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**GREEN FINANCE AND CLIMATE ECONOMICS****Meghna Gupta and Rohan Bichukale**<sup>1</sup>Bachelor of Business Administration (BBA), Institute of Management and Entrepreneurship Development, Bharati Vidyapeeth (Deemed to be University), Pune<sup>2</sup>Bachelor of Science — Artificial Intelligence & Machine Learning (B.Sc. AI/ML), Institute of Management and Entrepreneurship Development, Bharati Vidyapeeth (Deemed to be University), Pune**ABSTRACT**

*Over the years, we've noticed various environmental changes like- rising temperature, unpredictable rainfall and increasing pollution. This isn't something normal or random but due to the rapid economic growth without considering the future environmental concerns. In this context, Green Finance and Climate Economics adds their immense and essential approaches for aligning economic development with environmental responsibilities.*

*By this study we examined how Green Finance facilitates investment in sustainable initiatives such as renewable energy, low carbon technologies and climate resilient infrastructure, while Climate Economics supports a framework to determine environment risks, impacts and policy effectiveness. This paper highlights key challenges including lack of standardized definition, regulatory inconsistencies, limited access to finance in developing economy and a difference in climate risk assessment. It also shows a rising issue i.e. the Temporal Mismatch between short term financial decision making and long-term climate objectives which lowers the effectiveness of sustainable investments.*

*Using a secondary research methodology, This study shows up with an integrated framework supported by macro, meso and micro-level analysis. This finding reinforces the effective coordination amongst the policy makers, financial institutions and individuals which is important for achieving sustainable outcomes. This study concludes that aligning financial system with environmental priorities is not only necessary for addressing climate change but also crucial for ensuring long-term economic stability and resilience.*

**Keywords:** *Green finance, climate economics, sustainable development, climate change, green bonds, sustainable investment, carbon pricing, environmental sustainability, climate finance, low-carbon economy.*

**INTRODUCTION**

Climate change nowadays has become one of the most important global challenges, which affects not only the environment but also economic stability and social well-being. Rising temperatures, increasing frequency of extreme weather events, and environmental degradation are mostly affected by human actions such as industrialization, urbanization and dependence on fossil fuels. Scientific reports show that global temperatures have risen about 1°C above pre-industrial levels, leading to increased sea-levels, biodiversity loss and disruption in natural ecosystems. These changes are not the concerns that can be neglected but demands urgent attention.

The economic ramifications of climate change are significant and far-reaching. Harm to infrastructure, reduced agricultural productivity, supply chain disruptions and increased healthcare costs emphasize the limitations of traditional economic models that have largely been rejected by environmental externalities. In response, Green Finance has emerged as a crucial approach that directs investments towards sustainable projects such as renewable energy, energy efficiency and climate resilient infrastructure. At the same time, Climate Economics provides a framework to evaluate the costs, risks and policy interventions required to address climate-related challenges efficiently.

Instead of growing awareness and adoption, reimplementation of green finance faces multiple challenges, including lack of standardized definition, regulatory inconsistencies, limited financial access in developing countries and a gap in climate risk assessment. These issues create a difference in translating theoretical concepts into practical outcomes. This study focuses on to examine the relationship between Green Finance and Climate Economics, finding the key gaps in the existing system, and propose an integrated model that supports sustainable development and long-term economic resilience.

**Problem Identification**

Despite the increasing importance of Green Finance and Climate Economics in both academic narrative and policy frameworks, a substantial gap persists between conceptual advancements and their real-world implementation. The major challenge lies in the absence of a universally accepted definition and its standardized taxonomies for "green" investments. This lack of clarity leads to inconsistencies across the regions and

institutions enables greenwashing techniques, and weakens investor confidence thereby limiting the scalability and credibility of sustainable finance initiatives.

In addition, the global switch towards a low-carbon economy is hampered by a significant financing gap, particularly in developing economies. While green financial assets such as green-bond and climate funds have expanded, the number of investments remains insufficient relative to the scale required to reach the international climate targets. Structural barriers including limited institutional capacity, higher perceived investment risks, inadequate regulatory support and lack of technical expertise- further constrain access to green finance in vulnerable regions. On the other hand, the relationship between economic growth and environmental sustainability remains complex, often presenting a trade-off due to lack of integrated and practical structure that can align both the objectives efficiently.

Additionally, existing financial systems are not adequately formed to assess and inculcate climate related risks into decision making processes. Barriers such as incomplete data, outdated risks assessment models and weak integration between macro-level policies, meso-level financial institutes and micro-level actors restrict the efficiency of climate responsive investments. In the research landscape itself remains divided, and scarce coordination between financial mechanism, economic theory and environmental considerations. A major issue identified in this study is the temporal mismatch between short term financial incentives and long-term climate objectives, which compromises the effectiveness of green finance and highlights the need for more strategic, integrated and adaptive financial frameworks.

#### **Major problem identified:-**

The core issue isn't a lack of interest; it's the absence of a unified, standardized, and practical framework. Until we align green finance mechanisms with climate economic goals, we're going to struggle to build an economy that is actually resilient enough to survive—and thrive—in a changing climate.

#### **METHODOLOGY**

This study adopts the secondary research methodology, based on data from credible sources such as academic journals, government reports, institutional publications and industry analyses to evaluate developments in green finance and climate economics. This approach gives us the understanding of existing theories, practices and challenges without the need for primary data collection.

An illustrative research approach is employed to identify and explain the key trends which are related to sustainable investments, climate risks and evolving policy frameworks. This study sequentially reviews relevant literature to understand how financial systems are adapting to environmental concerns and sustainability objectives.

In addition to this, a comparative analysis is conducted to study different perceptions, models and findings from past research. This helps us to understand the subject while watching towards the key gaps, precisely the issue of temporal mismatch between short-term financial decision-making and long-term climate goals.

The gathered information is then synthesized to develop an integrated structure linking green finance and climate economics. This structure is further analyzed using a macro-meso-micro perspective to determine the interaction between policy-level decisions, financial institutions and individual behavior, ultimately generating meaningful insights of sustainable development.

#### **FRAMEWORK**

This study develops an integrated framework the brings together green finance and climate economics to create a organized way towards suitable and resilient economic development. The framework revolves beyond the traditional view of finance as a profit maximizing system and repositions it as a strategic mechanism for highlighting the environmental challenges while ensuring long-term economic stability.

As green finance and climate economics is the foundation of the framework it functions as the key driver by directing financial resources towards environmentally sustainable activity. It contains the measures such as green bonds, climate funds, sustainable investment portfolios and green lending practices. These financial assets are supported by the governing policies, institutional mechanisms and technological innovations that together facilitates the important allocation of capital. By adjusting investments from high-carbon sectors into low-carbon and sustainable alternatives, green finance plays a crucial role in activating the transition to a cleaner economy.

Backing this is climate economics, which acts as a structural model of the framework. It ensures that financial decisions are examined not only on immediate returns but also on long-term environmental and economic

plans. Crucial factors includes the assessment of environmental externalities, cost-benefits analysis of climate policies and evaluation of climate related risks. This includes both the physical risks such as extreme weathers, events and environmental degradation and transition risks, developing from policy changes, market shifts and technological advancements. This conceptual layer helps in making informed, forward looking decisions.

The combination of green finance and climate economics reduces results such as reduced greenhouse gas emissions , improved environmental quality, strengthened climate friendly infrastructure and more inclusive economic growth. However, the framework also observes critical challenges including greenwashing, lack of standardized definition, regulatory fragmentation and unequal access to finance across regions. To highlight these issues, the framework emphasizes transparency, strong governance, policy coordination and global cooperations.

Also, the framework explicitly focuses on the temporal mismatch between the short-term financial decision making and long-term climate objectives by promoting long-term investment horizons and sustainability dependent evaluation metrics. It also brings together the macro-meso-micro perspective, ensuring coordination between policy level decisions, financial institutions and individual acts. Therefore, this framework provides the comprehensive and flexible model that bridges the gap between financial systems and environmental sustainability, offering a practical approach to achieve the long term economic and ecological balance.

### **ANALYSIS**

To study how green finance and climate economics works in practice, this study tells us the interaction around 3 interconnected levels macro, meso and micro. This multi-level reach helps in analyzing how policies, financial systems and individual actions collectively contribute to sustainable outcomes.

At the macro level, governments and international institutions play a vital role in shaping the overall direction of sustainable development. They built a regulatory structure, climate policies and economic instruments such as carbon pricing, environmental regulations and sustainability targets. These policies create the foundation for green finance by offering incentives and standards that encourage environmentally responsible investments. Efficient macro-level government is essential for ensuring consistency, stability, and long-term commitment towards climate goals.

The meso level represents financial institutions such as banks, investment firms, and insurance companies, which act as a mediator between policy and practice. These institutions translate macro-level policies into actionable financial products, green bond, sustainable funds and climate focused lending. They are the reason for analyzing projects, managing risks and allocating capital towards sustainable initiatives. Their part is crucial in ensuring that financial resources are effectively directed towards environmentally beneficial activities.

At the micro level, individuals, businesses and investors make decisions that directly impact sustainability outcomes. These include accepting the renewable research solutions, investing in sustainable assets and implementing environmentally friendly practices within organizations. Micro-level actions are triggered by incentives, awareness and the availability of green financial products. The success of green finance ultimately depends on how effectively these stakeholders take action towards the opportunities and signals provided by higher levels.

The effectiveness of the system depends on strong coordination among all three levels. When policies(macro), financial mechanism(meso) and individual actions(micro) are bought together, they create a reinforcing cycle that promotes sustainable development. This sequence also helps address the temporal mismatch between short-term financial goals and long-term climate objectives by embedding sustainability considerations around all levels of decision-making.

### **PROBLEM IDENTIFICATION**

One of the doubts expressed in this research is the temporal discrepancy of financial systems and climate performances, which directly restricts the success of green finance and climate economics, this discrepancy is due to the significant disparity in time scale: financial systems are often more concerned about short-term returns, whereas climate interventions require long-term investments and long-term commitment.

Model financial market is operated under short period assessment, in which emphasis is put on quarterly earnings, annual returns and short run profitability. By contrast, environmental values, like lessened emissions, ecologies restoration and climate stabilization- tend to manifest themselves over decades. This creates an imbalance in structure where environmental positive but slow-to-turnover projects are underestimated or not considered at all compared to short-term and high-profit investments although they may be environmentally damaging.

The other aspect of the issue is the conventional financial analysis techniques. Discounting and other methods lower present value of future benefits, which makes long-term environmental gains seem unimportant in financial analysis. Moreover, the barrier to quantifying environmental benefits and climate resilience also discourages investment in sustainable projects, hence, financial systems are inclined to support long-term sustainability results in the short-term economic benefits.

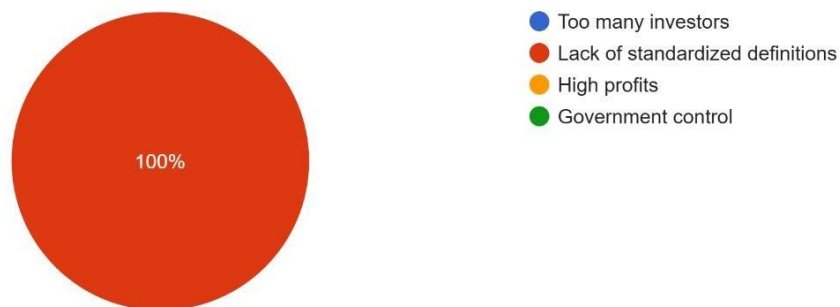
This time lag is not only a technical issue but also a methodical limitation in the financial systems and policies and decision-making. This creates an obstacle to climate-oriented adjustment of the financial flows and is part of the continued financing of unsustainable activities. To address this concern, it is important to reconsider financial assessment models, promote long-term investment views, and introduce sustainability into the main financial decision-making process to make sure that economic growth is aligned with the long-term environmental goals.

**SURVEY QUESTIONS AND SOME RESULTS**

1. What is a major issue in defining “green” investments?
2. The absence of global regulation in green finance leads to:
3. What is the main risk caused by unclear green finance definitions?
4. The “trillion-dollar gap” refers to:
5. Why do developing countries struggle with green finance?
6. What is the “growth vs green paradox”?
7. A major limitation in climate risk assessment is:
8. What does the “data blind spot” refer to?
9. Fragmented research in green finance means:
10. What is the core issue identified in your problem statement?
11. Why is policy coordination important in green finance?
12. Which factor reduces investor trust in green finance?
13. What is a key structural barrier in green finance?
14. Why is integrating climate economics with finance difficult?
15. Which problem limits real-world implementation of green finance?

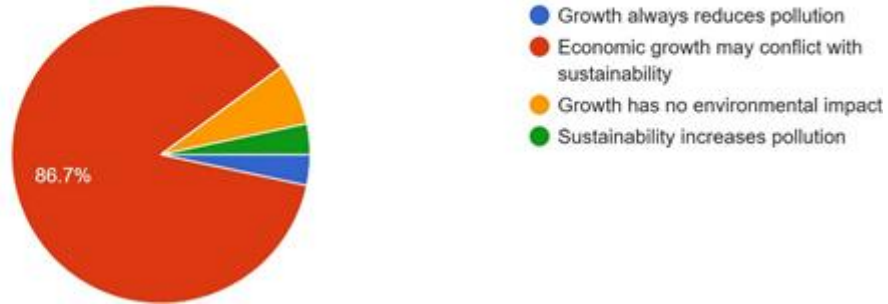
1. What is a major issue in defining “green” investments?

30 responses



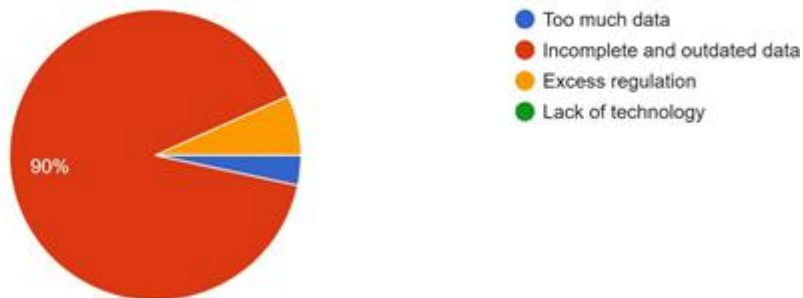
6. What is the "growth vs green paradox"?

30 responses



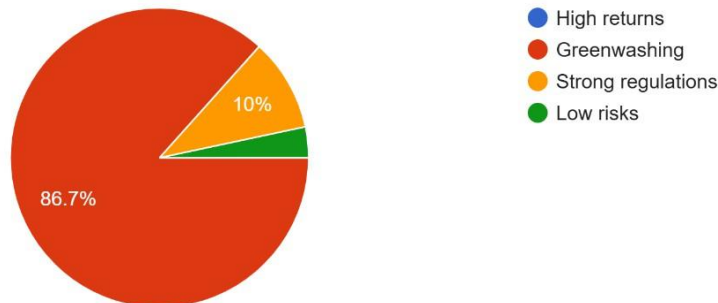
7. A major limitation in climate risk assessment is:

30 responses



12. Which factor reduces investor trust in green finance?

30 responses



**FUTURE SCOPE**

The future of green finance and Climate economics lies in reforming financial system to better align with long-term environmental sustainability. As climate tension increases, there is a rapid need to strengthen global structure that promotes transparency, accountability and consistency in sustainable finance. Constructing universally accepted definitions and taxonomies for green investments can lower uncertainty, limit greenwashing, and improve investor confidence, thereby enabling the effective flow of capital towards sustainable projects.

Change in technology, precisely in data analytics and artificial intelligence, are meant to play a significant role in improvising climate risk assessments and financial decision-making.

Assimilating climate data into financial frameworks can enhance the accuracy of risk evaluation and support more informed investment strategies. At the same time policy interventions such as carbon pricing, regulatory incentives and public-private partnerships will be important in encouraging long-term investments and addressing the temporal mismatch between short-term financial returns and long-term climate goals.

Furthermore, future efforts must focus on improvising access to green finance in developing economies where susceptibility to climate change is high but financial resources are limited. Empowering institutional capacity, increasing financial literacy, and promoting inclusive financial mechanism can help bridge the gap. Also, greater coordination across macro, meso, and micro level is important to ensure that policies , financial institutions, and individual acts work together efficiently.

Collectively, the future direction of this field requires an integrated, adaptive, and forward-looking approach that compiles financial innovation, strong governance, and global cooperation. By synchronizing financial system with environmental priorities, it is possible to attain sustainable economic growth while ensuring long-term ecological balance and adaptability.

## CONCLUSION

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## REFERENCES

- Intergovernmental Panel on Climate Change (2023) *Climate Change 2023: Synthesis Report*. Geneva: IPCC.
- World Bank (2022) *World Development Report: Finance for an Equitable Recovery*. Washington, DC: World Bank.
- International Energy Agency (2023) *World Energy Outlook 2023*. Paris: IEA.
- United Nations Environment Programme (2022) *Emissions Gap Report 2022*. Nairobi: UNEP.
- Organisation for Economic Co-operation and Development (2021) *Green Finance and Investment: Mobilising Institutional Investment for Green Infrastructure*. Paris: OECD.
- Climate Bonds Initiative (2023) *Green Bond Market Summary 2023*. London: CBI.
- International Monetary Fund (2021) *Fiscal Policies for Paris Climate Strategies*. Washington, DC: IMF.
- Network for Greening the Financial System (2022) *NGFS Climate Scenarios for Central Banks and Supervisors*. Paris: NGFS.
- Stern, N. (2007) *The Economics of Climate Change: The Stern Review*. Cambridge: Cambridge University Press.
- Nordhaus, W. (2018) *Climate Change: The Ultimate Challenge for Economics*. American Economic Review.
- Sachs, J. et al. (2019) *Financing Sustainable Development*. Journal of Sustainable Finance.