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How can nature support resilience planning and climate action in cities?

Policy Brief

- The Kunming-Montreal Global Biodiversity Framework recommends using nature-based solutions (NbS) to combat climate change and enhance nature's contributions to people (Targets 8 and 11).
- Cities seeking to reap the benefits of natural systems by mimicking ecosystem behavior can use several approaches, such as NbS or blue-green infrastructure (BGI). The International Union for Conservation of Nature defines NbS as "actions to protect, sustainably manage and restore natural or modified ecosystems that address societal challenges effectively and adaptively, simultaneously providing human well-being and biodiversity benefits."[1] Similarly, BGI integrates water and nature with ecosystem-based designs for urban hydrology and vegetation systems that also provide socioeconomic benefits.[2]
- Cities often struggle to scale NbS for biological diversity and climate adaptation due to key barriers such as lack of processes or tools to identify and evaluate which interventions would be most suitable to their local conditions and needs. They also lack data on NbS performance, clarity on roles and responsibilities for implementation and operations, as well as knowledge on practical ways to implement these solutions.
- Cities can now benefit from a NbS planning methodology tailored to their needs, thanks to a new Strategic NbS Framework. This framework enables rapid spatial risk analysis to help cities prioritize and invest in nature for climate resilience and biodiversity mainstreaming as part of urban planning.

Introduction

Many cities around the world lack data on flooding, heat islands, and ecosystem degradation risks, as well as information on the natural ecosystem solutions that can address these challenges with policy reform and landscape interventions. Recent research carried out by the World Resources Institute (WRI) with the Ethiopian Institute of Architecture, Building Construction and City Development (EiABC) in Addis Ababa and Rwanda Young Water Professionals (RYWP) in Kigali, has tested a new rapid approach to identifying (i) climate and natural risks, (ii) potential NbS to address those risks, and (iii) strategies to implement these solutions.

[1] International Union for the Conservation of Nature (2020), *IUCN Global Standard for Nature-Based Solutions*, IUCN, Gland, Switzerland.

[2] Dreiseitl H. & Wanschura B. (2016), *Strengthening blue-green Infrastructure in our cities*, coordinated by Liveable Cities Lab, Ramboll.

Authors
Lisa Beyer (WRI),
Julien Calas (AFD)

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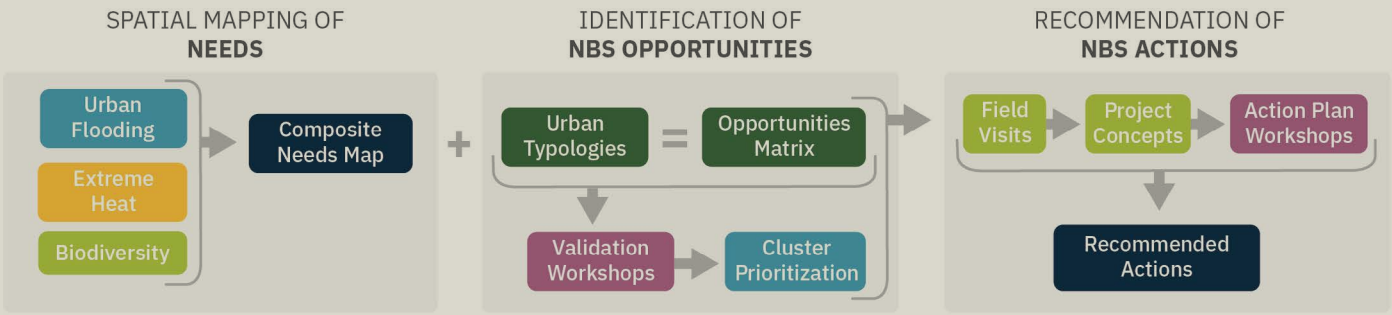
The Strategic NbS Framework creates a multi-stakeholder process for assessing risks and identifying NbS opportunities, as well as co-developing project concepts to begin testing on the ground. This approach embeds stakeholder touchpoints throughout the planning and recommendations development, creating the space for conversations among stakeholders with different priorities to identify common ground.

Figure 1 - City needs assessment and NbS selection process (WRI).



The Strategic NbS Framework methodology integrates globally available datasets with local data to evaluate areas of a given city that are susceptible to extreme flooding and heat, as well as opportunities to expand existing natural spaces and create corridors of ecological continuity. Using a combination of published methods for each risk, citywide maps can be quickly generated and then validated by city stakeholders. This approach minimizes the time, as well as cost, for analysis to allow cities to quickly move forward with recommendations in priority areas. After the selection of priority areas, on-the-ground field validation and verification is critical to the development of suitable NbS concepts and designs.

The goal is to provide cities with a planning framework that they can follow and interpret within their own context. This approach helps cities select appropriate NbS to address the climate and nature risks present. For example, greenways, bioswales, and street tree plantings not only absorb stormwater and promote infiltration, but they also add shade to reduce heat and provide critical habitat links between existing green spaces. The new framework is accompanied by a guide that provides technical information on usable NbS and case studies. For the approach to be effective, a team of government stakeholders, technical experts, and designers must engage with a broad set of government and community leaders in driving NbS priorities and collaborating on design concepts.

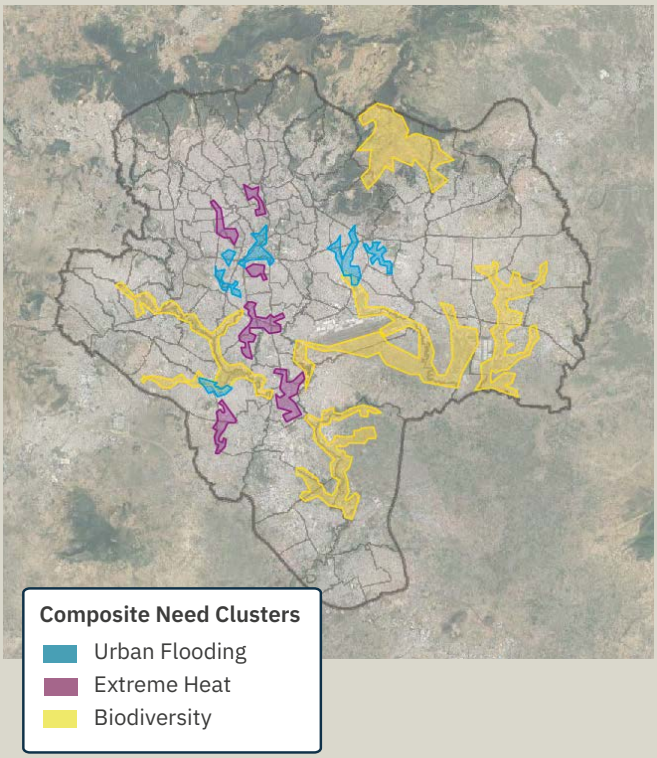
In Addis Ababa and Kigali, where this approach was tested, the planning framework process included field visits and the development of concepts for NbS projects. In Addis Ababa, the team prepared NbS project concepts for three priority areas to address downstream flooding and improve biodiversity at Gurara Green, mitigate urban heat island effect at Cooling Mercato, and mitigate urban flooding at Akaki Eco. In Kigali, the team prepared NbS concept designs that include afforestation, roadside and urban trees, river buffer zone, sustainable agriculture, and urban forests in three priority project areas, Mpazi-Rugunga, Gatsata-Karuma, and Rubirizi sub-catchments.

This rapid process is not without limitations. Specifically, the level of detail and accuracy of the datasets available globally are sufficient for a citywide analysis and coarse review for identifying areas of likely flooding and extreme heat, but more detailed analysis is required for design work. In addition, due to the lack of available data on habitat conditions and species surveys of flora and fauna, the output does not identify biodiversity-rich areas but instead highlights zones where, through improvements in current conditions, there exists the potential to create more favorable habitats conducive to supporting biodiversity. A deeper assessment requires significant time to analyze current and historical landscape conditions and assess species citywide to develop customized interventions that consider the intricate factors influencing biodiversity. Cities also need information about the costs of NbS for their context to evaluate and prioritize investments, however, this information is not universally available and must be refined *per* city.

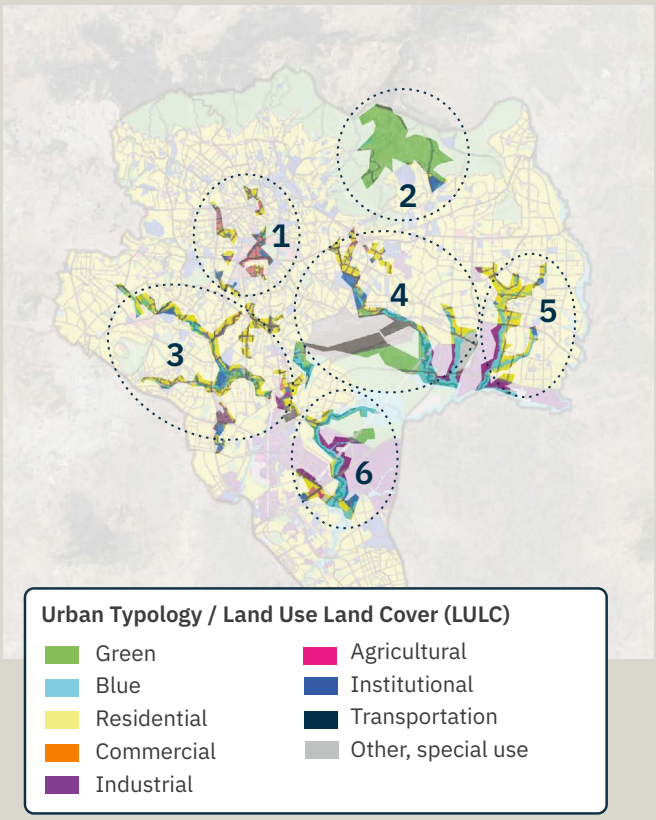
The Strategic NbS Framework guides cities to (i) apply a multi-stakeholder approach for analysis, planning and integration of NbS into the urban form, (ii) take advantage of data tools and rapid analysis methods to support decision-making, and (iii) identify NbS projects and programs for implementation, and governing approaches to ensure long term sustainability. The Strategic NbS framework guide can be downloaded here https://www.afd.fr/en/carte-des-projets/developing-strategic-framework-nature-based-solutions-urban-areas.

Figure 2 - On the left side, the framework uses remote sensing and publicly available data to spatially map urban flooding, extreme heat, and biodiversity needs. It highlights areas where these needs are close together or overlap. On the right side, the framework involves consultation processes to select priority areas for NbS opportunities. It shows the six areas of the city (with underlying color showing current land uses) where NbS could be developed to tackle urban flooding risks and/or extreme heat risks and/or biodiversity conservation opportunities (WRI).

Composite Needs Cluster Map, Addis Ababa



Needs Cluster by Urban Typology Priority Map, Addis Ababa



Overcoming Challenges to Implementing Nature-Based Solutions in Cities

This framework was tested during a joint research program involving the RYWP, the EiABC Addis Ababa Urban Development Department, the WRI and *Agence française de Développement* (AFD). The recommendations that follow are the direct result of feedback from the research activities themselves, which enabled the implementation of the approach presented to be tested in two cities (Kigali and Addis Ababa) in close consultation with local institutions and stakeholders.

1. Increasing Awareness and Institutional Integration

Challenge: A significant barrier to adopting NbS in urban settings is the lack of awareness and understanding of their benefits and technical implementation. Additionally, urban development often occurs in silos, making it difficult to integrate NbS across land-use and infrastructure sectors managed by various institutions.

Recommendation: Cities should implement multi-stakeholder engagement processes, such as the Strategic NbS Framework, to facilitate cross-sectoral discussions and collaborative prioritization. Knowledge-sharing of guidebooks and case studies and early implementation of NbS demonstration projects can help bridge the gap in understanding and institutional coordination.

2. Enhancing Data Availability and Decision-Making

Challenge: Decision-makers need reliable climate and land-use data to prioritize NbS projects. However, gaps in data availability, accuracy, and level of detail hinder effective planning. Communities are experiencing the impacts of climate change today. Cities need rapid methods to assess risks. However, data collection and analysis is time-consuming. In addition, without methods that consider multiple issues together, such as flooding, extreme heat, and biodiversity, projects focus on solving single issues and miss opportunities for integrated infrastructure solutions, like NbS.

***Recommendation*:** Cities should adopt data driven planning approaches that integrate local and global datasets and incorporate multi-hazard assessments to enable more effective NbS planning. Leveraging citizen science initiatives for data collection can support local validation of these integrated data sets.

3. Strengthening Planning and Implementation Linkages

***Challenge*:** Urban planning and policies for resilience often do not align with the practical implementation of NbS, as planning authorities and infrastructure managers play different roles in urban development. City planners lead on land use decisions, zoning, sustainability policies, and green space plans, while infrastructure authorities are responsible for implementation and operations of city infrastructure, such as roadways, utilities, and public open spaces. This disconnect limits the translation of NbS planning strategies into actionable projects.

***Recommendation*:** Cities should establish governance structures to facilitate NbS institutionalization, such as a Mayoral NbS Steering Committee or a dedicated NbS Task Team. This central NbS focused structure can mobilize political and societal support, coordinate between the various city authorities, develop shared design standards and practices, identify financing approaches and direct project implementation.

4. Securing Sustainable Financing for NbS Projects

***Challenge*:** Lack of dedicated funding sources for NbS projects limits their large-scale implementation. Enabling NbS institutionalization in cities requires both governance structures to support implementation and funding to test early ideas and build out programs.

***Recommendation*:** Cities should integrate NbS into city investment programs and ensure that financial mechanisms support pilot projects as the first step to scale successful initiatives. NbS investment programs must include strategies for public and private sector partnerships. A multi-benefit assessment framework to monetize NbS benefits can make them more attractive for investment. Incorporating NbS into broader infrastructure financing plans can also ensure long-term sustainability.

5. Localizing NbS Approaches for Greater Impact

***Challenge*:** Generalized NbS benefits often do not account for local variations in climate, land use, and ecological conditions, leading to inconsistent outcomes. Research shows a lack of long-term data monitoring on performance for NbS in relationship to flood risk reduction, heat attenuation and biodiversity improvement. Local preferences on benefits vary from neighborhood to neighborhood and can cause challenges when not considered in projects.

***Recommendation*:** Cities should prioritize implementation of NbS pilot projects and track their performance over time using monitoring, evaluation & learning (MEL) systems. Continuous refinement of NbS strategies based on real-world data will enhance their effectiveness and scalability. Integrating gender, equity, and social inclusion (GESI) considerations in NbS selection processes will further strengthen community engagement and long-term success.

By addressing these challenges through strategic planning, data-driven decision-making, and institutional collaboration, cities can effectively harness the potential of NbS to enhance urban resilience and sustainability. Expanding NbS implementation in cities can help improve the living conditions of their inhabitants while contributing to several of the objectives of the new global biodiversity framework.

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