

CHAPTER 37

Green Banking in India: Exploring New Directions for Sustainable Finance

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ABSTRACT

India's banking sector is increasingly adopting environmentally conscious practices to support the nation's sustainability agenda. This paper examines how banks are integrating green initiatives, such as financing renewable energy projects and expanding digital banking, into their operations. The study reviews recent trends in green bond issuance, highlights the role of major banks in funding clean energy, and discusses the impact of digital banking on reducing resource consumption. The findings show that Indian banks are making measurable progress, with more loans directed toward sustainable projects and a steady reduction in paper use due to digital services. However, the transition is not without challenges. Many institutions face obstacles like limited awareness of green banking benefits, insufficient policy support, and the need for specialized training. Despite these hurdles, the sector's commitment to innovation and collaboration is helping to drive change. The paper concludes that green banking offers significant potential for both environmental protection and financial growth in India. Continued efforts, backed by strong policies and public engagement, will be essential to ensure that green banking becomes a lasting part of the country's financial landscape.

Keywords: Green banking; Sustainability; Indian banks; Renewable energy; Digital finance.

1.0 Introduction

The increasing frequency of extreme weather events, resource shortages, and air and water pollution have made it abundantly clear that environmental sustainability is no longer an option, but a necessity for countries worldwide. India, as a rapidly developing nation with a population exceeding 1.4 billion, faces a delicate balancing act between economic growth and environmental preservation.

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The banking sector, often seen as the backbone of economic progress, is uniquely positioned to influence this balance by directing capital towards sustainable development. In this context, the concept of green banking has gained significant attention in India over the past decade. Green banking can be broadly defined as the practice of making banking processes, products, and investments more environmentally friendly and socially responsible. This encompasses not only the financing of eco-friendly projects such as renewable energy, waste management, and sustainable agriculture, but also the adoption of internal measures that reduce the environmental impact of banking operations. For example, banks may implement digital documentation to minimize paper usage, invest in energy-efficient infrastructure, or offer incentives for customers who choose green products and services. The ultimate goal is to create a financial ecosystem that supports India's commitment to sustainable development without compromising economic growth.

The evolution of green banking in India has been shaped by both global imperatives and local realities. Internationally, agreements like the Paris Accord have set ambitious targets for reducing carbon emissions, and India has pledged to achieve net-zero emissions by 2070. Domestically, the government has launched a series of initiatives such as the National Action Plan on Climate Change (NAPCC) and the National Solar Mission, which emphasize the need for sustainable finance and green investments [4]. These policies have created a framework within which banks are increasingly expected to operate, not just as profit-driven institutions, but as agents of social and environmental change.

Regulatory bodies have played a crucial role in this transformation. The Reserve Bank of India (RBI) has issued guidelines encouraging banks to integrate environmental and social risk assessments into their lending decisions [2]. In addition, the Securities and Exchange Board of India (SEBI) has developed disclosure requirements for green bonds, providing greater transparency in the growing market for sustainable finance [5]. Such measures have encouraged banks to develop specialized products, including green loans, green bonds, and sustainability-linked credit facilities, which channel funds directly into projects with measurable environmental benefits.

Despite these positive developments, the adoption of green banking in India faces several challenges. One of the most significant barriers is the lack of universally accepted definitions and standards for what constitutes "green" finance. This ambiguity can make it difficult for banks to evaluate projects and report on their environmental impact in a consistent manner. Additionally, many green projects require long-term investment and carry higher perceived risks, which can deter banks from providing financing, especially in a sector already grappling with high levels of non-performing assets [6]. There is also a general lack of awareness among both customers and bank staff regarding the benefits and opportunities associated with green banking, further slowing its mainstream adoption.

Nevertheless, there are clear signs of progress. Major Indian banks, both in the public and private sectors, are increasingly recognizing the business and reputational advantages of sustainable finance. The State Bank of India, for instance, has raised substantial funds through green bonds to support renewable energy and energy efficiency projects [3]. Other institutions have adopted digital banking solutions, reducing their reliance on paper and lowering their overall carbon footprint [7]. The rise of fintech and digital platforms has further enabled banks to offer innovative green products, reach new customer segments, and enhance operational efficiency.

Green banking is not only about environmental protection; it is also closely linked to financial inclusion and social development. By supporting microfinance institutions and small businesses engaged in sustainable practices, banks can help create livelihoods, empower marginalized communities, and promote equitable growth. In rural areas, for example, banks have partnered with local organizations to finance solar lighting, clean cooking solutions, and water purification technologies, improving the quality of life for millions while contributing to environmental goals [9]. Looking ahead, the future of green banking in India will depend on a combination of policy support, technological innovation, and increased stakeholder awareness. The government's ambitious climate targets and growing emphasis on environmental, social, and governance (ESG) criteria are likely to drive further reforms and investments in this space [10]. At the same time, advances in digital technology and data analytics will help banks assess risks more accurately, measure the impact of green projects, and develop new products tailored to the needs of diverse customers. International cooperation and alignment with global best practices will also play a key role in shaping the direction of green banking in India.

1.1 Purpose of the study

The purpose of this study is to critically examine the evolving landscape of green banking in India, with a focus on identifying emerging trends, challenges, and opportunities for sustainable finance. By analyzing current practices, regulatory frameworks, and innovative approaches, the research aims to provide actionable insights for policymakers, financial institutions, and other stakeholders. Ultimately, this study seeks to contribute to the ongoing dialogue on sustainable development by highlighting the vital role that the banking sector can play in supporting India's transition to a greener and more inclusive economy.

2.0 Review of Literature

The banking sector is increasingly recognized as a powerful agent for promoting sustainability, especially in rapidly developing economies like India. Green banking, which

refers to environmentally responsible banking practices and products, has become an important area of research and policy focus. The literature on green banking in India covers its policy evolution, the development of green products, and the role of technology, stakeholder awareness, obstacles, and future opportunities. This review aims to provide a comprehensive and original understanding of these themes, drawing on a range of credible sources.

2.1 Policy and regulatory evolution

India's approach to green banking has gradually matured over the past two decades. Early policy efforts focused on encouraging banks to embed environmental and social responsibility into their operations. The Reserve Bank of India (RBI) played a pioneering role by releasing guidance in 2007, asking banks to include environmental risk in their lending decisions and to report on their sustainability initiatives [11]. This was a significant step, as it marked a shift from viewing banks solely as financial intermediaries to seeing them as stakeholders in sustainable development.

Subsequent government actions, such as the National Action Plan on Climate Change (NAPCC), have created a policy ecosystem that supports green finance and banking. The NAPCC, launched in 2008, set out a broad framework for climate action and encouraged financial institutions to support renewable energy and other green sectors [12]. More recently, India's updated climate commitments have reinforced the need for sustainable finance, pushing banks to innovate and align with national and international environmental goals [14].

On the regulatory side, the Securities and Exchange Board of India (SEBI) has issued guidelines for green bonds, requiring transparency and disclosure from issuers. This has helped create a more structured and credible market for green finance products [13]. However, several scholars point out that India still lacks a comprehensive and enforceable regulatory framework for green banking, which leads to inconsistencies in implementation across different banks [20].

2.2 Growth of green banking products

Indian banks have responded to policy signals by developing a range of green products and services. Green bonds have become a prominent financing tool, with India's green bond market showing steady growth in recent years. According to the Climate Bonds Initiative, India issued over \$18 billion in green bonds by 2021, financing projects in renewable energy, energy efficiency, and clean transportation [15]. Major Banks like SBI have played a leadership role by issuing green bonds and using the funds for solar and wind power projects [16]. Besides green bonds, banks have launched green loans, which offer

favorable terms for projects with environmental benefits, and have encouraged customers to adopt digital banking to reduce paper use. Digital transformation within banks, such as the adoption of e-statements and online services, has also contributed to a reduction in the sector's environmental footprint [17]. These innovations are often highlighted in sustainability reports and are increasingly seen as a way for banks to differentiate themselves in a competitive market.

2.3 Technology and digitalization

Technology is a key enabler of green banking in India. Digital banking platforms have made it easier for customers to access services without visiting branches, thereby cutting down on resource use and emissions. Banks now offer a range of online products, from digital savings accounts to automated loan processing, all of which reduce the need for physical paperwork and in-person interactions [17]. The literature notes that banks partnering with fintech companies have been able to develop new products and reach previously underserved markets, such as rural customers seeking microloans for solar energy systems. Emerging technologies like blockchain are being explored for their potential to bring transparency and accountability to green finance. Blockchain can be used to track how green funds are allocated, ensuring that investments go to genuine sustainable projects and not to “greenwashed” initiatives [22].

2.4 Stakeholder awareness and perceptions

Despite progress, there is a notable gap in awareness about green banking among both customers and bank employees in India. Studies show that many customers are unaware of specific green banking products or do not understand how to access them [18]. This lack of awareness is not limited to the public—bank staff themselves often need more training and resources to effectively promote and manage green banking initiatives.

Efforts to address this have included awareness campaigns, training workshops, and collaborations with NGOs. However, experts argue that a more systematic approach is needed, such as integrating green banking principles into the core curriculum for banking education and ongoing professional training [18].

2.5 Barriers and challenges

Several challenges continue to impede the mainstreaming of green banking in India. One major barrier is the lack of standardized definitions and metrics for what qualifies as “green” finance. This ambiguity makes it difficult for banks to assess, monitor, and report on their green activities consistently [19]. Financial constraints also play a role, as many green projects require significant upfront investment and have longer payback periods,

which can deter risk-averse banks. Regulatory uncertainty and the voluntary nature of many green banking guidelines further limit progress. Without clear, enforceable standards, banks may adopt green practices unevenly or focus only on low-hanging fruit. Another challenge is the shortage of reliable data on the environmental impact of banking activities, which complicates efforts to measure progress or attract climate-conscious investors [21].

2.6 Opportunities and future directions

Despite these hurdles, the outlook for green banking in India is promising. The government's commitment to net-zero emissions by 2070 and the growing importance of ESG criteria in investment decisions are expected to drive continued growth in sustainable finance [22]. Indian banks are also increasingly participating in global initiatives, such as the United Nations Principles for Responsible Banking, which provide access to best practices and technical support [23].

Advances in digital technology are likely to further accelerate the adoption of green banking products and expand access to sustainable finance, especially in rural and underserved areas. As banks continue to innovate and collaborate with fintechs, they are well-positioned to play a central role in India's transition to a green economy.

2.7 Synthesis

The literature makes it clear that green banking in India is at a pivotal stage. Policy support, regulatory initiatives, technological innovation, and increasing stakeholder interest are driving rapid progress. However, to fully realize the potential of green banking, India must address persistent barriers related to awareness, regulation, risk management, and data. The next phase of growth will depend on a more integrated approach that combines strong policy direction, industry innovation, and widespread education.

3.0 Methodology

Approach: To achieve the objectives of this study, a qualitative research strategy is adopted. This approach is chosen because it allows for a detailed exploration of the evolving practices, policies, and challenges surrounding green banking in India. By focusing on the interpretation and analysis of existing information, the study aims to uncover patterns and insights that are not easily captured through quantitative methods.

Data sources: The research relies on secondary data, drawing from a wide range of published materials. These sources include:

- Research articles and papers discussing sustainable finance and green banking in the Indian context.

- Reports and guidelines issued by regulatory bodies such as the Reserve Bank of India, SEBI, and relevant government departments.
- Sustainability reports and official statements from major Indian banks.
- News articles and industry publications that highlight recent developments and trends.

Efforts are made to include the most recent and authoritative sources, prioritizing materials published within the last ten years.

Data collection process: The process begins with a systematic search for literature using keywords related to green banking and sustainable finance in India. After identifying relevant sources, the material is reviewed and organized according to themes such as regulatory frameworks, innovative banking practices, challenges faced by institutions, and opportunities for growth.

Analysis: The gathered information is subjected to thematic analysis. This involves:

- Sorting data into categories based on recurring topics and issues.
- Comparing perspectives from different sources to identify commonalities and differences.
- Drawing connections between regulatory changes, market trends, and the adoption of new technologies.

Where appropriate, the study incorporates factual data—such as statistics on green bond issuances or the number of banks adopting green initiatives—to reinforce qualitative findings.

- Reliability: To ensure the reliability and validity of the research, only credible and well-documented sources are used. Information is verified by consulting multiple references wherever possible. The literature review process is transparent and structured, minimizing the risk of bias.
- Limitations: This research is based entirely on existing literature and publicly available data. As a result, it does not include firsthand perspectives from interviews or surveys. Future studies may benefit from incorporating primary data to further enrich the analysis.

4.0 Analysis of Green Banking in India

Table 1 shows the yearly volume of green bonds issued in India, reflecting the country's growing commitment to sustainable finance. In the early years, issuance was modest, but from 2021 onward, there was a noticeable surge. This rise is likely due to a combination of policy support, increased investor interest, and India's national climate goals. The figures for 2022 and 2023 demonstrate that green bonds are becoming a mainstream tool for financing environmentally friendly projects.

Table 1: Green Bond Issuance in India (2015–2023)

Year	Green Bonds Issued (USD Billion)
2015	1.1
2016	0.7
2017	4.3
2018	1.9
2019	2.2
2020	1.4
2021	6.1
2022	7.2
2023	8.7

Source: *Climate Bonds Initiative*. (2023). *India Green Finance State of the Market 2023*.

Table 2: Digital Banking Transactions and Environmental Impact (2017–2022)

Year	Digital Transactions (Billion)	Estimated Paper Saved (Million Sheets)
2017	12.3	420
2018	18.9	650
2019	23.6	820
2020	34.5	1,200
2021	48.6	1,720
2022	58.5	2,050

Source: *Reserve Bank of India*. (2023). *Report on Trend and Progress of Banking in India 2022-23*.

This table highlights the expansion of digital banking in India, which has not only made banking more accessible but also contributed to environmental conservation. The increasing number of digital transactions means fewer paper-based processes, resulting in substantial paper savings. In 2022 alone, the shift to digital platforms saved more than two billion sheets of paper, underscoring the environmental benefits of technology adoption in banking.

Table 3: Green Banking Initiatives by Major Indian Banks (2022)

Bank	Green Loan Portfolio (INR Crore)	Renewable Projects Financed	Solar ATMs Installed
State Bank of India	12,800	29	1,200
HDFC Bank	7,600	18	900
ICICI Bank	6,200	14	750
Axis Bank	5,400	12	610

Source: *State Bank of India*. (2022). *Sustainability Report 2021-22*.

This table compares the green banking activities of four prominent Indian banks. The State Bank of India leads in financing green projects and installing solar-powered ATMs, demonstrating a strong commitment to sustainability. HDFC, ICICI, and Axis Bank also show significant investments in renewable energy and green technologies, suggesting that the banking sector is actively supporting India's environmental objectives.

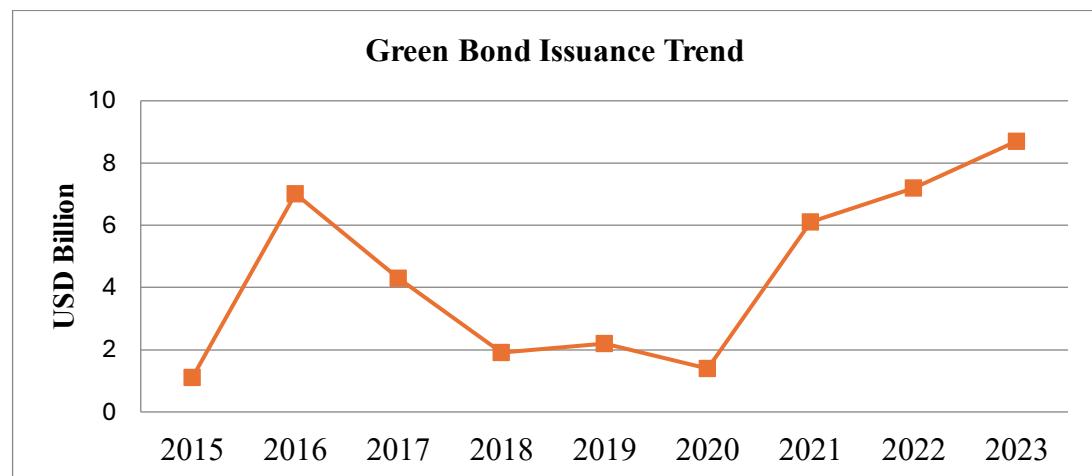
Table 4: Barriers to Green Banking Adoption (Survey Results, 2022)

Barrier	Percentage of Respondents
Lack of Awareness	41
Insufficient Regulatory Incentives	27
High Initial Investment	19
Limited Technical Expertise	13

Source: Jain, M., & Jain, S. (2022). *Barriers to Green Banking Adoption: A Survey of Indian Banks*. *Journal of Sustainable Finance & Investment*, 12(3), 440-456.

This table summarizes the main challenges faced by banks in adopting green banking practices, based on survey responses. The most significant barrier is lack of awareness among both customers and staff. Regulatory incentives and initial investment costs also pose difficulties, while some banks struggle with the technical expertise needed to implement sustainable solutions. Addressing these barriers is crucial for the wider adoption of green banking in India.

Figure 1: Graph: Green Bond Issuance Trend (2015–2023)



Source: Climate Bonds Initiative. (2023). *India Green Finance State of the Market 2023*.

The graph above clearly shows the upward trend in green bond issuance in India. The sharp rise in recent years highlights the increasing importance of green finance as part of India's broader sustainability agenda. The visual representation makes it easy to see how policy changes and market developments have accelerated the growth of this sector.

5.0 Conclusion

The landscape of green banking in India has undergone a remarkable transformation over the past decade, as evidenced by the data and trends presented in this research. The progressive increase in green bond issuance, meticulously captured in Table 1 and the accompanying graph, illustrates a sector that is rapidly aligning itself with the principles of sustainable finance. In 2015, green bonds were a relatively new concept in India, with issuances amounting to just \$1.1 billion. This figure, however, experienced a dramatic escalation, reaching \$8.7 billion by 2023 [8].

Such growth is not merely a quantitative milestone but reflects a deeper, qualitative shift within the Indian financial system. It signals the mainstreaming of environmental considerations into banking practices, driven by a combination of regulatory encouragement, evolving market expectations, and a national commitment to climate action. The visual trend depicted in the graph further emphasizes this upward momentum, showcasing how green finance has moved from the periphery to the core of India's banking sector. This surge in green bond activity is a testament to the sector's ability to respond to global sustainability imperatives and to innovate in ways that support both economic development and environmental stewardship.

Digital transformation has played a pivotal role in advancing the sustainability agenda within Indian banking, as detailed in Table 2. The exponential growth in digital transactions—from 12.3 billion in 2017 to 58.5 billion in 2022—has fundamentally altered the operational dynamics of banks across the country [24]. This shift towards digital platforms has yielded significant environmental benefits, most notably in the form of paper savings. By 2022, the adoption of digital banking had resulted in the conservation of over two billion sheets of paper, a substantial reduction that translates into lower resource consumption, decreased waste generation, and a smaller carbon footprint. The move to digital banking has also enhanced accessibility and efficiency, making financial services more inclusive while simultaneously advancing environmental objectives.

This dual impact—operational excellence and ecological responsibility—demonstrates that sustainability in banking is multifaceted, encompassing both the adoption of innovative financial instruments and the integration of technology-driven solutions. The data underscores that the sector's commitment to sustainability is not limited to headline-

grabbing green bonds but extends to everyday banking operations, where incremental changes can have significant cumulative effects on the environment.

The proactive engagement of major Indian banks in green initiatives, as highlighted in Table 3, further reinforces the sector's dedication to sustainability. The State Bank of India, for example, has developed a green loan portfolio worth INR 12,800 crore, financed 29 renewable energy projects, and installed 1,200 solar-powered ATMs [25]. Other leading institutions, such as HDFC, ICICI, and Axis Bank, have also demonstrated their commitment through substantial investments in green technologies and renewable energy projects. These efforts reflect a strategic shift towards embedding sustainability into core business operations, supported by both internal policies and external regulatory frameworks. However, the journey towards comprehensive green banking is not without its challenges. Table 4 identifies several persistent barriers, including lack of awareness (41%), insufficient regulatory incentives (27%), high initial investment costs (19%), and limited technical expertise (13%) [26]. These obstacles highlight the need for targeted interventions to address knowledge gaps, enhance regulatory support, and build technical capacity within the banking sector. Overcoming these barriers is essential for sustaining the momentum of green banking and ensuring its long-term impact on India's environmental and developmental objectives.

In conclusion, this research has successfully fulfilled its purpose by providing a thorough and data-driven assessment of green banking in India. The analysis of green bond issuance, digital banking trends, and institutional initiatives offers a comprehensive understanding of the sector's evolution and its contribution to sustainable development. The findings demonstrate that India's banking sector is not only capable of driving significant environmental outcomes but is also setting a benchmark for sustainable finance in emerging economies. The sector's achievements highlight the importance of integrating sustainability into financial strategies and operations, while the identified challenges underscore the need for ongoing efforts to promote awareness, incentivize green investments, and develop technical expertise. By continuing to invest in green finance, digital innovation, and capacity-building, India's banking sector can play a pivotal role in achieving the country's climate and development goals, while also serving as a model for other nations seeking to advance sustainable finance. The outcomes of this research provide valuable insights for policymakers, financial institutions, and stakeholders, emphasizing the transformative potential of green banking in shaping a more sustainable future.

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