DEVELOPING A GREEN TAXONOMY FOR INDIA: A RULEBOOK

Renita D'Souza

Attribution: Renita D'Souza, *Developing a Green Taxonomy for India: A Rulebook,* December 2021, Observer Research Foundation.

Observer Research Foundation
20 Rouse Avenue, Institutional Area
New Delhi 110002
India
contactus@orfonline.org
www.orfonline.org

ORF provides non-partisan, independent analyses and inputs on matters of security, strategy, economy, development, energy and global governance to diverse decision-makers (governments, business communities, academia and civil society). ORF's mandate is to conduct in-depth research, provide inclusive platforms, and invest in tomorrow's thought leaders today.

Design and layout: Rahil Miya Shaikh

Abstract

The global community is now recognising the detrimental nature of conventional development pathways and demanding increased accountability for environmental sustainability, making it imperative for countries to acknowledge the environmental costs of growth. To keep up with this global shift, India must outline a pathway of green transition that is 1.5 degrees Celsius compatible and accounts for its development needs; socioeconomic challenges; and institutional, technological, and financial capacities. Given the significance of the financial system in mobilising resources required for a green transition, the concept of "green finance" has gained traction in recent years. If industrialised, it can help India transform into a green economy. This report proposes an illustrative approach to developing a green taxonomy for India and delineates its broad contours, fundamental principles, and potential rules. The taxonomy suggests actions to support a green finance ecosystem, provides a template for disclosure and reporting practices for green investments, examines the gaps in the existing norms and standards of implementation, highlights the neglected green sectors of the economy, and makes recommendations for policy and regulations to support the taxonomy.

Contents

Executive Summary

Riding on the climate commitments made at Paris, the world was well on its way to a temperature rise over 3 degrees Celsius above pre-industrial levels by 2100. With the window of opportunity for climate action fast closing, the 26th session of the Conference of the Parties (COP26), hosted in Glasgow in November 2021, was referred to as the "make-or-break" summit in the fight against climate change. With the announcement of the net-zero targets by major economies, such as China, and the US, global warming projections have improved. Climate change is one of the outcomes of the environmental debt that has accumulated over time due to the global failure to incorporate environmental costs into economic growth and development calculus.

India's ambition to grow into a US$5-trillion economy by 2024-25 while also addressing this accumulated environmental debt will make it a decisive player on the global chessboard of climate-change mitigation. As the third-largest emitter, the second-most populated country (1.38 billion as of 2020 and

estimated to reach 1.6 billion in 2048), and one of the fastest-growing economies, India is expected to emerge as a world leader in climate action for achieving global net-zero emissions by pursuing a 1.5 degrees Celsius compatible development pathway. Further, this development experience can prompt similar action by peer nations and make India their touchstone in resolving the trade-off between environmental sustenance and economic growth.

India's green transformation—anchored in increased efficiency in technology and business models, as well as a growth in green infrastructure—must involve high-impact sectors such as energy, mobility, manufacturing, agriculture, waste management and buildings, given their contribution to India's pressing environmental concerns, namely, greenhouse gas (GHG) emissions inventory of the nation; air, water and soil pollution; land degradation; water stress; and ecosystem and biodiversity losses. This green transformation demands a significant portion of India's gross domestic product, approximately seven percent to eight percent annually, to be invested in green infrastructure as well as an annual climate-smart investment to the tune of US$300 billion. While there is no universally accepted definition of "green finance," investments that take into consideration the environmental sustainability of economic activities, projects or assets financed by them may be broadly referred to as such.

At the global level, green private capital is abundant. The number of signatories to UN-backed Principles for Responsible Investment stood at 3,826 as of April 2021, representing US$121.3 trillion in collective assets under management; the number of sustainability indexed funds benchmarked to environmental, social, and governance indices were as large as 534, overseeing a combined US$250 billion by the end of the second quarter of 2020; and the current size of the impact investing market stands at US$715 billion, according to Annual Impact Investor Survey 2020. Yet, the share of international private finance in tracked green finance for 2016-17 and 2017-18 was as low as five percent.

The investment peculiarities of green projects involve risk-return characteristics beyond the financing capacities of conventional financial institutions and lenders, which are under stress in India. The amount of green investment required, the relative underdevelopment of the Indian financial market, the small pool of domestic institutional investors, and the tight investment regulations imposed on such investors make foreign private capital crucial for India's green transformation. However, the high-risk perception becomes amplified in emerging economies and is one of the factors responsible for India's inability to attract the requisite green finance investments.[1] This perception is compounded to a certain degree by the absence of a national green taxonomy to standardise the notion of green finance and identify activities eligible for such finance. Consequently, green investments in India are susceptible to varied interpretations of green finance, increasing the likelihood of information asymmetry and, in turn, the risk of greenwashing. Developing a green taxonomy will kickstart the process of transforming green finance "from a trickle to a flow" and help provide the resource base required to realise India's green transition. A taxonomy characterised by a well-defined set of eligibility criteria can provide a clear understanding of and transparency about the environmental implications of the economic activities underlying financial instruments. It acts as a lighthouse for environmentally conscious investors in their decision-making and boosts their confidence in green investments. Financial institutions and companies can manage and track their environmental footprint in sync with the taxonomy, while the regulators can monitor these entities by mandating disclosures aligned with the taxonomy. Further, the Indian government can monitor its progress in contributing to the global net-zero vision and modify its action plan to correct any deviations.

[1] False or misleading claims about the degree of environmental sustainability of an investment instrument.

This report employs an illustrative approach to establish a rulebook for guiding the development of a national green taxonomy for India. As a springboard from which to approach this effort, the document first reviews some existing taxonomies—Bangladesh, China, Climate Bonds Initiative, Egypt, European Union, Malaysia, Multilateral Development Banks-International Development Finance Club (MDB-IDFC) Common Principles, Mongolia, and the World Bank guidelines. Some of the important insights derived from this exercise have become the guiding principles of the proposal presented in this document. These include:

- Addressing the pressing environmental challenges confronting India and thereby maximising the environmental gains accrued from implementing the taxonomy, without compromising India's growth and development needs.
- Ensuring that the eligibility criteria is technology agnostic and must preferably be defined in a way that allows India to pursue to the best extent possible a development pathway aligned with a goal of 1.5 degrees Celsius.
- Making the eligibility criteria compatible with the broader intent of India's nationally determined contributions (NDCs), major national plans and policies for environmental action. The taxonomy can enable more ambitious climate action than these NDCs, plans and policies.
- Broadly aligning the eligibility criteria with national environmental norms and standards. However, for the effective implementation of the taxonomy, these may be upgraded to be at par with international standards. New norms and standards may be created wherever needed.
- Harmonising with international taxonomies while taking into account specific domestic circumstances.
- Scheduling regular review and updates to incorporate changes in development levels, technology, policy, and standards that bear upon environmental sustenance, and environmental conditions.

The illustrative approach developed in this document distinguishes between two types of economic activities: (i) Critical economic activities that must satisfy the technical screening criteria to become eligible for green finance and (ii) Activities that enable the performance of type (i) activities, by which they become eligible for green finance and do not need to satisfy any technical screening criteria. The proposal develops technology-agnostic technical screening criteria for type (i) activities across sectors such as energy (power), manufacturing, transport, agriculture and livestock, waste and buildings.

For the energy (power), manufacturing and transport sectors, eligibility criteria are developed in terms of GHG emissions, air and water pollution, water consumption, and ecosystem and biodiversity losses. Cases that violate the quantitative thresholds of ecosystem and biodiversity losses will be ineligible for green finance. A Cumulative Environmental Impact Assessment is mandated for those in which the loss of ecosystem services and/or biodiversity is below the tolerable thresholds. For the power sector, thresholds are defined in the context of energy efficiency. For the buildings sector, technical screening criteria are developed with regard to energy efficiency and composite environmental performance, including water consumption, resource utilisation, and waste management. Eligibility criteria in the context of the waste sector are mostly qualitative in nature, classified across four broad categories—net GHG reduction; efficient use of scarce resources; source segregation and separate collection of waste; and pollution prevention and control.

Due to the heterogeneity of farms and the non-feasibility of tracking GHG emissions, air and water pollutants, and water consumption, adherence to the taxonomy requires demonstrating compliance to a pre-specified set of sustainable agricultural and livestock farming practices suitable for the Indian context. Sustainable agricultural practices include the

use of organic bio-stimulants, scientific field management, efficient irrigation management and suitable crop-rotation patterns, prevention and early detection of diseases, elimination of sources of infection, economised use of pesticides and insecticides to enhance the soil environment and health, ensuring a good water vapour cycle, improving the soil microbiota, and efficient utilisation of fertilisers to enable the recycling of nutrients. Sustainable livestock farming practices include better pasture management, improvement in animal nutrition and genetics, improved manure management, fertiliser management, animal health planning, well-designed selection strategies, cross-breeding and artificial insemination to improve livestock productivity, and measures to minimise water pollution.

This document superimposes the proposed technology-agnostic technical screening criteria on the existing green pathways implemented in India to gauge their taxonomy alignment.

Technical screening criteria across all dimensions of environmental sustainability are additive, not substitutive, and must be satisfied simultaneously. Only (an iteration of) an activity that adheres to the thresholds across all environmental concerns relevant to that activity will be deemed as green and the investments utilised to achieve this adherence will be recognised as green finance; irrespective of whether that investment is expended to satisfy one or some or all of the environmental commitments. To avoid ambiguity in the definition of a broad economic activity, it is critical to identify the complete chain of sub-activities. Activities eligible for green finance can be distinguished into two distinct categories: those that already adhere to the screening criteria and those that fall short of the screening criteria but intend to adhere to them. Thus, investments used for projects undertaken and assets created as part of an economic activity that satisfies

the eligibility criteria of the taxonomy qualify as green finance. The financial market participants must demonstrate how the taxonomy was used in securing the environmental sustainability of the underlying investments for each financial instrument and delineate the environmental goals met by such investments, as well as the proportion of underlying investments that are taxonomy-aligned (expressed as a percentage of the investment into an instrument, fund or portfolio). The companies must further disclose, disaggregated by economic activity, the proportion of their revenues/ turnover and capital/ operational expenditures aligned with the taxonomy as well as the environmental objectives achieved. Disclosures made by green-bond issuers and banks disbursing green loans must use the taxonomy as their point of reference. External verification of disclosures may be mandated to circumvent the risk of greenwashing.

The taxonomy proposed in this document focuses solely on climate change mitigation since the enormity of the subject necessitates a dedicated taxonomy for adaptation exercises. Future research in this area will focus on developing a taxonomy for the forestry sector, which must take into account the ecosystem services provided by forests and develop the criteria for afforestation, sustainable forest management and reforestation.

Table 1: Recommendations for the Effective Implementation of a Green Taxonomy in India

Sr. No.	Recommendations	Ministry/regulator/expert group responsible for implementing the recommendations
1	**Establish new standards**	
1.1	Determining GHG emission thresholds	
	Power sector	An expert group including scientists, academics, industry representatives; representatives from the Bureau of Indian Standards (BIS) and the Bureau of Energy Efficiency (BEE); representatives from the Central Electricity Authority (CEA), the Ministry of Power (MoP), and the Ministry of New and Renewable Energy (MNRE), under the aegis of the Ministry of Environment, Forest and Climate Change (MOEF&CC).
	Manufacturing sector	An expert group including scientists, academics, industry representatives, and representatives from the BIS, under the aegis of the MOEF&CC.
	Transport sector	An expert group consisting of academics; scientists; industry representatives such as the Society of Indian Automobile Manufacturers (SIAM); various emissions testing agencies such as the Automotive Research Association of India (ARAI) and International Centre for Automotive Technology (ICAT); representatives from the BIS; and representatives of the MoP, the Ministry of Road, Transport and Highways (MoRTH), and the Ministry of Petroleum and Natural Gas (MoP&NG) under the aegis of the MOEF&CC.
1.2	Establishing new norms and standards apart from GHG emissions	
	Formulating new air and water pollution norms where such norms do not exist	The Central Pollution Control Board (CPCB), the MOEF&CC
	Formulating water consumption norms where such norms do not exist	The MOEF&CC and the Ministry of Jal Shakti
2	**Upgrade existing norms and standards**	
2.1	Complete overhauling of the Environmental Impact Assessment (EIA) process; augmenting the EIA with Cumulative Impact Assessment based on International Finance Corporation Performance Standard 1: Assessment and Management of Environmental and Social Risks	The MOEF&CC
2.2	Replacing weight-based fuel efficiency standards with those that incentivise all fuel-efficient technologies	The BEE in collaboration with the MoRTH

3	Measures to minimise greenwashing in the implementation of the green taxonomy	
3.1	Improving compliance culture, based on incentive-compatible mechanisms	
	Ensuring compliance with industrial pollution norms	The CPCB and other agencies under the MOEF&CC
	Ensuring compliance with EIA protocol	Representatives from the MOEF&CC
	Establishing a compliance and enforcement regime in relation to type approval and Conformity of Production Testing (CoP Testing) in the transport sector	The MoRTH, in conjunction with the Ministry of Heavy Industries and Public Enterprises (MoHIPE), the MoP&NG, the MOEF&CC, the BIS, the SIAM, the ARAI and the ICAT
3.2	Specific greenwashing concerns in the transport sector	
	Replacing Modified Indian Driving Cycle (MIDC) and Constant Speed Fuel Consumption (CSFC) with Worldwide Harmonised Light Vehicles Test Procedure (WLTP) for type approval, CoP Testing, and evaluation of fuel efficiency in the case of passenger cars and other Light-Duty and Commercial Vehicles Replacing Constant Speed Fuel Consumption (CSFC) with World Harmonised Steady-State Cycle (WHSC) and World Harmonised Transient Cycle (WHTC) for evaluation of fuel efficiency in the case of Heavy-Duty Vehicles	The MoRTH, in consultation with the MoHIPE, the MoP&NG, the MOEF&CC, the BIS, the SIAM, the ARAI and the ICAT
	Gradually phasing out the preferential treatment for electric vehicles in evaluating their fuel efficiency	
	Establishing carbon-neutrality of biofuels	An expert group consisting of academics, scientists, industry representatives such as the SIAM, the ARAI and the ICAT; representatives from the BIS; and representatives from the MoP, the MoRTH and the MoP&NG under the aegis of MOEF &CC.
3.3	Agriculture and livestock production	
	Conducting research to establish substantial, reliable and robust evidence, if it exists, in favour of sustainable agricultural and livestock farming practices, and to delineate a set of essential agricultural and livestock practices that, when deployed collectively, yield appreciable environmental gains across various biophysical conditions in India	MOEF&CC, the Ministry of Agriculture & Farmers Welfare (MoAFW), and the Ministry of Fisheries, Animal Husbandry & Dairying (MoFAHD) to commission the Indian Council of Agricultural Research (ICAR)

4	**Align disclosures and reporting with the taxonomy**		
4.1	Mandating disclosures in financial statements of companies to be aligned with the taxonomy and developing guidelines for the same	Ministry of Corporate Affairs in consultation with the Reserve Bank of India (RBI) and the Securities and Exchange Bureau of India (SEBI)	
4.2	Mandating disclosure and reporting on green loans by banks to be aligned with the taxonomy and developing guidelines for the same	The RBI	
4.3	Mandating disclosure and reporting by financial institutions on green investments including green bonds/other debt instruments, aligning green equity with the taxonomy, and developing guidelines for the same.	The SEBI	
5	**Establish National Measurement, Reporting and Verification system**		
	Tracking performance of entities across all parameters relevant for the screening criteria of the taxonomy: GHG emissions, air pollution emissions, water effluents, energy consumption, water consumption (A related initiative would be the setting up of a national GHG inventory management system.)	The MOEF&CC	
6	**Reduce cost of compliance and disclosures**		
	Covering or subsidising the cost of compliance with the technical screening criteria and setting up infrastructure for enabling such compliance	For farmers	The MOEF&CC in consultation with MoAFW and MoFAHD
		For Micro, Small & Medium Enterprises	The MOEF&CC in consultation with the Ministry of Micro, Small & Medium Enterprises
7	**Cost-Benefit Analysis (CBA) of coal power expansion**		
	Commissioning research to undertake this CBA, on which should be contingent the future plans of coal power expansion and the inclusion of clean coal technologies in the taxonomy	The Ministry of Coal and the MoP	

The Imperative for a National Green Taxonomy

The COP26 climate summit, hosted in Glasgow in November 2021, has been referred to as a "make-or-break" opportunity in the fight against climate change. Climate action commitments made by countries in 2015 have fallen significantly short of what is required to achieve the goals of the Paris Agreement, and without urgent action, global temperatures were on track to exceed 3 degrees Celsius above pre-industrial levels by 2100.[2] One of the goals of COP26 was to achieve a global commitment to climate action commensurate with the highest possible ambition of nations to maintain global warming well below 1.5 degrees Celsius.[3] The Glasgow Climate Pact appeals to nations to deliver stronger national climate action plans next

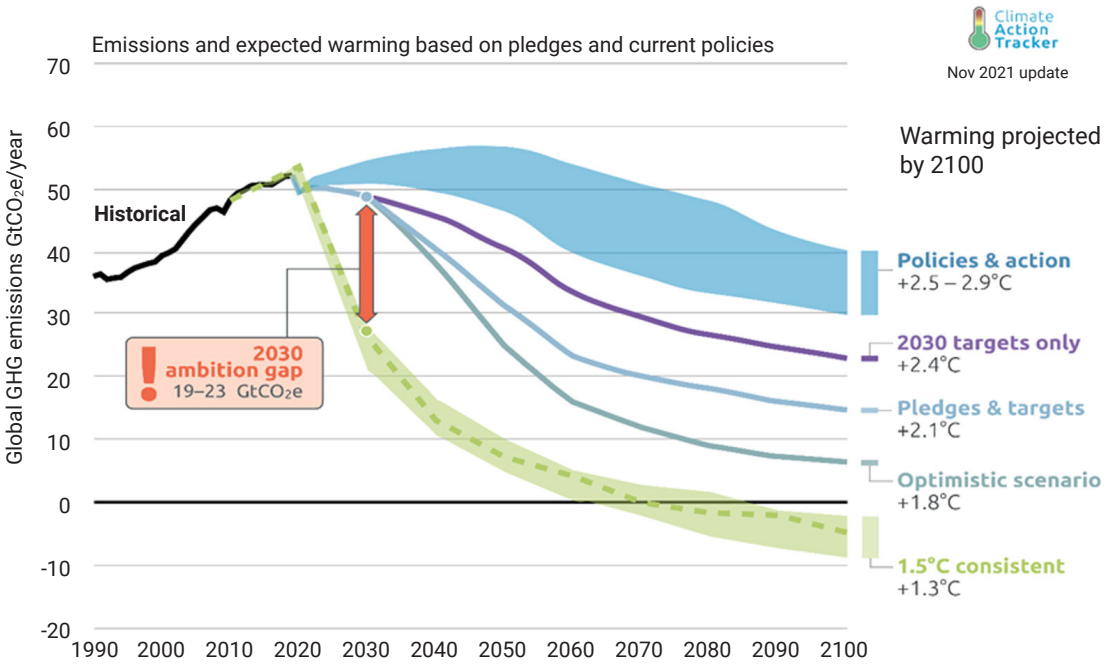
[2] Douglas Broom, "Climate change: What is COP26 and why does it matter?", The website of the World Economic Forum, posted on May 10, 2021, https://www.weforum.org/agenda/2021/05/cop26-un-climate-change-summit/,(accessed August 5, 2021)

[3] "COP26 EXPLAINED," the website of UN Climate Change Conference of the Parties UK 2021, https://2nsbq1gn1rl23zol93eyrccj-wpengine.netdna-ssl.com/wp-content/uploads/2021/07/COP26-Explained.pdf

[4] "Interview: The most impactful actions at COP26 point to progress on climate change," *UN News*, November 22, 2021, https://news.un.org/en/story/2021/11/1106242

year at COP27.[4] Following the announcements of net-zero targets by several major economies, including China and the US, there is some improvement in the global warming projections (See figure 1).[5] While targets provide the roadmap for action, translating this roadmap into reality requires the mobilisation of finance. The COP26 agenda acknowledged the scale and speed of transition required to align with the Paris Agreement and discussed strategies to mobilise the finance needed for such a transition, reiterating the importance of incorporating climate concerns in every financial decision.[6] Another outcome of the Glasgow Pact worth highlighting is developed countries agreeing to double their collective contributions to support the developing economies for climate adaptation.[7] One hopes that the developed world will deliver on this commitment unlike in the past.

Figure 1: 2100 Warming Projections



Source: Climate Action Tracker

[5] *Addressing global warming* (2100 Global Warming Projections), published on the website of the Climate Action Tracker, https://climateactiontracker.org/global/temperatures/

[6] UN Climate Change Conference of the Parties UK 2021, "COP26 EXPLAINED"

[7] "Interview: The most impactful actions at COP26 point to progress on climate change,"

[8] 2100 Global Warming Projections, published on the website of the Climate Action Tracker, https://climateactiontracker.org/global/temperatures/

The need to incorporate environmental concerns, particularly climate, in financial decision-making resonates with the appeal to strike a balance between long-term concerns of sustainable use of natural capital and near-term concerns of increasing income growth. The neoclassical economic framework for production decision-making only managed to optimise economic output in relation to constraints posed by costs of capital, labour, land and other raw materials, wherein the producers would pay what they owed the labourers, the capital providers, landowners and suppliers of raw materials. However, the framework did not require them to pay what they owed to the society in the form of costs resulting from depletion of natural resources, land-use change and environmental degradation, which further lead to costs relating to pollution, resource scarcity and global warming. Thus, the neoclassical approach to economic growth has led to the accumulation of environmental debt.

India Poised to be a Leader in Global Climate Action

India aspires to be a US$5-trillion economy by 2024-25 and, at the same time, address this accumulated environmental debt.[9] In other words, it has boldly embraced the challenge of reconciling the "irreconcilable trinity"[10] of economic growth, social development, and environmental sustenance. The challenge is compounded by India's status as the third-largest emitter in the world, accounting for 2.46 billion metric tonnes

[9] Jayant Sinha, Samir Saran, Mihir Sharma, Tanushree Chandra and Aparajit Pandey, *Getting to the Green Frontier,* January 2020, Observer Research Foundation.

[10] Nilanjan Ghosh, "Ecological Economics: Sustainability, Markets, and Global Change," (Modified version of the presidential address delivered at the Seventh Biennial Conference of the Indian Society for Ecological Economics, Tezpur University, Tezpur, Assam, December 5–8, 2013).

of carbon or 6.8 percent of the total global emissions.[11] Currently, the world is not on track to achieve the 1.5 degrees Celsius goal set by the Paris Agreement, for which it is critical to halve emissions over the next decade and reach net-zero carbon emissions by mid-century.[12] Since India is the second most-populated country[13] in the world, set to reach its peak population of 1.6 billion in 2048,[14] and one of the fastest-growing and largest-emitting economies, efforts to make its development pathway 1.5 degrees Celsius compatible will be key in the global calculus of climate change mitigation. This implies that India can and ought to emerge as a world leader in climate action for global net-zero emissions, having announced its own target of becoming net-zero by 2070 India's development experience can be the light that shines on solutions to some of the formidable contemporary problems of trade-off between environmental sustenance and economic growth that disproportionately affect emerging economies.

India's pursuit of a transformative development pathway must rely on the green transition of sectors such as energy, mobility, manufacturing, agriculture, waste management and buildings, given their contribution to the GHG inventory of the nation; air, water and soil pollution; land degradation; water stress; and ecosystem and biodiversity losses (See Box 1).

---

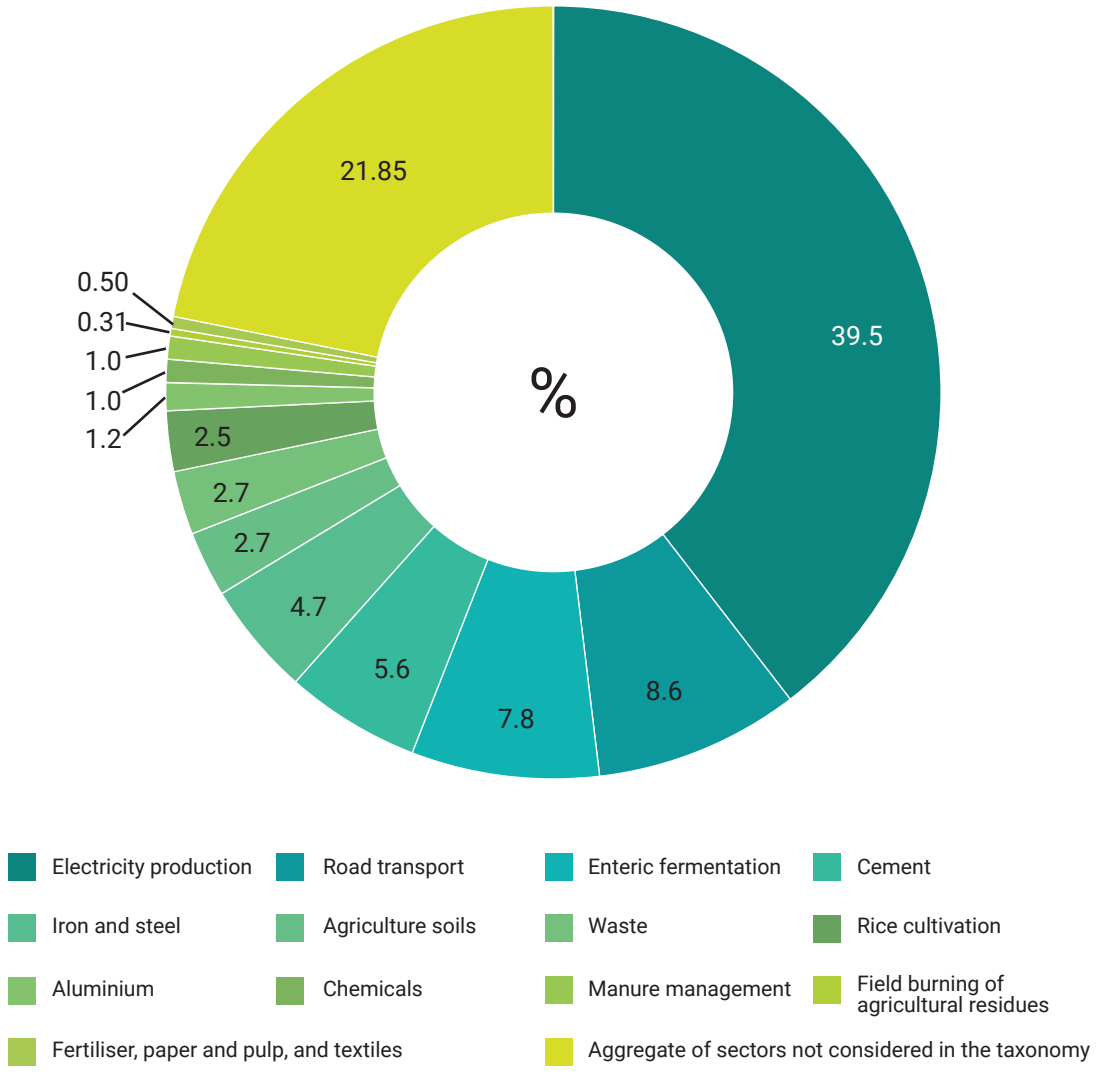
[11] Manu Moudgil," In India, the rich cause seven times more emissions than the poor," the website of Scroll.in, January 20, 2021, https://scroll.in/article/984472/in-india-the-rich-cause-seven-times-more-emissions-than-the-poor

[12] UN Climate Change Conference of the Parties UK 2021, "COP26 EXPLAINED"

[13] As of 2020, India's population stands at 1.38 billion.

[14] Anuradha Mascarenhas and Kabir Firaque, "Explained: Why world population is projected to peak early and shrink soon after," The Indian Express, July 18, 2020, https://indianexpress.com/article/explained/explained-what-forecast-of-shrinking-populations-means-for-india-and-world-6507785/, World Bank data https://data.worldbank.org/indicator/SP.POP.TOTL?locations=IN

Figure 2: Distribution of GHG Emissions Across Sector/Activities (2016)



Source: India Third Biennial Update Report to the United Nations Framework Convention on Climate Change[15]

[15] Ministry of Environment, Forest and Climate Change, *"India Third Biennial Update Report to The United Nations Framework Convention on Climate Change"*, Ministry of Environment, Forest and Climate Change, Government of India, 2021 https://unfccc.int/sites/default/files/resource/INDIA_%20BUR-3_20.02.2021_High.pdf

The linchpin of a successful green transformation strategy is a substantive increase in the efficiency of technology and business models; the evidence for this is well established.[16] Additionally, the infrastructure built by India over the next few years will determine its emissions profile for decades to come. Exorbitant levels of investments in the most advanced green technologies and business models as well as in green infrastructure will be required to support the nation's green transformation. While there is no universally accepted definition of the term, for the purpose of this document, "green finance" includes investments that take into account the environmental sustainability of economic activities, projects or assets financed by them.

The Indian government estimates that the country should spend seven to eight percent of its gross domestic product (GDP)on green infrastructure annually, i.e., investment to the tune of US$200 billion per year, up to 2030. The International Finance Corporation (IFC) estimates for climate-smart investment are at US$3.1 trillion until 2030, which implies an annual investment of US$300 billion.[17]

---

[16] Nilanjan Ghosh, "Deciphering the colours of India's economic growth," The website of Observer Research Foundation, September 11, 2020, https://www.orfonline.org/expert-speak/deciphering-colours-india-economic-growth/ (accessed August 5, 2021); James D. Ward, Paul C. Sutton , Adrian D. Werner , Robert Costanza , Steve H. Mohr and Craig T. Simmons, "Is Decoupling GDP Growth from Environmental Impact Possible?" PLoS ONE 11, no. 10(2016), https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0164733; Eckehard Rosenbaum, *Some observations on Green Growth,* EUR 28228 EN, JRC Science for Policy Report, Luxemburg, European Commission, 2016, https://publications.jrc.ec.europa.eu/repository/bitstream/JRC103728/lbna28228enn.pdf.

[17] Annapurna Mitra, Tanushree Chandra, Nandini Sarma, Ria Kasliwal, *A Green Investment Architecture for India: Building a Bridge for Global Capital,* June 2020, Observer Research Foundation.

[18] Saurabh Ghosh, Siddhartha Nath and Abhishek Ranjan,"Green Finance in India, Progress and Challenges", RBI Bulletin January 2021, Reserve Bank of India, https://rbidocs.rbi.org.in/rdocs/Bulletin/PDFs/04AR_2101202185D9B6905ADD465CB7DD280B88266F77.PDF

Need for Foreign Commercial Capital for Climate Action

Green projects typically involve a high up-front cost with cost savings possible only in the long-term.[18] The small size of many of these projects makes them non-viable to be financed under the conventional bond structures. The lack of expertise and experience in dealing with green technologies, the need to adapt to new business models, the difficulty in securing a reliable revenue stream for green projects, and unclear exit strategies create a high-risk perception of such projects.[19] This is further exacerbated by maturity mismatches between long-term green investment and short-term interests of investors who are comfortable with the risk-return characteristics of conventional investment instruments.[20] To satisfy these needs, financial institutions catering to green projects need to understand their specific investment needs and develop novel financial instruments leveraging the use of credit enhancement, aggregation and securitisation, blended finance, payment for ecosystem services, reducing emissions from deforestation and forest degradation, debt-for-nature swaps and the like.

Conventional financial institutions often find it challenging to accommodate the investment peculiarities of green projects and provide finance to them. Moreover, these institutions are currently in crisis, burdened by a large proportion of non-performing assets and lower levels of liquidity.[21] Thus, there is a pressing need for increased contribution from the private sector to green finance. For example, the Indian government has delineated a US$1.4-trillion infrastructure pipeline for the next five years with no specific focus on green infrastructure other than renewable energy. This pipeline relies significantly

[19] Swati Agarwal and Tamishka Singh, *Unlocking the green bond potential in India,* The Energy and Resources Institute (TERI), 2017
https://www.teriin.org/projects/nfa/files/Green-Bond-Working-Paper.pdf
[20] "Ghosh et al., "Green Finance in India, Progress and Challenges
[21] "A Green Investment Architecture for India: Building a Bridge for Global Capital".

on private-sector participation and is expected to contribute around 22 percent of the projects[22] and finance the entire investment in renewable energy (around US$120 billion) over the next five years.[23]

Indian financial markets are underdeveloped compared to the G20 economies, the domestic pool of institutional investment is small, and such institutional investors are constrained by tight investment regulations. Thus, the required contribution of the private sector cannot come from domestic sources alone. The foreign capital pool is large and well-suited for financing green investment.[24] Sustainability concerns, particularly green objectives such as climate risks, are being increasingly considered more seriously in configuring financial portfolios. This is evident in the scale achieved by environmental, social and governance (ESG) investing and impact investing in the recent past. In 2006, with the launch of the UN-backed Principles for Responsible Investment, 63 investment companies with US$6.5 trillion in assets under management (AUM) signed a commitment to incorporate ESG issues into their investment decisions. The number of signatories grew to 3,826 by April 2021, or US$121.3 trillion in collective AUM,[25] and the sustainability indexed funds benchmarked to ESG indices increased to reach 534, overseeing a combined US$250 billion as of Q2 of 2020.[26] According to the Annual Impact Investor Survey 2020 published by the Global Impact Investing Network, the current size of the impact investing market stands at US$715 billion.[27]

---

[22] With the contribution of state and the Central governments amounting to 39 percent each.

[23] "A Green Investment Architecture for India: Building a Bridge for Global Capital".

[24] "A Green Investment Architecture for India: Building a Bridge for Global Capital"; "Economic Headwinds – An Opportunity for Bond Market Reforms," published on the website of Acuite Ratings and Research, https://www.acuite.in/Economic-Headwinds.htm

[25] Data on PRI growth 2006-2021, The Website of UN Principles of Responsible Investment, https://www.unpri.org/pri/about-the-pri

[26] The Quantum Investment Team, "ESG indexes are only as good as the underlying data used to construct them and are rightly under increasing investor scrutiny", The website of Quantum Advisors, , November 11, 2020, https://www.qasl.com/post/esg-indexes-a-stumbling-block-for-india-investors

[27] Dean Hand, Hannah Dithrich, Sophia Sunderji and Noshin Nova, Annual Impact Investor Survey 2020: Executive Summary,The Global Impact Investing Network , https://thegiin.org/assets/GIIN%20Annual%20Impact%20Investor%20Survey%202020%20Executive%20Summary.pdf

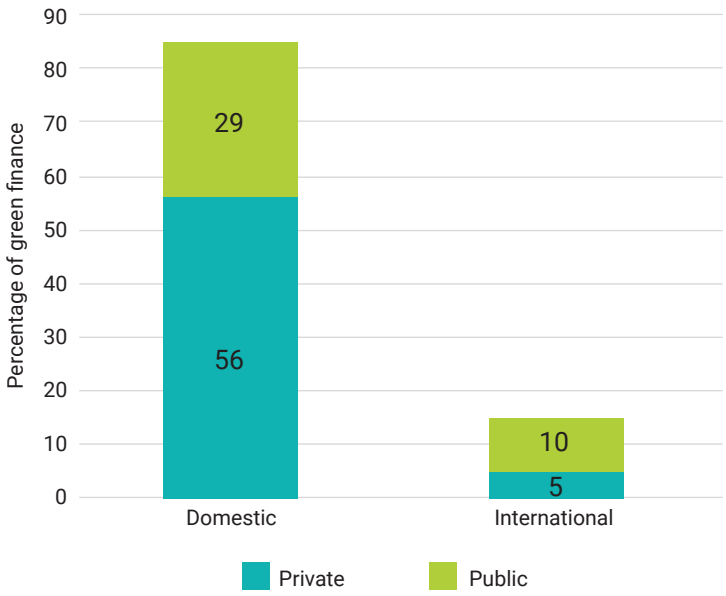
India's Inability to Lure Foreign Private Green Finance

Green finance in India is a cottage industry. The country started issuing green bonds in 2015. Since 1 January 2018, it has issued green bonds of approximately US$8 billion,[28] and as of 12 February 2020, the outstanding issuance stood at US$16.3 billion. This means that for the three-year from 2015 to 2017, India's average annual green-bond issuance was US$2.8 billion; while for the two-year period from 2018 to 2019, the average annual green-bond issuances stood at US$4 billion. To be sure, the green bonds issued since January 2018 constituted about 0.7 percent of all the bonds issued in the Indian financial market as of February 2020.[29]

Latest estimates on tracked green finance in India (in addition to green bonds) stood at a total INR 111,000 crore (US$17 billion) for 2016-17 and INR 137,000 crore (US$21 billion) for 2017-18. The contribution of domestic private investors to green finance was the largest (63 percent for 2016-17 and 51 percent for 2017-18) and stood at about INR 139,000 crore through debt and equity. The share of domestic public finance was 29 percent on average for the two-year period under consideration. The share of international public finance in tracked green finance remained nearly constant during 2016-17 and 2017-18, at 10 percent (INR 12,000 crores). In the same period, the contribution of international private finance was the lowest, at five percent.[30]

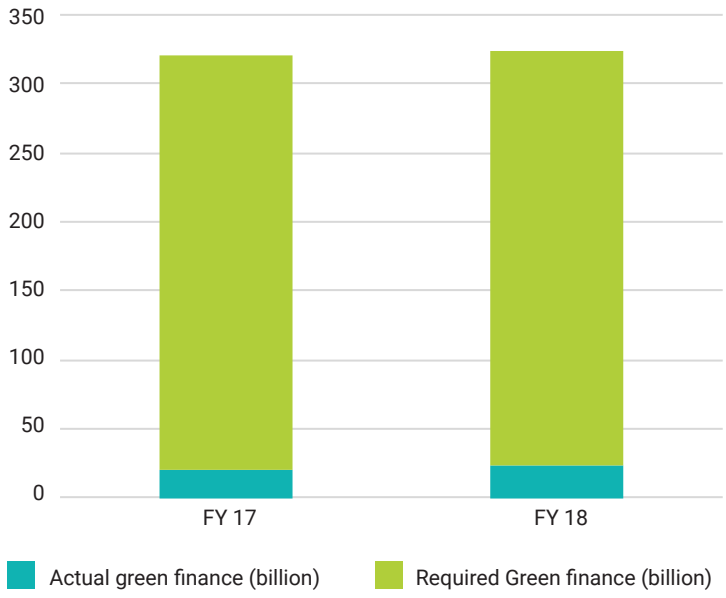
[28] Ghosh et al.,"Green Finance in India, Progress and Challenges
[29] Ghosh et al.,"Green Finance in India, Progress and Challenges
[30] Shreyans Jain, Rajashree Padmanabi and Jolly Sinha, *Landscape of Green Finance in India,* Climate Policy Initiative, 2020, https://www.climatepolicyinitiative.org/wp-content/uploads/2020/09/Landscape-of-Green-Finance-in-India-1-2.pdf

Figure 3: Sources of Finance, by Origin and Channel of Delivery



Source: Landscape of Green Finance in India, Climate Policy Initiative, 2020[31]

Figure 4: Actual vs. Required Green Finance (FY17 and FY18)



Source: Landscape of Green Finance in India, Climate Policy Initiative, 2020, Green Finance in India, Progress and Challenges, RBI Bulletin January 2021 and author's calculation

[31] "Landscape of Green Finance in India"

As evident, there is a significant gap between the actual green finance and the required green finance. A key reason for this is India's relative inability to attract green finance from the resource pool of international capital. Green investments are already perceived as high risk, and this is much more pronounced in the context of emerging markets. Such a perception is one of the many factors responsible for the sluggish inflow of international green finance. Furthermore, the scope for multiple interpretations of green finance leaves room for information asymmetry and increases the likelihood of greenwashing, i.e., false or misleading claims of environmental compliance or the degree of environmental sustainability of an investment instrument. This increases the risk associated with such investments.[32] India currently does not have a framework to standardise the definition of green finance or rules that define the eligibility of activities for such financing. Articulating a taxonomy that provides such standardisation can kickstart the process of "industrialising" green finance, changing it from a "trickle" to a "flow," and propel India's transformation into a green economy.[33]

How a Green Taxonomy Can Help India

A green financial instrument includes any instrument whose receipts are exclusively utilised to finance, either in part or in full, new and/or existing eligible green economic activities/ projects. A taxonomy is a framework for determining the eligibility of economic activities as "green". Such a framework is anchored in the environmental goals of a nation and establishes benchmarks for activities to be regarded as environmentally sustainable. An effective taxonomy is one

[32] Ghosh et al.,"Green Finance in India, Progress and Challenges

[33] Maya Forstater, Mark Halle and Simon Zadek, Green Finance for Developing Countries: Needs, Concerns and Innovations, May 2016, An initiative of the Inquiry: Design of a Sustainable Financial System, Switzerland, United Nations Environment Programme (UNEP), 2016, https://www.greengrowthknowledge.org/sites/default/files/downloads/resource/Green_Finance_for_Developing_Countries_UNEPInquiry.pdf

that establishes well-defined screening criteria to ascertain the environmental sustainability of activities, ruling out varied interpretations of what is green and thereby eliminating the ambiguity around the notion of green activities and green finance. Such a framework or a classification system provides clarity about the environmental ramifications of the activities underlying financial products and services, thus alleviating concerns of greenwashing. The taxonomy can guide investors who are conscious about the environmental impact of their investments and improve investor confidence in green investments by relying on disclosures aligned with the taxonomy. This, in turn, will positively impact the demand for green financial instruments and enhance the capital flows to environmentally sustainable activities.

Much of the green finance in India is directed towards renewable energy development, energy efficiency, and power transmission. Around 80 percent of the total green finance in the 2016-18 period was utilised for the power sector, with solar power projects obtaining nearly 41 percent and wind energy generation getting 23 percent of the finance.[34] The taxonomy also provides visibility to other areas or activities that require green finance but have been previously ignored due to, inter alia, lack of awareness, to attract potential investors to these activities and help the capital-starved initiatives garner the finance they need. Overall, the taxonomy is expected to widen the universe of green finance opportunities and increase the scope of positive environmental gains.

For Financial Institutions and Stock Exchanges

For financial institutions, the taxonomy provides direction and clarity on incorporating environmental concerns in their decision-making process. It allows them to track and monitor the environmental footprint of their investments and adjust

[34] "Landscape of Green Finance in India"

their portfolios accordingly. Moreover, it enables financial institutions to convey with clarity the "greenness" of the products and services they offer. The taxonomy can also become the basic template for environment-related disclosures across debt and equity markets as well as those required by banks for green loans. While the details of the disclosure will vary across financial instruments, what is regarded as green will remain constant across financial markets. In future, the taxonomy is expected to become the reference for environmental characteristics of green financial instruments, providing the anchor for financial innovation in green finance.

The ability to track environment-related performance and monitor how the green finance is being used increases transparency and boosts investor confidence. Global flagship programmes such as the Principles for Responsible Investment, the Equator Principles for financial institutions, the United Nation's Environment Programme, and the Statement of Commitment by financial institutions on sustainable development promote the contribution to green finance among the signatories. From India, SBI Funds Management Private Limited, Equicap Asia Management Private Limited, and Indus Environmental Services Private Limited are signatories to the Principles for Responsible Investment, while only the International Development Finance Club (IDFC) is a signatory to the Equator Principles. Mandated disclosures based on the taxonomy can help track and appraise the progress made by these signatories in increasing their contribution to green investments. Over time, more financial institutions can be persuaded to commit to increasing their contributions to green finance.

The Sustainable Stock Exchange Initiative encourages the signatory countries' stock exchanges to devise price indices for tracking the stock performance of a set of companies that are considered frontrunners in imbibing the ESG principles into their financial framework. These indices are intended to guide environment-conscious investors. The Bombay Stock Exchange (BSE) and the National Stock Exchange (NSE) are

part of this initiative and publish separate ESG indices, which include S&P BSE Greenex, S&P BSE Carbonex, S&P BSE 100 ESG Index, NIFTY 100 ESG Index, NIFTY 100 Enhanced ESG Index and so on.[35] ESG indices usually rely on ESG scores from major rating providers, which can vary greatly from one ESG provider to another. The variance in ESG scoring arises from the different methodologies used to compute them. Thus, the construction of the ESG index, involving securities selection and weighting, will vary depending upon the choice of the rating provider, which calls into question the credibility of the entire process.[36] The taxonomy may partially remedy this situation, at least for the environmental component of the rating exercise, by ensuring the standardisation of data collection, reporting and impact-measurement methodology.

For the Government and Financial Regulators

The introduction of the taxonomy is expected to boost green finance and provide momentum to the government's efforts towards becoming 1.5 degrees Celsius compatible. Mandated disclosures based on the taxonomy will help quantify the progress made in GHG savings relative to the baseline scenario and assess the nation's contribution to its own net zero target as well as the global net-zero vision. Such disclosures are expected to distinguish better-performing sectors from laggards, and improve the coordination between required investments and the implementation of necessary environmental policies and regulations.

---

[35] Chandan Bhavnani and Arnesh Sharma, *ESG Investing Scenario in India,* Yes Bank Ltd., 2019 https://www.yesbank.in/pdf/esg_investing_scenario_in_India

[36] R. Boffo and R. Patalano, ESG Investing: Practices, P*rogress and Challenges, OECD Report 2020,* Organisation for Economic Cooperation and Development (OECD), Paris, https://www.oecd.org/finance/ESG-Investing-Practices-Progress-Challenges.pdf

From the perspective of financial regulators such as the Reserve Bank of India (RBI) and Securities and Exchange Bureau of India (SEBI), mandated disclosures can help track the performance of banks and financial institutions in incorporating environmental concerns into their financial decision-making. The taxonomy provides a structural framework that can be used by the regulators to develop a system for tracking green finance at disaggregated levels, such as projects or economic activities, as well as at aggregated levels, such as institutions, companies and the nation. By listing the economic activities that need green finance, the taxonomy provides the regulators with direction on the kind of measures that must be undertaken to develop not only green financial markets but also the green finance ecosystem needed to attract foreign capital.

In May 2017, the SEBI issued disclosure guidelines for issuance and listing of green debt securities, which identified broad categories of projects and assets that can be reviewed for eligibility for funds raised through the issuance of green-debt securities. However, it does not establish well-defined screening criteria for determining such eligibility, and the issuer is required to disclose the decision-making process and the criteria used to ascertain such eligibility.[37] Since the SEBI guidelines allow for multiple interpretations of green finance, the likelihood of greenwashing is increased. The proposed taxonomy can be used as a reference to strengthen these guidelines and attract foreign institutional investments into green bonds in India.

[37] Securities Exchange Board of India, , *Disclosure Requirements for Issuance and Listing of Green Debt Securities,* SEBI Circular CIR/IMD/DF/51/2017, Securities Exchange Board of India, 2017, https://www.sebi.gov.in/legal/circulars/may-2017/disclosure-requirements-for-issuance-and-listing-of-green-debt-securities_34988.html

For Businesses

While the SEBI made it mandatory to produce business responsibility reports for the 500 largest listed companies in 2016, there is limited evidence for compliance with the Task Force on Climate-related Financial Disclosures.[38] The need for mandated disclosures based on the taxonomy, accompanied by an appropriate incentive structure for promoting green finance, will encourage companies to embrace the triple-bottom-line (profit, people, planet) and become environment-conscious in their business practices. This, in turn, will help them attract environmentally conscious foreign capital investments. Refinitiv's 2019 report titled "Financing a Sustainable Future in Asia" highlights a disparity between intention and action, since several Indian companies have policies on emissions, waste management and water efficiency without actual targets backing them. The largest gap exists in the case of resource and waste management, wherein 92 percent of Indian companies adopted waste-reduction policies in 2017, but only 31 percent of them had specific targets to achieve them.[39] A taxonomy can guide companies to set realistic targets for better environmental outcomes. As green finance inflows increase, businesses can access these flows to adopt advanced green technologies and business models to make them more competitive and profitable.

[38] *Shreyans Jain, Financing India's Green Transition,* ORF Issue Brief No. 338, , Observer Research Foundation, January 2020, https://www.orfonline.org/research/financing-indias-green-transition-60753/

[39] Refinitiv, *Refinitiv Insight: Financing a Sustainable Future in Asia, Refintiv.com.* October 2019. https://www.refinitiv.com/content/dam/marketing/en_us/documents/gated/reports/financing-a-sustainable-future-for-asia-report.pdf

In This Report

This report aims to create a rulebook for developing a green taxonomy for India by demarcating the broad contours of such a taxonomy. It addresses several weaknesses of the existing proposals for an Indian taxonomy,[40] most of which focus primarily on climate change mitigation, largely overlooking other environmental concerns, for instance, the fact that activities that minimise GHG emissions may lead to other environmental harms. Such associated environmental losses must also be accounted for while developing a green taxonomy. While the existing proposals identify a list of activities/assets/projects eligible for inclusion in the taxonomy, they do not define technical screening criteria or thresholds that determine such eligibility. This defeats the purpose of the taxonomy, which must provide a standard definition of what is deemed as green activity and green finance. Therefore, the existing proposals are neither able to demonstrate how they can help in circumventing the risk of greenwashing, nor provide inputs on how to ensure compliance and align disclosures with the taxonomy.

This report provides a roadmap for India's transition to a green economy by anchoring such transition in the taxonomy, demarcating the role of the taxonomy in India's green transition much more strongly than the existing proposals. It should be noted that the report's scope is limited to outlining the fundamental insights and potential rules: the list of activities identified for inclusion in the taxonomy is not exhaustive and the paper does not provide a full-fledged ready-to-implement taxonomy.

---

[40] Labanya Prakash Jena and Dhruba Purkayastha, *Accelerating Green Finance in India: Definitions and Beyond Discussion Brief,* Climate Policy Initiative, June 2020, https://www.climatepolicyinitiative.org/wp-content/uploads/2020/07/Accelerating-Green-Finance-in-India_Definitions-and-Beyond.pdf
Sakshi Bahl, Anushua Chowdhury, Upendra Bhatt, Labanya Prakash Jena, Dhruba Purkayastha and Mahua Acharya, *Building a Consensus on the Definition of Green Finance,* A collaboration of cKinetics, Climate Policy Initiative (CPI) and Shakti Sustainable Energy Foundation, 2019
http://www.indiaenvironmentportal.org.in/files/file/Green-Finance-Report.pdf

Box 1: Environmental Challenges Confronting India

Climate Change

India's average temperature registered a rise of around 0.7 degrees Celsius during 1901–2018, owing to significant GHG emissions. By the end of this century, India is expected to witness an average temperature increase of approximately 4.4 degrees Celsius, relative to the 1976–2005 average. This projected rise in temperature will be accompanied by an increase in the frequency of warm days (by 55 percent) and warm nights (by 70 percent), and of summer (April–June) heatwaves (three to four times higher than the reference period). Thus, heat stress across India is expected to intensify due to the combined rise in surface temperature and humidity.[41]

The summer monsoon precipitation (June–September) over India registered a dip of around six percent from 1951 to 2015. The summer monsoon season has been characterised by more frequent dry spells (27 percent higher during 1981–2011 relative to 1951–1980) and more intense wet spells. The overall decline in summer monsoon precipitation has amplified the propensity for and increased the frequency and spatial extent of droughts in India.[42]

Sea surface temperature of the tropical Indian Ocean rose by 1 degree Celsius on average during 1951–2015. Over the last few decades, the North Indian Ocean experienced an accelerated sea-level rise of 3.3 mm per year (1993–2017), and the frequency of very severe cyclonic storms during the post-monsoon season rose drastically (2000–18).[43]

---

[41] R. Krishnan, J. Sanjay, Chellappan Gnanaseelan, Milind Mujumdar, Ashwini Kulkarni and Supriyo Chakraborty, eds, *Assessment of climate change over the Indian region: A report of the Ministry of Earth Sciences (MoES), Government of India*(Springer Open, 2020), , , https://link.springer.com/content/pdf/10.1007%2F978-981-15-4327-2.pdf

[42] Krishnan et al,,, *Assessment of climate change over the Indian region: A report of the Ministry of Earth Sciences (MoES), Government of India*

[43] Krishnan et al,,, *Assessment of climate change over the Indian region: A report of the Ministry of Earth Sciences (MoES), Government of India*

From 1989 to 2018, droughts, extreme temperatures, floods, and storms have had an adverse impact on 1,410 million lives in India, and the economic losses incurred were to the tune of US$82,914.4 million for the same period.[44] The Global Climate Risk Index 2020 stated that in 2018 alone, India's loss in terms of economic opportunities amounted to US$37,808 million in absolute terms, a threefold increase from 2017. Around 60,000 farmers have died by suicide in the past three decades, driven by the massive distress following crop failures due to climate change, loss of income, and the worsening debt trap.[45]

Air Pollution

With 22 of its cities featuring amongst the world's 30 most polluted ones, India is the second-most polluted country globally. Delhi is the most polluted capital city in the world. Transportation, biomass burning, electricity generation, industry, construction, waste burning and agricultural residue burning account for the major proportion of India's air pollution.[46] Long-term exposure to outdoor and household air pollution have contributed to the increasing occurrences of stroke, heart attack, diabetes, lung cancer, chronic lung diseases and neonatal diseases in India.[47] According to the Greenpeace Southeast Asia Analysis of IQAir data, in 2020, air pollution was responsible for over 120,000 deaths and economic losses worth INR 2 lakh crore in India.[48]

---

[44] Renita D' Souza and Tanya Rana, "The Role of Monetary Policy in Climate Change Mitigation", ORF Issue Brief No. 350, , Observer Research Foundation, April 2020, https://www.orfonline.org/research/the-role-of-monetary-policy-in-climate-change-mitigation-63939/

[45] D' Souza and Rana, "The Role of Monetary Policy in Climate Change Mitigation"

[46] Press Trust of India (PTI), "22 Of The World's 30 Most Polluted Cities Are In India: Report", *NDTV*, March 16, 2021, https://www.ndtv.com/india-news/22-of-the-worlds-30-most-polluted-cities-are-in-india-delhi-most-polluted-capital-city-report-2392028

[47] Nandita Mathur, "Air pollution caused 116,000 infant deaths in India last year", *Livemint*, October 22, 2020, https://www.livemint.com/companies/start-ups/tekion-joins-the-unicorn-club-11603329718643.html

[48] Sharan Poovanna, "Over 120K died due to air pollution in India in 2020: Greenpeace", *Hindustan Times*, February 18, 2021, https://www.hindustantimes.com/india-news/over-120k-died-due-to-air-pollution-in-india-in-2020 greenpeace-101613628725846.html

Water Pollution

Water pollution is a major environmental problem facing India. About 70 percent to 80 percent of surface water in India is contaminated and thus unfit for consumption. Nearly 40 million litres of untreated wastewater enter directly into watercourses, eventually percolating into groundwater.[49] Poor waste management and sewage (including silt and garbage) pollution are primary causes of water pollution in India. Annually, about 38 million Indians suffer from waterborne diseases such as typhoid, cholera and hepatitis.[50] The lack of water, sanitation and hygiene is responsible for 400,000 deaths annually in India.[51] The health costs incurred due to water pollution in India are estimated at about INR 470 to INR 610 billion (US$6.7 billion to US$8.7 billion) per year. Furthermore, the economic loss on account of upstream water pollution is expected to be almost half of the GDP growth in downstream areas. The release of upstream water pollution accounts for a nine percent dip in agricultural revenues and a 16 percent decline in agricultural yields in downstream regions.

Water Scarcity

Despite accounting for 18 percent of the world's population, India has access to only four percent of the global freshwater resources. Annually, 600 million people across the country are adversely affected by water scarcity.[52] Nearly 60 percent of Indian districts have been declared critical on groundwater availability due to either scarce supply or poor quality, or both.[53]

---

[49] Vikas Dimble and Priyank Hirani, "Water pollution is killing millions of Indians. Here's how technology and reliable data can change that", World Economic Forum, October 4, 2019, https://www.weforum.org/agenda/2019/10/water-pollution-in-india-data-tech-solution/#:~:text=As%20India%20grows%20and%20urbanizes,a%20tiny%20fraction%20adequately%20treated

[50] Anna Sharudenko, "How Water Pollution in India Kills Millions", The website of Borgen Magazine, July 14, 2020, https://www.borgenmagazine.com/water-pollution-in-india/

[51] Dimble and Hirani, "Water pollution is killing millions of Indians. Here's how technology and reliable data can change that"

[52] Raj Chengappa, "The great Indian thirst: The story of India's water crisis, solutions to tackle it", *India Today*, March 22, 2021,
https://www.indiatoday.in/magazine/cover-story/story/20210329-the-great-indian-thirst-1781280-2021-03-20

[53] Reshma Anand and Arpit Jain, "10 things you need to know about the water crisis in India", Indian Development Review, March 21, 2020, https://idronline.org/10-things-you-need-to-know-about-the-water-crisis-in-india/

Heavy reliance on monsoons, which have been affected by climate change; excessive use of groundwater for irrigation; and water pollution due to poor waste management and sewage (including silt and garbage) pollution are the primary reasons for this crisis. About 54 percent of cultivable land is utilised for water-intensive crops such as rice, wheat, sugarcane and cotton, since the minimum support price incentives are skewed in favour of these. India utilises at least double the quantum of water to grow one unit of food compared to other emerging economies.[54]

According to a 2018 report by NITI Aayog, India is facing the worst water crisis in its history, and about 21 Indian cities will have exhausted their groundwater reserves by 2020. There is no readily available documentation on whether this prediction has come true. Moreover, 40 percent of India's population will have no access to drinking water by 2030.[55] The report states that the water crisis will be responsible for a six percent loss in the national GDP by 2050.[56]

[54] Anand and Jain, "10 things you need to know about the water crisis in India"
[55] Bhaskar Tripathi, "40% of Indians will have no access to drinking water by 2030: NITI Aayog", Business Standard, June 25, 2018, https://www.business-standard.com/article/current-affairs/40-of-indians-will-have-no-access-to-drinking-water-by-2030-niti-aayog-118062500074_1.html
[56] Jacob Koshy, "India faces worst water crisis: NITI Aayog", The Hindu, June 14, 2018, https://www.thehindu.com/sci-tech/energy-and-environment/india-faces-worst-water-crisis-niti-aayog/article24165708.ece

Ecosystem/Biodiversity Losses

Factors responsible for biodiversity loss include air, water and soil pollution; habitat loss and degradation; deforestation; exploitation of natural resources; and climate change.[57] These, in turn, are driven by an increase in population, rapid urbanisation, and mounting development pressures. India's ecological footprint is lower than 1.6 global hectares per person, its per capita biocapacity is 0.43 hectares, implying a biocapacity deficit of 0.76 hectares.[58] More than 90 percent of biodiversity hotspots in India have been lost;[59] over 12 percent of wild mammal species are endangered, with larger animals inhabiting freshwater ecosystems being almost on the verge of extinction. Annually, about three percent of bird species go extinct, with the number rising every year; as many as 19 percent of amphibians currently stand endangered.[60]

[57] Shikha Shukla, Vijeta Singh and Anamika Singh, "The principal factors responsible for biodiversity loss", *Open Journal of Plant Science 6*, no.1 (2021), https://www.peertechzpublications.com/articles/OJPS-6-126.php

[58] Soumya Sarkar, "Nature in peril as biodiversity losses mount alarmingly, states the Living Planet Report", *Mongabay*, https://india.mongabay.com/2020/09/nature-in-peril-as-biodiversity-losses-mount-alarmingly-states-the-living-planet-report/; Data on the ecological footprint by country 2021, the website of World Population Review, https://worldpopulationreview.com/country-rankings/ecological-footprint-by-country

[59] Bulbul Dhawan, "Biodiversity loss: India has lost 90% of area under four biodiversity hotspots, 25 species extinct, finds study", Financial Express, June 8, 2021, https://www.financialexpress.com/lifestyle/science/biodiversity-loss-india-has-lost-90-of-area-under-four-biodiversity-hotspots-25-species-extinct-finds-study/2267618/

[60] Sarkar, "Nature in peril as biodiversity losses mount alarmingly, states the Living Planet Report"

A Survey of Existing Taxonomies and Guidelines

This chapter presents key highlights of some of the existing taxonomies from around the world, which are the product of efforts initiated by financial authorities. The European Union (EU), China and Climate Bonds Initiative taxonomies are some of the most well-received and influential, and act as references for other taxonomies.[61] Among the other taxonomies developed or in development, Bangladesh, Malaysia and Mongolia share many commonalities with India. In addition to these taxonomies, this chapter also reviews the Green Bond Guidelines developed for Egypt by the Commercial International Bank (CIB), a leading

[61] Nicholas Plaff, Ozgu Altun, and Yanqing Jia, *Overview and Recommendations for Sustainable Finance Taxonomies,* Zurich, International Capital Market Association, 2021,https://www.icmagroup.org/assets/documents/Sustainable-finance/ICMA-Overview-and-Recommendations-for-Sustainable-Finance-Taxonomies-May-2021-180521.pdf

private sector Egyptian bank, to attain greater insight into the notion of taxonomy, and the MDB-IDFC Common Principles for Tracking Climate Finance, recognising the importance of tracking and reporting on green finance.

World Bank Guidelines for Developing a National Green Taxonomy[62]

The World Bank has furnished a set of guidelines to assist regulators in formulating a green taxonomy, based on the learnings and insights from its engagements on promoting and delivering a sustainable and environmentally conscious financial ecosystem globally and across nations. In developing these guidelines, the World Bank has adhered to a definition of green finance that acknowledges environmental concerns beyond climate mitigation and adaption, such as natural resource conservation, biodiversity conservation, and pollution prevention and control.[63] This definition clarifies the WB's position on the environmental challenges that must fall within the scope of green finance. Further, the World Bank endorses the International Capital Market Association (ICMA) definition of a green taxonomy as a tool for classifying activities or investments that enable a nation to achieve its environmental targets. To show how this can be achieved in a multi-pronged manner, the guidelines enumerate the ways in which the taxonomy will be useful for various stakeholders of the financial system such as banks and financial institutions, financial regulators, policymakers, investors, and green bond issuers. For example, the taxonomy helps banks and financial institutions by improving their efficiency of green lending and funding operations and green bond issuers by identifying eligible activities that can be financed with relevant thematic bonds.

---

[62] Farah Imrana Hussain, Laura Tlaiye and Marcelo Jordan, *Developing a National Green Taxonomy: A World Bank Guide,* World Bank Group 2020, documents1.worldbank.org/curated/en/953011593410423487/pdf/Developing-a-National-Green-Taxonomy-A-World-Bank-Guide.pdf

[63] Here, climate mitigation refers to lowering GHG emissions in alignment with the Paris Agreement and climate adaptation refers to climate resilience of social and economic infrastructure assets.

The World Bank guidelines delineate the following fundamental structural components that must constitute the taxonomy:

- **Defining a strategic goal**

While the broad strategic goal of any taxonomy has been identified as the securing of an environmentally sustainable future, examples of other goals include supporting the growth of domestic financial markets, improving the attractiveness of an economy as an investment destination for green funds, providing a structural template for tracking and reporting green finance, and creating visibility for capital-starved green avenues.

- **Selection of environmental objectives**

Environmental objectives covered by the taxonomy of a nation must include those that are relevant to the Sustainable Development Agenda and bear upon the achievement of goals outlined in the national plans, policies, regulations, NDCs under the United Nations Framework Convention to Combat Climate Change, and commitments made under international agreements. Furthermore, the taxonomy must address environmental challenges for which finance plays a critical role and can deliver definite and tangible outcomes.

- **Sectors and categories of investments**

At this stage of developing the taxonomy, sectors and related activities that are expected to generate the highest impact in the context of selected environmental challenges must be identified. According to the WB guidelines, the input for this exercise can be extracted from existing environmental policies; regulations; and measurement, reporting and verification systems used to monitor climate finance and existing financial products.

- **Assessment and selection of investments**

The selection of investments, according to the WB guidelines, must be based on an assessment of how these investments achieve national targets and/or standards and/or thresholds that align with the selected environmental objectives. For example, in the case of climate-change mitigation, an investment may be assessed on how it achieves a reduction in carbon emissions; in the case of energy and resource-intensive building sector, whether the investment adheres to the criteria defined by the Leadership in Energy and Environmental Design (LEED) rating system.

- **Target users**

The prospective target users of a taxonomy include banks and other financial institutions, project developers, issuers of green bonds, green funds, asset owners and managers, and other investors. The WB guidelines stipulate that the users of the taxonomy and the intended use must be clarified at the outset.

- **Reporting guidelines**

Regulators and national governments use reporting or disclosures to track green finance and the effectiveness of the green taxonomy in enabling the green transition of the economy. Such disclosures may be either be mandatory and regular, requiring standardisation of reporting procedures, or voluntary, allowing freedom and flexibility in reporting norms. Reporting would involve disclosures on the extent of taxonomy alignment of a company's turnover, revenues, Capex or Opex; nominal values or marked-to-market accounts of green financial securities issued by a financial institution; and the book value of green loans issued by a bank, amongst other things. Other requirements of the taxonomy highlighted in the guidelines include a science-based approach in assessing the linkages between activities and environmental objectives;

statures of an official policy document; and accelerating green finance inflows by using policy actions to supplement the implementation of the taxonomy.

While the World Bank guidelines are largely intuitive in their relevance to developing a taxonomy, they do have some limitations. First, the choice of environmental objectives is confined to those inherent in existing priority agendas, plans and policies, which can result in more pressing objectives being overlooked. The objectives should instead be informed by the exhaustive mapping of the critical environmental challenges facing the country. Second, sections on 'sectors and categories of investments' and 'assessment and selection of investments' in the guidelines have a significant overlap, rendering the latter redundant; 'assessment and selection of investments' may be rephrased as identifying or developing technology-agnostic technical screening criteria to determine the eligibility of economic activities for green finance. Such criteria may already exist in the form of national standards or labels or may have to be developed by commissioning expert groups for the same. Finally, according to the guidelines, potential users and associated use of the taxonomy will be determined post the development of the taxonomy. However, the design of the taxonomy will benefit from taking into account who needs to use it and for what purpose at the development stage.

Bangladesh Taxonomy[64]

Bangladesh's Sustainable Finance Taxonomy intends to provide a harmonised and sound policy and regulatory framework that facilitates sustainable and green transition in key economic sectors in a way that ensures clarity of purpose, protects consumers, and supports market development. It seeks to provide a standardised rulebook for sustainable

[64] Bangladesh Bank Sustainable Finance Department, *Sustainable Finance Policy for Banks and Financial Institutions,* December 2020, https://www.bb.org.bd/mediaroom/circulars/gbcrd/dec312020sfd05.pdf

finance disclosures for banks and financial institutions, and to identify avenues for sustainable linked finance. It is also meant to provide direction to R&D for sustainable product innovation, marketing, awareness, capacity building etc. The taxonomy prioritises substantial contribution to Sustainable Development Goals (SDGs); Perspective Plans (2010-21); the Eighth Five-Year Plan; Vision 2041; intended nationally determined contributions; Bangladesh Delta Plan 2100; government-issued rules, regulations, guidelines, instructions and notifications; and international benchmarks and standards.

In trying to acknowledge the importance of addressing sustainable finance through a sustainable finance taxonomy separately from a green finance taxonomy, the Bangladesh taxonomy further convolutes the two forms of finance instead of bringing clarity. The Sustainable Finance Taxonomy is positioned to include a green taxonomy containing green finance policy, corporate social responsibility; socially responsible finance; agriculture; and cottage, micro, small and medium enterprises (CMSME). Within this, sustainable finance is earmarked for agriculture, CMSME, and socially responsible finance, as well as working capital needs in sectors such as renewable energy, energy and resource efficiency, alternative energy, solid waste management, recycling and manufacturing of recyclable goods, environment-friendly brick production and green/environment-friendly establishments. Sustainable finance is also meant to finance priority green products and eco-friendly products for the trading sector. At the same time, the Green Finance Taxonomy identifies 68 green products, projects, or initiatives in the same sectors mentioned above. As such, there is significant overlap between what is sought to be covered under sustainable finance and green finance. Furthermore, the objectives of the Sustainable Finance Taxonomy are purely environmental and mimic those of the EU taxonomy: climate-change mitigation, climate-change adaptation, sustainable protection of water and marine resources, transition to a circular economy, waste prevention and recycling, pollution prevention and control, and protection and restoration of biodiversity and healthy ecosystems. This

renders the exercise of differentiating between sustainable and green finance somewhat futile.

The Bangladesh taxonomy highlights the need for technical screening criteria to determine the substantial contribution of activities to environmental objectives and the importance of the Do No Significant Harm (DNSH) principle. The following have been identified as the basis for choosing any product/project/initiative as eligible: review of national rules, regulations, guidelines and Perspective Plans (2010–21), the Eighth Five-Year Plan, policies, guidance notes, applicable SDGs and international standards; Climate Fiscal Framework; Environmental Conservation Rules 1997; Sustainable and Renewable Energy Development Authority Guidelines for identifying renewable and resource efficiency products/projects/initiatives; and Green Transformation Fund (GTF) guidance note of Bangladesh Bank. However, there is no clarity regarding how each of these bears upon eligibility. While there is a mention of norms, benchmarks and standards, these have not been explicitly identified. Further, no specific metrics or thresholds determining eligibility have been defined. Screening is based on the environmental and social risk management guidelines introduced in 2017 in Bangladesh, product/project/priority sector-specific environmental and social due diligence risk assessment, the GTF guidance note of Bangladesh Bank, and the sustainability rating methodology of the banks and financial institutions. It has not been stated how this screening process achieves transparency and how it tracks the intended performance to minimise greenwashing. The taxonomy only provides technical specifications underlying the definition of green buildings. A major drawback of this taxonomy is that it does not provide technology-agnostic eligibility criteria for inclusion in the taxonomy.

China Taxonomy[65]

Unlike the Bangladesh taxonomy, the China taxonomy—the Green Bond Endorsed Project Catalogue (2021 Edition)—is quite succinct, comprehensive, and easy to understand, without compromising on the required sophistication expected of a taxonomy. The taxonomy has been constructed with a very clear motivation: to provide the requisite momentum to the green transition of the whole financial system, particularly to the development of the green bond market, so that green finance can be leveraged to promote structural adjustment and transformation, and accelerate the construction of an ecological civilisation, the sustainable development of the economy, and the development of green industries. The precepts characterising the taxonomy are as follows: aligning with the National Development and Reform Commission's Green Industry Guiding Catalogue (2019 version); screening green projects with significant and positive environmental impacts in addressing climate change, circular economy, and environment improvement; taking mainstream international green finance taxonomy into consideration and continuously improving internationalization level of the taxonomy; and timely updates in view of technology developments, policy priorities and evolving technical standards. The taxonomy has harmonised the previously existing multiple standards governing green bond issuances into a single benchmark. It allows regions, departments and other relevant institutions to utilise the Green Bond Catalogue (2021) within the context of their own green development goals and initiatives as well as the relative development of the green financial ecosystem, and encourages them to devise and execute appropriate supplementary action plans.

[65] The People's Bank of China, *Notice on Issuing the Green Bond Endorsed Projects Catalogue,* Beijing ,April 2021, https://www.climatebonds.net/files/files/the-Green-Bond-Endorsed-Project-Catalogue-2021-Edition-110521.pdf; https://www.greenfinanceplatform.org/policies-and-regulations/peoples-bank-china-green-bond-endorsed-project-catalogue-2020-edition

However, the environmental challenges in focus have not been presented in a consolidated manner, their mention scattered across the document. These include environmental improvement, action to climate change and efficiency improvements, and industrial green transformation and upgrades, circular economy and pollution prevention and control. Nevertheless, what has been clearly established is the roadmap of environmental action, which includes the following: energy efficiency and use of clean energy; promotion of sustainable buildings; pollution prevention, control and treatment; water-saving and the use of non-conventional water resources; integrated utilisation of resources; resource efficiency and recycling; clean and green transportation; green and ecological agriculture; and ecological protection and construction. China seeks to achieve this roadmap across six broad categories that represent the first level of the four-level structure defining the taxonomy, namely, energy conservation and environmental protection sectors, clean manufacturing sectors, clean energy sectors, ecological environment sectors, green upgrade of infrastructures, and green services. At the second, third and fourth levels, there are 25, 48 and 204 categories, respectively.

Despite being simple yet sophisticated, the China taxonomy suffers from a major drawback. It identifies projects rather than economic activities as eligible but lacks a scientific approach in determining the eligibility of projects as green. Some national industrial standards and simple quantitative requirements are provided as benchmarks for around 125 of the 204 projects. While this iteration of the taxonomy embraces the DNSH criteria, it is not clear whether it is applicable across all project categories.

Climate Bonds Initiative Taxonomy[66]

The objective of the Clean Bonds Initiative (CBI) taxonomy is to identify activities that will make substantial contributions to a low-carbon and climate-resilient economy. Under this taxonomy, activities/projects/assets become eligible for green finance if they adhere to the technical screening criteria consistent with the 2 degrees Celsius global-warming target. This framework is expected to encourage the adoption of common definitions across global markets in a way that supports the growth of a cohesive green bond market, to be achieved by providing directions to green and climate-bond issuers, investors, and national and subnational governments. The effective implementation of the taxonomy can mobilise bond markets at scale to fund sustainable and climate-resilient infrastructure, low-carbon buildings, sustainable use of natural resources as well as to improve industrial processes to reduce emissions. Environmental areas of focus of this taxonomy include climate resilience, sustainable use of natural resources, pollution prevention and control, and ecosystem conservation. The taxonomy covers eight categories namely energy, water, transport, buildings, land use and marine resources, industry, waste, and ICT, and identifies 45 subcategories of eligible assets and projects within these eight categories.

The most impressive feature of the CBI taxonomy is that it is updated based on the latest climate science. Furthermore, it uses a composite approach towards determining eligibility by including assets, projects and activities within its ambit and employing a graded system of greenness. When projects/assets/activities are unambiguously green, they are automatically eligible with no criteria required to be satisfied;

[66] Climate Bonds Initiative, *Climate Bonds Taxonomy,* January 2021, Climate Bonds Initiative https://www.climatebonds.net/files/files/CBI_Taxonomy_Tables-2June21.pdf

for others, eligibility is contingent upon adhering to the associated screening criteria. There are some projects that are unambiguously ineligible, while for some others, screening criteria have not yet been developed. The technical screening criteria deployed by the taxonomy include quantitative benchmarks, qualitative stipulations including upstream and downstream supply chain requirements, and eligibility constraints on the prospective use of an asset as well as dynamic standards. Detailed analysis and specific eligibility criteria have been developed for solar, wind, marine, geothermal, bioenergy, forestry, buildings, water, waste, transport, shipping and agriculture.

European Union Taxonomy[67]

The EU iteration is the most comprehensive and sophisticated template of a regional/national taxonomy, anchored in scientific evidence, and can be modified to accommodate specific regional/national concerns without losing the essence of the template. The clarity and the detail afforded by this taxonomy makes it the top choice as a reference framework. This taxonomy constructs a reporting framework that aligns with the new EU regulation on climate-related disclosures and intends to facilitate the implementation of the European Green Deal. It is essentially a roadmap envisioning the EU's transition to a low-carbon, resilient, and resource-efficient economy, consistent with the region's environmental objectives. The EU taxonomy is expected to augment the environmental performance of companies, project developers, and issuers through the enhanced flows of green finance. Furthermore, it will help manage financial risks stemming from climate change, environmental degradation and social issues, and foster transparency and long-termism in financial and economic activities.

[67] EU Technical Expert Group on Sustainable Finance, *Financing a Sustainable European Economy: Taxonomy Technical Report,* European Commission, 2019, https://ec.europa.eu/info/sites/default/files/business_economy_euro/banking_and_finance/documents/190618-sustainable-finance-teg-report-taxonomy_en.pdf

The objectives of the EU taxonomy are purely environmental, and include climate-change mitigation and adaptation, sustainable use and protection of water and marine resources, transition to a circular economy, waste prevention and recycling, pollution prevention and control, and protection of healthy ecosystems. The following are the principles underlying the implementation of the taxonomy: substantial contribution to achieving one or more of the environmental objectives; DNSH to any of the other listed environmental objectives; compliance with minimum social safeguards; and compliance with the technical screening criteria. The minimum social safeguards that need to be complied with include the UN Guiding Principles on Business and Human Rights, the Organisation for Economic Co-operation and Development Guidelines for Multinational Enterprises, the International Labour Organisation's Declaration on Fundamental Rights and Principles at Work, and the International Bill of Human Rights. Such compliance represents the social component of this framework, transforming it from a green finance taxonomy to a sustainable finance taxonomy.

The taxonomy formulates eligibility criteria with respect to economic activities and uses the NACE classification system of economic activities for the same. Activities have been classified into three categories: (i) already low carbon; (ii) contribute to net-zero transition by 2050 but not currently close to net-zero carbon emissions level; and (iii) enable low-carbon performance or substantial emissions reductions. Since economic activities may use finance to either decarbonise themselves or enable the decarbonisation of other activities, two forms of greening have been identified in the EU taxonomy: greening of activities and greening by activities.

The taxonomy has developed technical screening criteria in relation to climate-action mitigation for 70 economic activities across sectors, including agriculture, forestry, and mining; manufacturing; electricity, gas, steam, and air conditioning supply; water, sewerage, waste, and remediation; transportation and storage; information and communication technologies;

and buildings. Such criteria have also been developed in relation to climate-action adaptation for 68 activities from various sectors including agriculture, forestry, and mining; electricity, gas, steam, and air conditioning supply; information and communication technologies; financial services and insurance; professional, scientific, and technical activities; and water, sewerage, waste, and remediation.

For climate mitigation, the document prescribes technology-agnostic metrics and thresholds to define eligibility for green finance. These are in the form of GHG reduction; increased carbon sequestration; or adherence to recognised benchmarks, directives, norms and regulations. These thresholds are anchored in the EU's Paris Agreement commitment to become 1.5 degrees Celsius compatible and the goal of a net-zero carbon economy by 2050. Furthermore, the DNSH criteria consider the environmental risks specific to an economic activity and are essentially qualitative in nature.
The EU taxonomy also provides clarity on how financial market participants, banks, green bond issuers and companies should align their disclosures and reporting with its requirements.

Malaysia Taxonomy[68]

The Malaysia taxonomy has been developed on a principle-based approach to promoting a low-carbon economy feasible for the current level of economic development in the country, nurturing climate-risk management without causing undesirable disruptions that can result from knee-jerk transitions. The focus of the taxonomy is a two-fold classification: one that identifies potential economic activities to achieve climate-change mitigation and adaptation, and the

[68] Bank Negara Malaysia (Central Bank of Malaysia, *Climate Change and Principle-based Taxonomy,* April 2021, https://www.bnm.gov.my/documents/20124/938039/Climate+Change+and+Principle-based+Taxonomy.pdf

other that classifies risk for clear-cut risk assessments at the institution and systemic levels to strengthen accountability and market transparency, and encourage climate financial flows. The country's specific national targets, formulated to achieve its NDCs, have informed the development of the taxonomy.

Malaysia's taxonomy is intended to serve as a guide for financial institutions supervised by the Bank Negara Malaysia: bank, investment banks, international Islamic banks, Islamic banks, insurers, reinsurers, takaful operators, retakaful operators and development financial institutions. The taxonomy also serves other financial sector stakeholders in investment and asset-selection decisions, as well as rating agencies in rating decisions. To ensure a robust due diligence protocol, the Malaysia taxonomy enumerates comprehensive requirements in the context of verification, certification, use of sustainability reporting standards, and external rating agencies.

The taxonomy does not offer quantitative screening criteria for determining eligibility for climate finance, but does enumerate a set of principles that dictate the eligibility of economic activities (See Table 2). However, the principle-based approach used by the taxonomy precludes the development of quantitative thresholds, thereby allowing varied interpretations of the principles. This will hinder the effectiveness of the taxonomy in circumventing greenwashing.

Table 2: The Five Guiding Principles

Climate-Change Mitigation	Climate-Change Adaptations that Satisfy this Criterion	No Significant Harm to the Environment	Remedial Measures to Transition	Prohibited Activities
An economic activity can be considered to fulfil the climate-change mitigation objective if it makes a substantial contribution to one of the following objectives: (a) Avoid GHG emissions (b) Reduce GHG emissions (c) Enable others to avoid or reduce GHG emissions	An economic activity can be considered to fulfil the climate-change adaptation objective if it achieves one of the following: (a) Implement measures to increase own resilience to climate change (b) Enable others to increase resilience to climate change. In both cases, there is a need to identify expected negative physical effects of climate change that are to be addressed by climate finance and demonstrate that the financed activity will build resilience or prevent an increase of the identified negative impact of climate change.	Eligible economic activities under GP 1 or 2 must be sustainable, i.e., they must not negatively impact other mitigation or adaptation efforts or cause harm to the broader environment and community. Such activities, and the overall business of which they are a part, must take into account their impact on the following environmental objectives: (a) Pollution prevention and control (air, water and land) (b) Protect healthy ecosystems and biodiversity (c) Sustainable and optimal use of scarce natural resources	If the economic activity and/or the associated overall business are expected to significantly harm the broader environment and/or community, then remedial measures that facilitate a seamless transition must be undertaken by the concerned entity to be eligible for climate finance.	This principle requires financial institutions to ensure that activities considered eligible for climate finance are not illegal and do not contravene environmental laws, and national human rights and labour laws.

Mongolia Taxonomy[69]

Amongst all the developing/emerging market taxonomies reviewed in this report, Mongolia delivers the best product. The approach to designing the taxonomy is organised and the various components of the taxonomy (overarching and environmental objectives, principles underlying the taxonomy, sectoral scope, technical screening criteria and target users) are clearly articulated. Its target users are financial institutions (banks, non-banking financial institutions, development banks, mortgage corporations, institutional investors, credit guarantee funds, insurance companies), bond issuers (corporate, municipal, government), industry (corporate, SMEs, start-ups, and other types of project developers), verification and standard-setting companies, and policymakers.

Specific objectives of the taxonomy include providing financial institutions, businesses, policymakers, and other market players with a common understanding and approach to identify, develop and finance green projects; supporting investors' confidence to finance green projects and mitigating the risk of greenwashing; boosting green finance flows from various sources, including the private sector, international financial institutions, and foreign investors; tracking private-sector investments in green projects and measuring the impact contribution to Mongolia's green development and climate-change-related policies and targets; shaping national policies and regulations on green finance that will boost the market development of green opportunities.

Environmental objectives of the taxonomy include climate-change mitigation, adaptation, pollution prevention, resource conservation, and livelihood improvement. It focuses on eight primary categories for environmental action namely,

[69] Financial Stability Commission of Mongolia, *Mongolian Green Taxonomy*, December 2019, http://toc.mn/post/116,

renewable energy; energy efficiency; pollution prevention and control; sustainable agriculture, land use, forestry, biodiversity conservation and ecotourism; low-pollution energy; green buildings; sustainable water and waste use; and clean transport. It further identifies 28 subcategories of potentially eligible projects within these priority eight categories. The following principles inform the taxonomy: aligning with national policies, targets and environmental concerns; focusing on carbon-intensive activities; complying with ESG standards; aligning with international standards and best practices; and timely review and development of the taxonomy.

The Mongolia taxonomy overcomes a critical deficiency in the Bangladesh and China taxonomies through the establishment of well-defined screening criteria in terms of mandatory thresholds. Some of these are low-pollution energy: the reduction of particulate matter (PM) 2.5 by 80 percent compared to the coal baseline; energy efficiency: a minimum 20 percent GHG emissions reduction; green building: internationally accepted green building certificate such as LEED, EDGE, BREEAM, local building norms, Mongolian energy passport; sustainable water and waste use: 20 percent water savings; sustainable textile production: National VCP ("Khaan Shirkhegt") and international standards such as REACH, Oeko Tex, GOTS.

Interestingly, while most of the Mongolia taxonomy's concerns are environmental, it also accommodates livelihood improvement within its fold. Thus, the taxonomy should technically be referred to as "sustainable taxonomy," instead of green taxonomy. However, from this perspective, the framework is rather limited and should expand its focus to include more social objectives to improve the gains from the taxonomy.

Egypt Green Bond Guidelines[70]

The CIB[71] Green Bond Framework defines guidelines and principles for green bond issuances by the bank in Egypt. It uses the following international standards as references: The Green Bond Principles (GBP) 2018 edition, the Egyptian Financial Regulation Authority's (FRA) policy guidelines, and the IFC climate definitions and metrics. This framework has been motivated by CIB's view of green bonds as an innovative, efficient tool for sustainable finance in Egypt and is founded on the four fundamental pillars of the GBP: definition, which provides clarity on the use of proceeds; selection, which delineates unambiguously the process for project evaluation and selection; traceability, which refers to the management of proceeds that allows tracking and monitoring of finance; and transparency, which is achieved through robust reporting and verification.

The proceeds from the CIB's green bond will finance green assets, which solely include loans or investments made by the CIB; where such loans or investments are dedicated to financing, in whole or in part, assets/projects/activities that facilitate the decarbonisation of the economy and improve environmental and climatic conditions. The "Use of Proceeds" section identifies the types of assets eligible for finance under CIB's Green Bond Programme and being part of the CIB Green Bond Asset Portfolio. The eligible assets are classified into sectors such as energy efficiency, renewable energy, sustainable transport, green buildings, waste and water efficiency, energy management systems (EnMS), and non-energy GHG reductions EnMS. These categories are further divided into 16 sub-categories; for each, types of applicable technologies have been identified along with thresholds that must be maintained to remain eligible. These thresholds are

[70] Commercial International Bank, *CIB Green Bond Framework,* May 2021, https://www.cibeg.com/-/media/project/downloads/about-cib/cib-corporate-responsibility-formerly-community/corporate-sustainability/green-bond/green-bond-framework-v3.pdf

[71] The CIB is the leading private bank in Egypt.

considered to be "minimum requirements" for the above-mentioned list of eligible assets. The exclusion list, which includes projects that are unambiguously ineligible, has also been enumerated in the "Use of Proceeds" section. Projects that do feature in the eligible list must additionally comply with the CIB Green Bond Eligibility Criteria, which, amongst other things, requires adherence to the FRA's guidelines for green bond issuance, ICMA's GBPs, and IFC's climate-finance eligibility criteria. They must also be compliant with the CIB's Environmental and Social Risk Management Policy, including the exclusion list. One of the steps in the review process of the project under consideration is the use of the IFC's Climate Assessment for Financial Institutions tool, a digital web-based platform, to examine the climate- and environment-related eligibility and measure the GHG savings.

The management of proceeds from green bonds focuses on maximising the allocation of these proceeds to eligible green assets. The fundamental rule to be followed is that proceeds of the CIB's green bond issuance be exclusively used to finance or refinance (up to 50 percent of each issuance), in whole or in part, eligible green assets in the Green Bond Asset Portfolio. As such, the Green Bond Asset Portfolio should ideally be greater than or equal to the green bond outstanding amount.

The framework mandates reporting on the allocation and impact of proceeds from green bond issuances. With regard to the allocation of proceeds, the following disclosures must be made: the total amount of proceeds allocated to eligible loans/assets, the number of eligible loans/assets, the balance of unallocated proceeds and means of temporary allocation, and the actual share of refinancing of each issuance. The impact of proceeds must be reported in terms of GHG emissions reduction of a project; for cases in which it is not feasible to measure the reduction of GHG emissions, the impact can be reported in terms of qualitative information and other proxy quantitative data. Such disclosures must be verified by independent and external reviewers that qualify based on the criteria set by the FRA.

MDB-IDFC Common Principles for Tracking Climate Finance[72]

The MDB-IDFC principles (version 2) were jointly developed to foster a consensus on the fundamentals of tracking climate finance. In effect, it puts forth a definition of a green activity that reflects the intended criteria of eligibility for climate finance. The principles identify a list of activities whose financing may be deemed as climate finance. It builds on the experience and expertise of those involved in developing them and achieve harmonisation across the differences that may exist in their approach to tracking climate finance.

The stated purpose of these principles is to achieve transparency and comparability of reporting protocols, and they are to be reviewed and updated regularly, based on acquired experience. "[A]n activity will be classified as related to climate-change mitigation if it promotes efforts to reduce or limit greenhouse gas (GHG) emissions or enhance GHG sequestration." This definition makes it clear that reduction or limiting of GHG emissions or enhanced sequestration is the benchmark for eligibility. Any project that applies for climate finance must furnish, ex-ante project implementation, specific theoretical and/or quantitative evidence of GHG emission mitigation. However, this implies that the actual results of the implementation of the project do not bear upon the eligibility of that project.

The list of eligible activities identified by the principles yields a taxonomy, defining eligibility in relation to the activities. It consists of 10 sectors, which are further disaggregated into 28 sub-sectors. Within each of these sub-sectors, eligible activities

[72] Common Principles for Climate Mitigation Finance Tracking, Version 2 – 15th June 2015, https://www.worldbank.org/content/dam/Worldbank/document/Climate/MDB%20IDFC%20Mitigation%20Finance%20Tracking%20Common%20Principles%20-%20V2%2015062015.pdf; Common Principles for Climate Change Adaptation Finance Tracking, https://www.eib.org/attachments/documents/mdb_idfc_adaptation_common_principles_en.pdf

are identified. The list is referred to as being "non-exhaustive." Given the location- and context-specific nature of climate adaptation and the greater heterogeneity in tracking and reporting methodologies, developing common principles in relation to climate adaptation is imperative. No attempt has been made to identify criteria that are common to all projects, since it would not be a viable task. Finances that support efforts that tackle the current and expected effects of climate change in the context of a certain activity deemed eligible may be referred to as climate-adaptation finance. For eligible projects, the documentation must identify risks, vulnerabilities and impacts to be addressed through climate finance and highlight a link between them and the financed activity.

Lessons for India

The fundamental objectives of the existing taxonomies discussed in this chapter are to provide a standard definition of what constitutes green, formulate a standard framework for identifying activities/projects/assets that qualify for green finance, and guide disclosure and reporting practices. In some taxonomies, this has been explicitly stated, while in others, it is implied in the outcomes expected. For instance, in the case of China, the taxonomy is expected to catalyse the development of the green transition of the financial market, the construction of the ecological civilisation, and the development of green industries. In the case of Mongolia, the fundamental objective is stated along with the outcomes of achieving this objective. The explicit identification of the outcomes from the taxonomy also highlights the parameters taken into consideration while developing it. The larger the number of outcomes, the more effective the taxonomy is expected to be in attracting green finance. For India, the framework of a green taxonomy may be developed in such a way as to generate maximum benefits for the green transition of the Indian economy, and must deliver all the outcomes identified by the reviewed taxonomies.

It appears, prima facie, that the environmental objectives underlying the reviewed taxonomies are not uniform. A

careful investigation will indicate that the environmental objectives covered across the reviewed taxonomies broadly include climate change mitigation and adaptation, pollution prevention and control, resource efficiency, conservation of natural resources, and ecosystem/biodiversity conservation. The taxonomies have stated how they intend to achieve these objectives—through clean energy and transportation, water conservation and waste management, ecological agriculture and so on. However, while there is a great overlap in the sectors chosen across the taxonomies, they differ in their inclusion of certain focus sectors, which reflects the differences in national priorities and how achievement of a broader environmental objective translates into differences in obligations across nations. Instead of focusing on all the environmental objectives identified in the reviewed taxonomies, the Indian taxonomy should focus on the ones that demand urgent attention in the Indian context, by identifying economic activities that represent high-impact sectors in delivering maximum gains with regard to these objectives. This will automatically cover the sectors that are a part of reviewed taxonomies.

All but the CBI taxonomy emphasise the need to align the framework with the NDCs, national plans and policies as well as national standards. In some cases, the need to comply with international standards is also highlighted. The China, Mongolia, and EU taxonomies concur on the need to identify sectors that can deliver significant positive impacts across environmental objectives. The China and Mongolia taxonomies further observe the importance of timely updates according to changing needs. The taxonomy designed for India must embrace all these principles, given their significance in delivering maximum impetus for the green transition of the economy.

In the context of screening criteria, the Mongolia, Egypt and EU taxonomies are important, since they address the specific needs of the geographies that they attend to. The differences in the screening criteria reflect the need to cater to national/regional circumstances and adhere to national/regional

standards and norms. Unlike the Bangladesh, Malaysia and China taxonomies, the Indian taxonomy must establish appropriate screening criteria to reflect domestic realities and align with national standards/norms (See Chapter 4).

The Mongolia, Malaysia and EU taxonomies cater not only to banks, financial institutions and investors, but also to companies, project developers, credit-rating agencies and standard setters. This is indicative of the utility and contribution to the development of the broader green finance ecosystem. The Indian taxonomy must be formulated in a way that gives direction to the development of its green finance ecosystem.

The MDB-IBFC principles, as well as the taxonomies of Malaysia, Egypt and EU, highlight the need for tracking climate/green finance through transparent and well-defined disclosures and reporting, as well as external verification. India must mandate aligning disclosures and reporting with its green taxonomy. External verification and public access to such disclosures and reports can help minimise greenwashing further.

A distinguishing feature of the MDB-IBFC Principles is that it does not take into consideration the actual results of the activity being financed, allowing projects that use climate finance to become complacent at the implementation stage. This defeats the purpose of taxonomies, since the actual outcomes are not bound by the requirement to demonstrate substantial contribution to GHG savings. India must consider penalising entities if actual outcomes deviate significantly from the technical screening criteria and it becomes evident that greenwashing has occurred. Although there is a rampant fear of penalties, the focus should not be to hamstring the market but to incentivise compliance.

Mapping Environmental Issues Across High-Impact Sectors

This chapter maps the environmental concerns across sectors that a green taxonomy for India must focus on and examines the input required to delineate the dimensions of environmental sustainability in relation to high-impact sectors. This exercise will enable the taxonomy to generate maximum environmental gains when implemented.

Energy (Power) Sector

Climate Change

While the energy sector was responsible for 75 percent of GHG emissions in 2016, the carbon dioxide (CO_2) emissions from electricity production accounted for 1,122,230 Gg CO_2e (39.53 percent) of total national emissions, the largest emitting category in the country.[73]

[73] Government of India, Ministry of Environment, Forest and Climate Change, *India Third Biennial Update Report to The United Nations Framework Convention on Climate Change,* (Ministry of Environment, Forest and Climate Change, 2021), https://unfccc.int/sites/default/files/resource/INDIA_%20BUR-3_20.02.2021_High.pdf

Air Pollution

The contribution to air pollution by power plants, especially thermal power, is a major cause of concern. Power plants have been known to be prominent sources of sulphur dioxide (SO2), oxides of nitrogen (NOX), TSP and PM emissions into the atmosphere.[74] Bioenergy installations emit SO2, NOx, dust and CO, amongst other pollutants. Geothermal power installations, too, pose air pollution concerns.[75]

Water Pollution

Power stations, especially different forms of thermal power and geothermal power, are responsible for the thermal pollution of water bodies, which reduces oxygen levels in the receiving water, creating anaerobic conditions that cause the release of foul gases. The decline in the oxygen level threatens the existence of various species of fish that require a minimum level of oxygen for survival.[76] Moreover, geothermal power stations also emit pollutants into watercourses.[77] Hydropower installations and tidal power plants, too, can add to water pollution, with the latter responsible for release or leakage of chemicals (lubricants, anti-fouling paints, etc.) during various stages of their lifecycle.

---

[74] EU Technical Expert Group on *Sustainable Finance, Financing a Sustainable European Economy: Taxonomy Technical Report;* Edgar Hertwich, *"Environmental Impact of Electricity: A Life-Cycle Perspective",* Centre for Industrial Ecology Yale School of Forestry and Environmental Studies, 2016, https://energy.mit.edu/wp-content/uploads/2016/05/2016-02-29_Environmental-Impact-of-Electricity.pdf

[75] EU Technical Expert Group on Sustainable Finance, *Financing a Sustainable European Economy: Taxonomy Technical Report;* Edgar Hertwich, "*Environmental Impact of Electricity: A Life-Cycle Perspective",* Centre for Industrial Ecology Yale School of Forestry and Environmental Studies, 2016
https://energy.mit.edu/wp-content/uploads/2016/05/2016-02-29_Environmental-Impact-of-Electricity.pdf

[76] Kumar, "Six Main Sources of Water Pollution", the website of Environmental Pollution, https://www.environmentalpollution.in/water-pollution/six-main-sources-of-water-pollution/142

[77] EU Technical Expert Group on Sustainable Finance, *Financing a Sustainable European Economy: Taxonomy Technical Report;* Edgar Hertwich, "Environmental Impact of Electricity: A Life-Cycle Perspective", Centre for Industrial Ecology Yale School of Forestry and Environmental Studies,2016, https://energy.mit.edu/wp-content/uploads/2016/05/2016-02-29_Environmental-Impact-of-Electricity.pdf

Water Scarcity

Thermal power plants are essentially water-intensive, exacerbating the concerns of water stress in India. Indeed, these plants violate water consumption norms set by the environment ministry. Furthermore, up to 40 percent of thermal power plants are situated in water-stressed areas, adding to the water woes in those locations.[78] Additionally, concentrated solar power (CSP) systems and hydropower, geothermal power, and bioenergy power installations can be responsible for significant water use.[79]

Ecosystem/Biodiversity Losses

Solar photovoltaic systems and CSP systems involve significant land use that results in losses in ecosystems and biodiversity. The high temperatures generated by the CSP facilities threaten birdlife. Wind power generation, too, poses a risk of birds and bats colliding with wind turbine rotor blades and/or overhead cables. The resulting disturbance and displacement impact on birds leads to habitat loss.

Tidal power is expected to have negative impacts on marine ecosystems and aquatic biodiversity. Several types of ecosystem and biodiversity losses stem from hydropower, including habitat loss of aquatic life, distortions in hydrological and hydrogeological systems, and water chemistry, as well as

[78] Rishika Pardikar, "Thermal power plants in India using more water than permitted limit: RTI", *Business Standard,* September 13, 2019, https://www.business-standard.com/article/current-affairs/thermal-power-plants-in-india-using-more-water-than-permitted-limit-rti-119091300136_1.html#:~:text=In%20addition%20to%20polluting%20the,to%20Information%20Act%20(RTI).

[79] EU Technical Expert Group on Sustainable Finance,*Financing a Sustainable European Economy: Taxonomy Technical Report,;* Edgar Hertwich, "Environmental Impact of Electricity: A Life-Cycle Perspective", Centre for Industrial Ecology Yale School of Forestry and Environmental Studies, https://energy.mit.edu/wp-content/uploads/2016/05/2016-02-29_Environmental-Impact-of-Electricity.pdf

interference with pathways of species migration. Geothermal, bioenergy and hydropower stations can have an adverse impact on the water quality of aquatic bodies. There are also concerns of bioenergy power plants damaging sensitive ecosystems.[80]

Manufacturing Sector

Climate Change

In the context of manufacturing, there are two sources of GHG emissions: energy (fossil fuels combustion including fossil fuel burning for in-house power and heat production) and industrial processes and product use (IPPU).

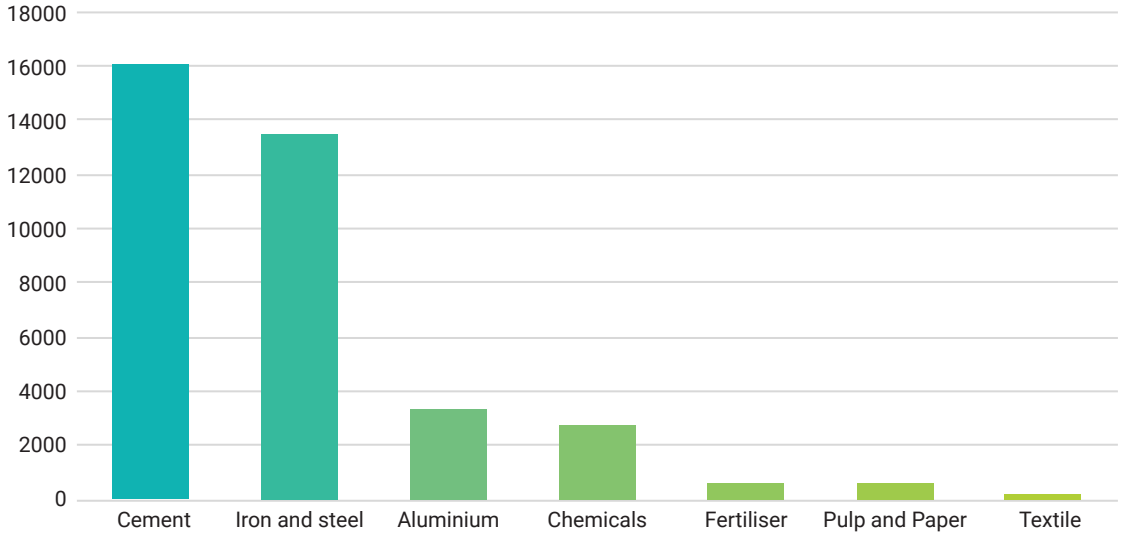
Table 3: Emissions from the Manufacturing Sector, by Industry (2016)[81]

Industry	GHG emissions from Energy (Gg CO_2e)	GHG emissions from IPPU (Gg CO_2e)	Total GHG emissions (Gg CO_2e)	As a percentage of total GHG emissions in the country (in %)
Cement	53,468	106,591	160,059	5.64
Iron and steel	134,731	-	134,731	4.75
Aluminium	-	33,455	33,455	1.18
Chemicals	1,988.60	25,358	27,346	0.96
Fertiliser	6,005.86	-	6,005.86	0.21
Pulp and Paper	2,625.08	3,341	5,966.08	0.21
Textile	2,306.88	-	2,306.88	0.08
Total GHG Emissions			**369,869.82**	**13.03**

[80] EU Technical Expert Group on Sustainable Finance,*Financing a Sustainable European Economy: Taxonomy Technical Report,;* Edgar Hertwich, "Environmental Impact of Electricity: A Life-Cycle Perspective", Centre for Industrial Ecology Yale School of Forestry and Environmental Studies, https://energy.mit.edu/wp-content/uploads/2016/05/2016-02-29_Environmental-Impact-of-Electricity.pdf

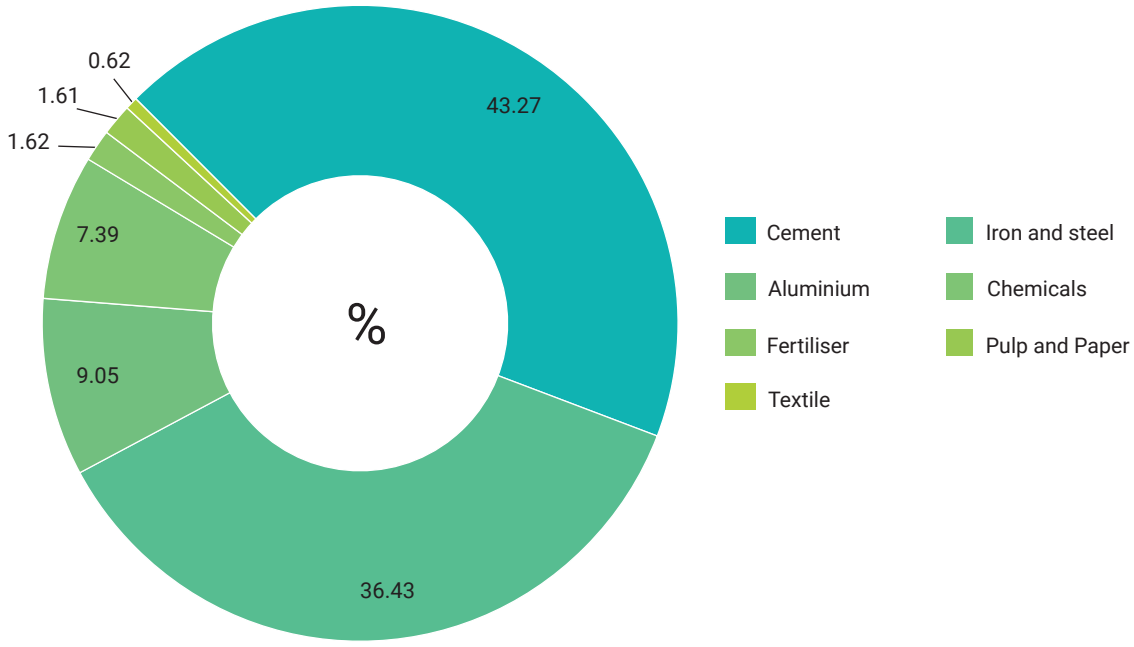
[81] Government of India, Ministry of Environment, Forest and Climate Change, India Third Biennial Update Report to The United Nations Framework Convention on Climate Change, https://unfccc.int/sites/default/files/resource/INDIA_%20BUR-3_20.02.2021_High.pdf

Figure 5: GHG Emissions, by Industry (Gg CO_2e)



Source: India Third Biennial Update Report to the United Nations Framework Convention on Climate Change[82] *and author's calculation*

Figure 6: Distribution of GHG Emissions in the Manufacturing Sector by Industry Type (2016)



Source: India Third Biennial Update Report to the United Nations Framework Convention on Climate Change[83] *and author's calculation*

[82] Government of India, Ministry of Environment, Forest and Climate Change, India Third Biennial Update Report to The United Nations Framework Convention on Climate Change

[83] Government of India, Ministry of Environment, Forest and Climate Change, India Third Biennial Update Report to The United Nations Framework Convention on Climate Change

Air and Water Pollution

In March 2016, the Ministry of Environment, Forest and Climate Change introduced a new categorisation of industries based on their pollution load, based on their score on the pollution index (PI). The PI of any industrial sector ranges from 0 to 100, such that the higher the value of PI the greater the degree of pollution load from the sector. Industrial sectors with PI scores greater than 60 fall in the 'Red' category, which comprises the largest polluters. Within this category, the Central Pollution Control Board has identified 17 highly polluting industries—sugar, cement, distillery, petrochemicals, pulp and paper, fertiliser, tannery, pharmaceuticals, copper, iron and steel, and aluminium.[84] Of these, iron and steel, sugar, paper, cement, fertiliser, copper, and aluminium have been marked as "critical."[85] These industries are notorious for their SOX, NOX, and CO2 emissions and for effluent discharges comprising heavy metals and/or synthetic organic compounds[86] and together account for 30 percent to 50 percent of the total pollution in most urban centres.[87]

Water Scarcity

Currently, industrial water demand accounts for about 8 percent to 10 percent of the total water demand in the country. Industrial consumption of water in India is considerably higher (2–3.5 times more water per unit of production) than international standards.[88] Some of the most water-intensive industries, and their current and projected water requirements, have been tabulated below:

---

[84] Tamil Nadu Pollution Control Board, *DASHBOARD*, the website of Tamil Nadu Pollution Control Board, https://tnpcb.gov.in/17Category.php

[85] Gurjar, "Air Pollution in India: Major Issues and Challenges"

[86] Kumar, "Six Main Sources of Water Pollution"; Gurjar, "Air Pollution in India: Major Issues and Challenges"

[87] Jyoti Pande Lavakare, "Can data prove to be the nemesis of India's polluting industries?", *Scroll*, April 6, 2021, https://scroll.in/article/991241/can-data-prove-to-be-the-nemesis-of-indias-polluting-industries

[88] Government of India, Ministry of Water Resources, *Guidelines For Improving Water Use Efficiency in Irrigation, Domestic & Industrial Sectors,* (Central Water Commision: Ministry of Water Resources, 2014), http://nwm.gov.in/sites/default/files/Final%20Guideline%20Wateruse.pdf

Table 4: Water Requirements in mm^3/year, by Industry (Production in 1,000 Tonnes)[89]

Category of industry	Water Required per tonne in m^3	2010		2025		2050	
		Production	Water required	Production	Water required	Production	Water required
Iron and Steel	22	265,350	5,837.7	273,300	6,013	547,050	12,035
Smelters	82.5	292.6	24.14	391.6	32.31	537.6	44.35
Textiles and Jute	200	95,094	19,019	183,507	36,701	234,618	46,924
Leather Products	30	2,191.3	65.64	3,102.5	93.08	4,927.5	147.83
Inorganic Chemicals	200	8,000	1,600	16,730	3,346	30,076	615
Pharmaceuticals	25	8,370	209.25	11,046	276.2	17,170	429.5
Distillery	22	3,059.6	66.31	4,454.6	318	6,020	5,203.9
Paper and Pulp	200	10,350	207	51,200	10,240	97,450	19,490

Transport Sector

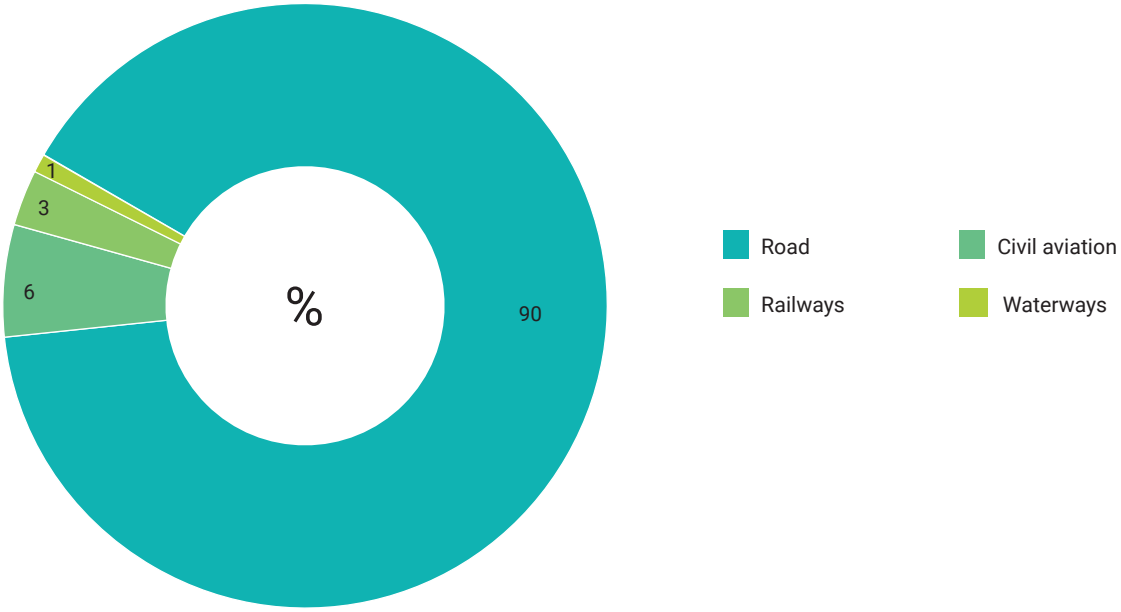
Climate Change

In the transport sector, GHG emissions generated from fossil fuel combustion amount to 2,74,434 $GgCO_2e$, the second-highest contribution in the country. Of this total, road transport accounts for 243,344 $GgCO_2e$, about 90 percent. Other transport activities together account for 10 percent of the sector's emissions: civil aviation (six percent), railways (three percent) and water-borne navigation (one percent). Road transport accounts for about 8.57 percent of the total national emissions, while civil aviation, railways and waterways are responsible for 0.6 percent, 0.3 percent and 0.1 percent, respectively.[90] The proposed taxonomy acknowledges the urgency to tackle road transport, both in terms of air pollution and global warming.

[89] Government of India, Ministry of Water Resources, *Guidelines For Improving Water Use Efficiency in Irrigation, Domestic & Industrial Sectors*

[90] Government of India, Ministry of Environment, Forest and Climate Change, *India Third Biennial Update Report to The United Nations Framework Convention on Climate Change*

Figure 7: Distribution of Transport GHG Emissions by Mode of Transport (2016)



Source: India Third Biennial Update Report to the United Nations Framework Convention on Climate Change[91]

Air Pollution

Transportation and, more specifically, road transport is a significant source of air pollution in the urban context. Vehicles are notorious for emissions of carbon monoxide (CO), NOX, oxides of sulphur (SOx), and TSP emissions. In terms of PM emissions, road dust accounts for 37 percent in Delhi, 30 percent in Mumbai, and 61 percent in Kolkata. Road transport is the highest emitter of PM2.5 in Bengaluru (41 percent), Chennai (34 percent), Surat (42 percent), and Indore (47 percent).[92]

[91] Government of India, Ministry of Environment, Forest and Climate Change, *India Third Biennial Update Report to The United Nations Framework Convention on Climate Change*

[92] Gurjar, "Air Pollution in India: Major Issues and Challenges"

Agriculture Sector

Climate Change

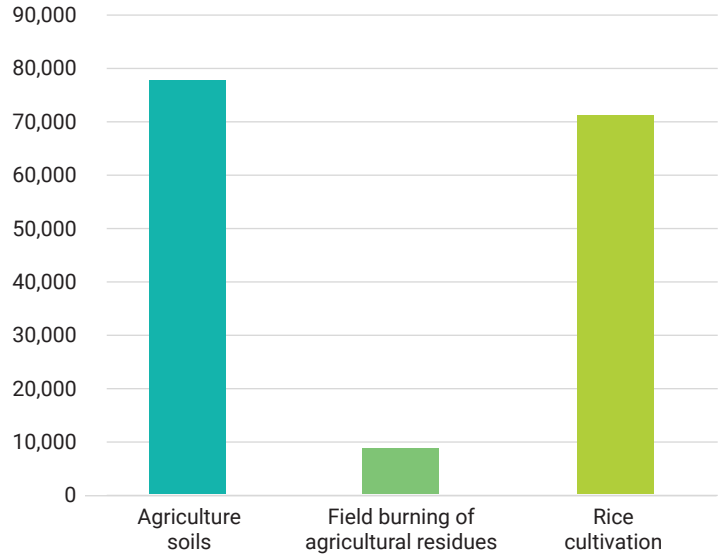
The agricultural sector is mainly responsible for methane and nitrous oxide (N_2O) emissions. Agricultural soils, rice cultivation, and field burning of agricultural residues are the major sources of GHG emissions. Agriculture soils are the largest contributor of (direct[93] and indirect[94]) N_2O emissions in the country and account for 77,781 $GgCO_2e$ (three percent) of the total national emissions. In 2016, field burning of agricultural residues generated 304.31 Gg of methane and 7.89 Gg of N_2O, i.e. 8,836 Gg (0.3 percent of the total national inventory) of emissions in CO_2 equivalent terms. In the same year, rice cultivation, a major source of methane emissions from the anaerobic decomposition of soil organic matter (SOM), accounted for 71,322 $GgCO_2e$ (2.5 percent of national inventory).[95]

[93] Direct emissions using human-induced net N additions to soils (e.g., synthetic or organic fertilisers, deposited manure, crop residues, sewage sludge), or of mineralisation of N in soil organic matter following drainage/management of organic soils, or cultivation/land-use change on mineral soils.

[94] There are two indirect emission pathways (i) following volatilisation of NH3 and NOx from managed soils and from fossil fuel combustion and biomass burning, and the subsequent redeposition of these gases and their products $NH4^+$ and NO3- to soils and waters; and (ii) after leaching and runoff of N, mainly as NO3-, from managed soils

[95] Government of India, Ministry of Environment, Forest and Climate Change, *India Third Biennial Update Report to The United Nations Framework Convention on Climate Change*

Figure 8: GHG emissions GgCO2e in agriculture sector 2016



Source: India Third Biennial Update Report to the United Nations Framework Convention on Climate Change[96]

Air and Water Pollution

Agriculture is responsible for the emission of pollutants such as ammonia (NH3) and NOx due to the application of fertilisers and other residues to soils. Further, the practice of "slash and burn" generates photochemical smog that produces smoke during the process, and crop residue burning also emits toxic pollutants.[97]

The indiscriminate use of chemical fertilisers, particularly since the green revolution, contributes significantly to pollution. The chemicals contained in the fertilisers contaminate the groundwater by leaching and the surface waters by run-off, and are also responsible for eutrophication. For example, the use of nitrogen fertiliser causes water pollution through nitrogen leaching and run-off. Water also gets polluted due to the application of pesticides and insecticides.[98]

[97] Gurjar, "Air Pollution in India: Major Issues and Challenges"; David Norse, "Agriculture and the environment: changing pressures, solutions, and tradeoffs," in World Agriculture: towards 2015/2030, ed. Jelle Bruinsma (Earthscan and FAO, 2003), 331-356, https://www.fao.org/3/y4252e/y4252e12.pdf

[98] Kumar, "Six Main Sources of Water Pollution", the website of Environmental Pollution ;Norse, "Agriculture and the environment: changing pressures, solutions and trade-offs", 331

Soil and Land Degradation

Agriculture causes land degradation through the unbalanced use of inorganic fertilisers and pesticides, which contributes to soil pollution and soil acidification, nutrient loss due to intensive farming, waterlogging and salinisation of soil due to poor management of canal irrigation, cracking of soil due to inefficient irrigation practices, decline in SOM resulting from excessive tillage and employment of heavy machinery, crop residue burning adding to SOM loss, and soil erosion due to inefficient cropping patterns.[99]

Water Scarcity

Nearly 80 percent of India's freshwater is consumed by the agriculture sector, with Indian farmers utilising almost 90 percent of the groundwater (one of the sources of freshwater) available in the country.[100] Cultivation of rice, wheat and sugarcane account for 40 percent of the country's gross farmed area but consume about 80 percent of its irrigation water.[101] Inefficient planning and management of irrigation and overdrafting[102] have led to significant spikes in the water table in most canal command areas.[103]

Ecosystem/Biodiversity Losses

Losses in biodiversity have resulted from the expansion of agriculture and the consequent reduction in natural forests and wetlands. Managed forests and field margins have witnessed losses in the diversity of species. Crop domestication has fuelled

[99] Ranjan Bhattacharaya, et al., "Soil Degradation in India: Challenges and Potential Solutions" , *Sustainability*, no. 7, (2015), https://www.mdpi.com/2071-1050/7/4/3528/pdf.
[100] Dr Vibha Dhawan, "Water and Agriculture in India", (paper presented the South Asia expert panel during the Global Forum for Food and Agriculture (GFFA) 2017), https://www.oav.de/fileadmin/user_upload/5_Publikationen/5_Studien/170118_Study_Water_Agriculture_India.pdf
[101] Pratik Parija and Bibhudatta Pradhan, "Rising water crisis forces Indian farmers to rethink their crops selection", *The Economic Times*, July 2020, https://economictimes.indiatimes.com/news/economy/agriculture/rising-water-crisis-forces-indian-farmers-to-rethink-their-crops-selection/articleshow/77098970.cms?from=mdr
[102] Extraction of groundwater beyond the safe yield of the aquifer
[103] Bhattacharaya, et al., "Soil Degradation in India: Challenges and Potential Solutions "

a decline in wild genetic resources. The poor management of mineral fertiliser usage has adversely impacted soil microbe populations, and the excessive use of insecticides and herbicides has also resulted in biodiversity loss.

Some agricultural activities have caused a decline in wild species (including micro-organisms) that assist in the sustenance of food and agricultural production, and have disturbed nutrient cycling.[104] The species reliant on agriculture for their sustenance have also seen a decline.

Livestock Production

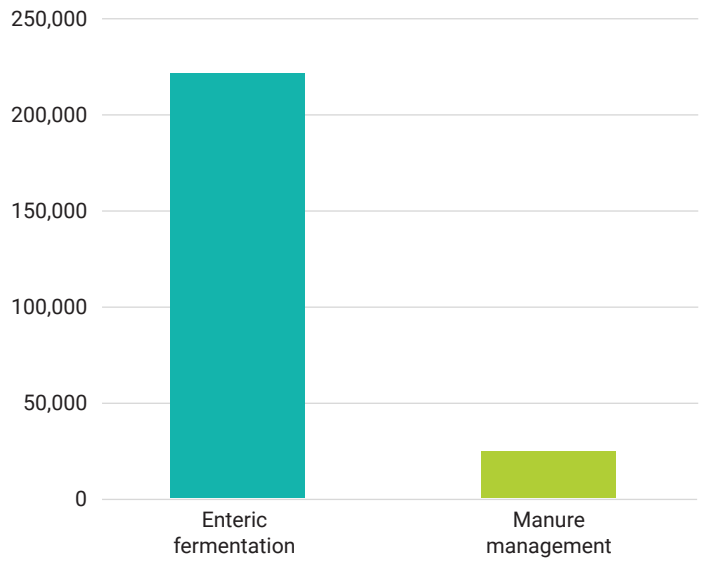
Climate Change

Enteric fermentation and manure management are the main sources of GHG emissions from livestock production. Methane emissions from enteric fermentation accounted for 222,655 $GgCO_2e$ (7.84 percent) of the total national emissions in 2016. It is the third-most significant source of emissions in the country. GHG emissions from manure management can be classified as methane and N_2O emissions from anaerobic manure decomposition, and volatile nitrogen losses (NH_3 and NO_x) from storage of manure in solid form. Manure management is responsible for 27,227 GgCO2e (0.95 percent) of total national GHG inventory in 2016.[105]

[104] Norse, "Agriculture and the environment: changing pressures, solutions and trade-offs", 331

[105] Government of India, Ministry of Environment, Forest and Climate Change, *India Third Biennial Update Report to The United Nations Framework Convention on Climate Change*

Figure 9: GHG Emissions $GgCO_2e$ in Livestock Production (2016)



Source: India Third Biennial Update Report to the United Nations Framework Convention on Climate Change[106]

Air and Water Pollution

Livestock production is a primary source of NH_3 emissions resulting from manure and urine.[107] Water pollution due to livestock farming results from intensive dairying, landless rearing of pigs and poultry, feed and fodder production, and nutrient runoff/discharges into surface waters due to poor waste management.

Intensification of pastures, through the indiscriminate use of fertilisers, also results in water pollution. Nutrient pollution of water causes eutrophication.[108]

[106] Government of India, Ministry of Environment, Forest and Climate Change, *India Third Biennial Update Report to The United Nations Framework Convention on Climate Change,* https://unfccc.int/sites/default/files/resource/INDIA_%20BUR-3_20.02.2021_High.pdf

[107] Gurjar, "Air Pollution in India: Major Issues and Challenges"; Norse, "Agriculture and the environment: changing pressures, solutions and trade-offs", 331

[108] Norse, "Agriculture and the environment: changing pressures, solutions and trade-offs" , 331

Land Degradation and Ecosystem/Biodiversity Losses

Overgrazing is responsible for the degradation of land and soil erosion, and NH3 emissions for soil acidification. Moreover, increased stocking rates on extensive pastoral systems have caused a decline in bird population and species. Excessive grazing pressures, reseeding of pastures, managed pastures and livestock domestication, too, have had an adverse impact on biodiversity.[109]

Waste Sector

Climate change

GHG emissions from waste may be traced to two sources: a) methane emitted during the treatment and disposal of solid wastes,[110] which are handled on solid waste disposal sites (SWDS); and b) emissions from the anaerobic treatment or disposal of wastewater.[111] In 2016, the waste sector accounted for 75,232 GgCO2e (2.65 percent) of the total national GHG emissions.[112]

Air and Water Pollution

The lack of proper treatment of MSW has generated alarming levels of particulate matter. Methane (CH_4) is emitted from landfills and wastewater treatment plants and NH_3 from the composting process. Moreover, the open burning of wastes produces toxins and carcinogens.[113]

---

[109] Norse, "Agriculture and the environment: changing pressures, solutions and trade-offs" , 331

[110] Solid waste (municipal, industrial and other solid wastes) disposal refers to managed, unmanaged and uncategorised waste that has been deposited in landfills.

[111] Wastewater refers to domestic wastewater, commercial and industrial wastewater, and can be treated on site (not collected), transferred through the sewerage system to a central treatment plant (collected), or eliminated without treatment.

[112] Government of India, Ministry of Environment, Forest and Climate Change, *India Third Biennial Update Report to The United Nations Framework Convention on Climate Change*

[113] Gurjar, "Air Pollution in India: Major Issues and Challenges"

Domestic wastewater and sewage cause water pollution as well as eutrophication, depleting oxygen from water and/or disturbing the balance of the aquatic ecosystem. Untreated wastewater is also a source of deadly viruses and bacteria.

Industrial units dispose of wastes such as heavy metals or synthetic organic compounds generated by them into water bodies, either through direct discharge or in the form of waste dumps that leach into groundwater.[114]

Radioactive dust generated during nuclear tests contaminates the rainfall received by the earth. Radioactive elements then trickle down through the soil into groundwater sources or are carried into watercourses.[115]

Finally, some waste treatment activities, too, can result in air, water and soil pollution.[116]

Building Sector

The rapidly expanding building sector in India is both a cause and an effect of the country's accelerated economic growth. Moreover, nearly two-thirds of the total building stock that will exist in 2030 are still to be constructed.[117] This expected expansion in the building sector has environmental ramifications resulting from an increase in demand pressures on energy and natural resources. Environmental concerns around the buildings sector include global warming, pollution, water and resource scarcity, and the distortion of landscape and ecosystem.

---

[114] Kumar, "Six Main Sources of Water Pollution", the website of Environmental Pollution, https://www.environmentalpollution.in/water-pollution/six-main-sources-of-water-pollution/142

[115] Kumar, "Six Main Sources of Water Pollution"

[116] EU Technical Expert Group on Sustainable Finance, *Financing a Sustainable European Economy: Taxonomy Technical Report,*

[117] BEE, "Energy Conservation Building Code FAQs", Bureau of Energy Efficiency, Ministry of Power, Government of India, https://beeindia.gov.in/sites/default/files/ECBC_FAQs_0.pdf

Eligibility Criteria for the Taxonomy: Fundamental Principles

This chapter delineates the principles that define the fundamental structure and design of the green taxonomy. It also discusses the formulation of the technical screening criteria for each sector covered.

Overarching Principles Guiding the Fundamental Design of the Taxonomy

1. The taxonomy must primarily address the pressing environmental challenges confronting India, as identified in Chapter 1 (See Box 1).

2. The objective of the taxonomy is to maximise environmental gains without compromising on India's growth and development needs. As such, the eligibility criteria must be defined in a way that allows India to pursue to the best extent possible a development pathway that is 1.5 degrees Celsius compatible.

3. The taxonomy must be technology agnostic and provide the freedom to choose between alternative pathways of green transition. However, the set of possible choices is determined by the technical screening criteria of the taxonomy.

4. The specific threshold for each criterion will depend on feasibility, i.e. the available technologies and other modes of green transition as well as their domestic economic viability. Thus, if there is a new innovation, the entire taxonomy does not run the risk of becoming irrelevant or inadequate; new possibilities can be incorporated by simply altering the thresholds. This approach will avoid creating path dependencies that might become difficult to circumvent in the future.

5. The taxonomy must be compatible with the broader intent of India's NDCs, major national plans, and policies for environmental action, while also enabling more ambitious climate action than what is currently being pursued.

6. The taxonomy must be harmonised with international taxonomies as much as possible while adequately addressing domestic concerns.

7. It is assumed that national environmental norms and standards are based on domestic circumstances. As such, the taxonomy utilises national norms and standards in the areas such norms already exist or can be established. For effective implementation of the taxonomy, national norms may need to be made comparable with international standards.

8. This taxonomy includes sectors such as power, which have near-zero or zero-emission substitutes, as well as hard-to-abate sectors such as aluminium, iron and steel, and cement, which do not have unambiguous green substitutes. While the former are deemed capable of

"decarbonisation," the latter are only expected to achieve the less stringent goal of "low carbonisation." The green taxonomy will address this dichotomy by setting different carbon emission thresholds across sectors, based on a sector's ability to make the GHG emission transition.

9. The taxonomy distinguishes between two types of activities: (i) Critical economic activities for which technical screening criteria are defined. These activities need to satisfy such criteria to be eligible for green finance; and (ii) Activities that enable the performance of critical economic activities that become eligible for green finance by virtue of this fact and do not have to satisfy the technical screening criteria.

10. This discussion presents perspectives for the first iteration of the taxonomy, which focuses on urgent matters of environmental action. The taxonomy needs to be reviewed and updated regularly to incorporate changes in development levels, technology, policy and standards that bear upon environmental sustenance and environmental conditions.

11. To cover significant impacts not addressed by the above environmental objectives, it is mandatory to conduct the EIA and the environmental risk assessment (ERA). These will help formulate plans for water conservation, environmental/biodiversity management, etc.

12. The mapping of environmental concerns and technical screening criteria is given in the table below.

Table 5: Mapping of Environmental Objectives and Related Thresholds

Climate-change mitigation	GHG/CO_2 emissions
Energy Efficiency	Star ratings by the BEE
Air and Water Pollution	Emission and/or effluent norms prescribed/to be prescribed by the CPCB
Water Scarcity	Water consumption norms established/to be established by the MoEFCC and the Ministry of Jal Shakti
Ecosystem/Biodiversity Losses	Monetary losses of ecosystem services; ecosystem dependency ratio (See Box 2)

Technical Screening Criteria

A. Energy (Power) Sector

Environmental Objectives: Climate-change mitigation, air and water pollution, water consumption, and ecosystem and biodiversity losses.

i. GHG Emissions

For the construction and/or operation of an electricity generation facility to be eligible:

- Short-term criteria: Given India's current stage of development and its future growth trajectory, it is worth considering whether the country is ready to focus on the lifecycle emissions (LCE)[118] of electricity generation. Is the LCE analysis the appropriate benchmark for defining "green" in the context of power generation in the taxonomy? At the current level of development, GHG savings solely in terms of direct emissions rather than LCE will also be significant. Direct emissions produced at the point of electricity generation should not exceed the threshold determined in terms of gCO_2e/kWh or percentage of GHG emissions, in relation to the fossil fuel baseline, whichever is applicable.

[118] Based on ISO 14044 compliant LCE analysis. LCA can help determine environmental burdens from "cradle to grave" and facilitate more consistent comparisons of energy technologies

Long-term criteria: As it narrows the gap in energy access and achieves greater levels of human development, India must eventually define emission thresholds in terms of lifecycle emissions. Facilities operating at LCE cannot exceed the threshold determined in terms of gCO_2e/kWh or percent of GHG emissions in relation to the fossil fuel baseline, whichever is applicable.[119]

For the construction and/or operation of a plant for cogeneration, i.e. Combined Heat and Power (CHP)[120] production, to be eligible:

- Short-term criteria: A power generation threshold (gCO_2e/kWh (e)) and a heat threshold (gCO_2e/kWh (th)) in relation to direct emissions must be determined. Then, depending on the relative production of heat and power, a weighted CHP threshold (gCO_2e/kWh (th+e)) has to be determined.[121] Direct emissions produced from CHP generation cannot exceed the weighted CHP threshold (gCO_2e/kWh (th+e)).

- Long-term screening criteria: A power generation threshold (gCO_2e/kWh (e)) and a heat threshold (gCO_2e/kWh (th)) in relation to LCE must be determined. Then, depending on the relative production of heat and power, a weighted CHP threshold (gCO_2e/kWh (th+e)) has to be determined. CHP generation plants cannot exceed the lifecycle emissions defined by the weighted CHP threshold (g CO_2e/kWh (th+e)).[122]

---

[119] EU Technical Expert Group on Sustainable Finance, Financing a Sustainable European Economy: Taxonomy Technical Report

[120] Incentives and subsidies, development of technologies lowering the cost of CHP systems, and increasing in-house energy demand from industry and the commercial sector are expected to propel the expansion of CHP systems in India. The need to move away from fossil fuels and the increasing demand for energy-efficient technologies are making solutions such as CHP attractive. CHP uses a single fuel to simultaneously produce useful heat and electricity from the same source, thereby making more efficient use of the fuel, generating savings to the tune of 15–40 percent of the energy in total.

[121] EU Technical Expert Group on Sustainable Finance, Financing a Sustainable European Economy: Taxonomy Technical Report

[122] EU Technical Expert Group on Sustainable Finance, Financing a Sustainable European Economy: Taxonomy Technical Report

ii. Air and/or Water Pollution

If the operation of an electricity generation facility or a CHP plant being considered for eligibility contributes substantially to air and/or water pollution, then the concerned facility must adhere to the applicable emissions and/or effluent standards prescribed by the CPCB.

iii. Water Scarcity

If the operation of an electricity generation facility or of CHP plant being considered for eligibility is water-intensive, then the concerned facility must adhere to the applicable water consumption norms prescribed by the MoEFCC and the Ministry of Jal Shakti.

iv. Ecosystem/Biodiversity Losses

For the construction and/or operation of an electricity generation facility or a CHP plant to be eligible, the threshold in terms of monetary losses of ecosystem services and the ecosystem dependency ratio cannot be exceeded. Once the above thresholds are satisfied, the next step is to undertake an EIA and an ERA, and draw up appropriate water conservation, environmental/ biodiversity management plans based on these assessments.

v. Energy Efficiency

The manufacture of energy-efficient appliances as recognised by the standards set by the BEE is eligible if they have received a five-star rating by the Bureau's labelling scheme.

B. Manufacturing Sector

Environmental Objectives: Climate-change mitigation, air and water pollution, water consumption, and ecosystem and biodiversity losses.

If an industry within the manufacturing sector contributes substantially to two or more of the above environmental objectives, then it must be considered for inclusion in the taxonomy. The construction and operation of a manufacturing unit within a given industry must satisfy the following thresholds to be eligible. These thresholds must be defined as a common benchmark for manufacturing units involved in the concerned activity. Of course, unit-level thresholds will differ across industries.

i. GHG Emissions

Thresholds in terms of GHG emissions relating to the manufacturing process must take into account both scope 1 (direct)[123] and 2 (electricity indirect) emissions. It is imperative to identify the components of scope 1 emissions that are dominant sources. Thresholds relating to these dominant sources may also be defined. Additionally, if scope 3 (other indirect) emissions constitute a large part of the total emissions, they must be accounted for in determining thresholds.[124]

[123] Scope 1: Direct GHG emissions result from sources that are owned or controlled by the company; Scope 2: Electricity Indirect GHG Emissions, or emissions from the generation of purchased electricity consumed by a company. Scope 3: Other Indirect GHG Emissions, or emissions that are an outcome of the activities of the company, but occur from sources not owned or controlled by the company. For example, extraction and production of purchased raw materials and their transportation, etc.

[124] World Wide Fund for Nature and CDP, "Corporate Climate Action in Support of NDCs: A case for Science Based Targets in India", https://wwfin.awsassets.panda.org/downloads/corporate_climate_action_in_support_of_ndcs.pdf

ii. Air and/or Water Pollution

The manufacturing unit must adhere to the applicable emissions and/or effluent standards prescribed by the CPCB.

iii. Water Scarcity

The manufacturing unit must adhere to the applicable water consumption norms prescribed by the MoEFCC and the Ministry of Jal Shakti.

iv. Ecosystem/Biodiversity Losses

For the manufacturing unit to be eligible, the threshold in terms of monetary losses of ecosystem services and the ecosystem dependency ratio cannot be exceeded. Once the above thresholds are satisfied, the next step is to undertake an EIA and an ERA, and draw up appropriate water conservation, environmental/biodiversity management plans based on these assessments.

C. Transport Sector

Environmental objectives: Climate-change mitigation and air pollution.

i. GHG Emissions

The CO_2 emissions standards applicable for petrol, diesel, LPG and CNG passenger vehicles are provided by the Corporate Average Fuel Efficiency/Economy (CAFE) regulation.[125] average corporate CO_2 emissions must be less than 130 gm/km by 2022 and below 113 gm/km thereafter. The first standard assumes an average weight of cars at 1,037 kg in 2016–17, for which the requirement of average fuel consumption standard

[125]CAFE regulations in India came into force on 1 April 2017.

should be lower than 5.49 litre/100 km, to meet the CO_2 emissions standard. For the second standard, the car average weight is assumed to be 1,145 kg (2022), and the average fuel consumption should be less than 4.77 litre/100 km. The CAFE standards govern corporate average fuel consumption, i.e. the average of the standard fuel consumption of all vehicles sold by a manufacturer in a fiscal year, rather than the fuel consumption of an individual model.[126]

The BEE, in consultation with the MoRTH, has developed a Fuel Economy Star Rating (FESR) for passenger cars, which is essentially a five-star system. This star rating system appraises individual passenger vehicle models, unlike the CAFE norms. The passenger cars that satisfy the threshold associated with the five-star rating is eligible for green finance.[127]

Fuel efficiency norms for heavy-duty vehicles and light and commercial vehicles, must also be translated into CO_2 emissions standards,[128] which are informed by the multiple fuel options available in the market, with carbon content and upstream CO_2 emissions resulting from their production.[129] These CO_2 emissions standards can provide direction for determining emission thresholds for heavy-duty vehicles and light and commercial vehicles. Only those that adhere to the thresholds are eligible for green finance.

[126]World Wide Fund for Nature and CDP, "Corporate Climate Action in Support of NDCs: A case for Science Based Targets in India"
[127]World Wide Fund for Nature and CDP, "Corporate Climate Action in Support of NDCs: A case for Science Based Targets in India"
[128]Fuel efficiency norms for heavy-duty vehicles and light and commercial vehicles were finalised and notified on August 2017 and July 2019 respectively. These norms are a function of the gross vehicle weight. However, these norms were applicable only to Bharat Stage (BS)-IV compliant vehicles. Thus, the implementation of the BS-VI norms (and the revision of safe axle weight limits for HDVs) required that a correction factor be determined that could be applied on the line equations of BS-IV FE norms for heavy-duty vehicles and light & commercial vehicles. This exercise is in progress.
[129]Gaurav Bansal and Anup Bandivadekar, Overview of India's Vehicle Emissions Control Program: Past Success and Future Prospects, The International Council on Clean Transportation, 2013, https://theicct.org/sites/default/files/publications/ICCT_IndiaRetrospective_2013.pdf

Passenger car manufacturers, to be eligible for green finance, must satisfy not only the CAFE requirements but also the individual level thresholds. In other words, investments used for the manufacture of eligible vehicles will be deemed as green finance only if such manufacturing activity enables the manufacturer to achieve the CAFE requirements.

ii. Vehicular Pollution

The Bharat Stage (BS)-VI norms define emission limits on pollutants including carbon monoxide (CO), nitrogen oxide NOx, hydrocarbons HC, and PM for different vehicle types and sources of fuels.[130]; [131] Other pollution standards may be applicable if the MoRTH notifies them.

D. Agriculture And Livestock Production

Environmental objectives: Climate-change mitigation; air, water and soil pollution; land degradation, water scarcity; and loss of biodiversity.

Eligibility Criteria for Taxonomy

i. In the context of agricultural and livestock farming activities, the benchmarks for eligibility cannot be defined in terms of GHG emission thresholds, emission/ effluent standards (none exists for agriculture), or water consumption norms. Given the heterogeneity of farms

[130]Ketan Salhotra, "Impact of Bharat Stage-VI norms on Indian Auto & Auto Component Industry", The Economic Times, June 6, 2016, https://auto.economictimes.indiatimes.com/autologue/impact-of-bharat-stage-vi-norms-on- indian-auto-auto-component-industry/1543; India Bharat Stage VI Emission Standards, Policy Update, International Council On Clean Transportation, April 2016, https://theicct.org/sites/default/files/publications/India%20BS%20VI%20Policy%20Update%20vF.pdf

[131]In April last year, India migrated to the BS-VI norms applicable to light- and heavy-duty vehicles, as well as to two- and three-wheeled vehicles. The adoption of these BS-VI emission standards has India at par with EU standards for light-duty passenger cars and commercial vehicles, heavy-duty trucks and buses, and two-wheeled vehicles. Adherence to these norms requires technological interventions and the use of a cleaner fuel, the BS-VI fuel containing reduced sulphur content.

due to differences in production systems, type of crop, farm size, and environmental and biophysical conditions, it is not possible to set common benchmarks across farms. Furthermore, monitoring and quantifying pollution and water consumption at the farm level is technically, as well as financially, non-viable, making farm-level GHG accounting impractical. Thus, in the Indian context, the alternative of demonstrating compliance through the deployment of a pre-specified set of farming practices is more suitable.[132]

ii. Sustainable agricultural systems and practices are likely to make it to the taxonomy. Such systems and practices are environmentally conscious in that they minimise pollution in all forms, conserve and promote biodiversity, facilitate the recycling of organic elements and enhance ecosystems.[133] While there are several types of sustainable agricultural systems and practices, common principles underlying them include: (i) utilisation of organic bio-stimulants (ii) reliance on scientific field management, efficient irrigation management and suitable crop rotation patterns (iii) prevention and early detection of diseases, elimination of sources of infection and economised use of pesticides and insecticides (iv) enhancement of the soil environment, soil health, ensure a good water vapour cycle, and improve the soil microbiota (v) the efficient utilisation of fertilisers for enabling the recycling of nutrients.[134]

iii. Sustainable livestock farming practices include better pasture management, improvement in animal nutrition and genetics, improved manure management, Fertiliser management, animal health planning, well-designed

[132]EU Technical Expert Group on Sustainable Finance, Financing a Sustainable European Economy: Taxonomy Technical Report

[133]Union of Concerned Scientists, "What is Sustainable Agriculture?," April 10, 2017, https://www.ucsusa.org/resources/what-sustainable-agriculture

[134]Dora Agri, "Sustainable Agriculture," https://doraagri.com/sustainable-agriculture/

selection strategies, cross-breeding and artificial insemination for improving livestock productivity, and measures to minimise water pollution.

iv. The inclusion of sustainable agricultural and livestock practices are contingent on establishing sufficient, reliable and robust evidence of the environmental benefits covered by the taxonomy.

E. Waste Sector

Environmental objectives: Climate-change mitigation, air and water pollution, water scarcity, and scarce natural resources

In this sector, there are several qualitative criteria, along with a few quantitative thresholds. Those applicable across waste-management activities can be categorised as follows:

i. Net GHG Reduction[135]

a. New waste treatment substituting the untreated waste or the more GHG emission-intensive waste treatment systems

b. The capture of biogas produced during waste treatment

c. The utilisation of by-products (biogas, sludge, digestate, etc.) of waste-treatment activities or recycled/reused materials substituting virgin materials and saving energy consumption on extraction, transport and production of such materials

[135]EU Technical Expert Group on Sustainable Finance, Financing a Sustainable European Economy: Taxonomy Technical Report

d. Using a monitoring system to limit methane leakage related to waste-treatment activities, and establishing a methane-emission threshold that cannot be exceeded

ii. Efficient Use of Scarce Resources

a. Maximum reuse of treated water

b. High rates of recovery of recyclable and/or reusable waste

c. The utilisation of by-products (biogas, sludge, digestate, etc.) of waste treatment activities or recycled/reused materials substituting virgin materials.

d. Use of reused/recycled materials in the taxonomy-eligible economic activities

iii. Source Segregation and Separate Collection of Waste[136]

a. Practising source segregation, either storing waste in source segregated form or putting waste through source segregation before recovery, reuse or recycling

b. Preventing the mixing of source segregated waste while being stored or transferred

c. Separate collection of source-segregated waste (for the purpose of preparing for reuse or recycling)/biowaste meant for anaerobic digestion or composting

[136]EU Technical Expert Group on Sustainable Finance, Financing a Sustainable European Economy: Taxonomy Technical Report

iv. Pollution Prevention/Control

a. Adhering to the effluent and/or emission norms set by the CPCB; alternatively, or additionally, taking active measures to minimise pollution (air, water and soil)

b. Measures for the prevention of leachate from reaching groundwater[137]

F. Building Sector

Environmental objectives: Climate-change mitigation, pollution, water scarcity and scarce resources.

i. Energy Efficiency:

- For new construction of commercial buildings:

The Energy Conservation Building Code (ECBC) 2017 delineates minimum requirements for energy-efficient design and construction of buildings.[138] The environmental gains expected from implementing the ECBC include: energy efficiency and reduced energy consumption, a decline in carbon emissions, and the optimal utilisation of scarce natural resources. Three levels of energy efficiency can be achieved through compliance with the ECBC: ECBC-compliant, or buildings that demonstrate minimum energy savings of 25 percent; ECBC+ compliant, or buildings with energy savings of 35 percent; and super ECBC complaint, or buildings with

[137]EU Technical Expert Group on Sustainable Finance, Financing a Sustainable European Economy: Taxonomy Technical Report

[138]The National Building Code of India (NBC), 2016 has incorporated the Energy Conservation Building Code (ECBC), which has been referred to as an "Approach to Sustainability." ECBC 2017 delineates the minimum requirements for energy-efficient design and construction of buildings without compromising on the efficiency of building function or on the comfort and health of occupants. It elucidates current as well as futuristic breakthroughs in building technology, which enables adhering to such standards. The ECBC energy efficiency standards apply to all commercial government and private buildings (or complexes), with a minimum connected load of 100 kilowatts (kW) or a minimum contract demand of 120 kilovolt-ampere (kVA). These benchmarks will allow Indian buildings to achieve energy savings at par with global counterparts.

energy savings of 50 percent.[139] Grades are assigned to buildings based on the comparison of their proposed energy performance relative to that of a conventional building.[140]

The BEE has developed a voluntary star-rating programme for commercial buildings, which is anchored in the actual performance of the building, measured as energy consumption in the building over its total built-up area (excluding the basement area) expressed in kWh/sq. m/year.[141] This programme assigns ratings to commercial buildings on a scale of one to five stars, with a five-star-labelled building being the most efficient.

The ECBC grading system develops standards for the design and construction stage of the building, while the BEE star rating system is concerned with the operational stage of the building. To determine taxonomy thresholds for energy performance of new buildings proposed for construction, an equivalence map between the ECBC compliance grades and the BEE star system must be established.[142] This map will guide the appropriate

[139] Kapil Menghrani, "Energy Conservation Building Code: A Step Towards Energy Efficient Building Constructions, the website of GoSmartBricks,"2017, https://gosmartbricks.com/energy-conservation-building-code-a-step-towards-energy-efficient-building-constructions/

[140]Energy Conservation Building Directive - 2018 (based on ECBC 2017), GRIHA Council Publication, AEEE, 2018 https://www.grihaindia.org/sites/default/files/pdf/ECBC-Code.pdf; NITI Aayog, Bureau of Energy Efficiency and Alliance for an Energy Efficient Economy, Roadmap to fast track adoption and implementation of Energy Conservation Building Code (ECBC) at the urban and local level, New Delhi, 2017, http://www.aeee.in/wp-content/uploads/2018/11/AEEE-ECBC-Report.pdf

[141]Government of India, Ministry of Power, Scheme for BEE Star Rating for Office Buildings: Details of the Scheme for Rating of Office Buildings, (Bureau of Energy Efficiency: Ministry of Power, 2009), https://www.beepindia.org/wp-content/uploads/2020/06/BEE-Star-Rating-for-existing-Office-Buildings.pdf

[142]A better ECBC grade should ideally ensure a better energy performance of the building while it is in operation. A higher ECBC grade is necessary but not sufficient for actual energy savings performance. Thus, the BEE star rating is also important. To determine taxonomy thresholds for energy performance of new buildings proposed for construction, the equivalence map between the ECBC compliance grades and the BEE star system needs to be established. Consider a hypothetical situation wherein the minimum threshold of the super ECBC grade is compatible with a three-star rating. Then, to encourage more ambition in energy savings consistent with a four or five-star rating (which of course is assumed to be achievable as the BEE rating system is meant to cater to the Indian context), the taxonomy may demand a combination of super ECBC with a five-star rating.

combination of the ECBC grade and the BEE star rating as a threshold for energy efficiency.

While the green finance is for the design/construction phase, its provision must be contingent on achieving not only the requisite ECBC grade at the design and construction stage, but also the BEE star rating while in operation. The financing mechanism must be able to penalise the violation of the BEE star-rating threshold.

- **For new construction of residential buildings**

  For determining the performance threshold of energy efficiency for residential buildings, it is important to understand how the ECBC-R[143] bears upon the BEE star rating system[144] for new residential units. The threshold for energy efficiency must be an appropriate combination of code compliance (perhaps corresponding to performance above the minimum requirement) and the BEE star rating.

- **For renovation of existing commercial and residential buildings**

  Renovation of existing buildings must align the energy performance of the building with the BEE star-rating threshold deemed appropriate.

[143]The BEE has envisioned a phased approach for the development of ECBC for the residential sector to accelerate India's energy conservation efforts: the Energy Conservation: New Indian Way for Affordable & Sustainable Homes (ECO Niwas) Samhita 2018.

[144]The BEE has also developed the Energy Efficiency Label for Residential Sector. This label has been launched with the intention of linking the price of a home with its energy-efficiency performance. This label provides a rating for both new and existing dwellings.

ii. Aggregate environmental performance

- **For new construction**

Green Rating for Integrated Habitat Assessment (GRIHA)[145] is India's official Green Building rating programme and is endorsed by the Ministry of New and Renewable Energy (MNRE). The rating system provides a holistic appraisal of the expected environmental performance of a new building (commercial, residential, educational or some other use) over its entire lifecycle, based on the green initiatives adopted during pre-construction, planning and construction, operation and maintenance of the building. The rating system focuses on energy and water consumption, along with resource utilisation and waste management. The adoption of the GRIHA is expected to reduce GHG emissions, controlling pollution, preserving landscape, enhancing energy security, and optimising the use of natural resources.[146]

The five-star rating system is based on 10 environmental sectors that are further split into 29 criteria, which represent the essential parameters required for a building to be green (See Figure 10).[147] The threshold for GRIHA rating for new buildings is the minimum star rating deemed as appropriate.

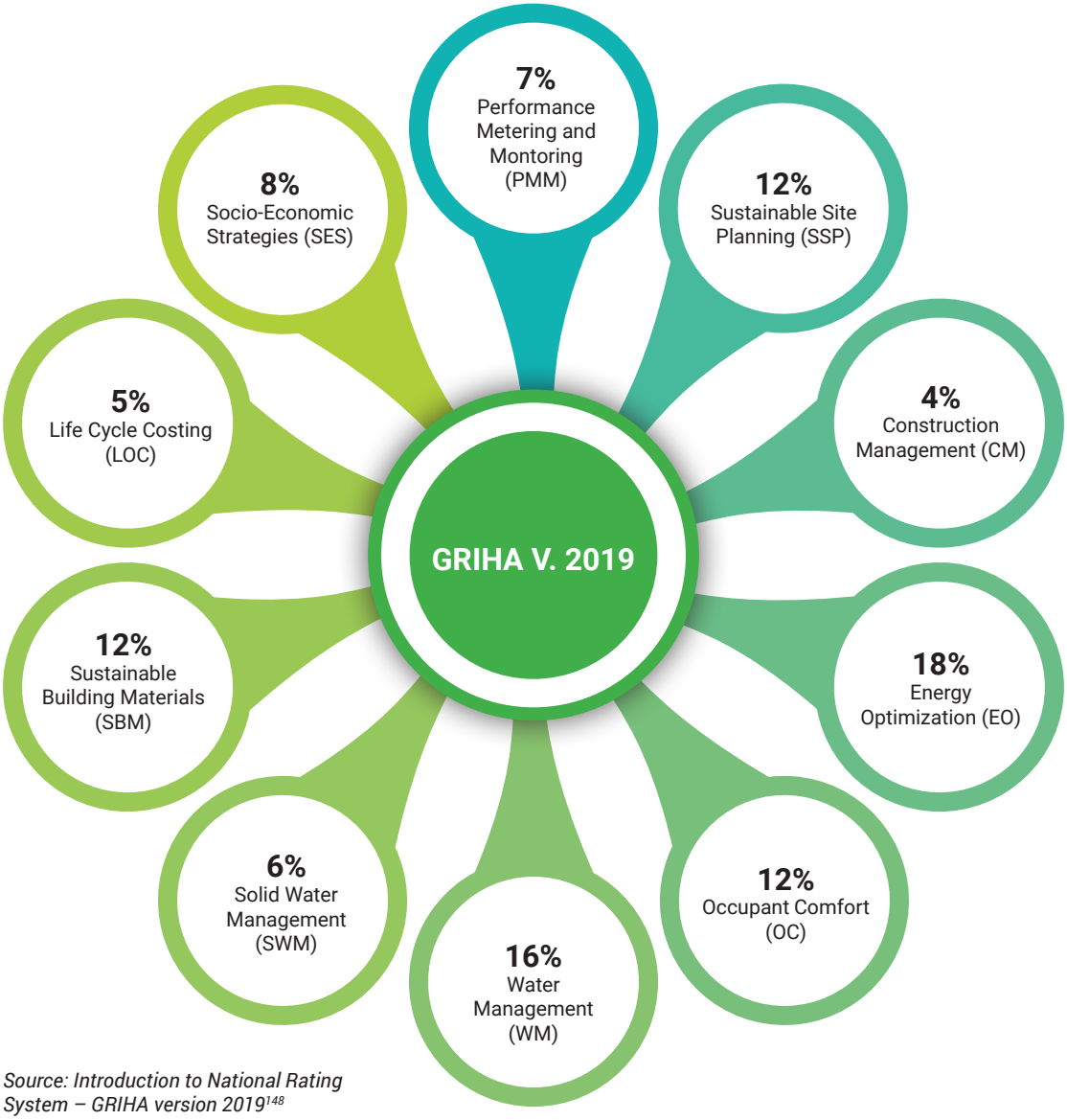
---

[145]Green Rating for Integrated Habitat Assessment (GRIHA) is the outcome of the efforts of the Energy Resource Institute New Delhi (TERI) to indigenise the internationally adopted building rating systems and arrive at a system that evaluates a building's environmental performance in the Indian context. This rating system has been designed keeping in mind the energy and resource needs across the diverse climate zones of the country. It is based on the NBC, ECBC, several IS codes, and local laws and standards. It has achieved a balance between established practices and emerging concepts. It is both process-driven and performance-oriented.

[146]Iliyas Ikbal Sande and N.S. Phadtare, "Comparative Study of LEED and GRIHA Rating System," Journal of Information, Knowledge and Research in Civil Engineering 3, no. 2 (2015) http://www.ejournal.aessangli.in/ASEEJournals/CIVIL32.pdf; Patricia Alphonso,"What are the Green Building Rating Systems in India?", Biltrax Media, August 23, 2019, https://media.biltrax.com/what-are-the-green-building-rating-system/; GRIHA Council, "Introduction to National Rating System - GRIHA: An evaluation tool to help design, build, operate, and maintain a resource-efficient built environment," New Delhi, GRIHA Council and The Energy and Resources Institute, 2019, https://www.grihaindia.org/sites/default/files/pdf/Manuals/griha-manual-vol1.pdf

[147]GRIHA Council, "Introduction to National Rating System - GRIHA: An evaluation tool to help design, build, operate, and maintain a resource-efficient built environment," New Delhi, GRIHA Council and The Energy and Resources Institute, 2019, https://www.grihaindia.org/sites/default/files/pdf/Manuals/griha-manual-vol1.pdf

Figure 10: GRIHA Rating System – Environmental Sectors and Assigned Weights



Source: Introduction to National Rating System – GRIHA version 2019[148]

- **For existing buildings**

  The GRIHA has developed a five-star rating system for existing buildings to provide impetus to the greening of the existing building stock and multiply the environmental gains that follow from greener buildings. A performance-oriented system, the rating is based on 12 criteria categorised under seven sections: site parameters,

[148]"Introduction to National Rating System - GRIHA: An evaluation tool to help design, build, operate, and maintain a resource-efficient built environment"

maintenance and housekeeping, energy, water, human health and comfort, social aspects, and bonus points.[149]

For existing buildings, the renovation of existing buildings must achieve the minimum star rating as deemed appropriate.

iii. Infrastructure Projects

Ecosystem/Biodiversity Losses:

For the infrastructure project to be eligible, the threshold in terms of monetary losses of ecosystem services and the ecosystem dependency ratio cannot be exceeded. Once the above thresholds are satisfied, the next step is to undertake an EIA and an ERA, and draw up appropriate water conservation, environmental/biodiversity management plans based on these assessments.

Valuation of Ecosystem Services and the Ecosystem Dependency Ratio

The exercise of incorporating environmental concerns into financial decision-making is incomplete without considering the valuation of ecosystem services. This consideration capitalises on the interaction between economy and ecosystem. Within the framework that characterises this interaction, economic activities are interventions on the structure and functions of the ecosystem aimed at generating the flow of ecosystem services for the satisfaction of economic needs. Indeed, the existence of human society is contingent on the "stock" of biodiversity, which is the sole source of the "flow" of ecosystem services.[150]

---

[149]GRIHA Council, "Transforming Existing Buildings to Sustainable Buildings," New Delhi, GRIHA Council and The Energy and Resources Institute, 2017, https://www.grihaindia.org/sites/default/files/pdf/Manuals/GRIHA_EB-Manual.pdf

[150]Nilanjan Ghosh, "Sustainability as Corporate Strategy: Importance of the Values of Ecosystem Services for Businesses", in Economics, Management and Sustainability: Essays in honour of Anup Sinha, ed. Partha Ray (Singapore: Springer),171-186.

Ecosystem services may be classified into four types: provisioning (food, water, fishery, genetic resources, raw materials, energy, minerals, etc.); regulating (climate regulation, carbon sequestration, pest and disease control, etc.); supporting (nutrient cycles, crop pollination, gene pool protection, soil formation, etc.); and cultural (spiritual and recreational benefits, tourism, etc.).[151]

The above-mentioned interaction between economic activities and the ecosystem services implies that the latter will inevitably find a place in the value chain, defining an economic activity. This reiterates the thesis that economic activity cannot be decoupled from ecosystem services, which appear in the production function(s) underlying an economic activity as "natural capital." Augmenting this form of capital requires investing in the health of the ecosystem and its services. Thus, the taxonomy must support financial decision-making that takes into consideration issues on ecosystem services. This requires a standardised framework for the identification, measurement and valuation of ecosystem services. The Natural Capital Protocol provides such a framework, along with the tools, methodology and approach that underpins the framework.[152]

The eligibility of economic activities for green finance should be contingent on the valuation of ecosystem services. While using a framework such as the one by the NCP, it is important to determine the ecosystem footprint of the economic activity, i.e. the extent of intervention caused by the activity in the ecosystem and the associated losses in the context of ambient environment and biodiversity. This will reveal the dependence of the economic activity and the firm at large on ecosystem services. The valuation exercise is expected to provide inputs for identifying strategies

[151]Nilanjan Ghosh, "Promoting a 'GDP of the Poor': The Imperative of Integrating Ecosystems Valuation in Development Policy," ORF Occasional Paper No. 239, Observer Research Foundation, March 2020, https://www.orfonline.org/research/promoting-a-gdp-of-the-poor-the-imperative-of-integrating-ecosystems-valuation-in-development-policy-63412/

[152]Ghosh, "Sustainability as Corporate Strategy: Importance of the Values of Ecosystem Services for Businesses,"171-186

to offset losses of ecosystem services.[153] The taxonomy must develop thresholds in terms of monetary losses of ecosystem services. Monetary valuation of ecosystem services will make visible the loss incurred and help decide whether the magnitude of the loss can and should be tolerated. The framework may also establish rules to determine levels of tolerance. This will be the basis of the thresholds in the taxonomy, and activities that seek green finance must not violate these thresholds. Furthermore, economic activities that qualify for green finance must offset or compensate for losses of ecosystem services through appropriate and well-defined strategies. The financial mechanism must allow penalising those who fail at this task.

The composite values of the ecosystem services have been referred to as the "GDP of the poor," recognising the significant dependence of the poor (as compared to the rich) on these services for their incomes and livelihoods. As such, financing economic activities/projects that incur significant losses of ecosystem services amounts to investing in the poverty of the dependent populations. In other words, the total product generated by the new activity that displaces the ecosystem may (more than) compensate the loss of income generated by the poor from the services provided by that ecosystem, but at the cost of increased poverty. Thus, such dependence must be taken into consideration while providing green finance to an economic activity. The ecosystem dependency ratio coined by Ghosh captures such dependence and may be used in this context. This ratio is defined as the sum of the value of ecosystem services in an economy to the total income of that economy.[154] The higher the value of this ratio, the higher the dependency. Thus, a threshold in terms of the ecosystem dependency ratio must be established.

[153]Ghosh, "Sustainability as Corporate Strategy: Importance of the Values of Ecosystem Services for Businesses,"171-186.
[154]Ghosh, "Promoting a 'GDP of the Poor': The Imperative of Integrating Ecosystems Valuation in Development Policy"

For example, an economic activity whose associated losses of ecosystem services is below the threshold established by the taxonomy but violates the threshold for the ecosystem dependency ratio. In this case, the activity stands ineligible for green finance. The rehabilitation of the dependent is an option, and this rehabilitation exercise may be conducted by the state. However, in the event of a failure to execute this exercise, the proposed financial mechanism should allow for imposing a prohibitive penalty (monetary or litigation) on the entity (the state or the firm that undertakes the economic activity) that reneges on the guarantee.

For an economic activity to be eligible for green finance, both the above-mentioned thresholds must be met. These thresholds may be modified in relation to different contexts if such modification is deemed necessary for circumventing the risk of greenwashing.

Illustrative Sectoral Taxonomies for India

This chapter develops illustrative taxonomies for the various sectors considered in this document. In addition to the technical screening criteria discussed in Chapter 4, there are other activities that can enable the achievement of critical economic activities and thus become automatically eligible. The illustrative taxonomies explicate this point. Furthermore, the chapter superimposes the technical screening criteria on green transition pathways that are being pursued within the Indian context. This throws light on which of the existing or planned endeavours are eligible from the point of view of the taxonomy.

Table 6: Illustrative Taxonomy for the Power Sector[155]

Activity Number	Economic Activity	
1	Construction and/or operation of an electricity generation facility	
	Existing and possible pathways: solar PV, concentrated solar power, wind power, tidal power, hydropower, nuclear power, geothermal, bioenergy	
2	Construction and/ or operation of a plant for the purpose of cogeneration -Combined Heat and Power (CHP) production	
	Existing and possible pathways: Concentrated solar power, geothermal, bioenergy	
3	Transmission and distribution infrastructure in systems required by activities 1 and/or 2	
4	T&D grid infrastructure-related activities: smart grid infrastructure,[156] i.e. wireless/wired/ optic communications; smart power meters; smart substations; controls; sensors; ICT platforms; and technology dedicated to smart systems	
5	Storage of Energy:[157] Construction and operation of facilities dedicated to the storage of electricity and/or source of energy used for the production of electricity in Activity no. 1 and/or CHP in Activity no. 2	Any storage technology utilising hydrocarbons as a medium of storage is not eligible.
6	Manufacture of products, key components and machinery that are essential for Activities no. 1 and/or 2	
7	Manufacture of energy-efficient appliances as recognised by the standards set by the BEE	
8	Manufacture of appliances and products powered by a source of energy used for the production of electricity in Activity no. 1 and/or CHP in Activity no. 2	

Critical economic activity that must satisfy technical screening criteria

Technical screening criteria to be satisfied by the critical economic activity

Examples of critical economic activity that are likely to satisfy the technical screening criteria

Economic activities that become eligible by virtue of enabling the critical economic activity that satisfies the technical screening criteria

Additional eligibility criteria that must be satisfied by economic activities that become eligible by virtue of enabling the critical economic activity that satisfies the technical screening criteria

[155]EU Technical Expert Group on Sustainable Finance, Financing a Sustainable European Economy: Taxonomy Technical Report; Climate Bonds Initiative, Climate Bonds Taxonomy

[156]The existing T&D infrastructure in India does not have the required ability to manage and integrate the power being generated by the expanding renewable capacity into the grid. This calls for immediate and significant changes to the existing system. Rebuilding the entire grid infrastructure from scratch is neither desirable nor feasible—both operationally and financially. A more suitable alternative is to make the grid "smart."

[157]Electricity storage can facilitate the integration of renewable energy sources into the broader transmission and distribution infrastructure. It can also balance electricity generation by tackling the concerns of variability of renewable energy. This will not only address the energy security concerns but also assist in greening other sectors such as transport and industry.

Table 7: Illustrative Taxonomy for the Manufacturing Sector

Economic Activity
Construction and/or operation of a manufacturing unit within a given industry, which satisfies the technical screening criteria
Iron and steel, fertilisers, paper and pulp, cement, distillery, aluminium, textile, pharmaceuticals and chemical industries

Table 8: Illustrative Taxonomy for the Transport Sector

Activity Number	Economic Activity	
1	Manufacture of vehicles that satisfy the technical screening criteria	
	Existing and possible alternatives: Battery Electric Vehicles (BEV), Plug-in Hybrid Electric Vehicles (PHEV), Hybrid Electric Vehicles (HEVs), E20 material compliant and E10 engine tuned vehicles,* E20 engine tuned vehicles and flex-fuel vehicles,* bio-CNG vehicles,* ICEVs retrofitted to become EVs/HEVs or for running on bio-CNG*	
2	Economic activities essential to the manufacturing and use of vehicles identified in Activity no. 1	
	Examples: OEM activities, manufacture of tyres improving fuel economy, manufacture of batteries and fuel cells, infrastructure for ethanol storage,* handling, blending and dispensing activities,* retrofitting services into EVs/HEVs and for running on bio-CNG*	
3	Setting up of biofuel production plants* for biofuels powering vehicles referred to in Activity no. 1	Production plants must satisfy technical screening criteria defined for the manufacturing sector.
	Examples: molasses-based distilleries and grain-based distilleries for ethanol production, 2G ethanol plants, biodiesel production plants, bio-CNG plants	
4	Passenger transport service provision using passenger vehicles referred to in Activity no. 1	Buses that emit less CO2 than the upper limit determined in terms of gCO_2/pkm (per passenger kilometre)
5	Freight transport service provision using commercial vehicles referred to in Activity no. 1	

*Conditional on establishing the carbon-neutrality of biofuel combustion
Note: Water-use efficiency/water conservation plans and environment/biodiversity management must be considered in cases where these are relevant concerns.

- Critical economic activity that must satisfy technical screening criteria
- Technical screening criteria to be satisfied by the critical economic activity
- Examples of critical economic activity that are likely to satisfy the technical screening criteria
- Economic activities that become eligible by virtue of enabling the critical economic activity that satisfies the technical screening criteria
- Additional eligibility criteria that must be satisfied by economic activities that become eligible by virtue of enabling the critical economic activity that satisfies the technical screening criteria

Table 9: Illustrative Taxonomy for the Waste Sector[158]

Activity Number	Economic Activity	Technical Screening Criteria to be Satisfied
1	Waste treatment systems (including collection and treatment)	Criteria i: a, b, c and d Criteria ii: a, b and c Criteria iv: a
	Example: Decentralised wastewater treatment systems (including collection and treatment)	
2	Anaerobic digestion of sewage sludge (a by-product of wastewater treatment): Treatment of sewage sludge in wastewater treatment plants or in other instalation with the resulting production and energetic utilisation of biogas.	Criteria i: b, c and d Criteria ii: c Criteria iv: a
3	Separate collection and transport of source segregated non-hazardous waste (for reuse and/or recycling) Expenditures incurred on resources required for this activity are eligible including related temporary storage and transfer facilities	Criteria i: c Criteria ii: c Criteria iii: b and c
4	Facilities for sorting and material recovery from waste	Criteria i: c Criteria ii: b and c Criteria iii: a
5	Waste storage facilities	Only waste to be eventually reused or recycled is eligible for storage. Criteria iii: a
6	Anaerobic digestion of bio-waste: Treatment of separately collected bio-waste through anaerobic digestion; production and energetic utilisation of biogas generated during the process; production of digestate for use as fertiliser/soil enhancer	Most of the waste material must be biowaste. Criteria i: b, c and d Criteria ii: c Criteria iii: c Criteria iv: a

[158]EU Technical Expert Group on Sustainable Finance, Financing a Sustainable European Economy: Taxonomy Technical Report; Climate Bonds Initiative, Climate Bonds Taxonomy

7	Composting of bio-waste: Treatment of separately collected bio-waste through composting (aerobic digestion), the use of generated compost as fertiliser/soil enhancer	Most of the waste material must be biowaste. To be used only if anaerobic treatment is not viable. Criteria i: a and c Criteria ii: c Criteria iii: c Criteria iv: a and b
8	Landfill gas capture and energetic utilisation Installation and operation of gas capture in existing, closed landfill facilities	The landfill is closed and is accepting only restoration materials. Criteria i: b, c and d Criteria ii: c
9	For the recycling of materials: Facilities for recycling metals, plastics, glass and paper	Criteria i: c Criteria ii: c Criteria iv: a
10	For the re-use of materials: Facilities refurbishing or repairing products, cleaning components or products for reuse in their original function	The products are put back to their original use without the need for further pre-processing. For Waste from Electrical and Electronic Equipment (WEEE), the products BEE and those that receive a five-star rating by the BEE labelling scheme are eligible. Criteria i: c Criteria ii: c Criteria iv: a
11	Use of reused/recycled materials in the taxonomy-eligible economic activities	Criteria ii: d

12	Carbon capture and storage (CCS) Direct air capture of CO_2, capture of anthropogenic emissions, transport and permanent storage of CO_2	Criteria to be satisfied:[159] Direct capture of CO_2 from the atmosphere that reduces CO_2 concentration in the atmosphere; capture of anthropogenic emissions that helps the related economic activity to achieve its respective GHG emission threshold. Captured CO_2 will be transferred to a taxonomy eligible CO_2 permanent storage/ sequestration facility. Reference to the ISO standards while developing thresholds for the taxonomy: ISO/CD 27919-2, 27920, 27921, 27924 and 1400. These standards may be tailored to the Indian context. Water Use/Pollution Control: Minimise removal or diversion of water from water bodies, minimise water pollution by discharge, risks related to local water quality and/or local water consumption during various stages of the activity, safeguard groundwater hydrology and aquatic ecology, and prevent groundwater contamination and acidification during various activities (conducted across the lifecycle) that pose such risk. Air Pollution Control: Establish permanent leakage-detection systems, prevent NH_3 losses and the formation of secondary aerosol, and the production of tropospheric ozone. Use of the most efficient equipment, preferably covered under the standards set by the BEE (fans, compressors, etc.) for the reduction of emissions during electricity production demanded by the activity. EIA should be performed at all stages of CCS, drawing up environmental/biodiversity plans based on outcomes of the EIA.
13	Treatment of nuclear wastes treatment and disposal	Appropriate screening criteria must be developed to address relevant environmental concerns.

Note: The taxonomy may consider water use efficiency/water conservation plans and environment/biodiversity management plans in cases where these are relevant concerns.

- Critical economic activity that must satisfy technical screening criteria
- Technical screening criteria to be satisfied by the critical economic activity
- Examples of critical economic activity that are likely to satisfy the technical screening criteria
- Economic activities that become eligible by virtue of enabling the critical economic activity that satisfies the technical screening criteria
- Additional eligibility criteria that must be satisfied by economic activities that become eligible by virtue of enabling the critical economic activity that satisfies the technical screening criteria

[159]EU Technical Expert Group on Sustainable Finance, Financing a Sustainable European Economy: Taxonomy Technical Report

Table 10: Illustrative Taxonomy for the Buildings Sector

Activity Number	Economic Activity
1	Design and construction of commercial buildings
2	Design and construction of residential buildings
3	Renovation of existing commercial buildings
4	Renovation of existing residential buildings
5	Manufacture of technological solutions and equipment that can help achieve technical screening criteria in relation to Activities no. 1, 2, 3 and 4

Critical economic activity that must satisfy technical screening criteria

Technical screening criteria to be satisfied by the critical economic activity

Examples of critical economic activity that are likely to satisfy the technical screening criteria

Economic activities that become eligible by virtue of enabling the critical economic activity that satisfies the technical screening criteria

Additional eligibility criteria that must be satisfied by economic activities that become eligible by virtue of enabling the critical economic activity that satisfies the technical screening criteria

Table 11 lists the sustainable agricultural systems and practices and the sustainable livestock farming practices that can be included in the taxonomy due to their environmental benefits across all dimensions. Investments made for implementing these practices may be eligible for green finance.

Table 11: Illustrative List of Sustainable Agricultural Systems and Practices and Related Environmental Benefits[160]

Agricultural Activity	Environmental Benefits
Organic Farming	Enhancement of the soil's physical, biological and chemical characteristics, increase in soil nutrients, reduced water runoff and erosion, improvement in the quality of soil and its cover, enabled water infiltration, reduced nutrient runoff and erosion, mitigation of GHG emissions due to increased soil carbon sequestration
Agroforestry	Increase in soil fertility, improved nutrient cycling, increase in soil organic carbon, improved soil aggregation, increased soil moisture, reduction in soil erosion, more efficient use of water, reduction in water runoff, mitigation of GHG emissions due to increased carbon sequestration, biodiversity conservation
Natural Farming	Improved microbiota of soil and soil organic matter, higher soil humus production leading to improved water vapour condensation on the soil surface and water-retention capacity, mitigation of emissions due to increased carbon sequestration, biodiversity conservation
System Of Rice Intensification (SRI)	Improved soil aeration, increased soil organic matter, enhanced physical, biological and chemical characteristics of soil, increased water productivity and water use efficiency, reduction in methane emissions
Precision Farming	Reduction in nitrogen leaching, improved soil health and fertility, higher water use efficiency, reduced waterlogging, soil erosion and salinity, improved water infiltration and reduced water run-off, reduced GHG emissions
Conservation Agriculture	Reduced soil erosion, minimised soil disturbance, increased soil carbon sequestration, improved water infiltration, enhanced soil biodiversity, improved soil microclimate, enhanced physical, biological and chemical characteristics of soil, improved soil water-retention capacity, increased nitrogen use efficiency, recovery of leached nitrates, reduced water evaporation and water run-off, high water-use efficiency, recharge of groundwater, reduced waterlogging, increased soil organic carbon, mitigation of GHG emissions, improved farm diversity

[160]CEEW, "Organic Farming in India", Council of Energy Environment and Water, https://www.ceew.in/sites/default/files/organic-farming.pdf; CEEW, "Agroforestry in India", Council of Energy Environment and Water, New Delhi, 2021, https://www.ceew.in/sites/default/files/agroforestry.pdf; CEEW, "Natural Farming in India", Council of Energy Environment and Water, New Delhi, 2021, https://www.ceew.in/sites/default/files/natural-farming.pdf; CEEW, "System of Rice Intensification in India", Council of Energy Environment and Water, New Delhi, 2021, https://www.ceew.in/sites/default/files/system-of-rice-intensification.pdf; CEEW, "Precision Farming in India", Council of Energy Environment and Water, New Delhi, 2021, https://www.ceew.in/sites/default/files/precision-farming.pdf; CEEW, "Conservation Agriculture in India", Council of Energy Environment and Water, New Delhi, 2021, https://www.ceew.in/sites/default/files/conservation-agriculture.pdf; CEEW, "Crop Rotation and Intercropping in India", Council of Energy Environment and Water, New Delhi, 2021, https://www.ceew.in/sites/default/files/crop-rotation-intercropping.pdf; CEEW, "Crop Mulching in India", Council of Energy Environment and Water,New Delhi, 2021, https://www.ceew.in/sites/default/files/cover-crops-mulching.pdf; CEEW, "Vermicomposting in India", Council of Energy Environment and Water, New Delhi, 2021, https://www.ceew.in/sites/default/files/vermicomposting.pdf; CEEW, "Biodynamic Farming in India", Council of Energy Environment and Water, New Delhi, 2021,https://www.ceew.in/sites/default/files/biodynamic-farming.pdf; CEEW, "Contour Farming in India", Council of Energy Environment and Water, New Delhi, 2021, https://www.ceew.in/sites/default/files/contour-farming.pdf; CEEW, "Integrated Farming in India", Council of Energy Environment and Water, New Delhi, 2021, https://www.ceew.in/sites/default/files/integrated-farming-system.pdf; CEEW, "Rainwater Harvesting in India", Council of Energy Environment and Water, New Delhi, 2021, https://www.ceew.in/sites/default/files/rainwater-harvesting.pdf; CEEW, "Floating Farming in India", Council of Energy Environment and Water, New Delhi, 2021, https://www.ceew.in/sites/default/files/floating-farming.pdf; CEEW, "Permaculture in India", Council of Energy Environment and Water, New Delhi, 2021, https://www.ceew.in/sites/default/files/permaculture.pdf; CEEW, "Integrated Pest Management in India", Council of Energy Environment and Water, New Delhi, 2021, https://www.ceew.in/sites/default/files/integrated-pest-management.pdf

Crop Rotation and Intercropping	Enhanced soil health, decreased soil run-off, more efficient use of soil nutrients, increased water-use efficiency, decreased wind and water erosion, enhanced soil and on-farm biodiversity
Cover Crops and Mulching	Improved soil health, decreased soil erosion, improved SOM, improved nutrient content in soil, prevention of nitrate leaching, regulation of soil temperature, enhanced soil structure, increased soil moisture, improved water infiltration, reduced evaporation and removal of excess water, decreased water run-off, increased carbon sequestration, improved nutrient cycling
Integrated Pest Management	Improved soil health, prevention of soil-borne diseases, improved surface and groundwater quality with reduced pesticide residues, biodiversity conservation.
Vermicomposting	Enhanced soil fertility and health, improved nutrient content in soil, soil aeration, improved moisture retention, regulation of soil temperature, increased oxygen availability, water-use efficiency, enhanced soil biodiversity
Biodynamic Farming	Improved SOM and soil health, increased soil microbes
Contour Farming	Soil conservation, reduced soil erosion and sediment run-off, increased water infiltration, increased soil moisture, high water-use efficiency, prevention of waterlogging, preservation of SOM including soil carbon, enhanced soil and crop biodiversity
Integrated Farming Systems	Enhanced soil organic carbon, increased soil microbial activity, reduced soil erosion, improved nutrient cycling, potential for GHG emission reduction, enhanced biodiversity
Rainwater Harvesting: Artificial Recharge of Groundwater	Reduced surface run-off, increased infiltration and percolation of water, increased nutrient content in soil, greater water-use efficiency, improved groundwater quality, enhanced biodiversity
Floating Farming	Improved nutrient content in the soil, clearing of the invasive water hyacinth
Permaculture	*no data available*

Source: Sustainable Agriculture in India 2021: What We Know and How to Scale Up (CEEW study).[161]

[161]Niti Gupta, Shanal Pradhan, Abhishek Jain and Nayha Patel, Sustainable Agriculture in India– What we know and how to scale up, Council on Energy, Environment and Water, New Delhi, 2021, https://www.ceew.in/sites/default/files/CEEW-Sustainable-Agricultre-in-India-2021-May21.pdf

Table 12: Illustrative List of Sustainable Livestock Farming Practices and Related Benefits[162]

Livestock Farming Activity	Environmental Benefits
Better pasture management for climate mitigation: Inclusion of trees, use of better plant species, legume inter-seeding, use of earthworms, increased grazing activity in grasslands with lesser grazing animal population than the livestock carrying capacity	Carbon sequestration and reduction of GHG emissions
Improvement in animal nutrition and genetics: Balanced feed rations, increase in dietary fat and reduced protein content in feed, provision of higher quality forage (with lower fibre content or greater fibre digestibility, greater energy content), supplementing forage with grain and other concentrate feeds, feed additives, provision of supplements (bovine somatotropin, 3-nitrooxypropanol) and the use of antimethanogens, i.e. vaccines, to suppress methane emissions	Increased digestibility and consequent reduction in methane emissions from enteric fermentation, reduced nitrogen leaching and air pollution due to decline in NO_x emissions
Improved manure management: Use of anaerobic digestors (with care taken to minimise methane leakage), the covering of ponds, tanks or lagoons in which manure is stored, use of enclosed storage facility with a flare, shortened storage time, removal of solids from manure using a solids separator, adjustment of animal diets to alter the volume and composition of manure, use of improved housing mechanisms to handle manure (such as perforated flooring with under-floor storage combined with short storage time, use of bedding contingent on the land application method used, use of air scrubbers in force-ventilated housing), rapid removal of manure using the cage and belt system combined with rapid disposal or proper storage in case of poultry, active aeration of stored manure and acidification of manure, use of appropriate land application methods (immediate incorporation or subsurface injection)	Reduction in GHG emissions from manure management, minimised water contamination, reduced air pollution by minimising NH_3 emissions

[162] M. Melissa Rojas-Downing, A. Pouyan Nejadhashemi, Timothy Harrigan and Sean A. Woznicki, "Climate change and livestock: Impacts, adaptation, and mitigation," Climate Risk Management, Volume 16 (2017); C.A. Rotz "Environmental Sustainability of Livestock Production"Meat and Muscle Biology 4(2): 11, 1–18 (2020), https://www.researchgate.net/publication/341665293_Environmental_Sustainability_of_Livestock_Production?enrichId=rgreq-9a317128bcf8337d6b2103bc9c4a582d-XXX&enrichSource=Y292ZXJQYWdlOzM0MTY2NTI5MztBUzo5MDcxOTE5MTM1NjIxMTJAMTU5MzMwMjgxNTU4OQ%3D%3D&el=1_x_3&_esc=publicationCoverPdf; "Animal Healthcare", Amul, http://www.amuldairy.com/index.php/cd-programmes/animal-health-care; Henning Steinfeld, "Improved manure management towards sustainable agri-food systems", Food and Agriculture Organisation of the United Nations, https://unfccc.int/sites/default/files/resource/Keynote_20191202%20COP25_FAO_Koronivia-version3.pdf; FAO, Transforming the livestock sector through the Sustainable Development Goals", Food and Agriculture Organisation of the United Nations, 2018, http://www.fao.org/3/CA1201EN/ca1201en.pdf; FAO, Climate-smart livestock production: A practical guide for Asia and the Pacific region, Food and Agriculture Organisation of the United Nations, 2021, https://reliefweb.int/sites/reliefweb.int/files/resources/cb3170en.pdf; Dr William Stiles, "Air pollution: Reducing ammonia emissions by adapting livestock management approaches", Business Wales, December, 2020, https://businesswales.gov.wales/farmingconnect/news-and-events/technical-articles/air-pollution-reducing-ammonia-emissions-adapting-livestock-management-approaches; FBFS "5 Ways to Minimize Agricultural Pollution on Your Farm", the website of Farm Bureau Financial Services, April 22, 2020, https://www.fbfs.com/learning-center/5-ways-to-minimize-agricultural-pollution-on-your-farm; James E. Hairston ," "Animal Waste Management To Protect Water Quality Managing Open Lots And Pasture Systems To Minimize NPS Pollution", Agriculture and Natural Resources WATER QUALITY: Controlling Nonpoint Source (NPS) Pollution, (Alabama A&M and Auburn Universities, June, 1995), http://lshs.tamu.edu/docs/lshs/end-notes/animal%20waste%20management%20to%20-3845600539/animal%20waste%20management%20to%20protect%20water%20quality%20managing%20open%20lots%20and%20pasture%20systems%20to%20minimize%20nps%20pollution.pdf; Don D Jones, John C Nye, and Alan L Sutton, "Runoff Control Systems for Open Livestock Feedlots", Purdue University, https://www.extension.purdue.edu/extmedia/ID/ID-114-W.html; Gilbertson, C. B., J. C. Nye, R. N. Clark, and N. P. Swanson, "Controlling Runoff for Livestock Feedlots," U.S. Department of Agriculture, 1981 https://ideas.repec.org/p/ags/uersab/309308.html

Fertiliser Management: Nitrogen use efficiency, soil nutrient management plan including regular soil testing, use of organic fertiliser, planting breeding and genetic modification to decrease fertiliser use, combining legumes with grasses in pastures to reduce the use of synthetic fertilisers, fertiliser technology for regulating nutrient release from fertilisers, and use of nitrification and urease inhibitors.	Reduction in GHG emissions, minimisation of air and water pollution due to imbalanced use of fertilisers, improved soil fertility and quality
Animal Health Planning: Prudent use of antimicrobials, effective disease prevention using quality vaccines (against zoonotic diseases) and diagnostic assays, enhanced biosecurity and hygiene on farms, sexual health control	Reduction in GHG emissions
Well-designed selection strategies, cross-breeding, and artificial insemination for improving livestock productivity	Reduction in GHG emissions
Diversion of clear water away from livestock yards to reduce contact with pollutants and the volume of polluted water, prevention of roof drainage entering the yard area, location of manure piles away from areas where water flows following a rainstorm, construction and maintenance of filter treatment system based on filter strips, efficient run-off control systems (settling basins, infiltration channels, detention or holding ponds, etc.), deployment of appropriate livestock runoff disposal mechanisms (evaporation pond, use as fertiliser if irrigation equipment is available, field sinks, vegetative filters, switchback waterways, etc.)	Minimisation of water pollution
Pasture Management for Pollution Control and Biodiversity Protection: Keeping livestock away from water bodies like streams, lakes, ponds and highly erodible areas, maintaining grass cover such as rotational grazing, keeping stocking rates consistent with carrying capacity of grazing area	Minimisation of water pollution, reduced negative impact on biodiversity, reduced soil erosion

The Question of Coal Expansion in India

A rising population and rapid economic growth have made India the world's third-largest energy-consuming country, with consumption more than doubling from 2000 to 2019. India's future demographic and economic trajectories will translate into a growing pressure on its energy sector, dominated by the demand for power.[163]

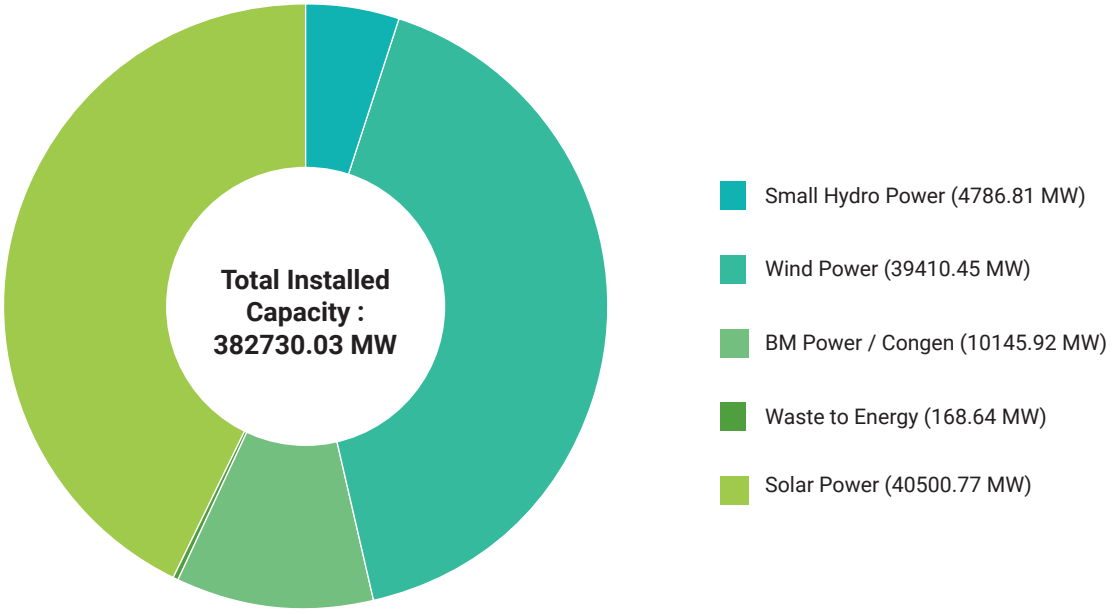
The total installed capacity of power generation in the country as of April 2021 stood at 382.73 GW, of which 234.73 GW (61.3 percent) was thermal power, 46.21 GW (12.07 percent) large hydropower, 6.78 GW (2.06 percent) nuclear power, and 95.01 GW (24.82 percent) renewable energy sources (RES).[164]

[163]International Energy Agency, India Energy Outlook 2021, IEA Publications, 2021, https://iea.blob.core.windows.net/assets/1de6d91e-e23f-4e02-b1fb51fdd6283b22/India_Energy_Outlook_2021.pdf

[164]Dashboard of the Central Electricity Authority (CEA), Ministry of Power, Government of India, https://cea.nic.in/dashboard/?lang=en

The category of RES can be further disaggregated as follows: 40.50 GW (10.58 percent) of solar power, 39.41 GW (10.30 percent) of wind power, 10.15 GW (2.65 percent) of biomass power and 4.79 GW (1.25 percent) of small hydropower, and 0.17 GW (0.04 percent) of waste to energy plants.[165]

Figure 11: Category-wise Installed Capacity of Power Generation in India (April 2021)[166]



Source: Central Electricity Authority (CEA), Ministry of Power, Government of India [167]

Although on a decline, coal-fired generation still represents the largest share of India's aggregate power production. Due to the dominance of thermal power in India's electricity generation, the carbon intensity of the country's power sector remains well above the world average.[168] As per India's old NDCs, India aspired to expand its installed capacity for renewable power generation to 175 GW by 2022 (and 450 GW by 2030) and achieve a 40 percent non-fossil-fuel-based capacity installation

[165]Dashboard of the Central Electricity Authority (CEA), Ministry of Power, Government of India
[166]Dashboard of the Central Electricity Authority (CEA), Ministry of Power, Government of India
[167]Dashboard of the Central Electricity Authority (CEA), Ministry of Power, Government of India
[168]"India Energy Outlook 2021"

for power generation by 2030.[169] As of April 2021, it has already established 148 GW of renewable power generation capacity, accounting for about 38.95 percent of the total installed capacity. According to India's new climate targets announced at COP 26, it has committed to expanding its installed non-fossil-fuel capacity to 500 GW and satisfying 50 percent of its energy requirements using renewable sources by 2030.[170]

India intends to continue the expansion of coal-fired power generation as envisioned in the National Electricity Plan (2022–27).[171] This bears upon not only the question of environmental sustainability of reliance on thermal power, but also the concern of stranded assets confronting those operating in the thermal power sector.[172] It has been argued that the stark energy poverty in India, the positive correlation between energy access and human development, the difficulty involved in adopting renewable sources of energy, and the practicality of coal power as a large-scale energy option justifies India's coal power expansion. Thus, allowing India to expand its coal power generation within reasonable limits amounts to granting it a fair share of carbon space.[173]

While this argument holds some merit, it must be considered in light of the adverse consequences of coal use. In 2018, coal-linked emissions alone accounted for 95,820 deaths—approximately 11 deaths per hour.[174] Another estimate

[169]TERI, India's NDCs: Key Messages, The Energy and Resources Institute, November, 2018, https://www.teriin.org/sites/default/files/2018-12/India%27s%20NDCs%20Key%20Messages.pdf
[170]Srivatsan K C, "PM Modi delivers India 'panchamrit' gift at COP26 to fight climate change: Five commitments in detail here," Hindustan Times, November 1, 2021, industantimes.com/india-news/pm-modi-delivers-india-panchamrit-gift-at-cop26-to-fight-climate-change-five-commitments-in-detail-here-101635788023755.html
[171]TERI, "India's NDCs: Key Messages"
[172]TERI, "India's NDCs: Key Messages"
[173]Samir Saran and Vivan Sharan, "The false debate on India's energy consumption", What Does India Think?,François Godement ,ed., European Council of Foreign Relations, November 9, 2015, https://ecfr.eu/special/what_does_india_think/analysis/the_false_debate_on_indias_energy_consumption
[174]Chetan Bhattacharji, "Coal Combustion Responsible For Almost 1 Lakh Deaths In India: Report." NDTV,December 3, 2020, https://www.ndtv.com/india-news/coal-combustion-responsible-for-almost-100-000-deaths-in-india-report-2333445

suggests that coal power plants running at full capacity at 2018 levels would lead to a 69 percent rise in diabetes cases, a 76 percent increase in asthma cases amongst children, and a 70 percent increase in cases of stroke and chronic obstructive pulmonary disease every year, leading a loss of 8,586,300 workdays.[175] A thorough cost-benefit analysis (CBA) might be advisable before deciding on coal power expansion. In the COP26 summit, a primary concern was that the world is not yet on track to limit global warming to 1.5 degrees Celsius. The nations have been called on to update their NDCs for 2030, keeping in view this concern. The summit also focused on having the developed countries commit to phasing out coal power. All countries were asked to not open or finance any new coal-fired power stations.[176] Even at COP26, India pushed for a 'phase down' of coal rather than a 'phase out.'[177] While revising its targets, India must consider the above-mentioned CBA. The Ministry of Coal and the Ministry of Power should commission research to conduct such a CBA to help the Indian government make an informed decision on whether to go ahead with coal power expansion or abandon the plans.

The inclusion of clean coal technologies in the taxonomy will depend upon how far the nation is from a gradual phase-out of coal power, and whether it is ready to commit to a permanent moratorium on its expansion. These considerations will also have implications for the issue of 'stranded assets'. For investors and the markets, the taxonomy should provide signals that are aligned with the national targets.

[175]Ishaan Gera, "Coal plants fail on pollution norms, may cost 4,800 lives every year: Study", Business Standard, March 23, 2021, https://www.business-standard.com/article/current-affairs/coal-plants-fail-on-pollution-norms-may-cost-4-800-lives-every-year-study-121032300641_1.html

[176]UN Climate Change Conference of the Parties UK 2021, "COP26 EXPLAINED"; Interview: The most impactful actions at COP26 point to progress on climate change," UN News, November 22, 2021, https://news.un.org/en/story/2021/11/1106242; "End of Coal in Sight at COP26,"External Press Release, The website of UNFCCC, November 4, 2021, https://unfccc.int/news/end-of-coal-in-sight-at-cop26

[177]Anshu Sharma," EXPLAINED: Why India Pushed For Coal 'Phase Down' Instead Of 'Phase Out' At COP26," News 18, November 17, 2021, https://www.news18.com/news/explainers/explained-why-india-pushed-for-coal-phase-down-instead-of-phase-out-at-cop26-4454003.html

Measures Against Greenwashing in Implementation

The fundamental objective of the green taxonomy is to minimise the risk of greenwashing. To this end, certain concerns must be addressed in the Indian context. This chapter highlights these concerns and proposes solutions for them.

Greenwashing in the Transport Sector

Evaluation of Fuel Consumption Norms

In the case of passenger cars, adherence to fuel consumption norms rely on tests based on the national driving cycle, i.e. Modified Indian Driving Cycle (MIDC). Similarly, heavy-duty vehicles and light and commercial vehicles must demonstrate compliance with respect to the constant speed-fuel consumption (CSFC) test procedure. For light-duty vehicles, compliance with fuel consumption norms must be demonstrated using the Worldwide Harmonised Light Vehicles Test Procedures (WLTP) while for heavy-duty vehicles,

compliance must be evaluated using the World Harmonised Steady-State Cycle (WHSC) and World Harmonised Transient Cycle (WHTC). The WLTP, WHSC and WHTC are representative of everyday driving conditions and give a more accurate picture of emissions compared to the tests currently used in India.[178]

For compliance with pollution standards, India has already adopted the WHSC and the WHTC cycles for type approval of heavy-duty vehicles.[179] However, it has yet to make a transition to the WLTP for type approval of light-duty vehicles.[180] Furthermore, the Real Driving Emissions (RDE) test using portable emissions measurement systems (PEMS) measures emissions from cars while being driven on the road and will be effective as an in-use compliance procedure from April 2023.[181] It can complement the lab-based tests such as WLTP, WHSC and WHTC, and can also be considered for measuring CO_2 emissions.

Phase-Out of Preferential Treatment for Electric Vehicles

To incentivise the introduction of electric vehicles (EVs) in their fleet, manufacturers in India are offered flexibility with regard to compliance with CAFE norms. The concession to EVs is provided by two components involved in evaluating actual fuel

[178]BEE, "Fuel Efficiency Norms", the website of Bureau of Energy Efficiency; https://beeindia.gov.in/content/fuel-efficiency#:~:text=BEE%20is%20working%20on%20the,the%20rising%20demand%20of%20fuel.&text=In%20August%202017%20the%20Government,of%2012%20tonnes%20or%20greater; The International Council on Clean Transportation, Constant-speed fuel consumption testing of heavy-duty vehicles in India, ICCT, November, 2015, https://theicct.org/sites/default/files/publications/PosBrief_CSFC_nov2015.pdf; WLTP Facts, "What is WLTP and How Does it Work", the website of WLTP Facts; https://www.wltpfacts.eu/what-is-wltp-how-will-it-work

[179]The International Council on Clean Transportation, INDIA BHARAT STAGE VI EMISSION STANDARDS, ICCT, April 2016

[180]Vivek Chattopadhyaya, Tanushree Ganguly, Anumita Roychowdhury and Shambhavi Shukla, Bharat Stage VI (BS-VI) READINESS AND ROADMAP IN INDIA, Policy Brief, Centre for Science and Environment (paper presented at Round Table on BSVI Readiness and Roadmap, New Delhi, India, September 2019). https://www.researchgate.net/publication/336085377_Bharat_Stage_VI_BS-VI_READINESS_AND_ROADMAP_IN_INDIA_Policy_Brief_Centre_for_Science_and_Environment

[181]Anumita Roychowdhury and Vivek Chattopadhyaya, POLICY BRIEF 2020: BHARAT STAGE- VI (BS-VI) LEAPFROG WHAT MORE TO DO, Centre for Science and Environment, September 2020

Electricity consumed by EVs is equated to gasoline consumed based on an energy equivalence

consumption and CO_2 emissions: i) the accounting method for calculating CO_2 emissions of EVs, and ii) the super-credit multipliers, which allow for an EV to be counted as multiple vehicles. In India, the emissions accounting methodology used in the context of EVs involves equating the electrical energy consumption from EVs with emissions from the equivalent volume of gasoline.[182] India has proposed super credits for both battery-operated vehicles (BEVs) and plug-in hybrid vehicles (PHEVs). The multiplier value for BEVs is fixed at three while that for PHEVs at 2.5. This erodes the gains that could have been accrued in the form of reduced CO_2 emissions in the absence of such preferential treatment. If CAFE norms are used as benchmarks in the taxonomy, this flexibility afforded to EVs would amount to greenwashing. To be sure, under these circumstances, making investments towards EVs that are eligible for green finance will increase CO_2 emissions. Thus, in line with the study conducted by the International Council on Clean Transportation (ICCT),[183] India may consider phasing out of super credits with an increase in EV uptake and fixing an upper bound on the number of EVs to be incentivised through gasoline equivalence emissions accounting, before shifting to net upstream emissions accounting.[184] Ideally, no individual vehicle's fuel consumption and the consequent CO_2 emissions should grossly exceed the average levels; a modest upper deviation may be permissible.

Electric Vehicles Run on Coal Power

The inclusion of EVs powered by renewable energy sources may be included in the taxonomy, since expansion of coal power to run a growing fleet of EVs is counterproductive. The

[182]Electricity consumed by EVs is equated to gasoline consumed based on an energy equivalence factor, as specified by the Indian government. CO2 emissions are estimated based on conversion of the carbon content in the equivalent volume of gasoline.

[183]Anup Bandivadekar , Shikha Rokadiya and Zifei Yang, INCENTIVIZING ELECTRIC VEHICLES TO MEET FUEL CONSUMPTION STANDARDS FOR PASSENGER CARS IN INDIA, International Council on Clean Transportation (ICCT), May,2019; https://theicct.org/sites/default/files/publications/ICCT_EV_standards_India_20190604.pdf

[184]The difference in upstream emissions from electricity (generation, transmission, and distribution) and upstream emissions from an energy equivalent volume of gasoline (refining, distribution) is calculated for the electricity consumed by electric vehicles.

use of net upstream emissions accounting for evaluating the compliance of EVs with fuel consumption norms may resolve this issue.

Bio-Fuel Powered Vehicles

The Indian government has launched the National Electric Mobility Mission Plan 2020, Faster Adoption and Manufacturing of Hybrid and Electric vehicle (FAME), and the National Policy on Biofuels, 2018—which provide the roadmap for the green transition of the transport sector.[185] While the long-term plan for the transport sector appears to be complete electrification, the complexities of realising this ambition perhaps compels India to focus on a dual policy of EVs and biofuel-based transport.

The initial target of becoming a 100 percent EV nation by 2030 has been revised to 30 percent of all new vehicle sales being electric.[186] This provides the space for biofuel-based vehicles. An expert group set up by the MoP&NG under the Chairmanship of Additional Secretary, NITI Aayog, has recommended that the Ministry & should officially announce the target for pan-India availability of E10 fuel by April 2022, and its continued availability thereafter until 2025 as a protection fuel for older vehicles. It has also recommended phased roll-out of E20 in the country from April 2023 onwards, to make E20 available by April 2025. Furthermore, the committee recommends the roll-out of E20 material-compliant and E10 engine-tuned vehicles starting April 2023, and the production of E20-tuned engine vehicles starting April 2025.[187]

---

[185]Government of India, Ministry of Environment, Forest and Climate Change, India Third Biennial Update Report to The United Nations Framework Convention on Climate Change

[186] Ronak Shah, "Government finally wakes up: Sets a realistic goal of 30% electric vehicles by 2030 from existing 100% target", Financial Express, March 8, 2018, https://www.financialexpress.com/auto/car-news/government-finally-wakes-up-sets-a-realistic-goal-of-30-electric-vehicles-by-2030-from-existing-100-target/1091075/

[187]Rakesh Sarwal, Sunil Kumar, Amit Mehta, Amit Varadan, Subodh Kumar Singh, S.S.V Ramakumar and Reji Mathai, Roadmap for Ethanol Blending in India 2020-25, Niti Aayog, June, 2021, https://www.niti.gov.in/sites/default/files/2021-06/EthanolBlendingInIndia_compressed.pdf

The rollout of biofuel-based vehicles depends crucially on the availability of biofuel sources. Ethanol is classified as 1G and 2G (where G stands for Generation) based on the raw materials used to source the fuel: 1G Ethanol is derived from molasses, sugarcane, sugar beet and sorghum, corn, cassava and rotten potatoes, edible oil seeds, rice and maize.[188] 2G Ethanol is sourced from surplus biomass and agricultural waste.[189] In light of the concerns of food security and water consumption, the National Biofuel Policy stresses on the use of 2G bioethanol.[190] However, agricultural waste is seasonal and distributed across the country,[191] and the high price of obtaining it for the production of 2G bio-ethanol makes it financially non-viable for the private sector to invest in 2G ethanol.[192] Furthermore, the capital expenditure involved in setting up 2G ethanol plants is rather prohibitive.[193] As a result, the recommended roll-out of E20 material-compliant and E10 engine-tuned vehicles, and the production of E20-tuned engine vehicles must rely on 1G ethanol production. More specifically, since the technology to augment the production of 1G ethanol already exists in the country, the focus is on increasing the ethanol production based on sugarcane and foodgrains (surplus rice with FCI and maize).[194]

However, the use of 1G Ethanol poses some major issues. First, molasses-based distilleries and grain-based distilleries

[188]Government of India, MoPNG, FAQs on 1G Bio-Ethanol, Ministry of Petroleum and Natural Gas, https://mopng.gov.in/files/PdcDocument/FAQs_on_1G_Bio-Ethanol-converted.pdf; "Roadmap for Ethanol Blending in India"

[189]Karunjit Singh, "Explained: What does the govt's move to increase bioethanol in petrol mean?", The Indian Express, August 18, 2020, https://indianexpress.com/article/explained/1g-2g-bioethanol-plants-blending-petrol-6558162/

[190]Monika Mandal, "Why Is India Struggling So Much to Get Its Biofuel Plan Right?", Science the Wire, July 1, 2020, https://science.thewire.in/environment/why-is-india-struggling-so-much-to-get-its-biofuel-plan-right/; Ministry of Petroleum & Natural Gas, Government of India, https://pib.gov.in/Pressreleaseshare.aspx?PRID=1532265, 2018.

[191]Anjan Ray, "Biofuels towards Atmanirbhar Bharat" (paper presented at the World Biofuel Day Webinar, August 2020), http://petroleum.nic.in/sites/default/files/WBD_10aug20.pdf

[192]Singh, "Explained: What does the govt's move to increase bioethanol in petrol mean?"

[193]Kalpana Pathak, "India oil firms go slow on plans to build second generation ethanol plants", Mint, March 18, 2021, https://www.livemint.com/news/india/oil-firms-abandon-plans-to-build-second-generation-ethanol-plants-11616003671290.html

[194]"Roadmap for Ethanol Blending in India 2020-25"; Mandal, "Why Is India Struggling So Much to Get Its Biofuel Plan Right?"

are classified as highly polluting industries and are quite water-intensive, and the ethanol production for the roll-out of the blended ethanol-based vehicles relies significantly on such distilleries. However, claiming that technological interventions can enable molasses-based distilleries with incineration boilers and grain-based distilleries to become Zero Liquid Discharge (ZLD) units producing minimal pollution, the MoP&NG's Expert Committee has recommended that such projects (up to 100 kilolitre (kl) per day for molasses-based distilleries and 200 kl per day for non-molasses-based distilleries) should be exempt from the EIA study and public hearing.[195]

Second, since the fuel efficiency of vehicles is reduced due to the use of ethanol-blended petrol, the CO_2 tailpipe emissions may be similar to those of conventional petrol.[196] An argument can be made that while the combustion of ethanol emits CO_2, such combustion should be regarded as carbon neutral as the emissions generated are offset by the CO_2 absorption resulting from the growth of the crops used for ethanol production.[197] However, in India, Ethanol is sourced from the production of crops such as sugarcane and rice, which are water guzzlers, and, rice cultivation, in particular, is a major source of methane emissions in the country.[198]

Thus, the overall impact of ethanol-blended petrol displacing conventional petrol on net CO_2 emissions is contingent on how ethanol is produced (agricultural practices and processing) on the indirect impact on land use (deforestation to increase crop cultivation for ethanol).[199] Similar concerns have

[195]"Roadmap for Ethanol Blending in India 2020-25"
[196]United States Environmental Protection Agency, "Greenhouse Gas Emissions from a Typical Passenger Vehicle", EPA, March, 2018, https://www.epa.gov/greenvehicles/greenhouse-gas-emissions-typical-passenger-vehicle
[197]AFDC, "Ethanol Vehicle Emissions", the website of Alternate Fuels Data Centre, US Department of Energy, https://afdc.energy.gov/vehicles/flexible_fuel_emissions.html
[198]Government of India, Ministry of Environment, Forest and Climate Change, India Third Biennial Update Report to The United Nations Framework Convention on Climate Change
[199]US Energy Information Administration, "Biofuels explained: Ethanol and the environment", the website of EIA, December 7, 2020, https://www.eia.gov/energyexplained/biofuels/ethanol-and-the-environment.php

been expressed about the impact of biodiesel on net CO_2 emissions.[200]

Greenwashing in Agriculture and Livestock Production

A farm is considered eligible for green finance if it can demonstrate the deployment of a pre-specified set of farming practices included in the taxonomy. Sustainable agricultural systems and practices are likely to make it to the taxonomy. Such systems and practices are environmentally conscious in that they minimise pollution in all forms, conserve and promote biodiversity, facilitate the recycling of organic elements, and enhance ecosystems.[201] While there are several types of sustainable agricultural systems and practices, some common principles underlying them include: (i) utilising organic bio-stimulants (ii) relying on scientific field management, efficient irrigation management and suitable crop rotation patterns (iii) preventing and early diagnosis of diseases, eliminating sources of infection, and economising the use of pesticides and insecticides (iv) enhancing the soil environment, soil health, ensure a good water vapor cycle, and improving the soil microbiota (v) recycling nutrients through the efficient utilisation of fertilizers.[202] Sustainable livestock farming practices such as enhanced pasture management, improved manure management, fertiliser management, animal health planning, measures to minimise water pollution are likely to be included in the taxonomy.

Currently, the nature of evidence in favour of the above-mentioned benefits of various forms of sustainable agriculture, particularly in the context of India, is rather scarce and in some

[200]Francisco Posada, Chris Malins and Anil Baral, Biodiesel carbon intensity, sustainability and effects on vehicles and emissions, International Council on Clean Transportation, (ICCT), January 2012, https://theicct.org/sites/default/files/publications/ICCT_biodiesel%20briefing_Jan12

[201]UCS, "What is Sustainable Agriculture?", the website of Union of Concerned Scientists, April 10, 2017, https://www.ucsusa.org/resources/what-sustainable-agriculture

[202]Dora Agri, "Sustainable Agriculture", https://doraagri.com/sustainable-agriculture/

cases non-existent.[203] Their inclusion in the taxonomy must be contingent on sufficient evidence that is both reliable and robust. This holds also for the inclusion of sustainable livestock practices. Such evidence needs to speak to all environmental concerns sought to be addressed by the taxonomy. In the absence of such evidence, there is a risk of greenwashing. Granular data establishing the environmental gains across the diverse agroclimatic zones of the country will strengthen the case for sustainable agriculture and livestock farming. Research may be conducted to delineate a set of essential agricultural and livestock practices to be included in the taxonomy, which when deployed collectively yield appreciable environmental gains across various biophysical conditions in India.

A Culture of Weak Compliance

The development of a green taxonomy is only the first of the many steps needed to mitigate concerns of greenwashing. Even aligning the frameworks of disclosures and reporting with the taxonomy will be a meaningless exercise unless some of the glaring weaknesses in the culture of compliance are corrected. Some of these concerns are highlighted below, in the context of pollution norms and EIA and the corresponding EMP.

To regulate industrial pollution in India, industrial units are mandated to install certain specific types of pollution-control equipment, even if their existing pollution control equipment could potentially be designed and maintained in a way that guarantees compliance. The environmental regulator can enforce such installation but not its maintenance and use. Since the operation and maintenance of pollution-control equipment are expensive and regulatory inspections rather infrequent, industrial units have no incentive for incurring such O&M expenses. Furthermore, the criminal penalties and

[203]Gupta et al., "Sustainable Agriculture in India 2021"

plant closures imposed upon violation are expensive and not commensurate with the degree of violation. Recognising that such penalties can be detrimental to growth has compelled regulators to punish only a few of the major violators, letting others go unscathed. The infrequent inspections conducted by accredited third-party auditors have been known to report false compliance, which explains the frequent violation of pollution norms.[204]

Transparency and disclosure initiatives involve making data on compliance possessed by the regulator available to the public. It is evident from global experience that the resulting pressure and threat to reputation (and litigation) increase compliance.[205] Disclosures and reporting associated with green investments are expected to do the same.

A 2017 Supreme Court order required all the 17 highly polluting industries to install continuous emissions and effluents monitoring systems (OCEMS)[206] and instructed the State Pollution Control Board (SPCBs) to make industrial emissions data available in the public domain. Of the SPCBs required to comply, 50 percent had not created OCEMS monitoring portals until 2020. Only 38 percent of those (16 states) who did comply allow public access to the data. Further, even if the data is made available in the public domain, its credibility is questionable, since the commissioning and operations of the monitoring systems are being managed by the same entities who are being monitored. Some news reports suggest that industrial units

[204]Michael Greenstone, Santosh Harish, Rohini Pande and Anand Sudharshan, "The Solvable Challenge of Air Pollution in India", (paper presented at India Policy Forum, New Delhi, India, July 11–12, 2017). https://cpb-us-w2.wpmucdn.com/campuspress.yale.edu/dist/7/2986/files/2019/06/IPF-2017_Solvable-Challenge-of-Air-Pollution-in-India_Greenstone-Harish-Sudarshan-Pande.pdf ; Michael Greenstone et al., "How India can use better data and regulations to stop industries from choking its cities", The Indian Express, August 13, 2018, https://indianexpress.com/article/opinion/how-india-can-use-better-data-and-regulations-to-stop-industries-from-choking-its-cities/

[205]Greenstone et al., "The Solvable Challenge of Air Pollution in India"; Greenstone et al., "How India can use better data and regulations to stop industries from choking its cities"

[206]The OCEMS systems are the ultimate checkpoints before pollutants are released into the environment. These systems are meant to continuously display emission levels from industries on the websites of the central and state pollution control boards where they are located.

have a practice of sharing one set of data with the regulator and a different set of data from the OCEMS system for internal monitoring. This points towards greenwashing, as disclosures may report false compliance.[207] For the OCEMS data to be accurate and reported with integrity, compliance protocols must be incentive-compatible with the OCEMS vendors, the regulators and the auditors as well as the regulated entities. For instance, aspects such as who hires the auditors, their payment mechanisms and other aspects of the compliance protocol may need to be re-evaluated. The government may want to consider migrating to market-based regulations in addition to making the OCEMS data publicly available.[208]

The EIA refers to the evaluation of the environmental, social and economic impacts of a project prior to decision-making. The objective of this evaluation is to delineate the likely environmental impacts at an early stage in project planning and design, identify measures to mitigate the adverse consequences, and design projects that are in harmony with the local environment.[209] The EIA framework should ideally be the line-of-life of environmental regulation. However, in India, it continues to remain a weak link.[210] Some environmentalists have even referred to it as a "mere exercise.:[211] No wonder that despite the EIA framework in place, India has witnessed over-extraction of natural resources and serious deterioration of the environment.[212]

Just as in the case of pollution, the compliance protocol in

[207]Lavakare, "Can data prove to be the nemesis of India's polluting industries?"
[208]Greenstone et al., "The Solvable Challenge of Air Pollution in India"; Greenstone et al., "How India can use better data and regulations to stop industries from choking its cities
[209]Pankaj Tyagi, "Importance of Environmental Impact Assessment (EIA) in India", the website of Corpbiz, March 2, 2021, https://corpbiz.io/learning/importance-of-environmental-impact-assessment-eia-in-india/
[210]Stella James and Nayana Udyashankar, "From 2006 to 2020: The Ongoing Problems of the EIA", the website of Socio-Legal Review, October 19, 2020, https://www.sociolegalreview.com/post/from-2006-to-2020-the-ongoing-problems-of-the-eia
[211]Sheshan Pradhan, "Environmental Impact Assessment in India", the website of PSC Notes, November 10, 2019, https://pscnotes.in/environmental-impact-assessment-india-pdf/
[212]Terracon, "Does the Environmental Impact Assessment (EIA) Process in India Serve the Purpose?", the website of Terracon Ecotech, October, 2020, https://www.terraconindia.com/2020/10/03/does-environmental-impact-assessment-eia-in-india-serve-the-purpose/

the context of EIA has several drawbacks. For instance, the consultants for undertaking the EIA are hired by the Project Proponents (PP) themselves, usually on a least-cost basis. The competing consultants are compelled to resort to undercutting based on unreasonable price reductions for acquiring the project. Moreover, the release of payments is conditional on getting the clearance for the project. Consequently, the quality and integrity of the assessment are compromised. Post project monitoring, too, is often manipulated by PPs. Similarly, monitoring labs are hired on a least-cost basis. Often, monitoring data is misrepresented to indicate compliance.[213] Thus, there is a serious concern of greenwashing, which compromises the effectiveness of the taxonomy.

The compliance mechanisms must account for the incentives of the entities involved in the exercise. For instance, an independent agency must appoint consultants and monitoring labs for undertaking the EIA and the EMP, respectively, based on parameters that indicate their merit. Payments must be made based on pre-determined rate cards that are based on market costs that need to be incurred for an objective and good quality impact assessment and monitoring. Further, payments may be paid in advance so that they can perform their tasks without any pressure of favouring the PPs.[214]

For the compliance and enforcement of mass emission standards and fuel efficiency norms in the context of type approval and Conformity of Production (COP) testing in the transport sector are concerned, India requires more stringent enforcement and regulatory architecture to delink financial incentives of testing agencies from manufacturers' need to demonstrate compliance and carry out independent testing and verification throughout a vehicle's lifecycle.[215] Even in the

[213]Terracon, "Does the Environmental Impact Assessment (EIA) Process in India Serve the Purpose?"
[214]Terracon, "Does the Environmental Impact Assessment (EIA) Process in India Serve the Purpose?"

building sector, green ratings are based on self-evaluation and reporting in the absence of independent official surveillance. Thus, many green-rated buildings have been exposed for their environmental underperformance and shown to be energy-intensive.[216]

In general, compliance mechanisms across sectors (including transport, waste, buildings) can be strengthened based on the same insights suggested for compliance reform in the context of industrial pollution and EIA.

Overhaul of the EIA Process

The intended objective of an EIA is to facilitate optimal decision-making for environmental clearances to those projects that entail minimum adverse social and environmental harm. This process is expected to be thorough in its assessment of the risks and implications of a prospective project. However, the current EIA regime has transformed into a mere formality of submitting an inventory of documents for acquiring an environmental clearance almost definitely. This is evident from the alarmingly low rejection rates of projects, not because they are deserving but because the relevant authorities are concerned about making the environmental clearance process "less time consuming"—a symptom of the bigger illness called "growth fetishism," which perceives precautionary clauses as "hurdles" and impacts on the poor and the environment as "collateral casualties." This is despite the fact that the average time spent on each project for appraisal by the concerned authorities is already as low as 12 minutes per project.[217]

Over the years, the EIA process and the environment clearance

[215]Zifei Yang, Rachel Muncrief,and Anup Bandivadekar, "Global Baseline Assessment Of Compliance And Enforcement Programs For Vehicle Emissions And Energy Efficiency", International Council on Clean Transportation,ICCT, 2017, https://theicct.org/sites/default/files/publications/PV-C&E-global-baseline-assessment_ICCT-report_14112017_vF.pdf

[216]Centre for Science and Environment, "CSE warns against green rating of buildings becoming 'green wash' with no real benefits.", https://www.cseindia.org/cse-warns-against-green-rating-of-buildings-becoming-green-wash-with-no-real-benefits--6164

[217]Menon, M. and K. Kohli, "From Impact Assessment to Clearance Manufacture", Economic and Political Weekly 44(28)20-23 (2009)

based on it has been compromised in terms of the authenticity of the exercise. Several exemptions have been made, without any evidence that such exemptions are based on the principle of least environmental impact, which has further exacerbated the problem. There have been compromises on the way the Terms of Reference (ToR) of a project is to be approached. The scoping and preparation of a ToR, which was supposed to guarantee quality in the preparation of site-specific reports, has also been relaxed in the context of certain projects, as an excuse to reduce the overworked authorities. ToRs define the environmental and social parameters that must be the focus of an EIA for a given project based on its characteristics, location and other specifications. The immense and rich information on diverse parameters demanded by an ideal EIA process requires time. This has prompted the standardisation of ToRs for projects that are apparently similar on certain parameters. However, this fails to acknowledge the ever-evolving nature of the physical landscape and the sociocultural parameters, and of the complexities characterising the interaction among these parameters. Thus, the standardisation has led to a failure in capturing essential information that can have major ramifications for the assessment of the risks and adverse impacts of a project being appraised. Other sources of compromise in the quality of the EIA process have been the conducting of the public hearing process through a standard questionnaire, which poses thoughtless constraints on the acquired information; the undemocratic act of eliminating open discussion and debate; and the introduction of "deemed" clearance, i.e. automatic authorisation for projects that violate identified timelines for appraisal.[218]

All these attempts to optimise the time and effort involved in an EIA process have backfired in the form of increased litigation.[219] The recommended overhaul of the EIA process

[218]Menon, M. and K. Kohli, "From Impact Assessment to Clearance Manufacture"

must seek to reverse decisions that have compromised the authenticity of the process and have called into question its raison d'etre. In a world that prides itself on innovation and out-of-the-box thinking, the time and effort taken to conduct the EIA exercise cannot be optimised at the cost of quality. The nation can survey global best practices in this regard and tailor them to the Indian context. Furthermore, the EIA process must aspire, to the best extent possible, to be at par with international standards such as the International Finance Corporation (IFC) Performance Standard 1: Assessment and Management of Environmental and Social Risks as well as ISO standards wherever applicable.

In line with (IFC) Performance Standard 1, the EIA in India may be augmented with the inclusion of Cumulative Impact Assessment. Cumulative impacts are an outcome of the interaction between the effects of several (past, present and future) interventions within a specific spatial-temporal context,[220] and the analysis focuses on the aggregation of these interventions and the resultant impact. Cumulative impacts of several interventions may refer to the aggregate impact on a resource, ecosystem, or a human community.[221] Such impacts are often overlooked in EIAs,[222] for example, declining groundwater quality and quantity, the deposition of toxic substances in aquatic sediments, the mobilisation of persistent or bio-accumulative substances, fragmentation and damage to habitats, loss of soil quality and the greenhouse effect.

[219]Menon, M. and K. Kohli, "From Impact Assessment to Clearance Manufacture"
[220]Tom Kaveney, Ailsa Kerswell, and Andrew Buick, Cumulative Environmental Impact Assessment Industry Guide, Minerals Council of Australia, July, 2015, https://www.minerals.org.au/sites/default/files/Cumulative_Environmental_Impact_Assessment_Industry_Guide_FINAL_0.pdf
[221]U.S. Environment Protection Agency, Consideration Of Cumulative Impacts In EPA Review of Documents, EPA, May, 1999, https://www.epa.gov/sites/default/files/2014-08/documents/cumulative.pdf
[222]Karsten Runge, "The Assessment of Cumulative Environmental Impacts in EIA and Land-Use Planning", in Urban Ecology, ed. Breuste J., Feldmann H., Uhlmann O (Berlin: Springer, 1998), 433-437

Aligning Disclosures and Reporting Practices with the Taxonomy

Eligibility Criteria for Green Finance

Eligibility criteria across all categories of environmental sustainability are additive, not substitutive, and must be satisfied simultaneously. Only (an iteration of) an activity that meets the standards and benchmarks across all categories of environmental sustainability will be considered as green, and the finance used to achieve these standards and thresholds will be deemed as green finance, irrespective of whether that finance is being channelled to achieve either one or some or all of the environmental objectives. The complete chain of sub-activities that characterise a broader activity must be delineated to avoid ambiguity in the definition of "economic activity."

Economic activities eligible for green finance can be classified into two categories:

a) activities that already satisfy the screening criteria, and

b) activities that do not satisfy the screening criteria but aspire to do so by using green finance

Investments used for projects undertaken and assets created as part of such activities that satisfy the eligibility criteria of the taxonomy automatically qualify as green finance, and do not need to satisfy any separate criterion. However, it has to be established unambiguously how the concerned project or asset is part of the associated economic activity.

It should be noted that the condition for eligibility entails an increase in the cost of production for those wanting to access green finance, adversely affecting profitability. This may dampen both the demand and supply of green finance, defeating the purpose of the taxonomy. Since green finance is motivated by the need to incorporate environmental costs of business into investment decisions, if investments catering to the low-carbon ambition must be regarded as green, so should finances dedicated to pollution prevention or control, water-use efficiency or conservation, as well as expenditures incurred while implementing environmental/biodiversity management plans. This approach acknowledges the increase in the cost of production caused by accounting for environmental costs and may further increase compliance to environmental norms.

In this context, a major challenge is that many forms of environmental expenses incurred (e.g. installation of pollution-control equipment, implementation of environmental/biodiversity management plan) do not translate into increased output or revenue. If green investments do finance these expenditures, how will they be repaid in the absence of an obvious flow of revenue from such investment? The exercise of developing a taxonomy must take into account these issues. While some may suggest diluting the eligibility criteria for green

finance, others, including the author of this paper, consider this an opportunity to innovate and design financing mechanisms to deliver the double bottom-line (profit and the planet).

Aligning Disclosures with the Taxonomy

The financial market participants must accurately disclose how financial products marketed as "sustainable" adhere to the screening criteria of the taxonomy as well as their strategy for securing the environmental sustainability of their investments. Companies, too, must report their taxonomy alignment and demonstrate how the green finance was used to ensure that the screening criteria were fulfilled.[223] They must elaborate on the nature and extent of the taxonomy alignment of their activities and report the proportion of their revenues/turnover as well as capital and operational expenditures aligned with the taxonomy, disaggregated by economic activity. Furthermore, such disclosure should map the economic activity to the environmental objectives achieved by it. While the disaggregation of turnover/expenditure by environmental objectives may be attempted, caution must be maintained against double-counting while clearly stating where an economic activity contributes to more than a single environmental concern. Verification of disclosures may be mandated in line with the TCFD recommendations and must be sufficiently stringent to prevent greenwashing.[224]

The financial market participants must explicate the nature and extent of the use of the taxonomy in ensuring the sustainability of the underlying investments for each financial product, the environmental objective(s) achieved by the investments, and the proportion of underlying investments that are taxonomy-aligned (expressed as a percentage of the

[223]EU Technical Expert Group on Sustainable Finance, Financing a Sustainable European Economy – Taxonomy Report: Technical Annex, European Commission, March,2020, https://ec.europa.eu/info/sites/default/files/business_economy_euro/banking_and_finance/documents/200309-sustainable-finance-teg-final-report-taxonomy-annexes_en.pdf

[224]EU Technical Expert Group on Sustainable Finance, Financing a Sustainable European Economy – Taxonomy Report: Technical Annex

investment, fund or portfolio). These disclosures must satisfy existing pre-contractual and reporting norms. The concerned regulators must further identify the investment instruments and funds required to make disclosures and the format of disclosure for each of these financial products. While the underlying definitions of what counts as "green" remains the same, disclosure and reporting formats will often differ across instruments. Disclosures may also indicate how the metrics of taxonomy alignment used by companies (percentage of turnover/expenditure) in their reports have been used to assess the environmental sustainability of underlying investments. To eliminate the risk of greenwashing, external verification of disclosures may be mandated.[225]

The green bond issuer, as part of ex-ante disclosure, may elaborate on the nature and extent of taxonomy alignment of bond proceeds and, as part of periodical ex-post reporting, may elucidate on how the proceeds have been, or are being, allocated to environmental objectives and the percentage of proceeds/ expenditures aligned with the taxonomy. The borrower of a green loan must disclose the percentage of the loan aligned with the taxonomy and the environmental objectives achieved by the economic activities financed by the loan.[226]

For increased accountability, it may be mandated that companies and investors make disclosures in the public domain, who will then be compelled to disclose accurate information to minimise reputational and litigation risks.

[225]EU Expert Group on Sustainable Finance, Financing a Sustainable European Economy – Taxonomy Report: Technical Annex

[226]EU Technical Expert Group on Sustainable Finance, Financing a Sustainable European Economy – Taxonomy Report: Technical Annex

Actions to Support Implementation

Establishment of GHG Emission Standards

There is a need to set up an expert group including scientists, academics, industry representatives, and representatives from the BIS to develop GHG emissions thresholds for the power and the manufacturing sectors under the aegis of the MOEF&CC. The expert group for the power sector must also include representatives from the Central Electricity Authority (CEA), MoP, and the MNRE.

Power Sector

The CEA maintains a database on CO2 emissions for all grid-connected power stations in India, which is regularly updated at the end of each fiscal year. However, the major limitation of this dataset is that it does not include CO2 emissions data on hydropower stations up to 25 MW, and wind, biomass and solar photovoltaic stations, which would be valuable while developing technology-agnostic GHG emission thresholds

for the energy sector. Furthermore, the CO2 emissions data available is based on Gross Calorific Value, and the oxidation characteristic of the fuel used for power generation and the total amount of fuel consumed. Therefore, the data can only be used in determining GHG emissions thresholds for direct emissions, not lifecycle emissions. There is no other database available that can guide the determination of short-term and long-term GHG emissions thresholds for the power sector.

To tackle this problem, the proposed expert group can leverage the expertise of the Science-Based Targets initiative (SBTi) for developing station- or unit-level GHG emission thresholds that are common for all stations/units within the power sector. The SBTi is a partnership between the CDP, the United Nations Global Compact, World Resources Institute and the World-Wide Fund for Nature (WWF). It helps identify a trajectory of GHG emissions reduction and the corresponding targets that align with benchmarks based on the latest climate science to meet the goals of the Paris Agreement. The SBT effectively tackles the uncertainty of emissions reduction targets, securing global warming well within 1.5 degrees Celsius by relying on the latest climate science.[227]

Manufacturing Sector

Currently, India utilises data on industrial energy use obtained from the Annual Survey of Industries (ASI) as baseline data for estimating industrial emissions. The proposed expert group could use factory-level data on fuels consumed available with the ASI, to understand industry-wise best environmental performance achievable in the Indian context. Furthermore, data generated by the Perform, Achieve and Trade (PAT) scheme can provide inputs on benchmarks for energy savings

[227]WWF and CDP, Corporate Climate Action in Support of NDCs: A Case for Science Based Targets in India, CDP; https://wwfin.awsassets.panda.org/downloads/corporate_climate_action_in_support_of_ndcs.pdf; Science Based Targets, "Uniting Business and Governments to Recover Better", https://sciencebasedtargets.org/ceo-climate-statement

and the consequent reduction in GHG emissions. Such data is available for iron and steel, fertilisers, paper and pulp, cement, aluminium and textiles—six of the eight industries identified as likely candidates to be included in the proposed taxonomy. Both ASI and PAT cycle data can provide inputs for GHG emission targets through energy savings, but PAT data does not help develop thresholds for GHG emissions from IPPU. So far, it remains unclear whether data reported in ASI on materials consumed can help in this purpose. The situation is further exacerbated by the fact that few companies in India make voluntary climate-related disclosures (approximately 200 in 2020).[228]

The expert group set up by the MOEF&CC can collaborate with the SBTi to identify firm/company/unit level thresholds for GHG emissions across various industries by leveraging the latest climate science. These thresholds must represent common benchmarks, which all manufacturing units operating in a particular industry must uphold. These thresholds must be formulated based on the best performance achievable in the Indian context without compromising on growth.

Transport Sector

Currently, fuel efficiency norms do not exist for two- and three-wheeler vehicles. The BEE, in consultation with the MoRTH, must develop these norms, which can then become the basis for CO2 emissions standards. As already mentioned, fuel efficiency norms for heavy-duty vehicles and light and commercial vehicles must also be translated into CO2 emissions standards to help accurately determine emission thresholds for these vehicles. While formulating these standards, it must also be considered that there are multiple fuel options available in the market, which differ in their carbon

[228]M Ramesh, "Climate-related disclosures are on the rise", The Hindu Business Line, April 5, 2021, https://www.thehindubusinessline.com/specials/clean-tech/climate-related-disclosures-are-on-the-rise/article34236777.ece

content and in the upstream CO2 emissions resulting from their production. An expert group consisting of academics; scientists; industry representatives, such as the SIAM and various emissions testing agencies such as the ARAI and ICAT; representatives from the BIS; and representatives of the MoP, the MoRTH and the MoP&NG may be set up for this purpose under the aegis of the MOEF&CC.

The SBTi can also be involved in this process to ensure that the CO2 emissions standards are aimed at approximating the global temperature target of 1.5 degrees Celsius. Moreover, they must establish whether biofuel combustion is truly carbon-neutral in the Indian context, since it is contingent on how they are produced.

Establishment of New Standards

While many economic activities mentioned in the taxonomy must be monitored for water consumption and pollution, the requisite norms do not exist. The concerned authorities need to establish these norms and standards. For example, pollution standards must be prescribed by the CPCB under the MOEF&CC, and water consumption norms should be established jointly by representatives of the MOEF&CC and the Ministry of Jal Shakti.

Strengthening of Existing Norms and Standards

Existing national norms and standards may be strengthened, with international standards being benchmarks but guided by India's specific circumstances. The International Organisation for Standardisation (ISO) may be a useful reference and can act as the benchmark for upgrading existing norms and standards wherever applicable. The complete overhaul of the EIA process, which should include augmenting it with the Cumulative Impact Assessment, requires the intervention of the MOEF&CC.

Currently, India uses a weight-based system for fuel-efficiency standards. Such systems do not incentivise the reduction of vehicle mass, since doing so requires a stricter fuel

consumption norm. Thus, weight-based norms are likely to prompt up-weighting of the vehicle fleet, to qualify for relatively lenient norms. The deployment of advanced technologies that minimise vehicle mass and improve fuel economy end up being penalised by weight-based norms.[229] The BEE, in consultation with the MoRTH, must consider developing fuel economy criteria that incentivise all fuel-efficient technologies (including improved powertrain designs, engine downsizing, and lightweight materials), while simultaneously permitting the production of a composite range of vehicle sizes, as demanded by the targeted market segment.

Measures Against Greenwashing

Improvement of Compliance Culture

There is a need to strengthen compliance protocols by rectifying them based on incentive-compatible mechanisms. In the case of industrial pollution norms, CPCB and other agencies under the MOEF&CC must initiate this effort. For the EIA, this responsibility falls on the representatives from the MOEF&CC.

Since new vehicle-type approval and CoP testing are responsibilities of the MoRTH—in conjunction with the Ministry of Heavy Industries and Public Enterprises (MoHIPE), MoP&NG, MOEF&CC, the BIS, the SIAM, ARAI and ICAT[230] —rectifying the relevant compliance and enforcement regime in the transport sector, based on compatible incentives, will be the collective task of these ministries and institutions.

In the context of compliance issues related to green ratings based on self-reporting in the buildings sector, the solution is

[229]Gaurav Bansal and Anup Bandivadekar ,Overview of India's Vehicle Emissions Control Program: Past Success and Future Prospects, International Council on Clean Transportation, 2013https://theicct.org/sites/default/files/publications/ICCT_IndiaRetrospective_2013.pdf

[230]Transport Policy, "INDIA: COMPLIANCE AND ENFORCEMENT", the website of Transport Policy; "Overview of India's Vehicle Emissions Control Program: Past Success and Future Prospects", https://www.transportpolicy.net/standard/india-compliance-and-enforcement/?title=india:_compliance_and_enforcement; https://theicct.org/sites/default/files/publications/ICCT_IndiaRetrospective_2013.pdf

to use the GRIHA ratings. The GRIHA rating process involves three rounds of due diligence, i.e. on-site visits carried out by the GRIHA Council officials. The preliminary and final evaluation (on which the final rating is based) of the submitted documents is carried out by the GRIHA Council officials along with external evaluators.[231] The final score is then submitted to the National Advisory Committee of the GRIHA Council for approval.[232] The GRIHA Council is an independent not-for-profit society composed of the National Advisory Committee (NAC) and Technical Advisory Committee (TAC), which include experts, eminent personalities and renowned professionals from ministries, state nodal agencies and the building industry.[233] Furthermore, the fee for the rating process is paid before the final rating is provided.[234] This precludes the likelihood of reporting false compliance.

Greenwashing Concerns in the Transport Sector

The MoRTH, in consultation with the MoHIPE, MoP&NG, MOEF&CC, the BIS, the SIAM, the ARAI and ICAT should consider replacing the chassis dynamometer tests such as the MIDC and the CSFC with engine dynamometer tests such as the WLTP for type approval, the CoP, and the evaluation of fuel efficiency in the case of passenger cars and other light-duty and commercial vehicles. Similarly, the CSFC should be replaced by the WHSC and the WHTC for evaluating the fuel efficiency of heavy-duty vehicles. The MoRTH must also consider a gradual phase-out of the preferential treatment for EVs in evaluating fuel efficiency (See Chapter 7).

[231]GRIHA, "GRIHA Rating", https://www.grihaindia.org/griha-rating
[232]GoSmartBricks ,"The Only All About 'GRIHA Rating System' Resources, You Will Ever Need", https://gosmartbricks.com/griha-rating-system/
[233]GRIHA Council, "India's own Rating System for Green Buildings", https://www.grihaindia.org/sites/default/files/sites/default/files/pdf/case-studies/GRIHA-Area-Brochure.pdf ; GoSmartBricks ,"The Only All About 'GRIHA Rating System' Resources, You Will Ever Need", https://gosmartbricks.com/griha-rating-system/
[234]GRIHA, "GRIHA Rating"

Agriculture and livestock Production

The MOEF&CC, the MoAFW, and the MoFAHD should commission the ICAR,[235] to conduct research and establish substantial, reliable and robust evidence, if it exists, in favour of sustainable agricultural and livestock farming practices that can then be included in the taxonomy. Granular data establishing the environmental gains across the diverse agroclimatic zones of the country will strengthen the case for sustainable agriculture and livestock farming. Research may be conducted to delineate a set of essential agricultural and livestock practices to be included in the taxonomy, which when deployed collectively yield appreciable environmental gains across various biophysical conditions in India.

Aligning Disclosure and Reporting Norms with the Taxonomy

The Ministry of Corporate Affairs, in consultation with the RBI and the SEBI, must mandate disclosures in financial statements of companies to align with the taxonomy. Furthermore, the RBI must mandate disclosure and reporting on green loans by banks, while the SEBI should do the same for financial institutions under their purview of regulation on green investments, including green bonds and other debt instruments, and green equity to be aligned with the taxonomy.

National Measurement, Reporting and Verification System

The implementation of the taxonomy can benefit from the establishment of National Measurement, Reporting and Verification system, which should be operated by a central authority under the MoEFCC. This authority can track the

[235]The ICAR reports to the Department of Agricultural Research and Education, Ministry of Agriculture & Farmers Welfare.

performance of entities across all parameters relevant for the screening criteria of the taxonomy, GHG emissions, air pollution emissions, water effluents, energy consumption, water consumption, etc. Several departments can be set up, each of which can oversee a single parameter or a subset of parameters. Currently, different authorities track these parameters, and there is a need for the information needs to be collated in a central repository maintained by the proposed authority in a format consistent with the taxonomy. This will provide the input needed to review and update the screening criteria of the taxonomy, and help formulate appropriate environmental policies. Furthermore, this database will provide evidence on best practices that can help firms become eligible for green finance. A related initiative would be to set up a strong, comprehensive, modernised and taxonomy-relevant national GHG inventory management system to improve the GHG emissions thresholds across the sectors included in the taxonomy.

Reduced Cost of Compliance and Disclosures

For the taxonomy to succeed in its objective of preventing greenwashing, the role of compliance and accurate disclosures is very important. However, compliance and disclosures will increase the cost of doing business. Thus, there is a need to innovate for cost-effective compliance mechanisms and information management systems. Furthermore, for green finance to be accessible to the small and marginal farmers as well as to MSMEs, cost-effective compliance is imperative. The MoEFCC, in collaboration with MoAFW and the MoMSME, must assume a proactive role in covering or subsidising the cost of such compliance and setting up the necessary infrastructure (services that assist farmers and MSMEs).

The Way Forward

The taxonomy proposed in this report has certain limitations. First, it does not include some sectors such as forestry, ICT, railways, aviation, and shipping. To be sure, the importance of each of these sectors varies in their environmental impact. The taxonomy for forestry must emphasise its role in offsetting global warming through carbon sequestration and enhanced soil quality and biodiversity, as well as increased soil carbon. Moreover, since forests provide habitats to diverse animal species, protect watersheds, reduce soil erosion, improve nutrient cycling, purify water and air, regulate temperature, serve as buffers against natural disasters and so on,[236] the taxonomy must take these environmental benefits in

[236]World Wide Fund for Nature, "The importance of forests cannot be underestimated", WWF, https://wwf.panda.org/discover/our_focus/forests_practice/importance_forests/; "More than carbon storage - The role of forests in climate change", Climate Change Post (Ellison et al., Global Environmental Change 43: 51-61, 2017), February 21, 2017, https://www.climatechangepost.com/news/2017/2/21/more-carbon-storage-importance-forests-climate-cha/

consideration while developing screening criteria. Thus, the approach to establishing screening criteria for forestry will be drastically different from what has been attempted in this paper. One possible method will be to develop the taxonomy for specific activities such as afforestation, sustainable forest management and reforestation. For ICT, the taxonomy should not focus on the GHG emissions of the sector, but on encouraging digitalisation solutions for emission reduction, resource efficiency, climate risk assessment and management, and so on.

Second, the taxonomy does not include concerns of climate change adaptation, since such an exercise deserves a dedicated paper. Climate change adaptation involves adjustments in processes, practices, and structures associated with ecological, social, or economic systems in coping with climate change. Such adjustments can be of any nature or form, with no "one-size-fits-all-solution," and will be contingent on the context of the adaptation[237] as well as its location. Finally, the interplay between climate change impact, resources, and socioeconomic realities characterising the object of adaptation will also bear on the ideal adaptation solution. As such, it is not possible or meaningful to draw up a context-free and exhaustive list of activities that could be deemed as contributing to adaptation under all circumstances.[238]

Attracting green finance for climate-change adaptation is particularly difficult for two reasons: First, the benefits of investment in climate change adaptation are usually uncertain in terms of timeline; for instance, in the case of building flood defences or setting up early warning systems for cyclones. Second, since climate change adaptation is a public good, the private sector has no incentive to finance adaptation solutions.[239]

---

[237]United Nations Framework Convention on Climate Change, "What do adaptation to climate change and climate resilience mean?", the website of United Nations Framework Convention on Climate Change, https://unfccc.int/topics/adaptation-and-resilience/the-big-picture/what-do-adaptation-to-climate-change-and-climate-resilience-mean

[238]EU Technical Expert Group on Sustainable Finance, Taxonomy Technical Report

The development of a taxonomy for climate change adaptation will need to consider these challenges. Adaptation solutions are characterised by several intangible, often secondary, environmental gains, with no single quantitative measure to assess their impact.[240] The taxonomy should get around this problem while developing screening criteria.

India's diverse topography, including the Himalayan Mountain range, coastal plains, the Great Peninsular Plateau, the Northern plains and the islands, creates significant variation in the nature and intensity of climate-change impact across the country.[241] The taxonomy for climate change adaptation needs to address this variation and should be developed for water resources, forests and other natural ecosystems (particularly the Himalayan ecosystem), coastal zones, agriculture, fisheries, health, energy and infrastructure systems, as these sectors require urgent attention.[242] Furthermore, the taxonomy should ideally also address the specific vulnerabilities of women, children, economically weak individuals, resource-dependent sections (such as small and marginal farmers), coastal communities and tribal populations. Finally, such a taxonomy may be more effective if anchored in state climate change adaptation action plans since it can then be tailored to the context- and location-specific climate risks.[243]

---

[239]Govinda R. Timilsina, "Financing Climate Change Adaptation: International Initiatives," Sustainability 13, no. 12 (2021)

[240]"OPINION: Why climate adaptation should be top priority in India's climate agenda", The Economic Times, October 23, 2020, https://energy.economictimes.indiatimes.com/news/renewable/opinion-why-climate-adaptation-should-be-top-priority-in-indias-climate-agenda/78830787

[241]United Nations Development Programme, "India", the website of Climate Change Adaptation, United Nations Development Programme, https://www.adaptation-undp.org/explore/india

[242]Jyotiraj Patra, "Review of Current and Planned Adaptation Action in India", CARIAA Working Paper no. 10, International Development Research Centre, 2016, https://www.iisd.org/system/files/publications/idl-55866-india.pdf

[243]Somya Bhatt, Na-Hyeon Shin, and Kirtiman Awasthi, India: NAPCC Process Country Case Study, Bonn, Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH, 2019, https://www.adaptationcommunity.net/wp-content/uploads/2019/04/giz2019-en-factsheet-nap-india-low-res.pdf

Conclusion

The global community is finally acknowledging the pernicious nature of conventional development pathways, which have breached planetary boundaries. The consequent increase in the global pressure for greater accountability from countries in terms of environmental sustainability has, in turn, fuelled the need to account for the environmental costs of growth. Nations, both developed and developing, have responded by showing greater ambition in emissions targets and making significant efforts in improving environmental accountability across systems (for instance, regulations and development plans).

In view of these developments, India must outline a pathway for green transition over the next few decades that is compatible with its development needs; socioeconomic challenges; and institutional, technological and financial capacities. The financial system is critical for mobilising the needed resources for such a transition and should therefore take centre-stage in any discussion on the matter. The greening of the real

economy demands the greening of the financial system. This paper provides insights into how the financial system can be better leveraged in making this green transition in India by providing directions on developing a green finance taxonomy, the first crucial step in achieving this longer-term endeavour of developing a green finance ecosystem in the country. The proposed taxonomy guides businesses in achieving the double bottom-line (planet and profit). It is designed to identify the ways in which businesses are responsible for environmental degradation and provide solutions to curtail them. Thus, the taxonomy can help businesses in India to green their practices. In recent years, investors have become increasingly conscious of the environmental footprint of their investment decisions and portfolio allocations. However, their efforts to address the issues have been frustrated by the uncertainty regarding the environmental sustainability of different types of investments and economic activities, and the absence of any standard definition and criteria to determine such sustainability. A well-defined and structured taxonomy can facilitate decision-making and allow investment to incorporate national environmental objectives.

This taxonomy also throws light upon other steps needed to build a green finance ecosystem in India. It provides a template for disclosure and reporting practices for green investments, throws light on the gaps in the existing norms and standards that are important for the effective implementation of the taxonomy, provides visibility to the neglected green sectors of the economy, and suggests policy and regulations required to support the taxonomy. By eliminating the uncertainty regarding the scope and definition of green finance and the activities eligible for the same, the taxonomy is expected to boost investment inflows and make India a secure and predictable destination for green finance.

As is the case in India, the cost of implementing intended nationally determined contributions (INDCs) by other developing countries is rather prohibitive and estimated to amount to over US$4 trillion. In light of the failure of developed nations to

uphold their promise of generating an annual US$100 billion by 2020 towards the Copenhagen Green Climate Fund, the largest dedicated climate fund, meeting the ambitiously calculated INDCs remains challenging.[244] This compels developing nations to shift efforts towards attracting private capital for climate action. However, the perception of being "high risk" prevents them from attracting the requisite levels of private finance. The introduction of a green taxonomy is expected to address this issue, allowing India to transform into a US$5 trillion economy while also accounting for environmental costs of growth. India's taxonomy may also become a useful template of reference for other emerging economies attempting to develop their own taxonomies.

The global temperature is on track to rise over the desirable limits by the end of the century. India's introduction of a green taxonomy will signal its strong commitment towards bending the temperature curve closer to 1.5 degrees Celsius and realising the global net-zero vision. A disclosure and climate-finance tracking system, aligned with the taxonomy, will allow India to closely monitor its progress in delivering on its commitment, and identify deviations, if any, and how to narrow them. Finally, India's positive experience can prompt its peers to augment their contribution towards the global net-zero goal, propelling other developing and emerging economies in their green transition and making India the touchstone for their green strategies.

[244] Somya Bhatt, Na-Hyeon Shin, and Kirtiman Awasthi, India: NAPCC Process Country Case Study, (Bonn, Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ), 2019, https://www.adaptationcommunity.net/wp-content/uploads/2019/04/giz2019-en-factsheet-nap-india-low-res.pdf

About the Author

Renita D'Souza is a PhD in Economics and a Fellow at Observer Research Foundation, Mumbai, under the Inclusive Growth and SDGs programme. Her research focus is on environmental and development finance, sustainability issues and the Indian economy. Her forte lies in quantitative economics and statistical modelling.

Amid its renewed climate commitments, India's green transition will require billions of dollars in investment. The investment peculiarities of green projects do not align with the risk-return profile demanded by conventional financial institutions. So far, India has managed to attract only a trickle of the existing green finance pool. One reason limiting India from accelerating the inflow of green finance is the perception of it being high-risk as an emerging economy. This situation can be partially remedied by articulating a national green taxonomy. A green taxonomy will standardise and establish eligibility criteria for green finance, and can boost such finance in multiple ways, reinforcing the need to develop such a framework.

ORF OBSERVER RESEARCH FOUNDATION
Ideas • Forums • Leadership • Impact

Observer Research Foundation
20, Rouse Avenue Institutional Area
New Delhi - 110 002, INDIA
+91-11-35332000 Fax: +91-11-35332005
contactus@orfonline.org
www.orfonline.org