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From savings to sustainability: Empowering investors in climate finance

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Abstract:

Climate change is a serious challenge, and enhanced involvement in climate finance to enable mitigation and adaptation is required. This research investigates the relationship between financial capability and the investment of individual investors in climate finance in India, with emphasis on the impact of financial literacy, risk perception, socio-economic characteristics and institutional trust. Employing a mixed-methods design integrating quantitative surveys with qualitative findings the study evaluates the extent of financial capability among Indian investors and determines drivers and hindrances to climate finance engagement.

The research points out the role of financial literacy, ethical issues, and ease of access to climate-friendly investments in decision-making. Results show that awareness and willingness are present, but structural impediments such as product scarcity, regulatory barriers and risk aversion hold back wider participation. The study identifies the need for focused financial education, policy action, and creative investment arrangements to increase retail investor participation in climate finance.

By closing the gap between financial ability and sustainable investment action, this research contributes to policy debates on inclusive climate finance approaches in emerging economies. The findings are of interest to policymakers, financial institutions, and stakeholders who seek to mobilize individual investments towards India's climate objectives, thereby complementing national programs such as the National Action Plan on Climate Change (NAPCC) and renewable energy missions.

Keywords: Climate finance, financial capability, individual investors, sustainable investments, India, behavioural barriers, policy interventions.

Introduction

Climate change is a daunting challenge requiring swift and concerted global action. The financing to address and adapt to climate change impacts is enormous, and public sources in the conventional sense are not adequate to address this need (Hourcade, Jean-Charles et al., n.d.). Climate finance, which is financial flows towards climate mitigation and adaptation, has become increasingly central to global and national policy discourse. Although institutional

investors, development banks, and state actors have dominated climate finance mobilization in the past, recent trends highlight the increasing significance of individual or retail investors, especially in emerging economies such as India (Andrés, Alonso J. & Marqués, Manuel, 2019).

India, being one of the world's most rapidly growing economies, is confronting distinctive climate risks of escalating temperatures, unpredictable monsoons, and a higher occurrence of extreme weather events. The government, in turn, has reacted with plans such as the National Action Plan on Climate Change (NAPCC), and ambitious renewable energy goals. Yet for these to be achieved, widespread financial engagement, including the participation of individual investors, is essential. A 2023 Standard Chartered report puts the potential mobilization of retail investor capital for climate investments in India by 2030 at as much as USD 543 billion, with 96% of investors surveyed showing interest in sustainable financial products (*USD543 Billion in Retail Investor Capital Could Be Mobilised to Combat Climate Change in India by 2030*, n.d.).

In spite of this optimism, real engagement in climate finance by individual investors is still low owing to a number of obstacles. One of the main drivers is financial capability, which includes financial literacy, confidence, access to services, and the capacity to make informed decisions (Atkinson, Adele & Messy, Flore-Anne, 2012). Research shows that financial capability is positively related to green investment participation and the uptake of sustainable financial practices (Chhatre et al., 2023). Risk perception is also a primary driver. (Umamaheswaran et al., 2024) point out that Indian debt investors view renewable energy projects as risky because of policy risks, technology complexity, and low familiarity with returns, thus discouraging investment.

Also, institutional trust has a strong impact on the behavior of retail investors. The 2023 Adani Group scandal, which added to concerns over corporate governance in the energy sector of India, showcases how transparency can undermine the confidence of investors in climate-focused initiatives (Time Magazine, 2023). Institutional mechanisms, such as regulatory surveillance and climate-based financial instruments, thus need to adapt so as to enhance investor confidence and credibility in the market (Jobst, Andreas & Pazarbasioglu, Ceyla, 2019).

Identifying such challenges, the Reserve Bank of India (RBI) has admitted that climate risks already present dangers to India's financial system and called for enhanced adaptation efforts (Times of India, 2024). Suggested ideas involve building a shared pool of bankable, climate-ready projects in order to limit perceived risk and boost investor interest (Reuters, 2025).

Theoretical Foundation

Climate finance is financial flows leveraged in order to contribute to climate change mitigation and adaptation. Climate finance is both national and global, involving both the public and the private sectors. The conceptual framework for climate finance exists at the crossroads of environmental economics, institutional theory, and theory in finance, to which more recently has been added sustainable development theory and behavioral economics. Knowledge of these structures is key to examining the mobilization, dissemination, and performance of climate finance, especially the role of individual investor action.

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Environmental Economics and the Social Cost of Carbon

One key theory foundation of climate finance is environmental economics, introducing the principle of externalities—that is, costs to the environment not included in market prices (Stern, 2007). Here, the emissions of greenhouse gases constitute an adverse externality that calls for corrective monetary mechanisms like carbon pricing, green bonds, and taxation incentives to bring these costs back into the framework. Social Cost of Carbon (SCC) has been strongly suggested as a metric to inform investment choice, project evaluations, and policy interventions (Hourcade et al., 2012). The inclusion of SCC in project funding constitutes a theoretical argument for guiding flows of capital toward low-carbon substitutes.

Public Goods and Market Failure

Mitigation of climate change is a global public good, whose value is non-rival and non-excludable. This results in a market failure, since private financiers can underfinance because there are no direct, exclusive gains (Barrett, 2003). Responding, climate finance emerged as a mechanism to right this shortcoming, quite commonly through blended finance solutions utilizing public funds to de-risk private financing for green ventures (Jobst, Andreas & Pazarbasioglu, Ceyla, 2019). Theory presumes invoking the application of subsidies, guarantees, and concessionality finance in bringing in individual and institutional investors towards climate-fossil-fuel-constrained assets.

Institutional Theory and Climate Finance Infrastructure

As per the institutional theory, investor confidence, risk perception, and market engagement are all affected by the presence of stable and transparent institutions (North, 1990). In climate finance, robust regulatory systems, climate disclosure, and green taxonomies facilitate the alignment of environmental objectives with financial flows. Strong institutional settings in countries are also more likely to draw sustainable finance, especially from retail investors, who mostly depend on trust and transparency (Jobst, Andreas & Pazarbasioglu, Ceyla, 2019).

Financial Innovation and Sustainable Investment Theory

Climate finance is also based on financial innovation theory, which accounts for the creation of new instruments such as green bonds, sustainability-linked loans, and climate mutual funds that allow investors to invest in climate targets at no cost to returns (Damerow, 2018). These instruments are based on conventional financial theories but incorporate non-financial metrics, such as carbon cut targets or ESG targets, to inform investor decisions. Individual investors are increasingly attracted to such innovations since they are aligned with individual values and remain financially viable.

Behavioral Dimensions of Climate Finance

Whereas classic theories posit rational agents, behavioral economics brings in bounded rationality, emotion, and bias to investment choices. Intertemporal trade-offs are usually problematic for retail investors, who tend to prefer quick returns over future climate benefits (Tversky & Kahneman, 1974). The theory of behavioral finance posits that nudges, framing, and default options in climate investment products can affect participation substantially.

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Review of Literature

Climate finance has evolved into an essential research area as the globe ramps up efforts to slow down and adapt to climate change. Climate finance describes capital flows towards climate-resilient initiatives, renewable energy, green infrastructure, and associated adaptation projects. With the 2015 Paris Agreement and increasing global warming concerns, academic and policy attention in this area has risen considerably. The climate finance literature cuts across disciplines environmental economics, public policy, financial markets, and institutions proportional to its multidisciplinary and intricate nature.

Recent bibliometric studies have offered hints of climate finance research evolution and coverage. (Kouwenberg & Zheng, 2023)researched more than 1,300 journal papers and found four general clusters within the literature: climate risk in financial markets, finance of renewable energies, green assets' investor tastes, and green risk pricing strategies. The literature also revealed sustained growth in publishing after the year 2015, representing amplified academic attention following climate policy breakthroughs. Equally, (Deb & Chen, 2024) performed a global map of climate finance literature and observed that the majority of publications came from China, the United States, and the UK. The review by these authors noted the prevalence of such themes as carbon markets, pathways to low-carbon transition, and mobilization challenges of finance for developing nations. Nevertheless, they also noted the lack of representation of the behavioral dimension and the role of individual investors, which this current study fills.

One of the major threads throughout the literature is the examination of financial instruments employed in climate finance, particularly the emergence of green bonds. (Damerow, 2018) examines how green bonds have emerged as a mainstream vehicle, drawing institutional and retail investors alike with transparency and ESG alignment. Other research has assessed how government subsidies, blended finance, and concessional lending reduce investment risk in green industries (Jobst, Andreas & Pazarbasioglu, Ceyla, 2019). Such mechanisms are based on environmental economic theory, according to which climate change mitigation has public good characteristics and therefore, without strategic intervention, markets themselves are not able to address the problem.
Another rich stream of literature examines climate finance from a governance and institutional point of view. (North, 1990) theory of institutions has been instrumental in shaping how policy choice, regulatory consistency, and institutional trust influence flows of finance into climate projects. Empirical evidence indicates that nations with well-established taxonomies of climate finance and clear disclosure standards receive more sustainable investments. Gaps, however, exist in understanding the impact of institutional trust on retail investor engagement, especially in emerging markets such as India.

Several researchers have utilized bibliometric and systematic review methods to reveal thematic and methodological gaps in the literature. (Singh & Jayaram, 2021) reviewed 80 peer-reviewed articles and categorized them into donor-related, recipient-related, and system-wide concerns. They discovered issues associated with transparency of fund disbursements, governance models, and political influences that hinder effective allocation. Most studies, though, relied on secondary data and lacked primary, field-level insights—particularly those based on behavioral dynamics of investors. (Gupta et al., 2021) highlighted that even though

there has been increasing awareness of climate matters, there is sparse empirical evidence about how personal financial capability affects climate investment behavior.

The literature further identifies ongoing challenges such as fragmentation, non-unified climate finance definitions, and inconsistent data for countries. Additionally, the difference between policy solutions and field implementation is large. Consequently, the demand for increased research based on financial innovation (such as green fintech), applications in behavioral finance, and local investigations within weak economies has been highlighted. In addition, the implications of digital platforms and mobile-phone-based investment applications to sustainable finance are being promoted as an issue with increasing potential in developing economies that have increasing pools of new investor groups.

Hypotheses and Literature Support

Hypothesis	Constructs	Proposed Relationship	Justification
H1	Financial Literacy → Participation in Climate Finance	**Positive**	Financially literate individuals are more likely to understand, evaluate, and invest in sustainable financial products. (Atkinson, Adele & Messy, Flore-Anne, 2012; Gupta et al., 2021)
H2	Risk Perception → Participation in Climate Finance	**Negative**	Higher perceived risk, especially in emerging or less-understood financial products like green bonds, reduces investment likelihood.(Tversky & Kahneman, 1974; Umamaheswaran et al., 2024)
H3	Socio-Economic Factors (Income, Age, Education) → Participation	**Significant Influence**	Income, age, and education shape financial attitudes and access, affecting willingness and ability to invest in climate finance. (Atkinson, Adele & Messy, Flore-Anne, 2012)
H4	Institutional Trust → Participation in Climate Finance	**Positive**	Greater trust in financial institutions and regulatory bodies boosts investor confidence, especially in climate-related investments. (Jobst, Andreas & Pazarbasioglu, Ceyla, 2019; North, 1990)

H5a	Financial Capability → Awareness → Participation	**Mediated**	Awareness of sustainable finance options mediates the effect of financial capability on actual investment behavior
H5b	Financial Capability → Access → Participation	**Mediated**	Lack of accessible, retail-level climate investment products hinders participation, even among financially capable investors. (Chhatre et al., 2023)

Research Methodology

Research Design

This research takes a quantitative, cross-sectional design in exploring the interaction between financial capacity and individual investor engagement with climate finance in India. The behavioral nature of research variables like financial literacy, risk perception, institutional trust, and climate finance awareness requires a formal approach that is appropriate for hypothesis testing. This research utilizes Structural Equation Modeling (SEM) to analyze both direct and indirect relations among constructs.

Data Collection

Primary data were gathered through a structured questionnaire developed from tested instruments. Financial literacy questions were taken from the (Atkinson, Adele & Messy, Flore-Anne, 2012), institutional trust questions were taken from (North, 1990), and risk perception was taken from prior climate investment research (Umamaheswaran et al., 2024). The questionnaire had six sections: demographics, financial literacy, risk perception, institutional trust, climate finance awareness, and participation behavior. All the items were quantified on a 5-point Likert scale.

The questionnaires were online administered using Google Forms and sent out through LinkedIn investment communities, WhatsApp investor groups, and mail lists of financial planning platforms. Secondary data relating to RBI reports, SEBI green finance briefs, and global institutions (IMF, World Bank, UNFCCC) assisted with contextualization of results.

Sampling Strategy

The target population includes individual investors in India, such as salaried professionals, self-employed, and first-time retail investors. Stratified purposive sampling method was adopted to obtain a representative sample across industries, age groups, and geographical locations (urban and semi-urban areas). The initial screening questions ensured that financially active participants were included.

The sample was calculated based on Cochran's formula ($Z = 1.96$, $p = 0.5$, $e = 0.05$), where it returned a minimum of 385 respondents. For further robustness and to allow for the applicability of SEM, 500 complete answers were gathered.

Validity and Reliability

A pilot test with 30 participants was carried out to verify the reliability and clarity of the instrument. Cronbach's Alpha coefficients established internal consistency: Financial Literacy ($\alpha = 0.81$), Risk Perception ($\alpha = 0.76$), Institutional Trust ($\alpha = 0.83$), and Awareness ($\alpha = 0.78$). Constructs were peer-reviewed by academic scholars for content validity.

Data Analysis

Data analysis was carried out using SPSS v26 and AMOS v24. Descriptive statistics gave demographic overview, whereas inferential statistics encompassed Pearson correlation and multiple regression analyses. SEM approach allowed simultaneous testing of measurement model (Confirmatory Factor Analysis) and structural model (path analysis). Mediation analysis using Hayes' PROCESS macro was carried out to explore the indirect effect of awareness and access between financial capability and involvement in climate finance.

Results

Descriptive Statistics

500 individual investors were included in the study. The demographic information indicated a gender-balanced sample (52% male, 48% female), where 67% were from urban areas and 33% from semi-urban/rural backgrounds. The age group of 30–45 years (42%) was the biggest, followed by 18–29 years (34%). Education-wise, 72% had a bachelor's degree or higher, and 61% had a monthly income of INR 50,000 or more.

Correlation Matrix

Variable	1	2	3	4	5
1. Financial Literacy	1	-0.26**	0.38**	0.46**	0.42**
2. Risk Perception		1	-0.21**	-0.27**	-0.30**
3. Institutional Trust			1	0.39**	0.36**
4. Awareness				1	0.48**
5. Participation in CF					1

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Regression Analysis

A multiple regression analysis was conducted to test direct effects of the independent variables on participation in climate finance.

Regression Coefficients (Dependent Variable: Participation in Climate Finance)

Predictor	β	t-value	p-value
Financial Literacy	0.31	6.22	<0.001
Risk Perception	-0.19	-4.88	<0.001
Institutional Trust	0.28	5.44	<0.001
Socio-economic Factors	0.17	3.76	<0.01
$R^2 = 0.47$, $F = 41.83$, $p < 0.001$			

The regression model explained 47% of the variance in participation. Financial literacy (β = 0.31) and institutional trust (β = 0.28) were the strongest positive predictors, while risk perception had a significant negative impact (β = -0.19).

Mediation Analysis

With Hayes' PROCESS Model 4, mediation tests were performed for Awareness and Access to Climate Finance between Financial Capability and Participation.
Awareness partially mediated the relationship (indirect effect = 0.12, SE = 0.03, CI [0.07, 0.18])

Access also revealed partial mediation (indirect effect = 0.09, SE = 0.02, CI [0.05, 0.14])
Both mediators were significant at the statistical level ($p < 0.01$), and they suggest that financially able persons are likely to engage in climate finance if they know and can access climate investment products.

Discussions

This research sought to explore the influence of financial capability, risk attitude, institutional trust, and socio-economic factors on individual investor engagement in climate finance in India. The evidence supports strong empirical evidence for the conceptually derived framework

and makes a valuable contribution to the developing debate regarding inclusive climate finance, especially in emerging economies.

The evidence establishes the role of financial literacy as a critical factor in enabling access to climate-favourable investments. This corroborates previous research by (Lusardi & Mitchell, 2014), who highlighted that financial literacy enables people to make assertive, forward-looking financial choices. In the Indian context, where green investment products are still in the process of gaining recognition, financial literacy prepares investors to determine product appropriateness, consider risk, and configure investments according to sustainability priorities. The strong positive correlation between financial literacy and engagement highlights the need for national financial education initiatives on sustainable finance.

Risk perception was also found to be a major deterrent to climate finance engagement. Investors who view green financial products as risky are less likely to invest in them, as supported by behavioral finance theory that highlights the role of perceived uncertainty in decision-making (Tversky & Kahneman, 1974). This is especially so in the emerging economies where climate finance instruments are new and regulatory safeguards might be felt to be insufficient. These observations underscore the importance of risk mitigation measures, such as policy guarantees, de-risking tools, and enhanced risk communication by the financial intermediaries.

Institutional trust also came out as a highly significant determinant of participation. Consistent with institutional theory (North, 1990), the present study confirms that individual investors place significant reliance on the integrity of financial institutions and regulatory agencies in venturing into new financial markets like climate finance. That trust is positively associated with participation in investment implies that open disclosures, ESG certifications, and strong enforcement of green finance rules are critical in securing investor trust. Current fiscal governance concerns in India (for example, energy conglomerate scandals) might have added to the conservatism of certain investors. Hence, building up institutional integrity and increasing transparency will be important in mainstreaming climate finance.

Awareness and access mediation yields qualitative understandings of sustainable investing behavior dynamics. Financial capacity is not enough—investors need to know about climate-aligned financial products and have them be available to them, both in terms of information and investment amounts. These results are consistent with the research of Standard Chartered , which observed high interest but low actual investment in climate finance because of awareness and accessibility issues. This implies an urgent need for focused communication, streamlined product structures, and retail-friendly climate finance platforms.

Notably, socio-economic factors like education and income also proved to be significant, albeit to a lesser degree compared to behavioral factors. This points to the intersectionality of the role of structural and behavioral factors. Although higher-income, more-educated people are likely to participate, behavioral enablers like literacy and trust can also close gaps in participation for lower-income groups if well-assisted.

Conclusion

This research investigated the interaction between financial capacity and individual investor involvement in climate finance in the Indian context, an area that is still under researched given its increasing importance to sustainable development. Employing a quantitative, cross-sectional design and structural equation modeling, the research tested the impact of financial literacy, risk perception, institutional trust, and socio-economic variables on climate finance participation, as well as the mediating roles of awareness and access.

The results identify financial literacy and trust in institutions as strong facilitators of climate-investments, while perception of risk serves as a key disincentive. Further, financially literate and capable investors can still stay out of climate finance unless they have knowledge about climate-aligned products and perceive them to be available and comprehensible. The results further highlight that while structural elements like income and education matter, behavior enablers are instrumental for enabling broad-based investor uptake in sustainable finance.

From a theoretical point of view, the study makes an original contribution to the literature by combining ideas from financial capability theory, institutional trust, and behavioral finance into one comprehensive model of climate finance engagement. From a practical point of view, the results provide important implications for policymakers, financial institutions, and climate investment platforms, especially in customizing strategies for inclusive and accessible green finance for retail investors.

India's aggressive climate goals, such as those set under the National Action Plan on Climate Change (NAPCC), cannot be met without unlocking domestic capital at scale. Individual investors are a largely untapped but very high-potential segment of climate finance mobilization. This report presents a strong argument for investment in financial education, risk-mitigation policy, transparent institutional arrangements, and digitally inclusive investment channels to leverage this engagement.

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