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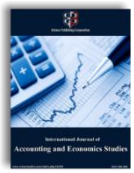

Green Finance in India: Catalyzing Economic Growth through Sustainable Investments and Public Perception Analysis

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Abstract

Green finance has emerged as a critical mechanism for reconciling economic development with environmental sustainability objectives, par-particularly in the context of global climate commitments. This study examines the evolving landscape of green finance in India, analyzing its key instruments, regulatory framework, and public perception. The study evaluates how socio-demographic factors influence public aware-ness and acceptance of green financial instruments. Primary data were collected through a structured questionnaire administered to 215 respondents in Bihar, India, using convenience sampling with stratified representation across demographic categories. The survey instrument demonstrated strong internal reliability (Cronbach's α = 0.800). Statistical analysis employing independent sample t-tests and one-way ANOVA revealed that while age, gender, occupation, and income do not significantly differentiate green finance perceptions, educational attainment and residential location (urban versus rural) emerge as significant determinants of awareness and acceptance levels. These findings suggest that targeted financial literacy initiatives and localized awareness campaigns are essential for broadening green finance participation. Policy implications emphasize the need for regulatory standardization, enhanced public education, particularly in rural areas, and coordinated multi-stakeholder efforts to mobilize green investments toward India's climate goals.

Keywords: *Green Finance; Sustainable Investments; Economic Growth; Environmental Protection; Public Perception.*

1. Introduction

The imperative for environmental sustainability has fundamentally transformed organizational priorities across all sectors (Biju et al., 2024). Contemporary enterprises increasingly recognize that financial performance must be balanced with environmental stewardship and responsible resource utilization. Green finance represents a paradigm shift in financial systems, establishing explicit linkages between capital allocation and environmental outcomes (Forstater et al., 2015). Broadly defined, green finance encompasses financial instruments, products, and services that channel investments toward environmentally sustainable activities, including renewable energy projects, energy efficiency improvements, sustainable infrastructure development, and climate adaptation initiatives (Berensmann & Lindenberg, 2016a). This financial evolution constitutes a substantive response to the interrelated challenges of sustainable development and climate change mitigation (Barua, 2019).

The theoretical underpinnings of green finance draw from multiple disciplinary perspectives. Sustainable finance theory posits that financial systems can be designed to generate both economic returns and positive environmental externalities, challenging the traditional assumption of a trade-off between profitability and sustainability (Lee, 2020a; Pereira et al., 2023). The diffusion of innovation theory, originally articulated by Rogers, provides a complementary framework for understanding how awareness and adoption of green financial instruments propagate through populations, with adoption rates influenced by factors such as perceived relative advantage, compatibility with existing values, complexity, trialability, and observability (Nasir & Ahmed, 2024a). These theoretical lenses inform our understanding of how green finance mechanisms gain traction among diverse stakeholder groups.

In the Indian context, where economic development aspirations coexist with significant environmental challenges, green finance assumes particular strategic importance for achieving the Sustainable Development Goals (SDGs) (United Nations, 2015a). India's updated Nationally Determined Contributions (NDCs) commit the country to reducing carbon intensity by more than 45 percent from 2005 levels by 2030 (United Nations, 2021). Meeting this ambitious target necessitates substantial capital mobilization; International Finance Corporation (IFC) estimates indicate that approximately USD 403 billion in renewable finance investment will be required by 2030 (Climate Policy Initiative, 2022; IFC, 2017). These investments are essential not only for decarbonization and climate adaptation but also for ensuring energy security and economic stability in an era of climate uncertainty (Nawaz et al., 2020).

Recognizing the pivotal role of financial institutions in this transformation, the Reserve Bank of India (RBI) has initiated regulatory measures to promote sustainable finance (Sarangi, 2018). In March 2023, RBI Governor Shaktikanta Das announced forthcoming guidelines for regulated entities covering green loans, green deposits, and climate risk management, thereby fostering a supportive ecosystem

for sustainable investment (RBI, 2023). Complementary initiatives by the Securities and Exchange Board of India (SEBI) have established disclosure standards for green bond issuances and facilitated the development of green listing platforms. These regulatory developments underscore the integration of financial systems with national and international climate objectives.

This study aims to analyze the current state of green finance in India, examining its instruments, regulatory framework, and role in sustainable development. Critically, the research investigates public perception and awareness of green financial products, recognizing that effective mobilization of green investments requires not only institutional frameworks but also informed participation by individual investors and citizens. By identifying socio-demographic factors that influence green finance perception, this study seeks to inform targeted strategies for expanding green finance accessibility and participation. The findings are intended to contribute to the twin objectives of sustainable economic development and environmental conservation as India pursues its vision of inclusive green growth.

2. Literature Review

2.1. Theoretical framework

The conceptual foundations of green finance integrate insights from environmental economics, sustainable finance theory, and behavioral finance (Guild, 2020a). Environmental economics provides the analytical framework for understanding market failures associated with environmental externalities and the rationale for financial mechanisms that internalize environmental costs (Fernandes et al., 2021). Sustainable finance theory extends this analysis by proposing that financial instruments can be purposefully designed to generate both financial returns and positive environmental impacts, thereby creating shared value for investors, society, and the environment (Lee, 2020b; Urban & Wojcik, 2019). The diffusion of innovation theory offers valuable insights into the adoption patterns of green financial products. According to this framework, the rate of adoption is influenced by the characteristics of the innovation itself, communication channels, time, and the social system (Nasir & Ahmed, 2024b). In the context of green finance, perceived complexity of green financial instruments, compatibility with existing investment practices, and observability of environmental benefits emerge as critical determinants of public acceptance. Behavioral finance perspectives further illuminate how cognitive biases, risk perceptions, and information processing affect individual investment decisions regarding green financial products (Guild, 2020b). The Theory of Planned Behavior (TPB) provides additional theoretical grounding for understanding green finance adoption, suggesting that behavioral intentions are influenced by attitudes, subjective norms, and perceived behavioral control (Ajzen, 1991). Recent research has demonstrated that financial literacy mediates the relationship between sustainable investment awareness and investment interest in green financial instruments, highlighting the critical role of financial education in promoting sustainable finance adoption (Senaya, 2024).

2.2. Global green finance developments

The global green bond market has experienced exponential growth since its inception (Jones et al., 2020). Asl et al. (2024) examined the causal relationships between green bonds and eco-efficiency from June 2014 to August 2023, finding evidence of reciprocal causality that underscores the instrumental role of green bonds in promoting environmental sustainability. The Paris Agreement (2015) and Agenda 2030 for Sustainable Development served as catalysts for green finance expansion, necessitating new economic models decoupled from carbon dependence (Berensmann & Lindenberg, 2016b; Manta et al., 2020; United Nations, 2015b). International green bond issuance surpassed USD 100 billion annually for the first time in November 2017, reached USD 297 billion in 2020, and exceeded USD 500 billion in 2021, reflecting strong global momentum (Climate Policy Initiative, 2022; Taghizadeh-Hesary et al., 2022). Bibliometric analyses reveal that climate finance research has been led primarily by scholars in the United States, United Kingdom, and China, with six major thematic clusters emerging: climate change, green finance, public policy, green bonds, financial markets, and their interconnections (Ayaz & Zahid, 2024; Long et al., 2022). Cross-national comparative studies have examined how policy heterogeneity affects green bond supply, with particular attention to energy policy configurations including solar and nuclear power capacity (Mertzanis, 2023). Cultural and institutional factors also significantly influence green finance development trajectories across countries (Kling et al., 2025).

2.3. Green finance in emerging markets and India

In emerging markets and developing economies (EMDEs), private financial institutions have increasingly responded to stakeholder demands for sustainable finance, though regulatory frameworks remain comparatively underdeveloped (Demekas et al., 2023; Dikau & Volz, 2020). Challenges, including data limitations, greenwashing risks, and inconsistent disclosure practices, persist, highlighting the need for standardized definitions and reporting requirements (Agarwal et al., 2023). In the Indian context, Chhaochharia (2021) documented growing public interest in environmentally sustainable financing and expansion of green financial intermediaries, attributing these trends to improved information availability and reduced information asymmetry. Research on India's green finance landscape has identified both opportunities and constraints. Bhatnagar & Sharma (2021) highlighted the potential of green bonds in renewable energy, construction, and transportation sectors while noting challenges including low credit ratings and limited market depth. The Climate Policy Initiative (2022) identified data limitations as a primary barrier to scaling green finance in India and proposed mechanisms for improved investment tracking. Studies on energy efficiency financing policies have documented their contribution to carbon emission reductions and alignment with Paris Agreement commitments (Debnath, 2021). Recent research emphasizes that financial, legal, and regulatory barriers are the most deterring obstacles, while technological innovation and clean energy sector development are prominent enablers (Sharma et al., 2021; Singh et al., 2020). The relationship between financial literacy and green finance adoption has emerged as a critical research area. Studies demonstrate that financial literacy positively impacts sustainable investment behavior and awareness (Huang et al., 2020; Klapper et al., 2015; Le et al., 2020). In developing countries, low financial literacy and awareness of financial services create significant barriers to green finance adoption, particularly in rural and marginalized communities (Kefela, 2010; Morgan & Long, 2020). Research in Asian contexts reveals that higher education levels and financial literacy are positively associated with green finance awareness and adoption (Lusardi & Mitchell, 2011a; Widdowson & Hailwood, 2007).

2.4. Research gap and contribution

While existing literature has extensively examined green finance instruments, regulatory frameworks, and market developments, relatively limited attention has been directed toward understanding public perception and awareness, particularly in the Indian context. Most studies

focus on institutional and market-level analyses, with fewer investigations of individual-level factors that influence green finance acceptance. This study addresses this gap by empirically examining how socio-demographic characteristics shape public perception of green finance, thereby contributing insights for targeted awareness initiatives and inclusive green finance strategies. The research specifically investigates whether variations in age, gender, education, occupation, income, and residential location correspond to differential perceptions of green financial instruments and their role in sustainable development.

3. Objectives of The Study

1) To examine the current landscape of green finance in India, including key instruments, institutional actors, and regulatory developments.
2) To assess public awareness and perception of green financial instruments among respondents in Bihar, India.
3) To analyze the relationship between socio-demographic factors and public perception of green finance.
4) To identify implications for policy and practice in promoting inclusive green finance participation.

4. Research Hypothesis

H0: Perception regarding green finance does not vary significantly across socio-demographic groups (age, gender, education, occupation, income, and residential location).

5. Research Methodology

5.1. Research design and population

This study employs a cross-sectional survey design to investigate public perception of green finance. The target population comprises adult residents of Bihar, India, representing diverse socio-economic backgrounds, including students, salaried employees, business professionals, and other occupational categories. Bihar was selected as the study location given its significant rural population, diverse educational attainment levels, and emerging engagement with financial services, characteristics that provide a suitable context for examining variation in green finance awareness.

5.2. Sampling technique and sample size

A convenience sampling approach was employed, supplemented by stratification across key socio-demographic variables including gender, age, education level, occupation, income, and residential location (urban/rural). While convenience sampling limits generalizability—a recognized limitation of this study—stratification ensured representation across theoretically relevant subgroups. The final sample comprised 215 valid responses, exceeding the minimum threshold recommended for statistical procedures, including ANOVA and t-tests (Hair et al., 2013). The sample size is adequate for the perception-based analysis undertaken, though findings should be interpreted with appropriate caution regarding broader population inference.

5.3. Data collection

Primary data were collected through a structured online questionnaire administered via Google Forms. The survey instrument comprised two sections: (1) socio-demographic information and (2) items measuring awareness, perception, and behavioral intentions regarding green finance. Perception items were measured on a 5-point Likert scale (1 = Strongly Disagree to 5 = Strongly Agree). The questionnaire was developed based on prior literature and pre-tested for clarity. Secondary data were obtained from government publications, RBI monetary policy reports, Climate Policy Initiative reports, academic journals, and financial databases to contextualize findings within the broader green finance landscape.

5.4. Analytical approach

Data analysis was conducted using SPSS (Version 23). Reliability of the survey instrument was assessed using Cronbach's alpha coefficient. Descriptive statistics summarized respondent characteristics and perception distributions. Hypothesis testing employed independent sample t-tests for dichotomous variables (gender, residential location) and one-way ANOVA for multi-category variables (age, education, occupation, income). Levene's test assessed homogeneity of variances; where this assumption was violated, Welch's robust test was applied to ensure valid inference. A significance level of $\alpha = 0.05$ was adopted for all statistical tests.

5.5. Limitations

Several methodological limitations warrant acknowledgment. First, the use of convenience sampling and geographic concentration in Bihar constrains the generalizability of findings to other Indian states or national populations. Second, self-reported survey data may be subject to social desirability bias, particularly regarding environmentally conscious attitudes. Third, the cross-sectional design precludes causal inference regarding the direction of relationships between socio-demographic factors and green finance perception. Fourth, the study measures perception and awareness rather than actual investment behavior, limiting conclusions about behavioral outcomes. Future research should address these limitations through probability sampling, longitudinal designs, and behavioral outcome measures.

6. Green Finance in India

India's engagement with green finance has evolved progressively since September 2007, when the RBI issued initial communications addressing sustainable development, corporate social responsibility, and climate change risks. Substantive regulatory development commenced in 2012 with the introduction of mandatory sustainability disclosure requirements for the top 100 listed companies on BSE and

NSE. The first green bond in India was issued by Yes Bank in 2014-15, raising INR 10 billion for renewable energy projects. SEBI's May 2017 guidelines established disclosure standards for green bond issuances, and in 2019, India International Exchange Ltd. launched a green listing platform to facilitate trading of green and sustainable bonds. Despite these developments, a significant financing gap persists. Climate Policy Initiative (2022) estimates indicate that India requires approximately INR 11 lakh crores annually to achieve its NDC targets, substantially exceeding current green investment levels. This gap underscores the urgency of scaling green finance mobilization through both domestic and international channels (Volz, 2018).

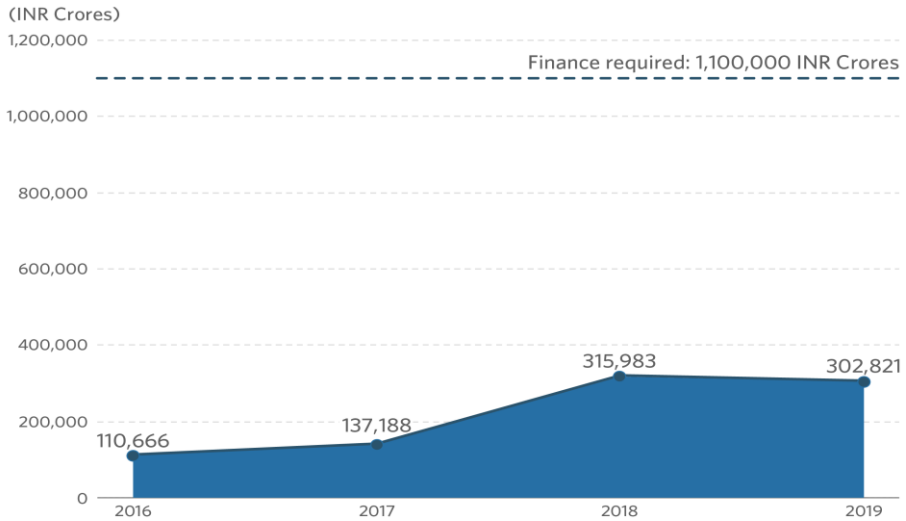

Fig. 1: Tracked Green Finance Investments and the Estimated Finance Required to Meet Current NDCs.

Source(s): Landscape of Green Finance in India (Climate Policy Initiatives).

6.1. Sources of green finance in India

Domestic sources constitute the majority of green finance in India, accounting for 87% in FY2019 and 83% in FY2020. Within domestic sources, the private sector contributes approximately 59% (INR 156.9 thousand crores), while public sector contributions are divided between public sector undertakings (54%) and government budgetary expenditures (46%). International sources increased from 13% in FY2019 to 17% in FY2020, with foreign direct investment in green sectors approaching INR 9 thousand crores (Fu & Ng, 2020; Yuan & Gallagher, 2019). However, green finance represents only 3% of total FDI inflows into India, indicating substantial scope for expansion (Climate Policy Initiative, 2022).

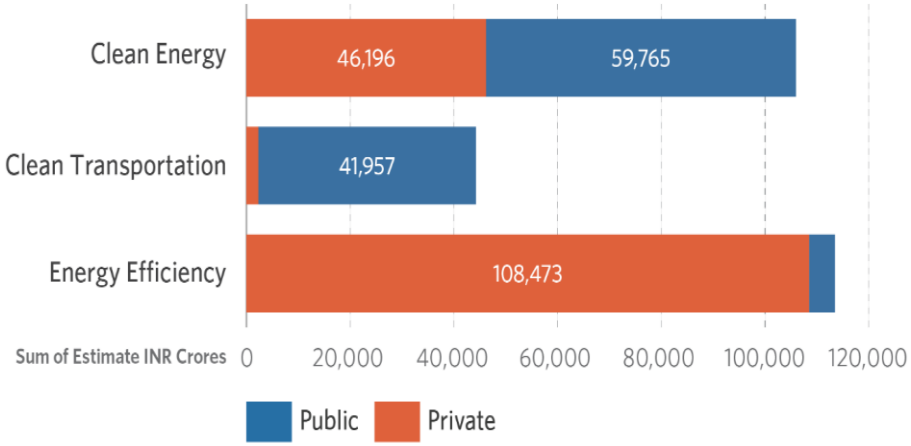

Fig. 2: Domestic Green Finance Flow to Mitigation Sectors (INR Thousand Crore).

Source(s): Climate Policy Initiatives.

6.2. Key instruments and institutional actors

Green Bonds: Green bonds are debt instruments whose proceeds are exclusively allocated to environmentally beneficial projects, including renewable energy, energy efficiency, sustainable transportation, and green buildings. Major Indian issuers include Yes Bank, EXIM Bank, NTPC, ReNew Power, State Bank of India, and Adani Green Energy. Municipal green bonds have also emerged, with Ghaziabad Municipal Corporation issuing India's first municipal green bond in April 2021 through BSE's Bond platform.

Green Banking Services: Multiple public and private sector banks, including SBI, PNB, Bank of Baroda, Canara Bank, ICICI, IDFC, Kotak Mahindra, and IDBI, have introduced green banking products. These include digital banking services promoting paperless transactions, green credit cards with environmental contributions, green loans for sustainable projects, and specialized financing for electric vehicles and energy-efficient home improvements.

Regulatory Framework: The regulatory architecture for green finance in India involves coordinated action by the RBI and SEBI. RBI's 2023 framework for regulated entities addresses green loans, green deposits, and climate risk management. SEBI's disclosure requirements

for green bonds provide transparency and credibility, while the establishment of green listing platforms facilitates market access for issuers and investors.

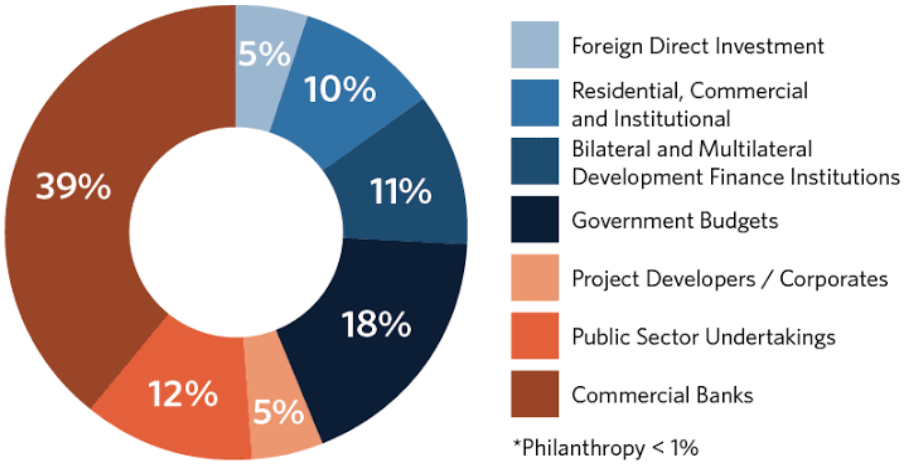

Fig. 3: Breakdown of Investment by Source (2016-2018).

Source(s): Climate Policy Initiatives.

Table 1: Key Green Bond Issuances in India

S. No.	Issuer	Amount	Issue Date	Tenure	Sector Exposure
1	Yes Bank	INR 10bn	15 February 2015	10 years	Energy
2	EXIM Bank	USD 500m	March 2015	5 years	Transport energy
3	CLP Wind Farm	INR 6bn	September 2015	3,4, and 5 years	Energy
4	IDBI Bank	USD350m	November 2015	5 years	Energy, Transport, and Water Management.
5	PNB Housing Finance	INR 5bn	April 2016	NA	Buildings
6	NTPC	INR 20bn	August 2016	5 years	Energy
7	ReNew power	USD 475m	February 2017	5 years	Energy
8	Azure Powers	USD 500m	August 2017	5 years	Energy
9	Indian Railways	USD 500m	December 2017	10 years	Transportation
10	Greenko	USD 300m	August 2019	3.5 years	Energy
11	State Bank of India	USD650m	September 2019	5 years	Energy
12	Adani Green Energy	USD362m	October 2019	20 years	Energy
13	ReNew power	USD 450m	January 2020	5.5 years	Energy
14	State Bank of India	USD 100m	March 2020	2 years	Energy

Source(s): Climate Policy Initiatives.

7. Analysis and Interpretation of Data

7.1. Socio-demographic profile

Table 2: Socio-Demographic Profile of Respondents

Variables	Category	No of Respondents	Percentage
Gender	Male	106	49.3
	Female	109	50.7
Age (in years)	18-25 years	140	65.1
	26-40 years	57	26.5
	41-60 years	10	4.7
	Above 60 years	8	3.7
Monthly Income	Less than 10,000	126	58.6
	10,000 – 25,000	34	15.8
	25,001 – 50,000	36	16.7
	More than 50000	19	8.8
Education	Graduation	131	60.9
	Post Graduation	63	29.3
	Ph.D. and others	21	9.8
Occupation	Students	157	73.0
	Salaried	39	18.1
	Businessman	8	3.7
	Professionals	11	5.1
Residential Location	Rural	64	29.8
	Urban	151	70.2

Source(s): Primary Data.

Table 1 presents the socio-demographic composition of the sample. Gender distribution was nearly balanced, with 106 males (49.3%) and 109 females (50.7%). Age distribution skewed toward younger cohorts, with 65.1% aged 18-25 years, reflecting the significant representation of students (73.0%) in the sample. Educational attainment varied from graduation (60.9%) to post-graduation (29.3%) and doctoral levels (9.8%). Monthly income distribution reflected the student-heavy composition, with 58.6% earning less than INR 10,000. Urban residents comprised 70.2% of respondents, with 29.8% from rural areas.

7.2. Public perception of green finance

Table 3: Public Perception of Green Finance

Statements		Count	Percentage
Are you aware of Green Finance and Green Financial instruments?	Yes	164	76.3
	No	51	23.7
Would you prefer to invest in Green Financial instruments and Green Bonds?	Yes	164	76.3
	No	51	23.7
Would you recommend others to invest in Green Bonds and Equity?	Yes	176	81.9
	No	39	18.1
Do you believe the Government is doing its part in taking action on Climate Change?	Yes	175	81.4
	No	40	18.6
Will you help promote activities that are related to Green Finance?	Yes	192	89.3
	No	23	10.7
The investments made in Green Finance are being effectively used for the right purpose.	Strongly Disagree	8	3.7
	Disagree	11	5.1
	Neutral	63	29.3
	Agree	85	39.5
	Strongly Agree	48	22.3
Green Finance refers to financial resources paid to cover the costs of transitioning to a low-carbon economy.	Strongly Disagree	11	5.1
	Disagree	8	3.7
	Neutral	50	23.3
	Agree	101	47.0
	Strongly Agree	45	20.9
A policy should be made in order to have a strong impact on Climate Change in our country.	Strongly Disagree	11	5.1
	Disagree	10	4.7
	Neutral	39	18.1
	Agree	51	23.7
	Strongly Agree	104	48.4
Green Financing may increase employment opportunities in India.	Strongly Disagree	12	5.6
	Disagree	13	6.0
	Neutral	46	21.4
	Agree	82	38.1
	Strongly Agree	62	28.8
Green Financing resulted in sustainable development.	Strongly Disagree	9	4.2
	Disagree	9	4.2
	Neutral	34	15.8
	Agree	85	39.5
	Strongly Agree	78	36.3

Source(s): Primary Data.

Table 3 summarizes key perception indicators. A substantial majority (76.3%) reported awareness of green finance and green financial instruments, and an equivalent proportion expressed willingness to invest in green bonds. Notably, 81.9% indicated they would recommend green investments to others, suggesting favorable attitudes toward green finance. Regarding government action on climate change, 81.4% agreed that the government is taking action—an important finding that warrants careful interpretation. This high agreement rate indicates public recognition of government initiatives; however, it should not be conflated with satisfaction regarding the adequacy of such efforts. Approximately 89.3% expressed willingness to promote green finance activities. Perception items measured on the Likert scale showed moderate to strong agreement with statements regarding effective utilization of green finance investments (61.8% agree/strongly agree), employment generation potential (66.9%), and contribution to sustainable development (75.8%).

7.3. Test of reliability

Table 4: Reliability Statistic

Cronbach's Alpha	No. of Items
0.800	10

Source(s): Authors' SPSS Calculation.

Following that logic, the validity of the constructs used in this analysis was examined by using Cronbach's Alpha to assess internal consistency. In the same literature by Hair et al. (2013), reliability analysis is defined based on Cronbach's Alpha (α) standard, where $\alpha > 0.70$. Nunnally (1978) also notes that most researchers consider an acceptable level of construct reliability to be .70 and above. The reliability test produced Cronbach's Alpha coefficients of.800 for the scale with 10 items, as shown in Table 4 below. This result confirms adequate reliability of the measurement instrument, supporting the validity of subsequent statistical analyses.

7.4. Testing of hypothesis

H0: Perception regarding green finance does not vary significantly across socio-demographic groups (age, gender, education, occupation, income, and residential location).

For this purpose, a way ANOVA test was conducted on multinomial variables, which comprised Age, Education, Occupation, and Income, respectively, and an independent variable t-test was also run on dichotomous variables, namely, Gender and Residency Status. Levene's test is specifically a test of homogeneity of variance. According to Levene's test used in the one-way ANOVA, the null hypothesis is that

the variance of scores across the groups is equal. If the calculated Levene's test statistic is greater than 0.05, then the homoscedasticity assumption is concluded, resulting in an easy interpretation of the one-way ANOVA test. However, if the significance value of Levene's test is below 0.05, then the hypothesis of homogeneity of variances is rejected, which suggests that the variability of scores across the groups is not the same; that is, the variability is unequal across the groups, and as such, the outcome of the F test of ANOVA should be done cautiously. In such a situation, only a powerful ANOVA method, such as the Welch's test, that can establish differences based on unequal variances has to be used. In the independent sample t-test, Levene's test of homogeneity of variances is used, and if the obtained significance value is greater than 0.05, the assumption that equal variances exist, where the variability of scores across groups is equal, then use is made, of the row labelled Equal variances assumed for reporting the t-test. That is, if the value of Levene's test is significant, less than 0.05, the population variances are unequal, and therefore the analysis uses the row labelled 'Equal variances not assumed' for the t-test analysis.

Table 5: Analysis of Variance in Perception across Socio-Demographic Factors

Factors	Category	Mean	S.D.	Levene's Test (Sig.)	ANOVA (F)	ANOVA (Sig.)	Welch (Sig.)
Age	18-25	7.8586	1.67890	.013	3.959	.009	.086
	26-40	8.3088	1.27395				
	41-60	6.4400	2.65129				
	Above 60	7.8500	.93044				
	Total	7.9116	1.65066				
Education	Graduate	7.6794	1.79550	.018	3.400	.035	.027
	Post Graduate	8.2857	1.38458				
	Ph.D. & Others	8.2381	1.16210				
	Total	7.9116	1.65066				
Occupation	Student	7.9325	1.62000	.429	1.623	.185	.528
	Salaried Employee	8.1128	1.44207				
	Professionals	7.7636	1.87578				
	Businessman	6.7250	2.57224				
	Total	7.9116	1.65066				
Monthly Income	Less than 10,000	7.8984	1.61369	.480	.746	.526	.596
	10,000 - 25,000	7.6235	1.95077				
	25,000 - 50,000	8.0278	1.46748				
	More than 50,000	8.2947	1.67514				
	Total	7.9116	1.65066				

Source(s): Authors' SPSS Calculation.

Table 6: Comparison of Green Finance Perception by Gender and Residential Location

Factors	Category	Mean		Levene's Test (Sig.)	t-test for Equality of Means	
					t	Sig. (2-tailed)
Gender	Male	7.6925	Equal variances assumed	.472	-1.932	.055
	Female	8.1248	Equal variances not assumed		-1.933	.055
Residential Location	Rural	7.5469	Equal variances assumed	.509	-2.127	.035
	Urban	8.0662	Equal variances not assumed		-2.098	.038

Source(s): Authors' SPSS Calculation.

7.5. Interpretation of results

Age: Although the standard ANOVA indicated significant variation (p = .009), Levene's test revealed heterogeneous variances (p = .013). The Welch robust test, appropriate under variance heterogeneity, yielded p = .086, exceeding the .05 threshold. Therefore, age-related differences in green finance perception are not statistically significant.

Education: Both ANOVA (p = .035) and the Welch test (p = .027) indicate statistically significant differences across educational categories. Mean scores increase progressively from graduates (7.68) to post-graduates (8.29) and doctoral holders (8.24), suggesting that higher educational attainment is associated with greater awareness and more favorable perception of green finance. This finding aligns with diffusion of innovation theory, which posits that education facilitates comprehension and adoption of complex innovations (Jappelli & Padula, 2013a; Lusardi & Mitchell, 2011b).

Occupation and Income: Neither occupation (ANOVA p = .185; Welch p = .528) nor income (ANOVA p = .526; Welch p = .596) demonstrated significant effects on green finance perception, indicating that occupational category and income level do not systematically differentiate awareness or attitudes in this sample.

Gender: The t-test comparing male (M = 7.69) and female (M = 8.12) respondents yielded p = .055, marginally exceeding the significance threshold. While females exhibited slightly higher mean perception scores, this difference is not statistically significant at conventional levels.

Residential Location: The t-test revealed a significant difference between rural (M = 7.55) and urban (M = 8.07) respondents (p = .035). The negative t-value indicates that urban residents demonstrate significantly higher green finance perception scores compared to rural counterparts. This urban-rural disparity likely reflects differential access to financial services, information channels, and exposure to green finance discourse.

Therefore, the null hypothesis is partially rejected. While green finance perception does not vary significantly by age, gender, occupation, or income, education and residential location emerge as significant differentiating factors. These findings have direct implications for designing targeted awareness and financial literacy interventions.

8. Discussions

This study contributes empirical evidence on public perception of green finance in India, a domain that has received limited research attention despite its importance for mobilizing sustainable investments. The findings regarding education and residential location as significant determinants of green finance perception have both theoretical and practical implications (Mehta et al., 2019; Soundararajan et al., 2019).

The positive association between educational attainment and green finance perception supports propositions from diffusion of innovation theory regarding the role of knowledge and cognitive capacity in innovation adoption (Allgood & Walstad, 2016; Behrman et al., 2012). Higher education appears to facilitate understanding of complex financial instruments and their environmental implications, consistent with findings from international studies on sustainable finance adoption (Nasir & Ahmed, 2024c). This suggests that financial literacy programs focusing on green finance concepts may be particularly effective when integrated with formal educational pathways (Jappelli & Padula, 2013b).

The significant urban-rural differential warrants attention from policymakers. Urban residents' higher perception scores likely reflect multiple advantages, including greater access to formal banking services, exposure to financial media, participation in discussions about climate change, and proximity to green finance information sources (Lawless & McCann, 2011). Rural populations, who constitute a substantial proportion of India's population, represent an underserved constituency for green finance awareness. This finding underscores the need for localized, context-appropriate communication strategies that address the specific information environments and financial practices of rural communities.

The high proportion of respondents (81.4%) who believe the government is taking action on climate change merits careful interpretation. This finding indicates public recognition of governmental initiatives rather than assessment of their adequacy (Bhandary et al., 2021). The distinction between acknowledging government action and evaluating its sufficiency is important; qualitative research may be needed to understand public perceptions of whether current governmental efforts meet the scale of climate challenges.

It is important to acknowledge that this study measures perception and awareness rather than actual investment behavior. While a favorable perception is a necessary condition for green finance participation, it does not guarantee behavioral engagement. The relationship between green finance perception and investment decisions represents an important avenue for future research, ideally employing longitudinal designs that track behavioral outcomes over time.

9. Conclusions and Implications

9.1. Summary of findings

Green finance represents an increasingly important mechanism for reconciling India's economic development aspirations with environmental sustainability imperatives. This study examined the green finance landscape in India and investigated socio-demographic determinants of public perception. Key findings include substantial public awareness of green financial instruments (76.3%), widespread willingness to invest in green bonds (76.3%), and general recognition of green finance's role in sustainable development (75.8%). Statistical analysis revealed that while age, gender, occupation, and income do not significantly differentiate green finance perception, educational attainment and residential location (urban versus rural) are significant determinants of awareness and favorable attitudes.

9.2. Policy implications

The findings suggest several policy directions for promoting inclusive green finance participation in India:

1) Targeted Educational Initiatives: Given the significant effect of education on green finance perception, financial literacy programs should incorporate green finance modules. Partnerships between financial institutions, educational institutions, and regulatory bodies could facilitate systematic integration of green finance education across academic levels.
2) Rural-Focused Awareness Campaigns: The urban-rural perception gap necessitates dedicated outreach to rural populations. Leveraging existing networks such as agricultural extension services, self-help groups, and rural banking infrastructure could enhance green finance awareness in underserved areas. Communication strategies should be adapted to local languages, cultural contexts, and information consumption patterns.
3) Regulatory Standardization: Continued development of clear definitions, disclosure standards, and certification frameworks for green financial instruments will enhance market credibility and facilitate informed investor decisions. Regulatory clarity is particularly important for building trust among retail investors unfamiliar with green finance products.
4) Multi-Stakeholder Coordination: Effective green finance mobilization requires coordinated action among government agencies, financial regulators, banks, corporations, civil society organizations, and citizens. Institutional mechanisms for coordination and knowledge sharing should be strengthened.

9.3. Limitations and future research

This study has several limitations that suggest directions for future research. Geographic concentration in Bihar and convenience sampling limit generalizability; future studies should employ probability sampling across multiple states to enhance external validity. The cross-sectional design precludes causal inference; longitudinal research could examine how green finance perceptions evolve and influence investment behavior over time. The study focuses on perception rather than behavior; future research should investigate the perception-behavior relationship and identify factors that translate awareness into actual green investment decisions. Additionally, qualitative research could provide deeper insights into the barriers and facilitators of green finance adoption across different socio-demographic segments.

9.4. Concluding remarks

As India pursues its ambitious climate commitments, green finance will play an increasingly central role in mobilizing the capital required for sustainable development. The findings of this study underscore that effective green finance expansion requires not only institutional development and regulatory frameworks but also attention to the socio-demographic dimensions of public awareness and acceptance. By targeting educational initiatives and addressing the urban-rural awareness gap, India can work toward a more inclusive green finance ecosystem that engages citizens across all segments of society in the transition to a sustainable economy.

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