

Green Bond as an Innovative Financial Instrument in the Indian Financial Market: Insights From Systematic Literature Review Approach

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Abstract

As India has set its ambitious target of reaching renewable energy by 2050, it has shown overwhelming interest in Environmental, Social, and Governance (ESG) focused financial products. However, studies on the Indian green bond market are sparse, besides its divergent role in terms of green bond issuance from an emerging market's perspective. This study aims to fill this gap by employing a systematic review of the literature, emphasizing green bond market growth, the limiting factors, and its future development. This review examined papers published between 2010 and 2022. The review demonstrates that the lack of proper framework, high transaction costs, non-labeling of bonds, higher greenwashing, issuers' poor creditworthiness, less government involvement, unattractive sovereign rate, unavailability of financial benefits, and lack of awareness have suppressed the rapid expansion of this market. The study based on its findings suggests effective policy measures with the expectation of the active involvement of multiple stakeholders.

Keywords

climate change, green bond, Environmental, Social, and Governance, financial market, India, Systematic Literature Review

Introduction

The threatening Climate Change (CC) problems across the world necessitated all countries to cope with sustainable initiatives for a green economy. The “Paris Agreement” focused on the drastic reduction of global temperature with the main intention to ameliorate climate risks (UNFCCC, 2015). The “Conference of Parties” (COP) held in Marrakesh stressed climate adaptation and mitigation efforts by deploying various financing mechanisms to reduce emissions (HLCB, S, n.d). The United Nations Development Program’s “Sustainable Development Goals” (SDGs) another agenda threw light on eradicating socio-economic problems through sustainable actions (United Nation, 2015). Moreover, the United Nations Commission on Trade and Development (UNCTAD) estimated the requirement of \$ 5 to 7 trillion to fulfill the targets of SDGs by 2030 (UNCTAD, 2014).

As far as investment needs for various green projects, it has been pointed out that, the developed countries may need \$100 billion between 2020 and 2030, and it is

estimated that a further \$53 trillion is required to invest in individual energy-related projects to keep the temperature rising within 2°C across the globe by 2035 (IEA, 2017). The COP 26 suggested that in response to the serious problems due to CC, the current provision toward climate finance in developing countries is insufficient (COP 26, 2021). However, it has been recommended that green bonds (GB) could be a suitable instrument to align with “Net Zero Emission” (CBI, 2021). In addition, it also noted that GB continued to be issued about 5 trillion dollars annually from 2025 onward. To this, the CBI

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in its “five steps to 5 trillion manifestos” highlighted the foster development of emerging countries’ GB markets to mitigate CC problems (CBI 2022, n.d). The recent COP 27 also stressed the crucial role of GB particularly in developing nations to ameliorate the climate risk (COP27, n.d).

There is a branch of finance called “Sustainable Finance,” which provides a new provision for investing in sustainable development-oriented projects. One of the prominent sustainable investment avenues involves bond financing. It creates a new opportunity in facilitating sustainability and innovative practices. Sustainable finance is a unifying concept that considers the multi-dimensional roles of the world financial system that enables, promotes, and supports achieving global sustainability (S. K. Park, 2020). Sustainable finance has produced innovative and new means of investment mechanisms. The “Green Bond” is one of the prominent examples of such a new sustainable investment tool. The bonds with green features also involve sustainability bonds and social bonds (S. K. Park, 2018). A sustainable bond is a hybrid of GB whose proceeds are employed to derive both social and economic benefits (ICMA, 2018b). A social bond is a bond “whose proceeds are explicitly used for social impact objects.” The green bond has emerged as an effective financing tool for mitigating climate risk problems (MacAskill et al., 2021) due to the need recognition of countries across the globe to combat CC (Kila, 2020).

Though India stands as a major country in terms of GB issuance, the recent GB issuance shows a declining trend due to several reasons. To achieve the nation’s CC targets through the deployment of private fiancé toward CC adaption and mitigation efforts and to attain the country’s paradigm shift toward a low carbon economy, a greater volume of GB issuance in the country is needed. In addition, the understanding of this market on the part of various stakeholders also seems to be inevitable. Therefore, to bridge this gap the present study throws light on the Indian GB market status, its limiting factors, and the future steps as a way forward and thereby, provides a summary overview. To this end, the study aims to address the following research questions:

1. What is the status of the Indian green bond market?
2. What are the factors that limit the development of the green bond market?
3. What could be the future development mechanisms for its faster expansion?

The remaining sections of the paper are framed as follows. The study begins with a literature review of the GB market followed by the methodology employed. The next

sections deal with results and discussion and finally, the study concludes by providing necessary steps to curate future research for the overall development of the GB market.

Background of the GB Market

The growing awareness of sustainable development on the part of ethical investors accelerated a new asset class called “green bond” (Hyun et al., 2020). The advent of GB indicates the trend in the recovery of the global economy through the development of low-carbon technologies to curb carbon emissions (Jin et al., 2020). GB are fixed-income yield securities whose proceeds are ring-fenced for eco-friendly projects (D. Park et al., 2020). The International Capital Market Association (ICMA) defined GB as “any type of bond where the proceeds will be exclusively used to finance or re-finance, in part or in full, new and/or existing eligible green projects” (ICMA, 2017). As per the “Green Bond Principles” (GBP) various projects include “renewable energy, energy efficiency, sustainable waste management, sustainable land use, biodiversity, clean transportation, clean water, green buildings.” The issuer uses the proceeds for projects, the investor receives a fixed amount of interest, and the principal is repaid unless the issuer becomes insolvent (Jin et al., 2020).

Various kinds of green bonds are as follows:

Use-of-Proceeds Bond. This is the first category of green bonds, which is aligned with GBP incorporating the feature of standard debt recourse to the issued obligation (ICMA, 2017).

Green Revenue Bond. A GBP-aligned bond has a feature of non-recourse to the obligation of the debt issuer, whose proceeds need not be fully financed toward green projects. Thus, the proceeds partly or fully are used for related or non-related projects (ICMA, 2017).

Green Project Bond. Investors of such bonds have direct risk exposure with the variation of debt recourse to the issuer which is aligned with the GBP whose proceeds are used either for single or multiple green projects (ICMA, 2017).

Green Securitized Bond. A bond has a feature of collateral by one or more specific green projects which are aligned with GBP. The cash flow of the asset will be the first source of repayment that includes Asset-Backed Securities (ICMA, 2017).

The introduction of the first GB dates back to 2007 where the European Investment Bank issued the GB for

Table 1. List of Sustainable Finance Policies in India.

S. No	Guidelines	Year
1	"CSR, Sustainable Development, Non-financial Reporting, and the Role of Banks"	2007
2	"National Voluntary Guidelines on Environmental, Social, and Economic Responsibility of Business"	2011
3	"Annual Business Responsibility Reporting"	2012
4	"SEBI Infrastructure Investment Trust Regulations"	2014
5	"RBI's National Voluntary Guidelines for Responsible Financing"	2015
6	"SEBI Guidelines for the Issuance and Listing of Green Bonds"	2016
7	"SEBI Disclosure Requirements for the Issuance and Listing of Green Bonds"	2017

Source. Authors' compilation.

the first time in the name of "Climate Awareness Bond" (CAB) followed by the World Bank that has issued the second GB to help countries across the globe by raising capital to create green projects (Tu et al., 2020). Afterward, multiple issuers started to issue GB across the globe (Banga, 2019). Presently, the world GB issuance reached about \$ 2 trillion (CBI 2022, n.d).

Standards of GB Market

A certified GB is defined as "a bond whose proceeds are exclusively earmarked for new and existing green projects which are attached to the environmental benefit and thereby serve as a signaling tool by disseminating reliable information to all investors." It also helps in the identification of potential climate-aligned investment avenues (CBI, 2016; Tolliver et al., 2021). The second party's opinions are imperative in determining the greenness of the bond (Siswantoro, 2018). Furthermore, the element of external review is of great significance in the realm of GB that fuels the GB market as it throws light on the credibility and consistency in disclosing the necessary information vis a-vis GB which is led by the "independent third-party verification" (Simeth, 2022).

Therefore, the labeled GB market is new and continually developing. Presently the green label standards are accounted for two types such as ICMA's "Green Bond Principles" (GBP) popularly termed as voluntary process guidelines (ICMA, 2018b), and the Climate Bonds Initiative's "Green Bond Standards." The voluntary process guidelines are standards that confirm the alignment of GB with the core component of GB principles, such as "certification," "second-party opinion," "green scoring/rating," and "verification" (ICMA (2018a, 2018b)).

Some of the global-level Green Bond Standards are:

1. The Climate Bonds Initiative's "Climate Bonds Standard/Taxonomy."
2. The People's Bank of China and China Securities Regulatory Commission: "The Green Bond Assessment and Verification Guidelines."

3. "The European Union (EU) Green Bond Standards of the EU High-Level Expert Group on Sustainable Finance."
4. "The ASEAN Green Bond Standards."

As policymakers and regulators are on the verge of adopting GB taxonomy to destine their use of proceeds for green projects as a matter of shifting toward a sustainable economy, many countries across the globe are accounted for their tremendous development in terms of GB standards (Initiative, C. B., & Pact, U. K, 2022). In India, the Securities and Exchange Board of India (SEBI) has issued new guidelines on sustainable reporting that made it mandatory for all listed 500 companies to disclose their ESG activities in 2012. Since then, it has mandated all listed companies to follow the guidelines to disseminate information on their sustainability activities (Getvoldsen et al., 2018).

The SEBI has also laid down guidelines on GB issuance and listing under the "Issue and Listing of Debt Securities Regulation Act 2008," which is aligned with a global standard such as the ICMA's "GBP." Similarly, the Corporate Bond and Securities Advisory Committee a meeting of SEBI finalized a draft on the disclosure and monitoring of GB in India (SEBI, 2017). As Asian countries accounted for dedicated platforms for listing SDG bonds, India also established "INX India International Exchange" in 2017 (Prakash & Sethi, 2021). In addition, the country also witnessed its propound policies with the wider financial community on GB (Ngwenya & Simatele, 2020; Table 1).

Literature Review

The unhealthy practices of human beings created the problems of CC. It is worth noting point that the increasing environmental activities caused the problem of pollution which remained unexpected. It is particularly in some regions like India which is expected to grow by around 2.6% between 2016 and 2050 (Bekun et al., 2021). However, there exist scholarly works on economic

activities, and the various mitigating techniques on the environment. It was found that the “Environmental Kuznets Curve” (EKC) technique is a descriptor of a country’s pathway in alignment with its economic growth and development. The study further affirmed this phenomenon in China, Russia, Brazil, Turkey, Mexico, India, and Indonesia (E7 economies). However, it was depicted that renewable energy as the prevention of pollution emissions and weak institutional quality as the deteriorating factors in terms of Environmental Quality (EQ) (Bekun et al., 2021). Fatai Adedoyin et al. (2021) posit that GDP per capita, tourism, and energy are carbon emission drivers in the European Union. The Indian-based study revealed renewable as a panacea for CO₂ emission whereas non-renewable energy, and GDP growth as drivers of CO₂ emission in the country (Bekun, 2022). It was also well documented that economic complexity and trade openness improve EQ whereas, natural resources growth, economic growth, and public-private partnership (PPP) contribute to environmental degradation (Caglar et al., 2022). Bekun et al. (2022) were of the view that GDP growth and non-renewable energy deteriorate the EQ in E7 countries.

However, to ameliorate the climate risks many researchers, academicians, and other market participants showed an overwhelming interest to investigate the new promising markets by delving into the GB market. Pham (2016) conducted the first empirical study on GB volatility and showed higher volatility in the “label GB markets” than in non-label GB. Since then, many studies investigated this segment and exerted the GB as “a risk-alleviating tool” for investors (Gatti & Florio, 2018; Jin et al., 2020; Mensi et al., 2022; Ortolano & Nissi, 2022; Uddin et al., 2022). Other strands of the literature demonstrated the portfolio diversification benefits for various investors (Gianfrate & Peri, 2019; Huynh et al., 2020; Karim & Naeem, 2022; Sohag et al., 2022; Tsagkanos et al., 2022). It has been well documented the stock market’s positive reaction to the GB announcements due to its signaling quality on issuers’ environmentally oriented activities (Bancel & Glavas, 2021; Laborda & Sánchez-Guerra, 2021; Roslen et al., 2017; Wang et al., 2020).

In the mindfulness of “Greenium” (“the yield difference between a conventional bond and GB”), some facets of the literature showed “Greenium” existence in the GB market (Agliardi & Agliardi, 2021; Dorfleitner et al., 2022; Huynh et al., 2022; Lau et al., 2022; MacAskill et al., 2021; Teti et al., 2022). With the severe drawback of the recent pandemic, few studies examined the GB market connectedness with other market forms and depicted it as a suitable investment tool for all investors during abnormal market conditions (Danışoğlu & Güner, 2022).

As in the case of conventional finance theories, sustainable business theories focus on minimizing the externalities with the main moto of maximizing social values for multiple stakeholders by incorporating ESG activities in corporate affairs (Tolliver et al., 2021). To this end, several theories such as stakeholder theory (Freeman, 1994), legitimacy theory (Deegan, 2002), signaling theory (Spence, 1973), and institutional theory (Meyer et al., 1977) have emerged to achieve good sustainable business practices. Accordingly, many researchers adopted these theories to understand the pros and cons of sustainable business for various stakeholders. As the GB has emerged from the mainstream of sustainable finance, it was well observed that the GB is a subject matter of reducing externalities with its ability to catering the appetite of investors, particularly “green mandate investors” (Tang & Zhang, 2020). Flammer (2020) opined that the Corporate GB issuance could be interpreted by adopting the signaling theory. Interestingly, Fernando and Lawrence (2014) integrated the theories of stakeholder, legitimacy, and institutional to provide a single integrated approach for several practices (Tuhkanen & Vulturius, 2022) including the GB issuance as a part of the company’s CSR initiative (Li et al., 2020). Besides the wider theoretical underpinnings, the theorization, and understanding of the GB market particularly at the country level are sparse.

Although India is the major emerging country in GB issuance, there exists a knowledge deficiency about the Indian GB market due to the paucity of literature. As outlined by the studies of Zhang et al. (2019) and Tao et al. (2022) there require further studies on green finance issues and green finance tools, particularly from developing countries’ perspectives. Moreover, the academic work of Kumar et al. (2022) suggested to undertake further research on sustainable finance tools to enhance the understanding among various stakeholders. Therefore, the present study aims to fill this gap by providing a summary overview of the Indian GB market.

Methodology

The review employed a Systematic Literature Review (SLR) method for analysis. This method systematically synthesis all past literature and locate them in alignment with particular research question based on high transparency by maintaining a better quality at each level (MacAskill et al., 2021; Stechemesser & Guenther, 2012). In addition, it also limits bias in any study (Goyal & Kumar, 2021). Therefore, this study followed the same method to synthesize the available past literature (Blanco-mesa et al., n.d.). This review particularly uses the “Scientific Procedures and Rationales for Systematic Literature Reviews” (“SPAR-4-SLR”) criteria due to its

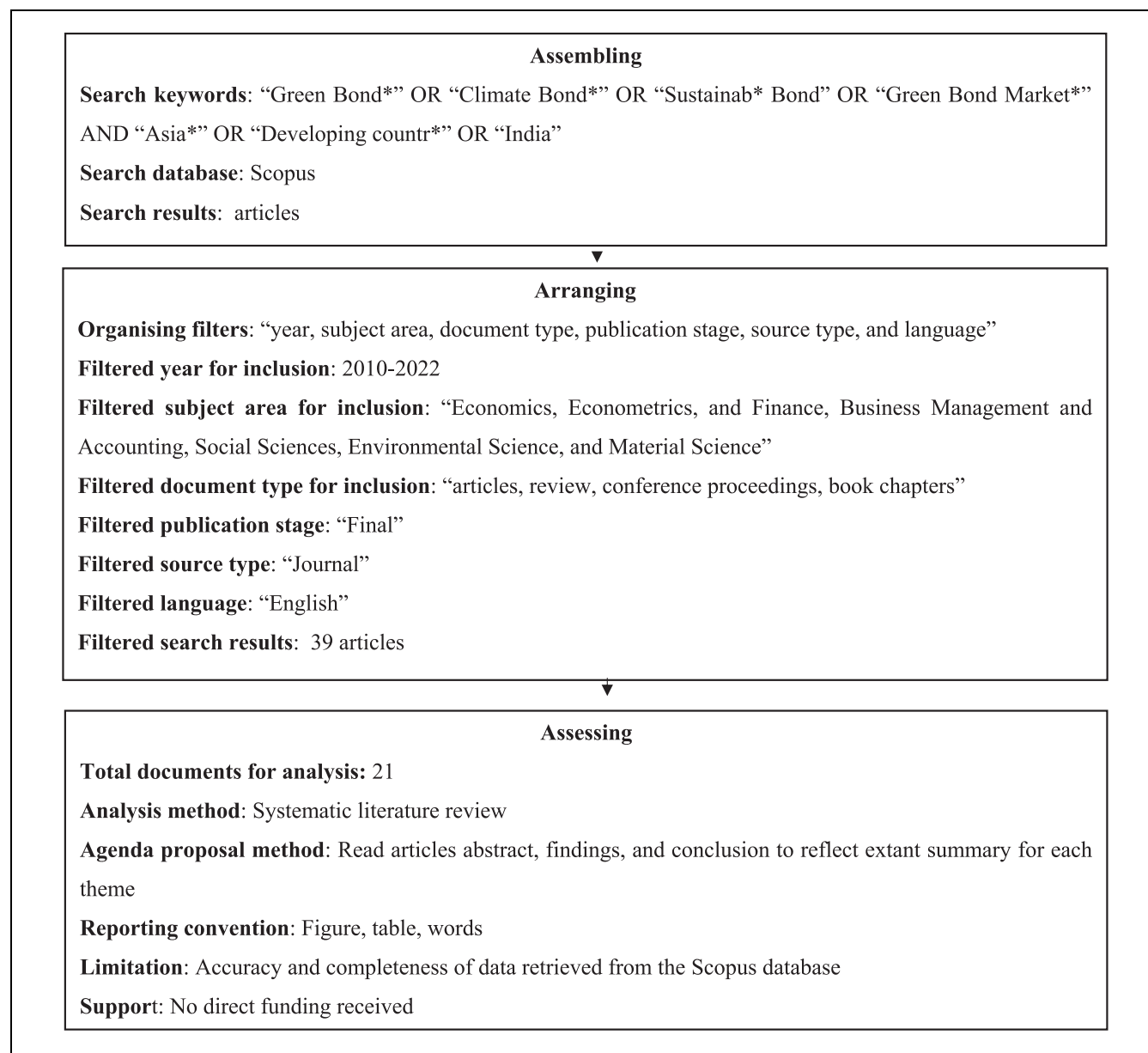


Figure 1. Shows the SPAR-4 SLR Flowchart.

Source. “SPAR-4-SLR” Flowchart.

supreme quality over the “PRISMA Guidelines.” Furthermore, this method adopts three major stages such as “assembling,” “arranging,” and “assessing” in the article process (Paul et al., 2021) which is depicted as follows (Figure 1):

Assembling

To identify all relevant articles on GB, the study reviewed past scholarly works. The review based on the literature of (Argandoña et al., 2022; Mathews, 2011) used the other names of GB such as “climate bond,” and “Sustainable

bond” in a search strategy. Firstly, the keywords of “Green Bond” OR “Green Bond Market” AND “India” were used in the search strategy which resulted in a total of 18 documents. Secondly, “Green Bond” OR “Climate Bond*” OR “sustainabl* bond” OR “Green Bond Market” AND “India” were used which yielded 19 documents. Finally, “Green Bond*” OR “Climate Bond*” OR “Sustainab* Bond” OR “Green Bond Market*” AND “Asia*” OR “Developing countr*” OR “India” were used which yielded a total of 54 documents.

The search strategy was done on 28-10-2022 to retrieve articles, and the search string was followed on a

“title, abstract, and keywords” basis. The Scopus database was preferred to retrieve the studies as this database accounted for a higher-quality scholarly work (Comerio & Strozzi, 2019; Norris & Oppenheim, 2007). Similarly, an alternative database Web of Science was also used which showed a lesser number of articles. Hence, the Scopus database was finalized.

Arranging

To arrange the obtained article, the study applied the “category (code) function” on the Scopus database according to “year, subject, document type, source type, publication stage, and language.” The search strategies were limited to “2022, Economics, Econometrics, Finance, Business Management, Accounting, and Social Sciences, Environmental Science, Material Science, articles, review, conference proceedings, book chapters, final, journal, and English” respectively. However, the studies found between 2010 and 2022 in the database yielded a total of 39 articles.

The gathered data were collected in “MS Excel sheet” form where each article was read with a major focus on “abstract, findings, and conclusion” by two independent researchers which yielded a total of 21 articles for the final review.

Assessing

In the assessing stage, the study applies an SLR method due to its good transparency (Ellegaard & Wallin, 2015). As pointed out by Paul et al. (2021) this method helps in framing a big picture, and thereby, it enhances the proper understanding of any field. Therefore, based on the research purpose, its questions, and target characteristics this paper employs this systematic review as a major method (Haghpour et al., 2022; Table 2).

Results

The Status of the Indian GB Market

As India has set its ambitious target of reaching renewable energy by 2050 and aligned its national program with SDGs, (Prakash & Sethi, 2021) it has shown an overwhelming interest in GB issuance. To this end, the country established its taxonomy to deal with GB issuance (Shideler & Hetzel, n.d.), accordingly, the country started GB issuance. The Yes Bank issued India's first GB in 2015 amounting to Rs. 100 crores. Similarly, the first certified GB was issued internationally from the Indian market by Axis Bank with 500 million U.S. dollars (A. Verma & Agarwal, 2020). Since then, the GB issuance in the economy fueled by various corporates.

With the healthy growth of the Indian economy, the GB of Indian companies such as Yes Bank GB, and EXIM Bank GB have been oversubscribed by several investors across the world (Ng & Tao, 2016) due to investors' priority toward sustainable stocks (Gupta & Jham, n.d.) which shows the inducing demands for country's GB. It has been observed that the Indian GB market is dominated by the banking sector where most of the GB were issued by this sector and only a few companies have issued GB (A. Verma & Agarwal, 2020). Moreover, the market is only observed for the existence of “Use of the Proceeds” GB which shows that all other types of GB have not yet been introduced (A. Verma & Agarwal, 2020). It is likely noted that the GB's proceeds are mainly destined for renewable energy sectors than other sectors in the country. These findings highlight that the other forms of green projects need to be financed by GB. Interestingly, the recent GB issuance in India shows a declining trend from USD 916 million to 3.2 billion (Uddin et al., 2022; Table 3).

Issues Existing in the GB Market

The GB markets particularly in emerging countries are facing several challenges and the Indian GB market is not an exception to this phenomenon. Though GB issuance has started in 2007, during the financial crisis of 2008 it remained a limited topic of interest (Banga, 2019). As in the case of Asian countries, the Indian GB markets have been dominated by banking sectors due to the immature corporate bond market in terms of its depth and liquidity (Prakash & Sethi, 2021; Ray & Bisbey, 2020). Apart from India's stand as the top country in terms of GB issuance among emerging countries, the recent trend delineated a declining trend. Though the countries GB were oversubscribed, the market is lagging behind both developed and developing countries (Prakash & Sethi, 2021) due to several factors which dampen the faster development of this market. Therefore, India's share in GB issuance is negligible compared to world GB issuance. The component of ESG investment has become more popular and investors are giving more focus on these investments, the lack of ESG information disclosure remains a constraint for the country's shifts toward a sustainable paradigm (Tolliver et al., 2021). At the instrumental level, lack of bond rating, high transaction cost, and non-green label (uncertified GB) constrained the market expansion. At the issuer level, the lack of issuers' creditworthiness, the problem of greenwashing (where the companies are pretending to be eco-friendly by disseminating unrealistic information toward ESG disclosure), and non-compliance with third-party verification limited the market development. Also, at the country level, lack of awareness, the lower

Table 2. List of Studies Included in the Review.

S. No	Author	Description	Methodology adopted
1	A. Verma and Agarwal (2020)	The study critically examined all plausible potentials of the GB market and showed certain challenges with future steps as necessary for future development.	Descriptive study
2	Ng and Ta (2016)	The study strongly assessed the potential of three financial tools such as LCY corporate bonds, asset-backed project bonds, and GB. The findings suggested the proper usage of these instruments to fill financing gaps in the Asian region.	Review
3	Gupta and Jham (2021)	The study revealed that Indian investors support the company's sustainable initiative by showing higher interest in green portfolios.	Descriptive analysis, paired t-test, CAPM, Carhart four-factor model
4	Uddin et al. (2022)	The study showed a green-to-black bond connectedness in the long run with fast and stronger recovery. It also found the long-term influence of bonds than in the short run.	ARCH, IGARCH, GJR-GARCH, TGARCH, Vector Auto Regressive
5	Banga (2019)	The study demonstrated that institutional and market factors, particularly in developing countries, hampered the GB market development	Theoretical approach
6	Ray and Bisbey (2020)	The study showed that emerging countries are beginners in playing infrastructure financing	Theoretical approach
7	Prakash and Sethi (2022)	The study presented major avenues for green project financing and highlighted the development of the financial market with the existence of an effective policy framework	Review
8	Prakash and Sethi (2021)	The study suggested that the availability of information, reduction of distortions, and avoidance of unnecessary regulatory restrictions help to deploy private finance toward sustainable activities	Case study Approach
9	Tolliver et al. (2021)	The Asian-based study revealed that the lack of financing avenues is conducive to CC mitigation efforts. Also, the lack of ESG information disclosure, particularly in India constrained the sustainable growth paradigm	Theoretical approach
10	Prajapati et al. (2021)	The study showed that ESG criteria, credit ratings, increased awareness, and financial incentives are given priority on the part of individual retail investors	Multinomial logistic regression
11	R. K. Verma and Bansal (2023)	The study proved that the stock market reacts favorably to GB issuance in the Indian financial market.	Event study
12	Lukšić et al. (2022)	The study opines that ESG-oriented bonds and debt for climate swap instruments are suitable tools to finance SDGs, particularly in the Western Balkans six countries such as EU Montenegro, Serbia, North Macedonia, Bosnia and Herzegovina, and Albania.	Theoretical approach
13	Bhatnagar and Sharma (2022)	The study opines that GB has a high potential to grow in the Indian financial markets, but the markets are less developed due to lower credit ratings	SWOT Analysis
14	Sarma and Roy (2021)	The study was intended to explore the present scenario of green finance instruments in India, and it revealed that the country accounted for only 8 types of such green finance instruments among 18 green finance tools	Review

(continued)

Table 2. (continued)

S. No	Author	Description	Methodology adopted
15	Pereira (2021)	The study argues that there is less scope for promised innovation in green assessment. It also found private capital as a major source of finance for infrastructures in emerging and least-developed countries.	Mixed approach
16	Sarkar and Sheth (2022)	The study introduced a sustainable (PPP) model for the bus rapid transit system in India with the inclusion of a GB as a financing avenue and considered this instrument feasible for the country	Case study Approach
17	Dash (2021)	The study contended that though the companies in India had issued bonds to use their proceeds toward green projects, they remained non-green in the market due to the absence of green labels in the bonds.	Case study
18	Versal and Sholoiko (2022)	The study showed that green projects are funded through World Bank and European Bank for Reconstruction and Development (EBRD) GB particularly in China, India, Turkey, Egypt, and Poland with the main intention to achieve green transition in the economies.	Structural analysis, Trend analysis, Descriptive analysis
19	Ngwenya and Simatele (2020)	They found that there requires policy framework to enhance the GB market growth in Africa	Case study
20	Taghizadeh-Hesary et al. (2021)	The study revealed that Asian GB markets are dominated by banking sectors by about 60%. It also revealed that these bonds accounted for higher returns with higher risks	Ordinary Least Square, Generalized Least Square
21	Yamahaki et al. (2020)	The study found the existence of structural and specific barriers in Brazil in exploring the growth of the GB market. It also highlights similar obstacles and their tackling for the growth of GB markets in other developing economies	Qualitative approach

sovereign rate, and the unavailability of financial benefits such as tax incentives have lessened the development (Prajapati et al., 2021; Uddin et al., 2022; A. Verma & Agarwal, 2020; R. K. Verma & Bansal, 2023). Bhatnagar and Sharma (2022) were of the view that there is high potential for GB in the domestic market, but the low credit rating is suppressing its development. Prakash & Sethi, 2(022) opined that a lack of liquid, deep, and well-functioning bond market hampers the deployment of private finance. As Indian green finance is in the nascent stage, the country is lacking in introducing varieties of green finance instruments and it accounts only for eight kinds of green finance products among 18 other instruments available across the globe (Sarma & Roy, 2021). As outlined by Pereira (2021) there is limited scope for a promised innovation in a country in terms of project assessment and private capital due to the prioritization of infrastructure for achieving development. One of the critics is that many Indian companies had already issued regular bonds without labeling them as green though their proceeds were destined for green projects (Dash,

2021). Talking about the regulatory norms, even though India has established a separate policy called “Issuance and Listing of Debt Securities” by SEBI, there is a lack of consistent regulatory participation as these guidelines apply only to publicly listed firms. Furthermore, green standards are still developing compared to other economies. Hence, it needs to be more attractive with proper provisions for effective issuance and monitoring guidelines to make all stakeholders active participants in this market segment.

Way Forward for Green Bond Market

With increasing serious threats of CC, financing of green projects became inevitable. India as one of the largest emitters of CO₂ in the world (Versal & Sholoiko, 2022) has pledged a target of achieving a “Zero carbon economy.” Following the SDG targets country has also shown overwhelming interest in the issuance of GB issuance as a part of sustainable investment. Thus, GB is demonstrated as a better financing mechanism to meet

Table 3. List of Indian Green Bond Issuers and Their Project Allocation.

Issuer	Renewable Energy	Energy Efficiency	Low Carbon Transportation	Green Buildings	Sustainable Water management	Sustainable waste management	Energy Sector Technologies	Sustainable Land Use
Hero Future energies	Yes							
Axis Bank	Yes		Yes	Yes				
NTPC Ltd.	Yes							
Renew Power	Yes							
Rural Electrification	Yes	Yes						
Indian Renewable Energy Development Authority	Yes							
Power Finance Corporation								
State Bank of India	Yes	Yes	Yes	Yes		Yes		
Azure Power	Yes		Yes					
Soft Bank Energy	Yes							
Adani Green Energy	Yes							
Jain International Irrigation					Yes			
JSW Hydro Energy Ltd	Yes							
Yes Bank	Yes							
Export-Import Bank	Yes							
India Green Energy Holdings	Yes		Yes					
Ghaziabad Municipal Nigam Ltd								
Punjab National Bank				Yes	Yes			
IL and FS	Yes							
Greenko Investment Company	Yes							
L & T Finance Ltd.	Yes							
Energy Efficiency Services Ltd.		Yes						
CLP	Yes							
Industrial Development Bank	Yes	Yes	Yes		Yes		Yes	
Vector Green Energy	Yes							
India Cleantech Energy	Yes							
Indian Railway Finance Corporation			Yes					

Source: Bloomberg, Climate Bond Initiative.

the SDG targets in the country. Though there is great potential for the development of the country's GB market with a stronger willingness of foreign capital to invest in Indian GB (Uddin et al., 2022) only a limited number of issuers issued the GB in a country.

Despite of country's own GB principles and guidelines on GB issuance and monitoring, due to low awareness among all stakeholders, the country's GB is required to be monitored and standardized effectively to provide a definition of a GB and what actually constitutes it as green. The practice of Greenwashing as stands the barrier to this development, the proper dissemination of all information to various parties is highly needed (A. Verma & Agarwal, 2020), and the policy framework on green projects at the country level is also required to be framed systematically (Prakash & Sethi, 2021) so that the existing and potential ESG seeking investors can get attracted to India's GB. With the strong relationship between stock market return and GB issuance, one can understand that GB issuance increases the share of wealth for investors as well as the market value for issuing firms (R. K. Verma & Bansal, 2023). It is evident to note that as "the-use-of-proceeds" of GB is ring-fenced to various green projects, it enhances issuers' reputations with their increased commitments toward ESG activities as well as provides issuers to access various investors (Ray & Bisbey, 2020), and thereby the greater volume of GB issuance is expected soon.

It is worth noting that, India is the first country that made CSR mandatory in the world by laying down guidelines on CSR spending but only a few companies have shown their interest in ESG-focused financial products such as GB. To allocate funds toward green projects not only the energy sectors are given importance but also other major green projects such as green buildings, clean transportation, electric vehicle, and water waste management must be given priority which in turn helps the country in hastening the achievements as a part of various international level accords taken by the country such as the International Solar Alliance, COP 26, Paris Accord.

Nevertheless, the concern about the future developments of the world GB market, the domestic market remains nascent due to the inactive participation of the government in making the GB market an effective market (Ngwenya & Simatele, 2020). It has been pointed out that by and large GB issuance are far to reach in developing economies which require a comprehensive and holistic approach in terms of policy framework to attract capital toward sustainable finance where the development of sovereign GB is needed with the active role of private enterprises (Lukšić et al., 2022). With the recent upsurge in global sovereign GB issuance, developing countries need to be involved in this movement (Ray & Bisbey, 2020) particularly, the Indian Government needs

to be actively involved to develop the GB market effectively by issuing a greater volume of sovereign GB in the country. Despite the existence of various types of GB in the world, such as sovereign, municipal, corporate, and supranational, the country accounts only for corporate GB with a limited number of issuers, and the future Indian GB market needs to be witnessed multiple types of GB with the active role Agencies, Municipal corporations, giant companies, and many more.

The scholarly works on GB have shown that the proper matching of incentives between issuers and investors is driving the GB market, the similar observations are also found in the country. There is a provision for tax-free green bonds for sustainable transport for Indian cities in the PPP model as proposed by Sarkar and Sheth (2022), more such benefits need to be offered to attract both potential and existing investors. In order to make GB more attractive in the future, proper incentives, tax benefits, and liberalization of carbon tax provisions need to be effectively availed to all stakeholders.

Discussion

This research analyzes the Indian GB market with three key elements such as its status, its limiting factors, and future development. The research question concerned with the growth of the GB market has put forth several interesting facts. Taghizadeh-Hesary et al. (2021) opined that the Asian GB market is dominated by banking sectors, and similar observations were found in the Indian GB market due to a highly revealed preference for banking sectors. Following the CC adaptation and mitigation techniques, the sector of renewable energy among other green project sectors was given priority in deploying the bond use proceeds with the major objective of cleaner production of renewable energy. One of the noted facts is that on the demand side, there is a huge demand for Indian GB not only in the domestic market but also in the overseas market, which could be understood by the introduction of INX India International exchange in India in 2017 (A. Verma & Agarwal, 2020). Despite investors increased demand for the country's GB, the recent issuance volume shows a declining trend. Though the GB issuance in the country is growing as compared to other economies, only the energy sectors and banking sectors have issued the GB in the country which necessitates other bodies such as corporates, government, agencies, and municipal corporations to issue GB in the country for rapid expansion of this market. To align with the country's transition toward a green economy, the GB market needs to be witnessed for GB issuance with a greater volume. These trends and the development of the GB market in the country context were used to address the first research question.

The second question concerning the limiting factors in the development of the GB market showed several limiting factors existing in this market. Based on past studies, it was observed that multiple factors are hindering the rapid expansion of this market at various levels. The lack of a proper framework, small issue size, high transaction cost, and lack of bond rating made GB less attractive due to which the growth has been suppressed. These findings are in tandem with Banga (2019) who found similar observations in developing countries' GB markets. The other factor attached to the issuers includes lack of creditworthiness, non-compliance with a green label, and increased greenwashing constraining the rapid expansion of this market. Further, the lack of ESG information disclosure remains a constraint for the country's shifts toward a sustainable paradigm. This observation is in line with Tolliver et al. (2021) who showed that as the component of ESG investment has become more popular, investors are giving more focus on these investments. The study also opined that companies in Japan, China, and South Korea are disseminating this information, but the Indian firms are lacking. Furthermore, the lower sovereign rating, and lack of proper integration between public and private also slowdown the expansion of this market (Bhatnagar & Sharma, 2022; Prajapati et al., 2021; A. Verma & Agarwal, 2020; R. K. Verma & Bansal, 2023). Overall, these findings are in line with (Yamahaki et al., 2020) who revealed that the growth of the Brazilian GB market suppressing due to structural and specific barriers. In addition, it further revealed that these factors are also hindering the growth of developing countries' GB markets. Hence, it was observed that the GB market in India lags due to the presence of these multiple factors. Therefore, these findings are reasonable to answer the second research question.

The third and last research question as a remedy for future development provides several steps as a way forward. There is huge potential for the greater development of the Indian GB market due to domestic investors' interest in sustainable stocks (Gupta & Jham, n.d.) and also, due to the stronger willingness of foreign capital investments in GB (Uddin et al., 2022). The practice of greenwashing as a severe threat to this market, proper dissemination of information, particularly about issuers' sustainable initiatives to all stakeholders should be provided to rule out this from the market. As there is a knowledge deficiency among various market participants about GB, a strong policy framework needs to be formulated. In pertinent to attract a large number of investors, certain financial benefits such as a tax-free bond or tax exemption, and provision for carbon tax must be offered. The government, as the main stakeholder in this market, the proper arrangements must be made either through a PPP or through sovereign GB issuance. Furthermore,

the GB market must be administered properly and effectively by laying down an adequate policy framework with the prime role of regulatory authorities. Hence, these necessary future steps as a way forward are reasonable to answer the third research question.

Conclusion and Implications

The problem of CC has started to threaten all countries irrespective of their geographic region which led to the introduction of green financing instruments as a matter of solution. This introduction has become inevitable for countries across the globe, particularly countries like India. As was observed earlier, the potential for a green finance mechanism particularly GB in the country is high. India, being one of the major economies in the world, its role in terms of sustainable investment to align SDG targets, and to achieve the objective of a low carbon economy is in great demand for the decade. Given the paucity of scholarly works on the Indian GB market, the present study synthesizes past literature through SLR evidence. Akin to this, the review provides the status of the Indian GB market, its major limiting factors, and future development as a way forward.

In line with the literature on the GB market, it has been contended that the domestic GB market has paramount importance due to its own pace among emerging countries' GB market. It is evident to note that the recent Indian GB issuance delineates a declining trend than earlier. It also demonstrated the active participation of banking sectors in terms of bond issuance and the greater demands for the country's bonds in both domestic and international markets. However, the stake of the whole bond market is depicted as insufficient due to the smaller number of issuers to date. Notably, the study also corroborated the idea that there is high potential for the country's bond market due to huge ESG-seeking investors' demand.

Despite, the current status of the domestic GB market, the review highlights some of the existing factors which dampen the expansion of this market. The review reveals a lack of proper framework, less issuance size, high transaction, lack of bond rating, high transaction cost, and non-green label as limiting factors at the instrumental level. It also shows the issuers' poor creditworthiness, non-green labels, and greenwashing as the major barriers to this market development. Furthermore, it highlights less awareness about GB, lower sovereign rate, unavailability of tax benefits, lower involvement of the country, and lack of public-private participation as the major obstacles to GB market expansion.

As a part of GB market future development, the study also provides necessary steps as a way forward. While framing the policy of sustainable debt financing, the

necessary provisions on a performance basis within the legal framework are to be made available to ensure positive social, and environmental externalities from the investment. To attract domestic as well as foreign investors certain financial benefits, such as tax advantages, green recognition, interest discounts, and carbon trading provisions should be made available in the future for the organic development of this market. It should also highlight the green attributes of GB by labeling the bond as green with standard GB certification bodies such as CBI. As a result, it increases the credibility, and greenness of the bond, and it also improves the issuers' image due to their commitment to sustainable activities. It also requires policy implementations at a country level in terms of ease of the GB issuance, and its investment process to increase the efficiency of existing and future GB in the country. In addition, proper funding arrangements from various international financial institutions through GB issuance in the country as in the case of Versal & Sholoiko (2022) who showed a great contribution in terms of funding facilities by supranational for a country like Turkey to achieve sustainable development, must be made available.

As a part of policy measures and practical implications the review, however, sheds light on necessary actions and suggests certain measures which could help to deploy finance toward low carbon investment. The potential measures include proper coordination between higher authorities such as a ministry of finance, environmental safety bodies, energy sectors, and other bodies to obtain capital with the proper institutional and regulatory framework. The regulators are required to play a pivotal role in terms of strategy formulation and its adoption on GB issuance and as well as its timely disclosure of impact reports. It also suggests the major market participants comply with sound taxonomy in relation to GB issuance with suitable green criteria. There is further room for policymakers to assure high transparency, and credibility for investors, and issuers from GB issuance. In turn, this will strongly induce all government bodies, local agencies, giant companies, and municipal corporations, to issue a huge number of GB in the country. Following the study insights in terms of findings, and policy measures, this review guides all stakeholders to take further steps in the GB realm and thereby creates a huge plausible impact in this field.

Limitations

The study by employing SLR methodology provides a summary overview of Indian GB markets and thereby contributes to the existing body of knowledge. However, the study is not free from limitations. First, the study used Scopus as a major database. Second, the review is

based on articles published in the English language only. Given the limited knowledge in this domain, more studies based on a qualitative approach such as a case study approach, in-depth interviews of major market participants, content analysis of available GB reports, and focus group discussion could be encouraged to get new insights into this market. As there is a scarcity of data on GB in the country, based on their availability in the future, the research could be done empirically to investigate into country's GB market in terms of bond yield, volatility, and its connectedness with other forms of markets. Further, this study casts light on the Indian GB market only. It is highly encouraged to carry out country-specific as well as comparative studies in this domain with a major focus on emerging countries' GB to understand the status of this market with the main intent to keep pace with the global GB market. As the knowledge of GB grows, it will continue to prove itself as a new promising market to achieve SDGs and transform the nation toward a green economy.




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