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# CONNECTING NATURE AND CITY: STRATEGIES FOR RESILIENT URBAN LANDSCAPES

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*Abstract*— **Urban landscapes are essential for urban development, providing public spaces, ecosystem services and preserving urban biodiversity. They are not only visually appealing but also contribute to a city's livability by providing recreational areas, enhancing public health, controlling the microclimate, lowering crime rates, fostering civic engagement, boosting urban food production and providing educational and capacity building spaces. Urban landscapes are most often considered a linked system and are considered an essential part of nature-based solutions for urban development. The role of these spaces in the provision of urban landscape services and sustainability is one of the major factors in designing resilience for cities. For sustainable future development of cities, urban resilience based on the theories and understanding of urban landscape ecology is quite essential. Therefore, urban designers and planners while designing and implementing policies should consider urban green areas to strengthen the existing ecological networks and their connectivity which can help in solving several urban challenges and help in the creation of future resilient cities and urban spaces that will support landscape services and consider overall human well-being. Incorporating nature and nature-based approaches in infrastructure, services and other related fields can help in achieving urban resilience. The decision-makers and designers should also consider that nature-based solutions should be designed, implemented and maintained in an effective way to increase urban resilience in an integrated or holistic manner and should look for practical ways to incorporate them. The paper will try to analyze the concept of urban resilience by inducing urban landscapes and their related nature-based strategies to strengthen cities resilience and also to frame an understanding of how designers and policymakers need to identify and assess urban environmental risks in reducing vulnerability and exposure by integrating smart policies and framework to make urban landscapes as part of an adaptive resilience strategy.**

*Keywords*— **urban resilience, landscapes, nature-based solutions, public spaces, ecosystem services**

## I. INTRODUCTION

Around the world, towns and cities are becoming more vulnerable to natural disasters, the effects of climate change, pandemics and disease outbreaks, criminal activity, civil unrest, terrorism, infrastructure failure, and resource shortages (Meerow & Newell, 2019). The security, well-being, and health of those who live in metropolitan regions are seriously threatened by these vulnerabilities. Urban resilience is now essential if cities are to survive and grow in the face of these dangers. "A system's capacity to absorb disturbance and reorganize while undergoing change so as to still retain essentially the same function, structure and feedbacks, and therefore identity" is what is meant to be understood when one speaks about resilience (Walker et al., 2004, p.5). According to Meerow and Newell (2017), an urban system includes a city's constructed infrastructure, governance networks, economic flows, socio-cultural dynamics, and ecological processes. Urban resilience thus refers to the ability of these interconnected systems across a city to withstand, adapt to, and recover rapidly from shocks and stresses without long-term damage to the city's fabric, functioning, or identity. Cities provide economies of scale, serving a big population, spurring innovation and economic progress, and generating employment. However, cities are also at the forefront of the causes and effects of significant environmental problems including pollution, climate change, and biodiversity loss. ("Smart, Sustainable and Resilient Cities: The Power of Nature-based Solutions," 2021). A city that is resilient possesses the ability to withstand and recover from any kind of adverse situation may it be natural or anthropogenic (Martino, 2023).

### NATURE-BASED SOLUTIONS – AN ALTERNATIVE

Nature-based solutions, or NBS, have been more popular recently as a vital strategy for building resilience in cities all over the world. "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" is how the International Union for Conservation of Nature (IUCN) defines NBS (IUCN, 2016). In order to increase a city's resilience, urban landscapes that include green spaces, urban forests, wetlands, rivers, and other ecosystems are essential NBS. First off, by absorbing abrupt shocks and controlling environmental extremes, robust urban ecosystems and green infrastructure can serve as the first line of defence against calamities like heat waves, storms, floods, etc. (Meerow & Newell, 2017). Secondly, continuous access and proximity to nature within cities promote public health and social cohesion – the foundations of resilient communities in the face of chronic stresses (Jennings et al., 2016). Thirdly, interlinked networks of urban green and blue spaces allow for sustaining biodiversity and critical ecosystem services like water regulation, microclimate regulation, food production etc. – the basis for urban resource security and self-sufficiency (Elmqvist et al., 2015).

NBS are important for urban areas on three levels:

- Within Cites – where they can provide natural shading and reduce urban heat island effects and cooling needs, manage run-off water, improve health and well-being by reducing air-pollution and offer recreational spaces.
- Around Cities – where they can form part of city-region interlink ages related to watershed management, recreational spaces, wildfire management, reduction and capture of CO2, sand and dust storm reduction measures.
- Away from Cities – where NBS can be applied to the procurement of goods and infrastructure as well as built environment decisions that influence urban supply chains (UNDP).

Some areas of Urban NBS include:

- Forested catchments that provide clean water and carbon sequestration
- Urban wetlands that increase water infiltration rate and reduces flood risks
- Urban and Peri-urban farms that reduces food miles
- Parks, tree-lined streetscapes, green roofs and building facades that mitigate the urban heat effect and accelerate water drainage while reducing noise pollution and energy demand for cooling
- City Parks that connect people to nature, provide recreational spaces and islands of biodiversity.
- Mangroves, dunes and healthy reef systems that protect coastal cities from storm surges (McKinsey, 2020)

Tree-shaded walking and cycling paths that provide combined ecosystem and mobility corridors particularly when linked to city-wide public space networks (UN Habitat, 2020). Thus, including urban landscapes in city planning and design appears to be a potential natural approach to increasing urban resilience. In addition to reviewing exemplary cases where green infrastructure and landscapes have enhanced urban resilience, this paper explores the connections between urban landscapes, ecosystem services, and resilience. It also analyzes important factors to take into account when leveraging urban landscapes for resilience goals and offers potential policy frameworks and guidelines for their effective adoption towards resilient and sustainable urban development.

## URBAN LANDSCAPES: ECOSYSTEM SERVICES AND RESILIENCE

According to Colding (2007), urban landscapes are the patchwork of green areas, water features, and other blue-green infrastructure scattered across cities that offer vital ecosystem services to city people. These landscapes support biodiversity conservation and regulate the microclimate, and carbon retention. They also strengthen the management of water and food production. Along with these they also offer spaces for recreation, cultural benefits, and several other functions that are essential to human health and well-being in cities. Such spaces range from managed parks, gardens, urban farms, and street trees to more natural features like forests, wetlands, rivers, and lakes (Gómez-Baggethun & Barton, 2013). The several services that urban landscapes offer and that overall contributes to resilience are:

- **Environmental regulation -** Through several processes like evapotranspiration, infiltration, reduction in effects of urban heat islands, and surface water attenuation, urban landscapes such as forests, wetlands, green roofs, rain gardens, etc., function as green infrastructures that modulate environmental extremes (Demuzere et al., 2014; Zölch et al., 2016). This regulating capacity aids in absorbing abrupt shocks and wards off cascade failures across interconnected city systems during disasters such as floods, storms, heatwaves, etc. (Meerow & Newell, 2017). For example, during heatwaves, urban trees can provide cool shade while urban wetlands can act as sponges soaking excess runoff (Matthews et al., 2015). Over time, interconnected and biodiverse urban ecosystems improve cities' ability to stabilize and self-regulate, making them more resilient to small-scale pressures like climate change (Elmqvist et al., 2015).
- **Provisioning Services -** Urban landscapes provide a range of provisioning services from food, water, fuel, and medicines to construction materials that support more self-reliant and circular urban resource flows reducing dependence on external resources (Colding & Barthel, 2013). The ability to sustain basic necessities on one's own during times of resource shortage is essential to the continued operation of urban systems. In addition to providing viable sources of income, productive urban environments also strengthen the ability of marginalized populations to withstand shocks and strains related to the economy (Barthel et al., 2015).
- **Supporting and Cultural Services -** Easy access to urban nature not only provides recreation but also a sense

of place, an element of social cohesion and several cultural ecosystem services that promote good physical and mental health in cities (Jennings et al., 2016). Strong social ties and community relationships serve as the backbone for building resilient neighbourhoods that can collectively prepare, respond and recover from disasters (Aldrich & Meyer, 2015). Besides, urban residents feel an emotional connection and stewardship responsibility towards local nature which can motivate pro-environmental behaviour and community-led greening initiatives to further urban sustainability (Andersson et al., 2014).

Thus, by offering a suite of interconnected services, biodiverse and well-managed urban landscapes strengthen the resistance, recovery and adaptive capacities across multiple facets of the urban system contributing to greater resilience during both sudden shocks and gradual stresses (Zhang & Li, 2018). While green infrastructure alone cannot guarantee urban resilience, it serves as an important nature-based solution and a healthy framework for resilient cities demands multifunctional and interconnected urban landscapes that support various ecosystem services (Meerow & Newell, 2017).

EXEMPLARY CASES OF URBAN LANDSCAPES FOR RESILIENCE

**Singapore: Active, Beautiful, Clean Waters Programme –** In order to balance dense development with blue-green infrastructure for improved liveability, Singapore provides an excellent example of how to integrate resilient, water-sensitive urban architecture throughout the city. By converting concrete canals and reservoirs into streams, rivers, and lakes that are connected with the surrounding parks, wetlands, and green corridors, the water agency PUB's "Active, Beautiful, Clean Waters Programme" combines stormwater management with recreational demands (Keesing et al., 2019). In addition to offering cultural services like beautiful views and active lifestyles that encourage community involvement in environmental stewardship, these blue-green places regulate water, thereby preventing floods.

**Seoul, South Korea: Restoration of Cheonggyecheon Stream –** Reviving lost urban ecosystems enhances environmental resilience and public health, as evidenced by the restoration of the Cheonggyecheon stream in downtown Seoul (Lee et al., 2015). According to Ryoo et al. (2015), turning a 5.8 km section of elevated freeway into a lush public corridor lowered summertime temperatures by 3 degrees Celsius. It also cut down on tiny air pollutants by 35% and allowed groundwater recharge, all of which led to an improvement in ecological control functions. As a well-liked tourist destination that draws up to 64,000 people every day, it also promotes cultural and recreational ecosystem services, reduces traffic and crime in the surrounding neighbourhoods by 30%, and enhances mental health and community vitality (Lee et al., 2015).

**New York City, USA: Staten Island Bluebelt –** Across 16,000 acres in an urban grid, the Staten Island Bluebelt uses the natural hydrological functions of the drainage corridors to provide services for storm water management alongside controlling floods and water pollution. (Gaffin et al., 2012). The Bluebelt improves water regulation capabilities and climate resilience by absorbing up to 80% of storm water runoff from impervious areas and preventing combined sewage overflows into nearby water bodies by integrating green infrastructure, such as rain gardens, within a larger blue matrix of wetlands, ponds, and streams (Gaffin et al., 2012). The resulting green-blue mosaic improves recreational areas and preserves biodiversity, both of which contribute to the well-being of the community.

**CRITICAL CONSIDERATIONS FOR URBAN LANDSCAPES AND RESILIENCE**

The following factors need careful evaluation when planning or restoring urban landscapes as part of a resilience strategy:

- Multifunctionality: Urban landscapes should provide numerous overlapping functions, such as management of stormwater, regulation of microclimate regulation, spaces for recreation, biodiversity conservation, etc. The provision of these varied spaces is for the purpose of maximizing ecosystem services, as opposed to optimizing only one function (McPhearson et al., 2015). For example, "maximizing the overlap between landscape adaptability, mitigation potential and quality of life benefits" was the main goal of Brisbane's climate-adapted landscape approach (Byrne et al., 2015, p.515).
- Connectivity: Isolated green patches only have a limited resilience value to offer. Developing interconnected corridors and networks of urban nature maximizes the continuity of ecosystem flows and services across the broader cityscape enabling regulation at landscape scale (Hansen & Pauleit, 2014). Tools like green infrastructure planning allow mapping landscape connectivity for strategic expansion along with aligning socio-ecological priorities (Lennon, 2015).
- Accessibility: The accessibility, visibility and distribution of urban landscapes determine the level of interaction with people and the utilization of ecosystem services in a region. Careful design and equitable distribution providing easy access for all communities is vital, especially for cultural services, recreation and community building which are intrinsic steps towards building social resilience (Jennings et al., 2016).
- Biodiversity: The richer the biodiversity of flora and fauna in urban ecosystems, the more stable and resilient the ecological cycles supporting critical regulation and provisioning services over time (Elmqvist et al., 2015). Maintaining native species and habitats wherever possible supports a complex web of symbiotic relations and genetic diversity that are key to self-regulation.

- Participation: Active community participation and environmental stewardship in urban landscapes can provide purpose, ownership and social capital that is critical for building grassroot community resilience during disasters (Appeaning Addo, 2017). Enabling participation through various activities like community gardening, adopt-a-park programs etc. can also effectively aid resilience.
- Governance: Coherent design, management, and long-term sustainability of urban landscapes depend on effective environmental governance that links public and private organizations, NGOs, and other stakeholders (Hansen et al., 2015). The frameworks for resilient urban landscapes can be institutionalized by incorporating resilience into municipal green space laws and plans.

Therefore, it is imperative to adopt a social-ecological systems perspective that emphasizes meaningful human interactions with urban nature in addition to biophysical resilience (Marcus & Colding, 2014). Urban landscapes can be successfully developed as interconnected, community-centric and bio diverse green-blue infrastructure systems to serve as strong nature-based solutions for enhancing the resilience of cities and their residents in today's times, provided that policy changes and careful planning are implemented.

## II. METHODOLOGY AND STUDY AREA

The methodology set for the paper involves a combination of methods that includes site visits and interviews for primary data collection; and literature study, archival research and survey reports for secondary data analysis. For the study to be carried out, three study areas were selected, the first study area comprised of Lodhi Garden and the second being Sunder Nursery in Delhi. These were selected on the basis that were surrounded with different communities and were also used by those communities for different purposes. Apart from community services these areas also acts a biodiversity spot with their natural vegetation and their related ecosystem services. For the third study area, Jahanpanah City Forest in Delhi was selected to analyse how urban forests interact within their settings and how they also help in mitigating the urban climate impacts. These selected parks also acts as elements of urban resilience within the built context in the city.

### STUDY AREA: DELHI

Delhi's urban parks, such as the renowned Nehru Park, Garden of Five Senses and the historic Lodhi Gardens, Sunder Nursery and Coronation Park and also the city's urban forest emerge as a critical component in fortifying the city's resilience and landscape management. In the face of rapid urbanization and associated challenges, these spaces contribute significantly to the city's overall resilience by providing a range of environmental, social and economic benefits. From the environmental point, Delhi's park and forests acts as essential carbon sinks and contributors to the biodiversity conservation. These green lungs within the urban landscape play a pivotal role in carbon sequestration, helping to mitigate the impact of urban pollution and thus contributing to the fight against climate change. The presence of diverse plant species in these parks also fosters biodiversity, supporting various flora and fauna in the midst of an otherwise densely populated urban environment. The sustainable design of these parks and urban forests is often characterised by the use of native plant species and water conservation practices. Native plants are adapted to the local climate, requiring less maintenance and water, which contributes to the overall sustainability of the park. Water features within these spaces are often designed with sustainable water management in mind, promoting responsible usage and reducing the strain on local water resources. Moreover, Delhi's parks also contribute to the social resilience by providing essential recreation al spaces for different communities. These areas serve s platforms for different physical activities, community events and cultural gatherings fostering social cohesion and evoking a sense of community. The availability of such green spaces in particularly is very crucial in urban environments where the hustle and bustle can sometimes leads to social isolation. Also during times of stress or crisis, these spaces become sanctuaries for residents, offering spaces for relaxation, contemplation and social interaction as evident from the recent pandemic of Covid-19. Several studies conducted by different researchers have highlighted the positive impact of green spaces on human mental health and overall well-being; also access to nature within urban areas has been associated with reduced stress levels, improvement in mood and enhancing cognitive functions. Therefore, the presence of well-maintained green spaces in Delhi contributes significantly to the city's social resilience by supporting the mental and emotional health of its residents. Economically, well designed parks can also have positive effects on property values and local business. Additionally, the recreational and cultural events held in these spaces can also stimulate local economies by attracting visitors and supporting nearby businesses.

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Table 1: Categorization of Green Areas along with activities as per the Master Plan of Delhi (MPD), 2021 and 2041 [Source: Master Plan Delhi (MPD), 2021 and 2041]

| Sl.No. | Category | Permissible activities as per master plan 2021 |
|---|---|---|
| 1 | Green Belts | Forest, vegetation belt, bird sanctuary, biodiversity, police post, fire post, veterinary centre, dairy farms |
| 2 | Regional Parks | Ridge, residential flat for watch and ward, picnic huts, shooting range, zoological garden, bird sanctuary, botanical garden, open air theatre, police post, fire post, orchard, plant nursery |
| 3 | City Parks | Aqua/water sports park, arboretum, botanical garden, national memorial, amphitheatre, open playground, aquarium and activities permitted under District Park |
| 4 | District Parks | Theme parks, recreational club, national memorial, open air food court, children's park, orchard, plant nursery, area for water harvesting, archaeological park, specialized park, amusement park upto 10 ha, sports, activity, playground, amenity structures, restaurant in District Park of area over 25 ha. |

**SITE 1: LODHI GARDENS, DELHI**

Lodhi Garden, which covers 90 acres, is a picturesque haven that provides a break from the bustling streets of Delhi. Vast verdant lawns and beautiful flower beds adorn the area. The garden's grounds are embellished with an assortment of ancient trees. The park is preoccupied with both local and foreign visitors who come here for morning walks, picnics, and leisurely strolls. There is a fascinating past to Lodhi Garden as the garden is named after the Lodi dynasty, who previously ruled over Delhi and dates back to the fifteenth century. Indeed, the park also houses the architecturally remarkable tombs of a number of Lodhi dynasty monarchs. These tombs provide a window into Delhi's illustrious history and are a beautiful example of Indo-Islamic architecture (Srivastava, 2023).


Fig. 1. Social analysis highlighted that the most frequent activities during the morning and evening. During the morning hours primarily middle aged to elder people can be seen in the park for walks, socializing and exercise. During evening times, people belonging to different aged groups can be seen in the park actively participating in different events. (Source: Author)

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Fig. 2. Sustainable materials such as perforated pavers, rammed earth, kota stone are used in the pathways to help in water percolation. (Source: Author)


Fig. 3. The vegetation are been done in 4 zones – high density zones, moderately planted zones, shrubs along the open spaces and open lawns along the monuments. These planting strategies were used to highlight full, minimal and partial enclosure within its premise. (Source: Author)

**SITE 2: SUNDER NURSERY, DELHI**

Sunder Nursery, also known as Delhi's Heritage Park, is a peaceful urban oasis within the busy national capital. The park was opened to the public in the year 2018 after ten years of landscape and restoration work done by the Aga Khan Trust for Culture, in collaboration with the Central Public Works Department and the Archaeological Survey of India. Inspired by the ancient Indian concept of congruency between nature, garden, and utility combined with environmental protection, Landscape Architect, Late Mohammed Shaheer produced the master plan for the landscape (Verma, 2018). Delhi has four prominent types of ecosystems that has been incorporated into

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the park' namely; dabur (marshy), kohi (hilly), khadar (riverine) and bangar (alluvial) that attracts various avi-fauna and insects (Ghosh, 2020). Marble fountains in the shape of lotuses can be found in the Mughal-inspired gardens that line the central vista. Water courses across terraced sandstone paths and geometric flowerbeds. Encircling a lake on the northern border of the central vista will be paths, benches, and pavilions. For cultural events, an amphitheater has also been constructed. In addition to collecting rainwater, the lake would act as a reservoir in case of emergencies (Verma, 2018).

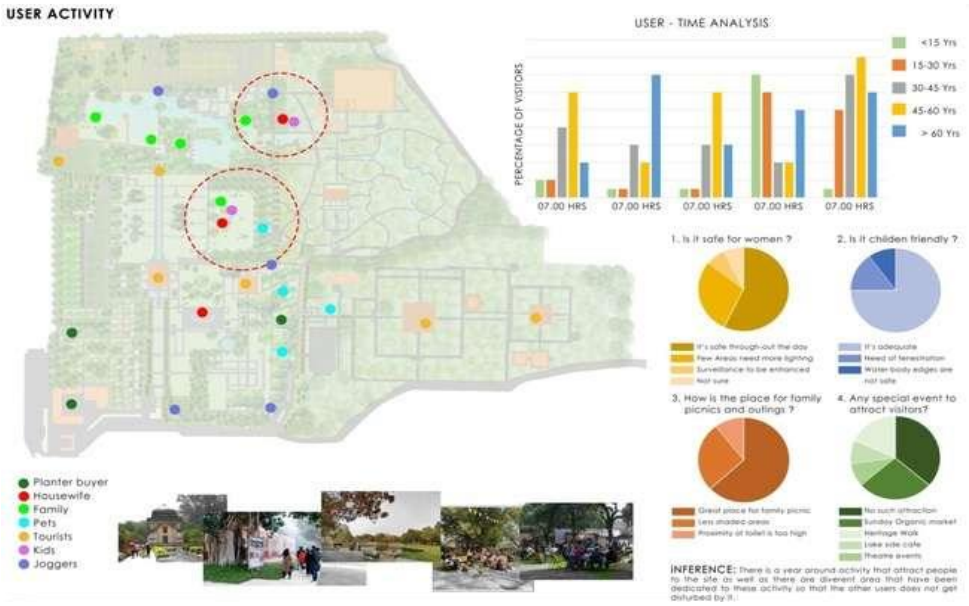


Fig. 4. User Group Analysis at Sunder Nursery located in Delhi where it was seen that the majority of the user groups ranges in the age group belonging to 45-60 years residing in the nearby communities of Sunder Nagar, Nizamuddin and Jangpura (Source: Author)

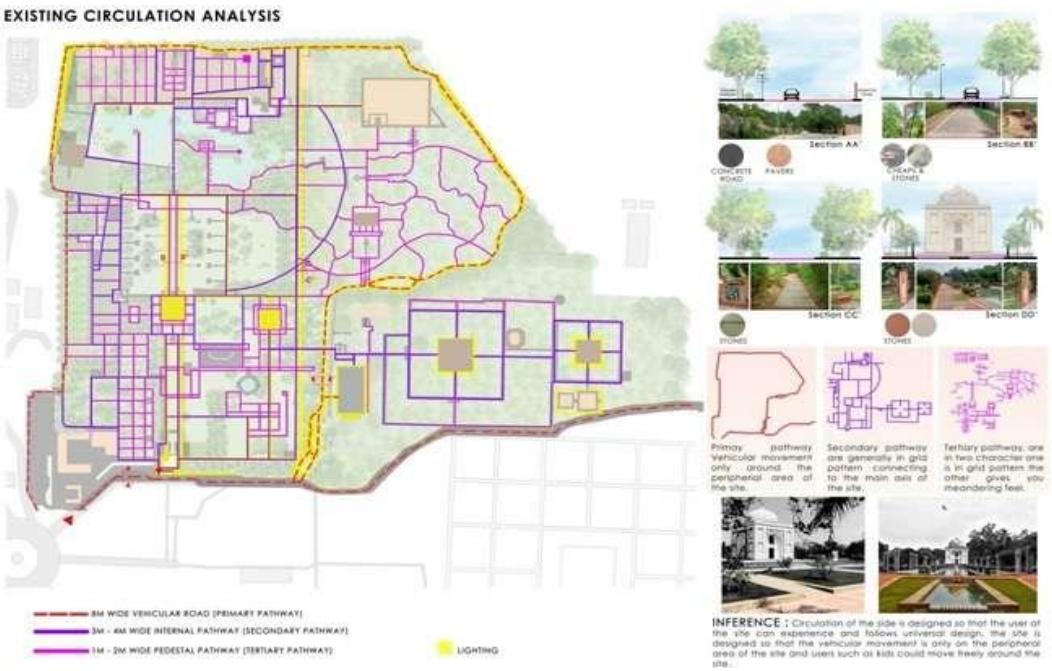


Fig. 5. Circulation Pattern designed in the park was divided into three categories: primary, secondary and tertiary catering to the different user-groups coming to the park and also the overall layout of circulation pattern is in form of a grid layout (Source: Author)

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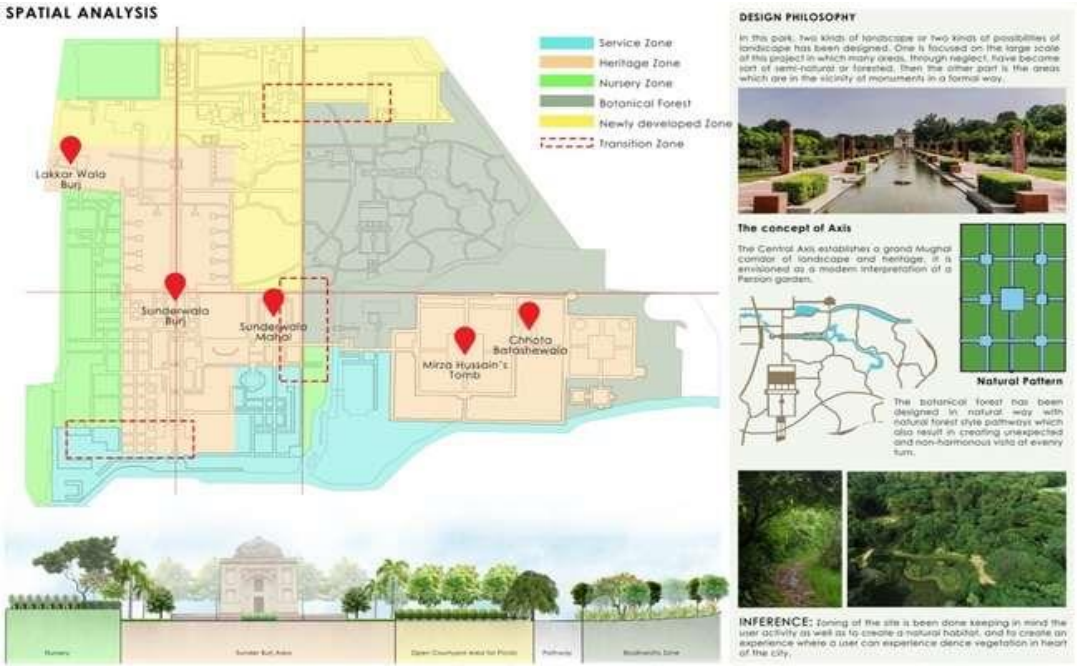


Fig. 6. Spatial Analysis of the Garden showcased that the entire garden is divided into 5 broad zones, namely, Service Zone, Heritage Zone, Nursery Zone, Botanical Garden and Newly Developed Zone. The Newly Developed zone comprises of the café and redesigned lake area which acts as a buffer and boundary to the National Zoological Garden located at its end. Each of these zones is simultaneously followed by a transition zone. (Source: Author)

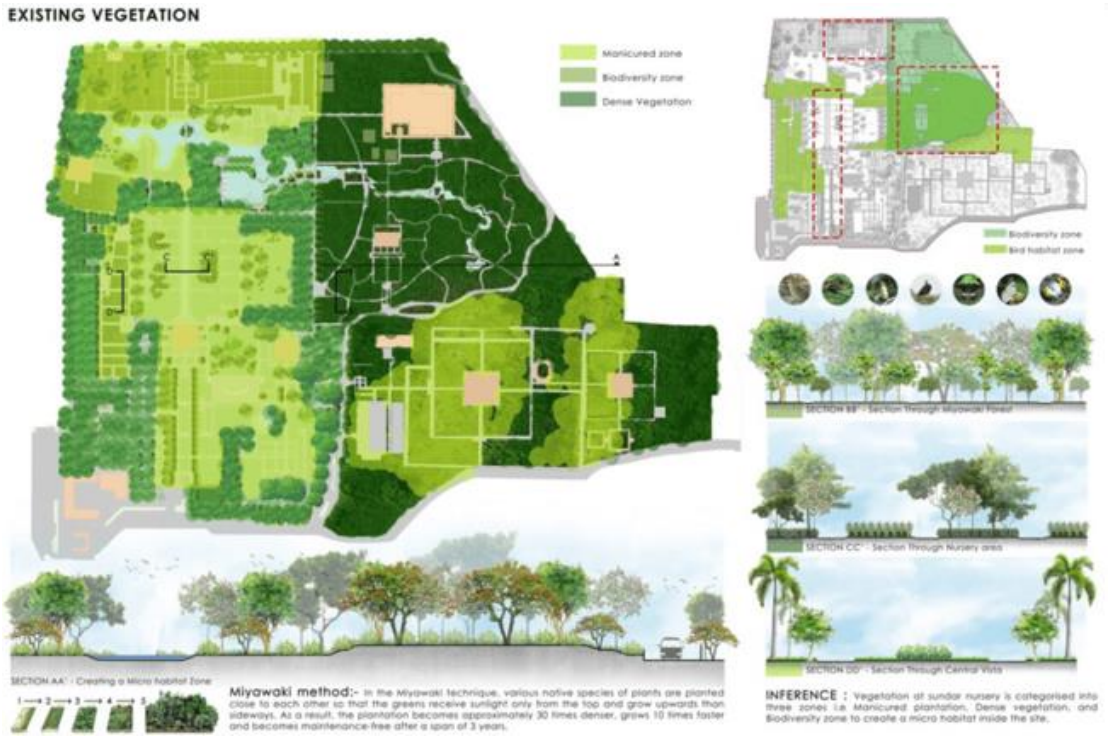


Fig. 7. Existing vegetation patterns consisted of the manicured zones on the entrances and near the tombs highlighting the heritage significance, biodiversity zone and densely vegetated zone are along the periphery areas and towards the Eastern part of the garden. The densely vegetated was designed using the Miyawaki method that helped further in creating a micro-habitat. (Source: Author)

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### SITE 3: JAHANPANAH CITY FOREST, DELHI

The location of Jahanpanah City Forest is in South Delhi. It is a 435-acre park with thick forests located in Delhi. The Masjid Moth DDA Flats, Balvantray Mehta Vidya Bhawan School, Dhobi Ghat, Sheikh Sarai, Chirag Delhi, Tughlakabad Extension, Batra Gate, and Greater Kailash II are the entrance points to the park. Jahanpanah City Forest is one of the many City Forests in Delhi that are protected by the Forest Department that acts as a lung space between the hustle and bustle of the concrete jungle. The park features over 100 species of birds, including peacocks, kingfishers, and parakeets, animals species like jackals, wild boar, nilgai, squirrels and mongooses, and wide range of trees, including neem, mango, jamun, and banyan The forest's numerous varieties of indigenous tree species and are used by the surrounding societies for their morning stroll and other activities (Jahanpanah City Forest, a hidden and serene oasis in Delhi, 2023).


Fig. 8. The user and social analysis at Jahanpanah City forests reveals that the primary activities taking place are the yoga sessions and exercise during the morning and evening times by the people residing at the nearby communities mainly of the age-group ranging from 45-60 years. (Source: Author)

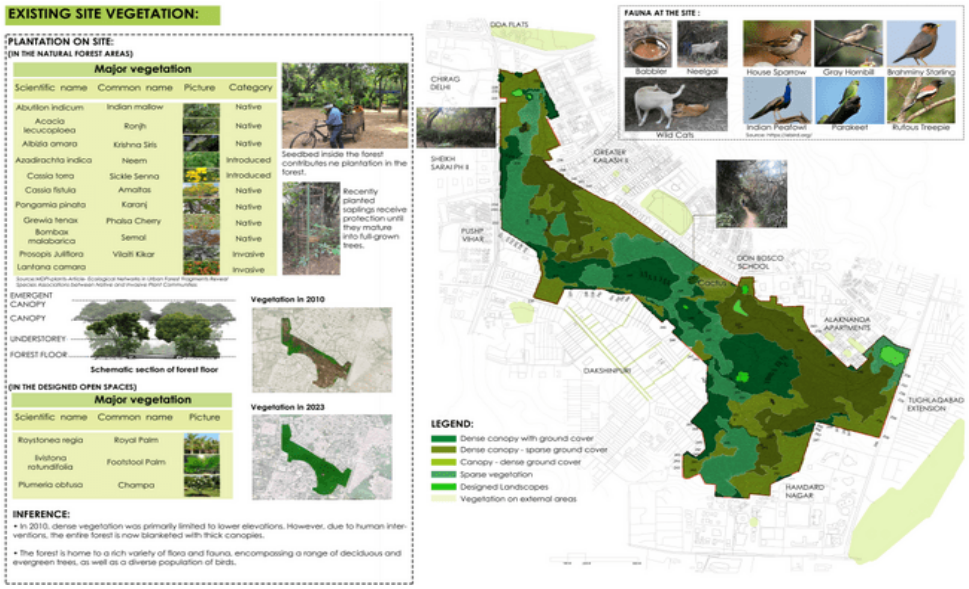


Fig. 9. The vegetation analysis showcased the growth of vegetation pattern from 2010 to 2023 where more than 70 percent of the forest is planted with indigenous species. This further also acts as a carbon sink for the dense populated city of Delhi. Major vegetation species includes in the natural settings Bombax malabarica, Acacia lecucoploea, Azadirachta indica, Cassia fistula and in the designed spaces Roystonea regia, Livistona rotundifolia and Plumeria obtusa. (Source: Author)

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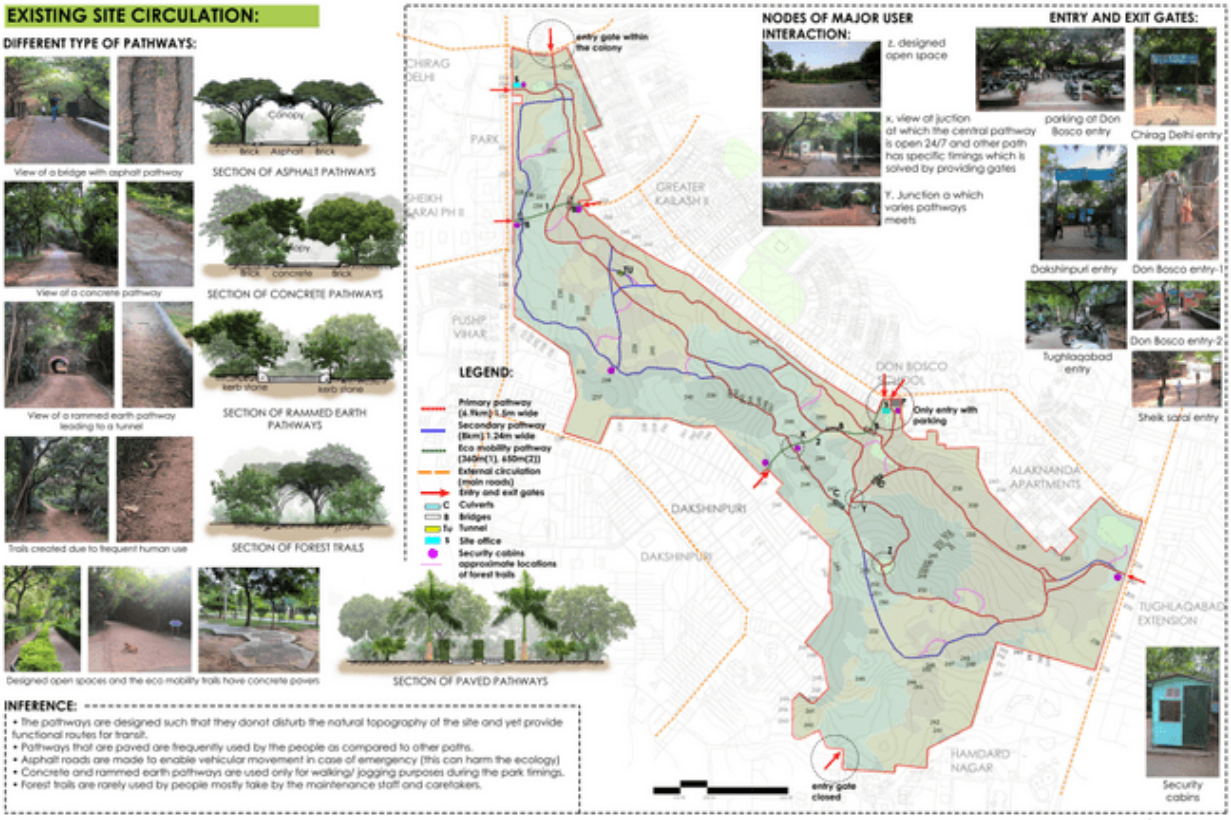


Fig. 10. The circulation analysis highlights that the forest has primary entries along the communities to allow access for the people living in those areas. The major element used in the pathways is rammed earth to help in ground water recharge and also to make it more sustainable. (Source: Author)

## III. FINDINGS AND ANALYSIS

Upon analysis through site visits, observations, interviews and literature surveys, following findings were noted:

- Both the parks namely, Lodhi Garden and Sunder Nursery were designed as public open green spaces even though historical monuments were located within its precincts. These historic structures and monuments add as an element of identity and mystery to these parks.
- The primary user group for these parks were the people and the communities living within or nearby as they use these spaces for morning walks, yoga, exercise, outdoor picnics, cultural events and festivals which also uplifts the well-being of the surrounding communities.
- Weekdays has the maximum footfall during the morning and evening hours whereas on weekends on afternoon.
- One of the interesting facts that were observed in these gardens was that during the winter seasons of January 2024 when the mercury level has relatively dropped down, maximum people have gathered in these areas to sunbathe. Many book readers have found their niche corners upon these green areas.
- Jahanpanah City Forest falls under the scheme of DDA (Delhi Development Authority – City Forests scheme) urban forest pockets which have been developed for the citizens with the purpose of providing eco system services like air purification, ground water recharge, carbon sequestration, pollution mitigation, nature-based healing, wellness education, awareness and ecotourism. The department till now has developed 17 city forests within the city with proposal for adding 4 more.
- All these parks and forests acts a space for resilience as they help in combating the effects of climate change and overall as a carbon sink for the city and also helps to mitigate the urban heat island effects, improving the micro-climate of the surrounding communities and as well as safeguarding the urban biodiversity of the city. Moreover, during disasters these open green spaces also acts as a refugee to the communities.

## IV. POLICY FRAMEWORKS AND GUIDELINES THAT CAN BE IMPLEMENTED FOR FUTURE PROJECTS

At the city level, the implementation of sustainable landscapes requires the assistance of governance mechanisms such as statutory plans, policy mandates, partnerships, and practical resources. Only then can the potential of multifunctional and

interconnected urban landscapes within resilient city plans be realized. Several important frameworks consist of:

- Resilient Urban Forest Plans: Proactively planning for urban forest cover, connectivity and diversity tailored to local threats and community priorities using participatory planning tools that map out long-term priorities, guidelines for afforestation along with its targets, conservation and community stewardship programs (Ordóñez Barona, 2015).
- Climate-Resilient Park Policies: In order to meet climate adaptation goals, park/recreation master plans should incorporate adaptable site-level green infrastructure additions with elements like bioswales, rain gardens, floodable lawns, diverse plant palettes, etc. (Byrne et al., 2015).
- Water Sensitive Planning Schemes: Landscape-oriented rainwater management policies like Singapore's 'Active, Beautiful, Clean Waters' approach that coordinate public agencies and developers to integrate blue-green infrastructure for source control and decentralized stormwater treatment across catchments (Keesing et al., 2019).
- Incentives for Resilient Landscapes: Green plot ratio bonuses, stormwater credits, direct subsidies etc. are financial and developmental incentives that encourage private developers to incorporate prescribed green infrastructure to enhance ecosystem services during construction (Demuzere et al., 2014).
- Capacity Building Networks: Utilizing regional networks such as the Resilient Melbourne program, which involves participatory planning and capacity building for green infrastructure projects, a means for knowledge exchange is created about real-life landscape practices between various communities, experts, and government (Resilient Melbourne, 2019).

## V. CONCLUSION

In conclusion, urban resilience is of the utmost importance now because of the growing dangers that cities face from natural catastrophes, disease outbreaks, climate change, infrastructure failure, and declining resources. Rethinking conventional urban planning and design is essential to achieving self-sufficiency and resilience to disturbances and long-term stressors. In this setting, green infrastructure and urban landscapes have become essential nature-based solutions that can improve many aspects of cities, including sustainability, liveability of a place, and resistance to disasters. The multifunctional ecosystem services that biodiverse and interconnected urban landscapes offer-be it resource provisioning, environmental regulation, benefits to physical and mental health, or risk mitigation, then they together strengthen the capacity for resilience, recovery, and adaptation across interconnected social and ecological sub-systems in cities. These green-blue networks can significantly increase cities' ability to resist and adapt to change in the face of abrupt or gradual adversity without losing functionality when thoughtfully incorporated into bigger resilience frameworks.

However, by means of careful planning, regulatory adjustments, and multi-stakeholder cooperation we can configure urban landscapes as accessible, biodiverse, participative, and interconnected systems at many scales for effective adoption in building resilient cities. To build more climate-resilient urban settings, it is important to take advantage of the socio-ecological potential of green infrastructure. Communities and local governments can be further supported in implementing resilience landscaping strategies via regional capacity development networks and useful resources.

To put it in brief, urban landscapes that adopt integrated landscape approaches, and are managed by active community stewardship and supportive governance mechanisms, can effectively promote sustainability and resilience in cities. Such an approach offers a nature-based solution that maximizes the multi-functional potential of urban landscapes. Future research should focus on assessing real-world examples and examining implementation frameworks to guide evidence-based planning policies that leverage resilient urban environments.

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