



Demystifying Net Zero Emissions - Compilation of Articles

July-September 2024

Towards Achieving Harmony with the nature: India towards Net Zero

NABARD's contribution towards climate action needs scaling up given the immensity of the problem. India's per capita emissions are among the lowest in the world. It is the only country that has kept its commitments as per the 2015 Paris Accord, even among the G20 countries which account for more than 80% of the global GDP. At the same time, per capita emissions vary widely by income class and degree of urbanisation. '[Carbon footprint] CF reduction policies within India need to target high-expenditure households which are responsible for nearly seven times the carbon emissions than low-expenditure households (living on \$1.9 consumption a day). Almost a tenfold difference is observed between the highest CF district, Gurgaon (2.04 tonne CO2 equivalent per capita), and the lowest CF district, Baudh (0.21 tonne CO2 equivalent per capita). These vast disparities between the carbon footprint of citizens in India highlights the need to differentiate individual responsibilities for climate change in national and global climate policy.' India is thus yet to reach its peak and once it does so, it would need to drastically cut down on emissions to reach 'net zero' or 'near net zero' level. Commitment to net zero - impacting livelihoods, employment, and consumption, and thus, the entire economy - demands a two-pronged approach:

- (i) scaling up climate-friendly interventions such as watersheds, wadis, mitigation measures, and adaptation projects; and
- (ii) adopting new techniques and shifts in paradigm towards agroecology.

Such an approach for India would no doubt entail huge investments in natural resource management and people. NABARD's best efforts in this direction could be integrated with mainstream programmes for large scale impact.

Taking cognizance of the trade-off between development and the environment, NABARD has been championing diverse strategies to address the impacts of climate change while promoting sustainable livelihoods and development. In line with global and national priorities and India's commitment to net zero emission by 2070, NABARD continues to devise, support, finance, and promote a wide range of initiatives aimed at mitigating the effects of climate change, adaptation to climate change impact, awareness generation, and knowledge sharing.

Net zero emissions target of India

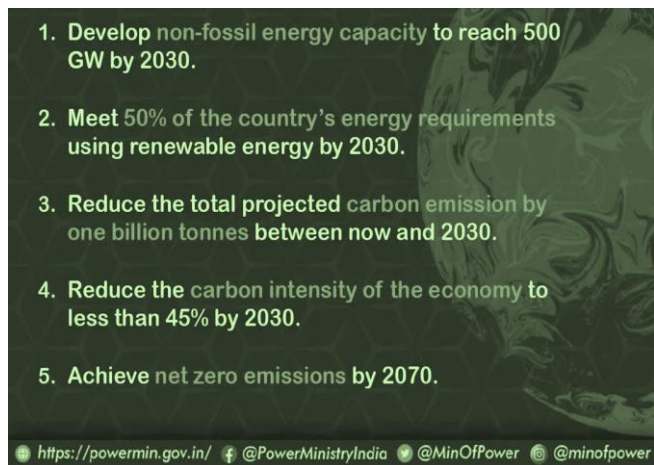
India is an emerging economy where Greenhouse Gas emissions are set to increase, albeit from a low base, in pursuit of its development and poverty eradication goals. It is to be noted that India's historical cumulative emissions from 1850 to 2019 amount to less than 4 per cent of cumulative carbon dioxide emissions of the world from the pre-industrial era, despite being home to 17 per cent of the world's population. Hence, India's responsibility for global warming thus far has been minimal and even today its annual per capita emissions are only about one-third of the global average.

India, at the 26th session of the United Nations Framework Convention on Climate Change (COP 26) in November 2021, announced its target to achieve net zero by 2070. In recognition of the Para 19 of Article 4 of the Paris Agreement, India's long-term low-carbon development strategy, has been submitted to the United Nations Framework Convention on Climate Change, and it reaffirms the goal of reaching net-zero by 2070. India's long-term low-carbon development strategy is based on the principles of equity and climate justice and the principle of Common but Differentiated Responsibilities and Respective Capabilities and rests on seven key transitions to low-carbon development pathways:

- i. low-carbon development of electricity systems consistent with development,
- ii. develop an integrated, efficient and inclusive transport system,
- iii. promote adaptation in urban design, energy and material efficiency in buildings, and sustainable urbanisation,
- iv. promoting economy-wide decoupling of growth from emissions and development of an efficient, innovative low emission industrial system,
- v. development of carbon dioxide removal and related engineering solutions,
- vi. enhancing forest and vegetation cover consistent with socioeconomic and ecological considerations and
- vii. economic and financial needs of low-carbon development.

With respect to each of these transitions, India's low-carbon development strategy document has elaborated the international and national context as relevant, the current policies and programmes already being implemented as well as the key elements for each transition, potential benefits and challenges.

There are several indices which rank countries on their performance to combat the challenge of climate change. However, there are many differences and disagreements with respect to the methodology, the conceptual framework as well as outcome of these indices both for India and the World.



Government has taken several actions to address the rapidly growing environmental problems in the country. Some of the noteworthy actions are listed below:

- i. Ministry of Environment, Forest and Climate Change (MoEFCC) has launched the National Clean Air Programme (NCAP) in January 2019 with an aim to improve air quality in 131 cities (non-attainment cities and Million Plus Cities) in 24 States/ UTs by engaging all stakeholders. The programme envisages to achieve reductions up to 40% or achievement of National Ambient Air Quality Standards for Particulate Matter 10 (PM10) concentrations by 2025-26.
- ii. PRANA (Portal for Regulation of Air-Pollution in Non-Attainment Cities), a portal for monitoring the implementation of NCAP has been launched. Under Swachh Vayu Survekshan (SVS) 2022, which is the evaluation of self-assessment report of NCAP cities, top 9 best performing cities have been awarded.
- iii. Commission for Air Quality Management (CAQM) in National Capital Region (NCR) and Adjoining Area has come out with a policy to curb air pollution in NCR, along with a standard list of approved fuels for NCR for industrial and other applications.
- iv. Levels of PM2.5 and PM10 in Delhi had registered a dip of almost 30% since 2016 while the number of clean air days had increased by almost 50% during the same period.
- v. Country has leapfrogged from BS-IV to BS-VI norms for fuel and vehicles from 1st April 2020.
- vi. Sustainable Alternative Towards Affordable Transportation (SATAT) has been launched as an initiative to set up Compressed Biogas (CBG) production plant and make CBG available in the market for use in automotive fuels.
- vii. Installation of Vapour Recovery System (VRS) in new and existing petrol pumps selling gasoline more than 100 kl per month in million plus cities and those selling more

than 300 kl per month in cities with population between 1 lakh to 10 lakh.

- viii. Subsidy on E-vehicles under Faster Adoption and Manufacture (FAME) for (Hybrid & Electric Vehicles in India.
- ix. For conservation of rivers, Ministry of Jal Shakti supplements efforts of the States/ UTs by providing financial and technical assistance for abatement of pollution in identified stretches of rivers in the country through the Central Sector Scheme of Namami Gange for rivers in Ganga basin and the Centrally Sponsored Scheme of National River Conservation Plan (NRCP) for other rivers.
- x. India added ten wetlands to the List of Wetlands of International Importance (also called Ramsar Sites) within the framework of the Ramsar Convention, taking the total number of Ramsar Sites in India to incredible 75, the highest in Asia by August 2022.
- xi. The government has taken a defining step to eliminate single use plastics. A ban has been imposed on identified single use plastic items from 1st July 2022.
- xii. As per the Desertification and Land Degradation Atlas of India, published by Space Applications Centre (SAC), ISRO, Ahmedabad, the extent of land degradation and desertification in India has been estimated to be 97.84 million hectares in 2018-19. It provides state-wise area of degraded land which is helpful in planning and implementation of schemes aimed at restoration of land by providing important data and technical inputs.
- xiii. Eleven Committees have been constituted by MoEFCC for development of Circular Economy (CE) action plans for 10 different categories of waste and EPR rules have been notified for 04 hazardous categories of wastes viz Plastic, Tyre, Batteries, and E-Waste.

In consonance with National Forest Policy (NFP), 1988 which envisages the national goal to have a minimum of 1/3rd of the total land area under forest or tree cover and 2/3rd of the area under such cover in the hill and mountainous regions of the country, various afforestation related schemes are being implemented by MoEFCC and other ministries. MoEFCC supports the States/ UTs for carrying out various afforestation/ tree plantation activities under Centrally Sponsored Schemes like National Mission for a Green India (GIM), Nagar Van Yojana, compensatory afforestation under Compensatory Afforestation Fund Management and Planning Authority (CAMPA) etc.

Further, the Trees Outside Forests in India (TOFI) program has been launched by the MoEFCC, Government of India and the United State Agency for International Development (USAID) for implementation in seven states viz. Andhra Pradesh, Assam, Haryana, Odisha, Rajasthan, Tamil Nadu, and Uttar Pradesh with an outlay of \$ 25 million for a period of five years. The purpose of this program is to expand the planting of trees outside of forests (TOF) for enhanced provision of ecosystem services, especially carbon sequestration, and increased inclusive livelihoods and economic opportunities for the rural population.

(Source: Press Information Bureau, Government of India, New Delhi)

Why should India target net-zero by the year 2047? - Transitioning away from fossil fuels in a quarter century will be a transformative change with its share of challenges: technological, societal, and economic

India's current climate strategy is to target net-zero greenhouse gas (GHG) emissions by 2070. We instead make the case for an accelerated schedule to achieve net zero by the year 2047 i.e., completion of 100 years of independence.

All over the world, the idea of becoming net zero in emissions is taking root. Countries, both developed and developing, are taking positive steps towards reducing their emissions. Climate change is becoming a real concern because of harmful emissions and global warming.

All countries need to take actual actions to reduce their emissions for a sustainable global future. As a responsible stakeholder in the global future, India, also had to play its part in minimizing its emissions. Moving towards a net zero emission future is all about bringing balance back into the atmosphere.

What is Net Zero Emissions?

When there are industrial and other human activities, a large amount of GHG emission occurs in the atmosphere. As a large and populous country, India's GHG emissions is very high. It is impossible to stop the emission of GHG emissions completely, but efforts can be made to nullify the and balance out their effect on the atmosphere.

By removing the harmful compounds from the atmosphere and balancing out the GHG emissions, net zero emissions stabilize the atmosphere and improve the atmospheric conditions to reduce the rising global temperatures. At a time when global temperatures are soaring, reducing emissions and achieving a state of net zero is very important.

The achievement of net zero emissions takes the transition from non-renewable to renewable energy resources. The use of renewable energy resources can reduce GHGs that are emitted from different sources. Renewable sources are cleaner and greener than fossil and other fuels. Using carbon capture technologies and smart devices to reduce the impact of GHGs is a step that India and other developing countries had to take.

Steps to be taken towards a net zero emission future

There have been many active steps towards reducing emissions and minimizing them to net zero. As recent as the Glasgow conference of 2021, Hon'ble Prime Minister declared some important steps for the future.

It is estimated that the country will reach its goal of 500 GW by 2030, a year that will mark the achievement of many sustainable development goals for India. India is also actively working towards harnessing its non-fossil fuels so that its renewable energy usage increases and the dependency on fossil fuels decreases.

The effect of greenhouse gases is reduced as the dependency on fossil fuels goes down. According to the pledges made by the country, India will install 50 percent non-fossil fuel sources for power generation in the next five years. India is also tapping into new and advanced energy sources like green hydrogen energy, which brings down carbon emissions.

India has also adopted the PAT (perform, achieve, trade) approach, which has prevented 92 million tonnes of CO₂ emissions in the 1st and 2nd cycles. These steps in the present and future have the potential of reducing emissions to net zero for the country.

Have Countries Set Net-Zero Targets?

Earth is a liveable planet, and countries worldwide are setting net zero emission targets to preserve its ability to support creatures. The net-zero emission targets are important as global temperatures have increased by 1.5°C on average. Countries, businesses, and even people at individual levels are pledging to reduce their emissions.

Apart from India, China, the USA, and countries of the EU have also set targets to achieve on the net zero emission front. It is important to note that more than 9000 companies and 1000 cities worldwide have joined the UN 'Race to Zero initiative' to bring the world's GHG emissions to net zero by 2030.

How Should Countries Align Their Short-term Emissions Minimisation goals with the Long-term carbon footprint reduction goals?

Many countries are focusing on bringing their GHG emissions closer to net zero by 2030. The long-term carbon footprint reduction goals are set for 2050. The short-term goals should align with the long-term carbon footprint reduction goals. The short-term goals should be ambitious but realistic and, should be focused on making policy decisions and implementing them. Long-term goals of carbon footprint reduction should be focused on corroborating the short-term results to create a long-term sustainable change in the carbon footprints.

What is India's long-term low-carbon development strategies?

India is making serious and impactful decisions to protect the environment and contributing to emissions reduction.

- India aims to increase its renewable energy quotient by installing 50 percent of its renewable sources harnessing equipment by 2023.
- India also aims to increase energy efficiency in its multiple sectors, such as transportation, power and electricity, and industrial manufacturing. The energy efficiency steps will help reduce the over-consumption and wastage of power and fuel in different sectors.
- India has already taken steps to reduce vehicular pollution and emissions by promoting electric vehicles (EVs).



- India aims to conserve and increase its forest cover and biodiversity to increase natural forest cover to minimize the effects of climate change and, also achieve net zero emissions and other developmental goals.
- India is trying to build its climate resilience with smart natural resource management strategies to reduce the effects of climate change. This will not only help in better resource allocation for a growing population but also in better disaster management and emergencies.

Bottom Line for India

India has to lead the challenge against climate change and global warming. Global warming and climate change are phenomena that affect people and countries all around the world. To protect the future and present generations, immediate steps for net zero emissions and a cleaner environment are necessary. India is actively taking and implementing these decisions today.

(Courtesy: www.deccanherald.com/environment/why-india-should-target-net-zero-by-47-2951944)

Agriculture food system causes 31% emissions, it is necessary to reduce it for net zero target

The agri-food system was never targeted before COP28 held in Dubai during November-December 2023 for limiting greenhouse gas (GHG) emissions, whereas doing so has become essential for achieving net zero emissions and limiting global warming. Globally, the agri-food system is responsible for 31 percent of emissions.

Due to its large population, India's agri-food system is one of the highest GHG emitters in the world. India is the third largest emitter of GHGs from the agri-food system, after China and Brazil, followed by USA and Indonesia.

There are ways to achieve net zero emissions at the lowest cost, while maintaining global food security and ensuring just transitions for vulnerable groups. Also, by focusing on the largest sources of emissions and the lowest-cost options,

countries will be able to prevent greenhouse gases from the agri-food system from reaching the atmosphere.

Till now most efforts to reduce emissions have been focused on sectors like energy, transportation and manufacturing, where the emission reduction was possible by using some key technologies. But emissions levels are still far from where they need to be to prevent climate disaster. The world has long avoided confronting agri-food system emissions because of its complexity. But according to scientists, it is time to put agriculture and food at the top of the emissions reduction agenda, so as, to keep the world liveable for future generations.

Limiting global temperature rise to 1.5°C by 2050 will require net zero emissions from the agri-food system. Despite its urgent need, agricultural negotiations under the United Nations Framework Convention on Climate Change (UNFCCC) are stalled because of differences between developed and developing countries on the issue of reducing emissions.

More emissions from the global agri-food system than electricity production

Previous calculations estimated that about one-fifth of global emissions come from agriculture, forestry and other land use (AFOLU). But recent studies incorporating the entire agri-value chain shows that the global agri-food system is responsible for 31 percent of emissions. This produces an average of 16 billion metric tonnes of CO₂ equivalent per year. By comparison, this is 2.24 billion tonnes or 14 percent more than the emissions from electricity production. Yet little attention has been paid to reducing emissions from the global agri-food system. Only half of the countries in the Paris Agreement included agriculture-related emission reduction targets in their Nationally Determined Contributions (NDCs).

The largest number of emissions in the agri-food system come from these eight key sectors:

1. livestock-related emissions - 25.9 percent
2. deforestation or change in land use - 18.4 percent
3. food system waste - 7.9 percent
4. household consumption of food items - 7.3 percent
5. fertilizer production and use - 6.9 percent
6. soil-related emissions - 5.7 percent
7. farm energy use and supply - 5.4 percent
8. emissions from rice production - 4.3 percent

Eighty percent of the world's fertilizers are consumed in middle-income countries. The top five countries include Brazil, China, India and Indonesia. In middle-income countries, an average of 168 kg of fertilizers are used per hectare. In high-income countries it is 141 kg and in low-income countries it is only 12 kg per hectare. Middle-income countries are also the largest fertilizer producers. China, India and Russia produce more than one-third of the world's nitrogenous fertilizer. Fertilizers are the largest sources of emissions in the pre-production stage and contribute 6.4 percent of emissions from the agri-food system.

Middle income countries contribute 68 percent to agricultural food emissions

Middle-income countries produce the most agricultural food emissions, high-income countries have the highest per capita emissions, and low-income countries have the highest rates of emissions growth. Today, middle-income countries account for 68 percent of global agri-food emissions, while high-income countries account for 21 percent and low-income countries account for 11 percent. There are 108 middle-income countries in the world. The number of high-income countries is 77 and the number of low-income countries is 28.

Higher per capita emissions in high-income countries are primarily caused by heavy consumption of meat and dairy, food transportation, processing, packaging, and wastage of foods. Due to low population growth rate, the share of these countries in agricultural food emissions has declined. These countries have shifted from agriculture to manufacturing and services and they source food from middle and low-income countries. They have also invested in food productivity and renewable energy.

Low-income countries have the lowest greenhouse gas emissions from the agri-food system, but the growth rates there have been the highest since the early 1990s. Emissions from these countries have increased by 53 percent compared to 12.3 percent for middle-income countries and 3 percent for high-income countries.

A deeper look reveals that the bulk of agricultural food emissions are concentrated in a handful of countries, mostly middle-income viz India, Brazil, China, Bangladesh and Russia. This trend is likely to continue as these countries follow the same path of growth that high-income countries followed in the past. The only difference is that the population of these middle-income countries is much larger and growing.

Fear of reaching more than 2°

It was agreed in the Paris Agreement to limit global warming to 1.5°C compared to pre-industrial levels. If the temperature rises beyond this level, the countries presently at risk will be at greater risk. If the temperature rises by more than 2°C, the number of destructive cyclones may increase and the food crisis will be acute. To achieve the 1.5°C target, it is necessary to reduce 52 giga tonnes of emissions every year, out of which, 16 tonnes will come from the agri-food system. New research shows that even if all fossil fuel emissions in other sectors were eliminated, emissions from the agri-food system alone would be enough to push global warming beyond the 1.5°C limit. It may even increase the temperature by 2.0 degrees Celsius. According to the Paris Agreement, to meet the 1.5°C target, emissions from the agri-food system will have to be reduced to net zero by 2050.

Lack of finance for mitigation

There is a major shortage of financing for mitigation in the agri-food system. Although, climate finance has almost doubled over the past decade, the amount available to the

agri-food system is only 4.3 percent of the total financing for mitigation and adaptation which amounts to USD 28.5 billion.

Only \$14.4 billion was made available for mitigation in 2019-20, which was 2.2 percent of the total climate finance. Renewable energy receives 51 percent of the financing and low-carbon transportation receives 26 percent. As per an estimate, the annual investments need to increase 18-fold (i.e., US\$260 billion) to halve current food system emissions by 2030.

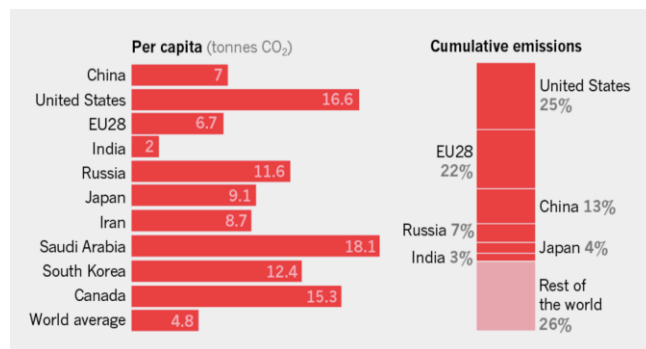
Changes in the agro-food system threaten food security

Caution is needed in adopting low-emission agri-food systems. Some studies have estimated that agricultural food system reform, if not done carefully, could reduce agricultural production and increase food prices. For example, reducing fertilizer use or switching to organic farming would reduce emissions by 15 percent, but could reduce agricultural production by 5 percent and increase global food prices by 13 percent. Healthy eating can be 10 percent more expensive. It has been estimated that by 2050, the food security of 40 million people could be at risk due to deforestation. For these reasons, political opposition to the adoption of a net zero agri-food system is possible (India refrained from signing the declaration on reduction of GHG emissions in agri-food systems during COP28 in Dubai)

The global nature of the agri-food system also leads to volatility in food prices. For example, 122 million people have faced hunger since 2019 because of supply chain disruptions caused by COVID-19, extreme weather conditions and Russia's attack on Ukraine. Investing in low-emission agriculture and food and land use changes could yield \$4.3 trillion in health, economic and environmental benefits by 2030.

Vegetarianism reduces emissions

Vegetarianism of the people of India also reduces emissions. There are more vegetarians in India than any other country in the world.



India's population is almost four times that of the US, yet its emissions are only 30 percent more than the US. This is because per capita emissions are much lower than the global average. Apart from vegetarianism, another major reason for this is poverty and malnutrition - a large part of the population cannot consume more.

This creates a contradiction. While in most of the countries a change in diet would reduce emissions, in India such a change would lead to a small increase in emissions. In India, 60 percent of agri-food system emissions come from the farmgate. India's livestock sector is also very inefficient. The emissions intensity per unit of both milk and beef is among the highest in the world. In contrast, India's rice production has the lowest emission intensity. But being the second largest rice producer after China, the total emissions here are higher. Not only is farmgate emissions the highest in India, pre and post-production emissions are also increasing rapidly.

Tackling emissions from the agri-food system

If one-fourth of the 88 lakh diesel pumps used for irrigation in India are replaced with solar powered pumps, 115 lakh tonnes of emissions can be reduced every year. Solar powered irrigation has been around since the 1970s and is being rapidly adopted in India. By December 2020, some 10 lakh solar powered irrigation systems were already commissioned in India.

In the agricultural sector, 48 percent of the mitigation potential in China and 63 percent in India lies in carbon sequestration. The potential for carbon sequestration in soils is greatest in middle-income countries. In India, along with Mexico, the method of precision crop nutrition management is being adopted without affecting the food production.

Despite these steps, the progress in this direction is slow. Food security in India and Bangladesh is almost entirely dependent on rice. Here governments provide subsidies on water, fertilizers, pesticides and electricity for rice production. There has been strong opposition to the steps taken to end it and there is competition among political leaders to get the votes of farming community.

(Courtesy: World Bank Report: 'Recipe for a Liveable Planet: Achieving Net Zero Emissions in the Agri Food System.')

Net Zero Banking: Creating a Long-Term and sustainable financial Services

The financial sector is becoming more and more aware of its vital role in assisting in the transition to a low-carbon economy and a sustainable future, as the world approaches a key turning point in the fight against climate change. The concept of net-zero banking, which seeks to integrate financial services with social and environmental sustainability objectives, is thus becoming increasingly important to the global efforts towards tackling climate change.

Banks must address every aspect of sustainability. However, presently, they seem to be contributing to both aspects of moving towards a green future. On the one hand, they support efforts to decarbonise the economy while on the other, they also help finance businesses that emit carbon dioxide. In this dual capacity, banks become potent catalysts that cause a seismic shift in the statistics related to climate change worldwide.

Globally, the market for sustainable finance is expected to develop significantly, with projections indicating that it will rise from USD 3.6 trillion in 2021 to USD 23 trillion by 2031.

The need for net-zero financing

Since it is imperative that we confront climate change, the Intergovernmental Panel on Climate Change (IPCC) recommended keeping global warming to 1.5°C over the pre-industrial levels in order to prevent any further deterioration of the global climate. However, the adverse consequences of climate change are unavoidable for global markets, as the current temperatures are already 1.1°C beyond the established thresholds. Therefore, businesses need to incorporate robust and effective net-zero initiatives into their fundamental operating frameworks in order to safeguard their long-term sustainability while responding to the changing environmental problems.

The rise of sustainable banking

The banking industry's dedication to net zero goals is indicative of the growing popularity of sustainable banking practices. In 2023, the United Nations (UN) convened the Net-Zero Banking Alliance (NZBA), with a membership of 138 of the world's top banks, spanning 44 nations and representing 41% of all the banking assets, in order to address this developing threat. The global banking sector, which has an asset under management (AUM) of more than USD 9.5 trillion, has embraced the challenge of strategically aligning its operations and moving its lending and investment portfolio toward net-zero GHG emissions by 2050, in compliance with the Paris Agreement.

Today, banks are generally cognisant of the collective stakeholder sentiment which is increasingly shifting in the favour of better sustainability ratings. The 'environment' and 'sustainable' components of ESG are being actively incorporated in the internal frameworks of banks, with the 'governance' aspect simultaneously evolving to cater to the former two components. This indicates an emerging era of responsible banking, where the focus is not only on traditional profit-centric models but also on the environmental impact. One of the major aspects within this paradigm is the consideration of financed emissions i.e., emissions resulting from the projects and activities funded by banks.

Banks have often come under scrutiny due to their role in financing activities that contribute to GHG emissions. As societies and regulators intensify their focus on mitigating climate change, banks are increasingly evaluating the environmental impact of the projects they now fund. In order to finance green projects, support renewable energy efforts and encourage energy efficiency, they are implementing sustainable banking practices. This ultimately lowers the total carbon footprint linked to their financial activities.

Green Finance Initiatives

Indian commercial banks have been supporting green finance programmes, allocating funds to projects aimed at fostering environmental sustainability. These programmes cover a wide range of sectors such as sustainable agriculture, energy efficiency and renewable energy. A few recent developments towards green finance initiatives are as under:

- The Reserve Bank of India (RBI) published a “Framework for Acceptance of Green Deposits” on 11 April 2023, with the goal of promoting, fostering and developing a sustainable financial ecosystem in the country.
- With the implementation of this framework on 1 June 2023, banks and non-banking financial institutions (NBFCs) can be encouraged to offer green deposits, thereby facilitating the financing of environmentally sustainable projects and activities for their portfolio consumers. This framework is aimed at protecting the interests of depositors, helping clients achieve their sustainability goals, addressing issues with greenwashing and encouraging more credit flow to green initiative-aligned projects.
- Establishing a comprehensive board-authorized policy, especially for green deposits, is mandatory for banks and NBFCs. All information pertaining to the issue and distribution of green deposits should be included in this policy. To guarantee the effective distribution of green deposits, these institutions must also put in place a Financing Framework (FF) that has been approved by the board.
- Of the 34 scheduled commercial banks in India, which include public, private and foreign banks, 85% agreed to make structural changes to their current lending and investing approach to support green financing, according to RBI’s Report of the Survey on Climate Risk and Sustainable Finance, July 2022. Among other considerations, a majority of banks (56%) have also chosen to progressively lessen their exposure to companies that emit or pollute a considerable amount of carbon in the upcoming years.

Additionally, even though banking and financial institutions’ green efforts were already in the work-in-progress stage prior to the introduction of RBI’s framework, it provided Indian commercial banks an additional impetus and push to actively integrate the facilitation of green deposits for their borrowers. Let’s now examine the actions taken by a few banks in this regard:

- In February 2023, India’s largest public sector unit (PSU) bank was able to secure a USD 1 billion³ syndicated social loan through two major international banks. This has been recognised as a notable milestone since it is the largest ESG loan secured by a commercial bank in the Asia-Pacific area and the second-largest social loan globally.
- A major state-owned Indian bank and the Indian Renewable Energy Development Agency (IREDA) initiated a joint venture in September 2023 with

the objective of enhancing credit activities within the renewable energy sector. The main areas of focus for the bank and IREDA, which include a wide range of renewable energy projects, are co-lending and loan syndication.

- Another major Indian PSU Bank released a green deposit policy and lending framework in August 2023, adhering to the Green Deposit Framework established by the RBI. Offering green financing options to clients in order to support their transition to a sustainable future is the bank’s primary goal.
- To promote innovation in the field of green hydrogen, a major global bank with operations in India teamed up with a well-renowned Indian management institution and a major sustainable energy foundation in August 2023.

As partnerships and cooperative efforts gain traction in the race towards net zero, several institutions are also taking the initiative to quicken the pace of green finance.

Way ahead

The banking sector is at the centre of a sustainable transformation as the world moves towards a net zero future. Financial institutions need to take the lead in promoting sustainability, resilience and environmental responsibility, as we negotiate the challenges posed by the fast-changing climate. The goal of net-zero banking is to create a future in which environmental preservation and financial prosperity coexist in harmony – and not just to minimise carbon emissions. Banks have the power to spark a significant shift that will lead sectors towards a more environmentally friendly and sustainable future by embracing sustainable finance products, improving transparency, strengthening risk management techniques and involving stakeholders.

(Courtesy: <https://www.pwc.in/blogs/net-zero-banking-creating-a-long-term-and-sustainable-financial-services-economy.html>)

Indian agriculture: The route post-COP 26

India’s pledge of *Panchamrit* (five-fold strategy) to fight climate change, announced during the COP26 at Glasgow, Scotland, has caught global attention. The country’s new commitments include reaching 500 GW of non-fossil fuel energy capacity by 2030; producing 50 percent of energy requirements through renewable sources by 2030; a reduction of 1 billion tonnes of carbon by 2030; reducing the carbon emission intensity of the GDP by 45 per cent by 2030; and most importantly, achieving the target of net-zero emissions by 2070.

Multiple agreements were signed by groups of countries during the COP26. As many as 26 countries signed the Sustainable Agriculture Policy Action Agenda to set a course of action to protect food systems and prevent loss of biodiversity against climate change. The countries laid down their commitments with a pledge “to use land sustainably and put protection and restoration of nature at the heart of all.” India did not sign the agenda as its Mission for

Sustainable Agriculture (NMSA), one of the missions within the National Action Plan on Climate Change (NAPCC), is already operational to deal with the issue of climate change in the agriculture sector.

While Indian agriculture is adversely impacted by the vicissitudes of climate change, the sector also is a significant contributor to GHG emissions. As per the Third Biennial Update Report submitted by the Government of India in early 2021 to the United Nations Framework Convention on Climate Change (UNFCCC), the agriculture sector contributes 14 per cent of the total GHG emissions (energy: 75.01 per cent; industrial process and product use: 8 per cent; and waste: 2.7 per cent, as per 2016 data).

Within the sector, 54.6 per cent of GHG emissions were due to enteric fermentation, followed by 17.5 per cent from rice cultivation, 19.1 per cent from fertiliser applied to agricultural soils, 6.7 per cent from manure management, and 2.2 per cent due to field burning of agricultural residues. Therefore, effective mitigation measures and appropriate adaptation technologies must be taken to reduce ghg emissions from the agriculture sector.

India's approach has been a balancing act between growth and sustainability in its climate change policies and it is leading the developing nations to place agriculture in the ongoing negotiations. The NMSA, as part of NAPCC for more than a decade now, has focused to make Indian agriculture sustainable, considering likely risks arising from climate variability.

'Indian Council of Agricultural Research (ICAR)' and 'International Crops Research Institute for the Semi-Arid Tropics (ICRISAT),' have developed climate smart agricultural technologies and approaches to assist the agricultural sector to be less vulnerable to the adverse impacts of climate change under National Innovations on Climate Resilient Agriculture (NICRA) network projects. We present a list of strategies/ pathways that could be prioritised in the policy agenda to make Indian agriculture resilient and sustainable in a changing climate.

1. Crop Diversification:

Diversifying from existing cropping systems, predominated by rice and wheat in many unsustainable landscapes, to more nutritious and environment-friendly crops have often been suggested to address challenges of climate change and malnutrition. However, such a transition must protect the income base of the farmers.

Research findings have already shown the potential benefits of crop diversification, including to sorghum and millet, and particularly in those tracts where rice yields are low. Such diversification would not only increase the nutritional value of the food system, but also holds potential to reduce inputs and GHG emissions.

Agroforestry, for example, brings synergies between trees and crops or forages (such as trees on field bunds, inline agroforestry and high-density fruit orchards) to help diversify existing farming systems and achieve medium to long term sustainability.

Diversification to crops like pulses, oilseeds, vegetables and fruits, adapted to specific agro-ecologies, must also be planned and, implemented by the states with suitable incentives to farmers during the changeover. However, diversifying to new portfolio of crops will require strengthening of existing value chains.

For crop diversification (from major staples to nutritious and climate-resilient crops) to succeed, healthy and diversified diets need to be promoted and incorporated in the menu of Indian consumers.

An increasing consumer interest on safe and nutritious foods is already observed during the pandemic, and this positive trend for healthy foods is expected to further rise. Reduction of food waste must also be internalised by large section of consumers, through campaigns by government and civil society, that lessen ghg emissions from this neglected part of the food system.

2. Agro-ecological approaches:

Methane from rice-paddies, nitrous-oxide emissions, or nitrogen leaching from inefficient use of chemical fertiliser are a key downside of resource-intensive approaches to production. Agro-ecological approaches, offer a solution to these problems. The natural farming practices are the simple examples, which have since been tried and scaled up in parts of India that bring synergy towards ecosystem services and biodiversity conservation.

Managing crop-residue burning remains a huge challenge. The activity affects air quality in immediate vicinity and in urban centres. This practice is propelled by a monoculture farming system and the legacy of, perhaps, perverse policy incentives.

Conservation agriculture offers solutions to such pernicious problems with good agronomy and soil management such as no-till farming, crop rotation, *in-situ* crop harvest residue management, mulching, zero-till planters such as the Happy Seeder, among others. These practices could be very useful in significantly reducing GHG emissions.

Excessive use of pesticides and fertilisers pollutes the environment. The scientifically prescribed ratio of macro nutrients (nitrogen-phosphorous-potassium or N-P-K) is already skewed in many states, because of excessive subsidy in favour of urea vis-à-vis the balance approach to plant nutrition considering macro- and micro-nutrients.

Since soil health card scheme of the government has penetrated throughout the country, site-specific, need-based nutrient management would be advisable to sustainably conserve the soil ecosystem.

Organic farming that involves crop cultivation in natural ways can be practised with supportive policy incentives, without compromising the profitability and income of farmers. Use of botanicals, green-manure and biological pest control is nature-friendly and can lead to reduction of GHG emissions to a considerable extent.

Nature-positive and regenerative agriculture practices mentioned above hold potential to reduce GHG emissions. Since the government is promoting such technologies and practices at some pace and scale, their scientific validation and demonstration (to avert notions that they might compromise on food security) can bring wide adoption by interested farmers.

3. Water-use efficiency:

Diminishing natural resources, including water, is the most visible manifestation of climate change in India. Water used for Indian agriculture accounts for about 80 percent of total freshwater resources and, therefore, water-use efficiency would be desirable for additional food production for a burgeoning population. Promotion of micro-irrigation practices (sprinkler and drip) through several schemes and programmes by the government has been localised in few states as of now that should proliferate to larger crop areas.

System of rice intensification (SRI), alternate wetting and drying (AWD), direct seeded rice (DSR) and furrow irrigation, have often been prescribed for efficient use of irrigation water in a traditionally perceived water-guzzling crop like paddy without any yield reduction.

Subsidy-based approaches to irrigate farmlands has led to negative environmental consequences in many parts of India. Punjab is a case in point, where over-exploitation of ground water due to subsidies on power (in fact, it is free) has already led to an alarming situation.

“More crop-per drop” has been the mantra of current public policies around irrigation water. Suitable policies with incentives mechanism could lead more farmers to adopt technologies that aim to “irrigate the crop and not the land”.

In-situ soil and moisture conservation with involvement of the community has successfully been addressed through the watershed management approach. The impacts of the interventions demonstrated successfully by institutes like ICRISAT have shown conservation and utilization of surface water has enabled farmers to grow more crops per year and enhancement of productivity of a diverse portfolio of crops.

Convergence of schematic interventions through the Mahatma Gandhi National Rural Employment Guarantee Scheme (MGNREGS), Pradhan Mantri Krishi Sinchai Yojana (PMKSY), among others, for groundwater recharging, revival of traditional water bodies and creation of water harvesting structures would go a long way in conservation and usage of water for agricultural use. Efficient use of water in agriculture will lessen an impending ecological threat from current unsustainable practices.

4. Renewable energy usage:

India’s ambitious renewable energy target (500 GW by 2030) must include the potential agriculture sector upfront. At present, Pradhan Mantri Kisan Urja Suraksha evam Utthaan Mahabhiyan (PM-KUSUM) scheme of the government aims to improve irrigation access and raise farmers’ income through solar-powered irrigation. However, with highly

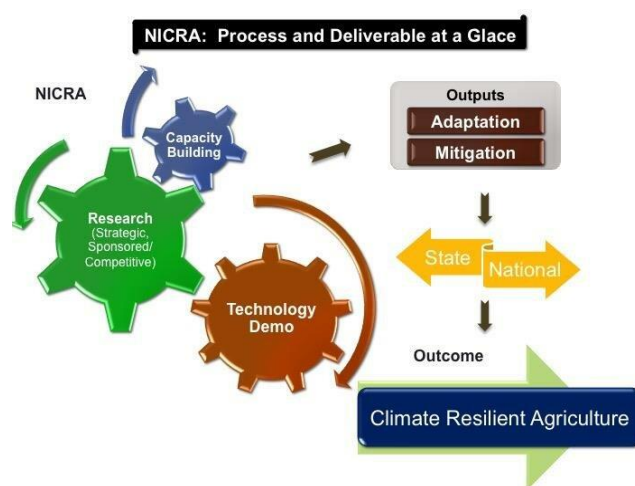
subsidised or free electricity to irrigate agricultural lands, farmers have not largely switched over to solar-powered irrigation and harness the potential.

Setting up of solar power plants on farmlands, wherever possible, and solarising existing grid-connected pumps, could earn additional income to farmers, besides making them net energy producers. Government policies must reorient to reduce agriculture’s power subsidy bills and divert the money towards sustainable farm sector investments like solar power that could address challenges arising from the “water-energy-food” nexus. Reducing energy usage from fossil fuel sources and moving towards renewables, will reduce carbon footprints in the agriculture sector and enhance livelihoods of smallholders.

5. Digital agriculture:

Increasing use of smartphones in rural India offers a unique opportunity to leverage information symmetry and connectivity to the advantage of farmers. The new ICT (Information and Communications Technology) and data ecosystems carry the potential to raise farm productivity and income by supporting the delivery of information and services, market integration and management of risks, mainly arising from weather extremes.

Proven support systems, like weather advisories and market intelligence, hold promise to make farming more profitable and sustainable. For example, Meghdoot, a pan-India application for accessing agro-met information, has been popular amongst its users. Similarly, new agri-tech start-ups and farm enterprises, including those led by farmer collectives like Farmer Producer Organisation, are increasingly using digital tools to bring efficiency in agricultural marketing and manage risks. Public policies must keep these emerging trends in mind.



6. Research and innovation investments:

To offset the impact of climate change on food and agriculture by developing climate resilient varieties and other suitable technologies, increased resource allocation to agricultural research and innovation has often been prescribed. The rise of carbon dioxide levels and temperature in the atmosphere have direct correlation on

crop productivity, grain quality, pest and disease incidence, as well as on the cropping system.

Research and analyses on the contributions of various allied sectors of agriculture on ghg emissions will also be helpful for effective policy planning. For example, animal husbandry contributes the highest carbon emissions within agriculture sector in India and therefore, life cycle assessment (LCA) studies need to be done for products or services in the livestock sector for robust measurement systems as tools for national GHG inventory and monitoring emission reduction targets.

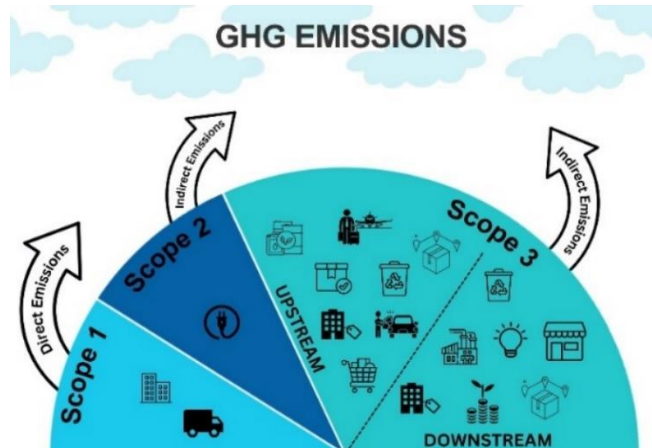
Inadequate and sub-optimal investments may not yield desired results and, therefore, the government must commit enhanced outlay for agricultural research and innovation, including improvement of infrastructure, and capacities of both scientists and extension personnel.

Climate change affects the poor and the smallholders, who earn their livelihoods from agriculture, disproportionately. Technologies and adaptation strategies must, therefore, reduce their vulnerabilities. India, in its mitigation and adaptation efforts, must formulate and implement policies that make Indian agriculture climate resilient and sustainable. Post-cop26, India's ambitious commitments should reflect in its tangible and concrete actions.

(Courtesy: <https://www.downtoearth.org.in/climate-change/indian-agriculture-the-route-post-cop-26-81154>)

What are the types/ scopes of Net zero emissions?

To achieve net zero, organizations and governments must address and reduce the GHG emissions. In order to report the progress, the emissions are categorized into three scopes. As per the "The Greenhouse Protocol" (global greenhouse gas accounting standard) where the word "scope" was mentioned. These scopes involve not only reducing emissions from direct operations and purchased energy but also considering the broader impact of their value chain. Companies often set emission reduction targets, invest in renewable energy, improve energy efficiency, and engage in sustainable practices to achieve net zero goals across all scopes.



Scope 1 (Direct Emissions):

It includes direct emissions from sources that are owned or controlled by the entity in question. These emissions are from on-site combustion of fossil fuels, such as those from company-owned vehicles and facilities.

Scope 2 (Indirect Emissions - Energy Indirect):

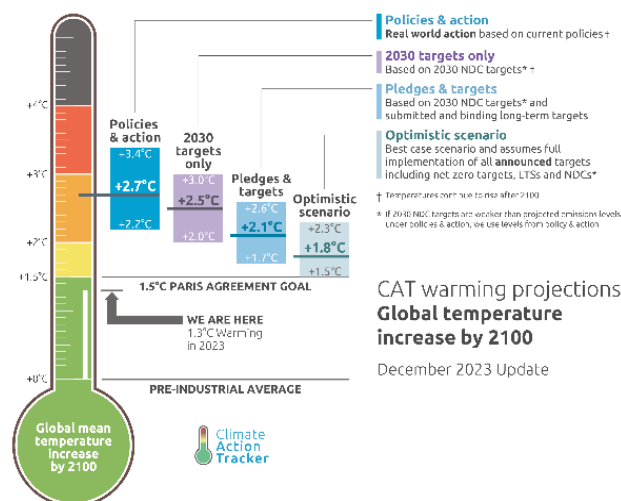
Scope 2 emissions encompass indirect emissions associated with the generation of electricity, heating, and cooling purchased and consumed by the entity. These emissions are generated off-site but are a result of the entity's activities. It often includes emissions from the production of electricity that the organization consume.

Scope 3 (Indirect Emissions - Value Chain):

Scope 3 emissions are indirect emissions that occur in the value chain of the reporting company but are not owned or controlled by that entity. This scope includes emissions from sources such as the extraction, production, and transportation of purchased materials, employee commuting, business travel, and the use of sold products. The emissions are typically the largest portion of a company's carbon footprint and can be the most challenging to measure and manage.

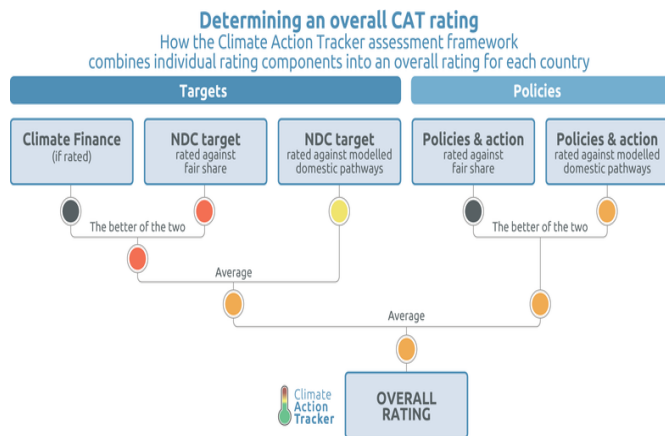
Net Zero Tracker

The Climate Action Tracker (CAT) is an independent scientific analysis that measures government climate action against the globally agreed aim of holding warming well below 2°C, and pursuing efforts to limit warming to 1.5°C. It is produced by two research organisations, Climate Analytics and New Climate Institute.



The CAT tracks climate pledges and policies of 32 countries, covering around 80% of global emissions, including all the biggest emitters and a representative sample of smaller emitters. The analysis focuses on:

- Government climate action pledged to the UNFCCC (and INDCs, other commitments)
- The policies, a government has implemented to meet its commitments
- Whether a government is doing its “fair share” compared with others
- Comparison to emission reduction potential based on a literature review
- Comparison of national and sectoral decarbonisation indicators

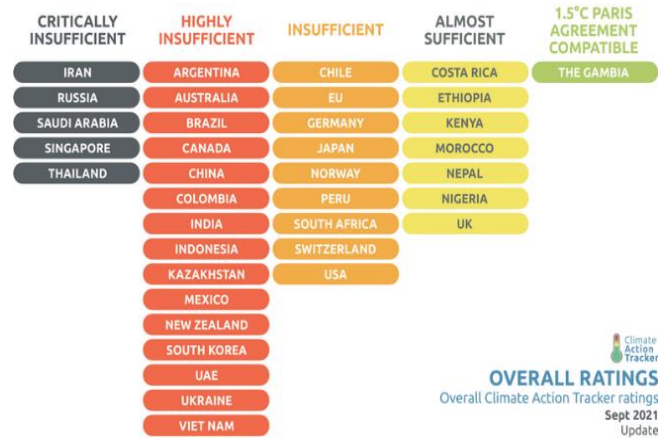


The key features of CAT include:

1. **Assessment of Nation’s Climate Goals:** CAT evaluates the climate goals set by the countries, including their commitments under international agreements Like Paris Agreement. It assesses the adequacy and ambition of these goals in terms of their potential impact on global warming.
2. **Temperature Pathways:** The organization analyses the collective impact of countries climate goals on global temperature rise. It makes assessment of whether the combined efforts of all countries are aligned with limiting global warming to well below 2°C above the pre-industrialization levels, as per the Paris Agreement Goals.
3. **Current Policies and Pathways:** CAT looks at the existing policies and measures that countries have in place in order to reduce GHG emissions and transition to low carbon economies. It evaluates, whether these policies are on track to meet the stated climate goals.
4. **Emissions Trajectories:** CAT provides projections of future GHG emissions based on current policies and commitments. It assesses whether these emission trajectories are consistent with global climate goals.
5. **Emission Coverage:** The accomplishment of net zero encompasses all key sectors of the economy. It is still an assumption whether it covers all GHGs, since this is not expressly talked in a Long-Term Low Emission Development Strategy (LT-LEDS).
6. **Rating System:** CAT categorizes countries’ climate efforts into different rating levels, viz. Critically Insufficient, Highly Insufficient, Insufficient, Almost Insufficient and 1.5°C Paris Agreement Compatible.
7. **Global and Regional Perspectives:** CAT provides assessments at both global and regional levels, offering

insights into, how different parts of the world are contributing to or hindering global climate goals.

CAT aims to hold the governments accountable for their climate commitments by providing clear and data-driven assessments of their actions. Its analysis is based on publicly available information and data from various sources



RBI and the net-zero transition - A roadmap for green India

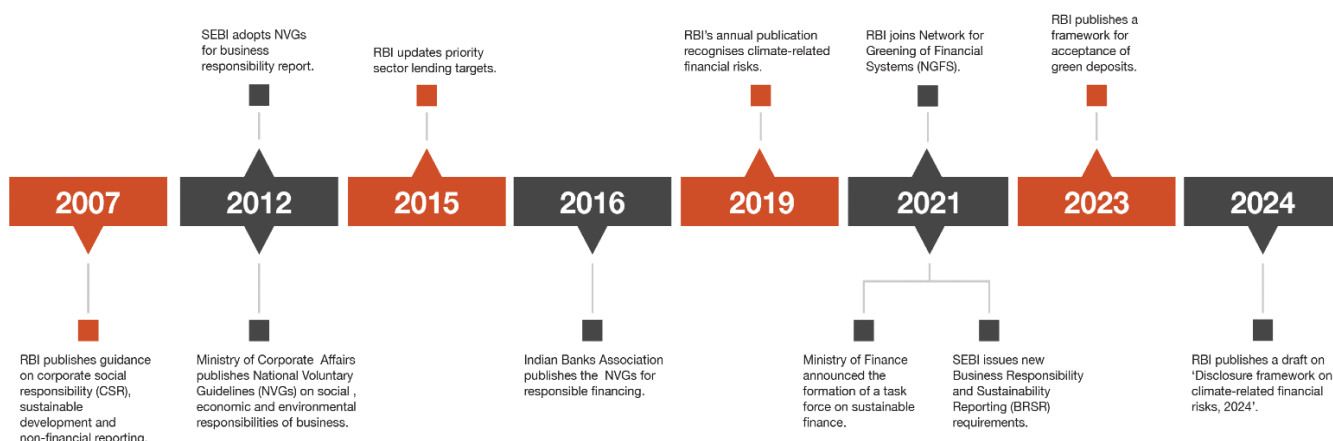
RBI has taken a step forward by introducing the draft that aligns well with international standards. Even as regulated entities begin to respond to the regulatory shift, they must simultaneously keep a watch on the asset quality not just in fossil fuel-based sectors but also in ‘green’ sectors

As fossil-fuel consumption is phased down over the coming decades, the financial system will need to prepare for change. The banking sector is an important actor in the financial sector. As a result, the transition to net zero will have implications for the Indian banking system. RBI estimates that banks’ current exposure to utilities, metal and transport is relatively higher. While the aggregate exposure level to climate-change risk remains moderate, there are sharp contrasts between the exposures of public- and private-sector banks. At the same time, non-banking financial companies (NBFCs) extend nearly half of their gross credit to power and auto segments. Given the interconnectedness between banks and NBFCs, the risk to the financial system may be pronounced. In the years to come, as fossil fuel-based assets and processes are phased down, there will be demand for green investments. The question is how can banking ensure that the two can be managed practically? The RBI is focussed on risk management and has signalled its intent to align policy with transition. The introduction of lending to renewable energy under priority sector lending, a framework for green deposits and the reports assessing climate risks are all efforts in this direction. The central bank has now followed through with its commitment to assessing climate change related risks in its draft disclosure framework on climate-related financial risks. The report underscores the need for comparable disclosure frameworks among Indian-regulated entities about climate-related financial risks to ensure that there is

adequate information about mispricing of assets and misallocation of capital. Therefore, the framework is set to deepen the understanding of current exposures and preparedness among the various entities regulated by RBI. The regulation will cover scheduled commercial banks, Tier IV primary urban cooperative banks, all India financial institutions and all top and upper layer NBFCs. RBI's survey of regulated entities in 2022 showed that 90 per cent of the respondents considered climate risk a material threat to business. However, detailed assessment of risks among the respondents is low. A disclosure framework fills in such gap.

The draft by RBI sets three thematic pillars for reporting: Governance, strategy and risk management. The framework expects financial institutions to provide information on their internal processes to ensure capacity or understanding of climate change-related issues as well as oversight. In terms of strategy, the regulated entities will have to specify the kinds of issues and impacts that may arise over different time horizons, that is, short, medium and long term. This is particularly important as the systemic risks will be more pronounced where there is more long-term lending to sectors in transition and prone to extreme weather events. In 2023, 64.2 per cent of bank loans had maturities less than or equal to three years. While the information on maturity of loans by sector is not available, a similar profile for the loans in fossil fuels-based sectors would mean that the banks may be able to prepare better for the transition.

Transition risks can impact differently under the various scenarios. Therefore, the framework seeks information from entities on the assessment of stress through climate-scenario analysis as part of the risk management strategy. This would require banks to provide reasons for choosing the climate scenario and align it with national and state-level policies. In fact, the draft refers to scenario analysis based on nationally determined contributions. To support more robust reporting, it is important to update the scenarios to align with India's aspiration to achieve net zero. Therefore, national and sub-national governments must help provide a pathway to benefit from the disclosure framework. Reporting of exposure and risks is not complete without metrics and targets. While reporting of information on the three pillars will begin in the financial year 2025-26, reporting of metrics and targets, which includes greenhouse gas emissions or intensity and financed emissions will begin in the financial year 2027-28. As entities prepare to report in a year's time it is essential to recognise that the technical capacities of banks vary widely. Capacity building is key for the success of the framework. RBI has taken a step forward by introducing the draft that aligns well with international standards. Even as regulated entities begin to respond to the regulatory shift, they must simultaneously keep a watch on the asset quality not just in fossil fuel-based sectors but also in "green" sectors so as to ensure a smoother journey to net zero



For limited Circulation

Printed and Published by: Director, Bankers' Institute of Rural Development (BIRD), Lucknow – 226012



CENTER FOR CLIMATE CHANGE
 BANKERS INSTITUTE OF RURAL DEVELOPMENT
 Sector – H, LDA Colony, Kanpur Road, Lucknow – 226 012
 e-mail: bird@nabard.org
 website: birdlucknow.nabard.org

