Green Finance: Trends and Challenges in India

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Abstract
Climate change has emerged as the defining political and economic problem of this century and future time. Governments, investors, business organizations and private individuals worldwide have started to take action in response to the climate issues, especially on decarbonization techniques. Moving to a low-carbon economy would need extraordinary levels of fresh capital investment, especially in the form of green financing, to support activities that cut GHG emissions and assist firms in adapting to the effects of climate change. It plays an important role in linking economic growth, environmental growth and financial system with each other. Public and private sector organizations both contributes in green financing projects. Hence, it becomes important to understand what is green finance and how does it matter. Present paper is an attempt to understand the rationale of green financing, its trends and various challenges faced by Indian economy.

Keywords: Green Finance, Green Bonds, Environmentally Sustainable, Climate Change

Section I Introduction

Green finance refers to financial investments in projects which are of having economic, social, and environmental value that contributes to more sustainable economy. It is any structured financial activity – a product or service – that is created to ensure a better environmental outcome. It includes an array of loans, debt mechanisms and investments that are used to encourage the development of green projects or minimize the impact of regular projects on the climate or a combination of both. Green finance is a loan or investment that promotes environmentally-positive activities, such as the purchase of ecologically-friendly goods and services or the construction of green infrastructure.

Lindenberg (2014) defines green finance as the financing of public and private green investments. Ozili (2021) defines green finance as the financing of projects that yield economic benefits while promoting a sustainable environment. Wang and Zhi (2016) define green finance as finance that integrates environmental protection with economic profits. Lindenberg (2014) shows that green finance encompasses all investments in environmental goods and services, and investment in activities that reduce damage to the environment and the climate. Also, in public policy, green finance involves the financing of public policies that encourage the implementation of environment protection projects or environment damage mitigation projects and initiatives. Bahl (2012) defines green finance as the financing of environment-friendly activities, green technology and projects that reduce pollution.

Green finance includes a variety of products and instruments. A 'traditional' financial product, service or instrument can be made 'green' if the product, service or

instrument is used to raise funds that will be spent on environmentally-friendly investments, projects or activities (Li et al, 2018). Examples include: a loan issued at low interest rates to plant trees in some communities, syndicated loans to finance cross-border green projects, green mortgage loans, solar energy financing, and clean air auto loan products. Green instruments are instruments used to raise funds for green projects. The literature documents some examples of green finance instruments such as: green bonds, structured green funds, carbon market instruments, community-based green funds, green bond grant scheme, international climate fund, green venture capital and green venture fund etc. In nutshell, green finance consists of financial instruments and institutions-green banks, green bonds and green funds that are involved in development of eco-friendly products and projects.

As the hazards connected to ecologically destructive products and services rise, green finance is becoming a mainstream phenomenon. Sustainable development is a very challenging task to achieve in alignment with economic growth globally. Climate change is the greater threat to the environment due to excessive use of fossil fuels. The temperature of our planet is likely to increase which will prove harmful to human health, food production and different communities. Many countries have started to be cautious about this issue and follow the path to achieve sustainable development by making investment in green projects. Though this investment is not much profitable but considered as Corporate Social Responsibility to protect the environment from pollution that is hazardous to human health. In order to achieve these objectives, policies on green financing have been formed in various countries involving various stakeholders- Central banks, governments, and corporations.

In many countries, public sector has not been able to afford such projects having long-term investments and private sector has always been unwilling to invest because of the risk associated with the projects and lower rate of return. The funding of green projects in the economy is dependent upon- Domestic public finance, international finance, and private sector finance.

The renewable energy sector in India is owned by private sector unlike conventional energy sources where two-third of ownership rests with central government. Financing of green projects becomes challenging due to uncertainness of private sector. Green financing in projects is not only helping in reducing carbon emissions and pollution but also helps in fostering energy sources which helps in achieving sustainable development goals in the country.

According to World Economic Forum, Investment in green infrastructure is projected to be $5 trillion per year until 2030 and more investment is required in developing countries. India will also require green finance of about $4.5 trillion by 2040 which is projected to be used in renewable energy sources, electric vehicles and green housing. UN environment has been working with different countries financial system to achieve sustainable development by 2030. To achieve economic development, India also needs a green finance strategy to prioritize environmentally friendly projects. It requires green infrastructure funding of about $4.5 trillion by 2040 (Kaur, 2024). Sustainable financing acknowledges the worth of the environment and its natural capital and improve the well-being of the society while it helps in reducing risks of environment-carbon emissions and maintain ecological balance.

Section II Literature Review

Green finance is emerging as an important investment avenue and contributes to environmental growth. Many research studies have been conducted on this concept. Soundarrajan and Nagarajan (2016) study the concept of green finance and its validity as feasible in the Indian industries for balancing the ecological depreciation due to the assimilation of carbon gases in atmosphere. Green Finance is a market-based investing or lending program that factors environmental impact into risk assessment, or utilizing environmental incentives to drive business decisions. The study discusses the recent trends and the future opportunities and challenges in green finance in the emerging India. Green investing recognizes the value of the environment and its natural capital and also seeks to improve the human well-being and social equity while reducing environmental risks and improving the ecological integrity.

UN environment inquiry paper (2017) studies the role of Central banks in enhancing green finance conducting a review highlighting the extent to which environmental factors effect on Central banks conventional goals. This study explored the ways in which central banks took investment decisions and allocation of credit and the challenges faced. It is found that central bank is a powerful tool to enhance investment in green projects.

Jha and Bakhshi (2019) study the green financing initiatives by public and private sector banks and non-banking institutions. Commitments made by different institutions for renewable energy projects were reviewed. Challenges associated with green financing have been discussed.

Another study by Ranjan, Abhishek (2021) identifies the best practices followed across the globe for green finance promotion- International best practices, as climate change is and agenda at G20. The focus has been on Circular Carbon Economy to deal with harmful emissions, to promote funding for sustainable development across the globe, directed and concessional lending, micro and macro prudential regulations for financial and non-financial institutions. Public policy in India initiatives include-Green lending, Green bonds and improvement in general awareness.

Sushma (2021) studies different aspects of Green Banking, Green Insurance, and Green Bonds as a part of Green Financing. The study also evaluates the opportunities and challenges for Green Finance in developing countries like India and attempts to give new insight about Green Finance as an effective tool of Sustainability**.** The researcher emphasized the need for proper regulatory framework to evaluate the green projects and to ensure that investors are not cheated in the label of green. India being a developing country should concentrate on renewable energy generation, protecting natural resources, efficient energy management, climate adoption, and other ecological issues with the help of green financing. The researcher is hopeful that Green finance if properly managed can work as an effective tool for sustainable development.

Ansari and Anand (2022) are of the view that financing of environment friendly projects has been a challenging task for an Indian economy especially financing the production of renewable energy. The study discusses various initiatives taken- Ministry of New and renewable energy is formed. In the dimension of Renewable Energy financing-accelerated depreciation, viability gap funding and Generation based initiative, Priority sector lending recognition for green financing projects. Green banks, Green loans, soft loans from IREDA. The study also highlighting the challenges- high cost of debt, disclosure

requirements, lack of framework, green washing.

Rathod and Thobhani (2023) analyze the recent trends and the future prospects of development of green finance in India. The study discusses various sources of green finance called green finance instruments such as green bonds, green banks, carbon financing. The researchers emphasised the need to make people aware about the importance of green financing.

Another study by Kaur (2024) discusses the role of Indian banks and organizations of public and private sector in implementation of green finance. The various obstacles faced in green financing-Investor's ignorance, market risk faced by financial instruments, expense of debt financing and offers various suggestions to overcome these obstacles. This review shows the relation between climate change and risk management and effect of environmental factors on financial decision making. This study also discusses how investors accept low returns in exchange for getting advantage of environment protection.

Section III Rationale of Green Financing

Green finance delivers economic and environmental advantages to everybody. It broadens access to environmentally-friendly goods and services for individuals and enterprises, equalizing the transition to a low-carbon society, resulting in more socially inclusive growth. This results in a 'great green multiplier' effect in which both the economy and the environment gain, making it a win-win situation for everyone.

Green Finance ensure economic development: The green finance bridges the gap of conventional financial system, where profitable projects are financed. This investment option is although less profitable but it contributes in the growth of economy in alignment with the protection of the environment. Green projects utilize alternative sources of energy and technology. It will conserve the natural resources and hence promote economic development.

Green Finance and Innovation: The most beneficial effect of sustainable finance is as it increases the innovation potential of different enterprises by switching to green or eco-friendly production which helps in sustainable development of an economy and take good care of the organization's financial objectives. Research and development take place considering the environmental factors and long-term benefits for an organization and economy.

Wider Technology Diffusion: Investment in eco-friendly technology like clean energy will bring down its costs and will ensure its wider diffusion. The country can leap ahead in terms of eco-efficient infrastructure which will ensure better management of resources and increase its competitiveness at the global level.

Reduction in hazardous emissions: As green finance helps in developing green projects or products, carbon emissions which leads to environmental pollution starts to come down. In the long run, sustainable economic development increase with the decreased carbon emissions.

Increases value of an entity: Green finance adds value to the portfolio of businesses, organizations, and corporations by publicizing their involvement in green finance. Green projects attract environment friendly investors and clients towards the organization.

Section IV Trends and Challenges in Green Finance

India has started focusing on green finance as early as 2007. In 2008, The National Action Plan on Climate Change (NAPCC) was formulated with the broad policy framework for mitigating the impact of climate change. The

Climate Change Finance Unit (CCFU) was formed in 2011 within the Ministry of Finance as a coordinating agency for the various institutions responsible for green finance in India. These investments have reduced the climate change and having good impact on environment. The Reserve Bank has also been taking various policy measures to promote green financing. RBI included the small renewable energy sector under its Priority Sector Lending (PSL) scheme in 2015. Under this scheme, firms in renewable energy sector are eligible for loans upto Rs.30 crore while the households are eligible for loans up to Rs. 10 lakhs for investing into renewable energy. In September 2019, India announced a target to reach 450 GW of renewable energy generation by 2030.Green finance has increased by 150% from 2017-18 to 2019-20. Government has launched various schemes for increasing investments in clean energy, clean transportation and energy efficiency. One such initiative is the Pradhan Mantri Kisan Urja Suraksha evam Utthaan Mahabhiyaan (PM-KUSUM) scheme, launched in 2019, which promotes solar energy in the agriculture sector, enhancing energy security and additional avenues of income for farmers. The program subsidizes the installation of solar-powered water pumps, converting existing grid-connected pumps to solar, and the setting up of small solar power plants (up to 2 MW) on farms. Launched in 2014 and extended until 2026 (MNRE 2023), the Scheme for Development of Solar Parks and Ultra Mega Solar Power Projects aimed to add 40 GW (MNRE 2024) of solar capacity. In the Budget 2024-25, the government announced a slew of measures for the promotion of renewable energy, including initiatives such as the PM Surya Ghar Muft Bijli Yojana for promoting solar rooftop energy for households.

In India, many public sector and private sector banks have started funding for the renewable energy projects. Bank of Baroda and Canara Bank have launched schemes for Small Medium Enterprises for purchase of equipment and services for promoting energy conservation. SBI has launched Green Home Loan scheme to support environment friendly residential projects. The scheme offers concessions in interest rates and zero processing fees for projects rated by Indian Green Building Council. The SBI also uses wind mill energy for its offices in Tamil Nadu, Gujarat, and Maharashtra. Yes, bank identifies Green Bonds for improving India as a green economy. In 2015, Yes bank issued first green bond to invest in renewable energy sector. Green projects received green finance through bonds expected to generate 2.35 MWh of electricity. Issuance of green bonds stood at USD 7.15 billion between 2015 to 2018. IndusInd Bank has initiated Green Office project in which Solar powered ATMs in different cities are installed to save energy reduce carbon emissions. ICICI bank assists various projects that contribute to the reduction of the GHG emissions and financing clean technologies. The Yes Bank supports South Asia Clean Energy Fund and the Tatva Investment Program. IDBI bank is leading in the segment of environmental banking. The bank has created an exclusive group working on the climate change. This group has devised a structured product for providing upfront finance against the carbon credit receivables. As a leading development financial institution engaged in the promotion, financing and development of the Indian MSMEs, the SIDBI has supported in the area of sustainable development of the MSME sector. The bank has so far provided support to more than 2000 MSMEs with the assistance of more than Rs.800 crore for the cleaner production and energy saving investments.

RIL has contributed to develop green projects. They have a goal to become net carbon zero by 2035. In 2021, RIL have its green finance by raising green loan of $736 million. RIL is

making investment over USD 10 billion for building ecosystem for New energy in India for clean and affordable energy solutions. For renewable energy business RIL has invested Rs. 150 billion and has the goal to build solar capacity of 100GW by 2030. Adani group started their green financing in 2021 for all green financial instruments-green bonds, loans for renewable energy projects. Equity investors through private equity and venture capital participating in green financing. Green banks are explored for clean energy. It was initiated by formation of first Green Bank Indian Renewable Energy Development Agency (IREDA) in 2016. Multilateral and international organizations also support green financing in India.

As per the environment ministry, to fulfill the environmental objectives, India will require on an average Rs. 162.5 trillion (USD 2.5 trillion) annually over the period of 2015-2030 as per India's NDC 2015 targets. Out of this, for green foundation in the years 2021-2026, USD 280 billion is required. Green finance is required for two main purposes: firstly, for mitigation which includes clean energy, clean transportation, and energy efficiency, secondly, for adaptation which includes disaster risk management, flood and cyclone mitigation, drought management and interventions in the agricultural sector. Estimates suggest that for adaptation-related interventions, India's cumulative investment needs are at least Rs. 85.6 trillion (USD 1 trillion) for the period 2015 to 2030. The tracked green finance for mitigation sectors in 2021-22, increased to Rs. 3,712 billion (USD 50 billion) per annum from Rs. 3,094 billion (USD 44 billion) in 2019-20. This is a significant step up from 2019-20, especially in the context of the economic disruption due to the COVID-19 pandemic. Private sector flows, both domestic and international, dominated green finance for mitigation sectors. However, much more needs to be done as the current tracked green finance for mitigation in India represents only approximately 30% (up from 25% in 2019-20) of the total investment needs just to meet the NDC goals. For adaptation-related sectors, tracked green finance increased to Rs.1,092 billion (USD 15 billion) in 2021-22 from Rs. 369 billion (USD 5 billion) in 2019-20. However, as the investment required for adaptation is large and likely to increase in the future, there is a need to scale up funding for adaptation considerably.

Challenges of Green Finance

Financing of environmentally sustainable projects and initiatives comes with various challenges-

Market Risk: Environmental externalities continue to distort market prices of energy sector. Investments in green energy projects will yield low return on investment because green finance markets are small in size and lack liquidity.

High cost of debt: Investment in green projects become expensive due to high cost of debt capital. The cost of issuing green bonds is generally higher than issuing other bonds. Moreover, green projects with short durations are not very attractive for investors.

Competitive objective: Green finance investment is affected by different objectives of the investors. Private investors aim to maximize the profits and growth of their investment while public investors who provide green finance want to improve the environmental conditions as their social responsibility. Policymakers are interested in achieving the best development prospects.

Ignorance of investors: Investors are still not aware about the importance of green finance and prospects of sustainable investment. Providing education to investors regarding environmental and social impact of investment in projects is very difficult. It creates hurdle in raising funds for green projects.

Improper framework and policies: Lack of proper framework for achieving sustainable development is a major problem in India. The government has listed various agendas, policies and circulars regarding the environment, energy sector, sustainability but they are not linked to each other for achieving a common goal of sustainable development.

Disclosure requirement: For issuance of green bonds SEBI lists down disclosure requirements in offer document and does not state any standard format for disclosure. In annual reports, brief description about green project is included which decreases the importance of project and discourage investment in such projects.

Green Washing: Another challenge being faced is 'green washing' which implies an act of making misleading claims about a green project and then leveraging on such claims and projects. Many corporations and government agencies raised capital based on the basis of such claims.

Risk assessment: Green projects carry several risks –regulatory risk, technology risk, currency risk etc. Changes in regulations or policies may have major impact on the profitability of the green projects. These risks can be challenging for new or innovative green instruments. The capital markets of developing countries are not efficient in pricing of risks associated with green projects. Mispricing of these risks represents a big challenge.

Project evaluation: Lack of proper criteria for project evaluation of innovative green project at an early stage becomes a challenge for channelizing funds towards such projects which will contribute to the environmental sustainability.

Section V Conclusion

India is exceptionally vulnerable to the adverse consequences of climate change. Moreover, as population in India is increasing day by day, demand of energy is increasing with the increase in the population and hence the environmental issues. The growing awareness of environmental and social issues and sustainable investments are the efforts to increase green financing. Green financing is required for mitigation and adaptation purposes. It is well established that climate change poses a serious threat to India's economic growth and overall development, and climate action today can significantly reduce expected economic, human, and environmental losses. This means that the economic cost of inadequate action is extremely high. If in future India and the rest of the world do not significantly reduce emissions relative to current levels, global warming can reach up to 3°C by 2070 (Deloitte Economics Institute 2021). This can result in an estimated economic loss of INR 2,607.5 trillion (USD 35 trillion) by 2070 which is projected to be 12.5% of Gross Domestic Product (GDP) in 2070 alone (Deloitte Economics Institute 2021). To mitigate this loss, a more transparent policy framework is required to increase green funds from domestic as well as international investors. Policies should be designed in consideration to the progress of green finance. Green finance can promote sustainable economic development with the help of various organization and corporations. India has still to go a long way until it becomes a green economy. For green future and sustainable development in coming years green project investment is recommended.

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