WEEKLY FOCUS
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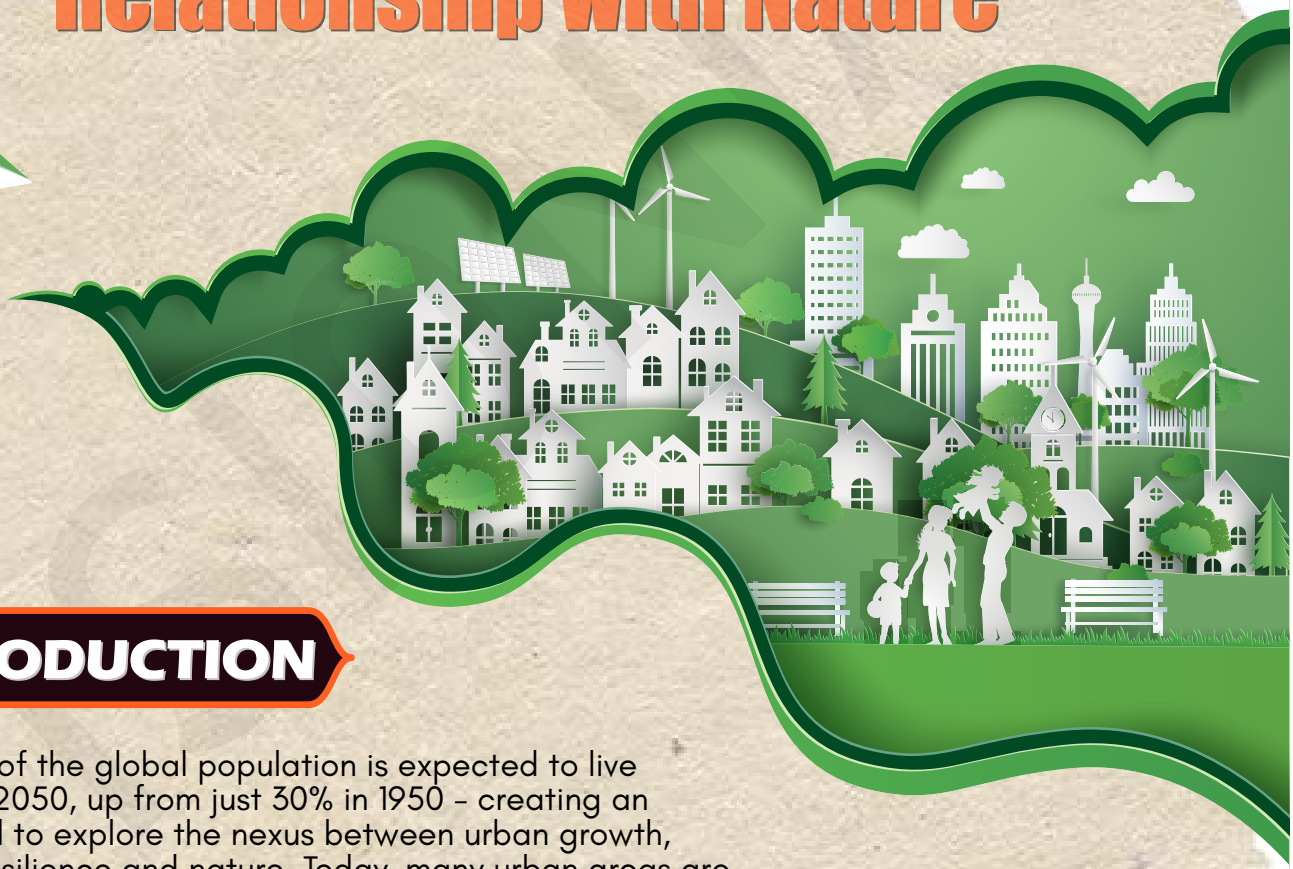
Nature Positive Cities

Rejuvenating Cities Relationship with Nature



INTRODUCTION

Nearly 70% of the global population is expected to live in cities by 2050, up from just 30% in 1950 – creating an urgent need to explore the nexus between urban growth, structural resilience and nature. Today, many urban areas are already suffering from the negative effects of climate change as well as other adverse socio-economic consequences which can be linked to collapse of cities' pre-existing natural ecosystems. Urbanization pressures have globally led to a general decline in urban dwellers' everyday interaction with nature, stressing the need to connect, or 'reconnect', urban dwellers with nature.

Around 2050, the impact of climate change and biodiversity loss on living conditions in cities will be dramatic. This would be due to higher temperature, more frequent and excessive rainfall with consequential flooding, more widespread and excessive drought etc. Since cities not only drive but are also are vulnerable to the triple planetary crisis: climate change, biodiversity loss and pollution, it becomes crucial to understand linkages of natural environment with urban spaces.

How has this relationship evolved over time and what have been its impacts? What factors have led to the deterioration of cities' relationship with nature? What ideas and strategies have emerged across the world to address the issue? What measures are needed to holistically repair and rejuvenate cities' relationship with nature? In this edition, we will try to explore the answers to these questions.

How is nature interlinked with cities and urban spaces?

Nature provides diverse life-supporting and life-enhancing contributions to people in cities and towns. These gifts from nature make human life both possible and worth living. All cities critically depend on healthy interconnected ecosystems within and around them in following ways-

- **Provision of Resources:** Nature provides cities with resources needed for human survival such as food, medicine, potable water etc. and economic activity such as timber, minerals and other forest products.
- **Energy:** Healthy natural ecosystems like rivers are an important source of energy through systems such as hydroelectric dams. Further, developments are ongoing to derive renewable energy from biomass, tides, hot springs etc.
  - Moreover, blue and green ecosystems in urban areas help in reducing overall energy consumption by bringing down regional temperature.
- **Buffer to natural hazards:** For instance, mangroves protect coastal cities from storm surges, urban wetlands and parks increase water infiltration and reduce flood risk etc.
- **Reduction in pollution:** Terrestrial and aquatic natural ecosystems help in air pollution regulation, waste and nutrient recycling, water purification, noise reduction etc.
- **Regulation of Urban microclimate:** Natural ecosystems help regulate urban climate by increasing humidity, lowering temperatures through shade provision, breaking wind and intercepting solar radiation.
- **Recreation and Ecotourism:** Nature-based tourism and recreation generates revenue and provides viable livelihood avenues in the cities. Green spaces attract tourists to participate in activities like birdwatching, trekking, camping, river rafting, etc.
- **Human health and well-being:** Human health, physical and mental alike, is inextricably linked with nature.
  - For instance, high species diversity has been found to reduce the risk of disease transmission to humans by diluting pathogens among a large type of potential hosts.
- **Others:**
  - Green space and tree canopies considerably boost the market value of homes, thus providing important contributions to the overall property tax base in cities.
  - Nearby nature can also contribute to the increased productivity and job satisfaction of employees.

"In Conversation"

Natural spaces are vital for Mental Health

Vini: *Hey Vinay! Where have you been? You have been missing a lot of our online game sessions lately.*

Vinay: *Hi Vini! Well, I have started going on walks to our nearby community garden every evening.*

Vini: *Oh! What is the reason behind this sudden interest in nature?*

Vinay: *I had been feeling a bit stressed due to my hectic college schedule, daily commute, and upcoming exams. So, I was researching on ways to reduce my stress. I came across an article on how green spaces can help improve mental health.*

Vini: *Oh really! Can you tell me more about it?*

Vinay: *Sure! I read that natural scenery and greenery can allow for visual stimulation, which can make people's minds more relaxed and have been found to have psychological benefits like improving sleep and reducing stress.*

Vini: *Okay. My Grandma also goes for a walk every morning in our society's garden with her friends. She says that while regular exercise helps her maintain a healthy lifestyle and reduce the odds of diseases like diabetes and hypertension, it is also a great way to develop positive social interactions and create a sense of belonging.*

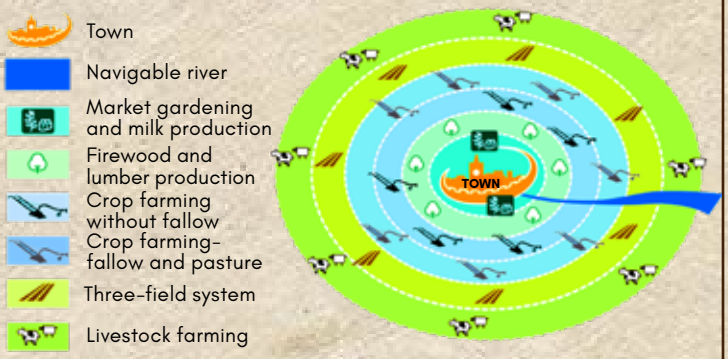
Vinay: *Yes Vini! Parks and public gardens are great places to make friends and engage in physical activities. Moreover, feeling more connected with nature has encouraged me to adopt positive environmental behaviours.*

Vini: *Sounds great! Looks like I will be joining you on your walks from tomorrow.*

How has this relationship evolved over time and what has been its impact?

The industrial revolution began with the process of accelerating urbanisation that has touched almost every part of the world and has been responsible for the pre-eminent societal transformation for the last 200 years. This has led to radical changes in cities' relationship with natural ecosystems.

The evolution of cities relationship with nature can be studied by comparing cities in pre-industrial era where vibrant agricultural activities were prime consideration for urban settlements **(Agropolis)** to globalized cities of the industrial period which are driven by activities sustained by fossil fuels **(Petropolis).**

'Agropolis'	'Petropolis'
	
Driven by **natural elements**- soil fertility, clean water, etc.	Driven by **fossil fuels and related amenities.**
Close proximity to cultivated land and other natural resources with limited impact on nature beyond city borders.	**Materials and energy are drawn in great quantities** from all over the world— often from large distances.
Residents have close contact with natural environment and biodiversity on a daily basis, with **green spaces playing important role** in their social and economic activities.	Residents have little to no contact with green spaces as living spaces are **majorly occupied by grey infrastructure** (roads, concrete pavements, large buildings etc.).
Resident **demands hinge on needs** for personal wellbeing.	Consumerist **culture based on wants.**
Relatively independent systems with **low reliance on external inputs and supply chains** for their sustenance.	Relatively dependent systems **heavily reliant on external inputs and supply chains** for their sustenance.

The expansion of cities, both spatially and economically, has had tremendous impacts on all stakeholders-

Impacts

On Biodiversity

- **Habitat destruction:** Modern cities have often been established on former forest and farmland.
- **Introduction of alien species:** Increasing trade as a result of urban appetite for global commodities has led to introduction of invasive species.
- **Habitat Degradation:** City activities generate sewage, solid waste and air pollution, which generally have an effect on the biodiversity in adjoining areas, such as rivers and marine or terrestrial hinterlands.
- **Increased Human wildlife conflict:** As suburban and exurban residential developments continue to multiply in urban areas, they encroach on wildlife habitats leading to increased human-wildlife interactions.

On Natural environments

- **Pollution:** Pollutants directly emitted by urban areas (e.g. industrial activity) or indirectly (e.g. ship discharges due to increased trade) affect extended areas and natural ecosystems.
- **Climate change:** Urban areas are responsible for over 75% of global carbon emissions, leading to **increased mean temperatures, altering precipitation regimes, increasing the frequency of extreme weather events and acidifying aquatic environments.**
- **Impact of Built infrastructure:** The creation of grey assets with impermeable surfaces is invariably harmful to nature leading to longterm disruption of natural ecosystem functions.

On Humans

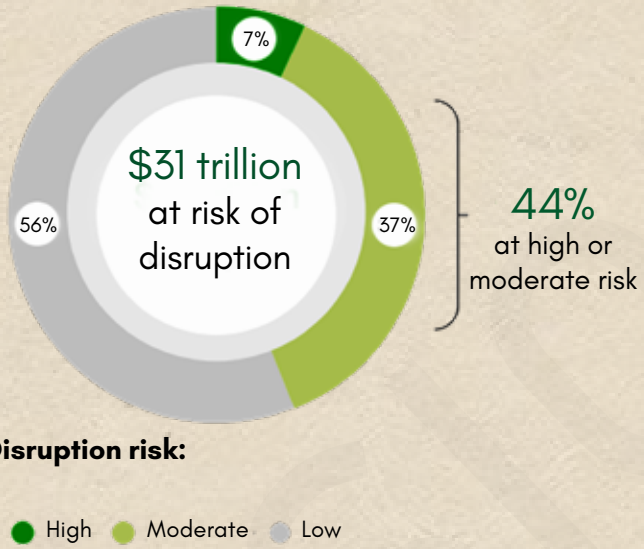
- **Compromised cities' stability:** Among the 576 largest urban centres in the world, 414 (over 70% of the total) - and their more than 1.4 billion inhabitants - are deemed to be at high or extreme risk from pollution, compromised water supplies, extreme heat and natural hazards.
- **Economic loss** with increasing frequency of extreme weather events, such as droughts and floods.
- **Urban heat:** World's cities are heating up at twice the global average rate due to the urban heat island effect which is often related to a lack of natural cover. This leads to soaring energy use, strained electric grids, high emissions and declining labour productivity.
- **Threat to Human health:** As many as 1.8 million excess deaths were caused by air pollution in cities globally in 2019.

Global Economy at risk

Despite cities around the world occupying different ecosystems, nature's contributions are essential to support critical economic activities and societies of all. As a consequence, around 44% of GDP in cities around the world – $31 trillion – is at risk of disruption from nature loss.

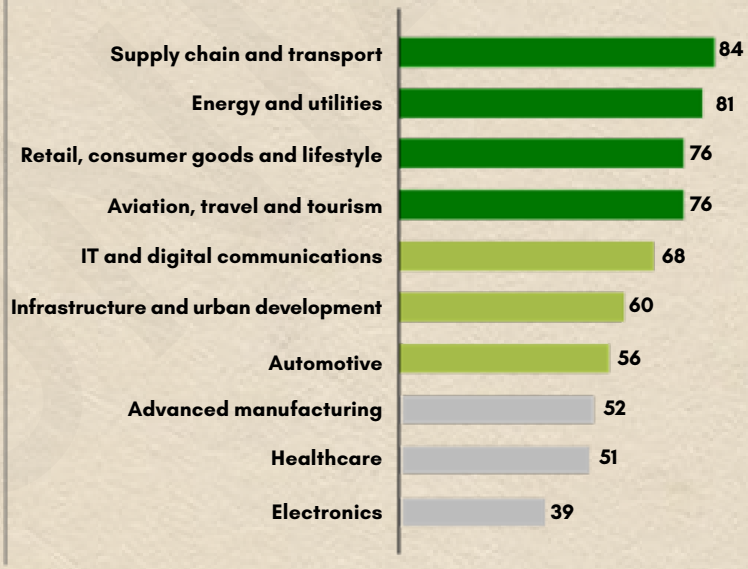
Economic value at risk in global cities

Percentage of 2019 GDP by disruption risk posed by biodiversity and nature loss



Top 10 industry sectors at risk of disruption

Disruption risk (Max=100)



What factors have led to deterioration of cities' relationship with nature?

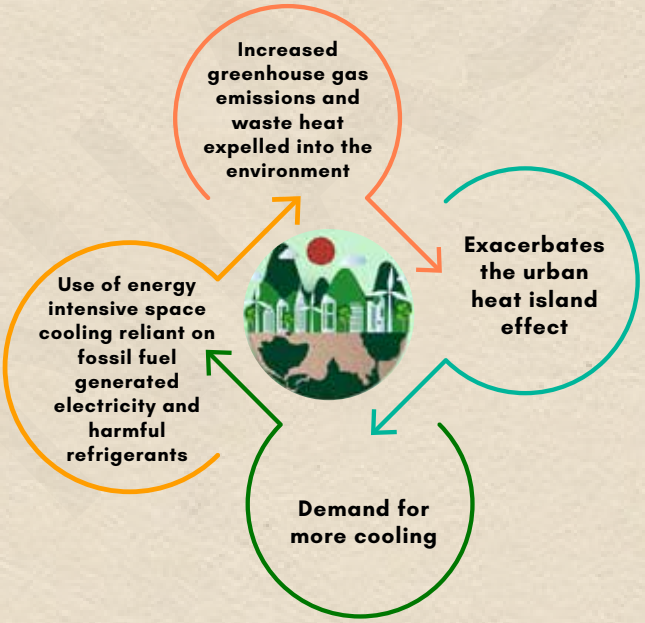
Between 1990 and 2015, while the urban population increased an average of 1.9 times, the urban footprint increased an average of 2.5 times. The disproportionate nature of cities' impact on environment can be attributed to the following factors-

- **Unplanned Urban expansion:** Population and economic growth generally results in greater demand for housing and basic infrastructure such as roads, public spaces, drinking water, sanitation, and community development. However, cities' service provision and infrastructure development has frequently **overlooked ecosystems and prioritized economic cost efficiency.**
  - Approaches and practices of urban planning lack ecological understanding and knowledge which hinders the development of effective governance mechanisms to manage the impacts of cities on nature and vice-versa. One of the many reasons for this is that the **process of interaction between cities and nature is still not well understood.**
- **Resource intensive development with primary focus on economic growth:** Idea of development in cities is intertwined with economic growth, i.e. accumulation of wealth and production of goods and services with indifference to the environmental consequences.
  - This is reflected in how the common indicator of growth- gross domestic product (GDP) does not consider the local economy based on forests and streams.
- **Rapid advancements in technology:** Technological innovations have made it easier to extract and use natural resources leading to their gross overuse and misuse.
- **Consumerist culture:** Urbanisation has brought significant changes in human lifestyles, such as the rise of consumerism, which complements production.
  - Higher levels of disposable income allows new consumers to express their demand for tastes previously unattainable, which puts pressure on natural resources across the globe to fulfil these demands.

- **Apathy towards nature:** Expansion of artificial built environment in cities has led to a decline in urban dwellers' everyday interaction with nature which has made them oblivious to the environmental consequences of their actions.
  - This is greatly reflected in the current waste disposal habits.
- **Commodification of nature:** Present conceptualization of ecosystem services is grounded in an anthropocentric view of nature. Natural resources are seen as a commodity serving the purpose of fulfilling human needs and demands.
- **Linear metabolic system of most contemporary cities:** Cities are nowadays based on linear metabolisms, extracting raw materials,manufacturing products for consumption and disposing them afterwards, contributing to depletion of natural resources and a high dependency on the non-renewable resources.

Cooling Trap in Urban cities

It refers to a vicious cycle where mechanical cooling is further warming our cities rather than holistically addressing the systemic issue of urban heat islands in cities.



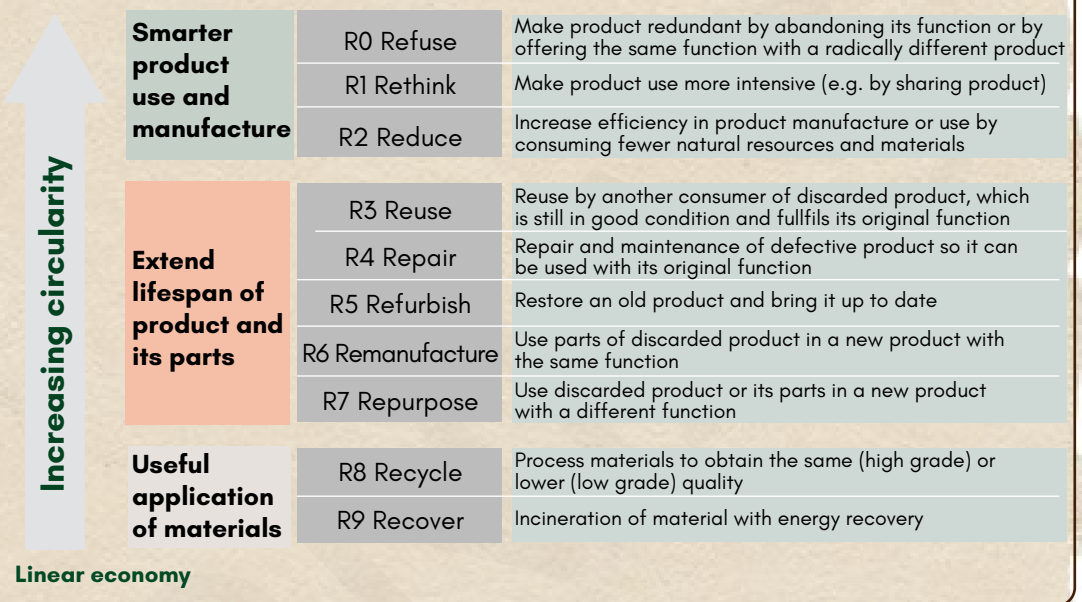
Are Smart cities green?

- The **Smart Cities Mission,** launched in 2015, aims to **drive economic growth and improve the quality of life of people** by enabling local area development and harnessing technology, especially technology that leads to Smart outcomes.
- There have been concerns regarding **increase in population density in such cities** which may place significant extra demands on resources, including electricity and water, while simultaneously increasing the output of waste in the form of drainage, solid waste and greenhouse gasses.
  - Also, software and networking services, including Data centres, which lie at the core of such cities, can affect the environment due to consumption of high energy and excessive e-waste.
- However, technological interventions can help model smart cities for nature positive urban living. Some examples have been stated below-
  - **Energy efficiency through smart solutions:** Highly networked smart cities can use a variety of smart metering approaches for their various utilities.
  - **Direct Air Capture' (DAC) stations:** They can capture carbon dioxide directly from the ambient air and generate a concentrated stream of CO_2 for sequestration or utilisation.
  - **Augmented reality applications:** They can also be used for monitoring and visualizing ecosystem services, such as displaying urban tree cover, and also add augmented information on site about planted vegetation, and how the different varieties of plants should be managed.
  - **Automated maintenance of green spaces:** Irrigation of urban street trees and plants can be automated based on real-time monitoring.

What ideas and strategies have emerged across the world to address the issue?

- Some emerging and widely discussed pathways and concepts to rebalance cities' relationship with nature have been discussed below-

Circular economy: It describes an economic system that is based on business models which replace the 'end-of-life' concept with reducing, alternatively reusing, recycling and recovering materials in production/distribution and consumption processes.



RESPONSIBLE CONSUMPTION
Reduce food and water waste and commit to circular economy and energy efficiency.

SUSTAINABLE MOBILITY
Opt for a car, bicycle or electric scooter, carsharing and public transport.

SUSTAINABLE FOOD
Buy organic foods and eat more fruit and vegetables and less meat and fish,

SUSTAINABLE DESIGN
Opt for ecodesign, from t-shirts to glasses, shoes toothbrushes.

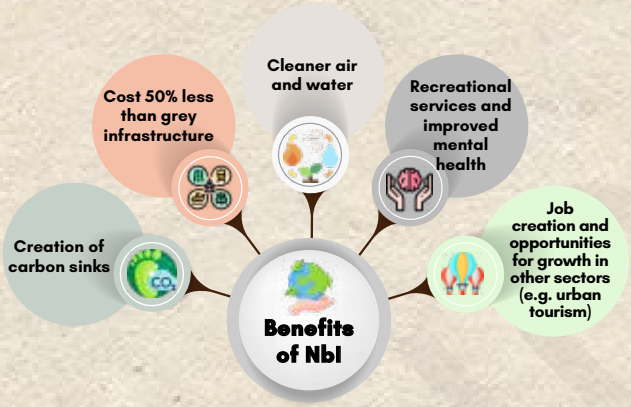
RECYCLE AND USE LESS PLASTIC
Don't forget to recycle property and avoid single-use plastics.

ENVIRONMENTAL EDUCATION
Share experience awareness of the importance of sustainability with those around you.

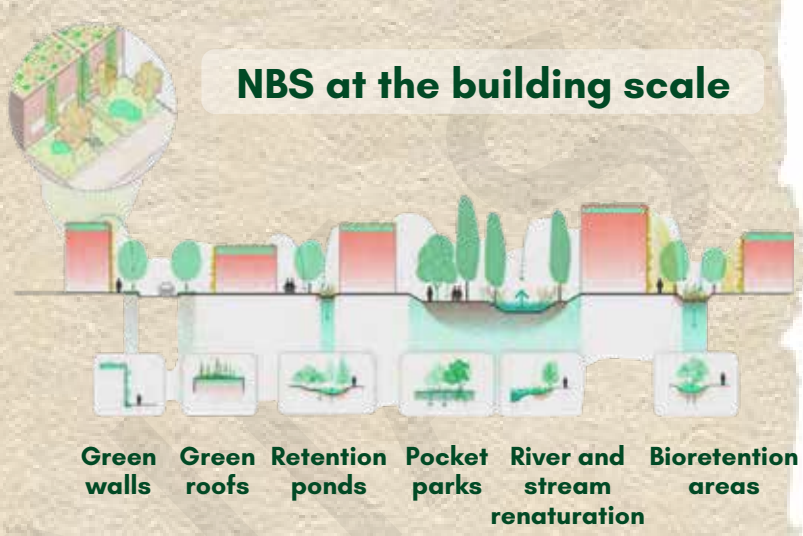
'Life'- Lifestyle for environment: At the COP26 Summit in Glasgow, Prime Minister of India pitched for a 'one-word movement' before the world in the form of 'LIFE' inspired by Indian culture and Gandhi's teachings to ensure peaceful existence with nature. It is about making lifestyle choices to improve the planet and urges **mindful and deliberate utilisation instead of mindless and destructive consumption.**

Nature Based Solutions (NbS)
These are 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.

Nature Based Infrastructure (Nbl)/Green Infrastructure: It seek to restore or utilize the existing natural extent, connectivity and diversity of cities' natural ecosystems to provide key functions of infrastructure. Around cities, NbS interventions can help with watershed management, recreational space, managing wildfires, reducing, and capturing CO2 emissions, etc.

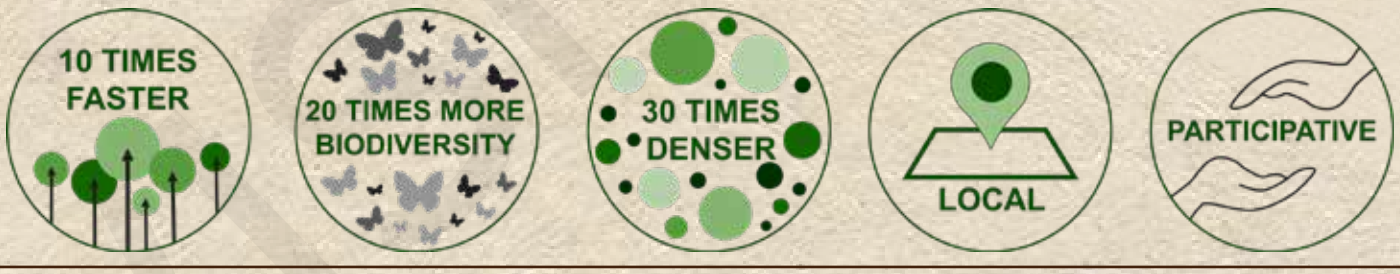


NBS at the building scale



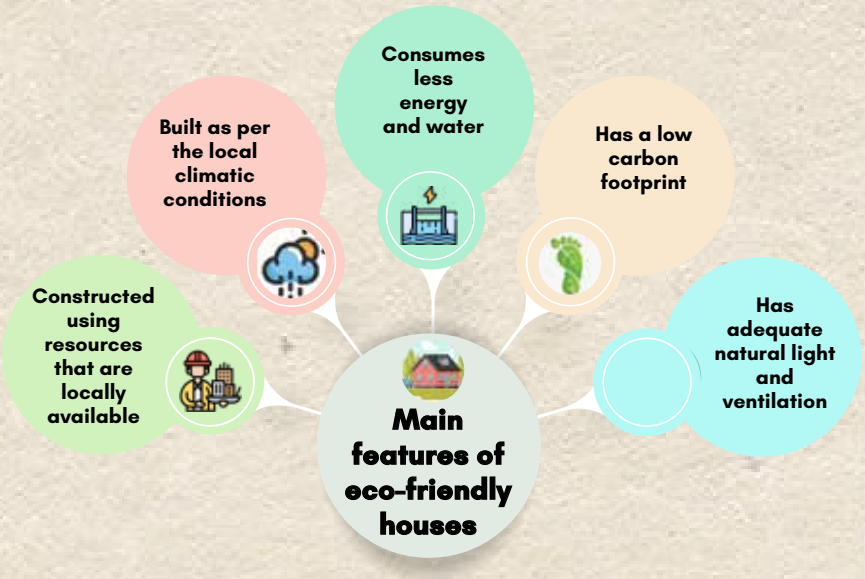
Urban forestry using Miyawaki method

The method, developed by Doctor Akira Miyawaki, involves planting two to four trees per square metre. Miyawaki forests grow in two to three years and are self-sustaining. They help lower temperatures in concrete heat islands, reduce air and noise pollution, attract local birds and insects, and create carbon sinks.



Eco-housing:

- It is a concept that applies sustainability principles to the entire lifecycle of a housing project, considering environmentally friendly approaches to the design, site assessment and material selection, and energy, water, and waste management at the household and community levels.
- Building an eco-house may include activities like- use of clay and mud blocks for construction, building natural skylights, green roofs etc.

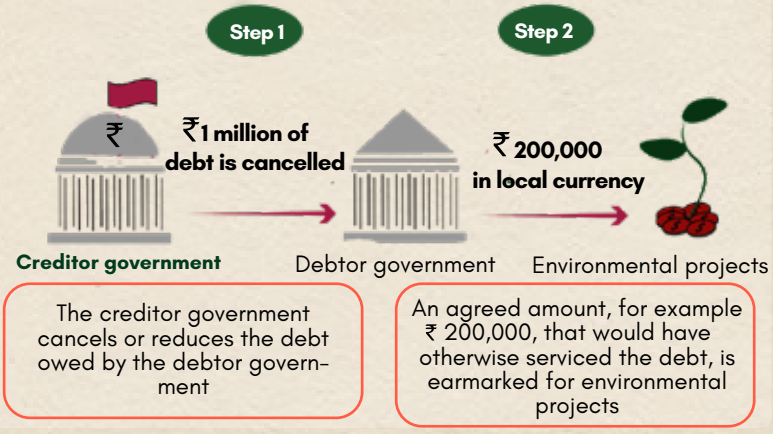


Novel Investment Models

- **Debt-for-nature swaps:** These are arrangements whereby national or local debt is forgiven or repaid at a significant discount in exchange for the conservation of critical habitats that provide key ecosystem services.
- **Insurance for nature:** Insurance can have a critical role to play in innovations that mitigate risks associated with climate change and biodiversity loss in cities.

- For example- In 2018, Swiss Re collaborated with The Nature Conservancy (TNC) and regional governments in Mexico to help protect against reef damage in the Mesoamerican Barrier Reef System by creating a new "parametric" insurance solution. The insurance product provides rapid payouts to fund essential reef restoration measures following strong hurricanes.

How do bilateral debt-for-nature swaps work?



"In Conversation"

Why is it necessary to measure Natural Capital ?

Vinay: *Hey Vini! How was your field trip to Uttarakhand?*

Vini: *Hi Vinay! It was amazing. We visited the Corbett National Park. The forests were beautiful.*

Vinay: *Great! Did you know that Uttarakhand became the first state in India to take into account Gross Environment Product while calculating its Gross Domestic Product?*

Vini: *But what exactly is Gross Environment Product?*

Vinay: *Well Vini, GEP is the total value of services supplied by an ecosystem to human well-being in a region annually. It will assign monetary values to four critical natural resources- Air, Water, Forest, and Soil of Uttarakhand. It's a type of Natural capital accounting or ecosystem accounting tool.*

Vini: *So, is natural capital accounting always done in monetary terms?*

Vinay: *Not necessarily. These accounts may present this information in physical or monetary terms.*

Vini: *Okay. But GDP indicates the economic development of a region, what purpose does calculating these accounts serve?*

Vinay: *They link ecosystems and the flows of services from them, with measures of economic and other human activity. They help answer questions like- Who benefits and is negatively impacted from natural resource use? Are current trends in production and consumption of resources sustainable? Are the expenditures on environmental protection effective? How does depletion of natural resources affect measures of the real income of a region?*

Vini: *Okay. So, they help us understand the importance of relationship between the environment and the economy. How is it all different from Green GDP?*

Vinay: *While Green GDP is obtained after deducting the damage to the environment from the total production of the state, GEP will assess the improvement in the environment components in a year.*

Vini: *Okay. So, it will tell how much work the state has done in reducing the loss of the ecosystem.*

Vinay: *Exactly!*

What measures are needed to holistically repair and rejuvenate cities' relationship with nature?

- **Transforming Urban Governance:**
  - **Ecological planning in cities:** It is planning that is cognizant of biodiversity and nature— both within and outside urban boundaries—and the ways in which a city impacts and depends upon them.
    - This shift must be steered by top levels of government, coordinated across stakeholders using strong city-level leadership and underpinned by policy that fosters innovation and accounts for the full value of nature.
  - **Embedding nature-related considerations into economic and financial decisions:** For instance, the city of Surabaya, Indonesia, launched a "One Soul, One Tree" campaign with the twin focus of enhancing city forests and creating alternative means of income for residents living in poverty along the city's beaches.
  - **Measuring Ecological Footprint of cities:** It can allow governments to track a city or region's demand on natural capital, and to compare this demand with the amount of natural capital actually available.
  - **Enhancing investment in natural capital:** Increased investment in natural capital should be further incentivized by mainstreaming biodiversity data for investment decision-making, creating an inclusive market for investment and promotion of novel investment models.
- **Coordination among all stakeholders:**
  - **Innovation:** Inputs from various scientific, technological, and allied academic fields are needed in terms of innovations and radically new ideas to make cities more resilient and sustainable.
    - For example, WEF launched the Biodiversity Challenge for innovative solutions enabling cities to become nature-positive and to fulfil their potential as engines of equitable and sustainable development, resilience and well-being.
  - **Awareness and public mobilisation:** Civil society needs to foster responsible stewardship of natural resources and social concerns.
    - In this regard, schools are an important means of establishing the connection between local life and global issues, including the challenges posed by the loss of biodiversity and climate change.

Steps taken in India to make its urban landscapes more nature positive

- **ClimateSMART Cities Assessment Framework:** It has been launched for the Smart cities in order to incentivize a holistic, climate responsive development. This is a first-of-its-kind Assessment Framework for cities, aimed at creating a green mind-set in cities while they plan and undertake various developmental projects.
- **India cooling action plan:** The ICAP provides a 20-year perspective and outlines actions needed to provide access to sustainable cooling.
- **AMRUT 2.0:** It aims to **make around 4,700 towns / cities 'water secure'.** It will build upon the progress of AMRUT to address water needs, rejuvenate water bodies, better manage aquifers, reuse treated wastewater, thereby promoting circular economy of water.
- **Swachh Bharat Mission-Urban 2.0**: It will focus on ensuring complete access to sanitation facilities and complete liquid waste management in cities with less than 1 lakh population.
- **Green city:** Ministry of New and Renewable Energy (MNRE) tabled a concept that envisages the creation of a **green city in every state** where all the power requirements are met by renewable energy..
- **CITIIS (Cities Investments to Innovate Integrate and Sustain) Challenge:** It was launched in partnership with Agence Française de Développement (AFD) and European Union, to extend a loan of EUR 100 million for implementation of up to 15 innovative projects in Indian cities.
  - One such project was the Howrah River Front\ Development (Phase-II) at Agartala, for restoring the city's relationship with the river, establishment of blue-green corridor, conservation and creation of livelihood opportunities with promotion of organic farming.

- **Efforts from private sector:** Business communities need to make their operation more environment friendly by fostering best practices in the use and disposal of resources and transactions with others in the supply chain.
  - For instance, Coalition for Climate Resilient Investment (CCRI) is a private sector led initiative developing innovative and practical solutions to help investors incorporate nature- and climate-related risks in infrastructure investment decisions.
- **Global cooperation:** The establishment of a variety of networks in which city governments and international organisations come together to design policy mechanisms for urban spaces as biodiversity preservation can be an effective instrument for cooperation, knowledge sharing, critical debate, monitoring and evaluation (indicators), and incentives (awards).

Global cooperation: International Initiatives aimed at making cities more Nature-positive

- **CitiesWithNature** is a unique initiative that recognizes and enhances the value of nature in and around cities across the world.
- **Green Cities Europe** is an initiative that encourages the greening of public spaces by providing innovative ideas, information based on scientific research, and technical expertise.
- **The City Biodiversity Index,** or CBI, also known as the **Singapore Index on Cities' Biodiversity,** is a self-assessment tool that encourages cities to monitor and evaluate their progress in conserving and enhancing biodiversity.
- **Taskforce on Nature-related Financial Disclosures (TNFD) Alliance:** It aims to support the required shift in global financial flows away from nature-negative outcomes via a science-based approach, by developing and delivering a risk management and disclosure framework that organizations can use to report and act on evolving nature-related risks.
- **The Economics of Ecosystems and Biodiversity (TEEB)** is a major international initiative to integrate the valuation of ecosystem services and biodiversity—appropriately referred to as "natural capital"—into governance and management, including at the city level.
- **System of Environmental Economic Accounting (SEEA)** is the accepted international standard for environmental-economic accounting, providing a framework for organizing and presenting statistics on the environment and its relationship with the economy.
  - It is produced and released under the auspices of the United Nations, the European Commission, the Food and Agriculture Organization of the United Nations, the Organisation for Economic Co-operation and Development, International Monetary Fund and the World Bank Group.

Conclusion

As hubs for innovation, cooperation, inspiration, and economic growth, the potential for urban centres to help protect nature should no longer be underestimated. The cities of the future have an opportunity to put nature at their core, and to hold themselves accountable for their collective impact on planetary health. Thus, cities must work with the natural world and not against it. Healing or resetting cities' relationship with nature requires a brighter paradigm of urban development and a vision of cities as living systems, wherein economic, social and ecological functions are in harmony.

TOPIC AT A GLANCE

Linkages of Nature with Urban Spaces

- **Provision of Resources** like food, medicine, potable water, food, medicine,etc.
- **Source of energy** derived from rivers, biomass, tides, hot springs etc.
- **Act as buffer to natural hazards** like storm surges and floods.
- **Reduces air and noise pollution regulation, recycles waste and nutrient, purifies water etc.**
- **Regulation of Urban microclimate.**
- **Recreation and Ecotourism** activities like birdwatching, trekking, camping, river rafting, etc.
- **Contributes to Human physical and mental health and well-being.**
- **Others:** Boosts the market value of homes, increases productivity and job satisfaction etc.

Evolution of relationship between Nature and Cities

Agropolis (cities in pre-industrial era)	**Petropolis** (globalized cities of the industrial period)
Driven by natural elements.	Driven by fossil fuels and related amenities.
Close proximity to natural resources with limited impact on nature beyond city borders.	Materials and energy drawn in great quantities from all over the world.
Residents have close contact with natural environment.	Residents have little to no contact with green spaces.
Needs based demands.	Consumerist culture based on wants.
Relatively independent systems with low reliance on external inputs and supply chains.	Relatively dependent systems heavily reliant on external inputs and supply chains

IMPACTS

On Biodiversity:

- **Habitat destruction and degradation.**
- **Introduction of alien species** due to enhanced trade.
- Increased **Human wildlife conflict.**

On Natural environments:

- **Polluted terrestrial and aquatic ecosystems.**
- **Climate change:** increased mean temperatures, altered precipitation, acidification of aquatic environments etc.
- **Disruption caused by impermeable built infrastructure.**

On Humans:

- **Unstable cities:** high or extreme risk from pollution, compromised water supplies, extreme heat and natural hazards.
- **Exacerbates Urban heat.**
- **Economic losses and threat to Human health.**

Factors responsible for deterioration of cities' relationship with nature

- **Unplanned Urban expansion** that overlooks ecosystems and nature and prioritizes economic cost efficiency.
- **Resource intensive development with primary focus on economic growth.**
- **Advancements in technology** making extraction and use of natural resources easier.
- **Rise of Consumerist culture.**
- **Apathy towards nature** due to urban dwellers' reduced interaction with nature.
- **Commodification of nature.**
- **Linear metabolic system of most contemporary cities.**

Steps taken in India

- Climate SMART Cities Assessment Framework
- India cooling action plan
- AMRUT 2.0 & Swachh Bharat Mission-Urban 2.0
- Environmental, Social, and Governance Standards
- Green cities
- CITIIS (Cities Investments to Innovate Integrate and Sustain) Challenge

Way Forward

Transforming Urban Governance

- **Ecological planning in cities.**
- **Embedding nature-related considerations into economic and financial decisions.**
- **Measuring Ecological Footprint of cities.**
- **Enhancing investment in natural capital.**

Coordination among all stakeholders

- **Innovative inputs from various scientific, technological, and allied academic fields:** e.g., WEF's Biodiversity Challenge.
- **Awareness and public mobilisation.**
- **Efforts from private sector:** e.g., Coalition for Climate Resilient Investment (CCRI).
- **Global cooperation:** e.g., BiodiverCities; The Economics of Ecosystems and Biodiversity (TEEB)etc.