



Dhaka Without Nature?

**Rethinking Natural Rights
Led Urban Sustainability**

Executive Summary



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Over the past four decades, Dhaka has undergone profound ecological transformation. Driven by rapid urbanization, real estate development, and the centralization of economic activities, the city's natural environment-wetlands, tree cover, and open spaces-has steadily eroded. Built-up areas have expanded aggressively, fragmenting hydrology, undermining biodiversity, and sharply increasing surface temperatures. By 2024, maximum average land surface temperature (LST) in parts of Dhaka reached 39.8°C, with low-income communities suffering the most due to poor ventilation and lack of access to green areas.

This study offers a natural rights-based ecological audit of Dhaka from 1980 to 2024, using satellite imagery, GIS-based land use and land cover (LULC) analysis, and LST mapping. The analysis reveals a disturbing trajectory-one where urban growth consistently violates the rights of nature. The study is grounded in the Natural Rights framework, which asserts that nature is not merely a resource but a living entity with the right to exist, flourish, and regenerate. It argues that Dhaka's development, as currently pursued, is both environmentally unsustainable and ethically flawed.

Methodology

The study adopts a mixed-methods approach. Landsat satellite imagery (1980–2024) was analyzed using Google Earth Engine, classifying land into five categories: waterbodies, tree cover, grass/agriculture land, barren land, and built-up areas. A directional analysis traced the spatial growth of the city. LST data for 1990 and 2024 was derived through thermal band processing. ArcGIS was used for spatial mapping. Combined, these tools provide a disaggregated, temporal view of urban ecological decline.

State of Nature (Land Use Change): 1980–2024

Table: Land Use change Estimation of Dhaka Mega Urban

Class	Waterbody		Tree cover		Grass & Agriculture		Vacant land		Built-up Area	
Year	Area (Sq.Km)	%	Area (Sq.Km)	%	Area (Sq.Km)	%	Area (Sq.Km)	%	Area (Sq.Km)	%
1980	37.3	12.3	65.7	21.6	168.8	55.4	11.7	3.8	20.7	6.8
1990	24.1	7.9	49.9	16.4	178.3	58.5	16.5	5.4	35.8	11.8
2000	16.8	5.5	47.1	15.5	152.1	50	18.1	5.9	70.2	23.1
2010	19.3	6.3	41.9	13.8	111.3	36.6	26.2	8.6	105.7	34.7
2020	20.1	6.6	37.5	12.3	76.6	25.2	39.3	12.9	130.6	42.9
2024	14.7	4.8	35.3	11.6	74.4	24.4	31.1	10.2	148.8	48.9

Dhaka's built-up area expanded from 20.7 km² (6.8% of total land area) in 1980 to 148.8 km² (48.9% of total land area) by 2024. This growth has come at a significant ecological cost:

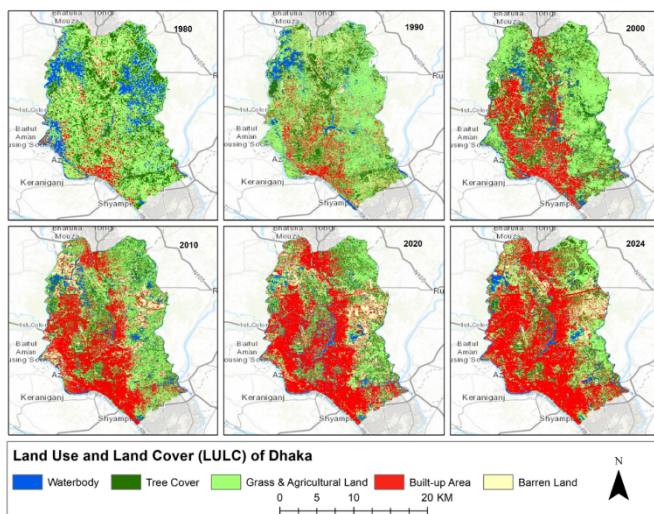
- Grass/agricultural land declined from 168.8 km² to 74.4 km² (total 56%)
- Tree cover reduced from 65.7 km² to 35.3 km² (around 50%).
- Waterbodies shrank from 37.3 km² to just 14.7 km² (61%).

In Dhaka North City Corporation (DNCC):

- Built-up area rose from 9.1 to 93.2 km².
- Grass/agriculture decreased from 108.4 to 51.2 km².
- Tree cover dropped from 45.8 to 25.0 km².
- Waterbodies fell from 32.7 to 10.6 km².

In Dhaka South City Corporation (DSCC):

- Built-up area grew from 11.7 to 55.6 km².
- Grass/agriculture fell from 60.3 to 23.2 km².
- Tree cover declined from 19.9 to 10.3 km².
- Waterbodies remained nearly static, at around 4.1 km².



Tree loss was most severe in the southeast and northeast. In DNCC, thanas like Adabar (0.02 m²), Rampura (0.38 m²), and Kafrul (0.39 m²) fall drastically below the WHO standard of 9 m² of green space per person. Only a few thanas, such as Bimanbandar (77.8 m²) and Uttarkhan (44.8 m²), meet or exceed it. Similarly, in DSCC, many areas such as Bangshal, Wari, and Sutrapur offer less than 0.5 m² of green space per capita.

Waterbody access also remains far below the required benchmark of 4.5 m² per person in most thanas. DNCC, in particular, experienced

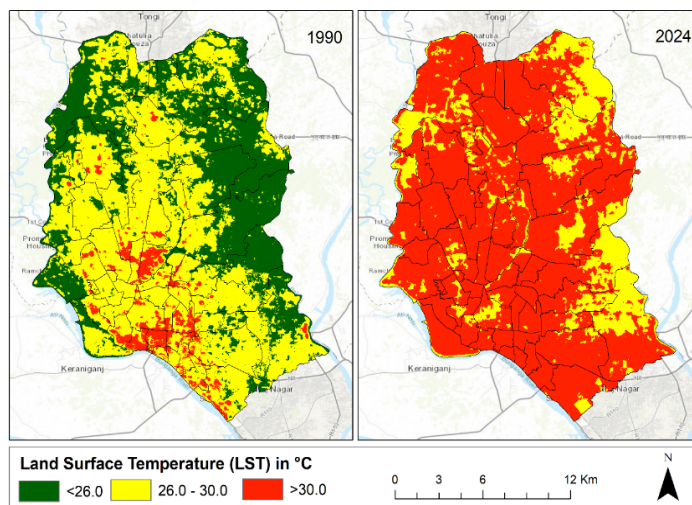
steep waterbody loss in its east and west zones. DNCC has 1.79 m² per person and DSCC has 0.97 m² per person waterbody.

Land Surface Temperature (LST) Trends

The thermal impact of ecological loss is stark:

- In 1990, 56.3% of Dhaka had standard-range LST (26–30°C); by 2024, this dropped to 21.7%.
- Areas above 30°C grew from 5.3% in 1990 to 78.3% in 2024.

- By 2024, no part of the city remained below 26°C.



DNCC:

From 2000 to 2024, the share of land above 30°C grew from 2.9% to 79.2%, while below-standard zones (cooler areas) disappeared completely.

DSCC:

The pattern is similar—an 80% share of the city now suffers from excessive surface heat, particularly in high-density localities with limited green space.

Heat vs. Land Use: A Thana-Level Analysis

Thanas with high built-up density and low vegetation record the highest LST. For example:

- Tejgaon Shilpa Elaka: 63.91% built-up, 9.69% tree cover, 33.08°C LST.
- Rampura and Darussalam: Both exceed 32°C LST with very low tree coverage.

In contrast, greener areas show cooler temperatures:

- Uttarkhan: 27.92% tree cover, 10.45% built-up, LST of 29.80°C.
- Shah Ali and Cantonment: LSTs between 30.5°C and 31.1°C.

DSCC shows a more severe heat profile. Shyampur and Hazaribag—with 88.8% and 82.3% built-up area respectively—have LSTs well above 32.7°C. Thanas with better vegetation (e.g. Demra, Khilgaon, Shahbag) record lower LSTs of around 30–30.5°C.

Discussion and Recommendations

Dhaka's unchecked urbanization has triggered serious ecological degradation, particularly in DSCC where tree cover and per capita green space are alarmingly low. The urban heat island effect, driven by loss of vegetation and spread of impervious surfaces, has made much of the city thermally unsafe. If Dhaka achieves the minimum ecological standards of **9 m² of tree cover** and **4.5 m² of waterbody area per capita**, the city could experience an average reduction in land surface temperature (LST) of approximately **1.01°C**.

Parks like Ramna and Shahbag demonstrate the cooling benefits of green infrastructure—temperatures drop by 2–3.5°C inside these spaces. But such areas are rare and unevenly distributed. The degradation of waterbodies, pollution of canals, and rampant land filling continue unchecked due to weak governance and institutional fragmentation. Agencies like RAJUK and REHAB have prioritized commercial expansion over ecological safety, while coordination among DNCC, DSCC, MoEFCC, and others remains inadequate.



To reverse this trajectory, the report recommends:

Actions	Concerned Stakeholders
0–3 Years (Short-Term)	
1. Following the Recent Judgement of International Court of Justice legislate Nature’s Rights in Bangladesh.	MoEFCC, MoLGRD, MoLaw, RAJUK, DNCC, DSCC
2. Ban filling of natural forest, canals, ponds, and wetlands and declare such actions as Crime Against Nature	
3. Reform the Detailed Area Plan (DAP) with clear ecological buffers; and declare Urban Ecologically Critical Zones; legally restrict Floor Area Ratio (FAR) in eco-sensitive zones.	
4. Form Community Stewardship (guardianship) Model to Protect Natural Resources	
5. Enact mandatory green zoning and eco-compensation; Embed equity metrics into DAP and zoning laws.	
6. Implement tree census, ecological audit, afforestation zones, green rooftop laws.	
7. Restore 31.2 km ² of waterbodies.	MoWR, DNCC, DSCC
8. Impose at least 5 times higher Holding Tax for Concrete Structures compare to the same for Nature Friendly Structures	DNCC, DSCC
3+ Years (Medium to Long-Term)	
1. Prioritize low-income and high-density areas for nature protection related bio-investment.	MoEFCC, MoLGRD, MoF, DNCC, DSCC
2. Plant 56.5 km ² of trees, targeting ecologically deprived zones.	DoForest, DNCC, DSCC, DCCI, Community
3. Greening and wetland restoration can lower temperatures by ~1°C.	
4. Reintroduce buffer zones and community water stewardship programs	MoEFCC, MoLGRD, MoLaw, RAJUK, DNCC, DSCC, Private Sectors
5. Prioritize heat-vulnerable zones and water stressed Thanas in climate adaptation.	
6. Digital System Based Natural Accountability of All Stakeholders.	

The report clearly links Dhaka’s ecological collapse to poor land use decisions and absence of nature in urban planning. As the green spaces disappear, urban heat rises, and vulnerable populations are left exposed to compounding risks. The disparity between DNCC and DSCC highlights environmental injustice across the city.

Without urgent reforms-both technical and institutional-Dhaka risks becoming unlivable for millions. A rights-based ecological framework can offer a new path forward: one that treats nature not as a passive backdrop to development, but as a co-equal entity deserving of protection, restoration, and respect.