

### **OVERVIEW**

- A brief inventory of the many ways the U.K. has provided global leadership on forests
- An update on the importance of forests for climate stability and development objectives
- Reasons for optimism that we can turn the tide of tropical deforestation

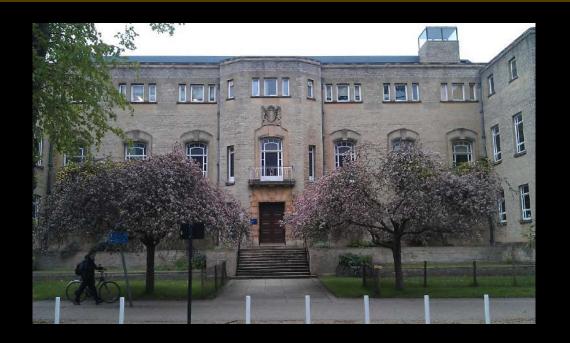


### Concern about tropical deforestation

Dr. Hugh Cleghorn, author of the Report of the Committee Appointed by the British Association for the Advancement of Science to Consider the Probable Effects in an Economical and Physical Point of View of the Destruction of Tropical Forests, 1852



### **Excellence in research and teaching**



The Oxford Forestry Institute, "...for almost a century arguably the English-speaking world's leading institution concerned with forestry education, research, information, and advice...."

Jeffery Burley et al, 2009

### Leadership in international conservation



"All our efforts should be guided by the people whose lives are so much more intimately intertwined with the forests than our own; the approaches we take should both recognize and protect their rights....", HRH The Prince of Wales, Paris, 2015

### Linking tropical forests and climate change

"We are seeing a vast increase in the amount of carbon dioxide reaching the atmosphere . . . At the same time as this is happening, we are seeing the destruction on a vast scale of tropical forests which are uniquely able to remove carbon dioxide from the air", Margaret Thatcher, UNGA 1989



### Initiatives to improve forest governance





The G8 meeting in Birmingham launched the Action Programme on Forests, which put the issue of illegal logging on the international agenda, 1998

### **Procurement of sustainable commodities**



www.gov.uk/defra

Wood products used in London's Olympic Park certified as legally and sustainably produced, 2012



Sustainable production of palm oil, UK statement

October 2012



### Integrating forests into development cooperation







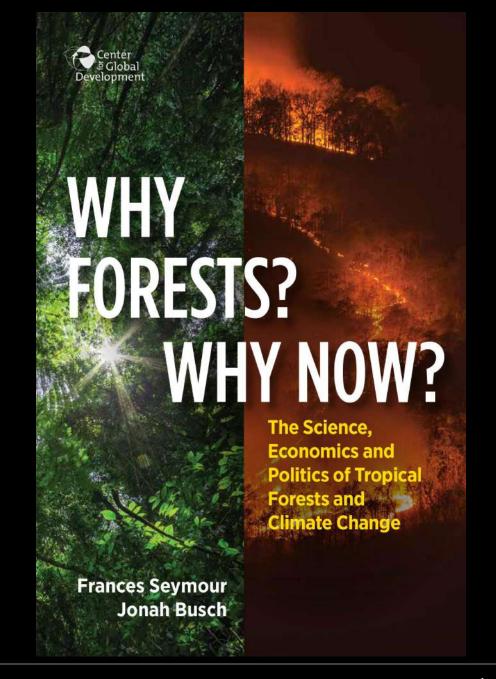












### The importance of forests for climate and development

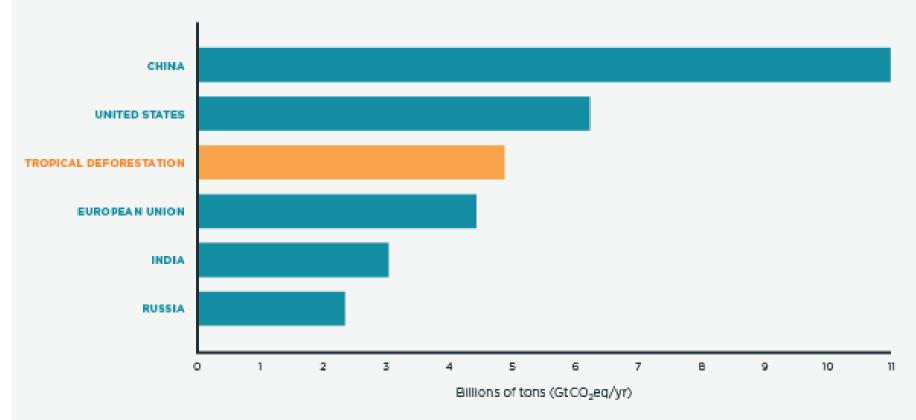
- Tropical deforestation is a major contributor to current global climate emissions; forest protection and restoration are an even larger part of the climate solution
- Forests provide many other development benefits in addition to global climate stability
- Rich countries are part of the problem, and can contribute to the solution





## If tropical deforestation were a country, its emissions would be greater than those of the European Union

#### ANNUAL GREENHOUSE GAS EMISSIONS, 2012



Source: CAITy2.0 (2012); Busch and Engelmann (2015).

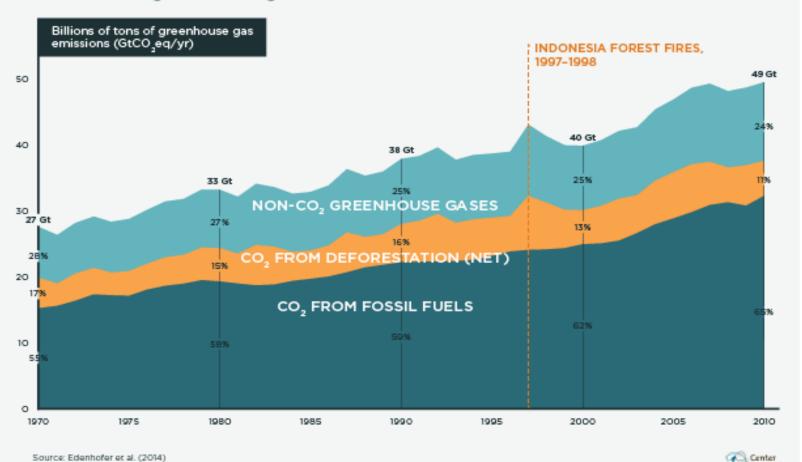
Emissions from deforestation refers to gross emissions from tropical forest cover loss and peat conversion



## Deforestation remains a significant contributor to climate change even as emissions from other sectors have grown faster

#### Total annual greenhouse gas emissions 1970-2010

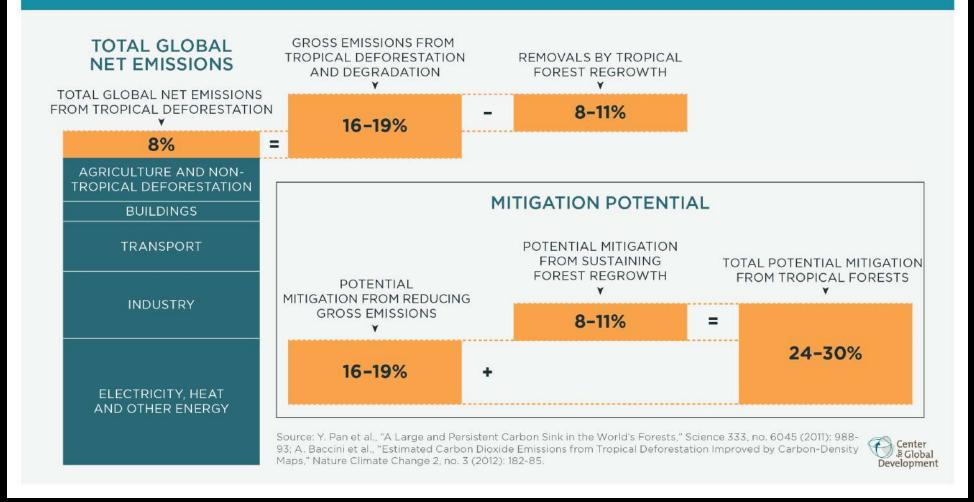
Deforestation represents net emissions from gross forest cover loss and degradation less removals by forest regrowth.





a Global

# Net tropical deforestation produces 8 percent of net emissions, but halting and reversing tropical deforestation could reduce total net emissions by up to 30 percent



### New science on the importance of forests is accumulating





#### Natural climate solutions

Bronson W. Griscoma, Justin Adams", Peter W. Ellis", Richard A. Houghton, Guy Lomax", Daniela A. Mitevad, William H. Schlesinger<sup>s, 1</sup>, David Shoch<sup>1</sup>, Juha V. Siikamäki<sup>8</sup>, Pete Smith<sup>1</sup>. Peter Woodburv<sup>1</sup>. Chris Zaaniar<sup>2</sup>. Allen Blackman<sup>o</sup>, João Campari<sup>i</sup>, Richard T. Conant<sup>b</sup>, Christophe SCIENCE ADVANCES | EDITORIAL Marisa R. Hamsik<sup>a</sup>, Mario Herrero<sup>m</sup>, Joseph Kiesecker<sup>a</sup>, Emily La Susan Minnemeyer, Stephen Polasky, Peter Potapov, Francis

The Hature Conservancy, Arlington, VA 2220, <sup>1</sup> Department of Biology, James Med Fallmock, IMA 02582, <sup>1</sup> Department of Agricultural, Agricult

Eva Wollenberg<sup>4</sup>, and Joseph Fargione

Contributed by William H. Schlesinger, September 5, 2017 Isent for review June 2

Better stewardship of land is needed to achieve the Paris Climate us Agreement goal of holding warming to below 2 °C however, con-fusion persists about the specific set of land stewardship options and quantify "natural dimate solutions" (NCS); 20 conservation, restoration, and improved land management actions that increase car-bon storage and/or avoid greenhouse gas emissions across global forests, wetlands, grasslands, and agricultural lands. We find that the maximum potential of NCS—when constrained by food security, fiber security, and biodiversity conservation—is 23.8 petagrams of CO<sub>2</sub> equivalent (PgCO<sub>2</sub>e) y<sup>-1</sup> (95% CI 20.3–37.4). This is ≥30% higher than prior estimates, which did not include the full range of action and safeguards considered here. About half of this maximum (11.3 PoCO.e v. 3 represents cost-effective climate mitigation, assuming the social cost of CO<sub>2</sub> pollution is ≥100 USD MgCO<sub>2</sub>e<sup>-1</sup> by 2030. Natural climate solutions can provide 37% of cost-effective CO. miting to below 2 °C. One-third of this cost-effective NCS mitigation can effectively implemented—also offer water filtration, flood buffering, soil health, biodiversity habitat, and enhanced dimate resilience. Work remains to better constrain uncertainty of NCS mitigation esrobust basis for immediate global action to improve ecosystem

The Paris Climate Agreement declared a commitment to hold e increase in the global average temperature to well below 2 'C above recondustrial levels" (1) Most Intersovernmental Panel on Climate Change (IPCC) scenarios consistent with limiting warming to below 2 °C assume large-scale use of carbon dioxide removal methods, in addition to reductions in greenhouse gas emissions from human activities such as burning fossil fuels and and use activities (2). The most mature carbon dioxide removal method is improved fand stewardship, yet confusion persists about the specific set of actions that should be taken to both increase sinks with improved land stewardship and reduce emissions from

The net amission from the land use sector is only 1.5 neturnous of CO2 equivalent (PgCO2e) y-1, but this belies much larger gross emissions and sequestration. Plants and soils in terrestrial ecosystems currently absorb the equivalent of ~20% of anthropogenic greenhouse gas emissions measured in CO, equivalents (9.5 PgCO<sub>2</sub>e y<sup>-1</sup>) (4). This sink is offset by emissions from land

www.pnas.org/cg/doi/10.1073/pnas.1710465114

#### **Amazon Tipping Point**

the 1970s. Brazilian scientist Eneus Solati shattered is dramatically low the long held dogma that vegetation is simply the consequence of climate and has no influence on climate whatsoever (1). Using isotopic ratios of oxygen on the hydrologica in rainwater samples collected from the Atlantic to use of fire to elimi the Peruvian border, he was able to demonstrate unequivocally that the Amazon generates approximately half of its own rainfall by recycling moisture 5 to 6 times as airmasses move from the Atlantic across the basin to

From the start, the demonstration of the hydrological cycle of the Amazon raised the question of how much deforestation would be required to cause the cycle to degrade to the point of being unable to support rain forest

High levels of evaporation and transpiration that forests produce throughout the year contribute to a wetter atmospheric boundary layer than would be the case with non-forest. This surface-atmosphere coupling is more important where large scale factors for rainfall formation ne weaker, such as in central and eastern Amazonia. Near the Andes, the impact of at least modest deforestation is less dramatic because the general ascending motion of has been increasing airmasses in this area induces biob levels of rainfall in sea surface temper. addition to that expected from local evaporation and

Where might the tipping point be for deforestationgenerated degradation of the hydrological cycle? The very first model to examine this question (2) showed that at about 40% deforestation, central, southern and eastern Ameronia would experience diminished minfall and a lengthier dry season, predicting a shift to savanna vegetation to the east.

Moisture from the Amazon is important to rainfall and human wellbeing because it contributes to winter rainfall for parts of the La Plata hasin, especially southern Paraguay, southern Brazil, Uruguay and central-eastern Argentina in other regions, the moisture passes over the area, but does ipitate out. Although the amount contributing to rainfall in southeastern Brazil is smaller than in other areas, even small amounts can be a welcome addition to urban reservoirs.

The importance of Amazon moisture for Bessilian agrigulture south of the Amazon is complex but not trivial Perhaps most important is the partial contribution of dry season Amazon evapotranspiration to rainfall in southeastern South America. Forests maintain an evapotranspira tion rate year-round, whereas evapotranspiration in pastures

models suggest a l

In recent decad etation. Many stud contributing factor would be the tippio use of fire leads to d vulnerability to fir We believe that

> tion, dimate chang a tipping point fo forest ecosystems in at 20-25% defores

could well represe tipping point. Thes of 2009, 2012 (and the whole system the dry season over also seem to be as

We believe that curb further defore of safety against th the deforested area reason that there tipping point by ti of the Parties, Bra forestation by 203 should be in south logical cycle of the . being in Brazil and

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#### Regenerate natural forests to store carbon

Plans to triple the area of plantations will not meet 1.5 °C climate goals. New natural forests can, argue Simon L. Lewis, Charlotte E. Wheeler and colleagues.

east amounts of carbon double from the our berg, as will as drastic cuts in orea

end of this currency. That is equivalent to all the CO, emitted by the United States

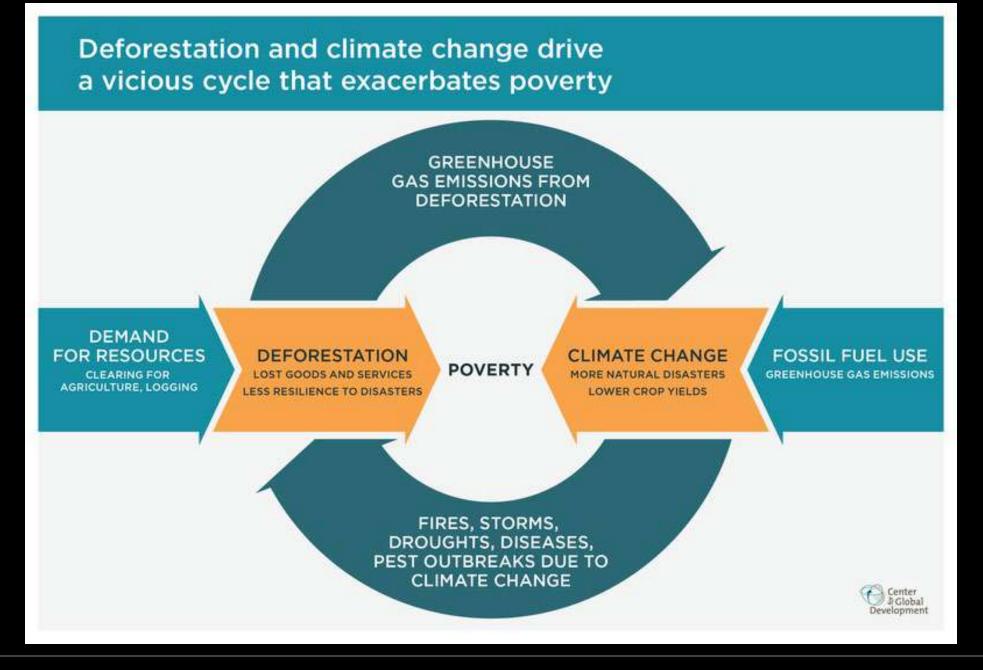
from afformable. Increasing tree gover has managing water and creating jobs.
The IPCC suggests that becoming



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### Tropical forests' goods and services contribute to development

### GOODS & SERVICES timber non-timber products INCOME tourism wild foods, bush meat freshwater and coastal fish forage and fodder erosion control FOOD rainfall patterns pollination less dam siltation fuelwood and charcoal ENERGY

clean drinking water clean air medicine mosquito control HEALTH fire control local temperatures recreation landslide prevention flood control tsunami wave attenuation carbon storage

biodiversity

GLOBAL

PUBLIC GOODS

→ GOODS & SERVICES





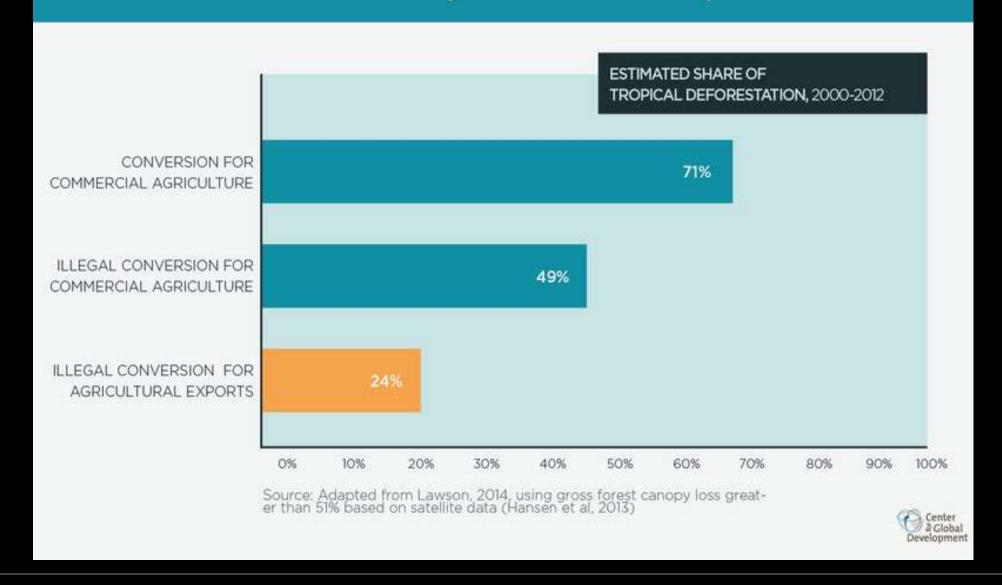
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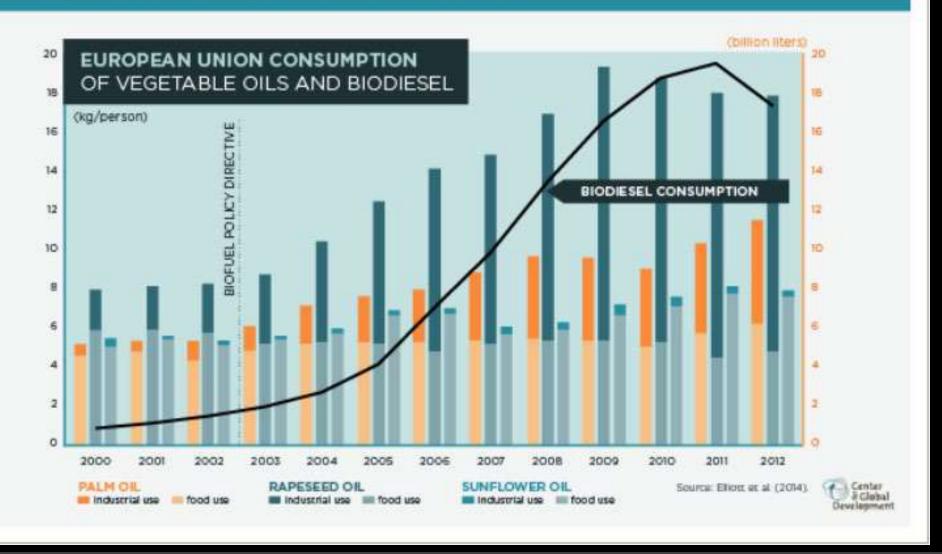




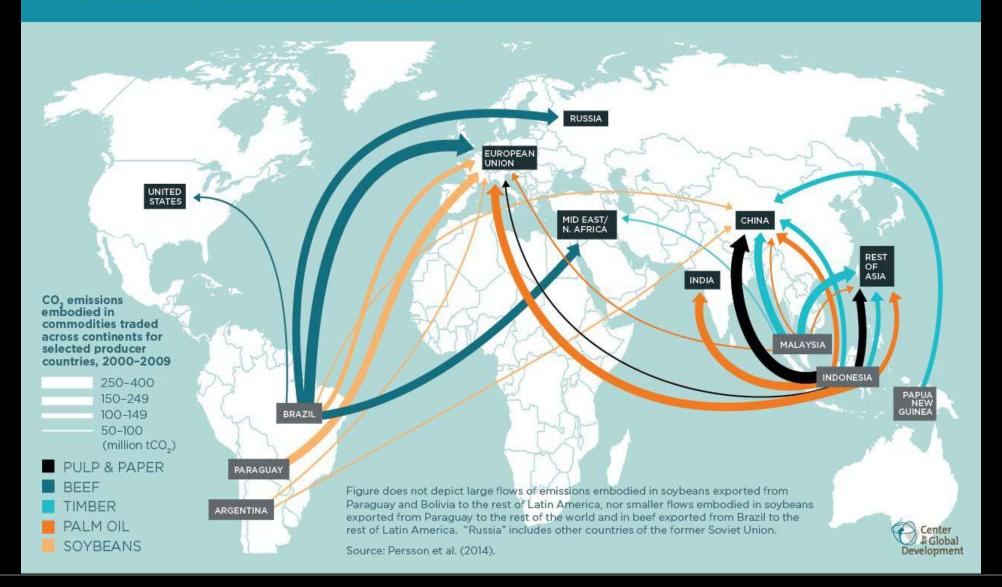
## Illegal conversion of forests to produce agricultural exports accounted for almost one-quarter of recent tropical deforestation



## European Union biofuel policy increased demand for palm oil, a driver of deforestation



## Emissions from deforestation are embodied in globally traded commodities



### The problem of subsidizing wood-based energy





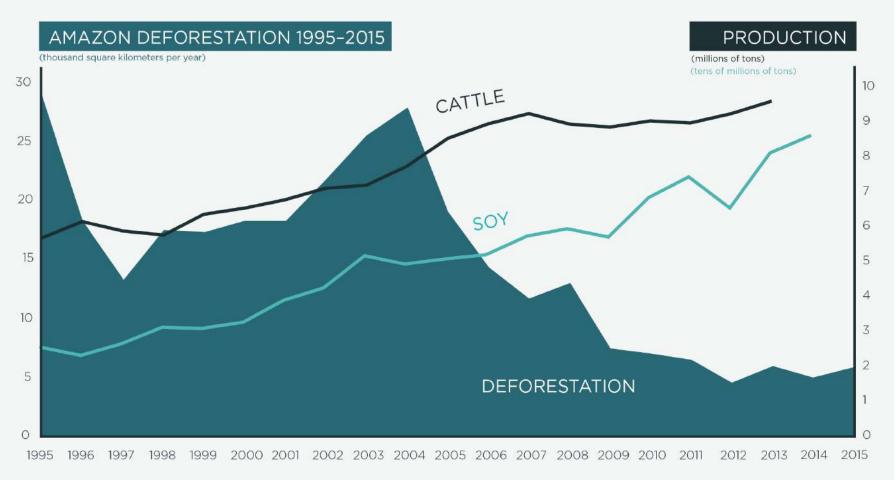




### Reasons for optimism on tropical deforestation

- We have evidence that reducing deforestation is feasible and affordable
- New tools are enabling transparency and accountability
- Global norms are shifting in ways favorable to forest protection
- We have achieved global consensus on REDD+, but finance remains the missing piece

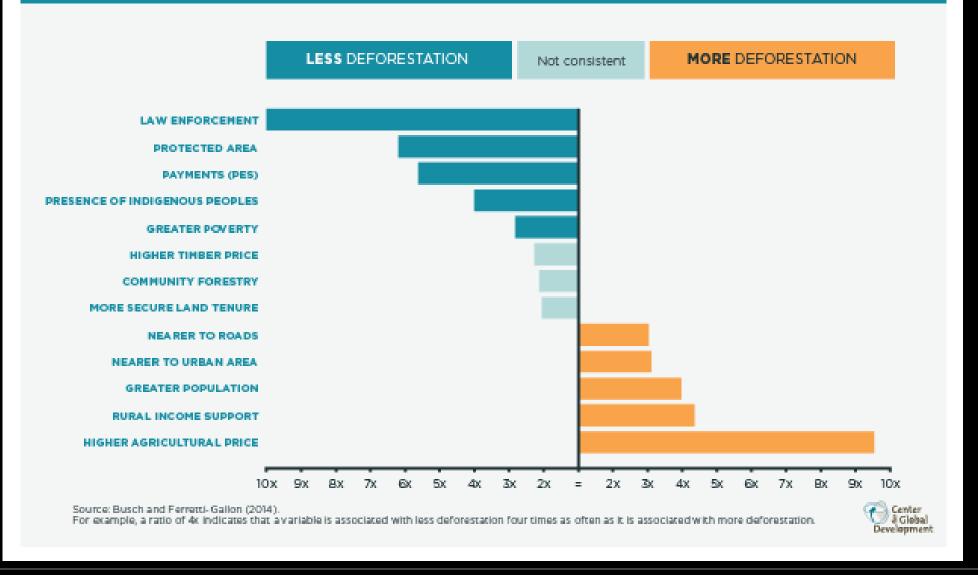
## Brazil reduced deforestation and increased agricultural production at the same time



Source: Food and Agriculture Organization of the United Nations (FAO), Statistics Division, "Production quantities by country," updated 2015, http://faostat3. fao.org/browse/Q/\*/E; National Institute for Space Research (INPE), "Projeto Prodes: Monitoramento da Floresta Amazônica Brazileria Por Satélite," updated 2016, http://www.obt.inpe.br/prodes/index.php

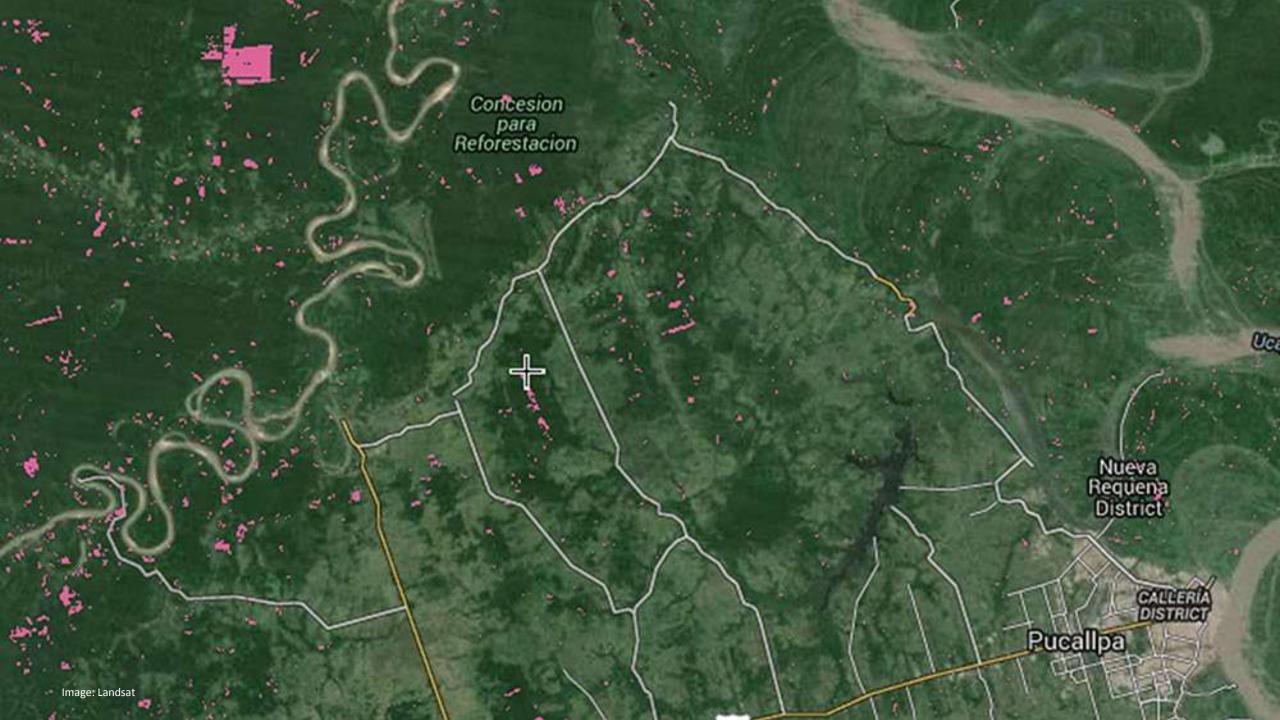


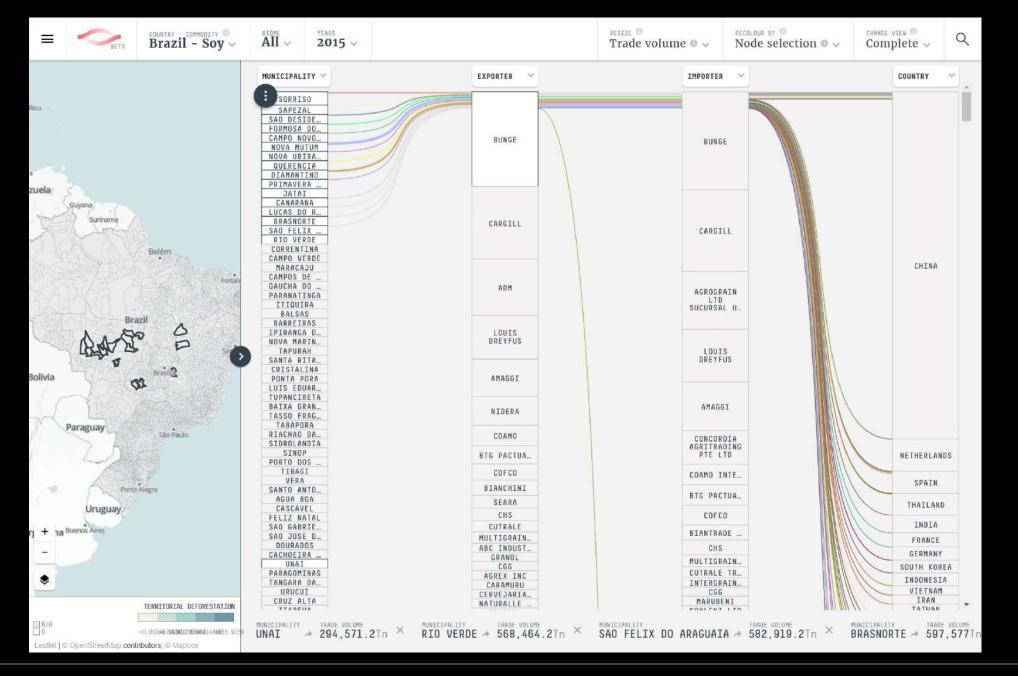
## Various factors were consistently associated with less or more deforestation



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# Decreasing tolerance for illegal logging



#### Corporations are accepting responsibility





















## Recognition of indigenous peoples' rights



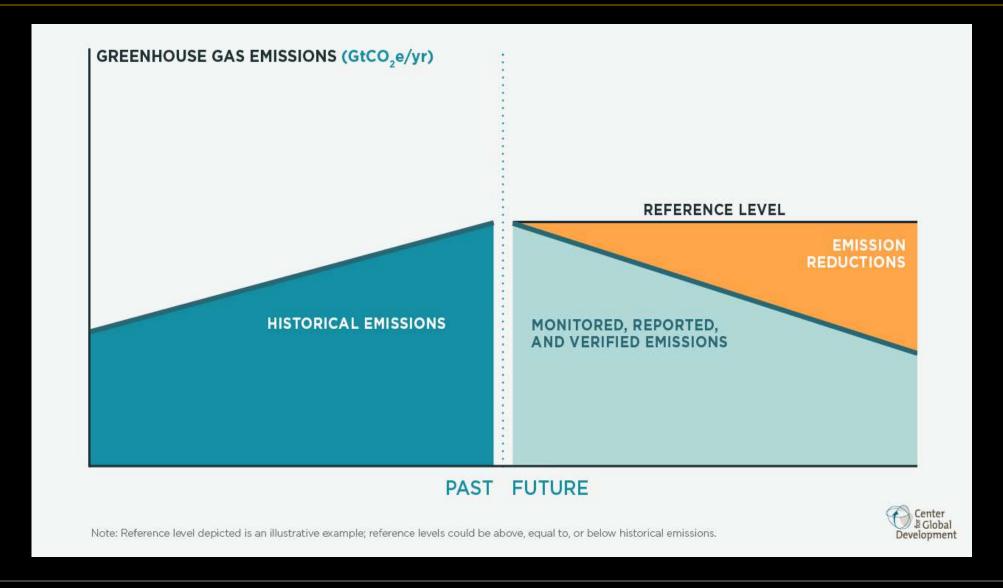
"It was only when the international community started talking about REDD+ that we had the opportunity to show that we do exist", Mina Setra, AMAN, Indonesia, 2014

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#### Reducing emissions from deforestation and forest degradation: REDD+



#### More than 50 countries have initiated REDD+ programs, but only a few have access to performance-based finance with international funding



"Countries that have initiated REDD+ programs with international funding" refers to countries that have signed a Preparation Grant with the World Bank Forest Carbon Partnership Facility, have active, closed or pipeline national programs with the UN-REDO Program, and/or participate in the Forest Investment Program, but did not yet have a payment for-performance agreement in place as of December 2015. "Countries with performance-based finance' refers to countries that had a payment for performance agreement in place as of December 2015.

Sources: Forest Carbon Partnership Facility (2016), Forest Investment Program (2016), United Nations Programme on Reducing Emissions from Deforestation and Forest Degration (2016).



## Prospective sources of results-based finance











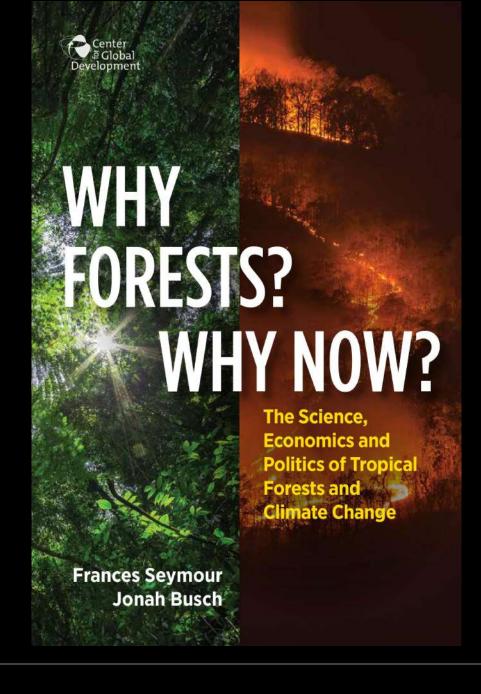
## **Looking Ahead**

- UN Secretary General's Climate Summit – September 2019
- 2020 deadlines for national climate ambition (NDCs), and forest-related commitments in the New York Declaration on Forests
- UNFCCC Conferences of the Parties in Chile 2019 (Article 6); UK in 2020?









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