

The Role of Monetary Policy in Climate Change Mitigation

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ABSTRACT Climate change is one of the most significant challenges defining the 21st century, and ways to deal with it occupy an important space in current policymaking discourse. Central banks in different parts of the world have recently started playing a part in articulating strategies to combat climate change. This brief explores the position of the Reserve Bank of India (RBI) in this regard. It outlines the physical and transition risks associated with climate change and maps India's vulnerability. Drawing lessons from how central banks in various developing countries have incorporated climate change concerns in their operations, the brief offers recommendations on how the RBI can do the same.

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INTRODUCTION

Global economic prosperity has come at a heavy cost to environmental sustainability. The level of carbon emissions generated in the race towards increasing GDP levels has resulted in the phenomenon of climate change, manifesting in erratic weather, heightened natural calamities, more frequent droughts, rising sea levels, worsening pollution, and ocean acidification. The annual 2019 World Economic Forum's (WEF) Global Risks Report has emphasised the urgency of formulating mitigation and adaptation strategies. Indeed, the United Nations (UN) estimates that the economic impact of climate change risks will reach US\$ 28 trillion (18 percent of global GDP) by 2050. The economic transition required to tackle them, meanwhile, will require some US\$1 trillion of incremental investments through to 2030.¹

Climate crisis mitigation requires global carbon emissions to fall by 50 percent in the next decade and become net-zero by the end of the century.² Many countries, however, have hardly altered their economic growth paths in consideration of intergenerational equity and sustainability, unwilling to face the tradeoffs in output and economic prosperity. In the context of many countries including India, the fight against poverty and deprivation complicates the choice. Concerns about the sustainable future of the environment and the world get discounted at a rate that some might say is warranted, but which others might find unreasonable. The tradeoff between rapid economic growth and sustainability needs to be incentivised, to help formulate solutions to the climate change problem.

Indeed, the climate crisis requires consolidated efforts towards mitigation and adaptation strategies. Several central banks across the world have begun deliberating on the role they can play in this regard. A step in this direction is the establishment of the Network for Greening the Financial System (NGFS), a group of 54 central banks and 12 observers, in December 2017.³ The essential question is how central banks can incentivise the tradeoffs between economic growth and ecological sustainability. Such tradeoffs in turn translate to a question of optimal allocation of resources, i.e., sustainability. The various responsibilities of the central bank—including monetary stability or financial stability—essentially involve mobilising, allocating and managing resources in a manner that seeks balance. This notion is defined differently for different contexts, and such variables determine the scope for central banks to contribute to combating climate change.

This brief highlights the climate-related risks facing India and the steps taken by the banking sector to mitigate the same. It is an attempt to fill the gap in existing literature on what the RBI must do to confront climate change-induced financial risks.

CLIMATE CHANGE AND FINANCIAL RISKS: A TAXONOMY

The financial risks associated with climate change are of two forms: transition risks and physical risks.

Physical risks: The climate crisis is expected to lead to a decline in economic output by deteriorating capital and labour, as well as eroding their productivity, thereby setting off a cycle of economic instability. Climate change

is predicted to spur a decline in consumption and investment demand until the market clears at a higher price under the pressures of the climate crisis.⁴

If physical risks are ignored for a long time, the economy may find itself trapped in a cycle of declining potential output and inflation—or stagflation. Tackling inflation caused by supply constraints has always been difficult for central banks as countering stagflation comes at the cost of reversing poverty reduction.⁵

Firms could suffer a liquidity crunch and increase their risk of default. The consequent credit rationing would in turn commence a credit cycle, culminating into a credit crisis. Household finance would migrate from corporate bonds to more liquid assets such as deposits and government securities, and consequently, asset prices would get deflated. Availing resources for the corporate sector would become difficult in the face of climate crisis.⁶

Banks also face the risk of defaults on loans.⁷

Transition Risks: These risks are associated with the transition to a low-carbon economy. In the process of transition, assets of firms heavily dependent on fossil fuels can get stranded, while policy and the broader trends favour purchases of green assets. This would bring immense pressure on the liquidity and revenue of these firms unless smooth re-pricing is in order following policy intervention. Asset price deflation in the face of re-pricing can lead to large price fluctuations. This re-pricing not only takes into account the current developments, but

extrapolates them into the future. Along with the uncertainty around climate change, this will attract a risk premium that will only exacerbate the price fluctuation.⁸

MAPPING INDIA'S VULNERABILITY TO CLIMATE CHANGE

The Global Climate Risk Index 2020 reports that in 2018 alone, India lost out on economic opportunities worth US\$ 37,808 million in absolute terms, representing a three-fold increase from 2017.⁹ The impact of climate change across the country is varied; the sectors likely to suffer the most negative impact are the rural and urban poor. A study shows the varying impact of changing weather conditions on livelihoods and demonstrates a “U-shaped relationship between temperatures and living standards for India.”¹⁰ It is estimated that 600 million people living in the “hotspots” locations may be vulnerable by 2050 if circumstances remain “carbon-intensive”. The change in living standards is negative for the 10 states evaluated by the study. Agricultural households and inland areas will be the most vulnerable if no shift is observed from carbon-intensive to climate-sensitive practices.

Construction, agriculture, and food and beverages are expected to be the biggest industries that will be highly vulnerable to climate-induced vagaries. To begin with, agriculture is the largest employer in the country (211 million in 2015-16) while the construction industry is the third largest (52 million employed). India's vulnerability to climate change is exacerbated by the intensity of economic activity and the population's dependence on natural resources for their livelihood. According to the Economic Survey 2017-18, losses in farmers' incomes in India

due to climate change are pegged at 15-18 percent on average, increasing further to anywhere between 20- 25 percent in unirrigated areas.

According to the India Meteorological Department (IMD) report on climate change in 2019, the country has warmed by 0.61° Celsius in the last 100 years. India suffered devastation from eight cyclones over the past one year – five of which were formed over the Arabian Sea—against the normal annual rate of one incident. Apart from these severe cyclonic storms, other high-impact weather events like heat and cold waves, extremely heavy rainfall and snowfall, thunderstorms, and dust storms,¹¹ have caused serious devastation in many parts of the country. The report states that Bihar, with 650 casualties in 2019, suffered the most from heavy rains and floods, heat wave, lightning, thunderstorms and hailstorms.

Heatwaves have been the worst among all extreme weather events in recent years, killing some 3,761 in India between 2015 and 2018, 2,081 of them in 2015 alone.¹² India was ranked as the “fourth most impacted” of extreme weather events in 2018.¹³ This is because India is particularly vulnerable to climate change owing to its vast geography and diverse climate regimes across regions. From 1989 to 2018, droughts, extreme temperatures, floods, and storms have affected some 1,410 million lives in India, and the economic costs reached US\$ 82,914.4 million for the same period.¹⁴ Around 60,000 farmers have killed themselves in the past

three decades, likely as a result of massive distress caused by failing crops due to climate change, and the consequent lack of income.¹⁵

Another grave crisis facing India is air pollution. Indeed, India leads the world on the count of premature pollution-related deaths per year at 2,326,771 for the period 1990 to 2017.¹⁶ It ranks second for total annual premature air pollution-related deaths at 1,240,529 for the same period. Of the top 30 most polluted cities in the world, 22 are in India.¹⁷ Air pollution kills approximately one child in India every three minutes.¹⁸ Several factors intensify air toxicity, including stubble burning in certain states, construction activities that are done without cover, and high emissions of vehicular exhaust.

The Government of India has launched eight missions under its National Action Plan on Climate Change (NAPCC). These include the National Solar Mission, National Mission for Enhanced Energy Efficiency, National Mission for a Green India Mission, National Mission for Sustainable Agriculture, and National Mission on Strategic Knowledge for Climate Change. The following sections will appraise these initiatives from the perspective of the RBI’s ability to formulate monetary policy in a manner that facilitates their implementation.

DEVELOPING COUNTRIES AND GREEN BANKING

Developing countries have taken cognisance of the importance of green banking.^a (See Table 1.)

a Green climate banking can be defined as “central banking that takes account of environmental risks, stability and development of the financial sector and the macro-economy.” Green banks are also referred to as “purpose-built financial institutions that facilitate funding of clean-energy projects.”

Table 1. Green banking initiatives by different countries

Country	Banking Authority	Green Banking initiative
The BRICS countries	New Development Bank	<ul style="list-style-type: none"> • Long-term infrastructure and sustainable development projects (from transportation renewable energy, water, urban renewal)¹⁹ • The adoption of 'Environmental and Social Risk (ESR) Framework to increase the stock of green investments²⁰
China	The People's Bank of China (PBoC), the China Banking Regulation Commission (CBRC)	<ul style="list-style-type: none"> • The Green Credit Policy in 2007²¹ • Green Credit Guidelines (2012) based on ESR framework²² • Launch of green products and services²³ • Initiatives for greening banks' operations²⁴ • Introduction of the Key Green Performing Indicators²⁵ • Tracking of data on loans with compliance issues²⁶ • Issuance of 'Guidelines for establishing the green financial system'²⁷ • Introduction of green loans with an AA rating as collateral in the medium-term loan facility (MLF)²⁸ • Efforts to boost China's green bond market - introduction of Green Bond Guidelines in 2015-16; regulatory changes for easing accessibility to interbank market for foreign investors interested in investments with positive environmental impacts;²⁹ Acceptance of green bonds as collateral from borrowing banks³⁰
Brazil	Banco Central do Brasil (BCB)	<ul style="list-style-type: none"> • Implementation of green and macro prudential norms³¹ • E&S risk management binding on banks³² • mandating banks to undertake stress tests, simulate the consequences of climatic hazards on their balance sheets, and then determine appropriate capital adequacy measures³³ • Mandating prospective borrowers to furnish documents such as environmental licenses etc.³⁴
Indonesia	The Indonesian government agency— Otoritas Jasa Keuangan (OJK), the Central Bank of Indonesia	<ul style="list-style-type: none"> • A roadmap for sustainable climate financing³⁵ • Working with International Finance Corporation (IFC) to finance, measure, report, and identify green finance avenues³⁶ • Boosting the green bond market³⁷

		<ul style="list-style-type: none"> • Mandating banks to consider environment protection while assessing asset/loan quality and increase share of productive loans³⁸
Nigeria	Central Bank of Nigeria	<ul style="list-style-type: none"> • Launch of Nigerian Sustainable Banking Principles (2012)³⁹ • Mandating financial institutions to report their performances bi-annually, provide preliminary one-off reports on policies and systems and collect baseline data according to the issued guidelines⁴⁰ • Introduction of the Monitoring and Reporting mechanism in 2013 to oversee the adoption and implementation of guidelines⁴¹
South Africa	Development Bank of South Africa	<ul style="list-style-type: none"> • Setting up of Climate Finance Facility in alliance with the Climate Action Fund: The CFC is based on two innovations in credit disbursements. (i) Loan tenor: Basel III norms do not allow commercial banks to extend loans for periods greater than seven to eight years. The CFC does not face any such restrictions and extends loans up to 15 years. (ii) Subordinated debt: The bank will be secondary to primary or senior lenders, namely the commercial banks, as far as lending is concerned. It will stand pari passu in terms of the bearing the risk involved in financing a project.⁴²
Bangladesh	The Bangladesh Bank	<ul style="list-style-type: none"> • Requiring commercial banks and FIs to lend five percent of their loan portfolio to renewable energy and energy efficient initiatives⁴³ • Lowering of equity margin requirements for E&S friendly endeavors.⁴⁴ • Launch of the Environmental Risk Management (ERM) guidelines in 2011⁴⁵ • Allowance to banks to undertake and formulate their own E&S framework to ensure sustainable banking practices⁴⁶ • Provision of preferential treatment to those who comply to the ERM guidelines⁴⁷

PROSPECTS FOR GREEN BANKING IN INDIA

According to the Indian Banks Association 2014, “Green Bank is like a normal bank, which considers all the social and environmental/ecological factors with an aim to protect the environment and conserve natural resources.” This definition has been interpreted as “greening” banking operations and habits of the clientele through the adoption of suitable technology that will reduce the carbon footprint of banking-related activities. Various Indian banks have taken initiatives towards green banking. These banks include the State Bank of India, Bank of Baroda, Punjab National Bank, ICICI Bank, Axis Bank, and HDFC.⁴⁸

- Setting up of windmills to generate energy required for their bank branches. For example, the State Bank of India has set up ten windmills in Maharashtra, Tamil Nadu and Gujarat.⁴⁹
- Setting up of solar ATMs.
- Launch of pilot projects to appraise the bank’s carbon footprint and make informed measures in reducing the same.
- Setting up of the Lending Automation Processing System for loan appraisals.
- Being a signatory to the Carbon Disclosure project, which drive investors, firms and other such entities to act on the objective of creating a sustainable economy by assessing their environmental impact.
- Encouraging shareholders to accept a paperless version of the bank’s annual reports.

- Undertaking energy efficiency measures and ensured optimal utilisation of technology in running their branches.
- Setting up of solar power generation systems and installing solar panels for lighting purposes
- Launching awareness programmes on environmental concerns.
- Planting of trees. For example, Punjab National Bank has been involved in planting trees along roadsides, maintaining residential parks and greening of traffic circles in different cities.
- Investing in the construction of green buildings and waste water treatment plants, setting up of solar lamps in rural areas and rain harvesting.

These efforts are expected to contribute to fighting climate risk. Yet more is expected from India’s banking system as a whole, given peculiar capacities arising from its functions.

The same banks have begun to undertake green banking measures, including the following:⁵⁰

- Provision of loans at concessional rates of interest to firms that take up efficient manufacturing methods which lead to a reduction in Green House Gas (GHG) emissions.
- Requiring prospective borrowers to obtain a No Objection Certificate (NOC) from the pollution board before they seek a loan. Many of these banks reject loan applications from environmentally-hazardous industries. These include foam

products, refrigerators & air-conditioners, aerosol products, and solvents in cleaning applications.

- Preference to lend to environment-friendly projects such as windmills and solar projects.
- Promotion of the use of vehicles that use alternative sources of energy by partially waiving the processing fee. They have also reduced the fee payment for those buying homes in Leadership in Energy & Environmental Design (LEED)-certified buildings.

RECOMMENDATIONS

These measures from India's banking sector are in the right direction. They are, however, still sporadic in nature compared to the strategies being undertaken by its counterparts in other developing nations in the world. As a result, Indian banks have not managed to tackle the climate-induced financial risks facing the country. Furthermore, whatever mitigating effect these initiatives have had on climate change, would be difficult to measure. India needs a well-articulated plan that will define how the monetary policy can be formulated to tackle climate change. Fundamental to this plan is a banking ecosystem which has the RBI as the apex institution.

1. The first step to the development of such an ecosystem is a comprehensive, holistic assessment of the climate risks facing the nation. In turn, this will require developing a framework for such an assessment. These assessments need to be integrated into the banks' financial

decision-making. Indeed, systems that assess the environmental performance of borrowers must also be formulated so that a green lending policy can be put in place. A green lending policy adjusts the cost of borrowing according to the carbon footprint of the prospective borrower. Polluting industries such as carbon-intensive ones need to be charged higher interest rates, while enterprises using and promoting renewable energy and other environment-friendly ones should be given preferential treatment by charging them a lower rate of interest.

2. The role of RBI in driving a green credit policy is significant. The RBI should consider setting differential *bank rates* (the rate at which the RBI buys or rediscounts bills of exchange and Commercial Papers of commercial banks) depending upon the share of loan portfolio in green projects. Preferential treatment is to be given to those who have a larger proportion of green loans on lending books.
3. The inflation-targeting mechanism used by the RBI to determine interest rates takes into account the output gap—i.e., the gap between actual output and potential output. The calculation of the potential output must consider the impact of climate change on capital stock and human capital. Furthermore, it is essential for the RBI to determine an energy-efficient potential output that will provide a reliable and ideal GDP benchmark.
4. The Perform, Achieve and Trade mechanism was launched by the Bureau of

Energy Efficiency (BEE) to decrease energy use and provide impetus to energy efficiency across various energy-intensive industries in the country. Each enterprise is assigned energy reduction targets. When an installation overachieves its target, it is awarded an energy savings certificate. Those who fail to achieve their targets are required to purchase (from the overachievers) via a centralised online trading system run by the Indian Energy Exchange (IEX). The target achievers invested INR 24,517 crore (US\$2.98 billion) complying with energy efficiency targets. Failed enterprises spent a mere INR 100 crore (US\$ 13.22 million) in compensation for meeting their targets. A lack of a floor value for the energy savings certificates is responsible for this anomaly and made non-compliance cheap.⁵¹ The banks can rectify this anomaly by offering cheaper credit to overachievers of energy reduction targets while penalising those who fail to comply.

5. The Modi administration has announced several initiatives to accelerate the adoption of electric vehicles (EVs) in the country. However, India faces a severe crunch of lithium supplies to run the EVs. While several Indian companies are making strides to tap overseas suppliers, investment in extraction and refinery processes of lithium as well as establishment of lithium-ion battery plants require green loans. The banks can be encouraged to provide loans to these entities under the umbrella of green finance as well as purchase bonds of these entities (or green bonds).

6. Green bonds are those that finance environment-friendly projects. They are a subset of the larger corporate bond markets. India's green bond issuance (at US \$ 7.7 billion) is second to China's (US \$108 billion) amongst Emerging Market Economies (EMEs) during the period 2012-18. Yet the distance between India and China's issuance levels is enormous, with the former amounting to only seven percent of the latter. Furthermore, India's green bond issuance involves only three entities, namely, Greenko (\$ 950 million), Adani Green (\$500 million), and SBI (\$650 million). Moreover, these issuances were made in the global green bond market rather than in the domestic bond market.

Domestic corporate bonds in India have a narrow investor base, with a majority of them comprising institutional investors. Prudential norms impose restrictions on insurance companies and mutual funds on investing in these bonds. The cost of borrowing via corporate bonds is higher in comparison with other mechanisms of raising finance. The corporate bond market also suffers from lack of liquidity. Given the current circumstances and what can be anticipated for the future, *ceteris paribus*, green bonds are going to gain value and enjoy the status of an asset as societies begin to consider sustainability as a pillar of human ecology. Given this, and from the perspective of deepening the domestic corporate green bond market, the RBI can hold green corporate bonds, while requiring commercial banks to do the same, perhaps as a requirement in terms of the Statutory Liquidity Ratio

(SLR). Liquidity can be infused into the green bonds market by the RBI by fixing repo rates and reverse repo rates^b in terms of green bonds, *inter alia*, as well. Green bonds can assume the role of liquidity adjustment, with RBI purchasing green bonds from banks when it wants to infuse liquidity into the banking system, and sell green bonds when it wants to absorb liquidity from the banking system.

7. Mitigating the adverse consequences of climate change on agriculture needs a reorientation of agricultural systems to a climate-sensitive approach. Such an approach is called Climate-Smart Agriculture (CSA). Enabling the small and marginal farmers to adopt CSA will require empowering them financially. The RBI must collaborate with impact investment entities to set up a green bank that provides affordable financing to these farmers. Given the circumstances of a typical financially-stressed farmer, this initiative must provide loans for a longer term and impact investors can provide the subordinated debt. The intervention of “patient capital” in the case, for instance, of a farmer facing subsequent droughts and successive crop failures can prove to be invaluable. It will create the social impact of delivering the farmer from the debt trap.

An example that India can emulate is South Korea’s Green Credit Card, launched by the Ministry of Environment and the Environment Industry and Technology Institute to monitor and determine the consumption of carbon-intensive goods and

services, transportation and use of energy. The Green Credit Card system rewards those who purchase eco-friendly products, utilise public transportation systems, adopt electronic transactions, economise on the use of electricity, water, and gas, and use electric vehicles. Rewards provided by the credit card is ultimately convertible into cash or can be used in other ways. Retail stores possess a green “Point of Sales” system which scans the bar code on products to identify whether they are eco-friendly or not and then registers eco-money points into the green credit card for the purchase of the same.⁵²

India’s Ministry of Environment, Forestry and Climate Change, in collaboration with the RBI can launch the country’s own version of a Green Credit Card. The ministry should mandate companies to disclose their carbon footprint and incentivise consumers to purchase environment-friendly products. Of course, steps need to be taken to prevent greenwashing—i.e., making false claims about environmental compliance.


CONCLUSION

The impact of the climate crisis on the world is not unforeseen. There is no dearth of analyses and reports that have highlighted the burgeoning impact of climate change on societies, economic stability, and even conflicts across regions. Costs of food distribution, water availability, health, migration, and other socioeconomic costs, are all expected to increase over time due to extreme weather conditions and heat stress. These are likely to have the most severe impact

b Repo Rate: The (fixed) interest rate at which the Reserve Bank provides overnight liquidity to banks against the collateral of government and other approved securities under the liquidity adjustment facility (LAF). Reverse Repo

on the most vulnerable communities, especially in developing countries like India where inequities remain stark. The unpredictability of climate change-related natural disasters increases the economic burden of a country that aims to undertake development in the fundamental elements of poverty alleviation: infrastructure, housing, amongst them – rendering them uninsurable. Unemployment becomes an ever-pervasive issue as heat stress and spread of diseases erode productivity of this crucial economic foundation. The country's declining rank on indicators such as the Global Hunger Index will set to a persistent decline in the face of nature's vagaries being undiscounted.⁵³

This brief makes the case for a comprehensive economic plan by financial regulators, investors, and policymakers, that will be mainstreamed into their risk analysis

frameworks. Crucial to India's growth objectives, infrastructural development must imbibe a holistic approach to achieve mitigation and adaptation due to unforeseen climate stresses. Companies must take up the leadership in effectively evaluating the exposure to risks in their portfolios and subsequently shifting their investments towards greener assets. Incentivisation of the same must be heralded by the RBI by establishing frameworks towards green banking – differential interest rates, deepening corporate bonds market through green bonds, and effective inflation targeting. Other developing countries have begun taking cognisance of these issues and are effecting changes in their financial systems through a climate-sensitive prism. Given the urgent timeframe for climate action, the preparation of this framework must no longer be further delayed. 

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