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Green finance and sustainable investing in India: A comprehensive review

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Abstract

India being at crucial point in progression, juggling growing environmental issues with quick economic expansion. As one of the world's fastest-growing major economies and one of the nation most vulnerable towards consequences of climate change, India has set ambitious sustainability objectives, including reaching 500 GW of renewable energy capacity by 2030 and net-zero emissions by 2070. These pledges call for hitherto unheard-of levels of cash mobilisation, establishing sustainable investing and green finance as essential tools for India's sustainable development path. In order to provide an integrated picture of market dynamics, policy frameworks, institutional processes, stakeholder responsibilities and implementation issues, this thorough study analyses state of green finance and sustainable investing in India by synthesising academic research. The study has objectives to analyse the current situation and developmental path of India's green finance ecosystem, assess the efficacy of regulatory and policy frameworks, pinpoint the obstacles and facilitators affecting the adoption of sustainable finance, determine the connection between green finance and sustainability outcomes and offer evidence-based suggestions for bolstering India's sustainable finance architecture.

Keyword: Green finance, sustainable investing, market dynamic, sustainable development, policy framing.

1. Introduction

Green finance and sustainable investing are becoming essential tools for tackling environmental issues and promoting economic expansion as the global financial scene undergoes a radical transition towards sustainability. Green finance include financial investments in eco-friendly products, sustainable development projects, and policies that encourage the expansion of a more sustainable economy. Given India's fast economic growth, mounting environmental concerns and dedication to international climate agreements, this paradigm change takes on special relevance in that country.

One of the fastest-growing major economies in the world, India must simultaneously maintain economic growth and reduce environmental deterioration. With lofty goals like reaching net-zero emissions by 2070 and 500 GW of renewable energy capacity by 2030, the nation has become a major actor in the global environmental agenda. Trillions of dollars will need to be raised over the next few decades to meet these obligations.

In India, sustainable investing which incorporates Environmental, Social and Governance (ESG) factors into investment decision-making has grown from a specialised idea to a popular investment philosophy. Government agencies, regulatory entities, financial institutions, businesses and investors are among the parties involved in integrating green finance principles into India's financial infrastructure. In the Indian market, instruments including green bonds, loans linked to sustainability, ESG funds and climate finance mechanisms are becoming more popular.

This thorough analysis looks at the state of sustainable investing and green finance in India by examining market trends, governmental frameworks, academic research and implementation issues. In order to offer insights into the present situation, new trends and potential paths of sustainable finance in the Indian context, the paper synthesises research findings.

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1.1 Importance of the Study

The necessity of the research stems from its thorough analysis of sustainable investing and green finance in the particular socioeconomic setting of India. The significance of this study is highlighted by multiple reasons.

Environmental Imperative: India ranks among the countries most exposed to effects of climate change, such as severe weather, water shortages and disruptions to agriculture.

Green finance serves as a crucial enabler for climate adaptation and mitigation strategies, making its study essential for national resilience.

Economic Transformation: As India pursues sustainable development goals, understanding green finance mechanisms becomes vital for channelling capital toward environmentally responsible projects. The changeover to a low-carbon low-cost necessitates estimated investments exceeding \$10 trillion by 2070, highlighting the critical role of sustainable finance.

Policy Implementation: India has introduced numerous green finance policies and regulatory frameworks in recent years. This learning offers appreciated understandings into the effectiveness of these measures and recognizes areas requiring policy intervention.

Market Development: The Indian green finance market, though growing, remains nascent compared to developed economies. This research contributes to understanding market dynamics, investor behavior and barriers to sustainable investing adoption.

Financial Sector Innovation: Green finance introduces innovative financial instruments and mechanisms. Understanding their application in India helps financial institutions develop appropriate products and services.

Academic Contribution: This comprehensive review consolidates scattered research on Indian green finance, providing researchers with a foundation for further inquiry and identifying knowledge gaps requiring investigation.

Stakeholder Guidance: The findings benefit multiple stakeholders including policymakers, financial institutions, corporate entities, investors and civil society organizations in making informed decisions regarding sustainable finance.

Global Learning: India's experience with green finance offers lessons for other emerging economies navigating similar sustainability challenges, contributing to global knowledge exchange.

2. Review of Literature

Paramati, *et al.* (2018) ^[14] in their study while intensive on tourism, this study provides methodological frameworks applicable to analyzing the environmental impacts of investments in India. It offers insights into balancing economic development with environmental sustainability through appropriate financing mechanisms. Soundararajan, *et al.* (2018) ^[19] The article reviews social responsibility in

small businesses, with applications to understanding how green finance can support sustainability transitions in India's vast small business sector. It emphasizes the need for tailored financial solutions for smaller enterprises. Mehta, K., Sharma, R., & Vyas, V. (2019) ^[10] in their study evaluated the sustainability performance of Indian companies using data envelopment analysis and TOPSIS methodology. It provides insights into corporate sustainability practices and their implications for sustainable investment decision-making in India. Ghosh & Rajan (2019) ^[6] in their research investigated the relationship between green finance availability and renewable energy development across countries including India. Using econometric analysis, the study demonstrated how green finance mechanisms facilitate renewable energy investments and contribute to sustainable energy transitions. Sachs, *et al.* (2019) ^[16] in this chapter provided conceptual framework for understanding green finance's role in achieving sustainable development goals, with applications to India's development priorities. It emphasizes the interconnections between green finance, energy security and sustainable development. Gupta & Barua (2020) ^[7] have examined in their article about the barriers to green innovation in Indian small and medium enterprises and the role of green finance in overcoming these obstacles. The study provided insights into how financial support mechanisms can facilitate environmental innovation among SMEs in India. Agarwal & Gneiting (2020) ^[1] in their study examined the financing mechanisms required for achieving sustainable development goals in India. The authors analyze the role of public and private finance in sustainability projects and identify significant financing gaps. They emphasize the need for innovative financial instruments and stronger regulatory frameworks to mobilize capital for sustainable development. Sharma, *et al.* (2020) ^[17] in their study examined operational and strategic aspects of India's wind energy sector, including financing challenges. It provides insights into how green finance mechanisms can address sector-specific challenges and facilitate renewable energy deployment. Chakraborty & Mazzanti (2020) ^[3] during this article explored the relationship between energy intensity, innovation and sustainable development across countries. While focused on OECD nations, it provides frameworks applicable to India's green energy transition and the financing mechanisms required to support innovation in renewable energy sectors. Chaudhary *et al.* (2020) ^[4] in their study examined green banking initiatives adopted by Indian banks, comparing practices across public and private sector banks. It assessed integration of environmental considerations in lending decisions and the promotion of green financial products. The research highlights best practices and challenges in implementing green banking in India. Singh, *et al.* (2020) ^[18] in a research explored organizational factors enabling green innovation, with implications for how financial institutions can support environmental innovation in Indian companies. It highlights character of green finance in facilitating organizational renovation to sustainability. Mukanjari & Sterner (2020) ^[12] through this article examines the role of green finance in post-pandemic economic recovery, with implications for India's recovery strategy. It analyzes how sustainable finance can support resilient recovery while advancing

climate and environmental objectives. Taghizadeh & Yoshino (2020) ^[20] in his study examined sustainable financing solutions for renewable energy projects in Asia, including India. It analyzes various green finance instruments and their effectiveness in mobilizing investments for renewable energy infrastructure development. Nath, *et al.* (2021) ^[13] in their research explored factors influencing green product adoption in India, with implications for green finance institutions designing sustainable product offerings. Understanding consumer behavior helps financial institutions develop appropriate green financial products. Rao & Kumar (2021) ^[15] in their empirical study investigated the relationship between ESG disclosure practices and financial metrics of Indian companies. The findings contribute to understanding the materiality of ESG factors for investment performance in the Indian context. Dasgupta & Chakraborty (2021) ^[5] in their comprehensive study analyzed India's climate finance landscape, examining sources of climate funding, allocation mechanisms and utilization patterns and authors identified structural barriers to effective climate finance deployment and propose policy recommendations for enhancing climate finance flows in India. Bhandary, *et al.* (2021) ^[2] in their mentioned that research reviewed global climate finance policies with specific attention to emerging economies including India. It evaluates the effectiveness of various policy instruments in mobilizing climate finance and highlights implementation challenges. The study provides comparative insights into India's climate finance architecture. Jain *et al.* (2021) ^[8] in their research empirically examines the relationship between ESG performance and financial performance of Indian listed companies. The findings provide evidence for the business case for sustainability and its implications for sustainable investing decisions in the Indian equity market. Kaur & Yadav (2022) ^[9] in their study analyzed the evolution of India's green bond market, examining issuance trends, issuer profiles and use of proceeds. The authors identify regulatory, market and awareness-related challenges hindering green bond market development and propose measures for market acceleration. Kumar *et al.* (2022) ^[11] in

their comprehensive bibliometric study analyzed global sustainable finance research, identifying key themes, trends and research gaps. The research provides context for understanding India's position within global sustainable finance scholarship and highlights emerging research directions.

2.1. Research Gap

Despite the fact that green finance has become a crucial tool for assisting India's shift to climate-resilient as well as low carbon economy, the exploration now in publication highlights a number of drawbacks. First, previous study has inclined to focus on either the conceptual definition or the general expansion of green finance in India, with little longitudinal data evaluating its development and current ecosystem in a thorough manner. Second, while frameworks for regulations and policies have been examined separately, there is still a dearth of comprehensive analysis of how these policies fit with market reactions and implementation realities. Third, research on financial instruments has mostly concentrated on green bonds, creating a knowledge gap about the wider range of instruments and their operational effectiveness in India's financial system, such as carbon markets, blended finance and loans tied to sustainability. Consequently, a thorough, multifaceted examination of India's green finance ecosystem that links regulatory frameworks, market instruments, stakeholder roles, implementation challenges and quantifiable sustainability performance is showing that there is a gap in research so the topic has been taken for the study.

3. Research Methodology

3.1 Research Intentions

The primary objectives of this research study are:

- To examine evolution of green finance and sustainable investing in India.
- To identify green finance instruments & adoption patterns in India.

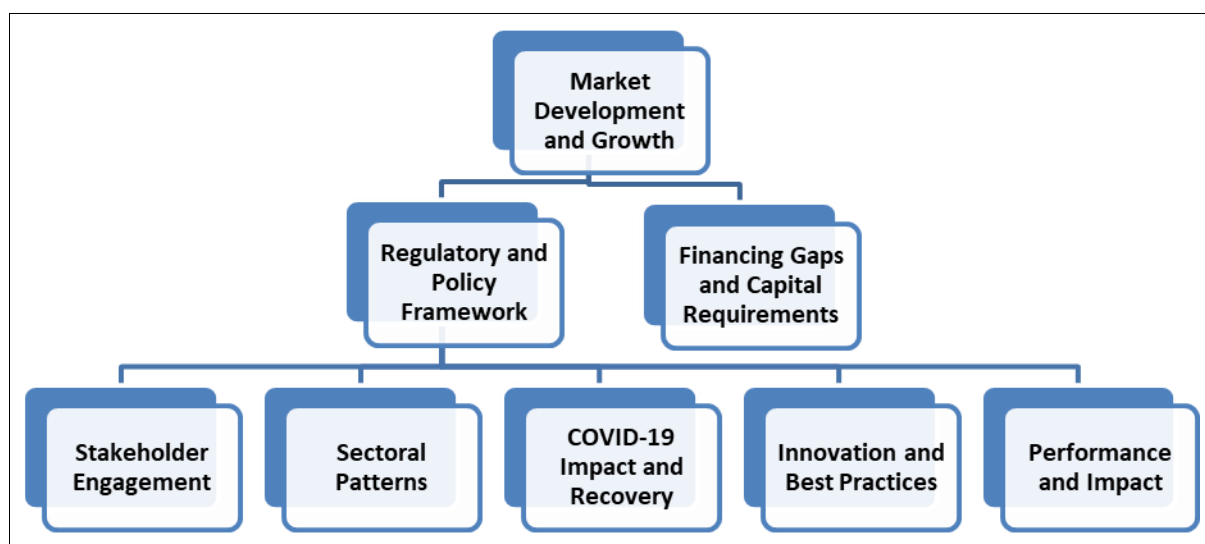


Fig 1: Conceptual Framework

3.2. Research Design

This study assumes a descriptive and logical examination intention based on a comprehensive literature review methodology. The research is qualitative in nature, synthesizing and analyzing existing academic literature, policy documents and research findings related to green finance and viable investing in India. The examination design comprises the following components:

- a) **Literature Review Approach:** Systematic review of peer-reviewed journal articles, focusing on empirical studies, conceptual frameworks and policy analyses related to green finance in India and comparable contexts.
- b) **Analytical Framework:** The study employs thematic analysis to identify patterns, themes and insights across the reviewed literature. Key themes include regulatory frameworks, market instruments, stakeholder roles, challenges and outcomes.
- c) **Synthesis Method:** Findings from individual studies are synthesized to develop a holistic understanding of green finance in India, identifying convergences, divergences and research gaps in existing literature.
- d) **Temporal Scope:** The review primarily covers literature published between 2018 and 2022, ensuring contemporary relevance while capturing recent developments in India's green finance landscape.
- e) **Geographical Focus:** While the study centers on India, it incorporates comparative insights from global literature where relevant to contextualize India's position and learn from international experiences.

3.3. Sources of Information

This research depend on sources relied on secondary data which includes the following:

- a) **Academic Periodicals:** Peer-reviewed articles from reputable journals specializing in finance, sustainability, environmental economics and business management. Key journals include Journal of Maintainable Economics & Investment, Climate Policy, Liveliness Finances, Managerial Finance and Journal of Cleaner Production.
- b) **Research Databases:** To find and retrieve material, scholarly databases like Scopus, Web of Science, Google Scholar, JSTOR and ScienceDirect were applied.
- c) **Policy Documents:** Government publications, regulatory guidelines and policy frameworks from institutions such as Ministry of Finance, the Reserve Bank of India (RBI), the Securities and Exchange Board of India (SEBI) and the Ministry of Environment, Forests, and Climate Change.
- d) **Industry Reports:** Publications from industry bodies, financial institutions, consulting firms and global institutions including the United Nations, the Asian Development Bank and the World Bank.
- e) **Selection Criteria:** Literature was selected based on relevance to green finance and sustainable investing in India, methodological rigor and publication in reputable sources. The 20 articles reviewed represent diverse perspectives including empirical studies, conceptual analyses and policy evaluations.
- f) **Data Analysis:** Qualitative content analysis was employed to extract key findings, themes and insights

from the reviewed literature. Thematic coding was used to organize outcomes into articulate groupings aligned with the examination point of view.

4. Findings

Based on the comprehensive review of literature, the following key findings emerge regarding green finance and sustainable investing in India:

4.1. Market Development and Growth

Although, it is still in its infancy when compared to industrialized economies, the Indian green financing business has grown over the last ten years. By 2021, the total amount of green bonds issued have surpassed \$20 billion, making them the most popular green finance vehicle. Nonetheless, this amounts to less than 2% of the whole bond market in India, suggesting significant room for expansion. A number of ESG-focused mutual funds and exchange-traded funds have been introduced in recent years, demonstrating the growing popularity of ESG investing among institutional investors. ESG integration in investment decision-making is still uneven, with notable differences across institutional investors despite increased interest.

4.2. Regulatory and Policy Framework

India has developed a progressive regulatory outline for green finance. SEBI's strategies on green bonds and ESG revelations represent important steps toward market standardization. The RBI has encouraged banks to adopt sustainable banking practices and integrate environmental risk assessments in lending decisions. However, policy implementation gaps persist. Many regulatory guidelines remain voluntary rather than mandatory, limiting their effectiveness. Coordination among regulatory bodies requires strengthening to create a cohesive green finance ecosystem.

4.3. Financing Gaps and Capital Requirements

A significant financing gap exists between India's sustainability commitments and available capital. Achieving renewable energy targets, climate adaptation and sustainable development goals requires estimated investments exceeding several trillion dollars over the next two decades. Current green finance flows meet only a fraction of these requirements. Public finance alone cannot bridge this gap, necessitating substantial private sector mobilization. Innovative financing mechanisms and risk-sharing instruments are needed to attract private capital at scale.

4.4. Stakeholder Engagement

Multiple stakeholders play crucial roles in India's green finance ecosystem. Commercial banks are increasingly incorporating environmental considerations in lending, though green loan portfolios remain small relative to total lending. Corporate issuers are recognizing the benefits of green finance instruments, including reputation enhancement and access to sustainability-focused investors. However, awareness and capacity constraints limit participation, particularly among smaller enterprises. Retail investor awareness regarding sustainable investing remains limited. Financial literacy initiatives specifically targeting green finance and ESG concepts are needed to broaden the investor base.

4.5. Sectoral Patterns

Renewable energy projects dominate green finance utilization in India, particularly solar and wind power. Green finance for other critical sectors including sustainable transport, green buildings, water management and waste management remains underdeveloped. The small and medium enterprise sector faces particular challenges in accessing green finance due to perceived higher risks, limited collateral and information asymmetries. Specialized financing mechanisms tailored to SME needs are required.

4.6. Performance and Impact

There are conflicting findings in empirical research on connection between ESG performance and financial performance in Indian businesses. While some studies find positive associations, others report insignificant relationships, suggesting that the business case for sustainability varies across sectors and organizational contexts. Green bond issuances demonstrate positive signalling effects, with issuers experiencing improved investor perception and market valuation. However, systematic impact measurement and reporting of environmental outcomes from green finance remain inadequate.

4.7 COVID-19 Effect and Recovery

The COVID-19 pandemic temporarily disrupted green finance momentum as immediate economic concerns took precedence. However, the crisis also highlighted the prominence of robust and justifiable economic systems, renewing focus on green recovery and sustainable finance's role in building back better.

5. Fate of the Research

The following suggestions are put out to improve green finance and sustainable investing in India in light of the results of the literature review:

Transition from voluntary to obligatory ESG disclosure standards for publicly traded firms, guaranteeing thorough comparable and audited sustainability information. This should follow internationally recognized standards while accommodating Indian context. Create fiscal and regulatory incentives for green investments, including tax benefits, priority sector lending status and preferential risk weights for green assets in banking regulations. Provide stable, long-term policy signals regarding sustainability goals and support mechanisms to reduce investment uncertainty and encourage long-term capital deployment. Expand green finance focus beyond renewable energy to sectors including sustainable transport, circular economy, nature-based solutions and climate adaptation. Develop specialized green finance products for sustainable agriculture, supporting smallholder farmers in adopting climate-smart practices. Scale up green finance for sustainable urban infrastructure including public transport, green buildings and waste management systems. Ensure green finance mechanisms support just transition for workers and communities dependent on carbon-intensive industries.

6. Conclusion

Green finance and sustainable investing represent critical pathways for India to achieve its ambitious sustainability

and climate goals while sustaining economic growth. The literature review reveals a dynamic and evolving landscape characterized by growing market activity, progressive policy development and increasing stakeholder engagement. However, significant challenges persist. Financing gaps remain substantial, awareness and capacity constraints limit participation and market infrastructure requires strengthening. The transition from voluntary to mandatory approaches, expansion beyond renewable energy and enhanced international cooperation are necessary for scaling impact. The necessity of robust and sustainable economic institutions has been highlighted by the COVID-19 pandemic, providing renewed impetus for green finance. India has the opportunity to leverage this momentum, learning from international experiences while developing context-appropriate solutions. Success in green finance requires coordinated action across multiple fronts: robust regulatory frameworks, innovative financial products, enhanced capacity, improved data infrastructure and sustained stakeholder commitment. The recommendations provided offer a roadmap for strengthening India's green finance ecosystem. As India navigates its sustainable development journey, green finance will play an increasingly central role. Continued research, policy innovation and practical implementation will be indispensable to reveal the full potential of sustainable economics in driving India's conversion toward a low-carbon, resilient and inclusive budget. The path forward requires balancing multiple objectives: mobilizing capital at scale, ensuring financial viability, delivering environmental impact, promoting social inclusion and maintaining economic competitiveness. While challenges are significant, the opportunities are even greater. India's success in green finance will not only advance national sustainability goals but also provide valuable lessons for other emerging economies facing similar transitions.

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