



Greening of the Earth and its drivers

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Abstract

Global environmental change is rapidly altering the dynamics of terrestrial vegetation, with consequences for the functioning of the Earth system and provision of ecosystem services^{1,2}. Yet how global vegetation is responding to the changing environment is not well established. Here we use three long-term satellite leaf area index (LAI) records and ten global ecosystem models to investigate four key drivers of LAI trends during 1982–2009. We show a persistent and widespread increase of growing season integrated LAI (greening) over 25% to 50% of the global vegetated area, whereas less than 4% of the globe shows decreasing LAI (browning). Factorial simulations with multiple global ecosystem models suggest that CO₂ fertilization effects explain 70% of the observed greening trend, followed by nitrogen deposition (9%), climate change (8%) and land cover change (LCC) (4%). CO₂ fertilization effects explain most of the greening trends in the tropics, whereas climate change resulted in greening of the high latitudes and the Tibetan Plateau. LCC contributed most to the regional greening observed in southeast China and the eastern United States. The regional effects of unexplained factors suggest that the next generation of ecosystem models will need to explore the impacts of forest demography, differences in regional management intensities for cropland and pastures, and other emerging productivity constraints such as phosphorus availability.

100 companies produce 71% of global emissions - report

10 Jul 2017 - RT News
3.3K

Some 71 per cent of global emissions are produced by just 100 companies, a new greenhouse gases (GHG) study has found.

In a Carbon Majors report, CDP, formerly known of the Carbon Disclosure Project, and the Climate Accountability Institute, outed many of the worst corporate offenders when it comes to pollution.

The study claims the contribution of fossil fuels to global of warming has "doubled," while just 100 companies have caused 71 per cent of methane and carbon dioxide emissions since 1988.

"[Twenty-five] corporate and state producing entities account for 51 percent of global industrial GHG emissions. All 100 producers account for 71 percent of global industrial GHG emissions," the report states.

Out of the 100 companies, 36 of the firms are at least partially state-owned, including Saudi Aramco, Gazprom, National Iranian Oil and Coal India. ExxonMobil, Shell, BP, Chevron, Peabody and Total are among the privately-owned companies in the report. The CDP tracks publicly available statistics regarding methane and carbon dioxide emitted by fossil fuel producers. In some cases, the information is provided voluntarily to the project by businesses.

The report does not mention how each company may be working to reduce its environmental impact. Fuel extraction is an increasingly worrisome business when it comes to pollution, the report states. Since 1988, more pollutants have been emitted into the atmosphere than in the previous 237 years.

"If the trend in fossil fuel extraction continues over the next 28 years as it has over the previous 28, then global average temperatures would be on course to rise around 4 degrees celsius... by the end of the century," the report states.

Based on a 2014 environmental impact report by the Intergovernmental Panel on Climate Change, the study states that such a temperature rise would result in "substantial species extinction" and "global food scarcity."

Empty half the Earth of its humans. It's the only way to save the planet

Telegraph – March 20, 2018

There are now twice as many people as 50 years ago. But, as EO Wilson has argued, they can all survive – in cities
Cities is supported by



Cities are part of the system we've invented to keep people alive on Earth. People tend to like cities, and have been congregating in them ever since the invention of agriculture, 10,000 or so years ago. That's why we call it civilisation. This origin story underlines how agriculture made cities possible, by providing enough food to feed a settled crowd on a regular basis. Cities can't work without farms, nor without watersheds that provide their water. So as central as cities are to modern civilisation, they are only one aspect of a system.

There are nearly eight billion humans alive on the planet now, and that's a big number: more than twice as many as were alive 50 years ago. It's an accidental experiment with enormous stakes, as it isn't clear that the Earth's biosphere can supply that many people's needs – or absorb that many wastes and poisons – on a renewable and sustainable basis over the long haul. We'll only find out by trying it.

Right now we are not succeeding. The [Global Footprint Network](#) estimates that we use up our annual supply of renewable resources by August every year, after which we are cutting into non-renewable supplies – in effect stealing from future generations. Eating the seed corn, they used to call it. At the same time we're pumping carbon dioxide into the atmosphere at a rate that is changing the climate in dangerous ways and will certainly damage agriculture.

This situation can't endure for long – years, perhaps, but not decades. The future is radically unknowable: it could hold anything from an age of peaceful prosperity to a horrific mass-extinction event. The sheer breadth of possibility is disorienting and even stunning. But one thing can be said for sure: what can't happen won't happen. Since the current situation is unsustainable, things are certain to change.

It wouldn't have to be imposed – it's happening anyway

Cities emerge from the confusion of possibilities as beacons of hope. By definition they house a lot of people on small patches of land, which makes them hugely better than suburbia. In ecological terms, suburbs are disastrous, while cities can perhaps work.

The tendency of people to move to cities, either out of desire or perceived necessity, creates a great opportunity. If we managed urbanisation properly, we could nearly remove ourselves from a considerable percentage of the the planet's surface. That would be good for many of the threatened species we share this planet with, which in turn would be good for us, because we are completely enmeshed in Earth's web of life.

Here I'm referring to the plan EO Wilson has named [Half Earth](#). His book of the same title is provocative in all the best ways, and I think it has been under-discussed because the central idea seems so extreme. But since people are leaving the land anyway and streaming into cities, the

Dimming the sun: The answer to global warming?

CNN - November 23, 2018 = "US Gov Climate Report on Black Friday"

(CNN) Scientists are proposing an ingenious but as-yet-unproven way to tackle climate change: **spraying sun-dimming chemicals into the Earth's atmosphere.**

The research by scientists at Harvard and Yale universities, published in the **journal Environmental Research Letters**, proposes using a technique known as **stratospheric aerosol injection**, which they say could **cut the rate of global warming in half.**

The technique would involve spraying large amounts of sulfate particles into the Earth's lower stratosphere at altitudes as high as 12 miles. The scientists propose delivering the sulfates with specially designed high-altitude aircraft, balloons or large naval-style guns. Stratospheric aerosol injection would involve spraying sulfate particles into the Earth's stratosphere at altitudes as high as 12 miles.

Despite the technology being undeveloped and with no existing aircraft suitable for adaptation, the researchers say that "developing a new, purpose-built tanker with substantial payload capabilities would neither be technologically difficult nor prohibitively expensive."

They estimate the total cost of launching a hypothetical system in 15 years' time at around **\$3.5 billion**, with **running costs of \$2.25 billion a year** over a 15-year period. The report does, however, acknowledge that the technique is purely hypothetical.

"We make no judgment about the desirability of SAI," the report states. "We simply show that a hypothetical deployment program commencing 15 years hence, while both highly uncertain and ambitious, would indeed be technically possible from an engineering perspective. It would also be remarkably inexpensive."

The researchers also acknowledge **potential risks**; coordination between multiple countries in both hemispheres would be required, and **stratospheric aerosol injection techniques could jeopardize crop yields, lead to droughts or cause extreme weather.** The proposals also don't address the issue of rising greenhouse gas emissions, which are a leading cause of global warming. And despite the conviction of the report's authors, other experts were skeptical.

"From the point of view of climate economics, **solar radiation management** is still a much worse solution than greenhouse gas emissions: more costly and much more risky over the long run," said Philippe Thalmann of the École Polytechnique Fédérale de Lausanne, an expert in the economics of climate change.

David Archer of the Department of Geophysical Science at the University of Chicago said, "The problem with engineering climate in this way is that it's only a temporary Band-Aid covering a problem that will persist essentially forever, actually hundreds of thousands of years for fossil fuel CO₂ to finally go away naturally. "It will be tempting to continue to procrastinate on cleaning up our energy system, but we'd be leaving the planet on a form of life-support. If a future generation failed to pay their climate bill they would get all of our warming all at once."