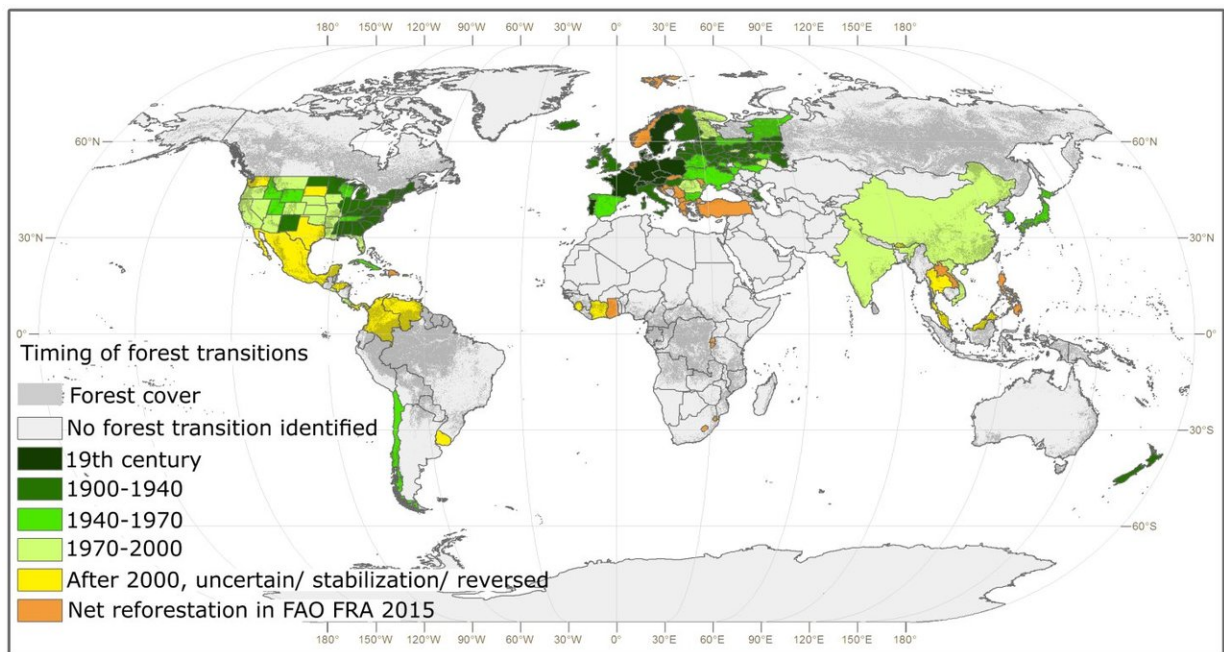


Expansion of global forests reflects well-being, not rising CO₂, experts say

May 14 2018



Since the 1800s, transitions from net forest loss to gain have coincided with a switch within nations from subsistence to market oriented agriculture. Today the growth or decline of a nation's forest resources correlates strongly to the UN Development Program's Human Development Index. Credit: University of Helsinki

The surprising, steady expansion of forests in many countries is a reflection of national well-being and does not constitute a benefit of rapidly rising levels of atmospheric carbon dioxide, experts say. On the

planet as a whole, forests and other terrestrial ecosystems have become greener, which several global climate change models attribute to CO₂ fertilization, says the study, published today by *PLOS ONE*.

In fact, however, since the 1800s, transitions from net [forest](#) loss to gain have coincided with a switch within nations from subsistence to market oriented agriculture. Today the growth or decline of a nation's [forest resources](#) correlates strongly to the UN Development Programme's Human Development Index.

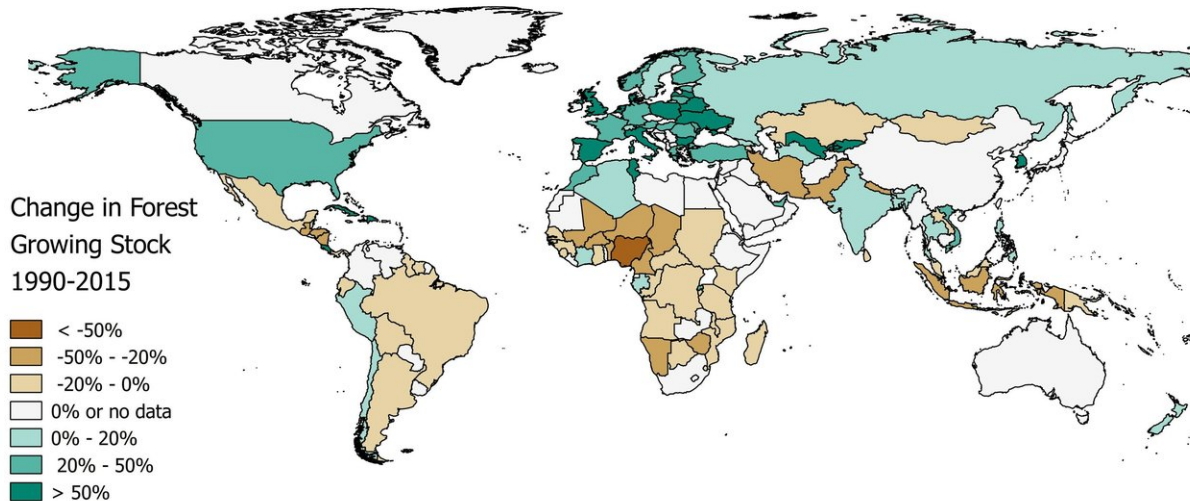
"Our findings offer an important insight for efforts to address climate change. Where people and nations are or become relatively well off, we can count on forests absorbing carbon at increasing levels," says Prof. Kauppi of the University of Helsinki, who co-authored the study with U of H colleague Vilma Sandström and Antti Lipponen of the Finnish Meteorological Institute.

From 1990 to 2015, forest growing stock rose annually by 1.31 percent in high income countries and by 0.5 percent in higher [middle income countries](#). By contrast, forest growing stock fell by an annual average 0.29 percent in 27 lower middle income countries and by 0.72 percent in 22 [low income countries](#).

"From a policy development perspective, it is very important to understand why national forests resources change in such a surprisingly diverse fashion," says Dr. Kauppi.

Transitions from net forest loss to net gain first occurred in the 1800s in Western Europe, then Central Europe and the eastern United States, followed by Northern and Eastern Europe, Japan and New Zealand. The study, entitled "Forest resources of nations in relation to human well-being," notes that Europe's early turnaround and expansion of forest resources obviously can't be attributed to the rapid rise of [atmospheric](#)

[carbon dioxide](#) that began decades later.



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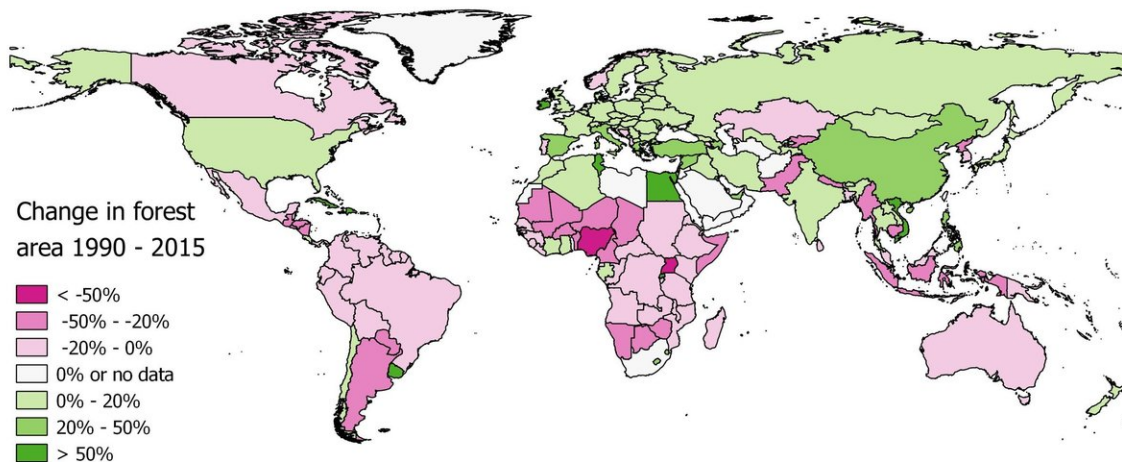
"Weather observations confirm indisputably that global temperatures are rising together with atmospheric CO₂ levels," says Dr. Lipponen.

"However, the study shows that, over more than a century, changes in forest growing stock around the world have been virtually unrelated to those trends." In the last 50 years, China and Chile have made the transition from net forest loss to net forest gain. More recently some subtropical and tropical countries of Latin America, Africa, and the Far East have done so as well. The report says that between 1990 and 2015 some 13 tropical countries appear to have either transitioned, or continued along the path of forest expansion that follows such

transitions.

A previously published summary of latest UN data (2010-2015) shows forest area expanding in Europe, North America, the Caribbean, East Asia, and Western Central Asia, but decreasing in Central America, South America, South and Southeast Asia, and throughout Africa.

At a regional level, the greatest losses are being experienced in Nigeria, Brazil and Indonesia. The report says transitions in Latin America and Africa are uncertain and perhaps reversible. Africa is the continent with a great risk of further losses of [forest ecosystems](#); a majority of the 55 African countries has not reported forest transition. Impressing the experts was the forest transition in India over three decades starting in 1970 despite more than doubling in population (from 555 to 1,231 million, 1970 to 2010).



The surprising, steady expansion of forests in many countries is a reflection of national well being and does not constitute a benefit of rapidly rising levels of atmospheric carbon dioxide, experts say. Credit: University of Helsinki

Brunei is the sole wealthy nation with decreasing forest resources. "Highly developed countries apply modern agricultural methods on good farmlands and abandon marginal lands, which become available for forest expansion," the study says. "Developed countries invest in sustainable programs of forest management and nature protection."

The study attributes forest expansion to several factors that have outweighed the impacts of population growth and improving diets. They include:

- Urbanization, which draws farmers off marginal rural lands
- Evolution from a subsistence regime to market economy, which further concentrates farming to the best lands
- Better agricultural technologies and yields, relieving the need to clear new agricultural land
- Better transportation, communication, storage, processing, and consumer behavior, reducing food waste
- The availability of alternatives to wood as a fuel

Vilma Sandström underlines that another factor requires detailed impact assessment: developed nations increasingly outsource their resource needs to others abroad through international trade. Earlier research suggested that growing stock stops decreasing at a per capita income threshold at US\$ 4,600 (in 2003 dollars). Today the threshold is likely closer to \$20,000 dollars income per capita.

"Unfortunately, deforestation continues in biologically rich forests," the paper says. "The new expanding forests are biologically less diverse, especially where they consist of planted monocultures."

Says Dr. Lipponen: "Human development can translate into the well-

being of forest ecosystems. This promotes carbon sequestration and preservation of the global biodiversity in the long term. Policy analyses must expand from focusing on individual projects such as carbon capture, biodiversity conservation or farm management to interdisciplinary analyses of harmonized well-being of people and forests."

The researchers also call for greater global scale monitoring of vegetation surfaces, calling "a major priority area in world science."

More information: "Forest resources of nations in relation to human well-being" *PLOS ONE*, [journals.plos.org/plosone/arti ...
journal.pone.0196248](https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0196248)

Provided by University of Helsinki

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