



Designing Nature-Smart Cities: Centring Urban Planning Around Nature-Based Solutions

The importance of ecology does not disappear in an era of extreme climate change – it only becomes more important. Increasingly, Nature-Based Solutions (NBS) have received growing attention in urban climate discussions. Across the world, governments, development agencies, and financial institutions now promote NBS as a pathway toward climate resilience.

For many people in Indian cities, climate change is no longer a future projection of disruptions expected in the distant 2100, as understood through scientific reports or future projections. It is experienced through everyday disruptions that indicate a deep lack of urban planning, as well as a lack of understanding that extreme events have become annual occurrences. Thus, Kerala experiences heavy monsoon rains, forcing residents to use boats to navigate flooded streets. Vast swathes of Chennai lose power during a heatwave. Neighbourhoods in Bengaluru where lakes once existed now depend on water tankers that carry borewell water pumped from increasingly unsustainable depths for their survival. Construction workers shelter under flyovers in Mumbai because there are no shaded public spaces left in the city. Schools in Delhi keep children indoors in the winter because air pollution, exacerbated by the cold, reaches dangerous levels.

The experiences of flooding, heat stress, air pollution, water scarcity, and public health are often discussed as separate urban environmental and climate change problems, but they are deeply connected. They reveal something more fundamental about the conditions of Indian cities. Once, Indian cities flourished and thrived because of nature – they had parks, rivers, lakes, wetlands, and grassland that nourished the city with water, cooled the air, and made urban livelihoods

and economies possible. But over the last few decades, urban development in India has largely treated nature either as an obstacle to growth or natural spaces as leftover “wasteland”. Wetlands and lakes have been concretised for real estate projects, lakes fragmented by roads, rivers frothing with pollution, and trees decimated for road widening and infrastructural projects. In most Indian cities, patches of nature now survive as isolated fragments, disconnected from the larger landscape around them.

Yet in cities, urban nature functions like public infrastructure that makes urban life possible. A lake is not just a water body. It regulates flooding, supports groundwater recharge, moderates local temperatures, and sustains biodiversity. Trees do more than beautify streets. They create shade for pedestrians, lower heat exposure for outdoor workers, and reduce temperatures in dense neighbourhoods. Wetlands are not empty land waiting for development; they absorb excess rainfall and reduce the intensity of floods downstream. These functions often become visible only after they disappear.

Indian cities already contain important examples of such systems. The East Kolkata Wetlands continue to support wastewater treatment, fisheries, flood absorption, and biodiversity for Kolkata while sustaining thousands of livelihoods. In Mumbai, the Sanjay Gandhi National Park functions as a major

*The author is the Director of the School of Climate Change and Sustainability, Azim Premji University, Bengaluru.
Email: harini.nagendra@apu.edu.in*



East Kolkata wetlands, a Ramsar site recognised for its unique ecological and livelihood functions.

urban ecological buffer that moderates temperatures, supports biodiversity, and protects watersheds within one of the world's densest metropolitan regions. The city's mangroves similarly reduce coastal flooding and absorb tidal surges during extreme rainfall events. These are not isolated environmental assets. They are functioning forms of urban infrastructure.

Yet urban governance still tends to treat these issues separately. Heat is addressed through emergency advisories. Flooding is approached as a drainage problem. Air pollution is discussed through transport and industrial regulation. Biodiversity is treated as a conservation concern disconnected from urban planning. This fragmented approach ignores the fact that ecological systems often address several of these crises simultaneously. NBS can help reconnect lakes, wetlands, and green spaces that urban growth has gradually broken apart.

The importance of ecology does not disappear in an era of extreme climate change – it only becomes more important. Increasingly, NBS have received growing attention in urban climate discussions. Across the world, governments, development agencies, and financial institutions now promote NBS as a pathway toward climate resilience. Wetland restoration, urban forests,

mangrove protection, bioswales, green corridors, and blue-green infrastructure are increasingly presented as tools for adapting to climate change.

In dense and land-constrained Indian cities, we need to redefine NBS to include smaller and more distributed forms of ecological infrastructure embedded within everyday urban spaces. Spaces beneath flyovers, roadside medians, canal edges, railway buffers, vacant public land, rooftops, institutional campuses, and stormwater drains are rarely viewed as ecological assets. Connected across neighbourhoods, these smaller spaces can improve cooling, absorb rainwater, and support biodiversity. By conducting carefully designed urban greening in such spaces, we can create new forms of NBS such as tree-lined streets, shaded bus stops, bioswales along roads, rain gardens inside apartment complexes, restored lakes, permeable pavements, urban farming spaces, and native vegetation inside institutional campuses and tech parks. These can reduce heat exposure, improve groundwater recharge, absorb stormwater, and make public spaces more usable during extreme weather.

Such interventions may appear modest compared to large infrastructure projects, but they often shape how people experience the city at the neighbourhood

scale. A shaded footpath matters for a street vendor working through peak summer heat. A restored lake matters for surrounding communities facing recurrent flooding. Even a small patch of vegetation near a busy road can improve air quality and alter how people experience a street during peak summer.

This is particularly important because environmental risks in Indian cities are not distributed equally. Exposure to heat, pollution, flooding, and water stress often falls most heavily on people with the fewest resources to cope with them. Informal settlement residents, sanitation workers, street vendors, delivery workers, construction labourers, and elderly populations experience climate risks much more directly than wealthier residents who can retreat into air-conditioned spaces and private infrastructure. Questions of ecology in Indian cities are therefore also questions of inequality.

Without careful planning, however, urban greening itself can deepen exclusion. Many cities have already witnessed forms of beautification that prioritise elite aesthetics while restricting access for traditional users and low-income communities. Lakes become fenced recreational spaces rather than shared commons. Public landscapes are redesigned in ways that exclude informal livelihoods and everyday use. NBS are unlikely

to succeed if vulnerable communities are excluded from decisions around restoration and planning.

This becomes especially visible in Heat Action Plans across Indian cities. Most plans still focus heavily on emergency response systems such as warnings and health advisories. While these are necessary, they do little to address why some neighbourhoods experience far greater heat exposure than others in the first place. Long-term heat resilience requires ecological thinking embedded within urban planning itself. Trees, wetlands, permeable landscapes, and blue-green corridors are often treated as beautification projects, even though they directly influence heat exposure across the city, supporting public health and life.

This is why the debate around NBS must move beyond the narrow language of “investment in nature.” Nature does not always generate direct financial returns in ways that conventional markets recognise. Their value often lies in preventing loss, reducing vulnerability, and stabilising urban systems over time. When wetlands disappear, cities become more flood-prone. When tree cover declines, heat stress and public health costs rise. Mangroves reduce coastal risk and biodiversity strengthens ecological resilience. These benefits may not appear as immediate profit, but cities pay heavily when they disappear.



Indian cities already spend large amounts on roads, drainage infrastructure, cooling technologies, and emergency response systems because these are understood as essential to urban functioning. Municipal budgets rarely account for the long-term value of wetlands, urban forests, permeable landscapes, or interconnected water systems. Ecological restoration is still treated as discretionary spending rather than as core urban infrastructure. As a result, cities have always spent too little on wetlands, trees, and water systems that reduce risk, while spending far more on managing floods, heat stress, and other disasters in a reactive manner. The challenge is institutional and political: how can cities make ecological systems visible within the planning and budgeting decisions they already make?

This challenge also goes beyond municipal governments. Large apartment

complexes, private townships, commercial developers, industrial parks, and tech campuses now shape major parts of urban India. Yet nature is often reduced to decorative landscaping instead of being treated as necessary urban infrastructure. Integrating meaningful NBS into building regulations, planning approvals, and urban design could help reduce heat, absorb stormwater, improve biodiversity, and strengthen water resilience across cities.

This is particularly important because private urban infrastructure now occupies large portions of expanding cities. Regulatory institutions such as RERA (Real Estate Regulatory Authority), urban development authorities, and municipal planning bodies, therefore, have an important role in defining what ecological responsibility should look like within private development itself. Requirements around native tree cover, permeable surfaces, water-sensitive landscaping, biodiversity corridors, shaded public access, and ecological restoration can no longer

remain voluntary sustainability measures. They need to become part of how cities define responsible urban growth.

Mainstreaming Nature-Based Solutions into municipal budgets would also require cities to rethink what counts as infrastructure. Roads, flyovers, and drainage systems are important, but so are wetlands, tree cover, lakes, and permeable landscapes that absorb heat, water, and pollution across the city.

Indian cities can no longer afford to treat ecology and development as competing agendas. The climate crisis has already shown that cities built without ecological thinking become more unequal, more fragile, and more expensive to sustain over time. The cost of ignoring urban ecology is already visible across Indian cities. The challenge now is whether urban development can continue without taking them seriously. □

Co-authored by Arvind Lakshmisha and Seema Mundoli.

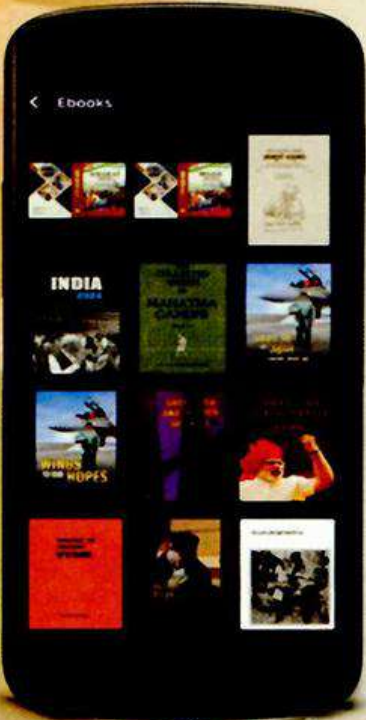


सूचना एवं प्रसारण मंत्रालय
MINISTRY OF INFORMATION AND BROADCASTING



Publications Division

Publications Division's Books & Magazines Now Available On






 **Free of Cost***





SCAN HERE