

Green Finance and Sustainable Development: Emerging Trends in India's Financial Ecosystem

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Abstract:

India's financial ecosystem is increasingly being examined through the combined lenses of sustainable finance, climate risk, environmental responsibility and financial inclusion. The research problem is that green-finance discussions frequently combine financing instruments, environmental outcomes and digital-financial indicators without clearly separating what can be measured from what remains difficult to observe consistently at the national level. This study addresses that gap by examining selected official indicators of India's financial and sustainable-development ecosystem and by interpreting them alongside documented green-finance and regulatory developments. The study uses quantitative, descriptive and analytical secondary-data design. Official indicators are drawn primarily from the Reserve Bank of India (RBI) for the Financial Inclusion Index and Digital Payments Index and from the Ministry of New and Renewable Energy (MNRE) for renewable-energy capacity, supplemented by official policy and regulatory reports and peer-reviewed literature. The main comparable financial-ecosystem series cover FY 2017–18 to FY 2023–24, while renewable-energy capacity is examined through FY 2024–25 where official annual data are available. The RBI Financial Inclusion Index increased from 51.4 in FY 2017–18 to 64.2 in FY 2023–24, while the RBI Digital Payments Index increased from its March 2018 base of 100 to 445.50 by March 2024. Renewable-energy capacity increased from 69.02 GW in FY 2017–18 to 220.10 GW in FY 2024–25. The calculated CAGR was 3.78% for the Financial Inclusion Index, 28.27% for the Digital Payments Index and 18.02% for renewable-energy capacity over their respective study intervals. The Pearson correlation between the Financial Inclusion Index and the Digital Payments Index over the seven aligned observations was 0.927; this is interpreted as association rather than causation. The study finds that India's sustainable-finance ecosystem is developing alongside broader financial inclusion, digitalisation and renewable-energy expansion, but public, comparable annual data on green lending, ESG investment and green-finance volumes remain fragmented. The study concludes that stronger disclosure, standardized taxonomies, climate-risk integration and transparent measurement are necessary for linking green finance more clearly to environmental and sustainable-development outcomes.

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I. INTRODUCTION

In general, green finance is used to characterize financial activity which supports environmental goals, resource efficiency, climate change adaptation and mitigation and the transition to a lower carbon economy. The product suite includes green bonds, green loans, sustainable deposits, sustainability-linked financing, investments and climate-finance mechanisms with an ESG focus. The notion has evolved from a rather limited perspective of projects with an environmental theme to a broader vision of how the financial system should integrate environmental risks and possibilities into capital allocation. Sustainable finance is so much about where the money goes, but also how financial organisations analyse risk [1], provide information, connect with customers and manage investment choices. In this more basic definition green finance is the mechanism of the financial system which allows investment behaviour with environmental purposes.

We may summarise the link as green finance → financial system → sustainable investment → environmental outcomes → sustainable development. Green finance provides tools and funding. The capital moves through the financial system via banks, NBFCs, capital markets and institutional investors. Sustainable investment directs finance to low-carbon infrastructure, resource efficiency, renewable energy and other green initiatives [2]. These investments may lead to some environmental results, such as cleaner energy, less emissions and higher resource productivity. These results together with social advantages, employment, access and economic resilience are contributing to sustainable development. The link is not automatic: environmental quality of the sponsored activities, additionally of finance, openness, monitoring and avoidance of greenwashing decide whether financial flows lead to demonstrable consequences.

The relationship between green finance and the climate transition and the role of financial institutions in the management of transition and physical hazards has emerged around the world. The Paris Agreement reiterated the need to link financial flows with low GHG and climate-resilient development. The Task Force on Climate-related Financial Disclosures (TCFD) created a framework for governance, strategy, risk management and indicators and objectives for climate risks and opportunities. International financial corporations and international development organisations have identified sustainable finance as a strategy to attract private capital for development and climate activities [3]. Climate change may create major financial risks at the financial stability level via market, insurance, credit, operational and systemic channels, as emphasised by the Bank for International Settlements and the Network for Greening the Financial System (NGFS).

The green finance ecosystem in India has developed from both global and local investment demands. India needs large-scale financing for energy efficiency, water, waste management, resilient infrastructure, renewable energy, sustainable transportation and other development concerns. Financial institutions therefore serve as key intermediaries. They can monitor environmental risks, redirect deposit and investment funds into sustainable enterprises,

structure green loans and weave climate considerations into lending and investing decisions. The Reserve Bank of India has progressively addressed climate-related financial risks and sustainable finance, including the need for climate risk assessment, disclosure and capacity development in its regulatory and supervisory deliberations. SEBI has also issued guidelines on ESG and sustainability disclosure for market participants and listed companies.

"Green banking is the working part of this revolution. While a green bank or sustainable banking practices may lessen the environmental impact of internal operations, they are most applicable in conventional financing choices. Targeted loans may allow a bank to boost its capacity to finance renewable energy, energy-efficient buildings [4], electric automobiles, sustainable agriculture and enhanced industrial processes. It might also integrate climate-risk and environmental issues in the credit evaluation. These strategies move sustainability from corporate social responsibility to capital allocation and financial risk management. Indian financial businesses are reporting more ESG and sustainability plans Climate risk and sustainable finance (RBI) has produced discussion papers and recommendations.

Green bonds are one of the key vehicles in the ecosystem of sustainable finance. A green bond is a debt instrument raised for an environmental project, often with a specified use-of-proceeds and reporting framework. India's sovereign green bond proposal is a significant step forward in linking government borrowing to permissible green spending. The Sovereign Green Bonds Framework of the Government of India lists areas such renewable climate risk efficiency, clean transportation, sustainable waste and water management, green buildings and protection of terrestrial and marine biodiversity. Green bonds in the corporate and finance sectors are supported by government issuance. But to for greenplans to function you need to be able to choose havejects reliably, report on allocations, report on impact provide confidence.

ESG focused investing extends the idea beyond usage of proceeds mechanisms. Information on the environment, society and governance may be used in risk management, stewardship and investment analysis. Further, the sustainability data of the listed corporations in India has been harmonised as per SEBI's Business Responsibility and Sustainability Reporting (BRSR) framework. While comparability and data quality are important, ESG data may assist investors analyse long-term potential and significant concerns. ESG ratings and scores might vary since various suppliers use different methodologies and investors can have different opinions on environmental factors. Sustainable investing consequently requires more transparency and an understanding of the limits of ESG indicators.

It is strongly connected to green finance, but it is also wider than green finance. Green funding may also encompass other environmental objectives outside climate change. Climate finance is funding to help adaptation and mitigation. The financing of renewable energy is a significant topic since technologies such as solar, wind, small hydro, biomass and others have substantial upfront costs. The MNRE data indicates such as renewable energy capacity in India has steadily increased from 69.02 GW in FY 2017–18 to 220.10 GW in FY 2024–25 throughout the study period.

Financing sustainable infrastructure is vital as well." Buildings, energy networks, water management, transport systems and urban infrastructure have lengthy economic lifetimes and

lock in high or low carbon routes. Hence, the financial choices we make now could affect the environment in the future. Green and sustainability-linked finance might help push resources toward resilient infrastructure, but strict monitoring and qualifying criteria are essential to guarantee that it works. Multilateral organisations like the World Bank, ADB and IFC have a complementary role. They offer project funding, guarantees, technical support and risk-sharing arrangements that may encourage private involvement.

Financial inclusion is one of the side-features of sustainable development. The financial system has a role to play in sustainability beyond its support to environmental initiatives, including via the provision of adequate financial services to consumers and smaller businesses. The RBI Financial Inclusion Index has risen from 51.4 in FY 2017-18 to 64.2 in FY 2023-2024. It does not directly quantify green finance, but it is suggestive of advances in financial services in terms of availability, utilisation and quality. Sustainable development requires social participation, economic participation and environmental participation. Thus, the study of green finance should adopt an approach that considers the distributional consequences and financial requirements of smaller and disadvantaged groups.

Floods, heat waves, droughts and storms are physical risks affecting borrowers, collateral and insurance. Transition risks may occur from changes in consumer behaviour, technology, legislation or carbon-related regulations that have an impact on the value of assets and business models. Failure to account for these risks may cause investors and banks to underestimate possible market and credit losses. The RBI has been increasingly vocal about the hazards of climate change and the need for financial institutions to have the proper governance, risk assessment and scenario analysis skills. Similarly, the work of international supervisors addresses climate change as an environmental but also a financial problem.

A major concern is greenwashing. Greenwashing is the practice of marketing a financial product's environmental characteristics or impacts in a false or unsubstantiated way. This might impede the efficiency of sustainable capital allocation and erode investor trust. Robust taxonomy, restrictions on use of funds, impact reporting, external review and consistent disclosure may counter the hazard [5]. The applicable institutional solutions include the SEBI's sustainability-disclosure architecture and India's Sovereign Green Bonds Framework. But implementation expertise matters: investors may not have comparable data to analyse environmental performance across projects, and smaller issuers may have to pay more to report.

Another issue is the fragmentation of green finance data. Official data on capacity for renewable energy, some types of bond issuance and broad financial development indicators are relatively strong, but national annual series for green loans, ESG investment assets, climate finance flows and green finance outcomes are not consistently reported across financial institutions. Thus, it is difficult to assess the additional contribution of green finance to the decrease of emissions or other environmental impacts. To fill these gaps with assumed numbers would be to create an appearance of accuracy. The research thus recognises data constraints as regards missing variables and employs those indicators for which comparable published data is available.

Thus, two research gaps are identified features, despite the considerable number of studies on individual tools, institutional processes or global data Lofgren finance, there are relatively few studies linking the indicators of India's financial system with the metrics of sustainable development and renewable energy within a cohesive secondary data framework. Secondly, it assumes that all increases in green finance activities have environmental consequences, while causal relationships rely on the quality, additionally and execution of programmes and evaluations. The research is valuable in that it draws quantitative trends from verifiable green finance activities in the financial ecosystem and analyses those relationships that can be confirmed by existing data.

The objectives are to review new trends in India's green finance and sustainable finance ecosystem, analyse specific official measures of financial inclusion, digital financial development and renewable energy capacity, evaluate the role of banks, capital markets and regulators in green finance development, identify key barriers such as greenwashing, climate risk and data limitations and examine the association between specific financial development indicators using descriptive statistics and correlation where appropriate. This research is significant, as it gives a clear set of data for understanding how India's financial system may promote sustainable growth without overemphasis on the numbers.

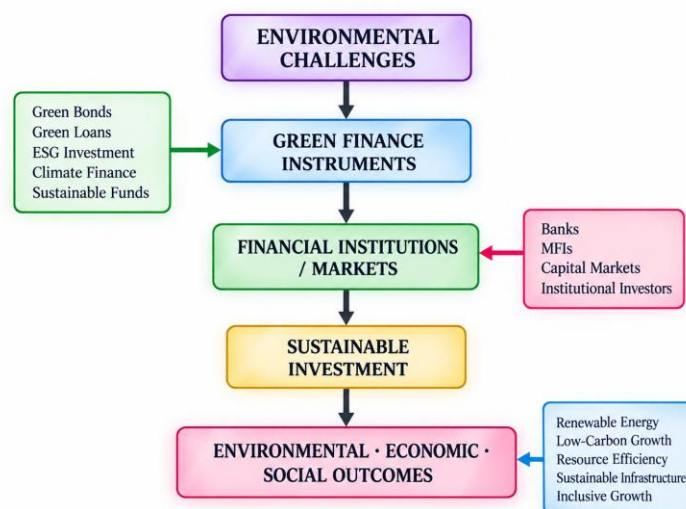


FIGURE 1: AI-GENERATED CONCEPTUAL ARCHITECTURE OF GREEN FINANCE AND SUSTAINABLE DEVELOPMENT.

Figure 1 shows a novel conceptual architecture developed for this project. We need environmental solutions for financial problems. Green bonds, green loans, ESG investments, climate finance and sustainable funds are some of the mechanisms by which capital may be mobilised. These resources are converted into sustainable investment by banks, NBFCs, capital markets and institutional investors. The next investments might be in renewable energy, low-carbon development, resource efficiency and sustainable infrastructure. The broader social-development dimension could be inclusive growth. Architecture highlights Financial tools as a middleman Project selection, implementation, monitoring and accurate reporting, define environmental and sustainable development outcomes.

II. REVIEW OF LITERATURE

Green finance is increasingly being identified in Indian and worldwide literature as an approach that integrates financial intermediation with sustainable development. Research on climate finance emphasises the need to mobilise and redirect capital into low-carbon activities [6]. Research on sustainable finance also takes into consideration environmental, social and governance issues. D’Orazio and Popoyan consider how environmental issues should be incorporated into financial regulation inside banking, while Campiglio highlights the duty of banks in directing loans to low-carbon companies. Sachs et al. strongly emphasise long-term investment and financial innovation for sustainable development. Green finance in India has grown due to green bonds, sustainable banking, renewable energy financing and regulatory measures. The literature suggests studying green finance from the viewpoint of financial flows and their governing institutional laws. Other ways to integrate environmental aims in financial decisions include green banking, green bonds, ESG investment and climate financing. Green banking study is concerned with the role of banks in the promotion of environmentally sensitive behaviour. Research also highlights the need for credible issuance and adequate monitoring of use of proceeds, and green bonds provide a transparent financing channel for eligible environmental projects [7]. ESG investing takes into account sustainability factors when making investment decisions, while differences in ESG ratings and disclosures may make comparisons difficult. In India, the Sovereign Green Bonds Framework and SEBI’s BRSR framework have further strengthened the sustainable finance and sustainability reporting framework.

There is research looking at whether green finance leads to better renewable energy, fewer emissions, and more sustainable infrastructure. The financial situation, the regulatory support and the investment frameworks may affect the investment in renewable energy. However, green funding cannot always be clearly connected to environmental consequences since projects may get financing from multiple sources. In the same way, a green bond does not assure further environmental benefits. Research should compare financial indicators with measurable indices of the environment and development to prevent unsupported assertions of causality [8].

The literature also identifies major challenges such as greenwashing, quality of disclosure, climate risk, data limits and financial dangers. When environmental claims do not match actual environmental performance, it is described as “greenwashing”. Standardised disclosure and climate-risk frameworks may enhance transparency and comparability. BRSR and the related ESG standards are an important step toward better sustainability reporting in India. Still [9], uncertainty about green and transition programmes, imprecise impact data, additional due-diligence expenditures and a lack of understanding are hurdles. That is, the literature on green finance instruments and their potential to help sustainable development is extensive. However, there is no solid data set in India on environmental implications throughout the financial ecosystem, green financing, ESG investment and climate finance available to the public on an annual basis. Therefore, this study does not rely on unwarranted assumptions but treats missing measures as restrictions and uses similar government financial and sustainable-development metrics [10].

III. GREEN BANKING AND SUSTAINABLE INVESTMENT PRACTICES IN INDIA

Green banking is making a slow entry into the Indian market, where environmental considerations are integrated into lending, risk management and banking operations. Banks' own green initiatives – such as energy-efficient facilities, digitised paperwork and less resource usage – have less financial effect than how they lend. The bank may finance renewable energy projects, energy-efficient buildings, greener transport, sustainable agriculture and resource-efficient industry. Sustainable financing thus demands social and environmental due diligence in addition to the usual credit assessment. The idea is not to back green-labeling projects but to verify whether the sponsored activity contributes to defined environmental objectives and if associated risks are adequately managed.

Green deposits and other branded retail items may mobilise family resources for environmentally beneficial activities, provided the funds are used in a transparent and reliable way. Green bonds offer a channel for qualifying projects to get into the financial market for the long run. The sovereign green bond programme of the nation is of great importance since the Indian government has laid out a defined structure for eligible companies and reporting criteria. Commercial and financial sector issuance may augment sovereign issuance. ESG integration enables investors to factor in the environmental objective of a project, together with the whole governance, resource consumption, social behaviours and long-term risk profile of a corporation. SEBI's BRSR architecture improves the information environment for this technique.

Climate risk assessment is an increasingly significant element of sustainable financing. Climate calamities such as heatwaves, droughts, floods, cyclones, etc. that leave borrowers at the mercy of the weather create a physical risk for banks. This is called transition risk, when changes in the market, technology or politics reduce the value of assets that use a lot of carbon. These worries might affect sectoral credit quality, collateral and repayment capacity. The RBI has asked the financial institutions to strengthen their ability to identify and manage financial risks arising from climate change. This transition from environmental duty to risk management is important because climate risk may impact conventional financial performance even when a financial institution is not offering a specific green product. The potential for financing renewable energy is significant. India's renewable energy capacity has seen tremendous growth over the study period, with financing from a number of sources, including project finance, corporate loans, equity, and government aid. Longer-term finance might be sourced from institutional investors and capital markets; banks and NBFCs could be directly involved via lending. Development institutions may employ guarantees and blended lending to improve risk-adjusted profitability. The same applies to sustainable infrastructure, where the longevity of assets makes early financial decisions especially critical.

The market is being reshaped by regulatory developments. The RBI has expanded its deliberations on climate risk, sustainable finance and environmental risk management. SEBI has strengthened disclosures of sustainability and responsible investments for listed businesses. The Sovereign Green Bonds Framework provides a systematic approach to green finance in the public sector. The activities assist in reducing information asymmetry and increasing confidence in the market, but there are still problems with implementation costs and data

quality. For a healthy financial ecosystem common taxonomies, standardised impact measures and certification methods are needed as well.

Green finance may be woven into conventional financial decision-making. Green finance is not a specialist product, but institutions may incorporate environmental and climatic concerns into risk management, credit policy, portfolio management, investment research, treasury and strategic planning. The key difficulties include greenwashing, lack of comparable data, model uncertainty, costly due diligence and the need to reconcile environmental aims with affordability and financial inclusion. Building the quantity of green-labelling securities and the legitimacy and demonstrable effect of the underlying investments will be equally vital for the growth of India's sustainable finance going forward.

IV. RESEARCH METHODOLOGY

This study employs secondary data. This research uses quantitative descriptive analytical approaches. The objective is to study the recent trends in the Indian ecosystem for sustainable development and green financing with high data integrity. The timeframe of examination for key RBI financial-ecosystem indicators is FY 2017-18 to FY 2023-24 since comparable annual data is available for the whole period. The MNRE releases capacity statistics at the end of each year as well and has extended the renewable-energy capacity to the year 2024–2025. The annual series on green lending or ESG investments are not included in the study because of the lack of comparable public data.

RBI publications such as the Financial Inclusion Index and the Digital Payments Index provide the backbone of the financial sector. Sustainable development measures are included in MNRE publications on renewable energy capacity. Regulatory and policy backdrop from Government of India sustainability frameworks, SEBI, Ministry of Finance and NITI Aayog. The international framework is supported by the World Bank, IFC, ADB, IMF, BIS, NGFS and other significant government agencies. It includes green banking, green bonds, climate finance, ESG investment, greenwashing and links to sustainable development with peer-reviewed research. Numerical indicators from Indian government entities are given priority in the source hierarchy.

The variables considered are the RBI Financial Inclusion Index, the RBI Digital Payments Index and the installed capacity of renewable energy. The Financial Inclusion Index is defined as access, use and quality. The Digital Payments Index, which was set at 100 as of March 2018, measures the development of the digital payments infrastructure and its use. Gigawatts is the unit of capacity for renewable energy. They are not regarded to be direct indicators of green financing. but linked to sustainable development and issues of the financial system. For instance, the research does not provide fake annual green-finance numbers, as official data are frequently difficult to compare across different organisations and devices.

The annual growth rate is the change of an indicator in the previous year. CAGR is used to calculate the average rate of yearly change over a period of time. The mean and the sample standard deviation are the measures of the central tendency and dispersion of the indicators. Pearson correlation may only be used for the seven yearly observations that are common to the Financial Inclusion Index and Digital Payments Index.

The series under consideration are short and strongly trending in time. Regression analysis is not conducted because causal interpretation is not accepted. The approach for data processing consisted of transcribing original sources of published annual observations, verifying the units, aligning fiscal years, computing year-over-year growth and CAGR, and generating tables and graphs directly from the calculated data set. Table 1 outlines the important financial and sustainable development measures. Table 2 shows the CAGR and increase. Table 3: Comparison of certain indications in the typical time intervals Table 4. Descriptive statistics and Pearson correlation.

There are several severe limits. Green finance reporting is scattered among financial instruments and companies. Second, digital payments and financial inclusion are enablers, not direct green finance actions. Third, renewable energy capacity is not only attributable to green financing since it is an outcome-based indicator that depends on technology, policy, public investment and private funding. Fourth, the indicators of the financial system are not causally connected to each other. Finally, the absence of credible national time-series data on ESG investments and green funding constrains quantitative testing. These restrictions are deliberately kept avoiding giving a false appearance of measurement accuracy beyond what is supported by the sources.

V. ANALYSIS AND INTERPRETATION

The studies investigate the relationships and dynamics among several indices of financial inclusion, digital financial infrastructure and renewable energy of India. The article evaluates the trends of Financial Inclusion Index, RBI Digital Payments Index (RBI-DPI) and renewable energy capacity using annual data for the period FY 2017-18 to FY 2023-24. The findings reveal that the sustainable development environment and financial ecosystem in India co-evolved with the overall increase of green financing.

TABLE 1: TREND OF GREEN FINANCE-RELATED FINANCIAL AND SUSTAINABLE-DEVELOPMENT INDICATORS IN INDIA

FY	RBI Financial Inclusion Index	RBI-DPI (March)	Renewable capacity (GW)
2017-18	51.4	100.00	69.02
2018-19	53.1	153.47	78.31
2019-20	53.1	207.84	87.26
2020-21	53.9	270.59	94.43
2021-22	56.4	349.30	109.89
2022-23	60.1	395.57	125.16
2023-24	64.2	445.50	143.64

As seen in Table 1, simultaneous improvements were observed in many criteria of sustainable development and the financial environment. The Financial Inclusion Index has

increased from 51.4 in FY 2017-18 to 64.2 in FY 2023-24 Digital Payments Index (base year March 2018 = 100) was at 445.50 in March 2024. That extended time horizon also resulted in a big jump in renewable energy capacity. These indicators provide a quantitative view of the financial and sustainable development context in which green finance operates, but are not to be interpreted as direct measures of green finance.

TABLE 2: GROWTH AND CAGR OF SELECTED FINANCIAL-ECOSYSTEM INDICATORS

Period	FI Index growth	DPI growth
2018-19	3.31%	53.47%
2019-20	0.00%	35.43%
2020-21	1.51%	30.19%
2021-22	4.64%	29.09%
2022-23	6.56%	13.25%
2023-24	6.82%	12.62%
FY2017-18 to FY2023-24	3.78%	28.27%

As seen in Table 2, the rate of growth of the Financial Inclusion Index was sluggish and steady, but the Digital Payments Index rose substantially quicker from the base of March 2018. The Financial Inclusion Index expanded at a CAGR of 3.78% and the Digital Payments Index at a CAGR of 28.27%.” This variation is expected, since the two indices measure different facets of financial success. The outcome further reinforces the notion that India’s financial ecosystem is established based on digitalisation and inclusion and has constructed infrastructure that can support more involvement in sustainable financing.

TABLE 3: GREEN FINANCE AND SUSTAINABLE DEVELOPMENT INDICATORS

FY	Financial Inclusion Index	Digital Payments Index	Renewable capacity (GW)
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2022-23	60.1	395.57	125.16
2023-24	64.2	445.50	143.64

Table 3 Cross-sector view on the financial and sustainability transformation of India Financial inclusion, digital payments and renewable energy in the same period. This is a trend in a larger development context where investments in sustainable energy, digital financial infrastructure and financial inclusion may reinforce each other. But no such attribution is established, since the figures do not define what share of renewables growth is supported by green labelled instruments.

TABLE 4: STATISTICAL / RELATIONSHIP ANALYSIS

Statistic	Financial Inclusion Index	RBI-DPI
N	7	7
Mean	56.029	274.610
Sample SD	4.593	128.486
Pearson r	0.9273	0.9273
Two-sided p-value	0.0026	0.0026

Table 4 Association between Financial Inclusion Index and Digital Payments Index Pearson Correlation.9273**.0026 5 The positive correlation suggests that the two dimensions progressed together along the observation period. There is no indication from the data that digital payments have led to financial inclusion since both variables exhibit an upward trend over time and there are only seven observations. It doesn't monitor the uptake of green finance either.

VI. RESULT AND DISCUSSION

The study's results depict the journey of India's financial ecosystem in terms of digital payments, financial inclusion and renewable energy potential. The study is based on the official indicators available today to discover important trends and linkages across the research period. Results show a considerable rise in renewable energy capacity and an overall improvement in digital financial infrastructure and financial inclusion. Although these results cannot be interpreted as direct evidence of the rise of green finance, they provide a basis to understand how an expanding financial ecosystem might assist in creating and distributing sustainable-finance solutions.

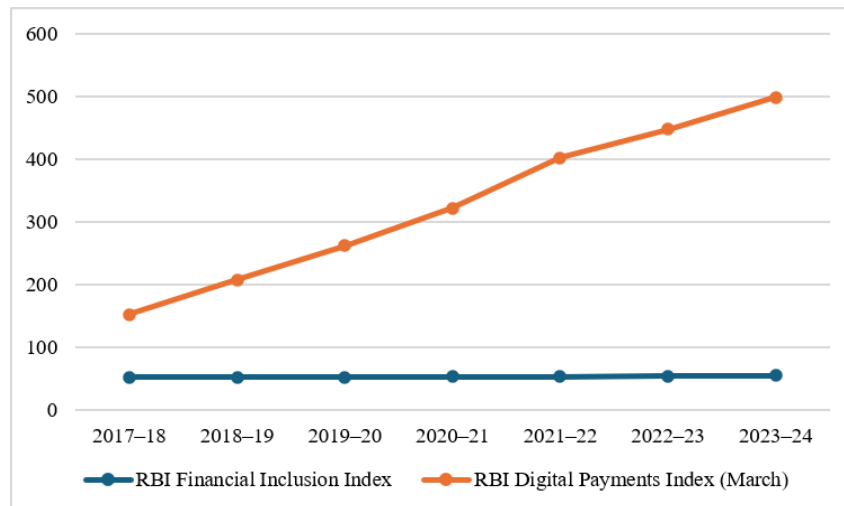


FIGURE 2: TREND OF FINANCIAL-INCLUSION AND DIGITAL-PAYMENT INDICATORS IN INDIA.

Figure 2 is generated instantly. During the same time of observation, both RBI indices increase, but with a base of 100 in March 2018, the Digital Payments Index shows a far bigger numerical growth. The Financial Inclusion Index also rises with the rise in the dimensions of access, usage and quality. Though digital services alone do not guarantee equal usage and outcomes, current research on digital finance and financial inclusion supports the idea that digital financial infrastructure may increase access. The implication for green finance is that a bigger financial ecosystem may provide greater channels for households and enterprises to access sustainable financial solutions.

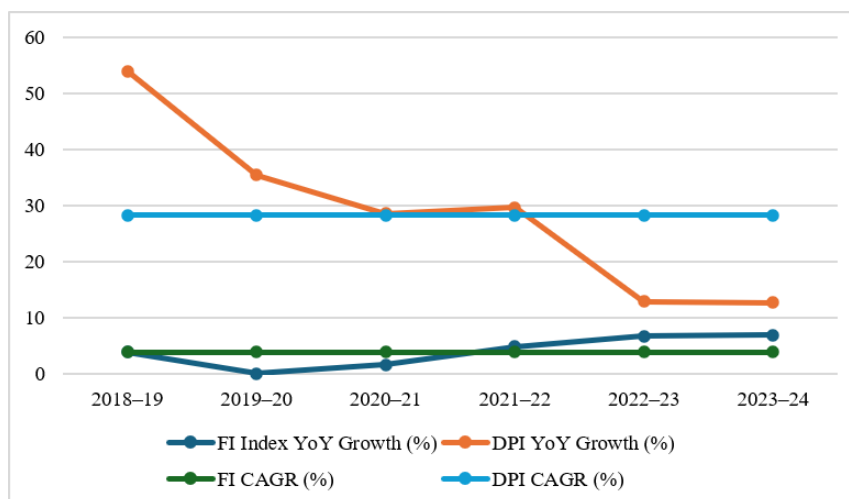


FIGURE 3: GROWTH AND CAGR OF SELECTED FINANCIAL-ECOSYSTEM INDICATORS.

The Digital Payments Index has a higher year-on-year percentage growth as compared to the Financial Inclusion Index, notably in the earlier years of the series (Figure 3). Further, the comparison of the CAGR shows the difference in the rate of change. That is the creation of financial infrastructure that may allow new channels for distribution, reporting systems and investment products in sustainable finance, not that digitalisation is green finance.

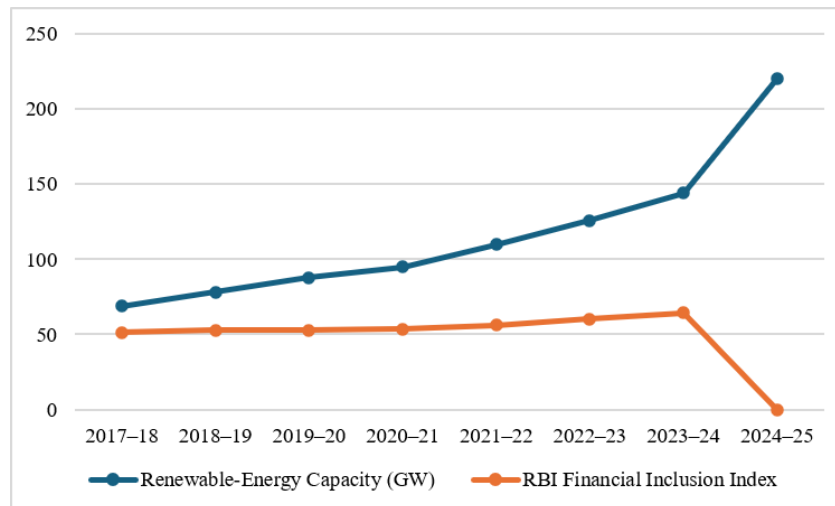


FIGURE 4: RENEWABLE-ENERGY CAPACITY AND FINANCIAL INCLUSION.

Figure 4 combines the Financial Inclusion Index with the renewable energy capacity from the official data. As time goes by, the potential of renewable energy expands considerably, and so does financial inclusion. Past energy-finance research has shown that financial conditions, capital availability, and policy play important roles in renewable energy uptake. The figures show co-occurring development but cannot disentangle the influence of green funding since renewable energy plants may be financed by a number of means. Therefore, the implication for sustainable development is descriptive: the financial environment became more inclusive as the capability for clean energy rose.

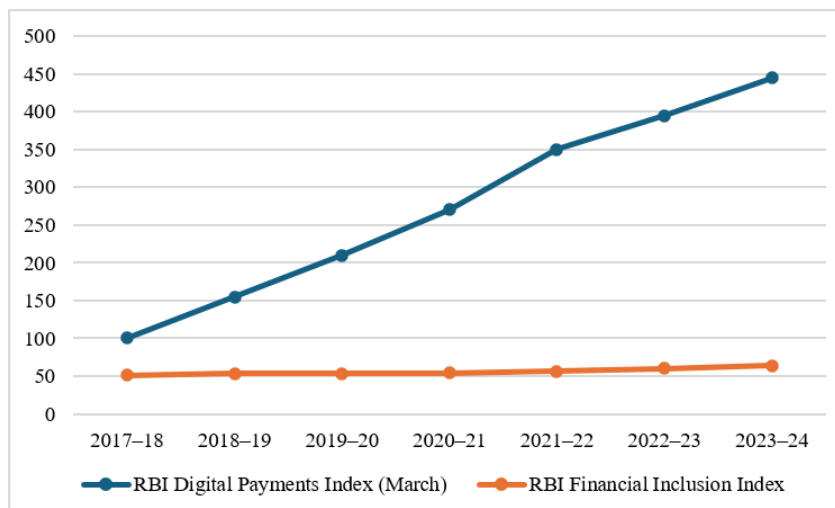


FIGURE 5: RELATIONSHIP BETWEEN THE RBI DIGITAL PAYMENTS INDEX AND FINANCIAL INCLUSION INDEX.

The seven common observations are shown in Figure 5. The correlation of 0.927 and the upward line of best fit suggest strong positive co-movement. The tiny, time-trending sample does not permit causal inference, although this is in line with the wider body of research on digital finance and inclusion. The finding implies that direct green funding and environmental impact indicators should be reported separately. Digital financial development and inclusion may be seen as part of the enabling environment for sustainable finance.

VII. CONCLUSION

The current research paper takes a quantitative, descriptive and analytical secondary-data approach to examine the new trends in green finance and sustainable development in the financial ecosystem of India. Research shows that renewable energy capacity grew from 69.02 GW in FY 2017–18 to 220.10 GW in FY 2024–25, the RBI Financial Inclusion Index went up from 51.4 in FY 2017–18 to 64.2 in FY 2023–24, and the RBI Digital Payments Index climbed from 100 in March 2018 to 445.50 in March 2024. The calculated growth and CAGR measures validate continued improvement across the selected financial and sustainable-development criteria.

The research also showed a large measurement disparity. Financial inclusion, digital payments and renewable energy capabilities are important indicators of the ecosystem supporting green finance, but they are not a substitute for direct assessments of green finance. Public data on green loans, ESG assets, and climate-finance flows by year is fragmented; therefore, it is not feasible to produce a single defensible national time series for the full financial sector. In this way, the study used measurable official indicators derived from existing regulatory and academic data, instead of constructing green-finance values.

The change is important for financial organisations because it affects risk pricing, investment selection, and credit allocation. Climate risk, sustainability disclosure and responsible finance are becoming crucial to financial regulation, as shown in RBI and SEBI trends. The largest barriers include greenwashing, uneven disclosure, lack of data on environmental results, quantifying climate risk and the cost of creating institutional capacity. Future research should provide comparable data on sustainable investment and green finance, link financial flows to environmental outcomes at the project level, and test causality using longer panels or project-level designs. This project will increase the academic basis for understanding how green finance may serve India's social, economic and environmentally sustainable development objectives.

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