1/CP.21)

[28] Trump announced intent to withdraw in 2017

[29] Agreement's goals: limit global temperature rise to well below 2 °C and pursue efforts toward 1.5 °C, and support vulnerable countries—key aims of the Paris Agreement

by providing them with financial as well as technical assistance; wealthier countries reaffirm their pledges to developing nations[30].

V. CHALLENGES IN IMPLEMENTING PARIS AGREEMENT

Richer nations have yet to fully honour their funding commitments, such as the $100 billion per year pledge[31], leaving poorer nations struggling to access sufficient resources for climate adaptation and mitigation. The absence of legal enforcement means the Paris Agreement relies on voluntary pledges (NDCs)[32], resulting in poor implementation, irregular reporting, and missed emissions reduction targets[33]. Furthermore, many economies remain heavily dependent on fossil fuels, and shifting to renewable energy demands substantial investment, infrastructure transformation, and overcoming resistance from powerful fossil fuel industries. At the intersection of public health and climate change, numerous challenges persist, requiring coordinated action across sectors; however, despite efforts through climate-health frameworks, a combination of technological, political, and financial barriers continues to hinder effective implementation[34].

Insufficient Financial and Institutional Support

Lack of adequate financing is one of the core barriers to the implementation of climate health principles. Most underdeveloped countries, which are most vulnerable to health issues induced by climate change, have constricted healthcare budgets and limited access to external aid[35]. Wealthier nations and global institutions have pledged financial assistance for climate adaptation and resilience, but these promises often fail to meet actual requirements[36]. In

[30]Paris Agreement, adopted 12 December 2015, entered into force 4 November 2016, UN Doc FCCC/CP/2015/L.9/Rev.1<https://unfccc.int/process-and-meetings/the-paris-agreement/the-paris-agreement> accessed, 07 March 2025.

[31] United Nations, 'COP27 Reaches Breakthrough Agreement on New "Loss and Damage" Fund for Vulnerable Countries' (UN Climate Press Release, 20 November 2022) (reaffirming the USD 100 billion per year climate finance goal from developed to developing countries).

[32] MIT Centre for Energy and Environmental Policy Research, 'How countries are held accountable under the Paris Agreement?' (Ask MIT, 8 March 2021) (Highlighting the voluntary nature of NDCs and lack of legal enforcement)

[33] Council on Foreign Relations, 'Global Climate Agreements: Successes and Failures' (Backgrounder) (noting implementation gaps, insufficient ambition, and missed targets).

[34] United Nations Framework Convention on Climate Change, 'The Paris Agreement' (UNFCCC webpages, adopted 12 December 2015, entered into force 4 November 2016) explaining the framework for finance under Article 9.

[35] Beyeler and Guinto, 'Overcoming barriers to successful climate and health adaptation practice: notes from the field' (2022) 19(12) International Journal of Environmental Research and Public Health 7169.

[36] UNFCCC, 'COP26 Outcomes: Finance for Climate Adaptation' (Glasgow, November 2021).

addition, effective implementation of climate-health policy is hindered in most countries by weak institutional frameworks and governance systems[37].

Weak Policy Coordination and Governance

There is a need for cross sectoral planning because climate change impacts various sectors like infrastructure, agriculture, and health[38]. The ministries of health and the environment hardly coordinate with each other, and most governments operate in silos[39]. Fragmentation brings about inconsistent policies, delayed response, and inefficient use of resources[40]. In addition, the integration of climate variables in health planning is hindered in some countries by political resistance and shifting governmental targets. Beyond undermining enforcement instruments, the lack of legally binding commitments hinders the ability to hold countries accountable for their climate-health commitments[41].

Lack of Data, Monitoring, and Early Warning Systems

Strong data collection and monitoring systems are needed to understand climate change impacts on health and develop effective solutions. The infrastructure for observing climate-sensitive health issues, including heat-related diseases, vector-borne diseases, and air pollution effects, is absent in many countries. Policymakers struggle to allocate resources efficiently and make sound decisions in the lack of reliable data. Poor early warning systems also hinder the ability to act rapidly against health crises induced by climate change, thus leaving people more vulnerable to extreme weather, disease outbreaks, and hunger[42].

VI. RECOMMENDATIONS FOR STRENGTHENING THE GLOBAL RESPONSE TO CLIMATE CHANGE AND HEALTH CRISIS

Climate change is one of the greatest threats to global health, as it increases the likelihood of disease spread, raises the number of extreme weather events, and overloads healthcare systems. Governments, international bodies, and communities need to join forces to build up the global

[37] Paula Michaelowa and Frances Michaelowa, 'The Governance of Climate Change Adaptation Finance-An Overview and Critique' (2016) Development Policy Review (OpenEdition Journals) no 2243.
[38] World Health Organization, Climate Change and Health: Policy Brief (WHO 2021) <https://www.who.int/publications/i/item/climate-change-and-health-policy-brief> accessed 10 August 2025
[39] Intergovernmental Panel on Climate Change, Climate Change 2022: Impacts, Adaptation and Vulnerability (IPCC 2022) ch 7.
[40] United Nations Environment Programme, Synergies between Climate Change Mitigation and Adaptation (UNEP 2020) 15
[41] Paris Agreement (adopted 12 December 2015, entered into force 4 November 2016) UNTS vol 3156 p 3, art 9
[42] World Health Organization and World Meteorological Organization, Climate Change and Health: Country Profiles 2021 (WHO 2021) 5

response. The following are some of the main recommendations for enhancing global efforts to address the climate-health crisis.

Increase Financial Investments in Climate-Health Initiatives

One of the biggest challenges to managing the health hazards associated with climate change is still a lack of adequate funding. To avoid, alleviate, and adapt to the health risks posed by climate change from heat stress to the spread of infectious diseases vast amounts of resources are required. To improve healthcare infrastructure, strengthen resilience, and pay for climate adaptation, governments, multilateral organizations, and development banks must greatly expand their financial commitments.

Global agreements such as the climate finance targets of the Paris Agreement require developed countries in particular to fulfil their financing obligations, with the funds going to the most climate-vulnerable countries, which typically lack the capacity to finance such projects internally. Furthermore, it is imperative that businesses and financial institutions be encouraged to invest in climate-resilient hospitals, medical facilities powered by renewable energy, and advanced early warning systems for disease outbreaks through the use of green bonds, tax breaks, and subsidies. By reducing the expense of emergency response and healthcare, these investments not only improve public health but also produce long-term economic advantages.

Strengthen Policy Integration and Cross-Sector Collaboration

The climate impacts on health are associated with alterations in urban planning, transportation, energy supply, and agriculture. For example, poor urban planning can deteriorate air, causing respiratory disease, and increased temperatures affect crop yields, which in turn will affect nutrition. Governments need to integrate climate-health considerations into national health policy and overall development planning to ensure a coordinated and comprehensive response.

Priorities can be reconciled and resources combined through the creation of interministerial working groups that comprise the energy, transport, agriculture, health, and environment ministries. Multilateral partnerships need to work across borders to exchange knowledge, tap resources, and create legally binding agreements that commit countries to their climate-health responsibilities. Strong legal frameworks and global agreements can counteract political inertia and make commitments binding and not just inspirational.

Improve Data Collection, Research, and Early Warning Systems

Sound action and policy need timely, complete, and accurate information. Governments cannot forecast disease outbreaks or gauge the success of adaptation without exact data. Investment in more advanced epidemiological studies, predictive models, and climate-health surveillance systems will allow new threats to be found before they reach crisis levels. Targeted interventions can be guided by real-time surveillance of climate-sensitive illness such as cholera, dengue, or malaria. Early warning systems for extreme weather events such as heat waves, flooding, and storms can save lives by allowing timely evacuation, mobilization of resources, and medical preparedness. Global cooperation in data sharing frameworks will ensure that innovative solutions and best practices developed in one region can be transferred to another, reducing effort duplication and allowing for a faster global reaction to health crises.

Enhance Healthcare System Resilience

Aside from working normally, health systems must be constructed in a way to be resilient to crises caused by climate occurrences. For this, investment in climate-resilient healthcare facilities such as flood-proofed hospitals, disaster-stricken area mobile health units, and renewable energy-based institutions that are able to operate independently during power outages is required.

There will be less loss of life and better preparation if health workers are competent in climate-related emergency response, including disaster triage, infectious disease containment, and psychological first aid. Because disadvantaged populations often suffer the most hazard from climate change but have the least access to first-rate medical treatment, access to universal healthcare is just as significant. Besides protecting marginalized groups, making climate-health adaptation more inclusive boosts general societal resilience.

Promote Public Awareness and Community Engagement

The citizens should be actively engaged in combating the health risks of climate change. Government, media, and civil society can all take lead in raising awareness that will bridge the knowledge gap between the public and scientific information. Personal behaviour change can be initiated by making the community learn about the relationship between health and climate change, for instance, how air pollution is a cause of respiratory diseases or how increased temperatures contribute to waterborne diseases.

Enhancing air quality and reducing the burden of non-communicable disease are just two of the immediate health advantages of stimulating sustainable living habits, like saving energy, climate-responsible food, and reduced use of dirty transportation. Direct engagement of communities in adaptation efforts, such as neighbourhood vector control programs or heat wave response planning, ensures that solutions are long-term, culturally acceptable, and widely supported.

Strengthen International Cooperation and Multilateral Action

Without global cooperation, no country can fully protect itself from the cross-boundary hazard of climate change. Enhanced cooperation through forums like the World Health Organization (WHO), the United Nations Framework Convention on Climate Change (UNFCCC), and regional climatologically-health associations can help coordinate policies, pool resources, and conduct large projects to benefit multiple countries simultaneously.

Collaborative commitments to reduce greenhouse gas emissions, transition clean technology, and provide humanitarian relief in the midst of climate-related health crises need to be given utmost importance in global climate-health diplomacy. More rapid mobilization of medical teams, equitable vaccine allocation during outbreaks, and collective access to technical innovations such as low-cost air filtration systems and portable diagnostic technologies can all be attained through collaborative global efforts.

VII. CONCLUSION

Climate change represents one of the greatest worldwide threats to human health, hitting individuals all over the world, especially in developing countries. There are several health issues, including infectious disease development, food and water insecurity, respiratory conditions, and mental illness that are aggravated by increased global temperatures altered climatic patterns, and increased frequency of natural disasters. Since they are resource-poor, possess inferior healthcare systems, and have limited strategies for adaptation, developing nations are more at risk. The most vulnerable groups will bear a disproportionate burden of the increased health burden brought about by climate change unless action is taken immediately. The misutilization of climate adaptation and mitigation strategies is the biggest hindrance to addressing climate change in the developing world. It is difficult to implement effective climate-resilient policy in most developing countries because they lack funds, have poor governance, and poor public awareness. In addition, the capability to respond properly to climate-associated health risks is hindered by poor technological advancement and a frail

healthcare system. This adds additional pressure on already unstable economies and worsens already-present health inequities. Some key recommendations should be considered to prevent the worsening of health issues in developing nations due to climate change. Governments and international bodies need to first collaborate in order to seek investment and financing for climate adaptation initiatives. It involves constructing climate-resilient infrastructure to withstand climate catastrophes, strengthening early warning systems for severe weather conditions, and strengthening health facilities. In addition, encouraging people-cantered solutions entails increasing public awareness and educating the public on the adverse health impacts of climate change.

Second, shortages of food and water are a grave health problem in most developing nations and may be prevented by implementing sustainable agriculture and water management practices. Governments must supply training and funds to small farmers in an effort to make their crops more resilient to climate change. Finally, expansion of renewable energy resources decreases respiratory diseases and air contamination, enhancing human health and sustainability in the environment. Lastly, addressing climate change as a global health concern requires international cooperation. Wealthy nations must keep their pledges to provide developing countries with financial and technological support. Global health organizations must establish policies pertaining to climate change that ensure vulnerable populations have adequate access to medical care and illness prevention. Developing nations may face devastating health consequences, increased mortality rates, economic instability, and humanitarian catastrophes if appropriate steps are not implemented.

Human health remains gravely endangered by climate change, and the developing nations are most at risk due to their inability to properly adapt. These nations will continue to suffer from the worsening health impacts of climate change unless adaptation and mitigation efforts are effectively implemented. At the local, national, and international levels, urgent action is required to strengthen health systems, increase resilience, and ensure that all communities have the capacity to address this growing catastrophe. Climate action must be given top priority by global leaders in the interest of sustainable development and public health because inaction at this point will inflict irreparable damage.

EXPLORING THE INTERSECTION OF CLIMATE CHANGE AND CLIMATE REFUGEE CRISIS

Parul Kangniawal[*]

ABSTRACT

"The alien was to be protected, not because he was a member of one's family, clan or religious community, but because he was a human being. In the alien, therefore, man discovered the idea of humanity."

The convergence of climate change and the escalating climate refugee crisis stands as one of the most pressing challenges of the 21st century. With the ever-increasing global temperatures and drastic changes weather events, millions of individuals across the globe are compelled to take a flight from their natural habitats and settle in other countries. The severe weather events which at times take a huge toll on human life, like the rising sea levels, severe droughts, hurricanes, and flooding, compel the populations to relocate themselves. This in turn disrupt livelihoods, agriculture, and access to basic resources like water and food is also fettered. Climate refugees are those individuals which are evacuated by the environmental consequences of environment change. They lack the resources to rebuild their lives or adapt to new environments, as they leave their previous habitats. The problem is further aggravated by the lack of legal recognition and protection for climate refugees under international law. Therefore, there is pressing need of the hour to entangle the intricate relationship between climate variation and displacement, focusing on the political, social, and economic implications of the climate refugee crisis. A robust and resilient global framework is required to manage this growing crisis.

Keywords: *sustainable development, climate refugees, environment, displacement, resettlement*

I. INTRODUCTION

Human race has undergone dynamic evolution and has surpassed progress and achievement in all spheres. In the quest and haste to achieve such remarkable achievements, mankind has threatened the sustainability of the earth. The supposed growth and development bring huge prosperity in terms of infrastructure, transport and communication, but at the same time it fails

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to address the multi-dimensional needs of the society as a whole. Development is a holistic concept and it has to be compatible with all the aspects of human development. It has various angles such as culture, society, ecology and political participation. Sustainable development can be achieved only by having a holistic vision regarding the overall development of the human race. Every individual is entitled to a life of freedom and dignity. The conceptualisation of the earlier mentioned term is subjective, and its efficacy changes with time and is different for different people of the world.

At its core, climate change is a complex phenomenon involving significant and long-lasting alterations in Earth's climate system that unfold over periods spanning from decades to millions of years. It involves changes in temperature, rainfall, and various other weather-related conditions, that can affect ecosystems worldwide, weather patterns and sea levels. Climate change is among the most urgent global issues of the 21st century, affecting the environment, society, and the economy on many levels. It involves long-term and substantial shifts in the Earth's climate, mainly caused by human actions that emit greenhouse gases into the atmosphere. Gases like carbon dioxide (CO_2), methane (CH_4), and nitrous oxide (N_2O) trap solar heat, resulting in an increase in global temperatures, a process widely known as global warming.[1]

The grievous problem of climate change, commonly known as 'global warming,' is largely the result of human activities such as burning fossil fuels (coal, oil, and natural gas), deforestation, and industrial operations. These actions emit greenhouse gases like carbon dioxide (CO_2) and methane (CH_4), which trap solar heat in the atmosphere, leading to rising global temperatures, a process known as the 'greenhouse effect.' The consequences are far-reaching, including more intense and frequent extreme weather events (such as hurricanes, heatwaves, and droughts), melting ice caps, rising sea levels, changes in ecosystems and wildlife, and challenges to food and water resources. Combating climate change calls for coordinated global action to cut greenhouse gas emissions, shift to sustainable energy, and adapt to the changes already taking place.[2]

Man, and his natural environment have always coexisted with each other. The issue of resource depletion and degradation of the environment and ecosystem began with the onset of

[1] Satish C. Shastri, *Environmental Law,* (5th edn., Eastern Book Company, Lucknow 2015) 22
[2] S.R. Myneni, *Law of Biodiversity Protection (*1st edn., New Era Law Publication, 2020) 34

industrialisation. The countries were developing and undergoing a social change.[3] As human aspirations for a higher quality of life and improved living standards intensified throughout the mid-20th century, these development ambitions brought about significant environmental consequences. For instance, annual carbon dioxide emissions more than doubled between 1960 and 1988. Similarly, tropical deforestation surged by 2015, nearly half of the planet's mature tropical forests had been lost, with approximately 20 % of that destruction occurring between 1960 and 1990.[4]

Despite these mounting ecological pressures, widespread environmental regulation lagged behind. It wasn't until dramatic events in the 1960s, such as the London smog and polluted rivers catching fire in the U.S., that public alarm spurred the creation of landmark institutions like the U.S. Environmental Protection Agency in 1970. Meanwhile, unchecked economic expansion and consumerism drove massive increases in plastic production from just 2 million tonnes in 1950 to over 390 million tonnes by 2021, alongside mounting land degradation. Today, soil degradation affects around 15 % of Earth's land area, roughly 2 billion hectares, an area larger than the combined expanse of the U.S. and Mexico. These intertwined challenges ranging from soaring emissions and plastic pollution to deforestation and degraded lands, have made environmental deterioration and resultant climate disruption inevitable. And with wildlife populations already down by about 68 % since 1970, myriad climate-linked problems have since echoed around the globe.[5]

The concept of sustainable development did not become popular until the late 1980s. As global human activities have drastically altered the environment, through fossil fuel consumption, deforestation, and intensified land use, these pressures have fuelled global warming and its harmful consequences. This growing awareness has, over time, catalysed a societal shift toward the pursuit of sustainable, enduring transformation. Population explosion, the ever-increasing consumerism, advancement in human lifestyle, industrial production, nuclear exploitation, infrastructure development and so on, led to the manifestation of a continuing environmental crisis. The resultant climate change which was the potential result of the exploitation done to nature, came as an evident result.

[3] Gyanaranajan Swain, "Environment and Sustainable Development" in Tapan Biswal(ed), *Human Rights Gender and* Environment (Viva Books 2015)
[4] Ibid
[5] Ibid

II. UNDERSTANDING THE GLOBAL IMPACT OF CLIMATE CHANGE

Climate change is already causing widespread, significant damage to ecosystems, economies, and communities around the world. From 1970 to 2016, wildlife populations decreased by an average of 68%, illustrating the steep ecological decline underway. In the oceans, 96% of global marine areas endured extreme heatwaves in 2023, the most intense and prolonged ever recorded, severely disrupting marine ecosystems, coral reefs, and coastal economies. Economically, climate-related damages are rising sharply. Direct losses from extreme weather, climate, and water events averaged over US $330 billion per year between 2015 and 2021. By mid-century, global income losses are projected to reach US $38 trillion annually, equivalent to nearly a 19% reduction in average global incomes unless urgent mitigation steps are taken.[6]

Increasing global temperatures are leading to more intense and frequent heatwaves, storms, and floods. These extreme weather events disrupt farming, harm infrastructure, and pose serious health risks, especially in regions that are most vulnerable. The melting of glaciers and polar ice sheets leads to higher sea levels, putting coastal cities and low-lying countries at serious risk of flooding, displacement, and the loss of livelihoods. Biodiversity is also at risk, as altered habitats force species to migrate or face extinction. Additionally, climate change is aggravating global inequality, disproportionately affecting poorer nations and marginalized groups who have fewer resources to adapt to its consequences. Tackling climate change demands unified global efforts to minimize its effects and ensure a sustainable future for coming generations. Its wide-ranging and complex consequences affect the environment, human societies, and economies, resulting in both direct and indirect impacts.[7] Climate change has far-reaching and multifaceted impacts on the environment, human societies, and economies, invariably leading to various direct and indirect effects.

III. THE LINK BETWEEN CLIMATE CHANGE AND CONFLICT: A GROWING CONCERN OF CLIMATE REFUGEES

"According to the United Nations High Commissioner for Refugees (UNHCR), a UN agency mandated to aid and protect refugees, forcibly displaced communities, and stateless peoples, in the past 10 years, the number of people forcibly displaced has doubled to almost 80 million people at the end of 2019, with fewer and fewer of those who flee being able to return home.

[6]<https://www.wwfindia.org/?19523/Living-Planet-Report-2020-reveals-68-decline-in-wildlife-populations> accessed on 24 March, 2025.
[7] P. S. Jaswal & Nishtha Jaswal, *Environmental Law* (3rd edn., Allahabad Law Agency, Haryana 2011) 54

Among them, almost 35 million are refugees, asylum seekers and others displaced outside their country, while the remaining 45 million are internally displaced."[8]

Climate change is an inevitable occurrence, which will change and multiply in the coming future. The aggravation of this change by human induced factors intensifies the wrath of climate change. The human activities and various forms have contributed a lot to the intensification of climate change.[9] Ranging from burning of fossil fuels, deforestation, faulty land use and unsustainable agriculture practices and so on, have all contributed to the worsened climate change. Climate change has various impacts as discussed above. The latent and patent effects are many. Out of these, conflict rising out of the climate crisis, is intensifying over the years. Growing numbers of individuals are compelled to relocate their home, contributing to the problem of displacement world over. The problem of influx of climate refugees, their maintenance and right to the share of limited resources, all are debatable issues.

"In 2023, the global average temperature was approximately 1.36 °C higher than the average during the late 19th-century preindustrial period (1850–1900). The ten most recent years have been the warmest on record according to NASA, 2024. According to estimates by 2100, the global average temperature could increase by 1.1–5.4 °C compared to today, depending on the level of mitigation efforts. Without actions to curb GHG emissions, global temperatures could rise by 3.28 °C (2.46–4.10 °C) above pre-industrial levels by 2100. Furthermore, sea levels are projected to increase by 573 mm (474–671 mm) above the 2021 mean due to land ice melting. Adhering to COP26 emission regulations would limit the temperature increase to an average of 1.88 °C (1.43–2.33 °C), although this still exceeds the 1.5 °C target set by the 2015 Paris Agreement."[10]

Climate change is a major global concern because of its serious threat to both humanity and the planet. The outcome of climate change has threat to humanity as it has various adverse outcomes such as environmental degradation, economic inequality between countries, increase of poverty and diseases, deterioration in health, reduction in life expectancy, decreasing mortality and last but not the least, military conflict and displacement. Throughout history, rearrangements in human settlement patterns have been a companion of

[8] <https://unfccc.int/news/conflict-and-climate>, accessed on 24 March 2025

[9] Intergovernmental Panel on Climate Change (IPCC), *Climate Change 2023: Synthesis Report. Contribution of Working Groups I, II and III to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change* ([Core Writing Team, H. Lee & J. Romero (eds.), 1–34, Geneva, Switz.: IPCC 2023.

[10] Jeremy Ko , Harry F. Lee , 'Chun Kai Leung War and warming: The effects of climate change on military conflicts in developing countries (1995–2020)' (2024) 3(4)Innovation And Green Development <https://www.sciencedirect.com/science/article/pii/S2949753124000523> accessed on 24 March 2025

development.[11]It has remained imprinted in the history of developing countries. The magnitude of involuntary population displacements and resettlement in developing countries has increased rapidly owing to climate change. In 2024, extreme weather disasters triggered by climate change led to 45.8 million internal displacements, nearly double the annual average over the last decade. By year-end, the total number of internally displaced persons (IDPs) globally reached 83.4 million, with 9.8 million displaced specifically by disasters, a 29% increase from 2023. Weather-related events intensified by climate change accounted for 99.5% of all disaster displacements in 2024.[12]

The process of involuntary displacement and relocation caused by development programmes, the victims of natural calamities such as hurricanes, tsunamis, earthquakes etc, the displaced population due to desertification, glacier melts, increased environmental pollution, have all been the victims of displacement. The environmental or ecological refugees or climate refugees are compelled to leave behind all their belongings and move away from their usual homes, and move to far off places in order to find suitable habitats for themselves. The climate refugees are affected by the unstoppable advance of globalization and capitalism and in the wake of increasing climate change and depleted resources they are often forced to confront basic survival and health support due to environmental degradation. The climate refugees are the victims of unsustainable paths taken by the developed and the developing countries. Global industrialization, mass consumption, and fossil fuel use which are the central pillars of globalization, have accelerated climate change, directly creating the environmental conditions (floods, droughts, sea level rise) forcing people to migrate. Developed economies, historically responsible for most greenhouse gas emissions, benefit the most from globalization, while developing nations bear the brunt and their citizens become climate refugees. There often forced to seek asylum as refugees in various countries.[13]

The forced migration imposed on the climate refugees make them the poor and most vulnerable section with no remedy available for them. The breakdown of ecological integrity, which is essential for human health, survival, and the proper functioning of ecosystems poses compelling circumstances for the population to disperse and become refugees. The issue of climate change may not be directly responsible for the forced displacement of the people, but it has a very obvious nexus with movement of people from their domestic habitat. The

[11] Ibid
[12] <https://www.internal-displacement.org/global-report/grid2024/> , accessed on 24 March 2025.
[13] Dr. V T Patil & Dr. P R Trivedi, *Refugees and Human Rights* (1st edn, Authorspress 2000) 122

movement as refugees to other places and habitats, often remains unaddressed at the international as well as domestic level.[14]

IV. INTERNATIONAL FRAMEWORK FOR THE RECOGNITION OF CLIMATE REFUGEES

The international framework for the safety of the refugees under the public international law encompasses various treaties, principles and institutional mechanisms that collectively work to uphold the refugee rights all over the world. The refugee crisis is aggravating at a very fast pace and the complexities of the refugee laws further aggravate the situation. The legal framework for refugees, aims to ensure the security and self-esteem of refugees. At the international level, the Refugee Convention, 1951 and the protocol of 1967, are the foundational basis of the recognition and move towards refugees' rights and protection. The United Nations high commissioner for refugees (UNHCR), plays an essential role in the implementation of the framework to safeguard the refugees globally according to the established legal norms and principles.

The 1951 Refugee Convention, or Geneva Convention, is a multilateral treaty established by the United Nations that defines who qualifies as a refugee and outlines the rights of those granted asylum, as well as the obligations of the countries offering asylum. It provides the internationally accepted definition of a refugee and details the legal protections, rights, and support they are entitled to. Along with its 1967 Protocol, the Convention serves as the primary legal framework for refugee protection and offers a universal definition of a refugee.[15]

The 1951 Refugee Convention is a thorough and legally binding international agreement that establishes global standards for the treatment of refugees. The growing number of refugees following the two world wars highlighted the need for a convention to promote international cooperation in addressing the refugee crisis, requiring collective action by governments to find a lasting solution to the issue.[16] The complexities of refugee laws pose significant challenges for climate refugees, who are not formally recognized under current international legal frameworks. The 1951 UN Refugee Convention, the core legal instrument for refugee protection, defines a refugee as someone fleeing persecution based on race, religion, nationality, political opinion, or membership in a particular social group. This definition does

[14] Anthony H. Richmond, *Global Apartheid: Refugees, Racism and the New World Order* (Oxford University Press, Toronto, 1994) 211
[15] <https://worldjurisprudence.com/legal-framework-for-refugees/>, accessed on 26 March 2025
[16] <https://www.unhcr.org/in/sites/en-in/files/legacy-pdf/4ca34be29.pdf>, accessed on 26 March 2025

not include people displaced by climate-related events such as rising sea levels, droughts, floods, or other environmental disasters. As a result, climate refugees fall outside the scope of international refugee protection and often lack access to legal status, resettlement pathways, or humanitarian assistance. Although terms like "climate migrant" or "environmentally displaced person" are used in policy discussions, they carry no binding legal protections. Global agreements like the Global Compact for Migration or the Sendai Framework acknowledge climate displacement, but they are non-binding and lack enforcement. Furthermore, proving that climate change is the primary cause of displacement is legally difficult, as it often intersects with poverty, conflict, and poor governance. Most climate displacement also occurs within national borders, leaving affected individuals dependent on domestic policies that are often inadequate. This legal and policy vacuum leaves millions of climate-displaced people vulnerable, marginalized, and largely invisible in international protection systems.[17]

V. IMPACT OF CLIMATE- INDUCED MIGRATION ON CLIMATE REFUGEES

Climate induced migration is a serious problem, which could be garnered from the above discussion. Considering the numerous pressures, experiences and environmental catastrophes are the major causes of innumerable difficulties confronted by the poor inhabitants world over, who are forced to become refuge seekers as 'ecological refugees'. This poses a serious weakness of international legal instruments, who are unable to address the issue of ecological refugees despite having a comprehensive network of treaties to address the needs of traditional refugees, ecological or climate refugees remain largely unrecognized and unprotected. The 1951 Refugee Convention and its 1967 Protocol form the cornerstone of international refugee protection. However, these instruments are narrowly focused on individuals fleeing persecution due to political, religious, ethnic, or social factors, and do not account for displacement caused by environmental degradation or climate change.[18]

This legal limitation is problematic given the growing number of people forced to leave their homes due to sea-level rise, desertification, extreme weather events, and natural disasters, conditions that are becoming more frequent and severe due to global warming. Despite the existence of numerous international agreements and bodies that deal with environmental issues (e.g. the UNFCCC, the Sendai Framework for Disaster Risk Reduction) and migration (e.g. the

[17] Supra note (3).

[18] Guy S. & Goodwin-Gill, *The Refugee In International Law* (Oxford University Press, Great Britain, 1983) 214

Global Compact for Migration), none of them offer binding legal protection or refugee status to those displaced by ecological factors.[19]

This disconnect reflects a broader institutional inertia and lack of political will to adapt existing frameworks to modern realities. As a result, ecological refugees fall into a legal vacuum, unable to claim asylum or receive international assistance through formal channels, leaving them vulnerable to exploitation, statelessness, and humanitarian neglect. This exposes a serious weakness in the international legal system, its inability to evolve in response to one of the most pressing humanitarian crises of our time.

The impact of climate induced migration is multidimensional. It badly affects the livelihood of climate refugees. Climate refugees are individuals compelled to leave their homes because of the effects of climate change, including rising sea levels, severe weather events, and extended periods of drought. The loss of their habitats as well as loss of livelihood of the indigenous populations are some significant impacts. Many climate refugees depend on agriculture, fishing, or tourism, industries that are highly vulnerable to climate change. The urgency to leave their homes leads to mental trauma and as they relocate to unfamiliar regions, far away from their homeland, they may struggle to find work in new economic systems, leading to financial instability, leading to their poverty.[20]

Cultural displacement is yet another stringent impact, when the people are uprooted from their ancestral lands, they not only lose their physical homes but also lose their identities. This cut off their ties with their heritage, traditions, and community bonds. The sense of identity tied to their environment is often irreversibly altered, causing deep psychological trauma.[21] Socio-economic hardships faced by the displaced people in the form of overcrowded camps or informal settlements, lacking basic civic services like healthcare, education, and clean water, lead to severe health problems. Refugees frequently face discrimination in the countries in which they seek asylum. They are marginalized, leading to further economic and social exclusion from the society aggravating their hardships further. The combination of these challenges creates a cycle of vulnerability, leaving climate refugees at risk of long-term instability and marginalization.[22]

[19] Ibid
[20] G. Martone, 'Life with Dignity: What is the Minimum Standard', in A. Bayefski (ed) *Human Rights and Refugees, Internally Displaced Persons and Migrant Workers,* (Martinus Nihoff, The Hague) 140
[21] L. Westra, *Environmental Justice and the Rights of unborn and Future Generations* (1st ed, Earthscan, London 2006) 268
[22] Id at p. 270

Within climate refugee populations, women, children, and marginalized communities face heightened vulnerability due to their socio-economic status and limited access to resources. Women often bear the impact of climate-related displacement, experiencing increased risks of gender-based violence, exploitation, and loss of livelihood. Children, particularly those in refugee camps, suffer from disrupted education, poor nutrition, and higher mortality rates. Marginalized groups, including indigenous populations and people with disabilities, encounter additional barriers in accessing aid, healthcare, and safe shelter. The intersection of gender, age, and marginalization worsens their hardships, making these groups more susceptible to exploitation and long-term instability.[23]

Climate-induced displacement can significantly exacerbate mental health issues, as individuals face trauma, loss of homes, and uncertainty about the future. The stress of relocation, coupled with the disruption of social networks and cultural ties, often leads to unease and despair. Displaced communities face an increased risk of infectious diseases as a result of living in overcrowded conditions, poor sanitation, and lack of access to clean water. These health challenges strain already limited healthcare resources, making it difficult to provide adequate care. The combination of mental and physical health burdens places immense pressure on humanitarian aid systems.[24] Thus, devoiding the climate refugees of their rights is the ransacking of their basic human rights.

VI. COMPREHENSIVE APPROACH TO PROTECT AND SUPPORT CLIMATE REFUGEES

A comprehensive approach is required to protect and support climate refugees. It requires a multi-faceted strategy that addresses both immediate needs and long-term resilience to uplift their cause. Global cooperation is required to tackle the challenge of displacement caused by climate change. Global cooperation will be the first step and all the countries must collaborate together, in order to establish an effective legal framework to recognise the climate refugees and grant them adequate protection under the international law as if given to any other traditional refugee. This would help ensure their rights to safety, shelter, and dignity. The gaps in the Refugee Convention should be filled by incorporating international human rights and humanitarian law to ensure effective protection. It should grant safety and aids like food, water medical support, in early stages of displacement. However,

[23] Id at p. 272
[24] L. Heinzerling, 'Climate Change, Human Health and the post- precautionary principle' (2008) 96(2) Georgetown Law Journal 46

long-term solutions, like sustainable livelihood programs and skills training, are needed to help climate refugees rebuild their lives and regain economic independence. Education, especially for children, must be prioritized to prevent a lost generation.[25]

Addressing the root causes of displacement is also critical. Mitigating climate change through emissions reductions and adaptation strategies in vulnerable regions can help reduce future displacement. Host countries must also invest in infrastructure and social services to integrate climate refugees, promoting social cohesion and reducing potential tensions with local communities. Ultimately, a comprehensive approach must balance immediate humanitarian relief with long-term sustainable development, ensuring that climate refugees are not only protected but empowered to thrive in their new environments.[26]

VII. CONCLUSION

In conclusion, the plight of climate refugees highlights the crucial need for global action to address both the causes and consequences of environment-induced displacement. As extreme weather events and environmental degradation continue to escalate, vulnerable populations are increasingly at risk of losing their homes, livelihoods, and cultural identity. A coordinated international response is essential, combining legal protection, humanitarian aid, and long-term solutions for economic stability and social integration. By addressing the origin sources of displacement and supporting affected communities, we can mitigate the effect of climate change while ensuring that climate refugees are given the opportunity to rebuild their lives with dignity and security.

[25] M. Wakernagel & W E Rees, *Our Ecological Footprint* (2nd ed, New Society Publishers, Canada 1996) 365
[26] Id at p. 367

PUNMASKING THE GREEN CLAIMS IN A CLIMATE-CONSCIOUS FASHION INDUSTRY IN LIGHT OF GREENWASHING PRACTICES

Samiksha Madan[*]

ABSTRACT

Sustainable, eco-friendly, or ethical - the terms are everywhere in advertising but what do they actually mean? The greatest enemy of truth is not a dishonest lie, rather it is the persistent persuasion and unrealistic lie that tends to determine market having natural corollary towards environmental crisis. Greenwashing has emerged as a marketing tool adopted by businesses to further their interests by manipulating consumer trust and broader sustainability concerns, especially by the fashion industry, considering their excessive resource usage, textile waste, and carbon footprint. The fashion industry currently stands tall in its carbon emissions and resource waste through the processes utilized. This makes it imperative to assess the prevalence of regulatory and legal framework in place currently in India and beyond, and how corporate sustainability accountability standards can be incorporated to achieve fashion sustainability in its true sense. This paper is an attempt to explore through consumer patterns in making green purchases and how businesses take advantage of the same to overexaggerate sustainability credentials, thereby calling for the need to have strict frameworks in place and find out the recent trends in light of greenwashing practices.

Keywords*: Greenwashing, Fashion Sustainability, Misleading Advertisements, Carbon Footprint, Sustainable Development*

I. INTRODUCTION

"*But man is a part of nature, and his war against nature is inevitably a war against himself*", a remark made by renowned environmentalist Rachel Carson. It showcases the paradox of human progress where man in his pursuit of technological advancement often depletes natural resources and thereby exploits the environment.

Sustainable ESG funds or investments that consider environmental, social, and corporate governance factors have exploded in the past decade. It is becoming increasingly profitable for companies to be seen as beneficial to the environment, with consumers increasingly demanding sustainable products. While the concept of green economy through eco-friendly products and

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services is gaining attention, there has been the issue of consumers being misled, on the rise through narratives set by companies in their race to gain more and more profits while jeopardizing the environment. India, which being home to a rich heritage in textiles and traditional craftsmanship, is one of the major economic drivers contributing significantly to GDP and employment. In today's rapidly evolving market, especially the fashion industry, is experiencing a paradigm shift in consumer preferences based on environmental parameters and consumers are the determining factor of profits for businesses, this shift calls for the need to decode the practice of Greenwashing.

The term Greenwash is a combination of two words – "green" and "wash" which indicates to businesses disguising or attributing their products and practices as environmentally friendly through false impressions. The practice of greenwashing is a conventional emerging issue that paves way for environmental degradations, and therefore, there is need to deploy mechanisms to curb the same. The U.S. FTC Green Guides[1] or the UK's Green Claims Code[2] are certain International efforts that have been made to strengthen regulations that prevent greenwashing while India has also made strong attempts to curb the same through the recent 2024 Draft Guidelines for the Prevention and Regulation of Greenwashing[3] in addition to existing regulatory frameworks in place under the Central Consumer Protection Authority, Advertising Standards Council of India, Securities and Exchange Board of India and the Reserve Bank of India. Considering the impact of fashion industry on environmental degradation, all efforts being taken currently are not exhaustive enough, and therefore, there still persists the impending need to have mechanisms and nuanced initiatives undertaken to deal with the practice of greenwashing.

Therefore, the present research paper attempts to provide a present scenario analysis on the threatening spread of greenwashing practices through misleading advertisements and its subsequent impact on customer trust and brand loyalty and image with an industry specific focus on Fashion Industry owing to its increasing carbon footprint. Since India lacks a specific legislation in place that deals with fashion law in particular, it puts a question mark on how practices of greenwashing can be dealt with when it comes to such industries. The present research work has incorporated a survey conducted to study and analyse consumer behaviour and preferences in light of green claims made and has explored ways in which sustainability in

[1] Federal Trade Commission Act, 15 U.S.C.
[2] CMA Green Claims Code 2021 (UK)
[3] Draft Guidelines for the Prevention and Regulation of Greenwashing 2024 (India).

fashion can be achieved while simultaneously curbing the ill side of green claims through misleading and misleading advertisements.

II. DECODING THE LOOMING PROBLEM OF GREENWASHING

Greenwashing is when a company or business uses misleading advertising to market itself as more environmentally friendly than it really is. The Draft Guidelines for the Prevention and Regulation of Greenwashing, under Cl.2 (e)[4] are as:

"Greenwashing" means-

(i) any deceptive or misleading practice, which includes concealing, omitting, or hiding relevant information, by exaggerating, making vague, false, or unsubstantiated environmental claims.

(ii) use of misleading words, symbols, or imagery, placing emphasis on positive environmental aspects while downplaying or concealing harmful attributes.

but shall not include (*i*) use of obvious hyperboles, puffery, or (*ii*) the use of generic colour schemes or pictures; either not amounting to any deceptive or misleading practice"

It is a practice where businesses indulge in false and overexaggerated green claims and appear as though they focus on sustainability by creating an illusion through eco-friendly marketing gimmicks. It takes the form of false labels; concealing unfavourable details by highlighting half-truths; green packaging of non-green products; false certifications; and so on. It uses common words like "sustainable", "ethical", "organic", "100% natural", "environmentally friendly", "biodegradable", "plastic free" and many such claims. If at all terms like "clean" or "eco-consciousness", etc. are used, they must be adequately substantiated and disclosures be made for the same.[5] Therefore, a substantial number of greenwashing concerns involve misleading advertisements greenwashing practice involves is the misleading advertisements made by businesses in order to outsell their products in comparison to other competitors.

Judicial initiatives preventing misleading advertisements

A recent observation made by the Apex Court in **Indian Medical Association v. Union of India**[6] addresses the misleading advertisements by Patanjali concerning their herbal medicines and its efficacy, thereby leading to violation of the Drugs and Magic Remedies (Objectionable

[4] Draft Guidelines for the Prevention and Regulation of Greenwashing 2023 cl. 2(e) (India).
[5] Draft Guidelines for the Prevention and Regulation of Greenwashing 2023 cl. 6 (India).
[6] [2024] 6 S.C.R. 375 (India).

Advertisements) Act, 1954.[7] In furtherance of the same, the inefficiency of regulatory mechanisms in place currently was highlighted and subsequent directions given to the government to implement stricter oversight over claims related to the health of individuals. Furthermore, the Apex Court in **Hamdard Dawakhana v. Union of India**[8] analysed freedom of speech in light of deceptive marketing and held that commercial advertisements are not fully protected under the Right of Free Speech and Expression granted to citizens under Art. 19(1)(a)[9] of the Constitution of India, especially when they are misleading to consumers.

This highlights the judicial intent to abolish the practice of misleading advertisement and pierce through the clutches of greenwashing practices, which involve such deceptive marketing under the false pretext of sustainability. Such advertisements that involve false eco-friendly marketing and green claims are far more damaging.

Greenwashing – Impact on Market Competition:

Greenwashing by companies related to their products, services, or other practices allows dishonest players in the market to take shortcuts by making misleading sustainable claims to win by attracting environmentally conscious consumers without actually taking steps to ensure sustainability, as a result of which honest competitors who genuinely put in efforts to adopt green practices are put at a disadvantage and fall behind. This practice, when adopted by companies, distorts market competition, thereby putting their businesses at a risk of diminishing trust of consumers. By continuously misleading consumers into making unethical purchases without actually incurring costs of adopting sustainable practices, the credibility of green markets deteriorates, making consumers extremely skeptical of all environmental claims, including those backed by real evidence. The **HUL Greenwash case of 2011**[10] marks as a prominent greenwashing in which the Central Pollution Control Board had imposed a Rs. 10 Lakh fine for making false and misleading assertions about your Surf Excel Easy Wash detergent being “100% natural” and “environment friendly” while in reality it contained synthetic ingredients. In doing so, HUL gained an unfair overriding edge over other ethical competitors of detergent, thereby adversely impacting competition.

[7] Drugs and Magic Remedies (Objectionable Advertisements) Act 1954.
[8] AIR 1960 SC 554 (India).
[9] Constitution of India 1950, art. 19 cl. 1 a.
[10] Puneet Gupta and CS Nikhil Kalra, ACS, ‘Green to Greed: Unravelling Corporate Deception’ (2024) ICSI Journal 122.

A prime example of how false environmental claims distort market competition and mislead consumers by creating an unfair business environment is the **2013 case of Voltas**[11] a well-known brand in India, who made false claims that their Air Conditioners were 'eco-friendly' with a '5-star energy rating.' However, it was found that they had a lower energy rating and consequently were fined Rs. 50,000.

Recent case of **Nestle India, 2020**[12] and **ITC Limited, 2022**[13] against misleading packaging claims made through advertisements by aligning them in lines of sustainability were highly criticized for making superfluous claims since the actual practices were not leading to reduction in the overall environmental impact through their continuous reliance on non-recyclable materials. The **allegations against Patanjali Ayur Ved in 2021**[14] also highlight how marketing gimmicks erode consumer trust through false claims of their so-called "natural" and "chemical free" herbal products, while independent tests revealed prevalence of synthetic additives. Therefore, these non-transparent and false communications made by companies about their sustainability efforts discern consumers and affect fairness in market.

Greenwashing – Impact on Society:

Greenwashing is a deceptive practice that seeks to meet ecocentrism beliefs of people that place environment and humans at the same level on a balance scale by adopting more friendly environment practices. The effects of greenwashing go above and beyond mere marketing strategies; it tends to have an effect on society through impact on consumer behaviour and public confidence in businesses. It has an adverse impact on society in general by casting a shadow of doubt on all sustainability claims taken by businesses by making it difficult to distinguish genuine efforts of sustainability as against misleading and deceptive claims.

Therefore, it has a negative impact on ethical consumption and acts as a barrier to real environmental progress by creating an air of manipulation and mistrust among the society as a whole.

[11] Ibid.
[12] Manoj Sonawala, ACS, 'Green Washing and Green Blushing' (2023) ICSI Journal 45.
[13] Ibid.
[14] Ibid.

III. THREADING THROUGH THE MAZE OF SUSTAINABILITY, FASHION, AND CONSUMER CHOICE IN GREEN PURCHASE

The term sustainable development has been defined differently, but the most quoted one being **Brundtland Commission**[15] states that it is the development that caters to the needs of the present generation without compromising the ability of the future generations to meet their own needs. The three core pillars of sustainable development includes; economic growth, social equality, and environmental protection. The fashion industry being a multi-trillion-dollar industry[16] plays a crucial role in ensuring sustainable development by aligning itself with this sustainable development goal through responsible practices and ethical business models, genuine production by reducing textile waste, environmental damage, promoting inclusivity etc. because achieving sustainable production and consumption is not a mere choice, it is a necessity for future generations.

The **fashion industry** being the world's second-largest consumer of water supply and 10% contributor of total carbon emissions plays a huge role in impacting the health of planet.[17] These calls for the need to have appropriate responses to the environmental damage and social harm caused by the fashion industry. As the need for sustainable practices gain prominence, so does the unethical practice of greenwashing – where businesses manipulate product or service environmental benefits through deceptive marketing activities. The deceptive approach depends on the rise of environmentally conscious product preferences to sway customers during their buying choices. This deceptive marketing strategy exploits consumers' growing preference for eco-friendly products, and erodes consumer trust in other genuine sustainable products. At present, companies use deceptive environmental responsibility statements to meet consumer demand for sustainable products yet their actual actions diverge from these claims.

SDG 12: Ensuring Sustainable Consumption and Production Patterns

One of the greatest challenges in the global scenario has been the need to integrate environmental sustainability with economic growth. The Sustainable Development Goals

[15] Brundtland, G.H. (1987) 'Our Common Future Report of the World Commission on Environment and Development' UN-Document A/42/427.
[16] Frankie Leach, 'The Trillion Dollar Question: How To Fix The Fashion Industry' *Euronews* (29 November 2021) <https://www.euronews.com/green/2021/11/29/the-trillion-dollar-question-how-to-fix-the-fashion-industry> accessed 27 January 2025.
[17] Rashmila Maiti, 'The Environmental Impact of Fast Fashion, Explained' *Earth.org* (20 January 2025) <https://earth.org/fast-fashions-detrimental-effect-on-the-environment/#:~:text=According%20to%20an%20analysis%20by,go%20to%20dumps%20each%20year> accessed 21 January 2025.

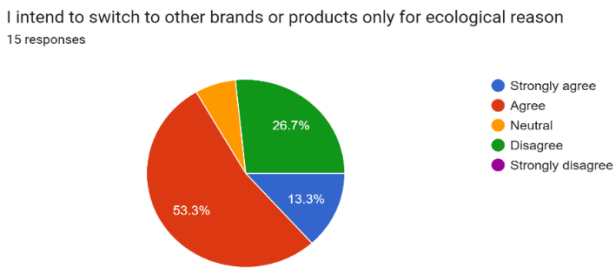
(SDGs) as unanimously adopted by the United Nations Member States in 2015 lay out 17 goals to be achieved by 2030[18] that would help combat environmental, political, and economic challenges faced by the world. One of such goals is SDG 12, which highlights the importance of sustainable consumption and production, which is important to combat climate change and environmental degradation as it encourages a reduction of wasteful consumption and increased resource efficiency in production by adopting sustainable practices. A natural corollary of this sustainable goal is the growing need of to go green. Now this poses a significant challenge to unmask the green claims of business as they create a mirage of sustainability, which in reality is nothing but false claims lacking substantial proof. This undermines SDG 12 as it prevents real progress towards achieving sustainable consumption and production. Consumers are likely to shift towards non-sustainable consumption as a direct consequence of greenwashing.

Consumer Perception on Green Claims

In order to understand consumer purchasing decisions in light of green claims made, a survey has been conducted to understand consumer consciousness towards greenwashing and their purchase patterns when it comes to sustainability. For this purpose, a questionnaire was conducted on the Likert Scale that included 8 questions, the results of which have been analyzed as follows:

Consumer Intention towards Green Purchase and Environmental Consciousness

Factor 1 [*See figure 1*]: "I intend to switch to other brands or products only for ecological reasons"



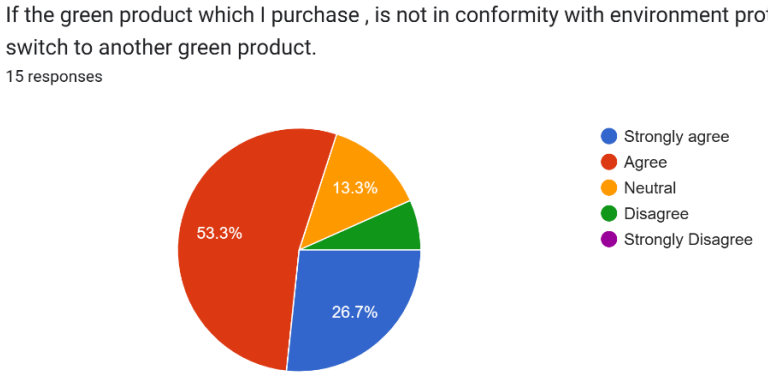
This factor aims to reflect the intention of the consumer towards green purchases. The majority of responses were made, i.e., **53.3%** "Agree" to the stated factor and thereby indicates that a significant portion of consumers are willing to prioritize sustainability while making

[18] UN General Assembly, *Transforming Our World: The 2030 Agenda for Sustainable Development* (2015) paras 54-59.

purchasing choices and decisions. Additionally, **13.3%** of the respondents "Strongly Agree" showcasing that a total of **66.6%** prefer switching to brands which are sustainable and green rather than those which are not.[19]

Factor 2 [*See figure 2*]: "If the green product that I purchase is not in conformity with environmental protection, then I will switch to another green product"

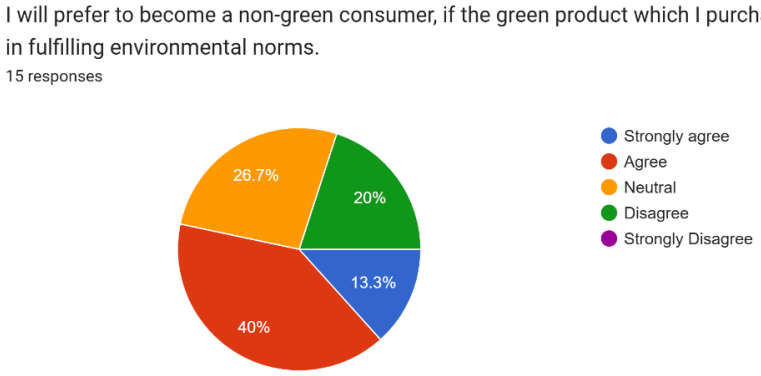
This factor aims to reflect the commitment of consumers towards genuine sustainability. The majority of responses were made i.e., **53.3%** "Agree" and **26.7%** "Strongly Agree" making up to **80%** of total responses received hinting towards willingness of consumers to switch to brands on finding that a particular product does not meet sustainability or environmental standards. This suggests that a substantial portion of consumers value authenticity in green claims and products and are willing to have a preference shift to align with environmental protection.[20]



Factor 3 [*See figure 3*]: "I will prefer to become a non-green consumer if the green product I purchase is found guilty of failing environmental norms"

This factor aims to reflect on the misplaced consumer trust in sustainable products. A significant portion of the responses i.e., **40%** "Agree" and **13.3%** "Strongly Agree" cumulating to a total of **53.3%** highlight consumer willingness to abandon green sustainable consumption altogether if it's found out that a product purchased by them does not comply with environmental norms.

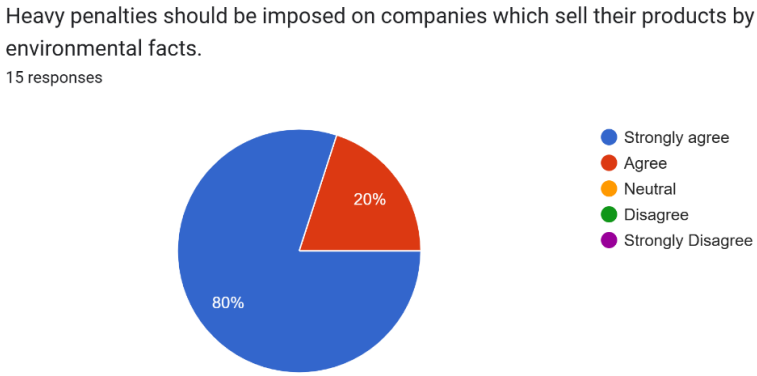
[19] See figure 1, '[Consumer Intention towards Green Purchase and Environmental Consciousness]'.
[20] See figure 2, '[Consumer Intention towards Green Purchase and Environmental Consciousness]'.



This indicates towards consumer perception towards damaged brand credibility that is found guilty in fulfilling environmental and sustainability norms.[21]

Factor 4 [*See figure* 4]: "Heavy penalties should be imposed on companies that sell their products using wrong environmental facts"

This factor aims to reflect on the strong consumer demand for accountability in environmental claims. An **80%** of responses indicate that consumers prefer companies that engage in greenwashing to face heavy penalties by "Strongly Agreeing" to the factor and **20%** "Agreeing" to the same that unanimously [**100%**] show support towards stricter regulations against false environmental claims.

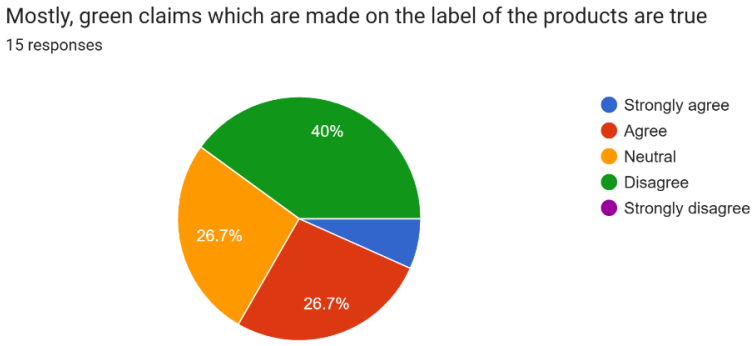


This shows environmental consciousness among the respondents as they prefer having environmental rules and regulations in place and are against practices that relate to environmental abuse indicating their tilt towards imposing penalties for false environmental claims.[22]

[21] See figure 3, '[Consumer Intention towards Green Purchase and Environmental Consciousness]'.
[22] See figure 4, '[Consumer Intention towards Green Purchase and Environmental Consciousness]'.

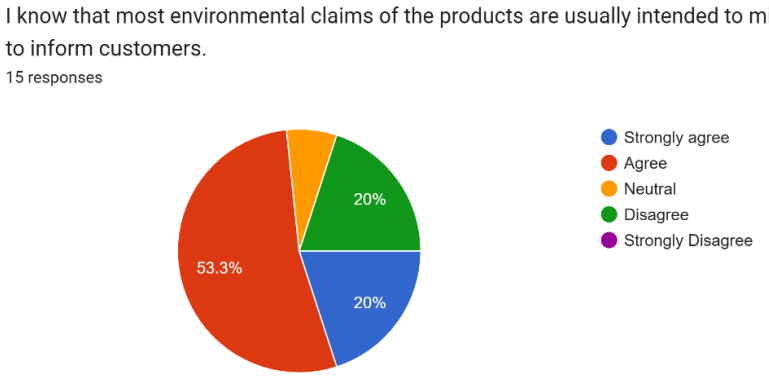
Consumer Perception about Greenwashing

Factor 1 [*See figure 5*]: "Mostly, green claims which are made on the label of the products are true"



This factor aims to reflect on the perception of consumer about the authenticity of green claims made by businesses. The responses indicate that there is a level of skepticism when it comes to such green claims on the labels of products. A significant proportion of respondents, i.e., **40%** "Disagree" suggesting a level of distrust in environmental marketing highlighting lack of credibility of claims in the minds of consumers.[23]

Factor 2 [*See figure 6*]: "I know that most environmental claims of the products are usually intended to mislead rather than inform customers." This factor aims to reflect on consumer awareness of greenwashing.

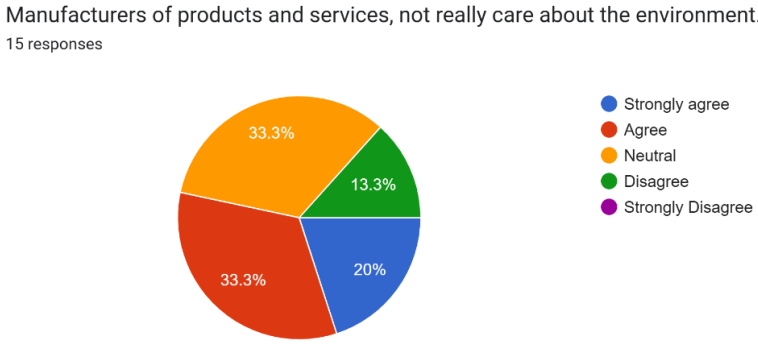


Now, even though the majority of the respondents, i.e., **53.3%** "Agree" along with a **20%** that "Strongly Agrees" that green claims made on products are usually intended to mislead consumers rather than to inform them, and though this is a positive sign towards consumer

[23] See figure 5, '[Consumer Perception about Greenwashing]'.

awareness, it still has a dark side to it when it comes to consumers building a skeptic wall towards all environmental claims made by companies, even the most genuine ones.[24]

Factor 3 [*See figure 7*]: "Manufacturers of products and services do not really care about the environment"

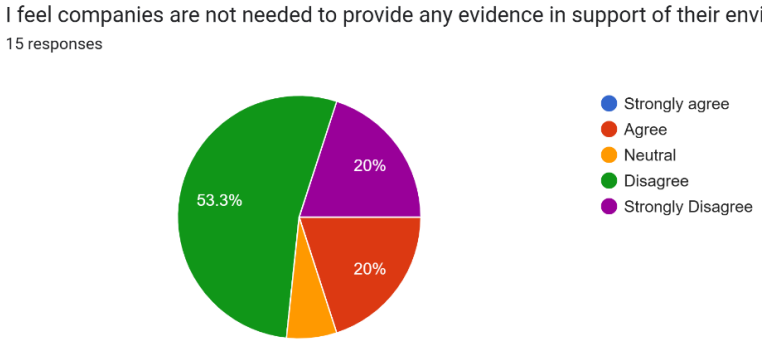


This factor aims to reflect on consumer mistrust in business efforts towards sustainability. The majority of respondents including a total of **53.3%** [**33.3%** that "Agree" and **20%** that "Strongly Agrees"] believe that businesses do not genuinely care about the environment and are aware about the exaggerated claims made by businesses with respect to their sustainability efforts thereby creating a trust deficit in consumer perception.[25]

Factor 4 [*See figure 8*]: "I feel the companies are not needed to provide any evidence to support their environmental claims"

This factor aims to reflect on the growing need to provide evidence-based support for the sustainable and green claims made by businesses today. A substantial **53.3**% of the respondents "Disagree" and **20%** that "Strongly Disagrees", making it to a total of **73.3%** that does not agree with the statement that companies do not have to provide evidence in support of their sustainable claims.

[24] See figure 6, '[Consumer Perception about Greenwashing]'.
[25] See figure 7, '[Consumer Perception about Greenwashing]'.



This indicates a strong support towards accountability and need to ensure corporate responsibility for the claims made by them on product labels, advertisements, etc.[26]

Therefore, the overall findings highlight the strong consumer predilection for environmental consciousness in sustainability claims made by businesses. A substantial portion of consumers prefer to switch to brands for ecological and sustainable reasons, thereby demonstrating inclination towards genuine green products. At the same time, the preference of consumers to abandon sustainable consumption altogether for false claims made highlights the emerging issue of diminishing consumer trust from genuine sustainable claims as well as exposing the problem of greenwashing towards society more and more. This particular survey highlights the emerging need for accountability and stricter regulatory framework in place to dust off the notable scepticism towards green claims by businesses ensuring that corporate marketing adopts green marketing by undertaking practices of genuine informing rather than misleading environmental marketing to maintain consumer confidence.

IV. GREENWASHING IN THE FASHION INDUSTRY

GHG Emissions and Fashion Carbon Footprint

Greenhouse gas emissions (CO2, methane, NOx) lie at the epicentre of the rising problem of global warming. Additionally, climate change accounts for a ton of natural disasters in India.[27] Fashion Industries are one of the leading sectors in that cause environmental pollution and GHG emissions through their carbon footprint and impact on climate change. There are various factors that lead to a carbon footprint on ecology, including but are not limited to overconsumption of resources, long supply chains, carbon-intensive the production

[26] See figure 8, '[Consumer Perception about Greenwashing]'.
[27] Dr. Sanu Rani Paul, 'Climate Change and Renewable Energy Consumption Obligations: Response of the Indian Judiciary' (2023) GLS LAW JOURNAL 45.

mechanisms, production of textile waste, and the shredding of garments leading to environmental pollution. This particular industry is responsible for an estimated 1.2 billion tons of GHG, 20% of water pollution, with reports showing that by the end of year 2050, the industry would end exploiting 25% of the global carbon budget. As on 2023, India is responsible for producing 5.5 million tons of cotton and 3.1 million tons of polyester fibre each year.[28]

Consumer behaviour significantly influences the sustainability efforts of the fashion industry. Around 30% of carbon emissions come from retail operations and consumer usage, making it an essential step towards reduction of environmental impact. Most fashion items nowadays are designed to meet fast needs of consumers, for their short-term use in the form of fast fashion resulting in these items ending up in landfills, waterways, and oceans, thereby contributing to growing textile waste and pollution.

Exploring Reasons for Indulging in Greenwashing

A recent study by HP demonstrates that eighty-four percent (84%) of Indian consumers base their buying decisions on sustainability practices of companies and eighty-five percent (85%) of Indian parents' favor purchasing sustainable products.[29] This showcases how sustainability has now become a key factor in influencing customer choices. This paradigm shift in consumer behavior and choices opens doors for corporates to leverage sustainability as a marketing tool by highlighting deceptive and misleading green claims.

Through these practices of promoting their products as "green", "eco-friendly", etc., customers are swayed to believe in the authenticity of such credentials, leading to uniformed or mislead consumers purchasing products with unverified claims, leading to the largely unchanged problem of environmental degradation.

Indian Framework on Greenwashing

The goal of India is to become carbon neutral by 2070 and reach a 45% decrease in emission intensity from 2005 levels by 2030 drives sustainability to be the prime requirement for

[28] Narasimhan Santhanam, 'India Textiles & Apparel Industry CO2 & GHG Emissions' (*Energy Alternatives India,* Aug 23 2024) <https://www.eai.in/ref/analytics/ghg/india/industry/textiles#:~:text=India%20produces%20about%205.5%20million,for%20the%20production%20of%20these> accessed 3 March 2025.

[29] Hewlett-Packard, 'Parents and the Planet: How Sustainability Impacts Purchasing Decisions' (2023) HP 2023 Sustainable Purchasing Pulse <https://press.hp.com/content/dam/sites/garage-press/press/press-kits/2023/2022-sustainable-impact-report/HP%20Sustainable%20Purchasing%20Pulse%202023_Executive%20Summary.pdf> accessed 5 February 2025.

business models.[30] Through its numerous sustainability policies such as Sustainable Development Goals and National Action Plan on Climate Change and various state-level environmental policies, industries are motivated to implement renewable energy solutions and green technologies

In order to curb and regulate greenwashing in India, the Central Consumer Protection Authority [CCPA] has released a Draft Guideline for the Prevention and Regulation of Greenwashing, last year in 2024, which defines the scope of greenwashing in terms of environmental claims.

The guidelines ensure substantiation of environmental claims by mandating all such claims relating to a product being environment-friendly, to be backed by verifiable data and evidence and wherever technical terms in reference to such claims and credentials have been used – they must be used and explained in a consumer-friendly manner along with necessary implications, if any.[31] They enlists adequate disclosures that must be made to ensure that businesses do not indulge in greenwashing practices including accurate disclosures through adequate medium linked to relevant and verifiable information without any cherry-picking of data.[32]

The penalty for making unsubstantiated claims with respect to environment which are not verifiable (or otherwise are contrary to provisions of Draft Guidelines) through advertisements, etc. would attract imprisonment for a term up to two years and shall be liable to fine extending up to Ten Lakh Rupees and for each subsequent offence, the penalty would extend to imprisonment for up to five years and fine up to Fifty Lakh Rupees.[33]

India is at a critical point to strike the balance between its economic progress and sustainable development objectives. The purpose of this study is to bring companies under the radar of the Advertising Standards Council of India ("ASCI"), the Central Consumer Protection Authority ("CCPA"), the Securities Exchange Board of India ("SEBI") and the Reserve Bank of India ("RBI") in particular and various frameworks such as the Guidelines for Environmentally Sustainable Practices released in 2018 by the MoEFCC, standards for eco-labelling (IS/ISO 14024:1999) by BIS and Green Rating Project Initiative by the Centre for Science and Environment which assesses and rates environmental performance of companies.

[30] 'Cabinet Approves India's Updated Nationally Determined Contribution to be communicated to the United Nations Framework Convention on Climate Change' (*Press Information Bureau*, 3 August 2022) <https://pib.gov.in/PressReleasePage.aspx?PRID=1847813> accessed 5 February 2025.
[31] Draft Guidelines for the Prevention and Regulation of Greenwashing 2023 cl. 6 (India).
[32] Draft Guidelines for the Prevention and Regulation of Greenwashing 2023 cl. 7 (India).
[33] Consumer Protection Act, 2019, No. 35 of 2019, §89 (India).

However, the problem of greenwashing still persists with deep implications on consumers and the environment, and this calls for the need to curb this practice by developing additional standards in existing laws and regulations to develop uniform sustainable qualities and standards throughout the country. This will ensure reliability and bounded guidance for environmental disclosures.

Problem of Greenwashing in the Fashion Industry

The world has seen a systematic rise in awareness among consumers about sustainability, which is attractive for businesses to ensure they promote greener products to increase sales and profits. There are undeniably sustainable products on the market, but there is a huge confusion between the truly green services and the green-washes ones, which is a great problem concerning consumers specifically. Globally, if the population reaches 9.6 billion by 2050, an equivalent of 3 planets would be required to meet and sustain the current lifestyles of people. Around 73%[34] of Gen Z shoppers today prefer buying from ethical companies and 73%[35] of Millennials spend more on sustainable brands. Research has shown that fashion businesses "routinely" deceive the public about their green credentials and several large fashion brands have been accused of being "all style and no substance" where well-known brands engage in unethical practices in what is called as greenwashing.

Problem Analysed on a Global Scale

The Global fashion industry has become one of the largest contributors to environmental degradation where every second an equivalent of one garbage truck of textiles is either landfilled or burned, making up to 92 million tons of clothing waste each year[36] with large fashion brands like H&M, Zara, Forever21, etc. driving such unsustainable patterns. H&M, for instance, enjoys the largest market share in India's fast fashion sector, with sales in India recorded at approximately Rs. 2960 Crore in FY 2022-23 which marks a 40% increase from the previous year[37]. Therefore, it becomes necessary to decode the greenwashing horrors of leading fast fashion brand – H&M.

[34] 'What Is Gen Z?' (*McKinsey & Company*, 28 August 2024) <https://www.mckinsey.com/featured-insights/mckinsey-explainers/what-is-gen-z> accessed 5 February 2025.
[35] 'The Database: What Sustainability Means Today' (*Nielsen*, October 2018) <https://www.nielsen.com/insights/2018/what-sustainability-means-today/> accessed 5 February 2025.
[36] Krishnendu Saha, Prasanta Kumar Dey, Vikas Kumar, 'A Comprehensive Review of Circular Economy Research in the Textile and Clothing Industry'(2024) 444 Journal of Cleaner Production 141252 <https://www.sciencedirect.com/science/article/pii/S0959652624006991> accessed 5 February 2025.
[37] Sagar Malviya, 'H&M Sales Expand 40% In FY23, Retains Position As India's Largest Fast Fashion Brand By Revenues' (*Economic Times*, October 2023) <https://economictimes.indiatimes.com/industry/services/retail/hm-

H&M, the world's second largest retailer, operates in around 74 countries and has been at the focal point of global concern for the effects of fast fashion since its very inception, raising questionable concern of "How sustainable and ethical is H&M truly?" H&M has committed to achieve a whooping reduction in its GHG emissions by using only recycled or sustainable materials by 2030. The company has been, in particular accused of deceiving customers by making misleading claims and engaging in greenwashing practices. A survey conducted in 2021 by the Changing Markets Foundation uncovered an astonishing level of greenwashing where they examined garments from major high-street manufacturers to determine the authenticity of their green and sustainable claims and discovered that 60% of the total claims were inaccurate and unsubstantiated. Through this outcome, H&M was found to be the greatest offender of all with an alarming 96% of their statements being proven to be false. As a result, H&M is being sued for "false" and "misleading" advertisements for marketing their products as sustainable. In 2024, a class-action lawsuit[38] alleging deceptive capitalization on the growing segment of conscious consumers by adopting the practice of greenwashing by marketing and presenting their products as environmentally friendly when in reality consumers were being deceived into paying a premium price for products that were not as sustainable as they claimed to be.

Therefore, this highlights the emerging need to tackle the problem of greenwashing on a global scale and scrutinize misleading sustainability claims. In addition to having a global impact, such greenwashing practices, though adopted by those being internationally-owned, have a two-fold impact on India: Firstly, a brand like H&M operates on a very large scale in India and Secondly, collaborations with such a brand would bring out backlash of criticism as it did in the case of Sabyasachi X H&M collab where the core values of the former brand were brought under radar and questions since its partnership with a brand that was accused of misleading sustainability claims and environmental damage.

Problem Analysed at National Scale: Assessing Aditya Birla Fashion and Retail Ltd.'s (ABFRL) Sustainability Claims and Possible Greenwashing Implications

ABFRL positions itself as a sustainability-driven company, while taking commitments to source sustainable materials and achieve a goal of using 100% sustainable cotton by 2025. The company aims at achieving an integral part of its mission statement, i.e., sustainability by

sales-expand-40-in-fy23-retains-position-as-indias-largest-fast-fashion-brand-by-revenues/articleshow/104534134.cms?from=mdr> accessed 5 February 2025.

[38] *Lizama et al. v. H&M Hennes & Mauritz Lp,* 4:22-cv-01170 (2022).

minimizing its environmental footprint across all supply chains. However, despite these initiatives and commitments made, the environmental impact of this business empire paints a different picture, thereby raising greenwashing concerns by misleading consumers by making overexaggerated credentials and standards to be reached.

For instance, FY2021-22 saw a lauded initiative to achieve a high 86% sustainable packaging[39] and also entered into collaborations with the Circular Apparel Innovation Factory (CAIF) for developing biodegradable polybags. However, in FY2022, the total Scope 1 (direct GHG emissions from sources owned and controlled) and Scope 2 (indirect emissions from purchased energy) emissions of the company reached 41,226 tonnes of CO2 equivalents, which was a 51% increase as compared to FY2021 where the Scope 2 emissions amounted to 95.3% of ABFRL's total GHG emissions in FY2022. In FY2022, the Scope 3 emissions remained at 4,76,608 tonnes of CO2 equivalents, which indicates an increased carbon footprint. Additionally, the company made claims of expanding their use of renewable energy, however, their total share of renewable energy in consumption saw a decline of 6% year-on-year to just 26.4% in FY2023.[40]

However, it is pertinent to note that although the rising GHG emissions or the declining share of renewable energy, showcasing the gap between actual performance and the commitments set are concerning, it cannot be denied that ABFRL has always demonstrated a commitment to embark on its sustainability journey with their vision to "give back more than what we take from our ecosystem" by undertaking to restore ecosystems.

V. CONCLUSION & FUTURE SCOPE OF THE STUDY

The rise of greenwashing practices in recent times, particularly in the fashion industry, not just at the global scale, but at the national scale as well, has made it imperative to study how we can truly move towards a sustainable path while protecting and upholding the needs and faith of consumers. By fabricating or making deceptive claims about sustainability, businesses erode the long-term goals set by the world at large.

While a green lifestyle is the need of the hour considering our depleting environment and ecosystem, it should not be attempted to be achieved at the cost of making false propagation of

[39] 'Aditya Birla Fashion and Retail, Sustainability Report 2021-22' (*ABFRL SDR*, 19 August 2022) <https://www.abfrl.com/wp-content/uploads/2023/10/2.-2021-22-PDF-VERSION.pdf> accessed 3 March 2025.
[40] 'Aditya Birla Fashion and Retail, Sustainability Report 2022-23' (*ABFRL SR*, 2 August 2023) <https://www.abfrl.com/wp-content/uploads/2023/10/1.-2022-23-PDF-VERSION.pdf> accessed 5 February 2025.

environmentally friendly practices. The findings of the study above shed light on the need to have strict mechanisms in place and strengthening the ones already implemented, to ensure that businesses move ahead of merely improving their sales growth.

Furthermore, there is further scope of research that needs to be done, since greenwashing as a concept requires a more exhaustive conceptual work as it is the need of the hour and a number of definitions and interpretations made from different point of view make it confusing for the consumers and incentivizes the corporations to further such practices. Additionally, greenwashing in this present study is done in lines of misleading advertisements; however, there are various untouched and unexplored subsets of greenwashing prevalent as well which when explored would help identify the need to conduct and discover new measures to curb the same.

VI. RECOMMENDATIONS

(i) Curbing Greenwashing through Stricter Regulatory Framework and Laws: The Regulatory authorities already in place dealing with the issue of greenwashing should be empowered to strictly penalize businesses indulging in corporate false green claims. Government should ensure transparency in dealings of the fashion industry by mandating publishing of verifiable data for their sustainability claims, waste management efforts, emissions, etc. A "Greenwashing-Free Product Certification" can be issued by national/internationally recognized agencies to verify authentic claims and eco-certificates issued by BIS, and must be regulated and standardised to ensure that they are not misused.

Furthermore, additional policies such as the 2024 Guidelines to prevent greenwashing should be implemented to effectively prohibit misleading environmental claims and ensure disclosures made are verifiable through accurate certifications by credible authorities, internal verifiable evidence, etc. Those companies guilty of indulging in greenwashing must be obligated to issue public corrections as a deterrent measure for future violations. Government can take initiatives to provide subsidy or tax incentives to truly sustainable brands meeting environmental standards; this would also encourage businesses to refrain from getting into anti-sustainable practices.

An online platform must be developed that provides a credibility score check based on independent sustainability audits and real-time reports of companies that claim that their products are environmentally friendly, which will ensure transparency and build a feeling of inclusion among consumers at large.

(ii) Sustainable Production by Fashion Industries: The processes used by the apparel and fashion industry must be designed in a way that incorporates sustainability while reducing environmental impact through efficient use of resources and waste reduction. The fashion industry consumes a lot of energy, water and chemicals, thereby urging to the need of having highly efficient technologies like reuse of waste energy and water to reduce wastage of such inputs. Additionally, there must be an ethical supply chain management in place, including circular fashion models that use recycled materials such as recycled polyester. Sustainable fabrics are known to be more durable compared to other fabrics, which is in addition to numerous other reasons for switching to sustainable fashion.

(iii) Sustainable Consumption by Consumers: One of the foremost ways to ensure that sustainable consumption is achieved at the customer level is by spreading awareness through marketing and the awareness-raising campaigns among them to check for third-party certifications, legitimacy of claims made along the lines of "caveat emptor" to ensure that they research and inspect the product before purchasing it.

Alternatives like second-hand options like thrifting, opting for ethical cloth, sustainable materials like bamboo, linen, and organic cotton, upcycling, and clothing swaps should also be explored and easy grievance redressal or complaint mechanisms should be enforced to encourage customers to raise their voice in cases of unsubstantiated green claims.

(iv) Alignment with Global Standards: Though India is not far away from taking efforts on curbing greenwashing, Global alignment would assist in strengthening control mechanisms; for instance, the U.S. Federal Trade Commission Green Guides will go a long way in offering insights on how regulatory frameworks already in place in India can be evolved to ensure truthful environmental claims and build consumer trust. Additionally, the Green Claims Code introduced by the UK's Advertising Standards Agency and the Competition and Markets Authority would go a long way in protecting customers from deceptive marketing practices.

(v) Reviving Eco-Friendly Materials to promote Fashion sustainability: Khadi, for instance, was introduced to ensure self-sufficiency and independence from British textiles and is considered a highly sustainable fabric due to its low carbon footprint and promotes circular economy by using good quality materials during production and its subsequent purchase being a direct investment in achieving "sustainable fashion" for a self-sufficient and sustainable India. Now as we know that the practice of greenwashing thrives in a market which believes in sustainability as a marketing tool and not as genuine green marketing, by

truly achieving sustainable fashion – it will help in eliminating room for greenwashing by growing eco-consciousness among the consumers.

VII. OVERALL FEEDBACK

The study presents a comprehensive analysis with good reliance on existing sources. However, there were some grammatical and phrasing errors which has been resolved by the editorial team. The existing issue is with the citations which are not in OSCOLA 4rth Ed. The comments has been added wherever the editor(s) deemed necessary. The CEL team appreciates the author's efforts to write such a detailed paper and well examined surveys.

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Submission Guidelines

Cover letter- All submissions must be accompanied by a cover letter separate attachment stating the title, author's full name, university and year of study and the author's contact details. It should also declare that the paper has not been published or sent for publication elsewhere. **The cover letter should contain the details mentioned above and not the manuscript.**

Submissions must be in MS Word.

Main text- Times New Roman, font size 12, 1.5 spacing, justified with a margin of left 1.5 inches and suitable 1.0 inch, top 1 inch and bottom 1 inch. The first line of the paragraph should be indented.

Foot Notes- Times New Roman, font size 10. Substantive footnotes are accepted.

Citation Style- OSCOLA 4th Edition

Word Limit (including footnotes):

Research Article- 4000-6000 words

Case Study- 2500-3000 words

Policy Analysis- 3000-4000 words

Case Comment- 1500-3000 words

However, the Editorial Board reserves the right to change these guidelines.

Abstract- Every manucript should have an abstract not exceeding 250 words.

Deadline for submitting manuscripts is 31st March 2026

The Manuscript along with the cover lettter in PC-compatible.

Contact Details- MS Word document format should be emailed to the editors at: centenvlaw.il@nirmauni.ac.in with the Subject: Submission for JCEL: Research Article/Case Study/ Case comment/ Policy analysis

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