

## How China, followed by India, has led greening efforts across world

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A new satellite-based study shows that China and India are leading the increase in “greening efforts” across the world. Published in *Nature Sustainability*, the study shows that the change driving these efforts emerges from China's ambitious tree-planting programmes and intensive agriculture practised in both countries. A group of researchers from the US, Europe, China and India had detected the greening phenomenon in satellite data from the 1980s; it was initially unclear whether human activity was the cause. Lead study author Chi Chen, from Boston University's Department of Earth and Environment, said this was especially unknown in the case of China and India, which saw quick economic development since the 2000s.

### The findings

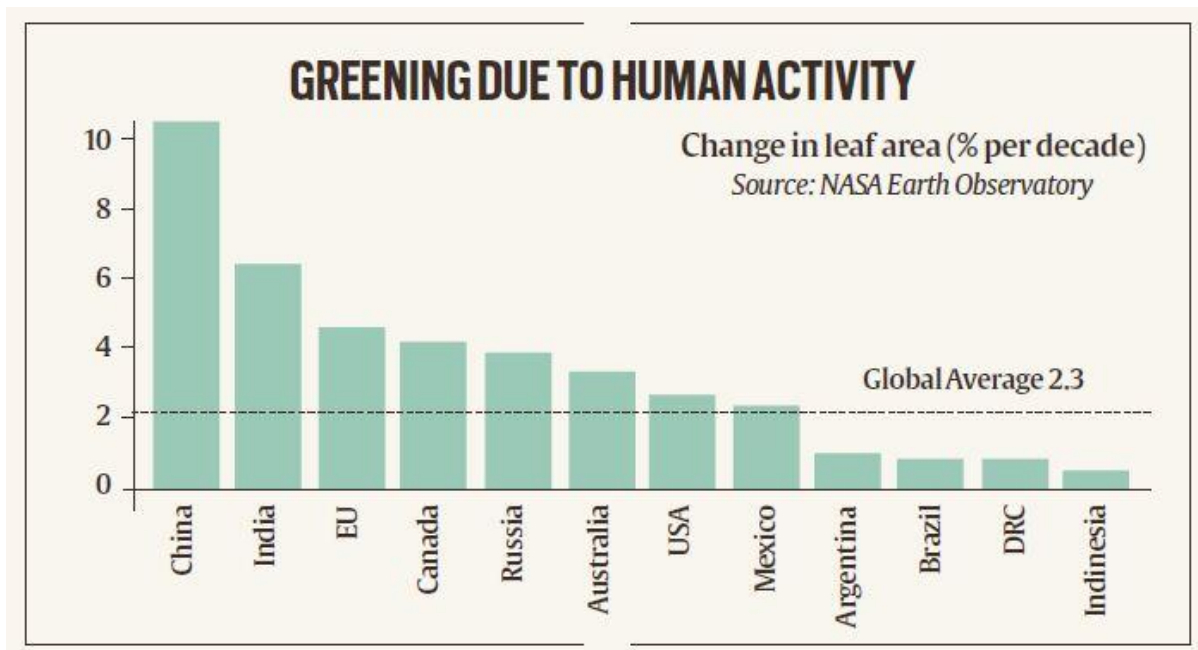
The research team set out to track the total amount of Earth's land area covered by vegetation and how it changed over time (2000-17). Through NASA's Moderate

Resolution imaging Spectroradiometer (MODIS) data, the team found that the global green leaf area has increased by 5% since the early 2000s. “This translates to a net

increase in leaf area of 2.3% per decade, which is equivalent to adding  $5.4 \times 10^6$  sq km new leaf area over the 18-year period of the record (2000 to 2017),” Chi said. This is equivalent to the area of the Amazon.

China alone accounts for 25% of the global net increase in leaf area. India has contributed a further 6.8%. The greening in China is from forests (42%) and croplands (32%) but in India is mostly from croplands (82%) with minor contribution from forests (4.4%).

The study was entirely based on satellite data with access to forest inventory data. There were no physical checks carried out in either China or India to assess what kind of trees or vegetation were preferred. “We only look at the abundance of leaves, not the species,” Chi said. “Our paper only talks about the abundance of leaves. The quality of trees are good in view of leaf abundance... Satellite data do not have the ability to accurately recognise the species at the global scale.”



Ramakrishna Nemani, a co-author of the study and a researcher at NASA’s Ames Research Center, said in a statement at the time the paper was released, “When the greening of the Earth was first observed, we thought it was due to a warmer, wetter climate and fertilization from the added carbon dioxide in the atmosphere, leading to more leaf growth in northern forests, for instance. Now, with the MODIS data that lets us understand the phenomenon at really small scales, we see that humans are also contributing.”

## The India growth

Chi noted that “with only 2.7% of the global vegetated area, India accounts for 6.8% of the global net increase in leaf area”. About the growth being due to agriculture, Chi said: “It is as expected because most of the land cover type in India is cropland (2.11×10<sup>6</sup> sq km). Total cereal production in India increased by 26% during the same period... There are only a few forests in India, and that is why their contribution is small.”

Data show that since Independence, a fifth of India’s land has consistently been under forests. The Forest Survey of India’s State of Forest Report 2017 had recorded that forest cover had increased by 6,600 sq km or 0.21% since 2015.

## The China growth

China traces its efforts back to 1978, marked by projects including the Three-North Shelterbelt Forest Program for planting of forests. This project affected 30.13 million hectares, according to Jiang Sannai from the Department of Ecosystem Conservation and Restoration at the National Forestry and Grassland Administration, and meant the “forest coverage rate of the project area increased from 5.05% to 13.57%, and the forest stock volume increased by 4.96 times”.

Along with this, Jiang said in a presentation recently, a nationwide voluntary tree planting campaign launched in 1981 meant that for the “first time, the mass tree-planting campaign was fixed in a statutory form by the country”.

In his 2018 book *The World in a Grain*, journalist Vince Beiser, however, quotes scientists in China and abroad who said these efforts may be more disastrous than useful. “Many of the trees, planted in areas where they don’t grow naturally, simply die after a few years. Those that survive can soak up so much precious groundwater that native grasses and shrubs die of thirst, causing more soil degradation,” he writes.

**Sources:** <https://indianexpress.com/article/explained/india-china-tree-planting-programmes-biodiversity-forest-cover-percentage-environment-ministry-5717902/>