

4. Policy Landscape

4.1. International commitments

International commitments are powerful mechanisms to guide and bolster global consensus for climate action. They provide a robust framework and a shared vision that can guide cities in the Global South, like those in India, to effectively implement NbS for coastal adaptation. By aligning local action with these global agreements, developing nations can progress towards sustainable development, climate resilience, and enhanced ecosystem and community well-being, setting a pathway for sustainable coexistence between humans and nature. International frameworks discussed here underscore the urgent need for sustainable, resilient, and inclusive approaches such as NbS to combat climate change, enhance disaster risk reduction, promote biodiversity conservation, and achieve socio-economic development goals.

Apart from the Sustainable Development Goals, coastal and marine NbS have been recognised in the Intended Nationally Determined Contributions during the Paris Agreement in 2015, along with the commitments made in the Sendai Framework for Disaster Risk Reduction and the post-2020 Global Biodiversity Framework. The inclusion of NbS vocabulary in these international commitments underscores the global acknowledgment of the critical role of NbS in addressing climate change and DRR. Overall, 97 countries have incorporated coastal and marine NbS in their Nationally Determined Contributions, with 61 countries focussing on both mitigation and adaptation and acknowledging the socio-economic benefits for coastal communities (Lecerf et al., 2021).

The 30 × 30 post-2020 Global Biodiversity Framework under the Convention of Biological Diversity is a global commitment to conserve 30% of the Earth's lands and oceans by the year 2030. It further highlights the importance of NbS in preserving biodiversity, sequestering carbon, and enhancing ecosystem and community resilience against climate impacts.

4.2. National policies and frameworks

India's national policies and frameworks adhere to international obligations and enhance the national capacity to address environmental challenges through innovative, sustainable, and locally adapted solutions. This strategic alignment enables the country to advance its development goals while contributing to global efforts to mitigate climate change, conserve biodiversity, and reduce disaster risks. The nation's commitment to environmental preservation and sustainable development is deeply rooted in its legal and policy framework, which encompasses various measures aimed at the conservation, protection, sustainable use, access, and benefit-sharing of its natural resources. India's approach to NbS involves integrating these solutions across various sectors and levels of governance, from national to local. This includes constitutional provisions, legislation, and national policies related to water management, agriculture, urban development, and coastal zone management (*Nature-Based Solutions for Urban Climate Resilience in South Asia*, 2022).

Effective coordination between different governmental levels and sectors ensures that India's policies are comprehensive and aligned with international commitments.

4.2.1. Constitutional Provisions

The Constitution of India has evolved to include provisions for environmental protection that align with NbS motives. It provides a robust framework for implementing NbS, promoting greater public participation, environmental awareness, and preservation of ecological integrity crucial for the well-being of all citizens. Major constitutional provisions and their relevance for NbS are explained in Table 1.



Table 1. Constitutional provisions and their relevance for NbS

Constitutional provision	Provision	NbS relevance
Fundamental Right: Article 14 (Right to Equality)	Grants equality before the law or equal protection of the laws within the territory of India.	Links a healthy ecosystem maintained through NbS to resilience against climate impacts, emphasising adaptation co-benefits for vulnerable communities
Fundamental Right: Article 21 (Right to Life)	Expansively interpreted to include the right to a healthy environment, extended to include protection against the adverse effects of climate change	Expands to encompass protections against climate change, underscoring environmental health as a core element of the right to life
Fundamental Right: Article 19(1)(g) (Freedom to Practice Profession, Occupation, Trade, or Business)	Grants the right to pursue any profession or business, conditioned by environmental considerations	Provides a legal basis for NbS in business and industry, prioritising ecological health in economic activities
Article 47 (Duty of the State to Enhance the Nutrition Levels and Living Standards and Promote Public Health)	Marks the duty of the State to raise the nutrition level and living standards of its people, improve public health, and prohibit the consumption of substances that are injurious to health.	Connects the enhancement of ecosystem services through NbS with improved nutrition and living standards, including access to green spaces
Article 48 (Organisation of Agriculture and Animal Husbandry)	Notes the duty of the State to protect and improve the environment, safeguard forests and wildlife, and promote modern and scientific practices for agriculture and animal husbandry	Aligns with NbS such as agroforestry and sustainable land use for ecological conservation, supporting better air, water, and soil quality
Fundamental Duty: Article 51A (g) (Duty of Every Citizen to Protect the Environment)	Highlights the duty of every citizen to protect the environment, including forests, lakes, rivers, and wildlife, and be compassionate towards living creatures	Emphasises citizen involvement in natural resource protection and supports NbS for ecological balance

Constitutional provision	Provision	NbS relevance
Article 246 (Subject-matter of laws made by the Parliament and by the State Legislatures)	Delineates the jurisdiction for legislation between the Union and State Governments, addressing different environmental issues at appropriate levels.	Enables effective local and state-level management of environmental issues, supporting national standards for pollution control and wildlife conservation, beneficial for NbS
Article 253 (Legislation for giving effect to international agreements)	Empowers the Parliament to legislate on environmental protection to fulfil international commitments	Facilitates India's compliance with international environmental treaties and strengthens the legal framework for NbS globally
Panchayati Raj Act, 1992	Empowers local bodies i.e., Panchayats for water management, irrigation, watershed development, and sanitation.	Decentralisation aids NbS by enabling localised management of ecosystems, water resources, and community-led conservation efforts
74th Constitutional Amendment Act, 1992	Marks a significant shift towards decentralisation and greater local governance, emphasising urban local bodies as self-governing entities promoting participatory governance	Provides a foundation for local bodies to integrate ecological strategies into urban planning and encourages community-led NbS initiatives, with local governments including Panchayats playing a vital role in soil, water, and forestry management (Legasis, 2022)

4.2.2. Legislation

The linkage between India's legislative framework for environmental protection and the NbS encompasses conservation, restoration, and sustainable use of ecosystems to address challenges such as climate change, water security, water pollution, and disaster risk management (Figure 3). Some environmental laws and their relevance for NbS are described in Table 2.

Figure 3. Legislation and enforcement agencies

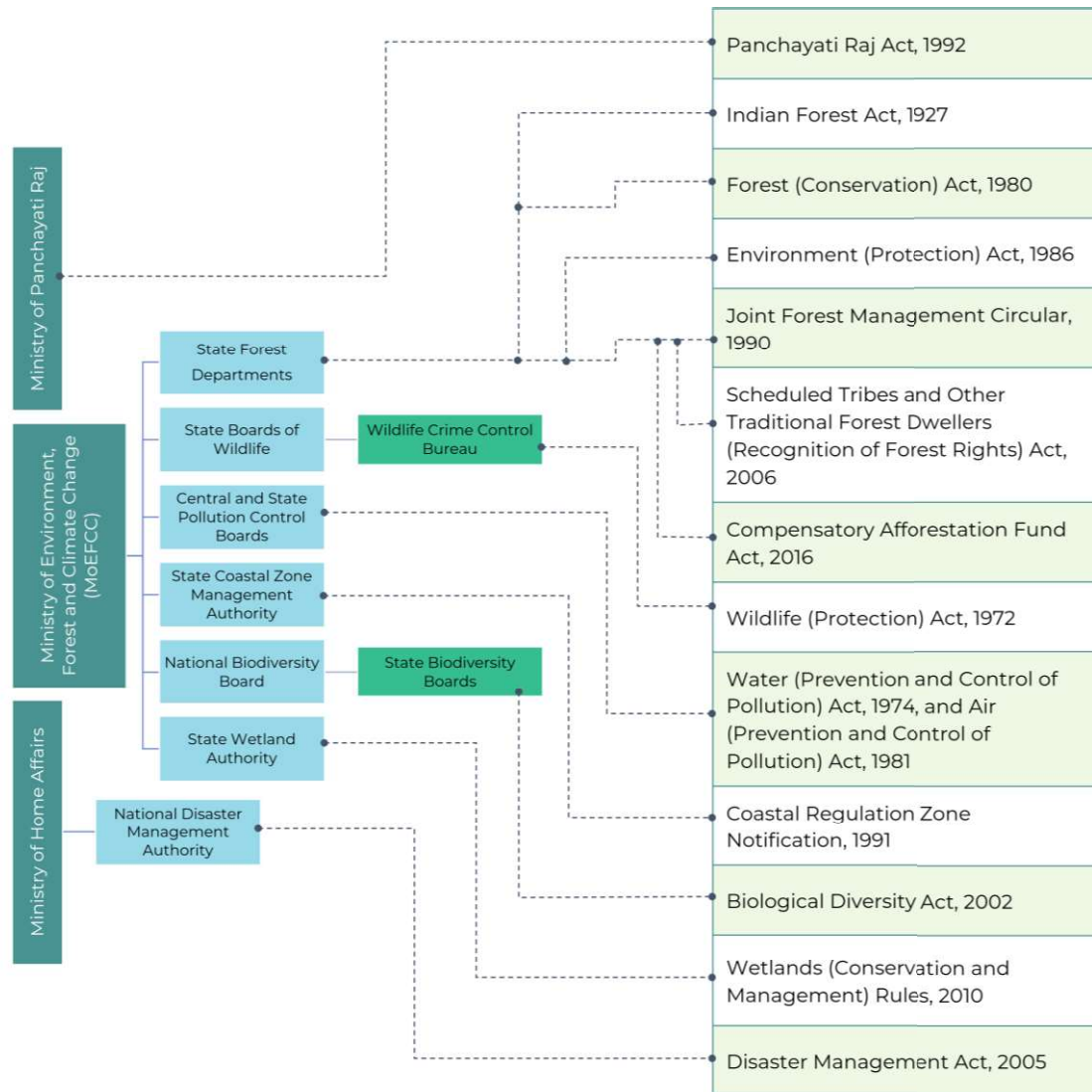


Table 2. Legislative frameworks and their relevance for NbS

Legislative framework	Enforcement agency	Provision	NbS relevance
Indian Forest Act, 1927	Ministry of Environment, Forest and Climate Change (MoEFCC), through State Forest Departments	Governs forests, forest produce transit, and duties on timber and other forest products within various forest categories, excluding those under government control	Supports a balanced ecological cycle, aids in climate regulation and biodiversity support and sustains forest-based livelihoods
Wildlife (Protection) Act, 1972	MoEFCC, through State Boards for Wildlife, and Wildlife Crime Control Bureau	Protection of wildlife and their habitats with amendments to provide better protection mechanisms and include conservation reserves and community reserves within its purview	Aims to ensure biodiversity and ecological balance for sustaining ecosystem services complementarily provided by NbS
Water (Prevention and Control of Pollution) Act, 1974, and Air (Prevention and Control of Pollution) Act, 1981	MoEFCC, through Central Pollution Control Board and respective State Pollution Control Boards	Earliest legislation that laid the foundation for India's fight against environmental pollution, establishing the framework for controlling air and water pollution	Implicitly support NbS by aiming to maintain the natural purifying role of wetlands and forests in filtering air and water pollutants
Forest (Conservation) Act, 1980	MoEFCC, through State Forest Departments	Restricts de-reservation of forests and use of forest land for non-forest purposes without the explicit approval of the Central Government	Aims to strengthen NbS by enhancing ecosystem resilience and promote the sustainable use of natural resources
Environment (Protection) Act, 1986	MoEFCC, through State Forest Departments	Empowers the Central Government to prevent environmental pollution and address specific environmental challenges	Enhances environmental protection and management capabilities, supporting diverse NbS applications across regions
Joint Forest Management Circular, 1990	MoEFCC, through State Forest Departments	Mandates forest preservation and regeneration through community co-management	Enhances biodiversity and improves socio-economic conditions of communities, maintaining ecosystem services through NbS

Legislative framework	Enforcement agency	Provision	NbS relevance
Coastal Regulation Zone Notification, 1991	MoEFCC, through State Coastal Zone Management Authority	Protects beaches from unplanned development and identifies sensitive areas for conservation. Mandates states to prepare Coastal Zone Management Plans by classifying four different Coastal Regulatory Zones.	Promotes NbS by maintaining coastal and marine ecosystems, vital for biodiversity conservation and climate adaptation
Biological Diversity Act, 2002	MoEFCC, through National Biodiversity Authority with state biodiversity boards	Focusses on the conservation of biodiversity, sustainable use of its components, and equitable resource benefits	Critical for achieving the Convention on Biological Diversity goals, focussing on NbS for ecological conservation and sustainable resource use
Disaster Management Act, 2005	Ministry of Home Affairs through National Disaster Management Authority	Establishes comprehensive disaster management mechanisms at various administrative levels	Incorporates ecosystem-based solutions for disaster risk mitigation, enhancing community resilience through NbS
Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006	MoEFCC, through Ministry of Tribal Affairs	Grants forest-dwelling communities rights over inhabited forest lands and promotes community forest resource management	Advances community-driven environmental governance to legally 'protect, regenerate, conserve, or manage' their forest resources, effectively incorporating NbS into statutory law
Wetlands (Conservation and Management) Rules, 2010	MoEFCC, through the respective state wetland authorities	Aims for wetland conservation and management to prevent degradation	Highlights the role of wetlands as NbS for water purification, flood control, and climate resilience, urging nationwide conservation
Compensatory Afforestation Fund Act, 2016	MoEFCC, through State Forest Departments	Enables compensatory afforestation and forest conservation compliance	Supports forest conservation efforts through a specific institutional framework, aligned with the Forest (Conservation) Act, 1980

4.2.3. Policy Landscape

The policy landscape encompasses a range of policies across forestry, agriculture, water management, and urban planning, designed to bridge the gap between sustainable development and climate action. Although not explicitly labelled as NbS, these crucial mechanisms are essential for enhancing ecosystem resilience, conserving biodiversity, and contributing to climate adaptation and DRR (Figure 4). Key policies and their implications for NbS are summarised in Table 3.

Figure 4: Policy Landscape and Enabling Agencies

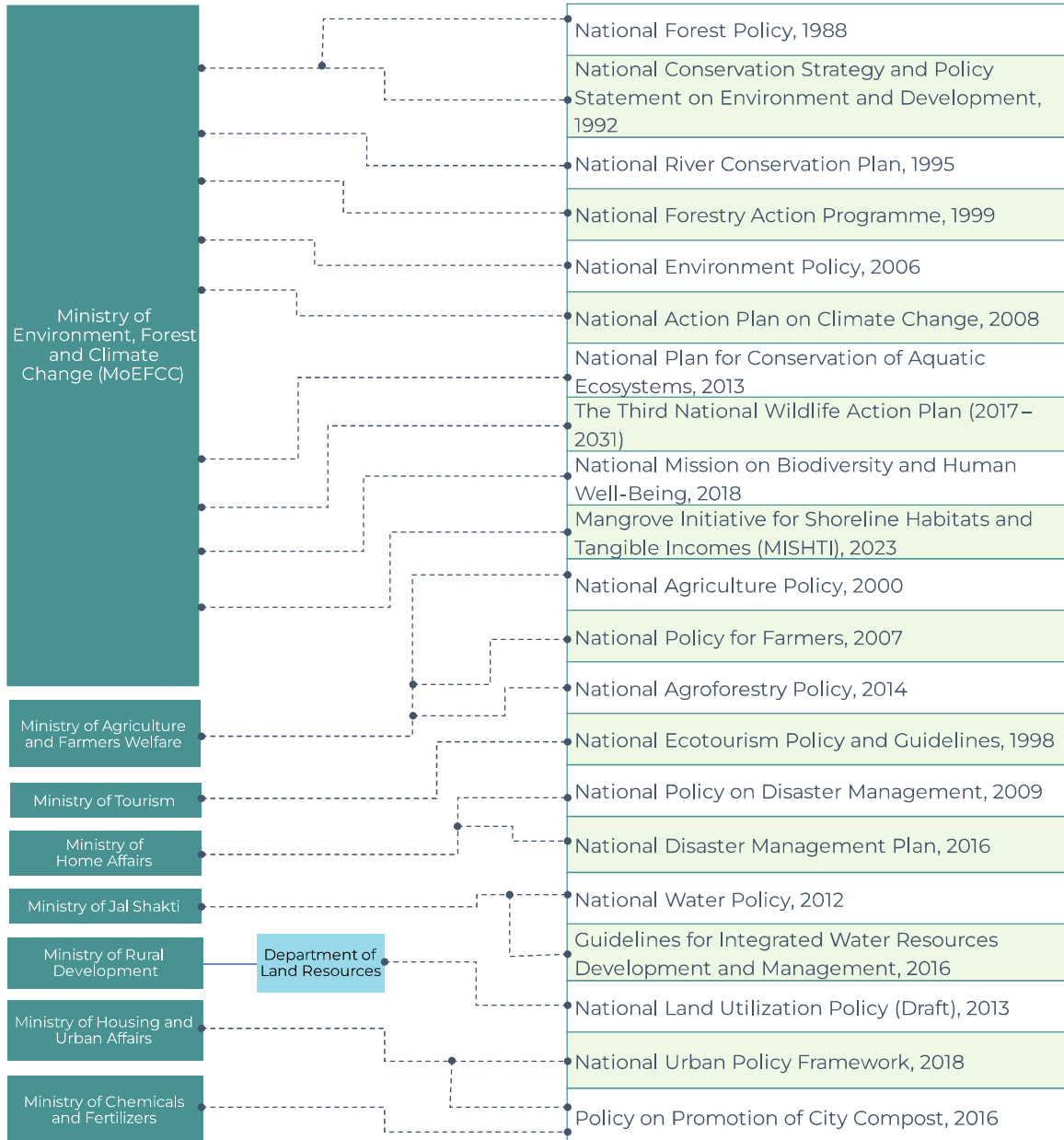


Table 3. Major policies and their relevance for NbS

Policy	Enabling agency	Provision	NbS relevance
National Forest Policy, 1988	Ministry of Environment, Forest and Climate Change (MoEFCC)	Advocates an ecology-centric approach to protect, conserve, and develop forests, with the 2018 modifications suggesting improvements in partnerships for afforestation, forest fire prevention, and timber industries	Increases forest cover, encourages community management of forests, and integrates climate considerations into forestry practices
National Conservation Strategy and Policy Statement on Environment and Development, 1992	MoEFCC	Aligns India's policies with environmental perspectives to address current challenges and set future priorities	Guides the inclusion of environmental considerations in national development policies to support NbS
National River Conservation Plan, 1995	MoEFCC	Outlines strategies for preventing pollution in over 33 rivers	Focusses on river conservation to maintain water quality and ecosystem health
National Ecotourism Policy and Guidelines, 1998	Ministry of Tourism	Focusses on preserving natural resources and regulating ecotourism based on seven principles from a community development and ecological conservation perspective	Promotes sustainable tourism that conserves natural resources and supports communities, aligning with NbS principles
National Forestry Action Programme, 1999	MoEFCC	Details actions for sustainable forest development over 20 years, targeting forest and tree cover as per the National Forest Policy	Supports sustainable forest management and development initiatives
National Agriculture Policy, 2000	Ministry of Agriculture and Farmers Welfare	Promotes equitable growth and sustainability in agriculture, emphasising bio-resource conservation and sustainable resource usage, including soil conservation through NbS	Encourages sustainable agricultural practices and conservation of natural resources

Policy	Enabling agency	Provision	NbS relevance
National Policy for Farmers, 2007	Ministry of Agriculture and Farmers Welfare	Supports farmers' productivity and quality of life improvements, emphasising natural resource protection	Aims to enhance agricultural productivity while ensuring environmental sustainability
National Environment Policy, 2006	MoEFCC	Outlines India's strategy to address challenges of environmental conservation, guide regulatory reforms, and mainstream environmental considerations into all developmental activities	Facilitates environmental safeguarding across development sectors
National Action Plan on Climate Change, 2008	MoEFCC	Outlines eight national missions focussing on aspects such as sustainable development, energy efficiency, water conservation, and strategic knowledge for climate change	Addresses climate change concerns and promotes sustainable development, central to NbS strategies
National Policy on Disaster Management, 2009	Ministry of Home Affairs	Takes a proactive approach to disaster risk reduction and management	Enhances the capacity for disaster preparedness and response across multiple levels of governance
National Water Policy, 2012	Ministry of Jal Shakti	Advocates integrated water resource management based on hydrological units, integrating quality, quantity, and ecological factors, and declares water as a community resource. The Draft National Water Framework Bill (2016) encapsulates principles of water protection, conservation, regulation, and management.	Promotes sustainable water management practices and legal frameworks for water resource conservation
National Plan for Conservation of Aquatic Ecosystems, 2013	MoEFCC	Focusses on the restoration and conservation of water bodies and wetlands	Aims to preserve aquatic ecosystems, enhancing biodiversity and water quality

Policy	Enabling agency	Provision	NbS relevance
National Land Utilization Policy (Draft)	Department of Land Resources; Ministry of Agriculture	Aims at sustainable development with an emphasis on preserving lands with important environmental functions	Seeks to balance land-use development with the conservation of ecologically important areas
National Agroforestry Policy, 2014	Ministry of Agriculture	Addresses climate change mitigation and sustainability in agriculture through agroforestry practices	Integrates trees and shrubs into agricultural landscapes to enhance productivity, sustainability, and climate resilience
National Disaster Management Plan, 2016	Ministry of Home Affairs	Addresses disaster management across various levels based on the Sendai Framework for Disaster Risk Reduction	Enhances the coordination and management of water resources to ensure sustainability and efficiency
Guidelines for Integrated Water Resources Development and Management, 2016	Ministry of Jal Shakti	Implements integrated management principles at the river-basin level in line with the National Water Policy	Enhances the coordination of water resources to ensure sustainability and efficiency
Policy on Promotion of City Compost, 2016	Ministry of Housing and Urban Affairs; Minister of Chemicals and Fertilizers	Encourages organic waste composting to manage waste and reduce greenhouse gas emissions	Supports waste reduction and sustainable practices in urban waste management
The Third National Wildlife Action Plan (2017–2031)	MoEFCC	Focusses on wildlife conservation with considerations for climate change impacts, including adaptation and mitigation strategies	Enhances wildlife conservation efforts with a focus on climate resilience and adaptation

Policy	Enabling agency	Provision	NbS relevance
National Mission on Biodiversity and Human Well-Being, 2018	MoEFCC	Aims to address biodiversity loss and environmental degradation through scientific research and public participation for protecting natural heritage sites	Promotes the conservation of biodiversity and the engagement of communities in environmental stewardship
National Urban Policy Framework, 2018	Ministry of Housing and Urban Affairs	A unified strategy for India's urban planning built on 10 principles related to key urban functions, focussing on environmental sustainability to achieve sustainable urbanisation. It urges all government levels to integrate sustainability efforts to proactively mitigate negative impacts on crucial natural systems, supporting communities, economy, and infrastructure.	Guides sustainable urban development with a strong focus on environmental sustainability and NbS integration
Mangrove Initiative for Shoreline Habitats and Tangible Incomes (MISHTI), 2023	MoEFCC	Launched at the Mangrove Alliance for Climate during the 27th Conference of Parties under the United Nations Framework Convention on Climate Change, MISHTI strives to improve shoreline habitats while offering real economic benefits through the restoration of ecosystems.	Focusses on the restoration and economic valorisation of mangrove ecosystems, enhancing coastal resilience and community livelihoods

5. Funding Mechanisms

Globally, the annual funding for NbS amounts to USD 200 billion, which is only a third of the amount required each year until 2030 (USD 542 billion) to achieve targets related to climate change, biodiversity, and land degradation. Further, 82% of this amount is government-funded, underscoring the substantial investment opportunities offered by NbS owing to their cost-effectiveness and wide-ranging benefits to the commons (UNEP, 2023).

In India, the FY2023–2024 Union Budget emphasised expanding NbS to enhance natural ecosystems and local livelihoods, with initiatives such as the Amrit Dharohar scheme and the Mangrove Initiative for Shoreline Habitats and Tangible Incomes focussing on wetland use, biodiversity enhancement, and shoreline protection.

However, challenges such as inadequate funding, limited institutional capacity, and poor public engagement continue to impede progress. There is also a significant gap in stakeholder understanding of the risks and benefits of NbS projects, deterring investment owing to outcome uncertainties.

Financing for NbS in India primarily comes from government grants and loans, with substantial contributions from public sector institutions such as the National Bank for Agriculture and Rural Development (NABARD). NABARD collaborates with international development finance institutions such as the World Bank, United States Agency for International Development (USAID), Kreditanstalt für Wiederaufbau (KfW), Japan International Cooperation Agency, and Global Environment Facility (GEF) to provide targeted financial support for forestry, water management, and soil conservation projects that directly contribute to climate adaptation.

The private sector contributes through Corporate Social Responsibility (CSR) funds, primarily supporting forestry and water-related NbS projects, with non-CSR funds occasionally directed towards broader environmental initiatives through green bonds or concessional loans.

During the coronavirus disease pandemic, the Indian government's fiscal stimulus significantly boosted investments in rural job creation under the Mahatma Gandhi National Rural Employment Guarantee Act. These investments aimed to enhance long-term climate resilience through afforestation and land, soil, and water management while ensuring income generation during the global crisis.

5.1. Bridging financial gaps

Gaps in funding NbS fundamentally stem from a lack of understanding about NbS. Often, their roles in several existing initiatives remain underappreciated because of inadequate accounting of their ecosystem services. The absence of market mechanisms, limited private-sector financing opportunities, and the lack of cost-benefit analysis for nature-based infrastructure have resulted in grey infrastructure projects based on short-term profit being favoured over NbS.

Although 94% of NbS funding in India comes from government sources, mirroring global trends, this reveals a fragmented financial landscape that underlies the funding

structure. Moreover, the provision of technical assistance to organisations engaged in NbS lacks an executive committee under the Ministry of Environment, Forest and Climate Change (MoEFCC) to review and distribute grants, which hinders the exploration of new NbS strategies and models. This gap detracts from attracting private investments (currently a meagre 3.6%) and aligning NbS measures with national initiatives.

To address these financing gaps, it is crucial to establish coordinated funding procedures, explore public funding sources, and promote financial instruments such as India's Sovereign Green Bond Framework (Dorst et al., 2021; Yadav et al., 2024). Including diverse sectors and private equity in this framework can foster a more inclusive approach and help mobilise additional resources necessary for implementing large-scale nature-based climate adaptation projects.

A dedicated monitoring body is needed to manage and track fund disbursement and application (*What Are Nature-Based Solutions and Why They Matter for India*, 2023). This would ensure transparency and accountability in fund management calls for state-specific reporting and issue-resolution mechanisms.

Public-private partnership models and financial risk minimisation strategies can incentivise private sector involvement in NbS, thus broadening the funding base beyond government sources. Last but not least, developing clear legal frameworks and a comprehensive list of funding instruments can provide clarity and support for both public and private entities involved in NbS.