GREEN COVER - How Indian cities are being shorn of trees

A new study reveals the rate of urbanisation in four Indian cities.

Image credit: Pexels.com

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[Deepa Padmanaban](#)

- Kolkata's tree cover fell from 23.4% to 7.3% over 20 years; built-up area up 190%. By 2030, vegetation will be 3.37% of Kolkata's area.
- Ahmedabad's tree cover fell from 46% to 24% over 20 years; built-up area up 132%. By 2030, vegetation will be 3% of Ahmedabad's area.
- Bhopal's tree cover fell from 66% to 22% over 22 years. By 2018, it will be 11% of city's area.
- Hyderabad's tree cover fell from 2.71% to 1.66% over 20 years. By 2024, it will be 1.84% of city's area

These are the findings of a new Indian Institute of Science study that used satellite-borne sensors, compared images over decades and modeled past and future growth to reveal the rate of urbanisation in four Indian cities.

TV Ramchandran, a professor, and his team at the Energy & Wetlands Research Group, Centre for Ecological Sciences, studied "agents of change" and "drivers of growth", such as road networks, railway stations, bus stops, educational institutions and industries; defence establishments, protected regions, such as reserve forests, valley zones and parks.

The researchers classified land use into four groups: Urban or "built-up", which includes residential and industrial areas, paved surfaces and "mixed pixels with built-up area", meaning built-up areas which contain areas from any of the other three categories–water, which includes tanks, lakes, reservoirs, and drainages; vegetation, which includes forests and plantations; and others, including rocks, quarry pits, open ground at building sites, unpaved roads, cropland, plant nurseries and bare land.

Here is what they found in each city.

Kolkata: The population of Kolkata is now 14.1 million, making it India's third-largest city. Urban built-up area, as we said, increased 190% between 1990 and 2010.
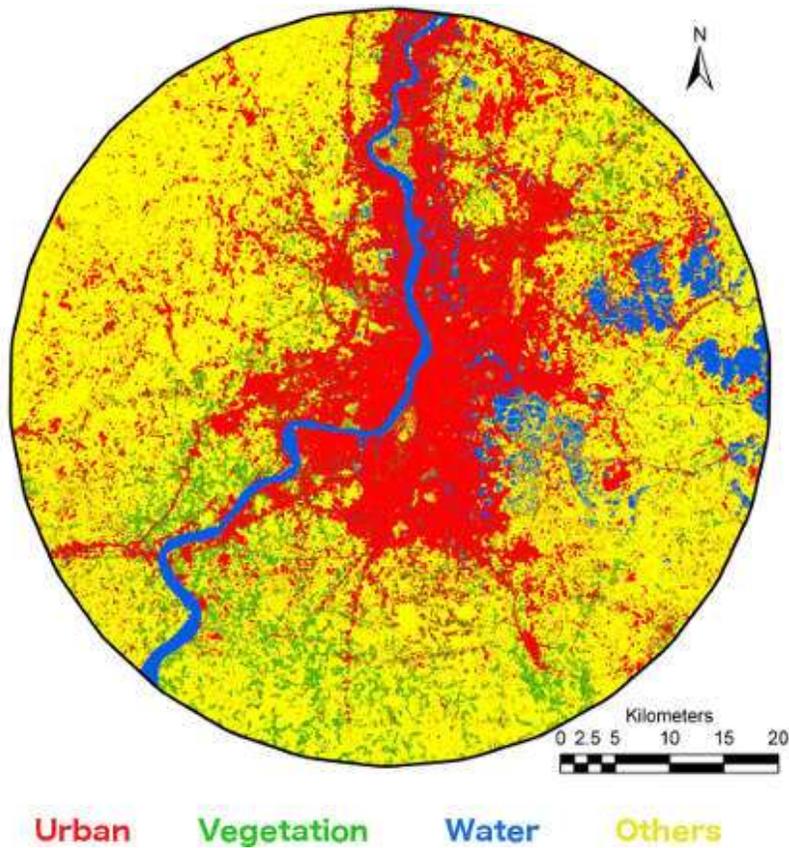
In 1990, 2.2% of land was built up; in 2010, 8.6%, which is predicted to rise to 51.27% by 2030.
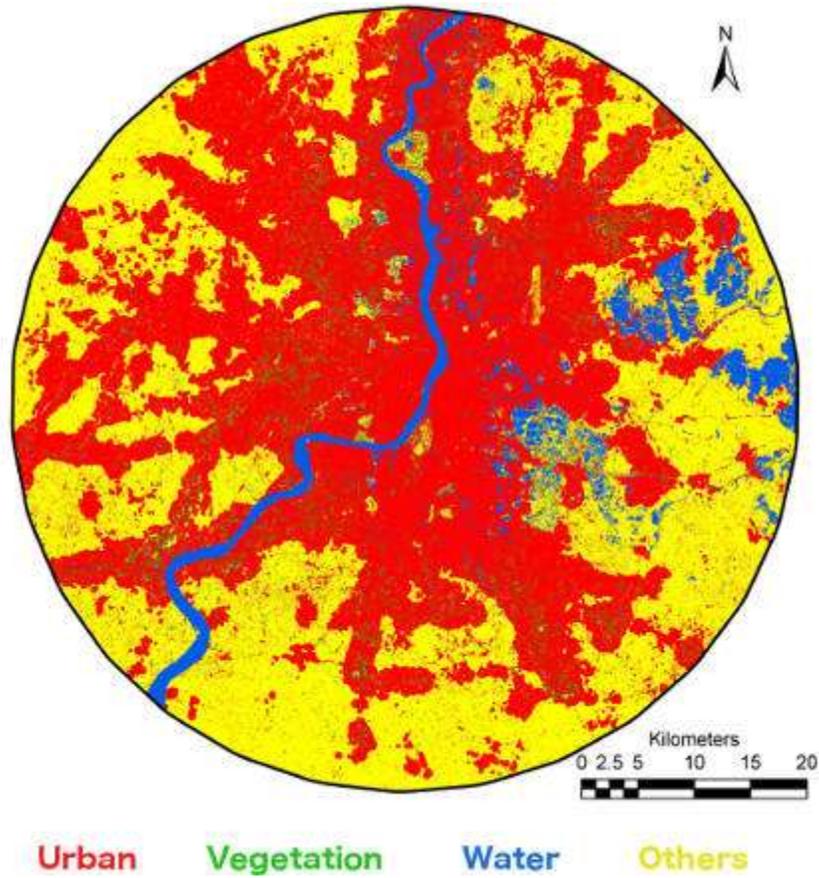
Breakup of Land Usage In Kolkata
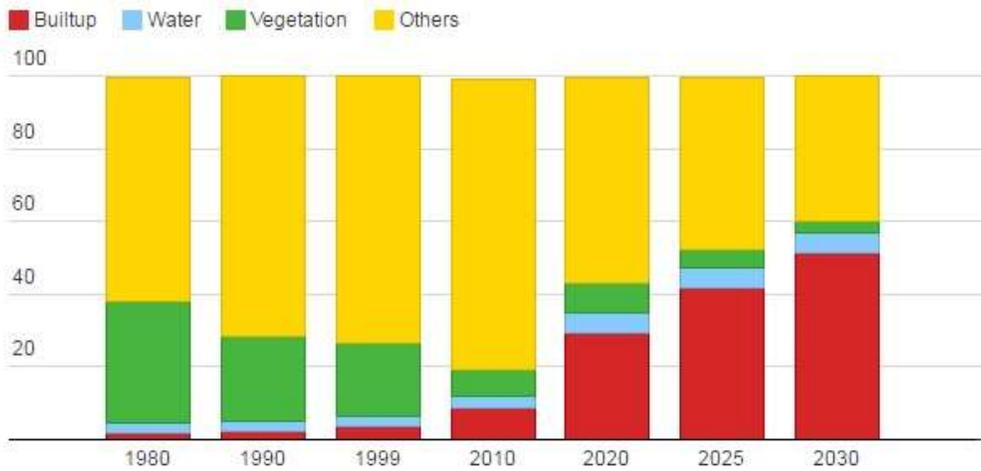
In percentage

Source: Centre for Ecological Sciences, IISc, Bangalore
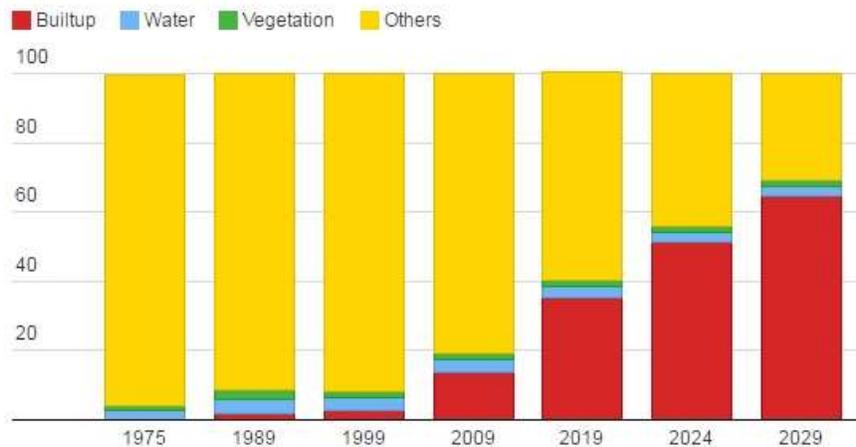

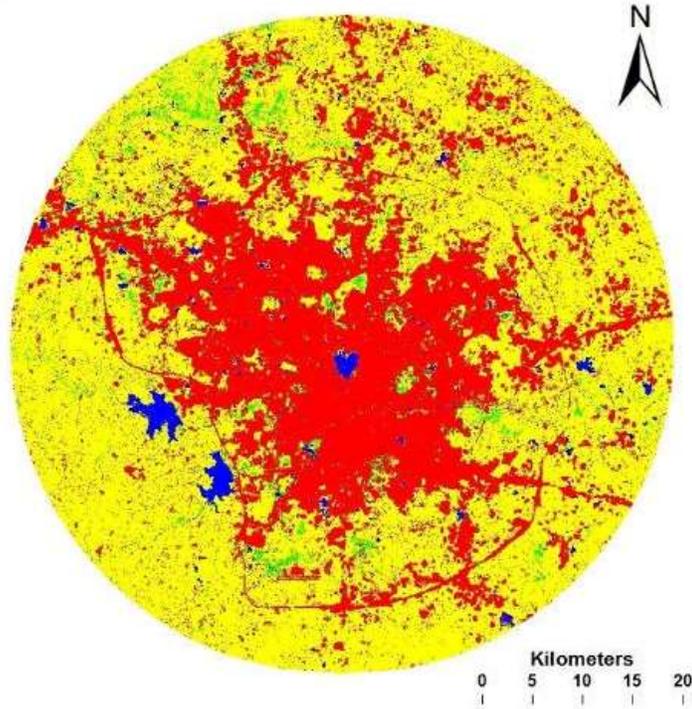Kolkata 2020

Urban   Vegetation   Water   Others

Kolkata 2030

Hyderabad: With a population of 7.74 million in 2011, Hyderabad is poised to be a mega city with 10 million people in 2014. Urban built-up area rose 400% between 1999 and 2009.

In 1999, 2.55% of land was built up; in 2009, 13.55%, which is predicted to rise to 51.27% by 2030.
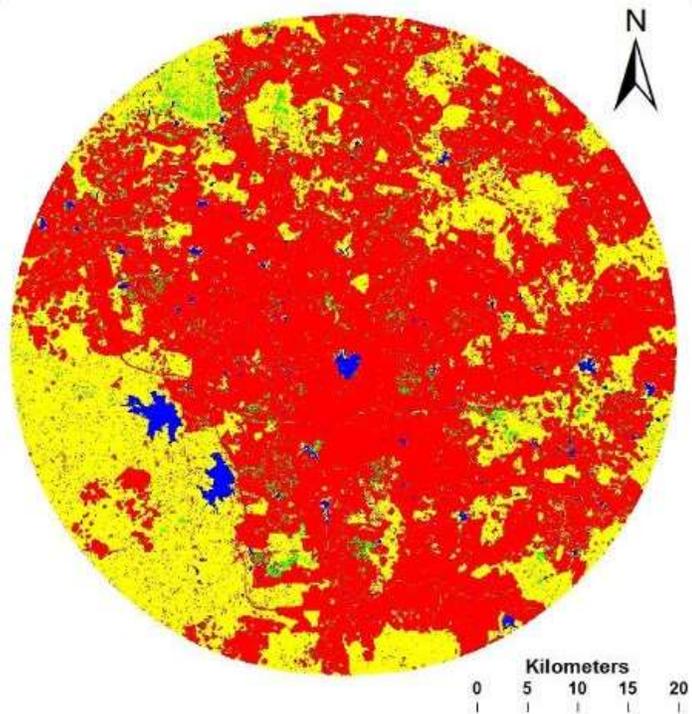

Breakup Of Land Usage In Hyderabad

In percentage

Hyderabad 2019
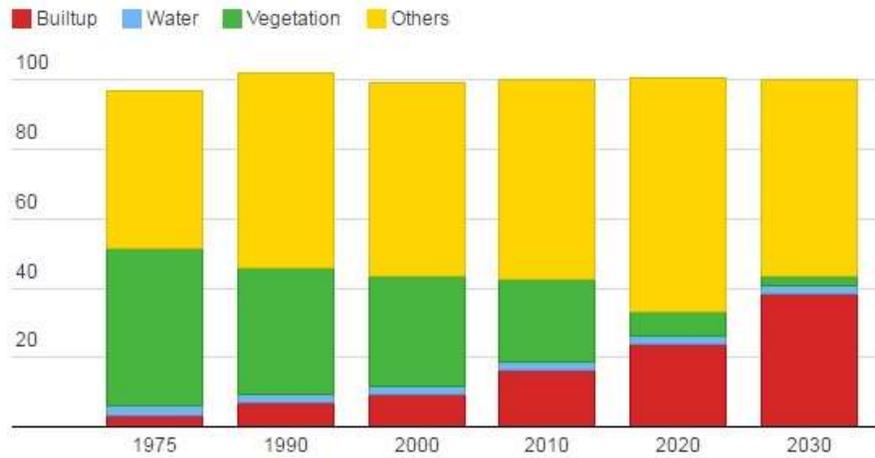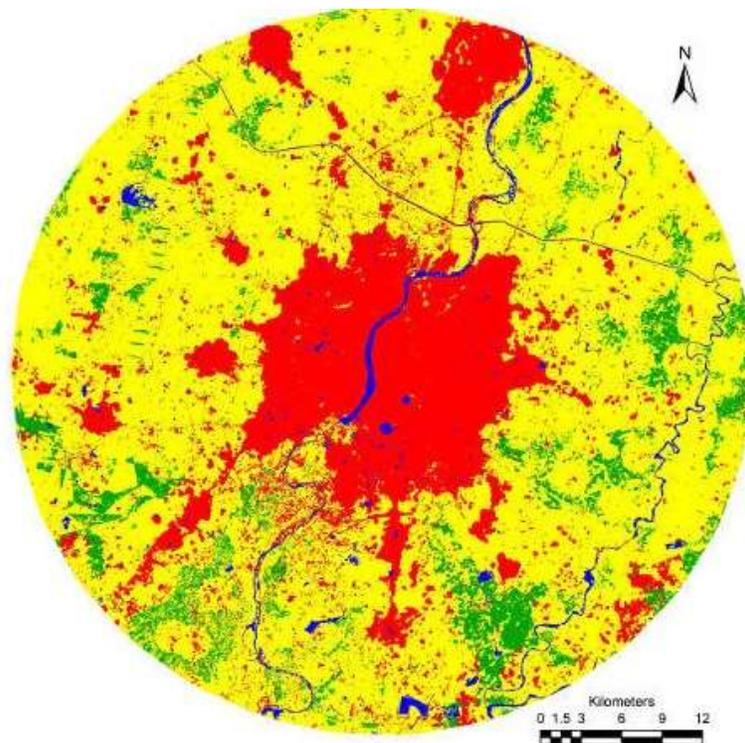

Hyderabad 2029

Ahmedabad: With 5.5 million in 2011, the city was India's sixth largest by population and third-fastest growing city. Ahmedabad's built-up urban area grew 132% between 1990 and 2010.

In 1990, 7.03% of land was built-up; in 2010, 16.34%, which is predicted to rise to 38.3% in 2024.
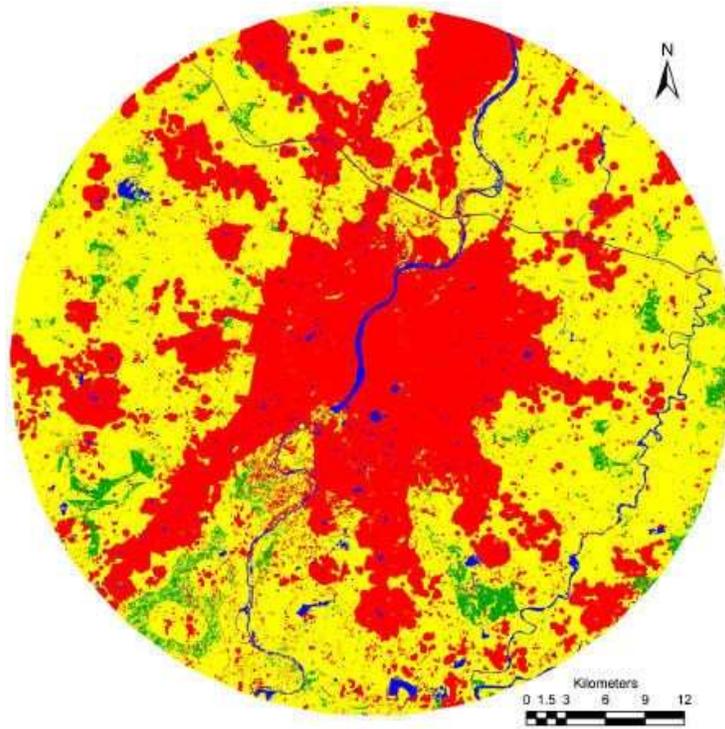
Breakup of Land Usage in Ahmedabad

■ Builtup ■ Water ■ Vegetation □ Others
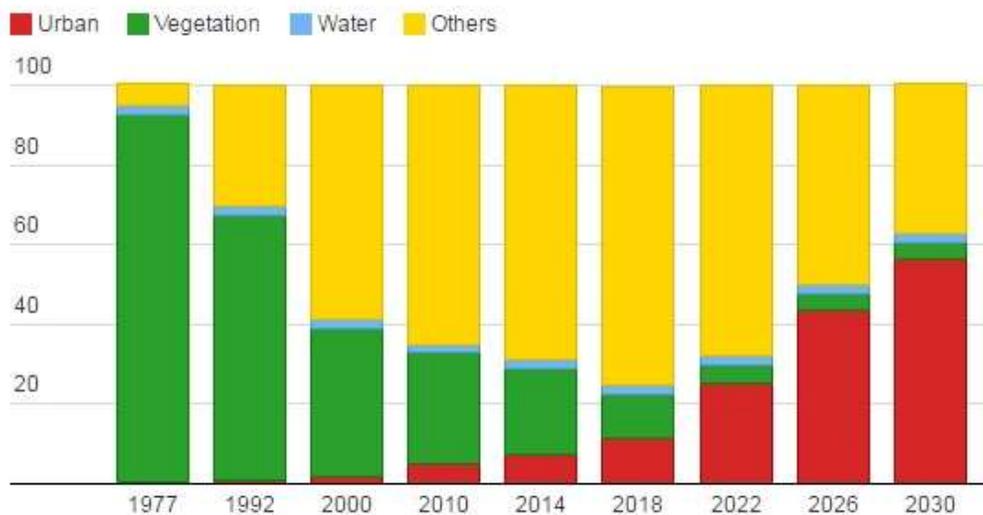

In percentage

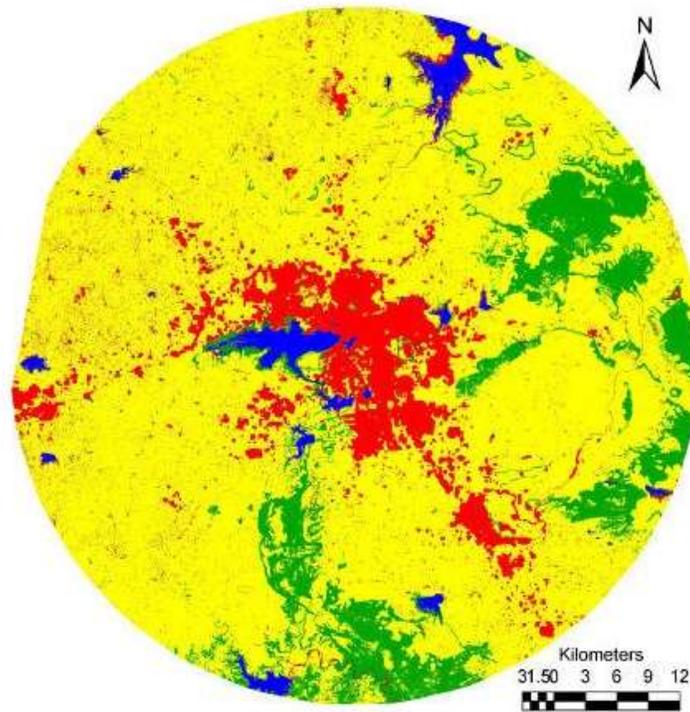Urban Vegetation Water Others

Ahmedabad 2020

Ahmedabad 2030

Bhopal: One of India's greenest cities, it is 16th largest by population with 1.6 million people. Bhopal is better off than other cities even today, but the concretising trend is clear: In 1992, 66% of the city was covered with vegetation (in 1977, it was 92%); that is down to 21% and falling.
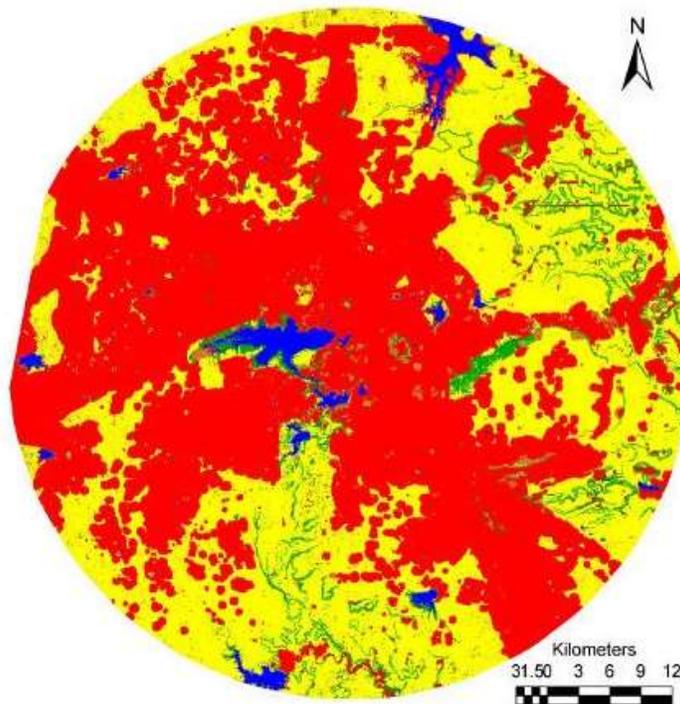

Source: Centre for Ecological Sciences, IISc, Bangalore

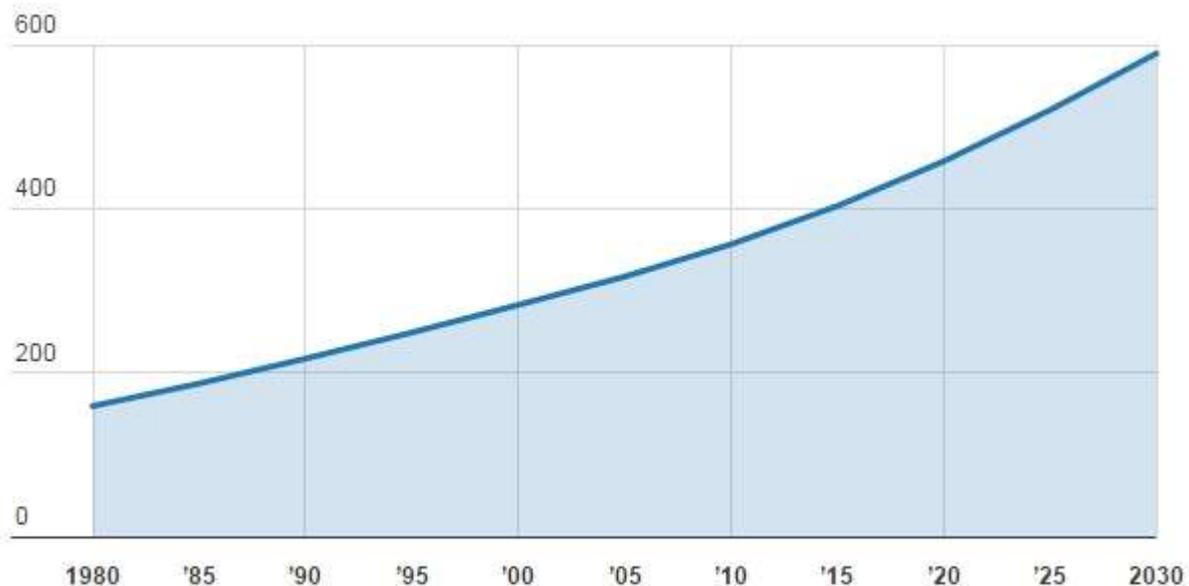| Urban | Vegetation | Water | Others |

Bhopal 2018

| Urban | Vegetation | Water | Others |

Bhopal 2030

India's urbanisation drives concretisation of its cities

India's urban population rose 26% over the decade ending 2010 to 350 million, according to United Nations data, and is projected to rise 62% between 2010 and 2020 and 108% between 2020 and 2030.

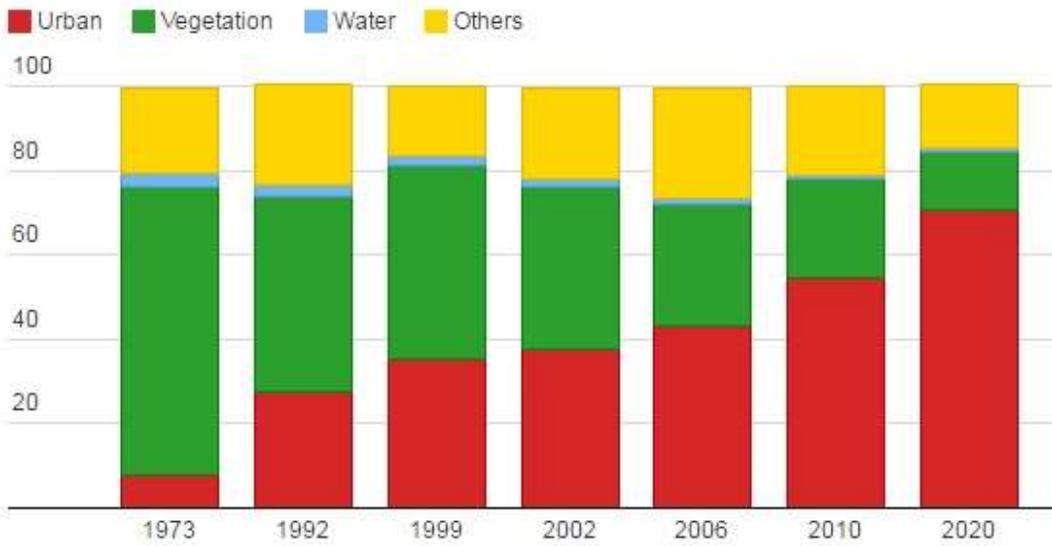## Urban Population In India

In millions

Source: Centre for Ecological Sciences, IISc, Bangalore

India's fastest growing city has traditionally been Bangalore. There are no recent estimates for its concretisation, but in 2012, Ramachandran and his group found a 584% growth in built-up area over the preceding four decades, with vegetation declining 66% and water bodies 74%, according to this study.

The highest increase in urban built-up area in Bangalore was evident between 1973 and 1992 – 342.83%. Decadal increases since, between 1992 and 2010, have averaged about 100%: 129.56% from 1992 to 1999; 106.7% from 1999 to 2002; 114.51% from 2002 to 2006; and 126.19% from 2006 to 2010
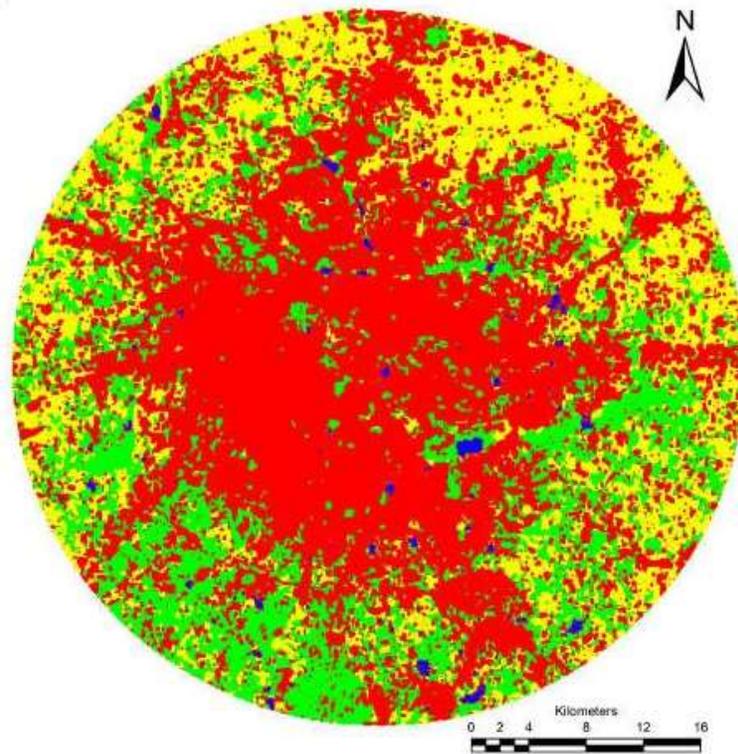
Bangalore's population rose from 6.5 million in 2001 to 9.6 million in 2011, a growth of 46.68 % over a decade; population density increased from 10,732 persons per square kilometre in 2001 to 13,392 persons per square kilometre in 2011.
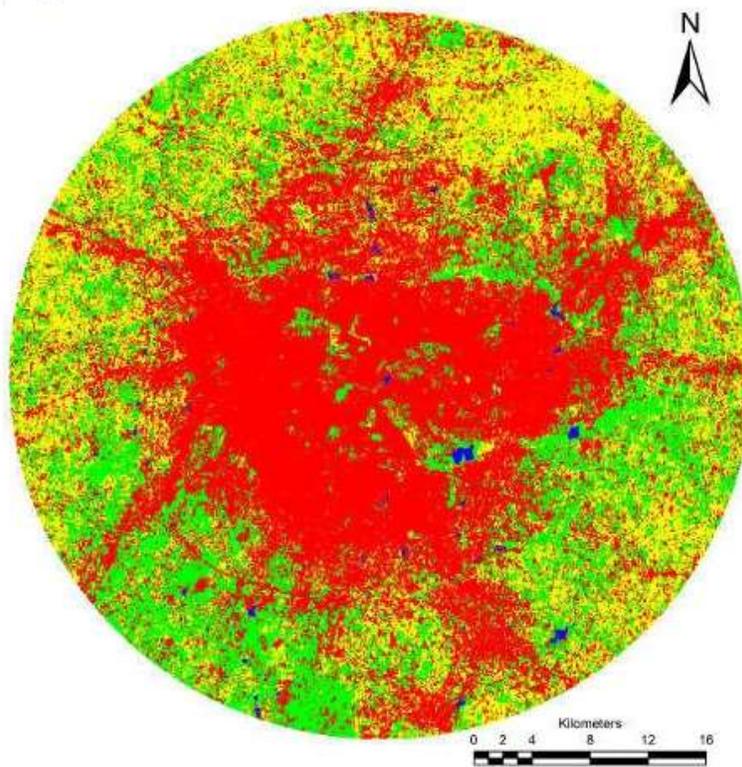
Breakup Of Land Usage In Bangalore

Source: Centre for Ecological Sciences, IISc, Bangalore

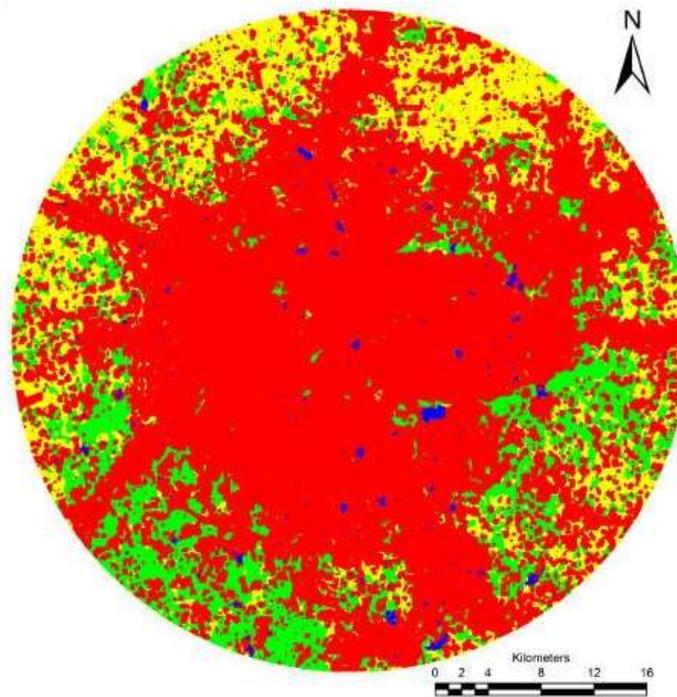Bangalore 2012 – Prediction

Urban   Vegetation   Water   Others

Bangalore 2012 – Actual

Urban   Vegetation   Water   Others

Bangalore 2020 – Prediction

This 2013 study by Ramachandra listed implications of unplanned urbanisation:

- Loss of wetlands and green spaces.
- Floods: As open fields, water bodies, wetlands, and vegetation are converted to residential layouts, roads, and parking lots, absorption of rainfall reduces. Encroachment of natural drains, alteration of the topography, such as construction of high-rise buildings, causes flooding, even during normal rainfall.
- Decline in groundwater table.
- Heat island: Increased consumption of energy causes energy discharges, creating heat islands with higher surface and atmospheric temperatures.
- Increased carbon footprint: High consumption of electricity, building architecture, more vehicles and traffic bottlenecks contribute to carbon emissions—a situation aggravated by mismanagement of garbage.

This article first appeared on IndiaSpend, a data-driven and public-interest journalism non-profit.
We welcome your comments at letters@scroll.in.

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