WRI INDIA

INDIA FORUM FOR Nature BASED SOLUTIONS

CONFERENCE PROCEEDING

India Forum for Nature-based Solutions: Annual Summit

A SUMMARY OF CHALLENGES, OPPORTUNITIES, AND POTENTIAL STRATEGIES TOWARD MAINSTREAMING NATURE-BASED SOLUTIONS FOR CLIMATE-RESILIENT CITIES

August 6, 2024 | New Delhi | Compiled by: Aarathi Kumar, Harshil Suresh, Shaurya Mall, and Shruti Maliwar

BACKGROUND

Climate change continues to intensify the risk posed to people, nature and climate. Infrastructure systems designed for long-term service to large populations are being stressed by the growing pressure and demands stemming from increasingly frequent and intense climate events. Climate-related disasters cost over US$630 billion in economic damage globally between 2016 and 2018 (Morgan Stanley 2019), and India suffered over $37 billion in infrastructural losses and damage due to extreme climate events in 2018 alone (Eckstein et al. 2019). Further, the knock-on effects of these extreme climate events are exacerbating vulnerabilities in social and ecological systems, impacting lives and livelihoods. India is also home to 13 of the 20 cities that are most vulnerable to environmental hazards globally (Firstpost 2021).

Analysis by G20 Insights has shown that "the socioeconomic costs of infrastructure damage and lost functionality that follow natural disasters, including climate change or a major attack, are much larger than the cost of improving infrastructure resiliency to typical events and properly maintaining it" (Kovarik et al. 2020). Evidence suggests that nature-based solutions (NbS) can reduce the vulnerability of social-ecological systems to environmental shocks and changes in three ways: first, by reducing exposure to climate hazards; second, by reducing sensitivity to adverse impacts; and third, by building adaptive capacity. In addition to addressing the localized challenges associated with flooding, drought, and extreme heat, NbS has also demonstrated public health, education, and awareness benefits, as well as environmental benefits such as microclimate and water regulation, improved biodiversity, and sequestration.

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These conference proceedings reflect the presentations and discussions of participants and do not necessarily represent the views of WRI India or other participating institutions.

However, local systems to implement NbS are fragmented, with actors working in silos and limited trust between stakeholders. Public finance remains the primary source of funding, but governments have a limited appetite for risk, and responsibilities are not clearly defined across departments. Finally, stakeholder capacities, perceptions on the reliability of these solutions, and long-term operational models will have to be strengthened before these solutions can be scaled up.

INDIA FORUM FOR NATURE-BASED SOLUTIONS: ANNUAL SUMMIT

FIGURE 1 | Aarathi Kumar, Senior Manager, WRI India, setting the context for the summit

Photo credit: WRI India.

India hosted its first annual summit on urban NbS, bringing together public and private actors across the ecosystem, to build synergies, foster dialogue, share learnings, and increase awareness about how NbS can be used to build resilient Indian cities. The event focused on strengthening mechanisms for the adoption of NbS, with an agenda framed around the value chain for delivering NbS. Sessions at the summit included plenary discussions on the Indian urban context; the climate risks and vulnerabilities of Indian cities; and mechanisms and best practices for selecting, implementing, financing, and evaluating the outcomes of NbS projects.

OPENING PLENARY: POLICY AND REGULATORY SUPPORT FOR NATURE IN CITIES

The summit commenced with an opening plenary that focused on the policy and regulatory support required for NbS interventions in cities. The speakers highlighted key aspects such as integrating NbS with policies and schemes, informing policies and the regulatory framework by documenting pilot demonstrations, developing standards to enable increased adoption of NbS, and so on. The panelists also released two reports:

Accelerating Investments for Nature-based Solutions in the Global South: A Unified Framework for Mapping and Estimating Benefits (Wadhawan and Bajpai 2024) and *Climate Resilient Cities: Assessing Differential Vulnerability to Climate Hazards in Urban India* (Rangwala et al. 2024).

FIGURE 2 | Panelists of the opening plenary releasing two reports

Photo credit: WRI India.

Debolina Kundu, Director (Additional Charge), National Institute of Urban Affairs (NIUA), spoke about the potential of NbS to transform the current approach to urban development and environmental conservation and thereby create resilient urban landscapes, enhance biodiversity, and improve the quality of life of communities. She emphasized the importance of integrating NbS with the development of sustainable and resilient urban infrastructure. As an example of this integration, she cited the NIUA-anchored initiative to develop an Urban River Management Plan (URMP) framework (NIUA 2020) for about 60 cities as part of the Namami Gange Programme (Ministry of Jal Shakti 2024). She also stressed the need for supportive policy frameworks, enhanced capacity and knowledge, and collaboration among stakeholder groups to mainstream NbS adoption in cities.

Rahul Kapoor, Joint Secretary, Ministry of Housing and Urban Affairs, highlighted key learnings from central missions and schemes, such as the PM Street Vendor's AtmaNirbhar Nidhi (PM SVANidhi), Mission Karmayogi, and Smart Cities Mission. He stressed the crucial role that data and technology will play in NbS programs, mainly on the monitoring and evaluation (M&E) front, for which city data officers and the digital infrastructure set up in cities through the Smart Cities Mission (Ministry of Housing and Urban Affairs 2024) could be leveraged. He also highlighted the importance of tapping into the existing knowledge within the community, especially that of women and underserved groups, to bridge barriers in implementation capacity. He summed up his presentation by emphasizing the need for a regulatory framework to help translate strategies and action plans on NbS into action, and also stressed the importance of documenting and sharing both good practices and the challenges encountered in NbS interventions piloted across cities through collaborative platforms. In conclusion, he suggested bridging the financing gap by exploring the blended finance approach and encouraging private sector participation.

Rajiv Ranjan Mishra, Chief Advisor, NIUA; former Director General, National Mission for Clean Ganga, highlighted the need for supportive policies and strong environmental protection regulations in cities to protect existing natural assets, such as mangroves, forests, and waterbodies in urban areas. He stressed that standards for designing, planning, implementing, and monitoring NbS need to be developed, and that these efforts should be informed by various demonstration projects, field experience, and associated research initiatives being conducted in cities across the country. He also mentioned that coalitions and platforms such as the River Cities Alliance (NIUA and NMCG 2022) and India Forum for Nature-based Solutions had the potential to bridge knowledge gaps in the urban NbS ecosystem, promote interdisciplinary work, and facilitate the transition from pilot projects to scaled-up interventions.

FIGURE 3 | Rahul Kapoor, Joint Secretary, Ministry of Housing and Urban Affairs, delivering the keynote address in the opening plenary session

Photo credit: WRI India.

Claudia Lopez, former Mayor of Bogotá, Harvard 2024 Advanced Leadership Initiative (ALI) Fellow and Advisor to WRI, highlighted the fact that humans are responsible for climate disasters, and therefore we need to learn to obey and respect nature. She pointed out that India is 50 percent urbanized and that the pace of urbanization will grow rapidly from here onward, presenting a great opportunity for the country to decarbonize existing cities and industries and create new sustainable cities and industries on the journey ahead. She shared her thoughts on sustainable urban planning, covering topics such as protecting natural assets, redistributing land for the provision of basic services and social infrastructural services, and building green corridors that can enhance biodiversity and accelerate the adoption of clean mobility modes, such as biking and walking. Lastly, she emphasized the need for effective guidance and funding to enable communities to develop and sustain local NbS interventions.

Opportunities for action:

- Support the integration of NbS with schemes, programs, and policies that include a focus on urban climate adaptation (e.g., Atal Bhujal Yojana, Namami Gange Programme, National Urban Livelihood Mission).
- Create a platform that documents and showcases evidence of NbS actions in cities, including challenges and learnings.
- Build standards and guidelines for designing, planning, implementing, operating and maintaining (O&M), and monitoring NbS to facilitate its increased adoption across cities.
- Strengthen policies that will enable environmental protection of natural assets, such as mangroves, waterbodies, and forests, in urban areas.

THE DECODE TOOL: NBS FOR CLIMATE-RESILIENT CITIES

FIGURE 4 | Interactive session with attendees on addressing urban climate risks using NbS

Photo credit: WRI India.

This session aimed to introduce participants to new perspectives on climate stresses and NbS, enhancing their understanding of an array of engagement strategies, solutions, and implementation methods. The session began with presentations by Rajiv Ranjan Mishra, Chief Advisor, NIUA and former Director General, National Mission for Clean Ganga; Suresh Babu SV, Director, Rivers, Wetlands & Water Policy, WWF India; and Vaishnavi Shankar, Lead, Climate Centre for Cities (C-Cube), NIUA.

The presentations were followed by an introduction to the DeCode tool on NbS, a decision-nudging tool being developed by NIUA and WWF India. The tool is designed to help decision-makers in cities adopt NbS for addressing the challenges related to climate change. The tool specifically focuses on climate-related urban issues.

The second half of the session was devoted to an interactive exercise with the audience to explore the potential applications of NbS in addressing urban heat, urban flooding, and water scarcity.

Urban heat

The discussion focused on the dynamic nature of the urban heat (UH) effect and how infrastructure design, especially building design, impacts the natural environment. Community-level engagement and awareness programs are crucial for the success of strategies developed to tackle UH.

The participants suggested the following NbS strategies for addressing UH:

- Built level: NbS strategies, such as cool roofs, rooftop gardens, and vertical gardens, were discussed by the audience. The participants highlighted best practices from European countries where the involvement of both the government and the community in developing and operationalizing green building codes has been effective.
- Neighborhood level: The participants suggested linear green infrastructure and parks, along with urban forests, emphasizing the importance of involving citizens through awareness programs on native plant species and identifying low-lying areas suitable for blue-green infrastructure.
- City level: The participants highlighted solutions, such as urban forests, green corridors, biodiversity parks (e.g., Yamuna Biodiversity Park and Okhla Bird Sanctuary in Delhi), and wetland rejuvenation.

Urban flooding

The participants suggested three categories of NbS solutions for the remediation of urban flooding:

- Infrastructure: The suggestions included the incorporation of multifunctional detention zones to address the lack of permeable surfaces. This would involve creating permeable surfaces, for example, by implementing underground utility channels designed to accommodate old-growth trees surrounded by soft areas with growth pits. Other suggestions included using neighborhood water recharge pits as multifunctional open spaces and constructing wetlands for wastewater treatment.
- Treatment: Bioremediation and bioswales offer promising treatment solutions and could be situated near community toilets in informal settlements with limited or no access to water, sanitation, and hygiene (WASH).
- Natural rejuvenation: This involves conserving the existing blue-green infrastructure, such as wetlands, rivers, ponds, mangroves, and urban forests.

Water scarcity

The participants identified multiple strategies for addressing water scarcity, from rejuvenating old water bodies to implementing green infrastructure for rainwater harvesting and managed aquifer recharge.

- Rejuvenation of old water bodies: Efforts should focus not only on desilting but also on enhancing water quality at the source, increasing water availability, promoting natural biomes, improving water management practices, ensuring clean water sources, supporting community well-being, and mitigating flood risks.

  It is essential to revive and use traditional methods of water collection and management such as *baolis* and stepwells, while integrating them with the existing water network. In addition, *johads*, traditional water storage structures, can be constructed to support groundwater recharge.
- Rainwater harvesting: Rain gardens and bioswales can be used to collect run-off water and channel it to nearby green spaces. Soak pits along streets and roads to trap rainwater can help groundwater recharge and solve the problem of urban flooding.
- Green streets: Implementing green streets that incorporate capping buffers, and bioswales enhances water retention and management at the neighborhood level.

- Sponge parks: These can be integrated at various scales within urban planning and offer significant potential to enhance water recharge, provide recreational opportunities, reduce UH, generate revenue, and strengthen blue-green networks.
- Mangrove restoration and wetlands: Mangroves serve as natural barriers to storm surges and prevent saline water intrusion, thus mitigating salinization of water and soil. Urban wetland linking is important for maintaining the city's water quality and supporting ecosystem services.

The participants also identified other NbS practices such as managed aquifer recharge, revival of smaller water bodies connected to large rivers and the blue-green network of creeks and urban drainage, and reuse of treated domestic wastewater, as techniques for combating water scarcity.

Opportunities for action:

- Involve youth in participatory methods for the O&M of NbS to build direct public ownership and a culture of community protection.
- Conduct city-level awareness campaign using behavioral change principles.
- Involve the following key stakeholders for successful implementation:
  - For the city-wide network of blue-green infrastructure: The community, sectoral experts (WWF India, The Energy and Resources Institute [TERI], etc.), practitioners, academicians, local government bodies, youth, and policymakers.
  - For integrating traditional practices: The indigenous community, influencers, local women, community elders, architects, urban planners, and designers.

MASTERCLASS: REJUVENATING AND REVIVING URBAN WATERBODIES

FIGURE 5 | Myounggu Kang delivered the first masterclass, on rejuvenating and reviving urban waterbodies, of a series launched at the summit

Photo credit: WRI India.

A series of masterclasses focusing on multiple aspects across the value chain of urban NbS was launched at the summit, and the first masterclass was delivered by **Myounggu Kang, Director, Urban Big Data and Artificial Intelligence Institute (UBAI) and Professor, University of Seoul**, on the restoration of the Cheonggyecheon Stream in Seoul, South Korea.

Kang threw light on the factors that led to the restoration and the approach that was adopted to restore the stream. The key highlight of the project was the demolition of an 18-lane elevated highway that had been built over the course of the Cheonggyecheon Stream. This step not only brought the stream back to life and reduced flood risk but also transformed it into a recreational public space, subsequently leading to economic growth in the downtown area of Seoul.

To know more about the Cheonggyecheon Stream restoration efforts, see Kang (2016).

AFTERNOON PLENARY: INSTITUTIONAL MECHANISMS ENABLING NBS FOR RESILIENT CITIES

FIGURE 6 | Debashree Mukherjee, Secretary, Ministry of Jal Shakti, delivering the keynote address in the afternoon plenary session

Photo credit: WRI India.

The afternoon plenary session brought together senior government officials to discuss potential institutional mechanisms to integrate NbS with existing policies and decision-making. The speakers underscored the importance of collaboration across sectors and levels of government, supported by expert knowledge and community engagement, as key to solving the looming challenges of climate change.

Debashree Mukherjee, Secretary, Ministry of Jal Shakti, delivered the keynote address, emphasizing the need to mainstream NbS to address flooding challenges and water resource management. She highlighted the critical nature of weather-related events in urban areas, exacerbated by factors such as population concentration, inadequate infrastructure, and inequitable development.

She highlighted the Ministry of Jal Shakti's initiative to raise awareness about water management by bringing together local communities and administrators through the Jal Shakti Abhiyan. She also discussed the River Cities Alliance (RCA), a 140-member city alliance that aims to manage rivers as systems and incorporate NbS into the URMP framework to promote sustainable river management.

She also stressed the importance of following a broader two-part flood management strategy to protect people from floods:

- Design and construct embankments and implement other structural measures.
- Use the institutional process of floodplain zoning effectively.

Institutional arrangements for managing rivers would ideally be basin-level organizations, with multiple stakeholders viewing rivers as a system. However, this is difficult to achieve across state boundaries because of competing interests. To address these aspects, states are being asked to work at the sub-basin level, she said.

FIGURE 7 | Krishna Vatsa, Member, National Disaster Management Authority (NDMA), delivering the keynote address in the afternoon plenary session

Photo credit: WRI India.

Krishna Vatsa, Member, National Disaster Management Authority (NDMA), outlined how urban flooding has become a serious problem across the country over the past two decades. The challenges facing cities are not adequately addressed by the current solutions and investments. He highlighted the need for a paradigm shift in urban flood management, emphasizing the limitations of conventional approaches and the potential of NbS.

He shared the current efforts of NDMA to actively promote the integration of NbS with urban flood management plans through the work being undertaken in seven cities in the country. He emphasized that municipal corporations and development authorities must take the lead in improving water bodies, with external support from agencies such as NDMA, to provide the necessary technical expertise. He also emphasized the need to integrate NbS with bio-engineering solutions for successful implementation.

Opportunities for action:

- Engaging with local communities is essential for successfully planning and implementing NbS at both the municipal and river basin levels.
- There is an urgent need for integrated and holistic approaches that incorporate both structural solutions such as stormwater drains and non-structural solutions such as wetlands, to solve the challenges posed by climate change.
- Cities need to be supported with technical expertise to integrate NbS with their existing infrastructure development.

THE WORLD CAFÉ SESSION: MAINSTREAMING NBS-CHALLENGES AND OPPORTUNITIES

FIGURE 8 | One of the groups at the World Café session engaged in discussions across multiple thematic areas aimed at mainstreaming NbS in cities

Photo credit: WRI India.

The World Café session brought together practitioners, experts, and solution providers working on NbS to address the existing challenges and share actionable strategies to mainstream NbS in cities.

The key questions discussed included the following:

- What steps are necessary to mainstream NbS in the current ecosystem and what progress has already been made?

- What design challenges do cities face in incorporating NbS?
- What should be included in the standard operating procedure (SOP) for the integration of NbS in cities?
- How can the procurement process be simplified and made more adoptable?

The session was undertaken in a World Café format where the audience was divided into groups to engage in discussions and provide insights on these four key questions. Outlined below are the key thematic areas that emerged from the discussion.

Key themes

Data and decision-making

The challenge: Lack of baseline data, exacerbated by issues of ownership and accountability, often leads to more discussion than actual implementation.

Suggested solutions: There is a need to map localized climate-related issues, the skillsets of implementing organizations, and available natural resources to help cities establish baselines. For project-level baselining, it is necessary to perform site-specific assessments such as groundwater table mapping to understand the carrying capacity of the implementation area.

Policy and regulatory framework

The challenge: Government support for NbS implementation remains inadequate, with a lack of policy frameworks, guidelines, and standardized procedures. NbS is often not systemically integrated within city planning, with cities facing difficulties in tailoring NbS to specific local contexts. This issue is compounded by the vested interests of organizations implementing gray infrastructure solutions.

Suggested solutions: Aligning NbS with legal and statutory frameworks of states and institutionalizing it through State Action Plan on Climate Change (SAPCC) will be crucial for its widespread adoption. It is crucial to incorporate NbS into existing policies such as the Atal Mission for Rejuvenation and Urban Transformation (AMRUT) scheme, Central Public Health and Environmental Engineering Organisation (CPHEEO) manuals, and urban local body (ULB) guidelines. Further, it is essential to redefine concepts such as “smart cities” to include NbS in the definition. Policy support for NbS integration is also required at the local level, including vulnerability assessments, to understand the gaps and needs.

Operation and maintenance of NbS

The challenge: Despite the existence of different types of NbS, the scale-up of their pilot sites is hampered by challenges in their operation, maintenance, and standardization.

Suggested solutions: There is a need to establish M&E SOPs with clear impact metrics to evaluate the performance of NbS over the long term.

Capacity-building and training

The challenge: The implementation of NbS is hindered by behavioral barriers, limited peer-to-peer learning, and the lack of a common language and narrative within implementing organizations.

Suggested solutions: To build momentum and spread awareness about NbS, it is imperative to focus on capacity-building efforts through campaigns, courses, and toolkits for ULBs and NbS stakeholders. Defining a clear taxonomy for NbS with geographical perspectives on integrating it with the existing infrastructure could help sensitize city officials to the benefits of NbS. Additionally, international collaborations, knowledge exchange, and the involvement of local institutions is crucial for scaling NbS.

Community involvement

The challenge: The public’s perception and understanding of NbS are often limited, and better communication and education efforts are needed to remedy this.

Suggested solutions: NbS implementation should ensure continued engagement with stakeholders, including local communities, to enable the long-term adoption of solutions.

There is also a need to involve marginalized communities in the design of solutions, along with better communication, trust building, and inclusivity, particularly in areas with low representation or low community trust. Involving youth and children to empower adoption and promote behavioral change can also supplement awareness creation initiatives.

Supporting innovation and financial sustainability

The challenge: The private sector lacks sufficient incentives to support the implementation of NbS.

Suggested solutions: Strengthening the entrepreneurial ecosystem, especially for start-ups and micro, small, and medium enterprises (MSMEs), is important for capitalizing on the NbS movement. This can be achieved by fostering partnerships between the government and green vendors. Subsidies and incentives linked to carbon or green credits, along with tax incentives, could influence public and private sector actors to incorporate NbS.

City governments should also provide support in piloting NbS projects to test the feasibility and impact of solutions. They could identify common financial sources for NbS planning and implementation, and conduct cost-benefit analyses to optimize solution selection. The costing for NbS should be standardized to ensure consistency across project implementations. Creating accelerators and incubators for pilot-to-scale initiatives through government-backed funding for academic labs will also aid these implementation efforts.

Procurement processes

Training should be provided to government officials and private sector players to familiarize them with the benefits, cost savings, and best practices of effective NbS procurement. To reach a wider base of solution providers, request for proposal (RfP) criteria should be flexible in accommodating years of experience, revenue, and geographical variability in performance and solutions. A single-window system should be established for processing applications, together with a contextualized procurement server for due diligence. Green procurement should be promoted by incentivizing it and integrating environmental key performance indicators (KPIs) in tenders. Another important aspect is to focus on including informal sector participants, such as gardeners, in the procurement process to ensure that marginalized communities are represented.

Platforms or alliances that include solution providers, government, academia, and scientists should be established to get multi disciplinary inputs for the procurement processes.

FIGURE 9 | Deep dive group discussions, part of the World Café session, across multiple thematic areas aimed at mainstreaming NbS in cities

Photo credit: WRI India.

INVESTING IN NATURE: UNLOCKING FINANCIAL OPPORTUNITIES FOR A SYSTEMS APPROACH TO NBS

FIGURE 10 | Panelists at the "Investing in Nature: Unlocking Financial Opportunities for a Systems Approach to NbS" session releasing the report by Wadhawan and Bajpai

Photo credit: WRI India.

This session focused on exploring the challenges and opportunities for co-investments toward an incremental, systems approach to NbS in Indian cities. Urban NbS implementation in India is marked by lack of scale, fragmented efforts, the absence of standardized metrics, and ineffective maintenance and community ownership models. Project examples where efforts were made to address these barriers, include the mangrove coalition that is being set up to understand the socioeconomic impact of restoration practices. The coalition aims to build business models that attract viable finance for conservation at scale with regulatory support. A presentation by Lubaina Rangwala, Program Head, WRI India helped to set the context for the discussion.

Vishwas Chitale, Program Lead; Shreya Wadhawan, Program Associate; and Aryan Bajpai, Research Analyst, Council on Energy, Environment and Water (CEEW), released a report titled *Accelerating Investments for Nature-based Solutions in the Global South: A Unified Framework for Mapping and Estimating Benefits.* The report provides a comprehensive understanding of NbS and the challenges associated with scaling and implementing NbS in the Global South. The report also introduces ENSURE (Effective Nature-based Solutions Utilization and Resource Evaluation), an innovative framework to map and estimate the benefits of NbS (Wadhawan and Bajpai 2024).

Aparna Dua, Director, The Blended Finance Company, underscored the need for a common taxonomy of NbS to understand how different stakeholders define NbS and to establish clear criteria for what qualifies as an NbS.

She highlighted the lack of a project pipeline for aggregated impact as a key challenge, acknowledging that there was no clear pathway to monetize benefits. Blended finance was proposed as a solution to address risks, with bridged financing being used to establish business models that can attract private investments. Pilots are needed to identify areas of interest and showcase successful use cases to attract commercial capital.

She demonstrated how convergence models were operationalized, by using the example of the agroforestry fund in India. This fund established a guarantee facility, enabling start-ups, MSMEs, farmer producer organizations (FPOs), and other entities in the agroforestry sector to access capital. She also spoke about Farmers for Forests, a program that helps farmers adopt more climate smart practices, emphasizing the role of philanthropy in obtaining transition finance. In such models, once the ability to monetize benefits and get carbon credits is established, philanthropists can get their capital back and reinvest it in subsequent models. Thus, a revolving fund for urban NbS could be created.

Manu Gupta, Cofounder, Sustainable Environment and Ecological Development Society (SEEDS) India, brought in a practitioner's perspective to the discussion. He stressed that although strong technical solutions are important for projects, it is equally important to invest in local communities by empowering people to codevelop solutions that suit their needs. He suggested that building ownership and developing context-specific solutions can also support scale.

He then highlighted that although most projects have been funded through philanthropic capital thus far, commercial markets and the parametric insurance sector have shown interest in sustainable solutions and community resilience, which could offer economic benefits to those whose health and livelihood are affected by recurring disasters. SEEDS also looks at interdependencies between communities and NbS, for example, how self-help groups (SHGs) can link their livelihoods to NbS initiatives. Another example, the Jharsa Lake restoration project in Gurugram, was shared to illustrate how time spent on community engagement could strengthen local NbS, leading to sustainable projects and the involvement of the real estate sector.

Navin Horo, Chief Advisor, GIZ India, shared the need for more transformative approaches to NbS. He stressed that such a shift requires a systemic change, requiring collaboration with major stakeholders such as the public, the government, the private sector, and community groups. He emphasized utilizing the opportunities that already exist within municipal programs, raising the question of how the different existing schemes and initiatives could be converged to create long-term solutions.

To illustrate how public resources could be optimized, he cited the use of a digital planning approach to deploy suitable engineering solutions. He explained that this method brought down planning costs by building in efficiency. He also said that working with public agencies from the project outset, during the development of digital solutions and planning tools, is key to identifying bottlenecks and codeveloping solutions. He summarized his presentation by highlighting how programs such as the Swachh Bharat Mission (SBM) have resources that can be optimized for NbS, and building ULB capacities can help leverage these resources.

Vivek Sen, India Director, Climate Policy Initiative, highlighted the risk profiling of NbS as a problem, noting that traditional sources of financing and bank lending for small-scale projects can impose high risks on beneficiaries who lack the capacity to manage them. He also reported that there is a mismatch between the tenor of financing and the nature of NbS, giving examples of de-risking mechanisms to address these challenges.

These examples included insights from the agroforestry sector, where women-led enterprises typically do not have access to credit, since they cannot bear the high costs. Project preparation facilities can be set up so that such enterprises can get access to commercial capital, which requires different kinds of financing options tailored to specific purposes. Similarly, smaller projects are typically unable to access financing because they are not deemed bankable. By providing services, such as technical studies, business modeling, and product piloting/testing, projects can be made bankable, attracting commercial investors. Sen also explained that insurance products could de-risk investments for NbS, an example being parametric insurance products, which offer low premiums. Such products could incentivize beneficiaries to opt for such solutions.

Opportunities for action:

- Blended finance structures can serve as catalysts, combining different forms of capital. By strategically using public and philanthropic capital, these structures can develop bankable project models that mitigate risks and attract private capital.
- When working with public finance, it is important to involve governments at the start of projects, leveraging current schemes and missions for holistic implementation of NbS.
- Collaboration between the actors in the NbS ecosystem (public, private, social enterprises) is necessary to develop innovative finance models and build stakeholder capacities to access them. In addition, integrating community collectives into financing structures needs to be further operationalized for impact at the grassroots level.

NBS AWARDS AND PECHA KUCHA PRESENTATIONS

FIGURE 11 | An attendee examining posters displayed as part of the exhibition at the summit

Photo credit: WRI India.

The first edition of the NbS Awards and Exhibition initiative was held at the summit, providing a platform to showcase select high-impact urban NbS interventions from across India. Applications were invited for entries in three categories: Implementation, Enablers, and Champions.

A total of over 50 applications were received, and 16 were shortlisted. Shortlisted candidates presented their work in the form of posters at the venue of the summit. Further, the top two applicants in each category were invited to showcase their work through a pecha kucha session. Finally, the winners of each category were felicitated with the NbS Award.

TABLE 1 | NbS Awards: Categories and winners

CATEGORY	WINNERS
Implementation Pilot projects, products, or solutions that test new and innovative ways of designing and implementing NbS in Indian cities	Awarded jointly to City of 1,000 Tanks for the Water Balance Pilot at Little Flower Convent School, Chennai, and Youth for Unity and Voluntary Action (YUVA) for Nature-based Placemaking in an Urban Poor Resettlement Colony in Mumbai
Enablers Research, data and analytics, governance structures and partnerships, technology, or policy that enables NbS implementation	GRRID Corps for the "CulTool/Sanchay: Culture for Climate Action" project in Jodhpur
Champions Individuals or organizations that have shown leadership, inspiring action, and helped move the needle on urban NbS	Sudha S., Member Secretary, State Planning Commission, Government of Tamil Nadu, for "Nature-based Solutions: A Sustainable Model for Urban Resilience – A Case Study from Tamil Nadu"

Source: WRI India.

FIGURE 12 | The winners of NbS Awards

Photo credit: WRI India.

All the posters shortlisted for the awards can be viewed here: https://www.nbs4india.org/wp-content/uploads/2024/08/Merged-Posters.pdf.

THE WAY FORWARD AND KEY ENTRY POINTS FOR ACTION

Alignment and convergence with existing schemes and programs could help unlock significant resources to support cities engaged in scaling the application of NbS. Examples include the following:

- Aligning with sector focus areas such as the URMP for 60 cities under the Namami Gange Programme and the Jal Shakti Abhiyan for water conservation.
- Tapping into the digital infrastructure set up through the Smart Cities Mission for M&E support
- NbS is not a cure-all for the climate challenges facing cities. Hybrid solutions, data, and technology should all form part of a multidisciplinary approach to adopting NbS in cities. Successful urban digital planning approaches that have helped deploy suitable engineering solutions to reduce planning costs and build efficient technology offer lessons that can be applied to NbS planning. These approaches will help foster collaboration, identify bottlenecks, and codevelop solutions.
- There is a need to support decision-making around NbS through strong supportive policies and regulations in cities that prioritize the creation, conservation, restoration, and maintenance of natural assets. Further, standards for designing, planning, implementing, and monitoring NbS are needed to help decision-makers mainstream NbS as part of urban climate resilience plans and projects.
- The localized nature of NbS requires communities to be supported with effective guidance and funding to develop and sustain local NbS interventions. There is a need to invest in communities by shifting agency to people, thereby empowering them to innovate and codevelop solutions that suit their needs.
- Given the lack of business models and clear pathways to monetize the benefits of NbS, philanthropic and bridge funding need to be applied to establish business models and de-risk investment. Approaches could include the following:
    - Offering services for technical studies, developing business models, and implementing pilots to help demonstrate successful use cases
    - Learning from successful non-urban NbS examples, such as agroforestry funds
    - Establishing project preparation facilities to enable enterprises access commercial funding
    - Developing new instruments such as parametric insurance products to incentivize beneficiaries to invest in NbS

APPENDIX : SPEAKERS, PANELISTS, AND MODERATORS

Opening plenary I: Policy and regulatory support for nature in cities

Welcome address

Dr. Debolina Kundu, Director (Additional Charge), National Institute of Urban Affairs

Guest of honor

Claudia Lopez, former Mayor of Bogotá, Harvard 2024 ALI Fellow and Advisor to WRI

Keynote speakers

Rahul Kapoor, Joint Secretary, Ministry of Housing and Urban Affairs

Rajiv Ranjan Mishra, Chief Advisor, National Institute of Urban Affairs (NIUA); former Director General, National Mission for Clean Ganga

Moderator

Jaya Dhindaw, Executive Program Director, Sustainable Cities; Director, WRI India Ross Center

The DeCode tool: NbS for climate-resilient cities

Speakers

Rajiv Ranjan Mishra, Chief Advisor, NIUA; former Director-General, National Mission for Clean Ganga

Suresh Babu SV, Senior Director, Ecological Footprint, WWF India

Presenter

Vaishnavi T.G. Shankar, Lead – Training & Capacity Building, Climate Centre for Cities, NIUA

Panelists

Ambika Malhotra, Program Manager, C-Cube, NIUA

Nidhi Jain, Senior Associate (Net Zero), C-Cube, NIUA

Yashwant Puducheri, Senior Associate (Capacity Building), C-Cube, NIUA

Deepshikha Sinha, Program Associate, C-Cube, NIUA

Satarupa Roy, Program Associate, C-Cube, NIUA

Kaveri Bahure, Program Assistant, C-Cube, NIUA

Masterclass: Rejuvenating and Reviving Urban Waterbodies

Speaker

Myounggu Kang, Director, Urban Big Data and Artificial Intelligence Institute (UBAI), University of Seoul

Moderator

Suresh Babu SV, Director, River Basins & Water Policy, WWF India

Afternoon plenary: Institutional mechanisms enabling NbS for resilient cities

Keynote speakers

Debashree Mukherjee, Secretary, Ministry of Jal Shakti

Dr. Krishna Vatsa, Member, National Disaster Management Authority

Moderator

Dr. Sudeshna Chatterjee, Program Director, Sustainable Cities and Transport, WRI India

World Café: Mainstreaming NbS: Challenges and opportunities

Presenters

Prerna Mehta, Associate Director, Urban Development, WRI India

Dr. Priya Narayanan, Senior Program Manager, Urban Forestry & Urban Development, WRI India

Table moderators

Ambika Malhotra, Program Manager, C-Cube, NIUA

Arun Manohar, Senior Program Associate, WRI India

Aryan Bajpai, Research Analyst, CEEW

Harshil Suresh, Senior Program Associate, WRI India

Ravi Prakash, Wetlands Specialist, Wetlands International South Asia (WISA)

Shaurya Mall, Senior Program Associate, WRI India

Shreya Wadhawan, Program Associate, CEEW

Siddharth Thyagarajan, Senior Program Associate, WRI India

Investing in nature: Unlocking financial opportunities for a systems approach to NbS

Panelists

Aparna Dua, Director, The Blended Finance Company

Dr. Manu Gupta, Cofounder, SEEDS India

Dr. Navin Horo, Senior Advisor and Country Project Lead, GIZ India

Vivek Sen, Director, Climate Policy Initiative

Moderator

Rishika Das Roy, Lead – Sectoral Strategy & Investments, India Climate Collaborative

Introductory presentation

Lubaina Rangwala, Program Head – Urban Development, WRI India

Report release

Aryan Bajpai, Research Analyst, CEEW

Shreya Wadhawan, Program Associate, CEEW

Closing remarks

Vishwas Chitale, Lead, Climate Resilience Program, CEEW

Pecha kucha session and #NbS4India Award Winners

Champions

SEEDS India

Sudha S., Member Secretary, State Planning Commission, Government of Tamil Nadu

Enablers

GRRID Corps

Centre for Environmental Research & Education (CERE) for Urban Forests for a Greener Tomorrow

Implementation

City of 1,000 Tanks

Youth for Unity & Voluntary Action (YUVA)

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LIST OF ABBREVIATIONS

AMRUT, Atal Mission for Rejuvenation and Urban Transformation

C-Cube, Climate Centre for Cities

CEEW, Council on Energy, Environment and Water

CERE, Centre for Environmental Research & Education

CPHEEO, Central Public Health and Environmental Engineering Organisation

ENSURE, Effective Nature-based Solutions Utilization and Resource Evaluation

FPO, farmer producer organization

GIZ India, Deutsche Gesellschaft für Internationale Zusammenarbeit India

GRRID Corps, Green, Resilient, Risk-Informed Development Corps

ALI, Advanced Leadership Initiative

KPI, key performance indicator

MSME, micro, small, and medium enterprises

NbS, Nature-based Solutions

NDMA, National Disaster Management Authority

NIUA, National Institute of Urban Affairs

O&M, operations & maintenance

PM SVANidhi, PM Street Vendor's AtmaNirbhar Nidhi

RCA, River Cities Alliance

RfP, Request for Proposal

SAPCC, State Action Plans on Climate Change

SBM, Swachh Bharat Mission

SEEDS India, Sustainable Environment and Ecological Development Society India

SHG, self-help group

SOP, standard operating procedure

TERI, The Energy and Resources Institute

ULB, urban local body

URMP, Urban River Management Plan

WWF India, World Wide Fund for Nature India

YUVA, Youth for Unity and Voluntary Action

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ABOUT WRI INDIA

WRI India, an independent charity legally registered as the India Resources Trust, provides objective information and practical proposals to foster environmentally sound and socially equitable development. Our work focuses on building sustainable and liveable cities and working towards a low carbon economy. Through research, analysis, and recommendations, WRI India puts ideas into action to build transformative solutions to protect the earth, promote livelihoods, and enhance human well-being. We are inspired by and associated with World Resources Institute (WRI), a global research organization. Know more: www.wri-india.org

ABOUT THE INDIA FORUM FOR NATURE-BASED SOLUTIONS

The India Forum for Nature-based Solutions (NbS) is a coalition of research, practice, and finance organizations working to scale up the adoption of NbS to shape climate resilient cities and communities in India. The forum aims to climate proof 100 million residents and infrastructure worth $100 billion in Indian cities by 2030. It aims to achieve this by supporting peer-to-peer exchange of best practices, technical training, and knowledge-sharing and strengthening local knowledge and evidence on NbS for urban services and resilience.

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