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THE STUDY OF CLIMATE RELATED FINANCIAL RISK AND GREEN FINANCE DEVELOPMENT IN INDIA

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Abstract

Climate related financial risk includes the risk related to loss of physical asset due to adverse weather events and loss of assets due to transition to low carbon economy. The Climate Change affects all sectors of economy. Considering the debts of various sectors, the climate related transition risk is very high in Indian financial system. Reserve Bank of India has recently taken various measures to address climate related financial risk with improvement in disclosure, data accessibility and vulnerability analysis. The Sustainable Finance Group (SFG) has been formed within department of regulation of RBI to address and assess the climate related risks in Indian financial system but still it is in naïve stage. Government of India are taking various efforts to increase the Green finance in India, thus Green Lending and Green Bonds have improved in recent years but still India is lacking behind its targets. Green finance is majorly contributed by domestic sources.

Introduction:

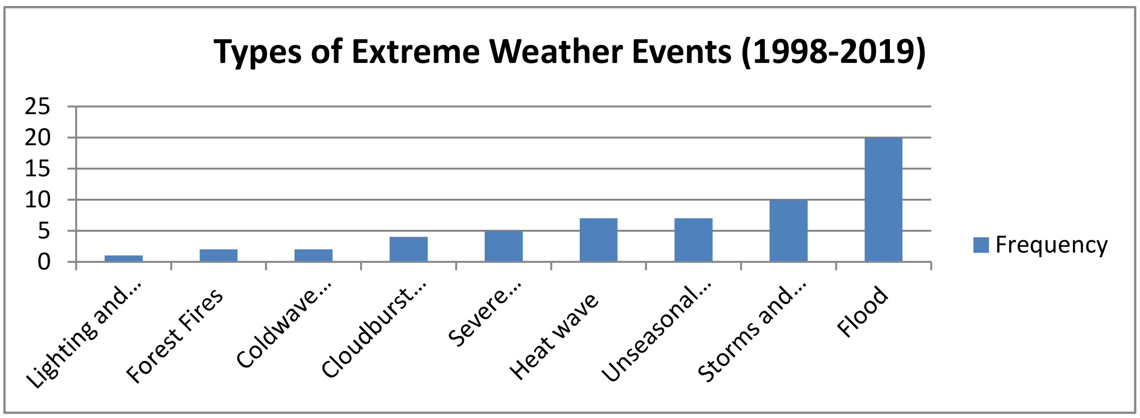
The climate change poses a severe threat to the economy and the financial system. Since Green house emission is not bounded within national boundary, a collective effort is needed globally to address these issues. The finance plays an important role to address the development needs and it should be directed in such a way that the goal of sustainable development must not be compromised. The financial system is vulnerable to climate change as the physical assets created by them can be lost or damaged due to adverse natural events and also due to transition towards the path of low carbon economy. Thus the climate related risk to financial system is large and it can't be ignored in present situation. At global level, Network for Greening the Financial System (NGFS) and Basel Committee on Banking Supervision's Task Force on Climate Related Financial Risks (TCFR) are taking effort to address the issues of financial risk created by climate and environment change. The NGFS is a group of Central Banks and supervisors which contributes to the development of environment and climate risk management in the financial sector (NGFS,2020). The Reserve Bank of India is now the member of Network for Greening the Financial System (NGFS) from April 2021. In recent years RBI has made various efforts to address the climate related risk in financial system and development of green finance development in India. The regulating agency in India is addressing these issues through various measures. It includes disclosures, data management, vulnerability analysis and regulatory measures. The sustainability disclosure has been improved and green finance is improved in recent years. Reserve Bank is now aware to include climate risk in assessment of risk in financial system. Government of India also taken budgetary allocation to tackle climate related risk and incentivizing the financial institution for green lending.

The study includes the climate related financial risk in India and regulatory measures to address this risk. The study also elaborates the progress and challenges of green finance in India.

I. Climate Related Financial Risk in India

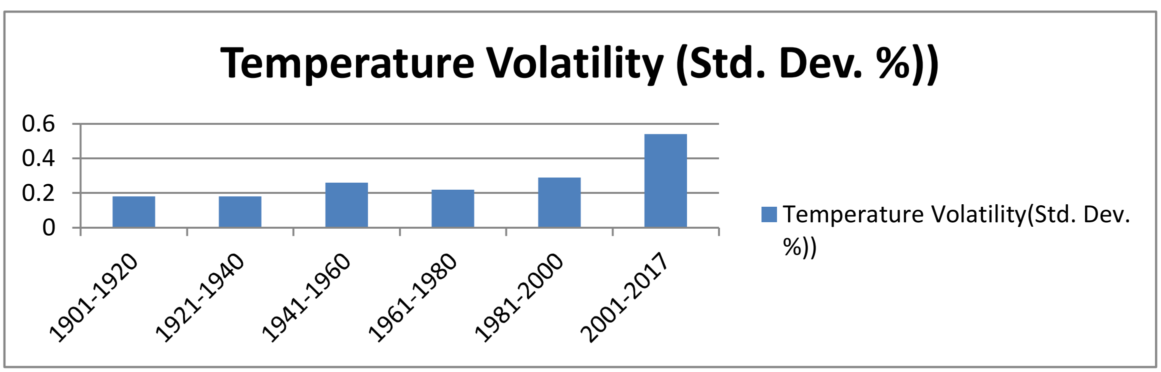
The climate related risk to the financial system are of two categories: 1. Physical risk which refers the economic cost and financial losses resulting from extreme weather and longer term shift of the climate like rise in average temperature , change in rainfall pattern etc. 2. Transition risk : These are risk related to process of adjustment towards a low carbon economy. It includes the replacement and modification of existing process and technologies.(RBI,2020). Over the years, India has also witnessed the climate change in line of other countries. The rise in economic activities and increase of GHG emission impacts on rise on average temperature and change in rainfall patterns. These factors along with extreme weather events impacts on agriculture production and ultimately the economic parameters like GDP, food inflation, demand of tractors etc. India is vulnerable to the climate related physical risk and thus urgent action is needed considering our long coastal line, high share of fossil based electricity and high dependence on agriculture. The combined share of three industrial sectors electricity, chemicals and automobile is directly exposed to the fossil fuel and other various industries ae indirectly dependent on fossil fuels and these are sizable portion of bank credit. Some of sector is high Gross NPA ratios. The transition risk in these sector is very high. Thus a significant risk is underlying in financial system in India. (RBI, 2022b)

Graph1: The frequency of extreme weather events in periods 1998-2019 (RBI,2020)



Source: Down to Earth, IMD publications

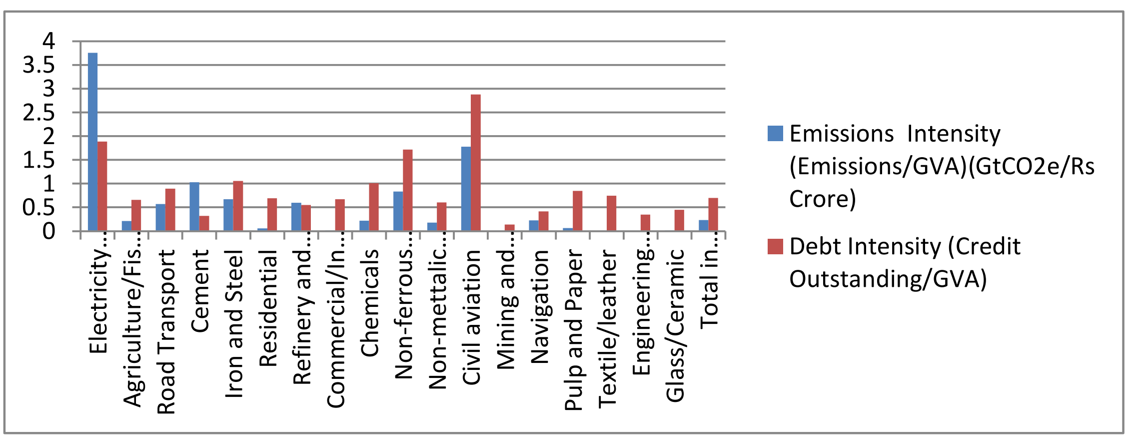
Graph2: Temperature Volatility in India (RBI, 2020)



Data Source : www.data.gov.in

The industrial GHG emission data along with outstanding debt reflects that the physical and transition risk is very high in Indian financial system. The electricity sector although highest in GHG emission (40%), its debt outstanding is 5.2%. The agriculture sector is having great role in gross value added, it is highly vulnerable to climate change. The transformation of the global economy to achieve net zero emission by 2050 requires annual average $9.2 trillion on physical assets. In India, It has already estimated that a total investment of USD 10.1 trillion is needed to meet the commitment towards net–zero till 2070. Thus we are lacking behind in transition to low carbon economy and large climate risk is underlying in our financial system. Climate risk affects the traditional risks of financial system through various channels. Credit Risk increases if drivers of climate risk reduce the borrowers' ability to repay and rise in credit default. It indirectly also affects the market risk. Climate risk drivers cause bank counterparties to draw down deposits and credit line. The operational risk, regulatory risk and reputation risk is also associated with the climate risk.(RBI, 2022a)

Graph3: The Emission Intensity and Debt Intensity of Various Sectors in India (Vaje and Others, 2022)



Source: MoEFCC (2021); MoSPI (2021a); RBI (2021b & c).

Table1: Total Value of Borrowing by High Carbon Secrors in 2021 (Rs Crore)

Sector	Indian Rupee	Foreign Currency	Grand Total
Manufacturing	433484	139248	572732
Mining	109611	247281	356892
Non-Durable Goods	500	0	500
Transportation,Communication,Electric, Gas & Sanitary Services	712471	151686	864156
Total	1256065	538215	1794280

Source: Refinitiv (2021).

II. Regulatory Measures for climate related financial risk in India

The Reserve Bank of India and Government of India are taking various measures to mitigate the climate risk in financial system. Renewable Energy Sectors is included in Priorilty Sector Lending(PSL) category and its lending limit is also increased upto Rs 30 Crores in purposes like Solar based power generator , biomass based power generator and other non-conventional based utilities, which was earlier upto Rs 15 Crores. The challenge of central bank is to incorporate the impact of environment into commercial lending decisions, along with need to expand the credit and economic growth. The Sustainable Finance Group (SFG) within the department of regulation has been set up to make efforts and initiatives in the area of sustainable finance and the climate risk. Some of the initiatives which we are contemplating and discussing within the Reserve Bank are to integrate the climate-related risks into financial stability monitoring and making in-house capacity on assessment and monitoring of climate risk and generating awareness regarding this among regulated entities. These also includes advising regulated entities and exploring forward looking tools like scenario analysis and stress testing to assess climate related risk in the system. (Bank for International Settlements, 2021) There are four building blocks , which are endorsed by G-20 are needed to address the climate related financial risks. The regulation includes Disclosures, Data, Vulnerabilities Analysis and Regulatory & Supervisory Practices to address climate related risk. India has made progress in recent years in these parameters but still it is in naïve stage, comparing to other nations. (RBI, 2022a)

Disclosures: Internationally, a significant effort has been made regarding climate related disclosures. The FSB's Task Force on Climate Related Financial Disclosures (TCFD) has been leading the work along with other standard bodies to formulate disclosure work. This is very important to assess the company's performance and actions towards sustainable development. Given the global nature of funding and cross border flows of capital, there is idea to make a common baseline disclosure of each Multi National Firms, which includes all disclosure, related to environment, employee and society. In India, Reserve Bank has published Discussion Paper on Climate Risk and Sustainable Finance which has elaborated that sustainable disclosure is very important source of information of different stakeholders –environment, employee, society and investors to understand the risk faced by them. For the corporate, SEBI has made mandatory to disclose climate related information to firms. SEBI is make now mandatory for top listed 1000 firms (based on market capitalization) to disclose the same since FY2022-23.

Data: Data is required in each country for making macro level assessment of risks. Although global effort has been made to create data depositories and guidelines on collection of data, accessibility of data is still remain a challenge for policy makers. The comprehensive data on climate related exposures will help the nation to assess climate related scenario analysis and stress testing for the amount of risk from climate events. The availability of sufficient and comprehensive data is crucial and very important for modeling forward looking climate events and monitor the climate related financial risk in the system.

Vulnerabilities Analysis: Vulnerabilities analysis refers the analysis and understanding of tthe financial stability risks arising out of climate events. It includes stress tesing, scenario analysis to better understand the risk in financial system and understanding the inter-linkage between financial sector and real sector. While development of these tools is still in naïve stage, it is very crucial to understand the climate related risk in the financial system. The climate events may span over decades and this may make the data collection exercise quite difficult and the outcome more uncertain. The vulnerability analysis will assess the risk and very important for macro level risk assessment for a country.

Regulatory and Supervisory Practices: There is need to regulate the prudential polices to integrate the climate risks into the regulatory frameworks of central bank. The risk management, governance structure must be regulated in such a way that sustainability parameters should not be compromised. The global effort has been made in this direction and India is recently taken climate risk within its regulatory framework. Internationally, the BCBS has published Principles for Effective Management and Supervision of Climate Related Risks in June 2022 and FSB published its Final Report on Supervisory and Regulated Approached to Climate Related Risks in October 2022. These reports have shown the importance of regulatory system to tackle the risk in financial system and various suggestion has been given. The NGFS recent report on Nature Related Risks highlights that the failure to address the climate related risk could have a significant macroeconomic implication and thus our financial supervisor must regulate the policy in such a manner that it can't be ignored.

III. **Green Finance Development in India**

Green finance refers the finance specific to the use of environmentally sustainable projects. These projects includes the energy projects of non- fossil based, clean transportation and energy efficiency projects like green builing, waste management using recycling and disposal etc. It includes the Green bonds, Carbon Market Instruments like carbon tax etc and new financial institutions like Green Banks. These altogether refers as green finance.(RBI,2021). Internationally various flagship programs like Principle of Responsible Investment, Equator Principle Financial Institutions, UNEP

Commitment of Financial Institutions on Sustainable Development, Sustainable Stock Indices suggest ways to finance under green finance to signatories. India is also a signatory in all of them. The regulatory framework across globe follows the four principles to uplift environment responsible finance. These are 1. Sustainable Disclosure ,2.Directed and Concessional Lending, 3.Micro and Macro Prudential Regulation,4.Green Financial Institutions.

The sustainable disclosure by firms annually gives information regarding their action and commitment towards environment, employee, investor and society. SEBI has now make it mandatory for top 1000 listed firms to disclose the data related to the stakeholder and thus useful to make a environment for green and responsible finance. The directed and concessional lending is very important for green finance. Financial institution in India is giving finance to non-conventional energy projects and clean transport at concession rate. Also the finance under Renewable Energy comes under Priority Sector Lending. These are helping to enhance green finance in nation. The prudential norm considering the risk consideration of each category loans may be regulated such a way that the financial institution prefers to finance green projects. The dedicated green financial institutions is good for development of green finance and every country is working for this.

The sustainability linked bonds and sustainability linked loans has rises significantly in India in recent years. Liberalised external borrowing norms have also enabled Indian companies to access the offshore through green bonds and external commercial borrowings in green projects. Thus the sustainability debt has rises significantly in India and green finance has increased. Government are also making efforts to decarbonizes various sectors of economy and incentivize bank to provide support in terms of transition finance for businesses to adopt greener technologies and to increase energy efficiency. Government of India in Union Budget 2022-23 announced that climate action would be key priority and proposed that Sovereign Green Bond will be issued for mobilizing resources for green infrastructure. The formal definition of Green

Finance along with a good taxonomy is the need of hour to expand the green finance in India.

The study reveals that the awareness regarding green finance has risen recently and green lending and green bond has increased significantly. The lending by financial institution in India to non-conventional energy is total Rs 36543 Crores as on March 2020. It is 7.9% of total lending to energy sector and 0.5% of total financial lending. The green bond market in India has risen recently and it is USD 16.3 million in Feb 2020 and last two years its growth was very high. The Indian Renewable Energy Development Agengy (IREDA) which is front runner in clean energy development, is announced plan to become first Green Bank in India in May 2016. Thus India is progressing towards Green finance development in recent years (RBI,2021). Green Finance flows in India is far below the country's current needs. In 2019/2020, the tracked green finance was Rs 309 thousand crores(~ USD 44 billion) per annum, although the need is Rs 11 lakh crores per year, considering the goal of India's National Determined Contribution (NCD) under paris agreement. In 2021, India announces the panchamrut target considering the ambitions towards climate action. It includes adding 500GW energy through non- fossil based sources, meeting 50% of total energy demands. The green finance flows has increased 150% from 2017/2018 to 2019/2020. In overall increase, the public sector growth is 179% and private sector growth is 120%. There is need to increase private sector flows in green finance and disclosures are playing important role to increase green finance. Domestic sources continue to account for the majority of green finance, with 87% and 83% in FY2019 and FY2020, respectively.

Finance towards Risk Mitigation and Adaptation :

The total fund flow towards mitigation was almost equally split between clean energy (42%) and energy efficiency (38%), and was significantly higher than clean transport (17%). It is Rs 118856 Crores, 129824 Crores and Rs 60719 Crores. Clean energy finance is equally shared by private and public sectors. Within the clean energy, the solar projects received the highest financial investments in solar projects with Rs 54000 Crores in FY 2019/2020. The clean transport received maximum funding from public sources and within this sector Mass Rapid Transit System (MRTS) is having highest share of 87%. The electric vehicle which is almost 1% of finance of the sector shows improvement in 2020. The finance within energy efficiency is mainly supported by private sector. For adaptation sectors, the total amount of green finance was INR 37 thousand crore (USD 5 billion) per annum over FY2019/FY2020. The major source of adaptation funding was domestic (94%), and it was fully funded by Central and State government Budgets.

Conclusion: There is urgent need to understand the climate related risk in financial system and it should be mitigated through appropriate regulatory measures. The climate change is affectting various sectors of economy which is funded by financial institutions. The erosion of these assets will create the financial stability risk in the economy so it should be carefully examined, monitored and effective regulated. The sustainability disclosure , data accessibility and vulnerability analysis is helpful to assess the climate related risk in the system. India is at naïve stage to address the issues of climate related financial risks, comparing to other developed countries. Recently , India has progressed towards green lending and it is generated both by domestic and international sources. The government of India is also taking effort to address the climate issues and recently various measures has been taken to improve the green finance in India.

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