Perspective for sustainable future in urban landscape of Delhi, India

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ABSTRACT

The air quality of Delhi has been alarming over the past few years and as per the data base of World Health Organization, the city has exceeded the limits of clean air guidelines. United Nations Sustainable Development Goal 11 promotes to make cities inclusive, safe, resilient and sustainable. This short note attempts to indicate the perspective of sustainable future in the urban land scape of Delhi. It is well recognized fact that urban areas need to conserve and promote biodiversity for enhancing the urban resilience. Environment awareness programmes where residents take part voluntarily is the need of hour. Moreover, effective environment awareness would help individuals adopt green habits so that the future generation will have greener environment.

Figure : 01	References : 28	Table : 01

Introduction

Urbanization is one of the major factors leading to land use change of a region which has led to the development of a large number of cities[7]. The proportion of the global human population inhabiting urban areas has rapidly increased over time, rising from 2% in 1800 to 47% in 2000 [8, 16,17]. The human population is expected to rise to be about 9.3 billion in 2050 and it is predicted that 66% of people would live in urban areas[8,17]. Urban areas have been the most severely impacted by the increase in land degradation for the past two decades[22]. Factors like habitat loss, competition from introduced species, human demand for certain species and products, and rapid environmental changes are contributing to biodiversity loss[10]. Promoting and preserving biodiversity within urban green-space is one way to decelerate the rapid rate of biodiversity loss as the world becomes more urbanized[1].

United Nations Sustainable Development Goal 11 promotes inclusive, safe, resilient, and sustainable cities. Resilient and sustainable urban development depends on policies and practices that prioritize access to basic services, affordable housing, efficient transportation and green spaces for all[27]. There is growing recognition of urban areas to conserve and promote biodiversity and parks, which are biodiversity hotspots in the cityscape[20]. This short note attempts to indicate the perspective of sustainable future in the urban landscape of Delhi.

Delhi, the capital of India and one of the most densely populated cities in the world covers an area of 1,483 sq. km with forest cover[14] of 195.28sq.km. As per Census of India[5], 2011 the city is having population of 1.6 crore. It is geographically located in the coordinates of 76.84°E, 28.41°N, by 77.35°E, 28.88° N; and characterized by hot & dry summers and cold winters[15]. Rainfall is dominated by monsoonal weather pattern, with

TABLE- 1 : Urban biodiversity parks in Delhi

S.No.	Name of the biodiversity park	Area of the park	Provisions
1.	Yamuna Biodiversity Park	184 ha	
2.	Aravalli Biodiversity Park	280 ha	✓ Eco-system services
3.	Northern Ridge	87 ha	✓ Eco-tourism
4.	Tilpath valley Biodiversity Park	70 ha	✓ Research opportunity
5.	NeelaHauz Biodiversity Park	3 ha	✓ Environment Education
6.	Tughlaqabad Biodiversity Park	130 ha	
7.	Kalindi Biodiversity Park	167 ha	

Source: Delhi Development Authority, https://dda.gov.in/biodiversity-parks

maximum rainfall occurring from June to September. Delhi has presence of threatened spp. viz. Hog deer (Endangered), Striped Hyena (Near Threatened), Leopard (Vulnerable), Sambar (Vulnerable)[18]. More than 400 bird species have been recorded from Delhi and adjacent areas, including resident and migratory species; of these, nearly 30 species were identified as globally threatened [4]. Rapid urbanization in the city has resulted in increased pollution, decreased water percolation into ground, lesser green cover and urban heat island phenomenon[15].

Biodiversity conservation

Conservation approaches for urban biodiversity depends upon the people who live in the cities and recognition of their experiences[21]. A study[25] identified the conservation actions undertaken by urban environmental managers *viz.* managing threats (*eg.* weeding, pest control, fencing), restoring grasslands, native species, adding structures like nesting hollows, governance, and coordination/outreach through community science program. The creation of biodiversity parks is regarded as one of the most innovative techniques to address the issue of biodiversity loss [22]. As on date, Delhi has seven urban biodiversity parks (Fig. 1 and Table-1). These parks play important role in achieving Target 3 of Kunming-Montreal Global Biodiversity Framework[9] which calls for the conservation of at least 30% of terrestrial, inland water, coastal and marine areas globally through "well-connected systems of protected areas and other effective area-based conservation measures, recognizing Indigenous and traditional territories". Also conservation of these urban green spaces is most beneficial for urban heat mitigation[11].

Clean Air

The air quality of Delhi has been alarming over the past years and as per the database of World Health Organization the city has exceeded the limits of clean air guidelines. The worst air quality has been responsible for 10,000 premature deaths per year in Delhi [6]. To improve the air quality in Delhi, National Clean Air programme was launched in year 2019 in 130 cities (non-attainment cities and Million Plus Cities) including Delhi. It enforces stringent adherence to set emission regulations, acknowledging that various sources like industries, vehicles, construction, open biomass burning and dust from roads are responsible for air pollution in Delhi [13, 26]. To monitor the implementation of programme, cities have been mandated to submit quarterly progress report on 'PRANA' portal. Delhi's action plan include mechanical road sweeping, water sprinkling using treated sewage water, solid waste management, Construction & Demolition waste management *etc.*[23]. It has been reported[12] that the air pollution's cross-sectoral and cross-regional nature calls for cross-state/cross-departmental coordination, thereby an 'airshed management approach' to be considered to compliment city's efforts with the regional efforts.

Further Ministry of Environment, Forest and Climate change is implementing *Nagar Van Yojana* which envisages developing *nagar vans* [urban forests] in order to significantly enhance ecological benefits in urban and peri-urban areas[19]. It involves local communities, NGOs, local bodies, educational institutions to conduct activities like plantation of native shrubs, tree species, soil - moisture conservation measures and fencing. Local

Fig. 1 : Wetland inside Yamuna Biodiversity Park of Delhi which provides habitat for various migratory birds

municipalities and urban local bodies may also focus on the legal provisions for biodiversity and mobilize resources by leveraging corporate social responsibility funding[24].

Circular economy

Circular economy is a useful tool for enhancing the world's sustainability wherein all the products are recycled and no waste is sent to landfills, incineration or other disposal methods. Circular economy development model provides environmental benefits by demonstrating waste management benefits[28]. For example, ash which is generated from coal or lignite based thermal power plants have been mandated to be utilised for eco-friendly purposes like Fly ash based products *viz.* bricks, blocks, tiles, fibre cement sheets, pipes, boards, panels; cement manufacturing, ready mix concrete *etc*[3] . Therefore, fly ash being a waste product transforms into a valuable resource and promotes circular economy in sectors like infrastructure. Additionally, Plastic Waste Management Rules, 2016, and the Plastic Waste Management Amendment Rules, 2021, enforces Extended Producer Responsibility (EPR) for plastic packaging, mandating

recycling and reuse[19]. Through the EPR regulations, the producer, importer or brand owner who introduces the product in the market are obligated under law for its environmentally sound management after end-of-life of such products.

Conclusion

A report of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services revealed that almost half (47%) of threatened terrestrial mammals, excluding bats, and about 23% of threatened birds may have already been negatively affected by climate change in atleast part of their distribution[10]. It is very crucial to understand, recognize the importance of urban biodiversity and preserve the same as the quality of life, well being of urban residents is linked to it. Environment awareness programmes where residents take part voluntarily is the need of hour. *Great Backyard Bird Count-India* wherein over 100 birders in Delhi explored bird diversity in their neighbourhood highlighted the importance of scientific documentation and community engagement[2]. Such scientific knowledge can be used in urban planning and management thereby

maintaining the ecological services to secure sustainable future. Moreover, effective environment awareness will help individuals adopt green habits so that our future generation have greener environment.

Conflict of interest/Competing interest

The authors have declared that there is no conflict of interest. Perspective for sustainable future in urban landscape of Delhi, India

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