AMAZONTEC 2021: TECHNOLOGY, INNOVATION AND EMPOWERMENT FOR AN AMAZON IN CRISIS

Climate, Technology, and the Future of the Amazon

How bioeconomy can provide climate resilience, economic development, and ensure the survival of the Amazon's biodiversity

Wednesday October 27, 2021

2:00 p.m. EST / 1:00 pm hora Perú

SESSION HOSTED BY: AMAZON CONSERVATION

WITH SUPPORT FROM: aceaa CONSERVACIÓN AMAZÓNICA

AND PARTICIPATION BY: WORLD RESOURCES INSTITUTE, ecociencia, WWF

AS PART OF: AmazonTEC

WHICH IS ORGANIZED BY: CONSERVACIÓN AMAZÓNICA ACCA

Welcome

John Beavers
Executive Director of
Amazon Conservation

Photo of Wayqecha Conservation Hub by Jess Suarez

Gray-breasted Mountain-Toucans (Andigena hypoglauca) taken at Wayqecha Conservation Hub. Photo by James Adams

Opening Remarks

Carlos Nobre

Senior Researcher Institute for Advanced Studies, University of São Paulo [Brazil]

TOPIC AND SPEAKER INTRODUCTION

What are science and technology telling us about carbon and climate in the Amazon?

Manuel Pulgar Vidal

Leader of the Climate & Energy Global Practice, World Wild Fund for Nature International, and President of the UN Climate Convention's Twentieth Conference of the Parties (COP 20) [Peru]

Climate and Carbon: A Global Perspective

David Gibbs

GIS Research Associate in
Global Forest Watch,
WRI [USA]

GLOBAL MAPS OF 21ST CENTURY FOREST CARBON FLUXES

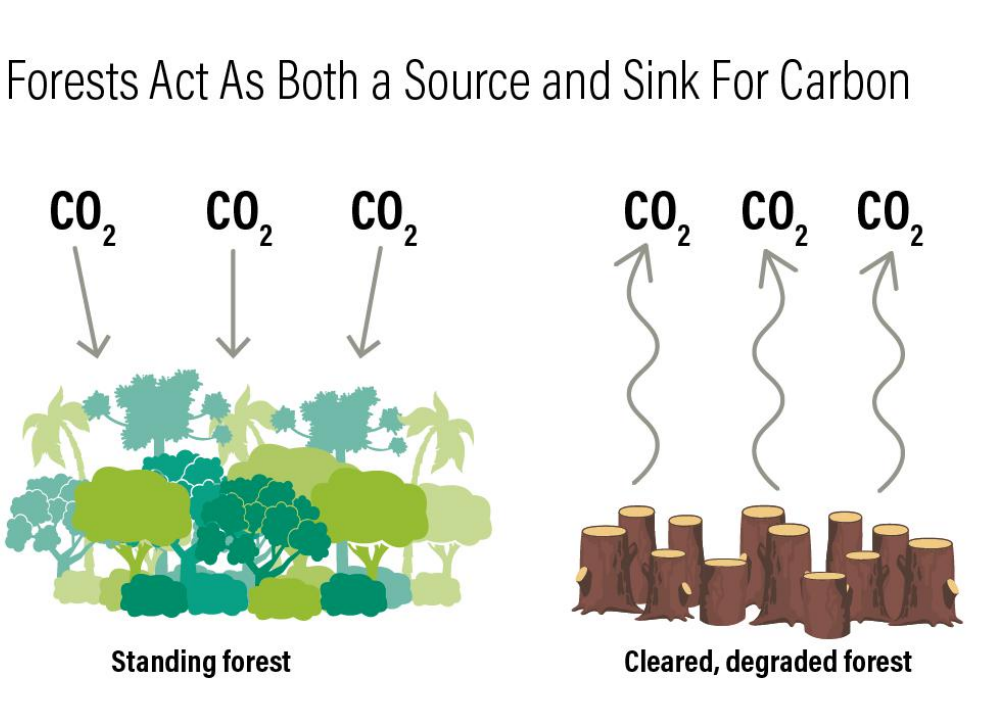
David Gibbs

October 27, 2021

AmazonTEC 2021

WORLD RESOURCES INSTITUTE

HOW WELL DO WE UNDERSTAND GREENHOUSE GAS FLUXES FROM FORESTS?



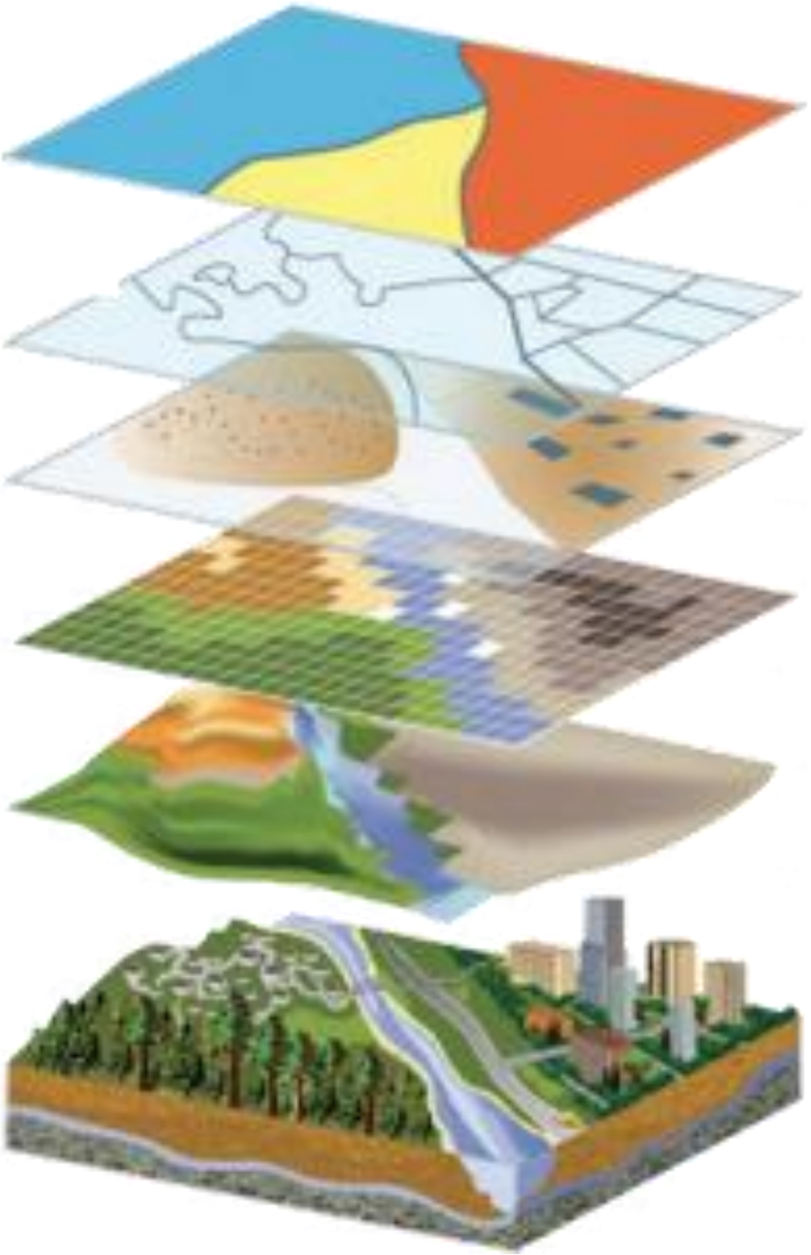
- How much? ☑
- Where? ☒
- Why? ☒

https://www.globalforestwatch.org/blog/climate/forests-carbon-emissions-sink-flux/

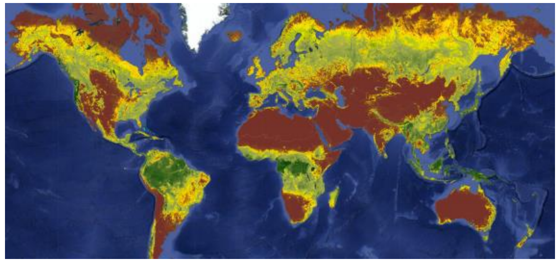
THE APPROACH

- 30-m global maps of forest-related greenhouse gas fluxes by combining IPCC methodologies with spatial data on forests

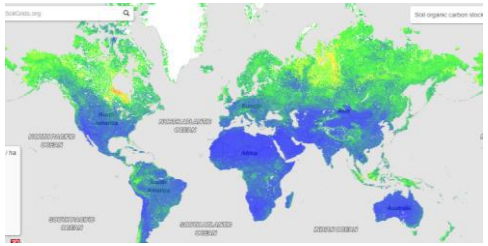
- Simulate forest greenhouse gas fluxes at 30 m from 2001-2020:
  - Gross emissions
  - Gross removals
  - Net GHG flux (difference between emissions and removals)



Combined data sources in inventory framework

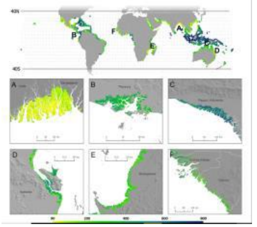


Tree Biomass/Carbon
Various

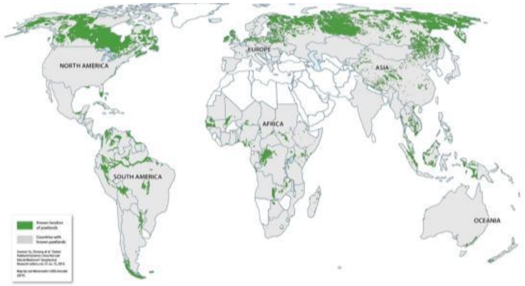


Soil Carbon
SoilGrids250, v2.0

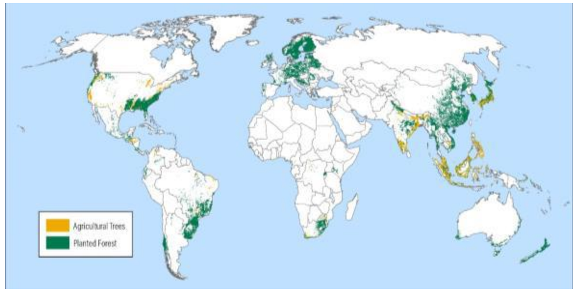
Mangrove Biomass
Simard et al. 2018



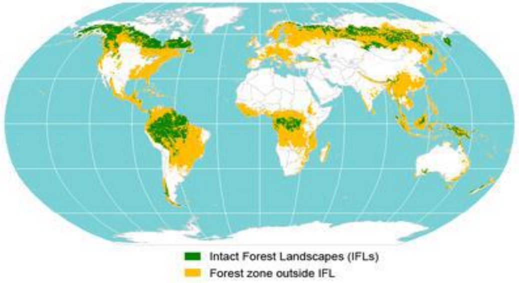
Mangrove Soil Carbon
Sanderman et al. 2018



Peatlands
Gumbrect et al. 2017

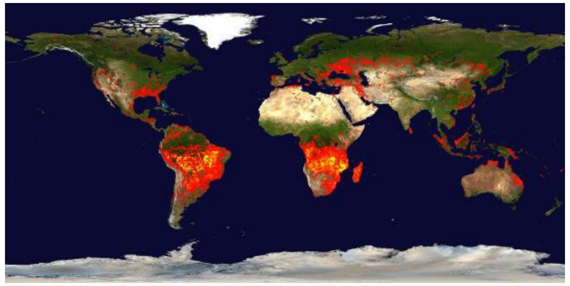


Plantations
Harris et al. 2019

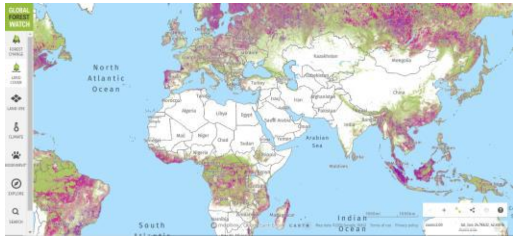


Intact Forests
Potapov et al. 2017

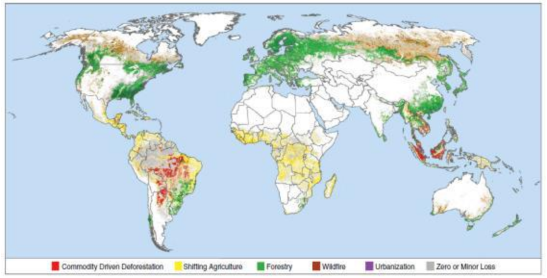
Mangrove Extent
Giri et al. 2000



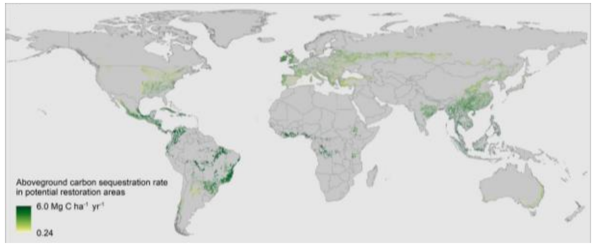
MODIS Burned Areas
Giglio et al. 2018



Tree Cover, Loss and Gain
Hansen et al. 2013

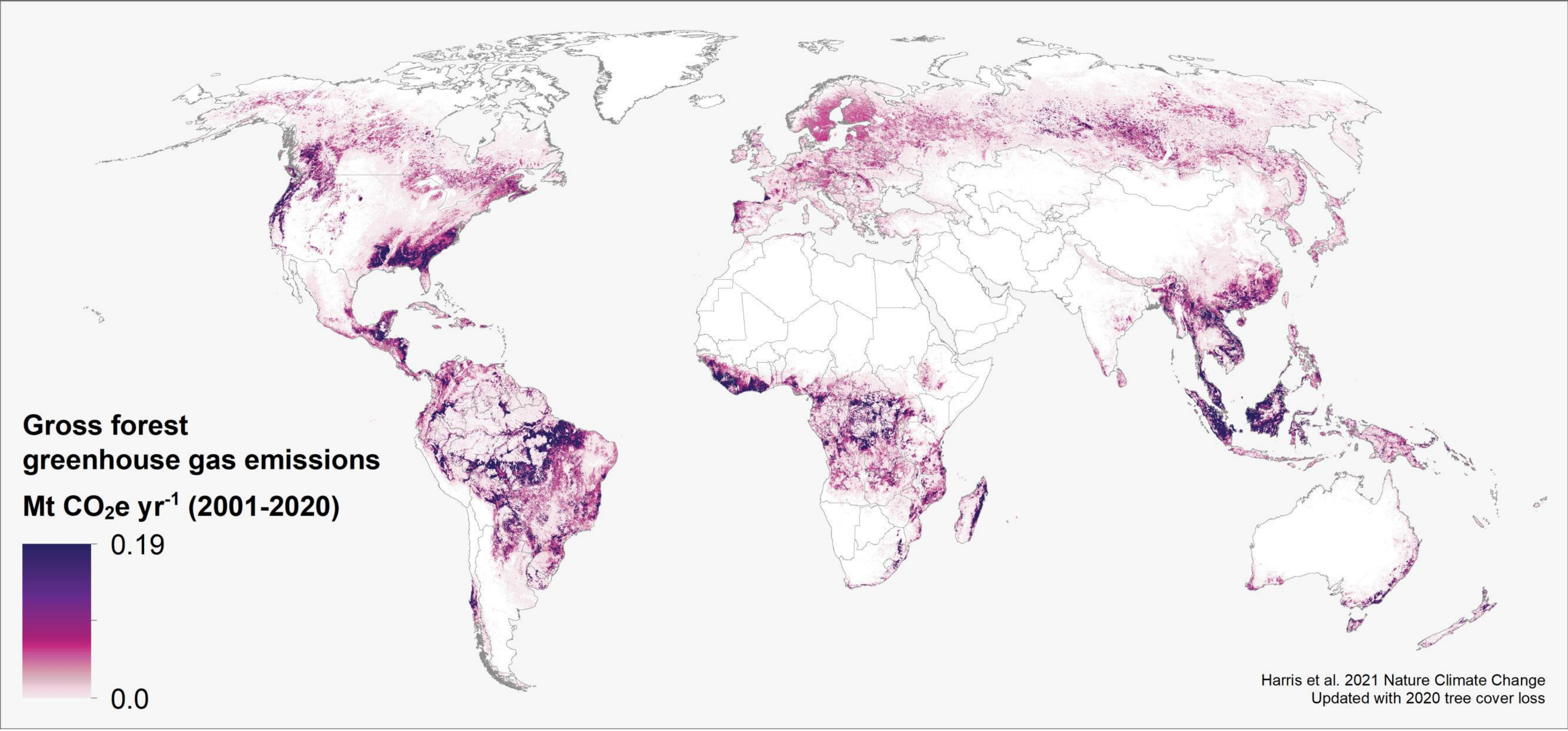


Drivers of Forest Loss
Curtis et al. 2018

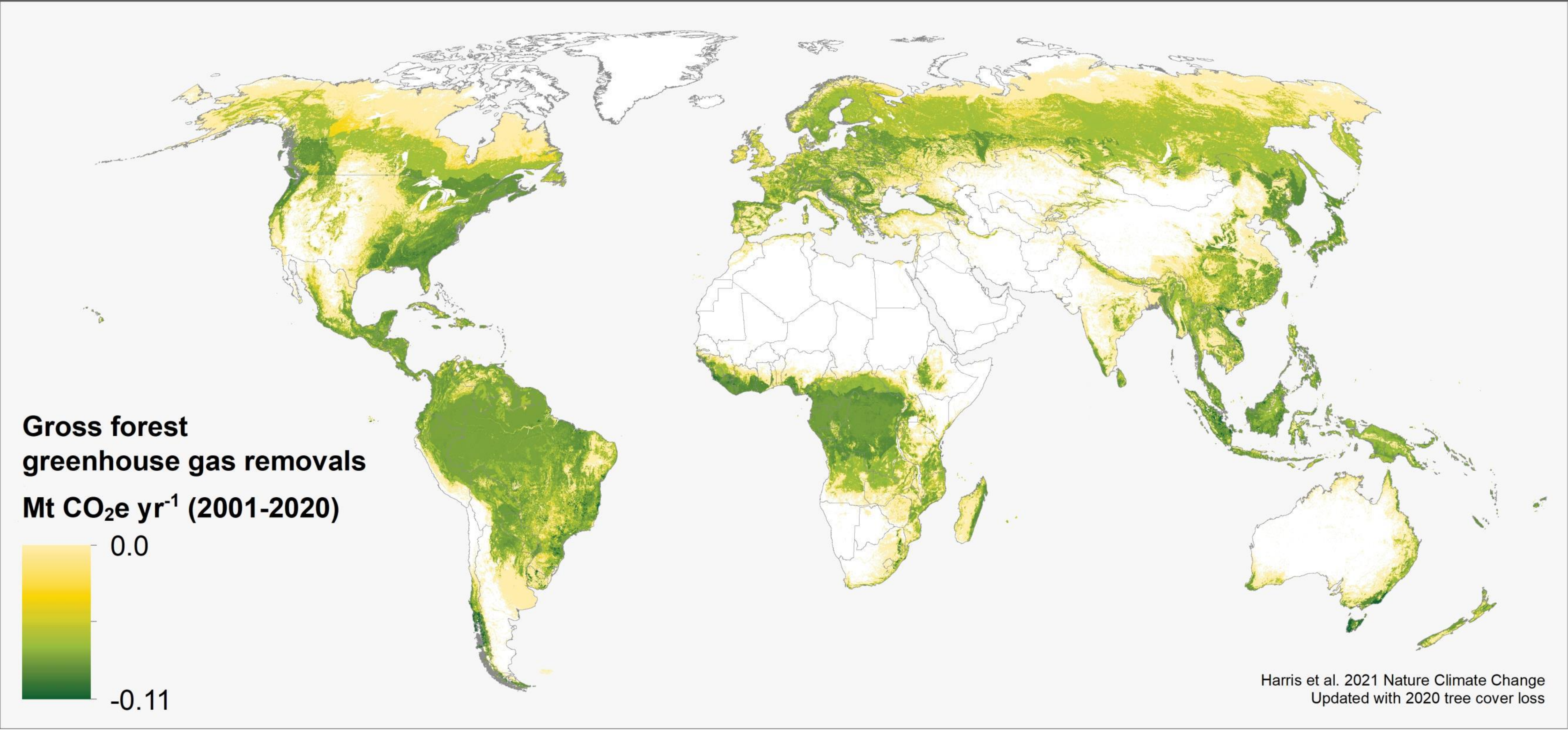


Forest Regrowth C Rates
Cook-Patton et al. 2020

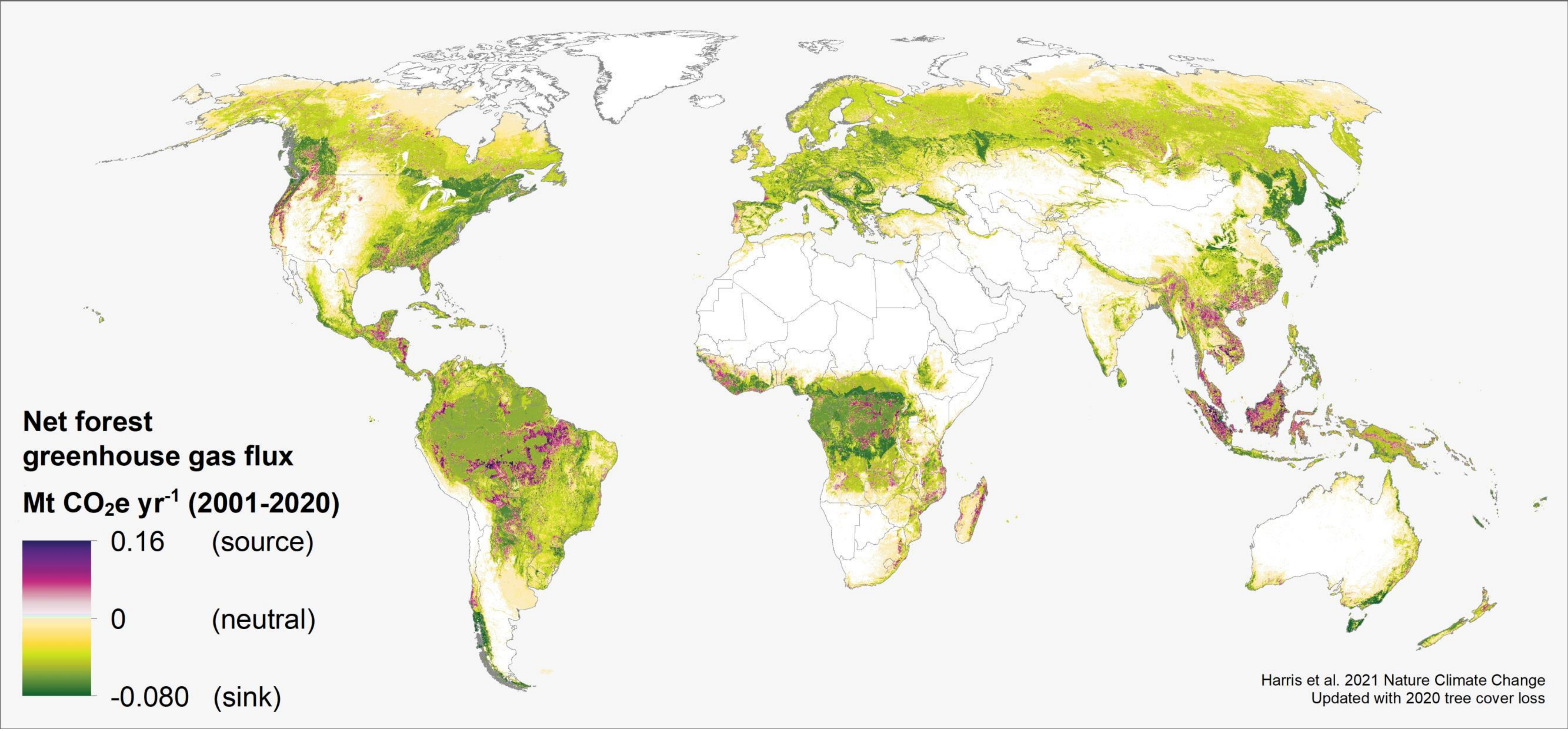
Emissions

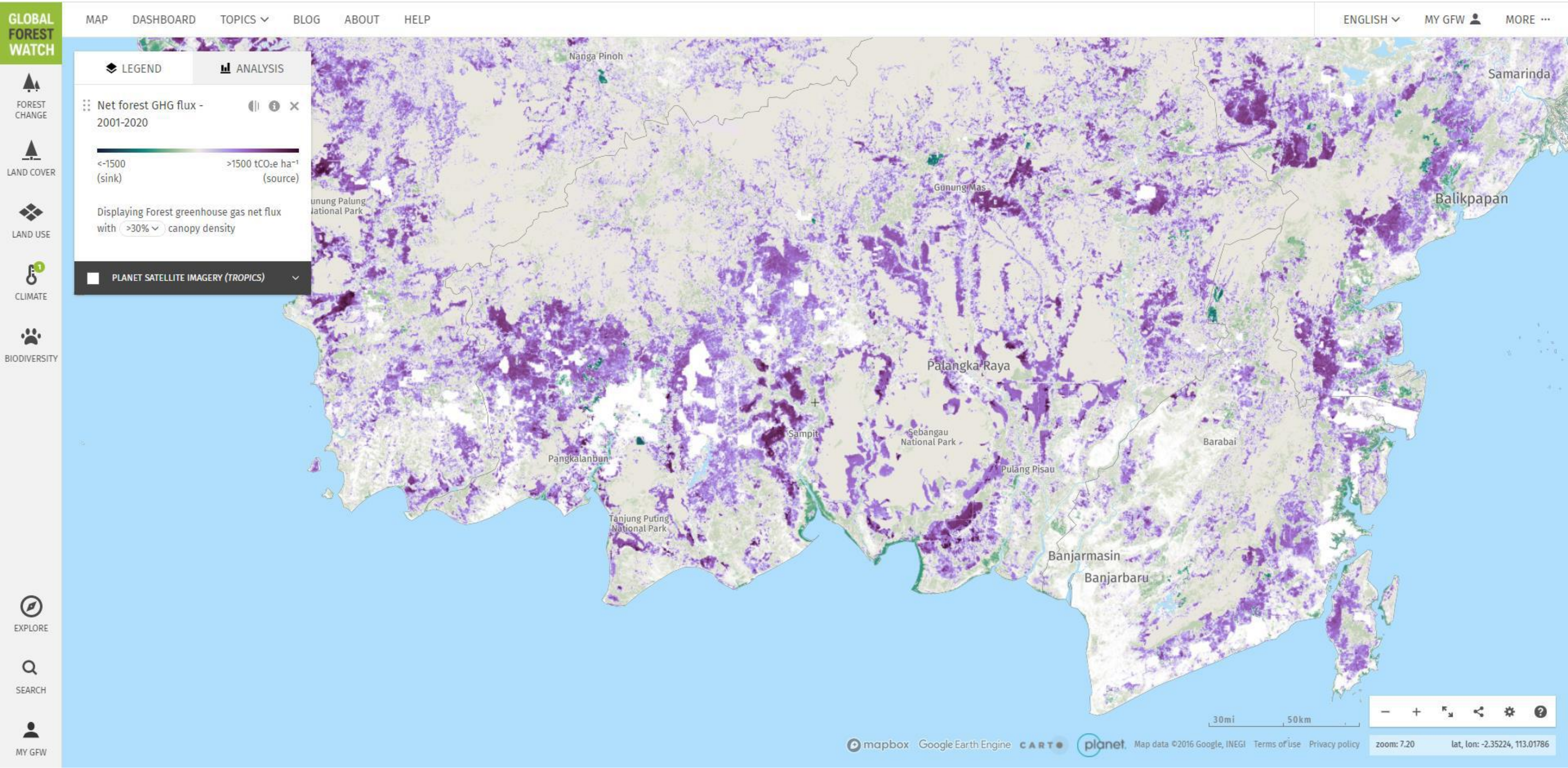

Gross forest
greenhouse gas emissions
Mt $CO_2e\ yr^{-1}$ (2001-2020)
0.19
0.0
Harris et al. 2021 Nature Climate Change
Updated with 2020 tree cover loss

Removals (sequestration)



Net flux


Net forest
greenhouse gas flux
Mt CO_2e yr^{-1} (2001-2020)
0.16 (source)
0 (neutral)
-0.080 (sink)
Harris et al. 2021 Nature Climate Change
Updated with 2020 tree cover loss



https://gfw.global/3nsxFmN

Carbon Fluxes from World's 3 Major Rainforests

AMAZON RIVER BASIN

SINK

Net flux (Gt CO2e/yr): -0.10

Emissions (Gt CO2e/yr): 1.1

Removals (Gt CO2e/yr): -1.2

CONGO RIVER BASIN

SINK

Net flux (Gt CO2e/yr): -0.61

Emissions (Gt CO2e/yr): 0.53

Removals (Gt CO2e/yr): -1.1

SOUTHEAST ASIA

SOURCE

Net flux (Gt CO2e/yr): 0.49

Emissions (Gt CO2e/yr): 1.6

Removals (Gt CO2e/yr): -1.1

Source: Harris et al. 2021.

Notes: all values in units of billion metric tonns CO2e per year

20.01.21

GLOBAL FOREST WATCH

WORLD RESOURCES INSTITUTE

https://www.globalforestwatch.org/blog/climate/forests-carbon-emissions-sink-flux/

Contact info:

David Gibbs
david.gibbs@wri.org
Global Forest Watch
World Resources Institute

Climate and Carbon: Regional/Amazonian Perspective

Matt Finer

MAAP Director,
Amazon Conservation
[USA]

Photo by Jason Scullion

The Amazon & Climate Change

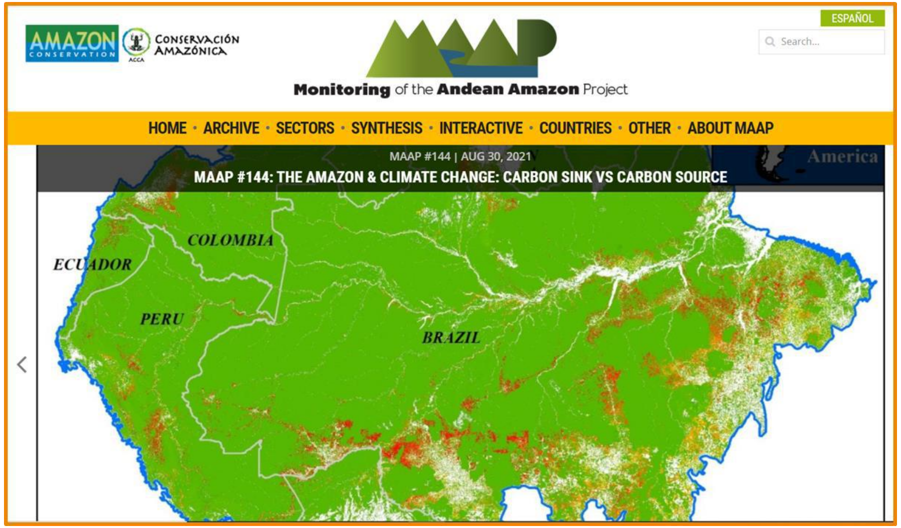
Carbon Sink vs Carbon Source (Carbon Flux)

Dr. Matt Finer
Senior Research Specialist &
Director of MAAP

MAAP =

Satellite-based
Real-time
Amazon Monitoring

Launched in 2015
>145 public reports
>150 confidential reports



Deforestation (Mining, Ag,…)
Fires
Logging
Carbon/Climate Change

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MAAP #144: THE AMAZON & CLIMATE CHANGE: CARBON SINK VS CARBON SOURCE

PERU, BRAZIL, COLOMBIA, ECUADOR, BOLIVIA, CLIMATE CHANGE, MAPS AUG 30, 2021

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A pair of recent scientific studies revealed that parts of the Amazon now emit more carbon into the atmosphere than they absorb (Gatti et al 2021, Harris et al 2021).

Here, we dig deeper and highlight the key finding: the **Brazilian Amazon has become a net carbon source** over the past 20 years, whereas the **total Amazon is still a net carbon sink**.

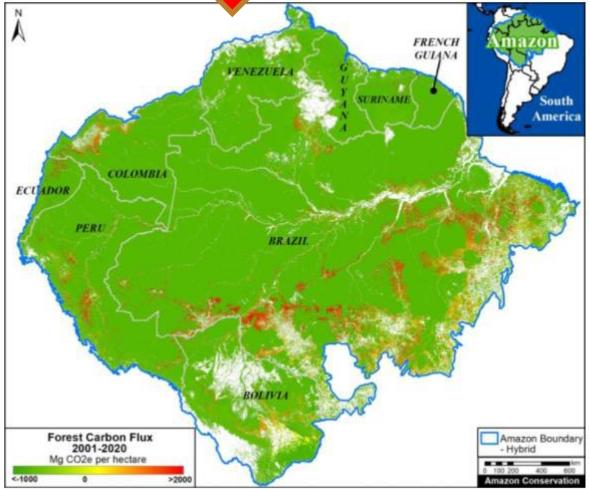
We also show that **protected areas and indigenous territories are crucial carbon sinks**, showing once again their importance and effectiveness for overall conservation across the Amazon (**MAAP #141**).

One of the noted studies (Harris et al 2021) presented a new global monitoring system for **forest carbon flux** based on satellite data.

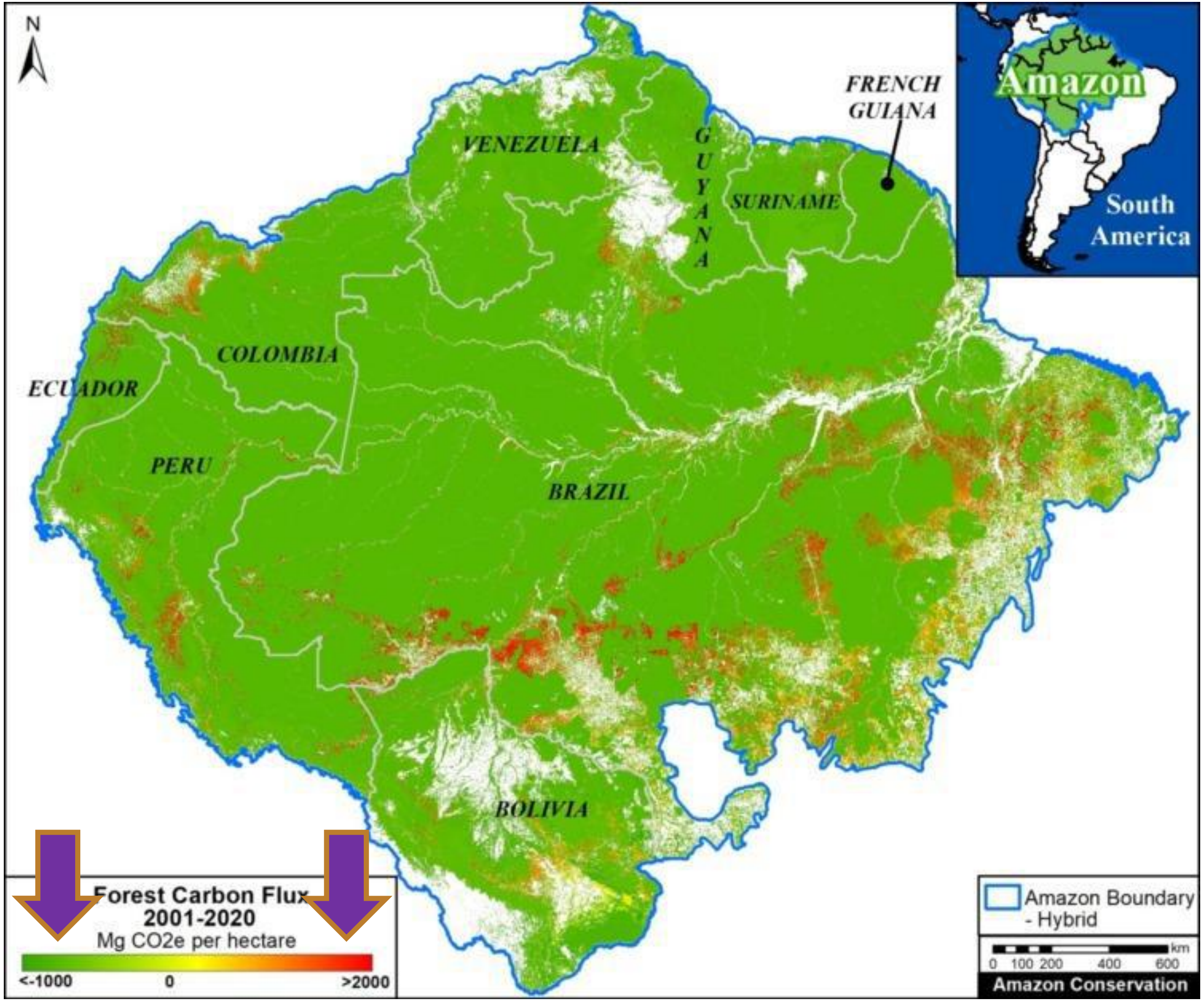
Here, we independently analyze this data with a focus on the **Amazon**.*

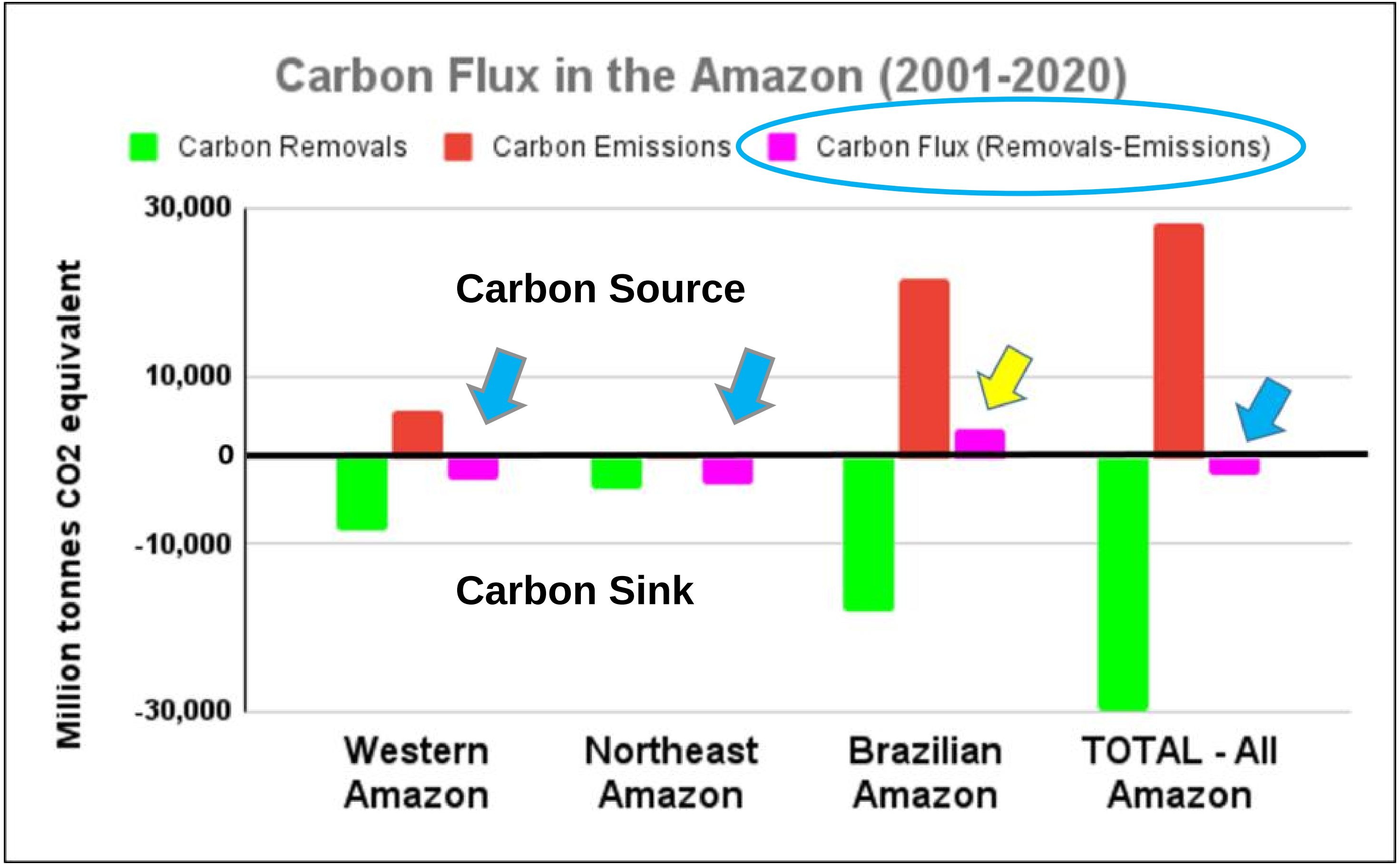
The flux is the crucial difference between forest carbon **emissions** (such as deforestation) and **removals** from the atmosphere (such as intact forests and regrowth).

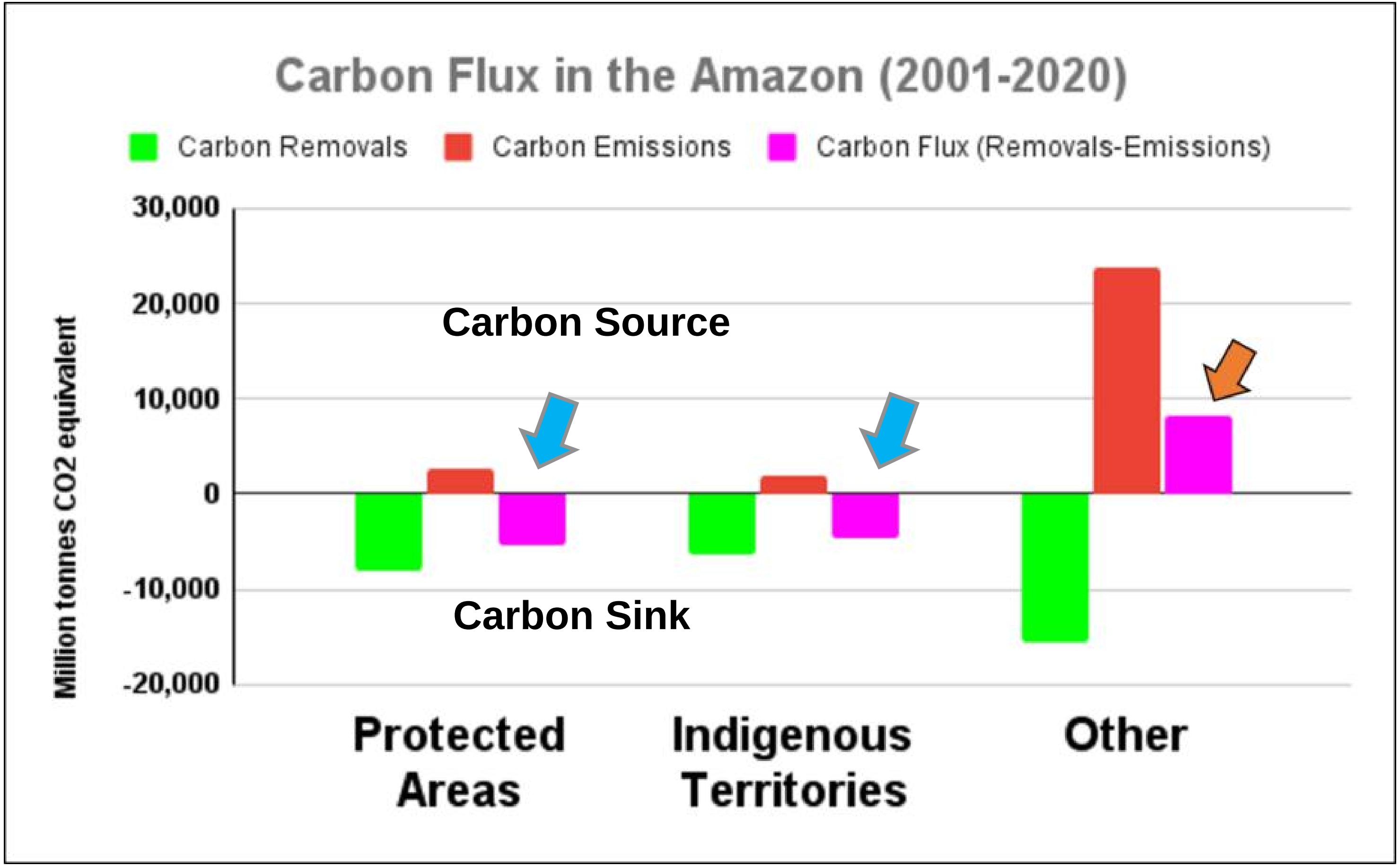
A **negative flux** indicates that removals exceed emissions and the area is a **carbon sink**, thus buffering climate change. The Base Map illustrates these sinks in **green**.



Base Map. Forest Carbon Flux across the Amazon, 2001-2020. Data: Harris et al 2021. Analysis: Amazon Conservation/MAAP.


N
FRENCH GUIANA
VENEZUELA
GUYANA
SURINAME
COLOMBIA
ECUADOR
PERU
BRAZIL
BOLIVIA
Amazon
South America
Forest Carbon Flux 2001-2020
Mg CO2e per hectare
<-1000
0
>2000
Amazon Boundary - Hybrid
km
0 100 200 400 600
Amazon Conservation


Carbon Flux in the Amazon (2001-2020)
Carbon Removals
Carbon Emissions
Carbon Flux (Removals-Emissions)
30,000
10,000
0
-10,000
-30,000
Million tonnes CO2 equivalent
Carbon Source
Carbon Sink
Western Amazon
Northeast Amazon
Brazilian Amazon
TOTAL - All Amazon


Carbon Flux in the Amazon (2001-2020)
Carbon Removals
Carbon Emissions
Carbon Flux (Removals-Emissions)
30,000
20,000
10,000
0
-10,000
-20,000
Million tonnes CO2 equivalent
Carbon Source
Carbon Sink
Protected Areas
Indigenous Territories
Other

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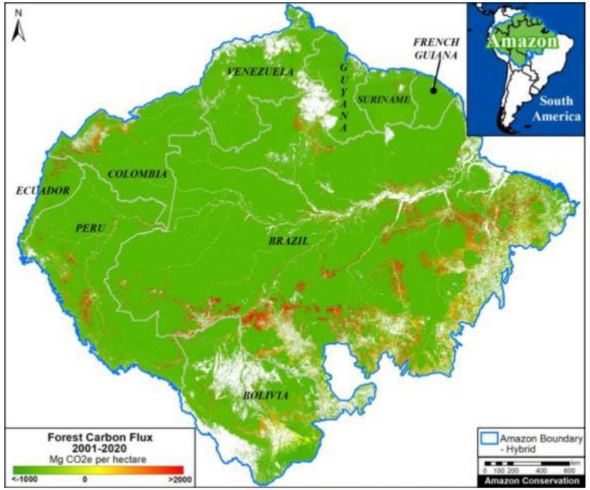

Base Map. Forest Carbon Flux across the Amazon, 2001-2020. Data: Harris et al 2021. Analysis: Amazon Conservation/MAAP.

Key Results:

Brazilian Amazon: Carbon Source

All Amazon: Carbon Sink

Protected Areas & Indigenous Territories Key

Current Actions Critical

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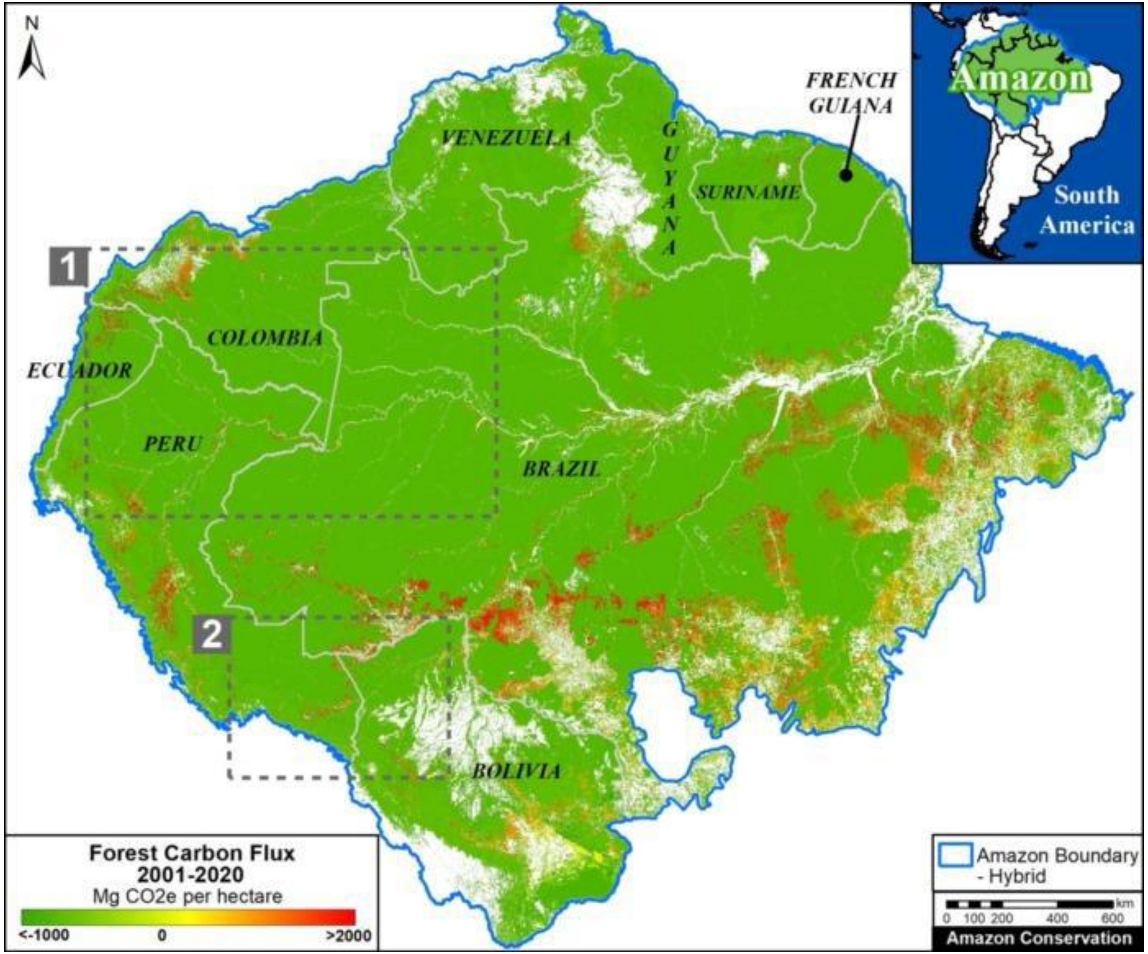
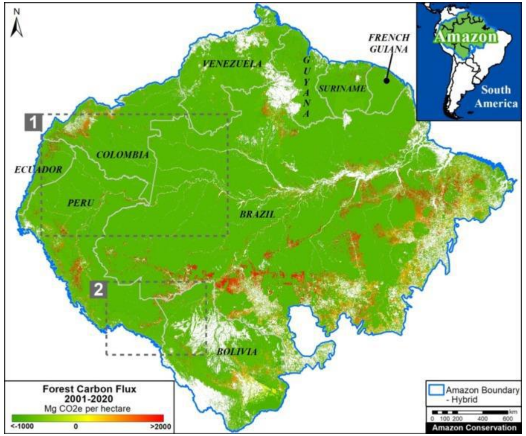
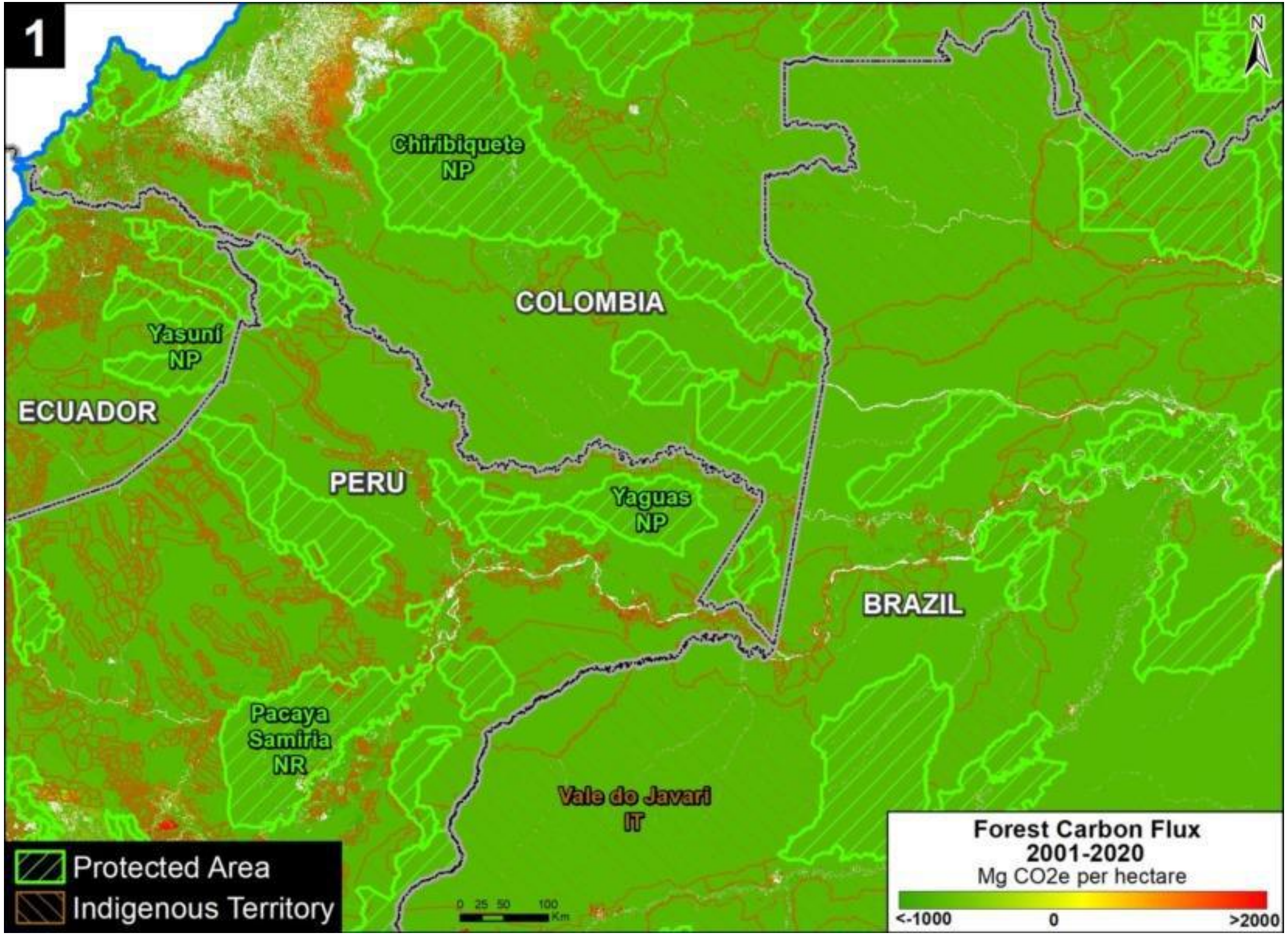
Carbon Sinks

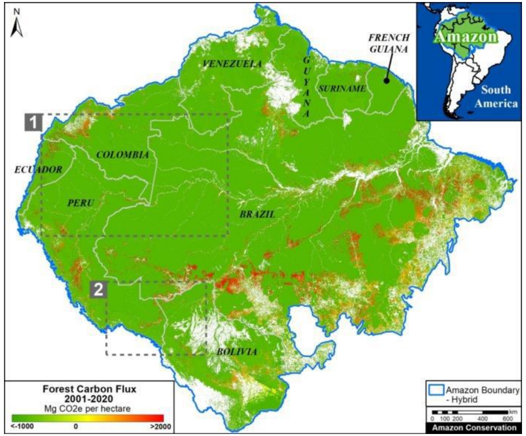


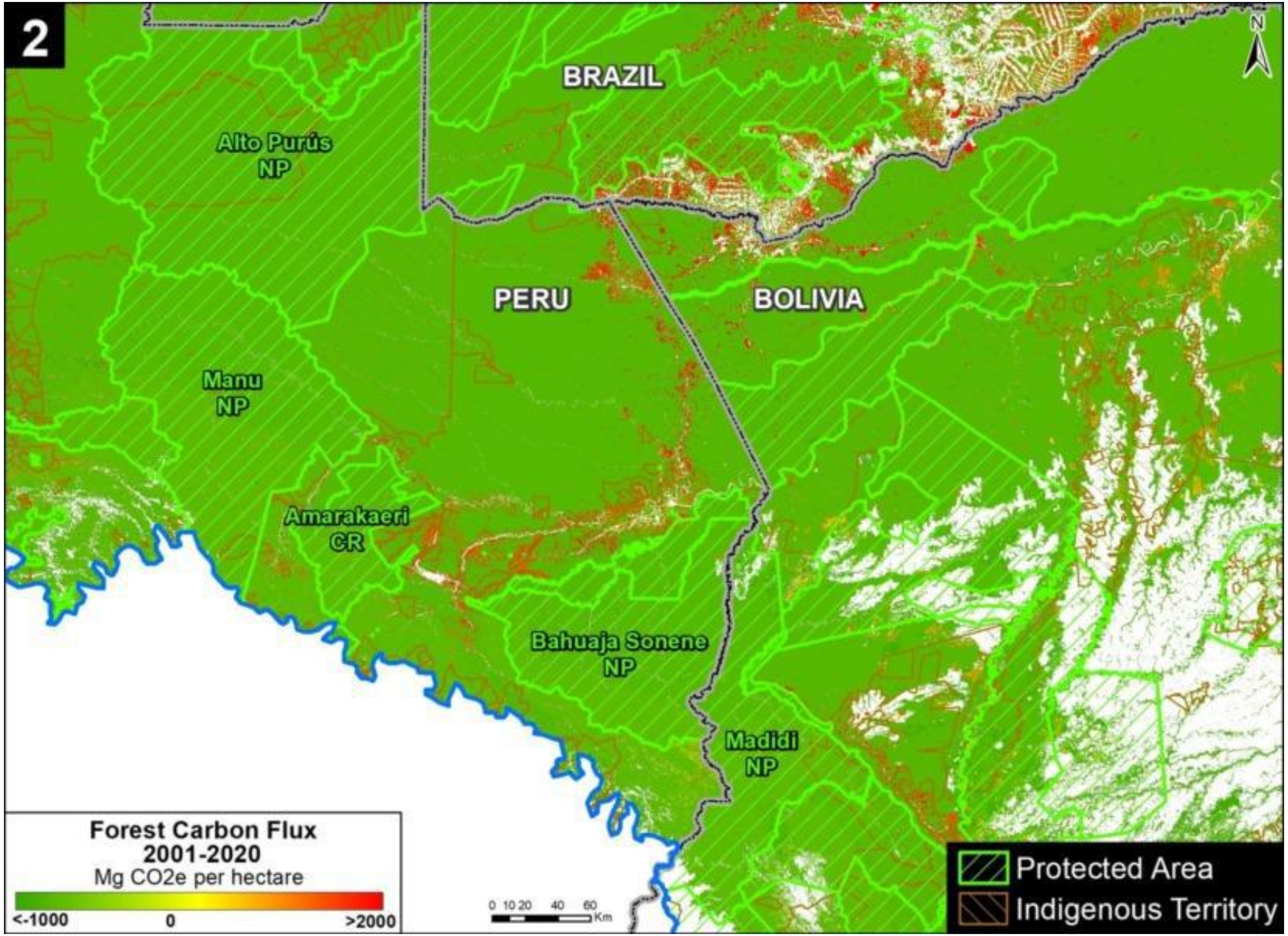
Carbon Sinks



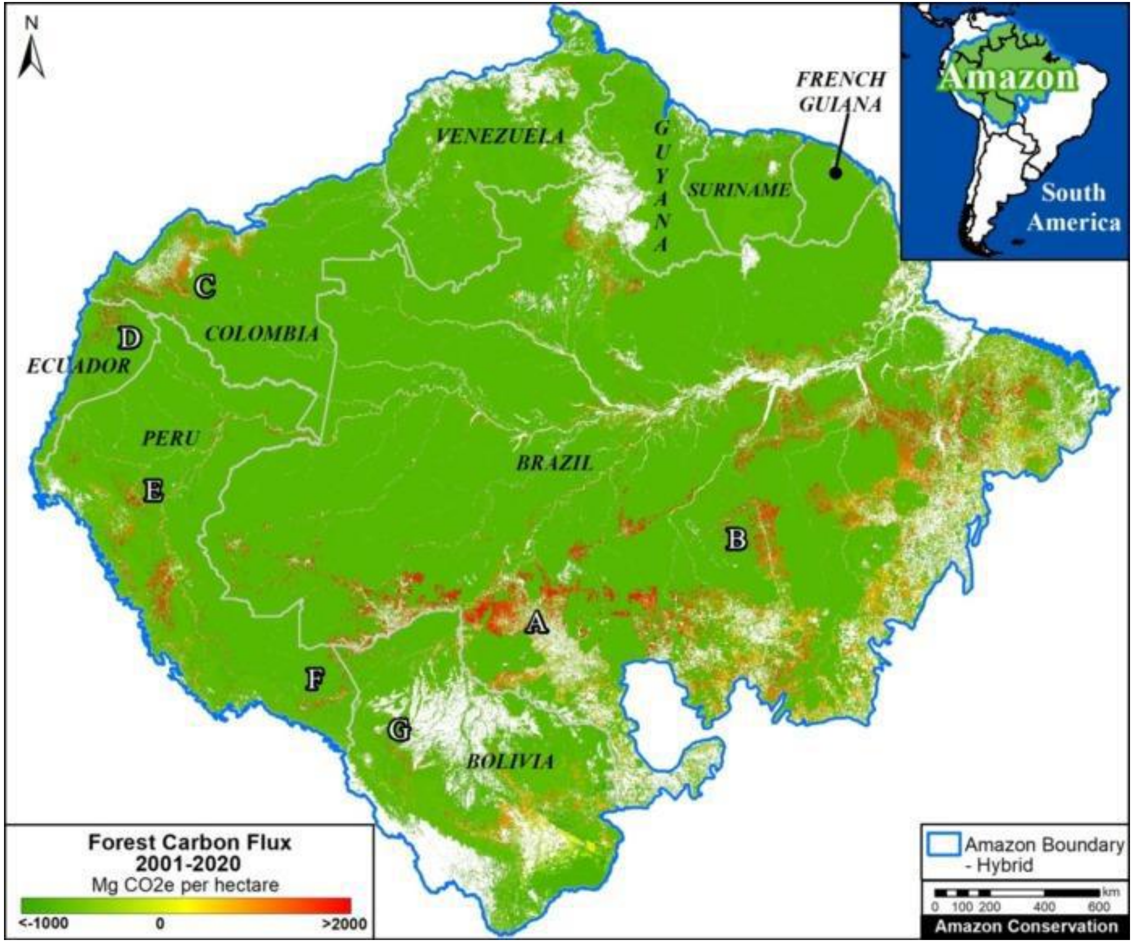


Carbon Sinks

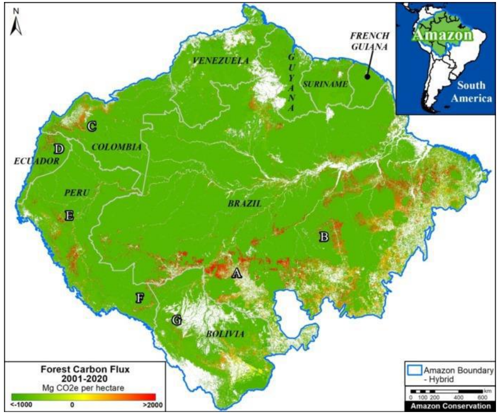


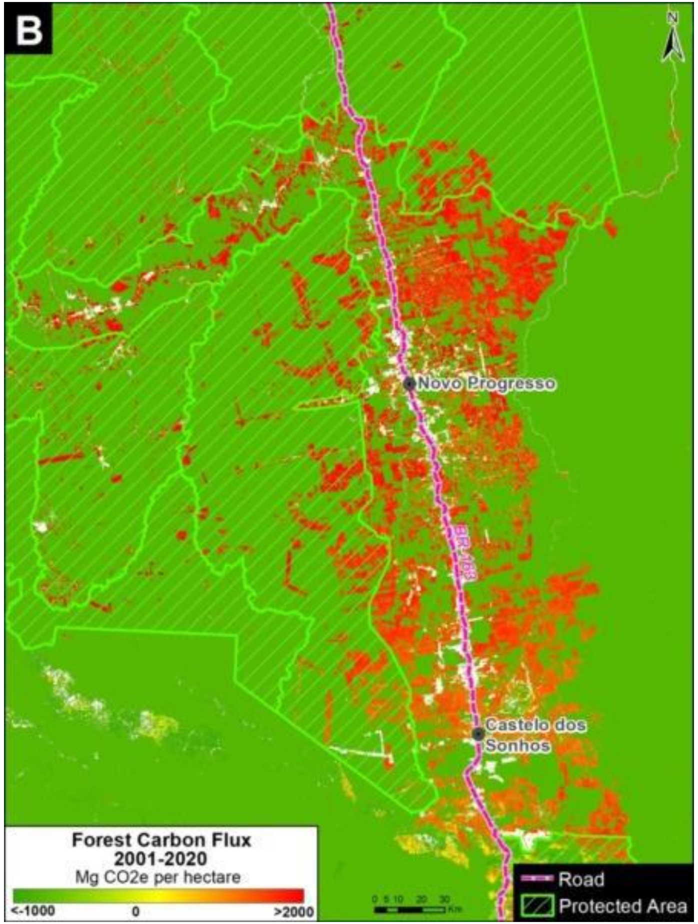


Carbon Sources

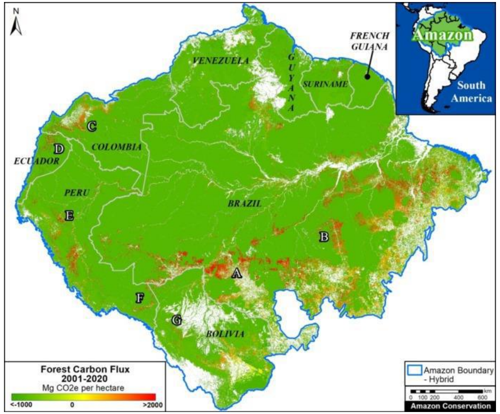


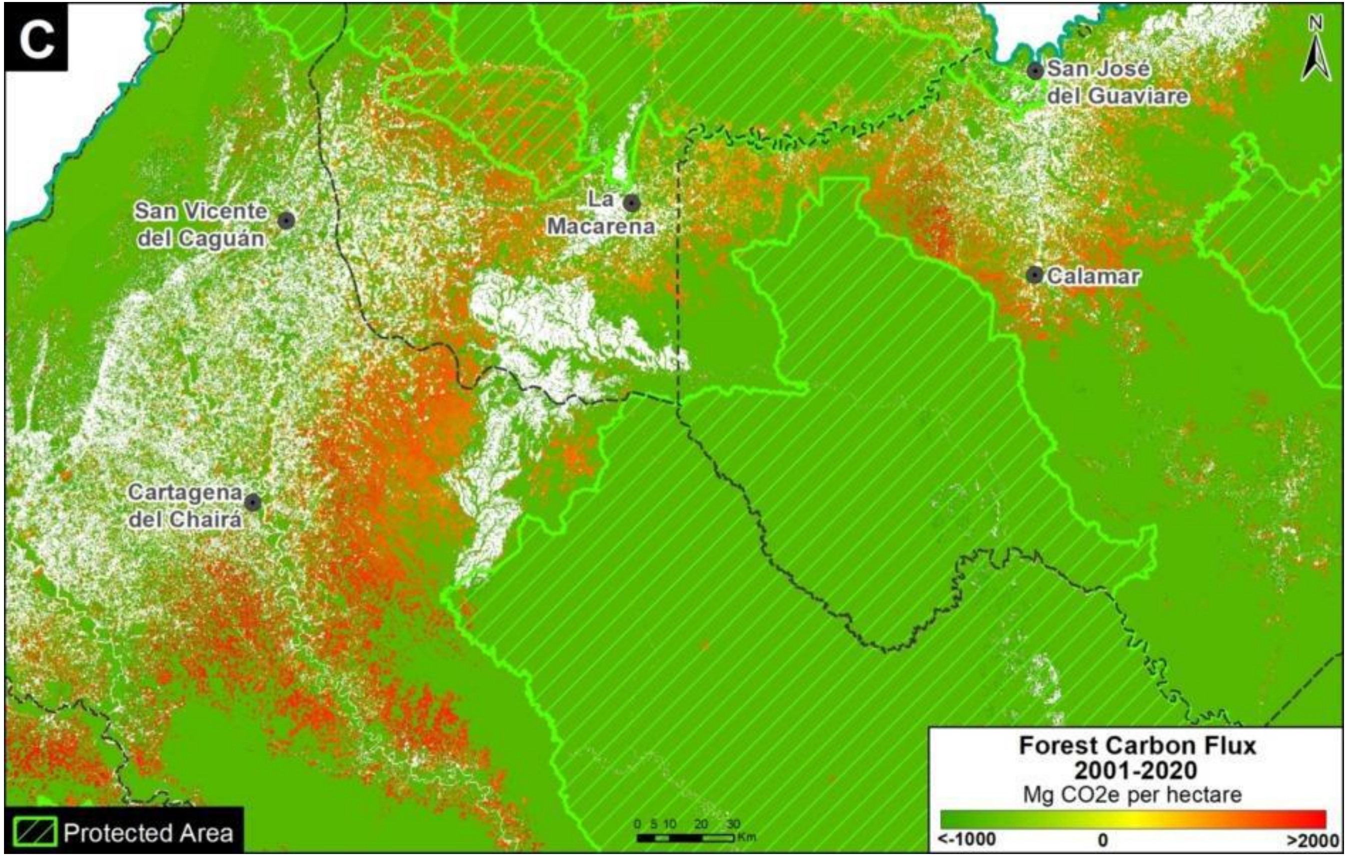
Carbon Sources



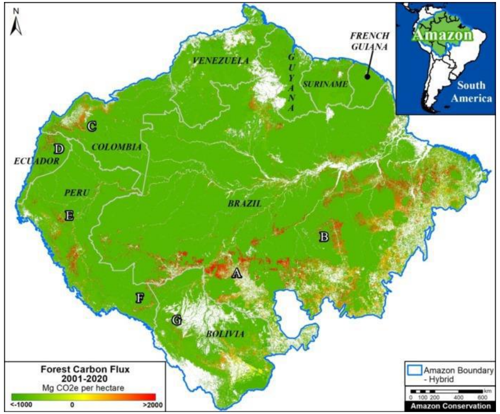


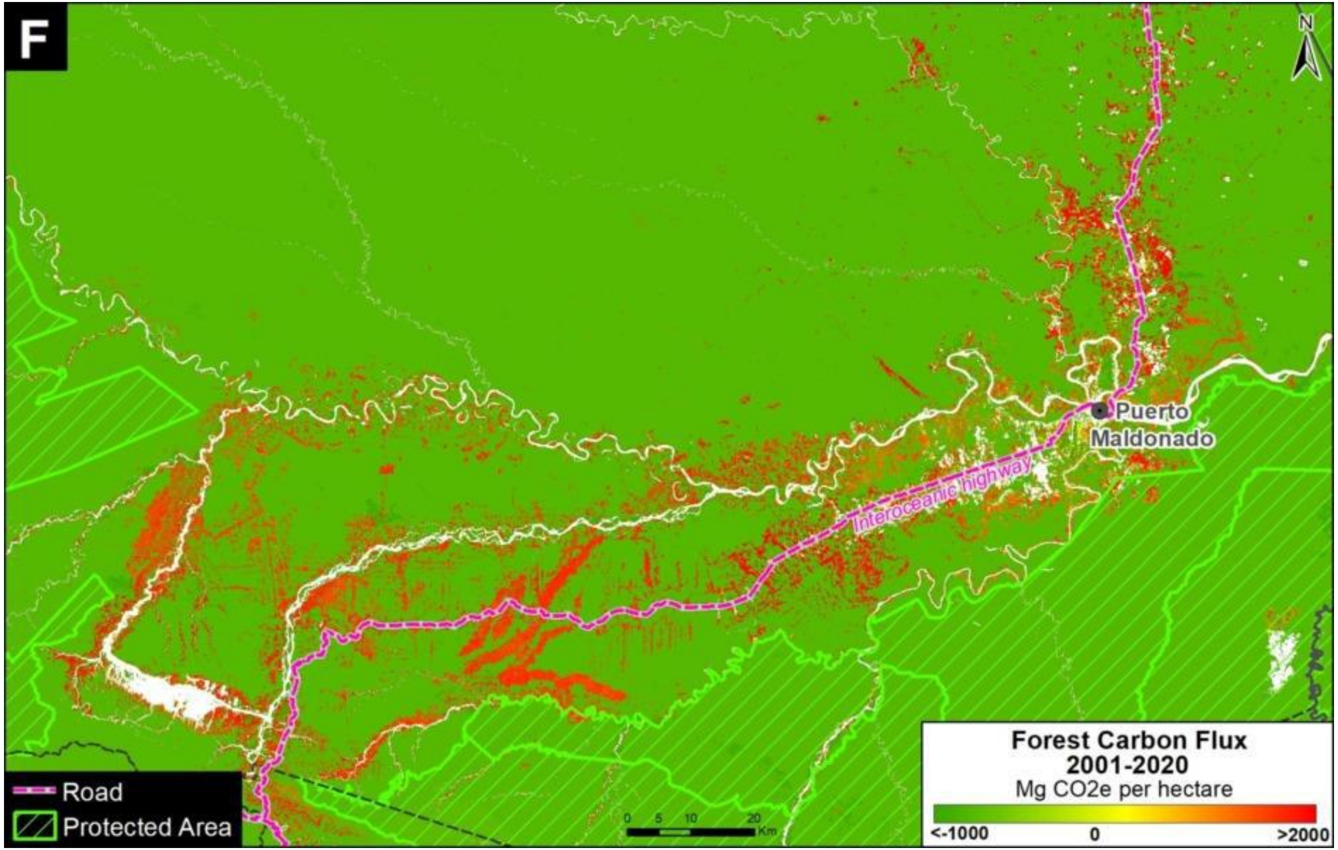
Carbon Sources





Carbon Sources





Thanks!

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Senior Research Specialist & Director of MAAP
mfiner@amazonconservation.org
Twitter: @MattFiner

amazonconservation.org
maaproject.org

Photo by Ana Carolina de Lima

Climate impact on ecosystems, species, and people

Daniel Larrea

Science and Technology Program Coordinator, Conservación Amazónica - ACEAA [Bolivia]

Cambio climático y frutos de la Amazonia: el caso de la Castaña

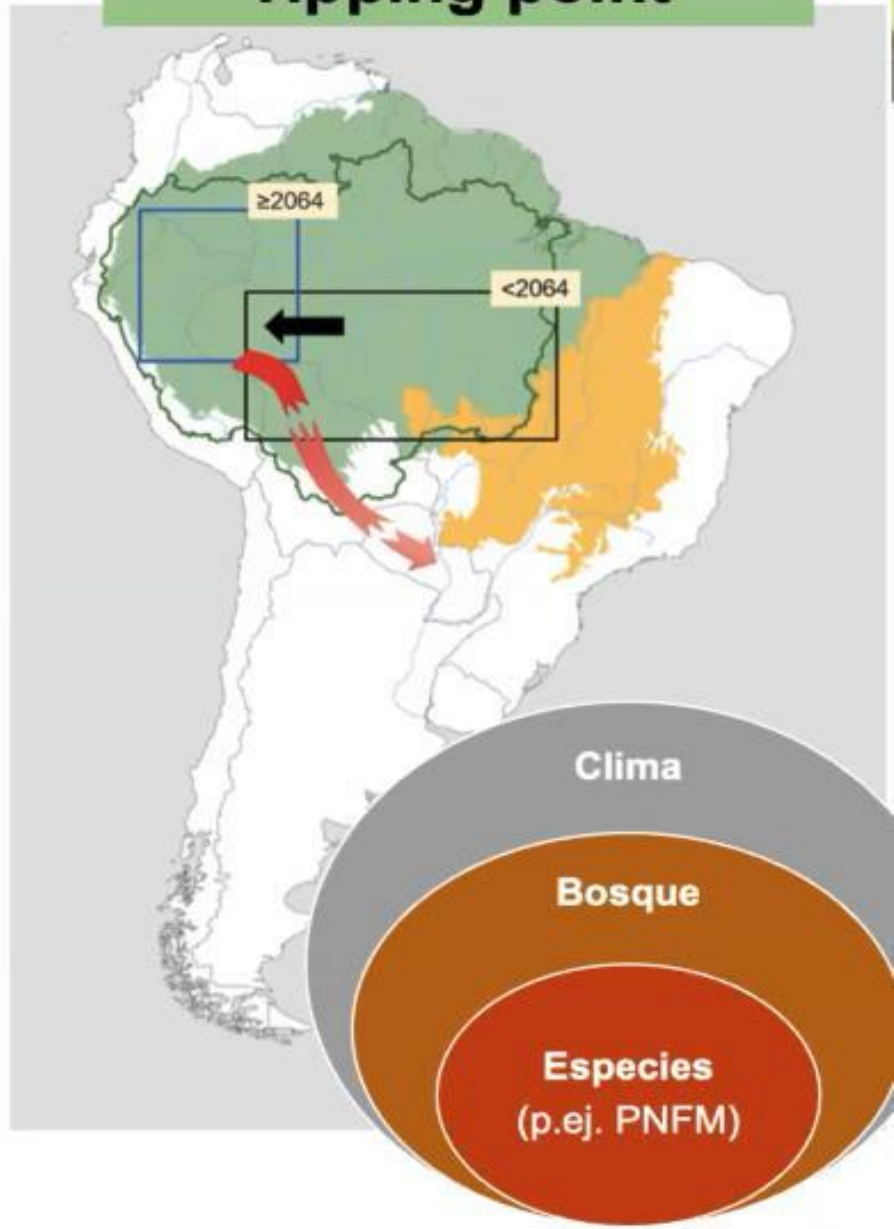
Daniel M.Larrea
Programa de Ciencia & Tecnología
ACEAA-Conservación Amazónica
dlarrea@conservacionamazonica.org.bo

2021

Ríos voladores

(Toovey 2021)

“Tipping point”



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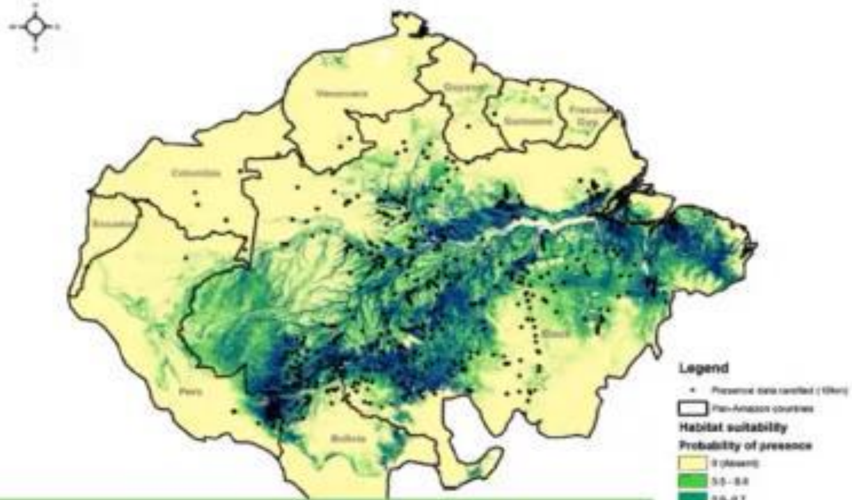
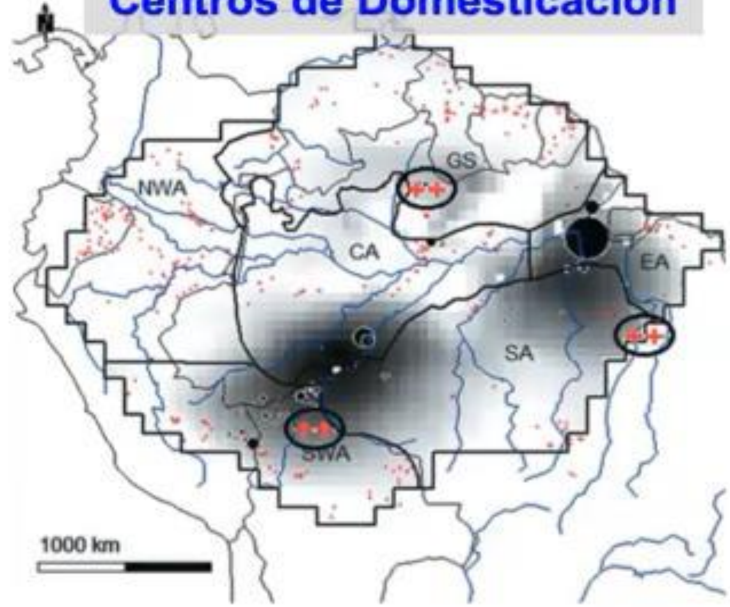
La castaña o nuez amazónica, la **piedra angular**
la conservación de la Amazon



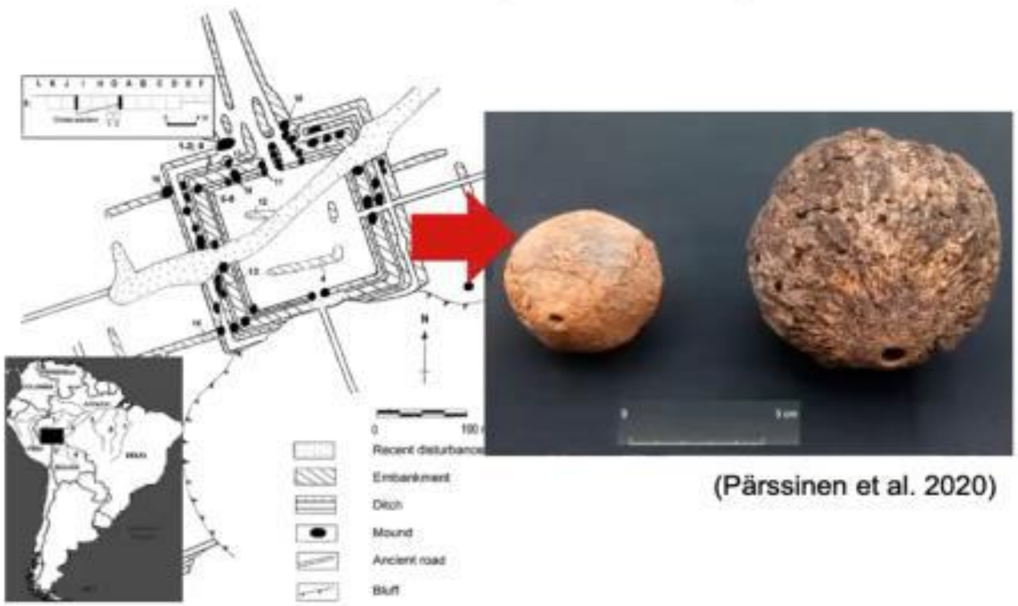
2,3 millones de km²
(32% del bioma amazónico)

(Tourne et al. 2019)

Centros de Domesticación

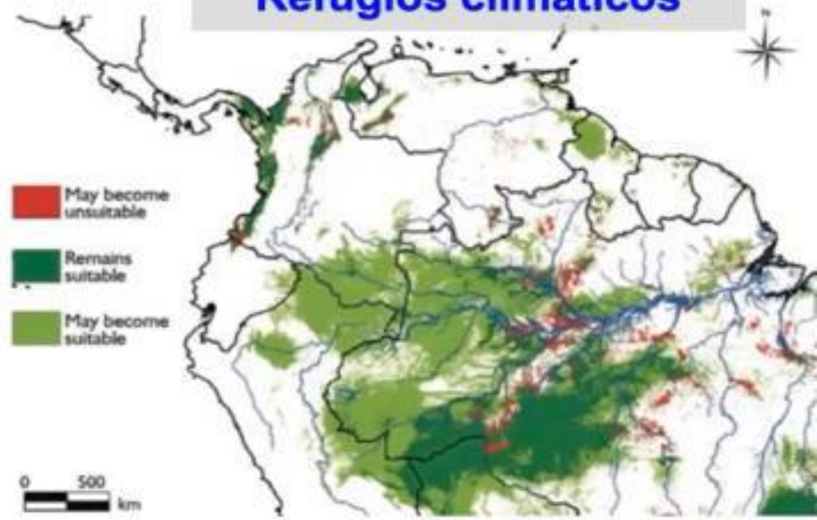


(Levis et al. 2017)



(Pärssinen et al. 2020)

Refugios climáticos



(Thomas et al. 2015)

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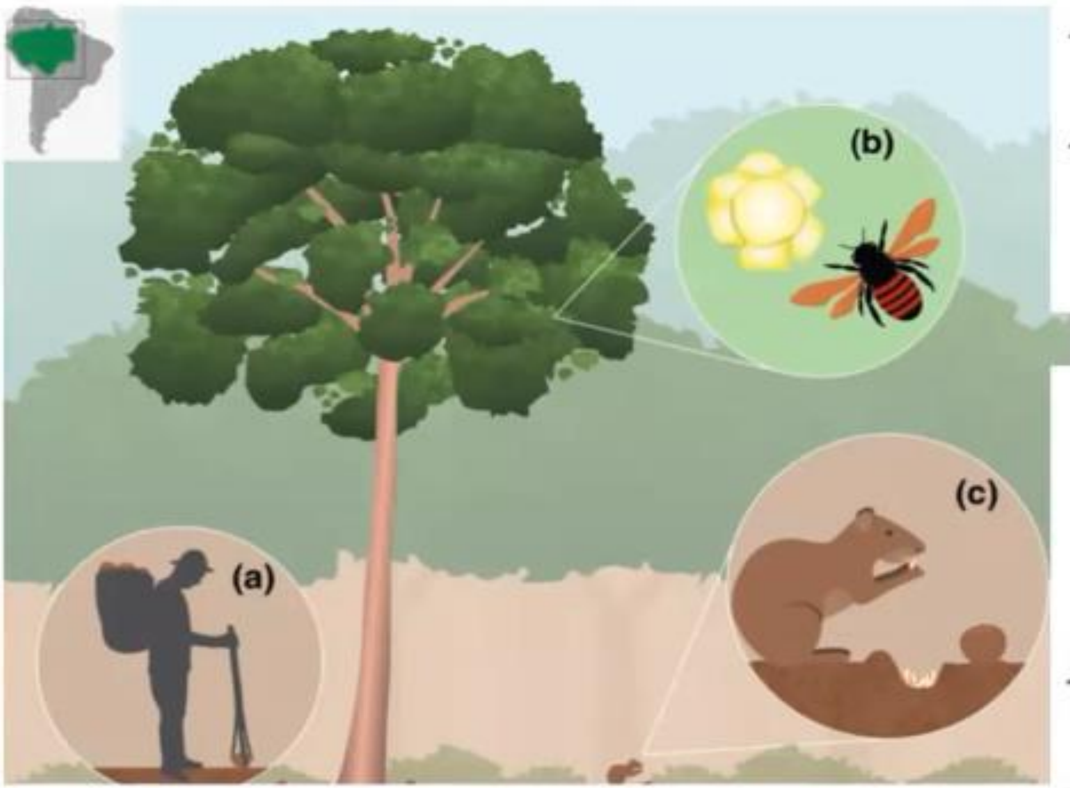
Received: 28 May 2020 | Revised: 11 September 2020 | Accepted: 14 September 2020
DOI: 10.1111/geb.13200

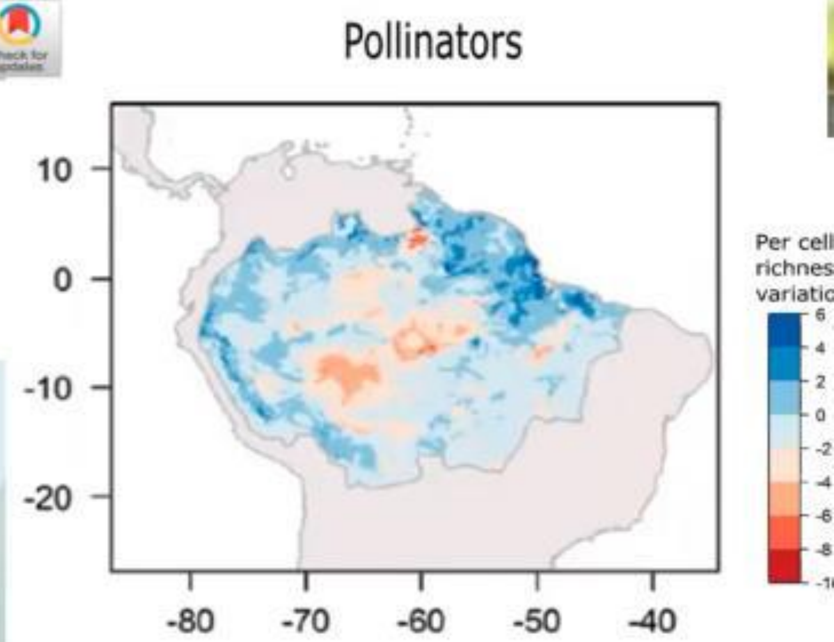
RESEARCH PAPER

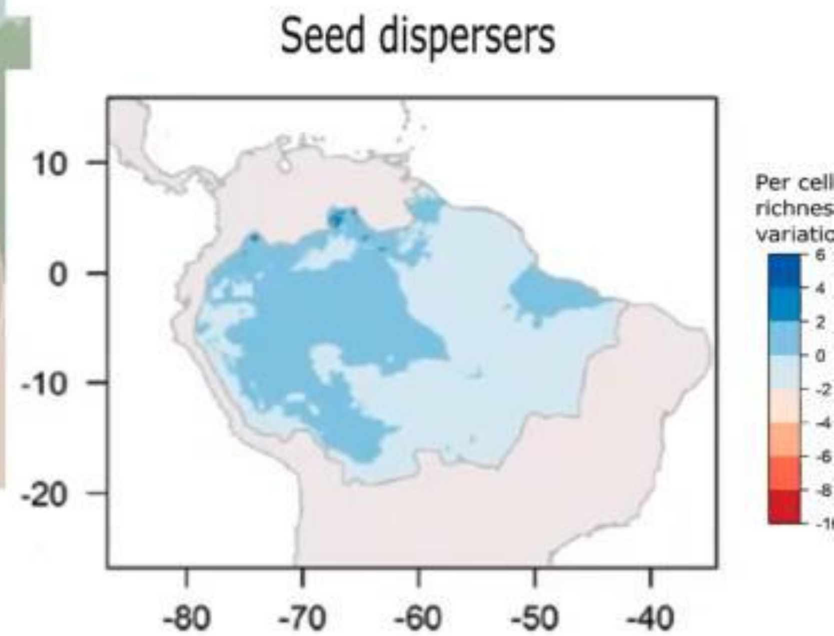
Global Ecology and Biogeography
WILEY

Climate change drives spatial mismatch and threatens the biotic interactions of the Brazil nut

Lilian P. Sales[1*] | Lucirene Rodrigues[2*] | Rômulo Masiero[2*]







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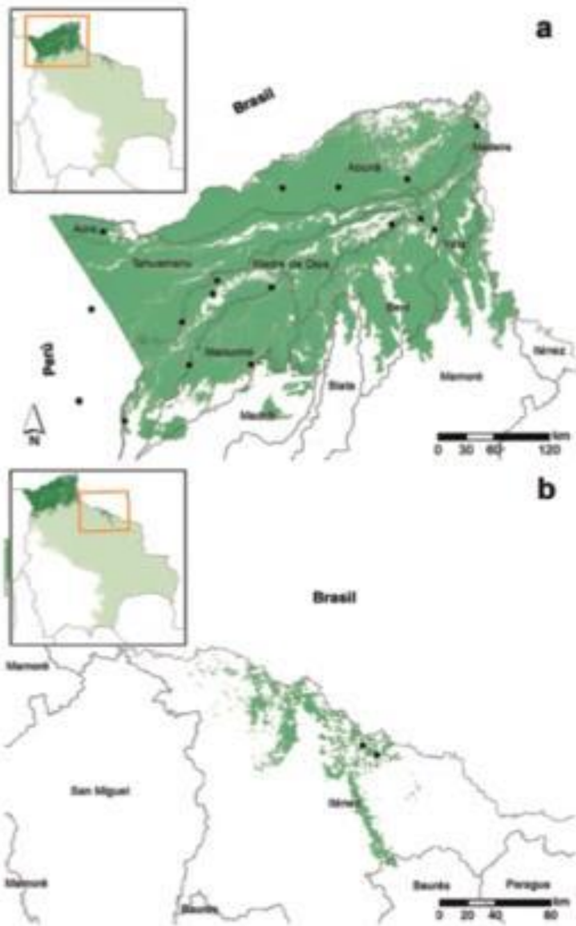
45-60% menos de la producción usual

84 mil km²
7% Bolivia, 3,7% del bioma



20-22 mil t/año

130-135 millon
USD/año

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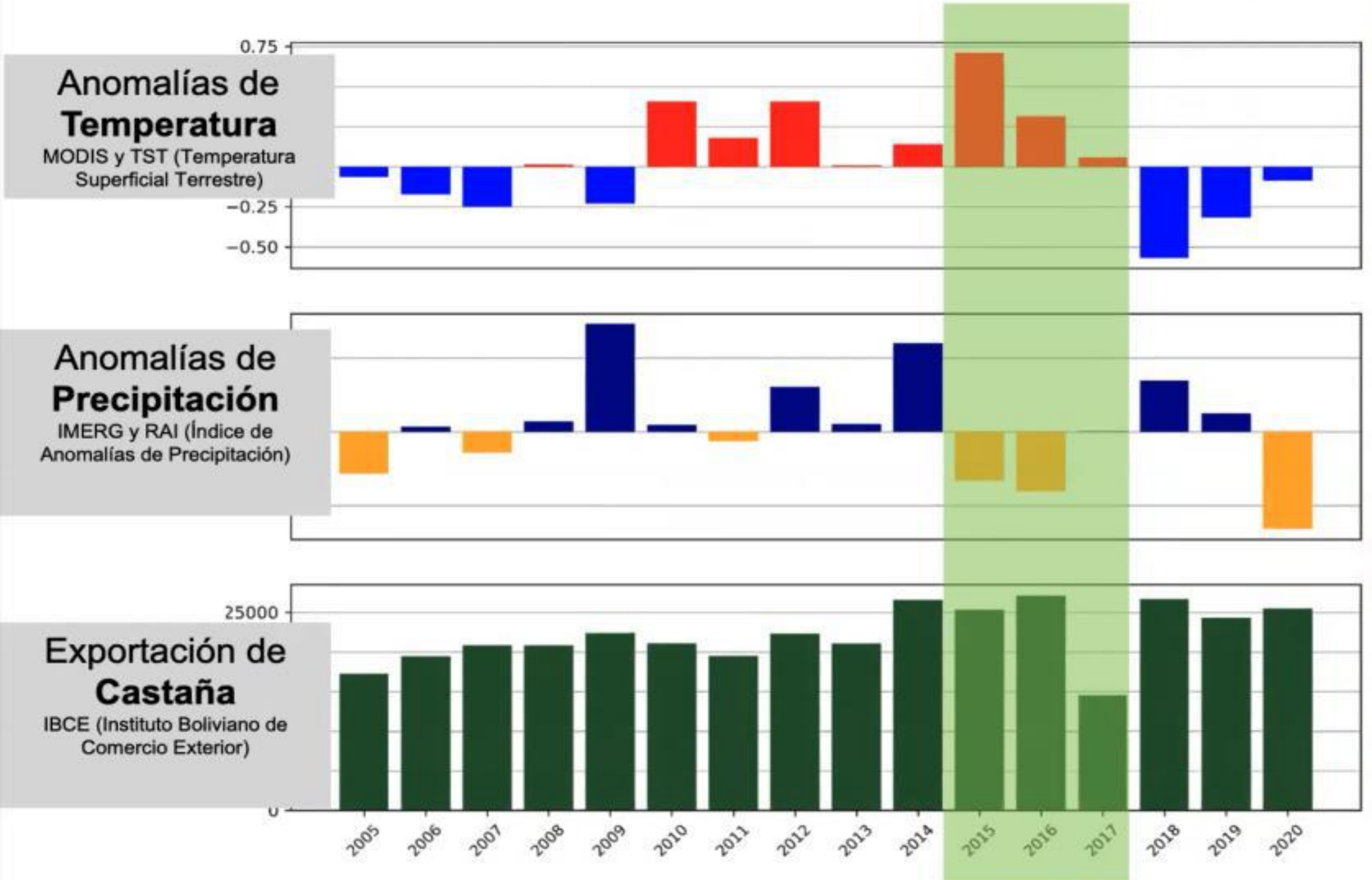


(ACEAA, manuscrito en prepara

PROYECTO BOSQUES AMAZÓNICOS Y CAMBIO CLIMÁTICO

Implementado por:

aceaa CONSERVACIÓN AMAZÓNICA

Este proyecto forma parte de EUROCLIMA+

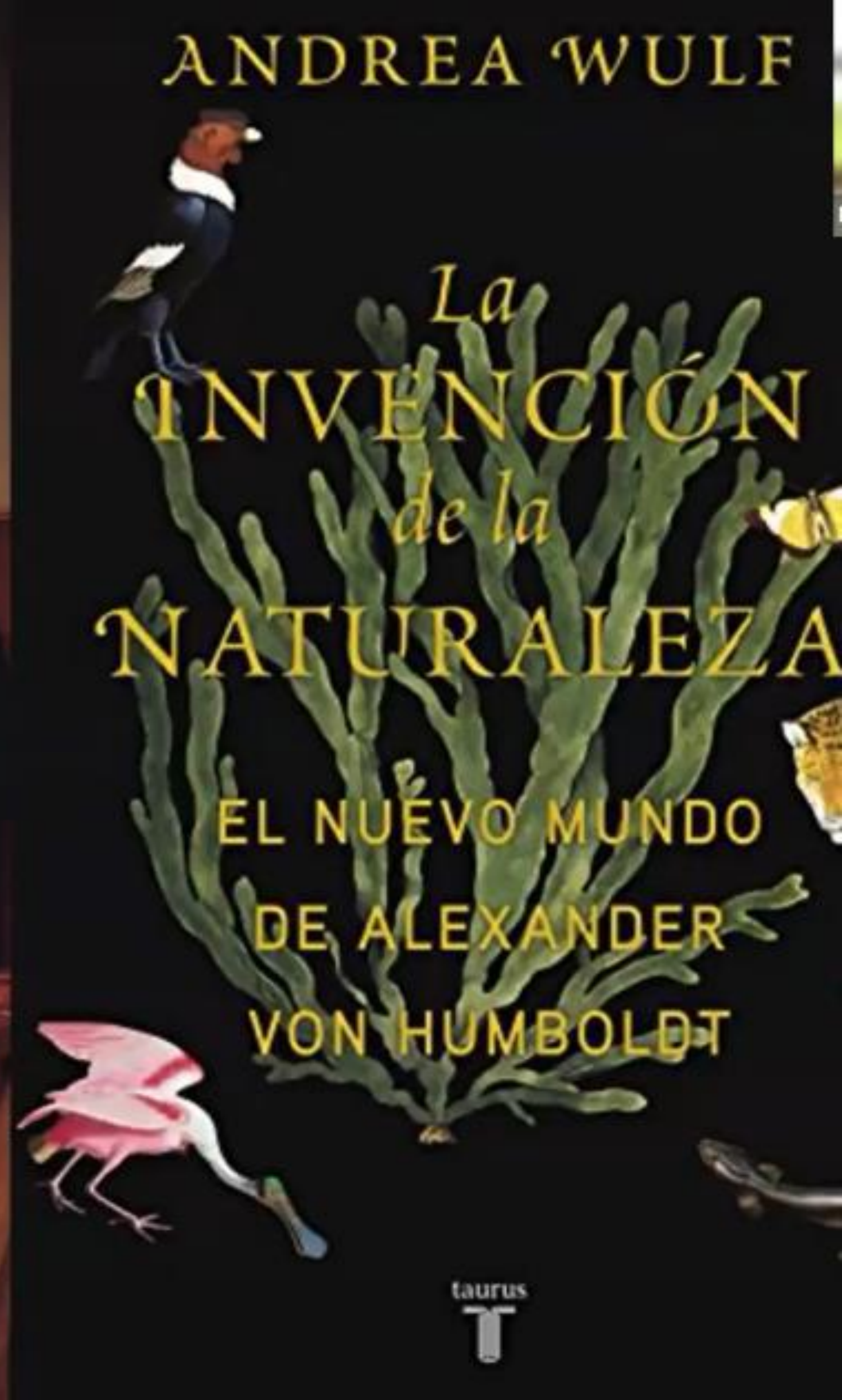
Agencias implementadoras del sector Bosques, Biodiversidad y Ecosistemas

EXPERTISE FRANCE

giz

Implementando el Observatorio de Frutos Amazónicos y Cambio Climático (OFAyCC)

Alexander von **Humboldt**
(Rio Orinoco, Venezuela)
“Antes de ser libre es necesario ser justo…”



Gracias…


Photo by Ana Carolina de Lima

Climate impact on ecosystems, species, and people

Marcos Terán

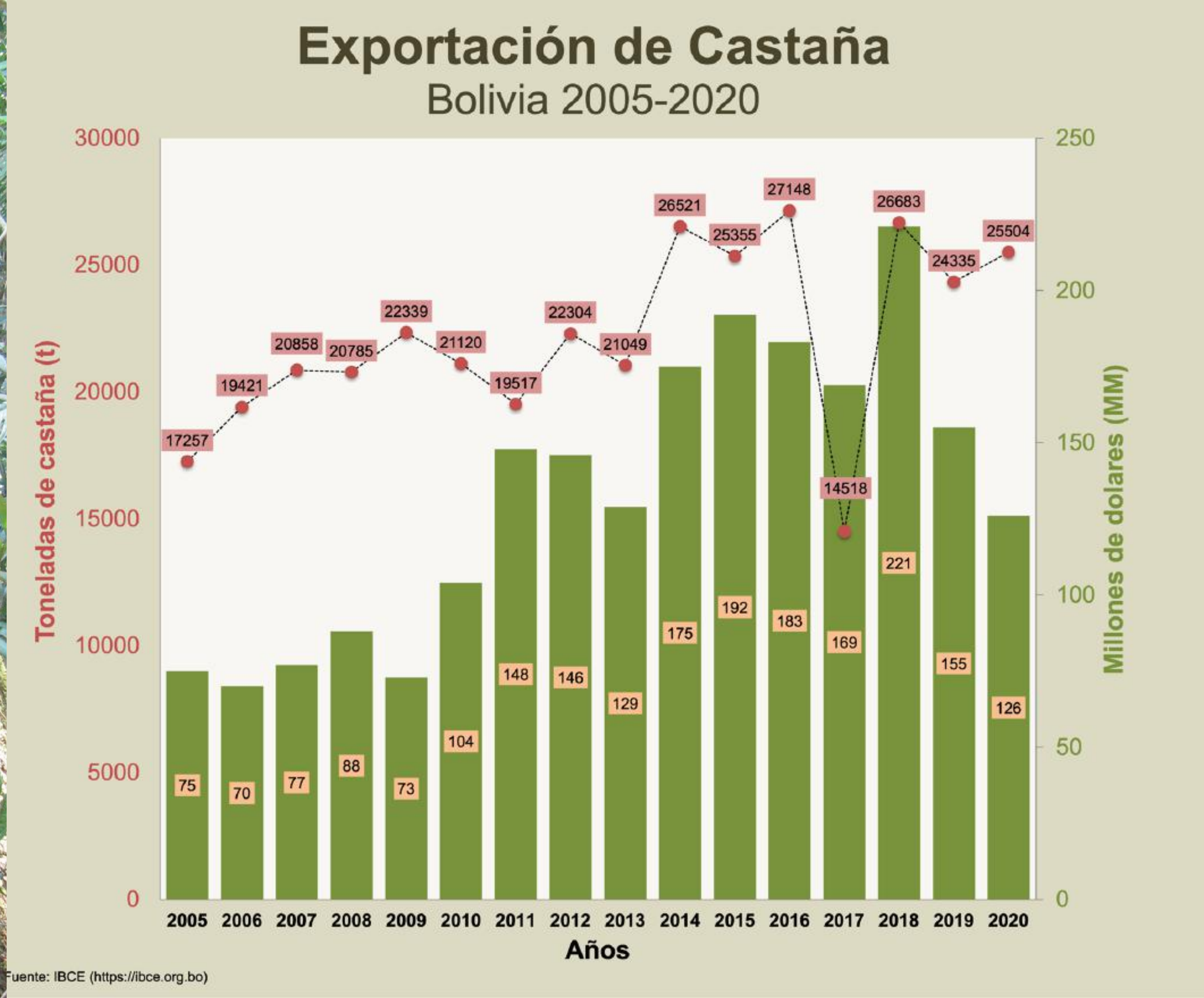
Executive Director,
Conservación Amazónica -
ACEAA
[Bolivia]

Although the fires of recent years have been caused by human activity, the conditions for these fires to have become increasingly larger are due to the effects of climate variability, increasing droughts and the reduction of regional atmospheric water contributions.

Brazil nuts are key to the conservation of Amazonian forests in Bolivia

Seasonal rain and droughts are changing and affecting phenology patterns of many species, including the Brazil nut

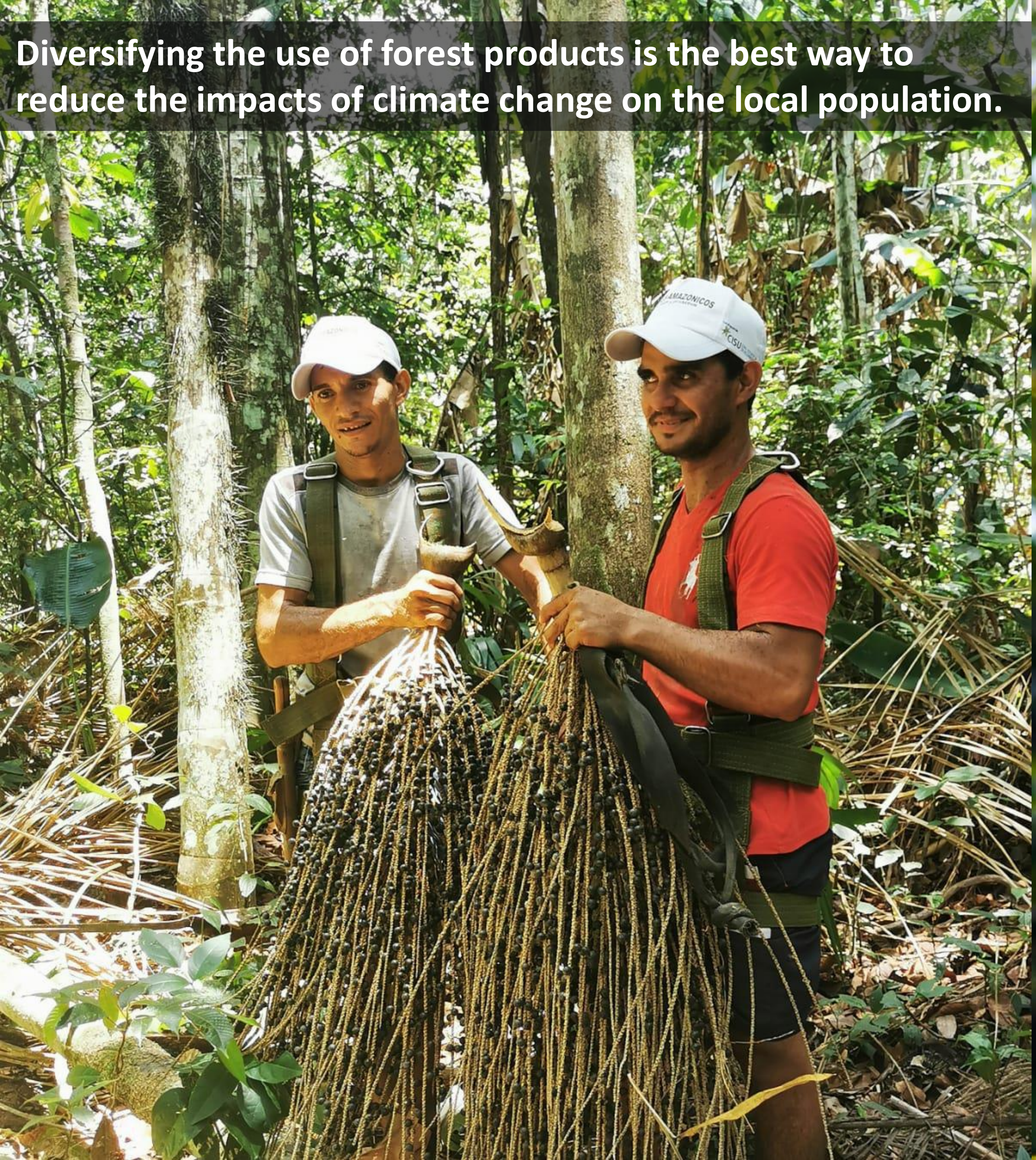
reduction in Brazil nuts due
roughts directly affects the
ihoods of local families’



at can local communities do to
e this challenge?

20-22 K tons annually

130-135 million USD annually


Diversifying the use of forest products is the best way to
reduce the impacts of climate change on the local population.


ACAI / ASAI
Wild Cacao
Majo / Batua palm
Other native palms

Improving harvesting practices

PAST

PRESENT

Improving Equipment Necessary to Process Forest Products

PAST

PRESENT

Thank you for your attention!

Climate impact on ecosystems, species, and people

Carmen Josse

Executive Director,
EcoCiencia
[Ecuador]

Photo by Gabby Salazar

AMAZON TEC 2021
Climate, Technology, and the Future of the Amazon
"CLIMATE IMPACT ON LOCAL PEOPLE"

Carmen Josse

ecociencia

The goal of our analysis:

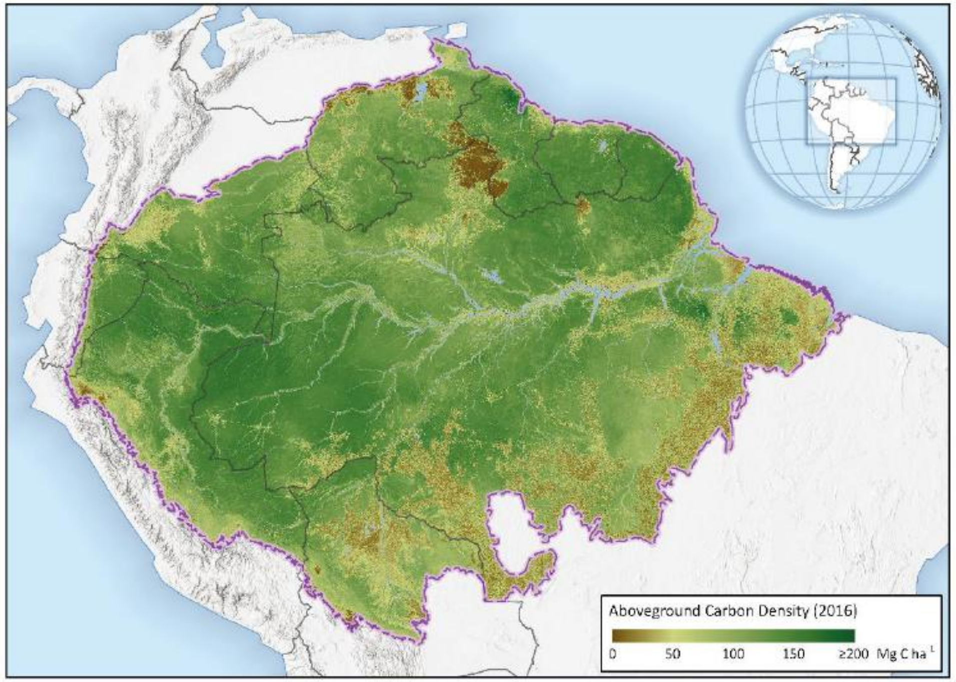
Use new data on gains and losses in carbon density from 2003-2016 to provide a comprehensive accounting of change in the amount and distribution of carbon stored aboveground inside and outside the nine-nation network of Amazon Indigenous Territories and Protected Natural Areas.

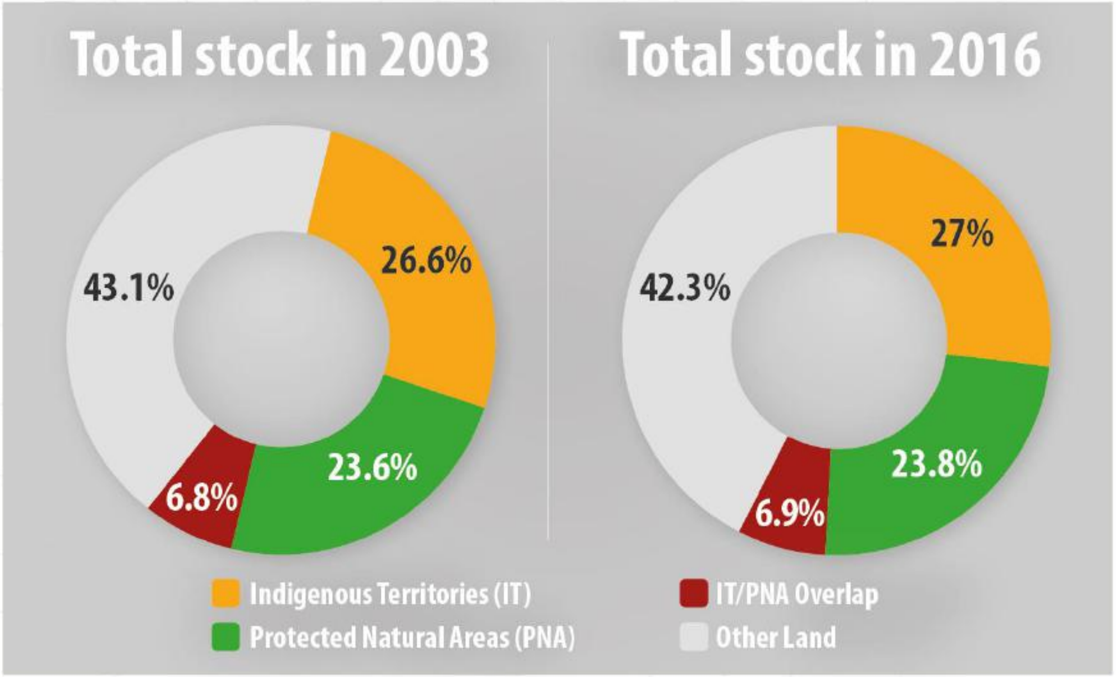
Walker et al. *2020.* The Role of Forest Conversion, Degradation, and Disturbance in the Carbon Dynamics of Amazon Indigenous Territories and Protected Areas

CHANGE IN ABOVEGROUND CARBON STORAGE

(2003 - 2016)

2003: 74,041 MtC – 2016: 72,752 MtC





**Amazonian IT and PNA store over half of the region's aboveground carbon: 58%.
TI alone, including overlap areas store 34%.**

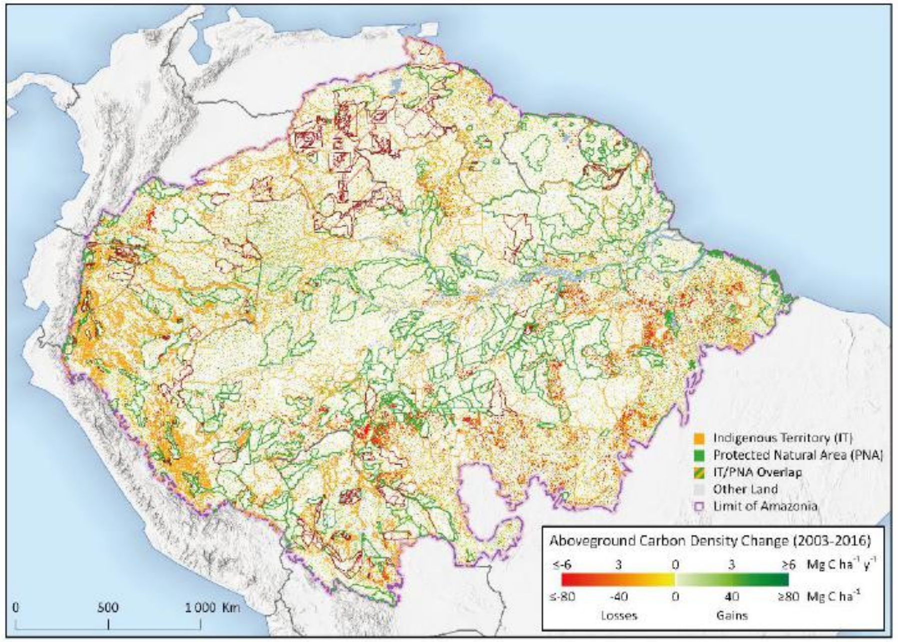
RAISG
RED AMAZÓNICA DE INFORMACIÓN SOCIOAMBIENTAL GEORREFERENCIADA

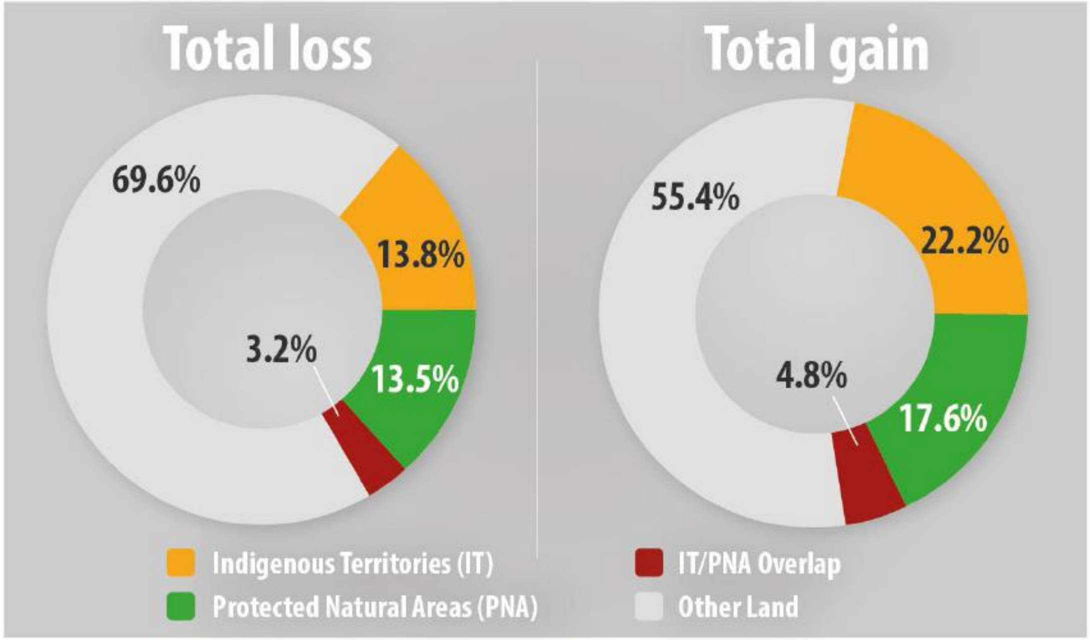
WOODS HOLE RESEARCH CENTER

Loss and gain in carbon stock inside Indigenous Territories and Protected Natural Areas in Amazonia

(2003 - 2016)

Loss: 3,140 MtC – Gain: 1.851 MtC

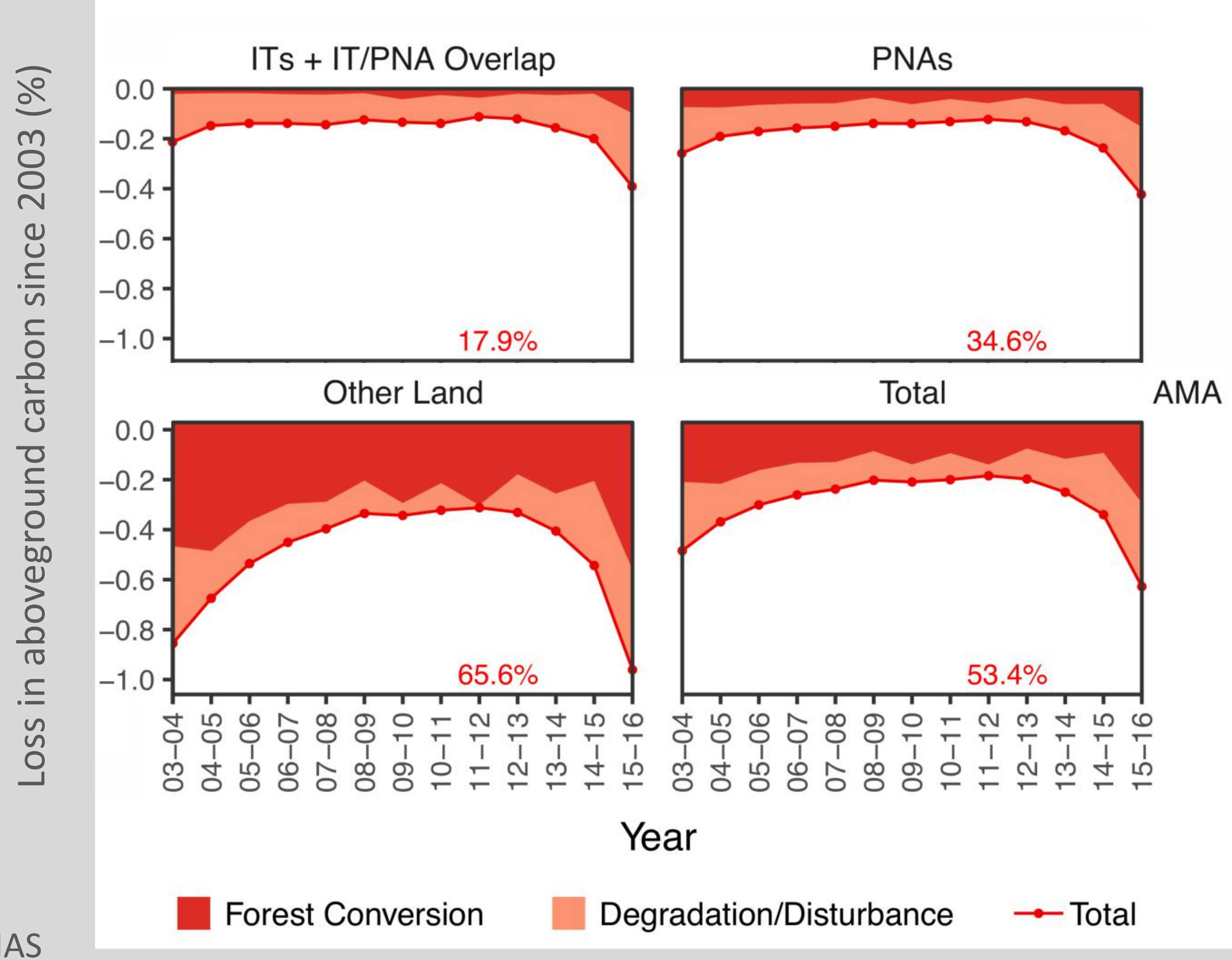




The net loss over the whole period is only of 0.1% inside Indigenous Territories, 0.6% in Protected Natural Areas, and 3.6% in Other Land

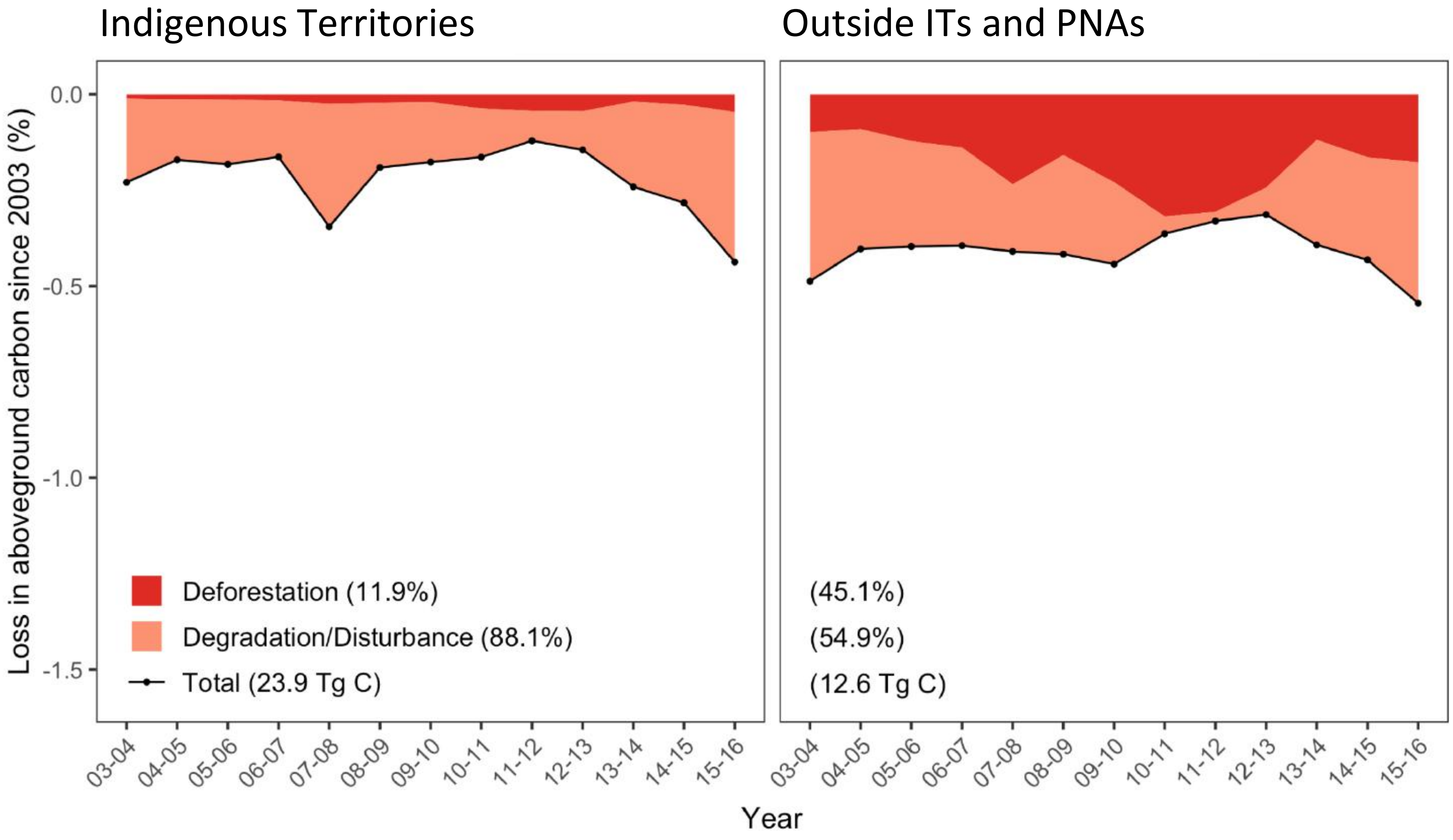

Intact
© Chris Linder
Deforested/Converted
Degraded/Disturbed

Deforestation vs. Degradation loss



Walker et al, 2020 PNAS

Ecuador


Indigenous Territories
Outside ITs and PNAs
0.0
-0.5
-1.0
-1.5
Loss in aboveground carbon since 2003 (%)
Deforestation (11.9%)
Degradation/Disturbance (88.1%)
Total (23.9 Tg C)
(45.1%)
(54.9%)
(12.6 Tg C)
03-04
04-05
05-06
06-07
07-08
08-09
09-10
10-11
11-12
12-13
13-14
14-15
15-16
Year

Summary

- Losses of carbon inside ITs and PNAs remain relatively small, but they do occur, and are largely attributed to degradation and disturbance, which have a range of causes that can be challenging to identify and track. But are an important research topic.
- This degradation is already, or will eventually, diminish the resilience capacity of forests within indigenous territories, and with it the adaptation opportunities.
- Action by governments and the donor community is as important as ever if IPLCs are to continue to serve in their roll as stewards of these globally important forests and ensure their livelihoods.

Question & Answer
Session Introduction

Manuel Pulgar Vidal

Leader of the Climate & Energy Global Practice, World Wild Fund for Nature International, and President of the UN Climate Convention's Twentieth Conference of the Parties (COP 20) [Peru]

Photo by Gabby Salazar

Open Question and Answer Session for All Panelists

Carlos Nobre
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Marcos Terán
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Closing Remarks and Conclusion

Manuel Pulgar Vidal

Leader of the Climate & Energy Global Practice, World Wild Fund for Nature International, and President of the UN Climate Convention's Twentieth Conference of the Parties (COP 20) [Peru]

Photo by Walter Wust

AMAZONTEC 2021: TECHNOLOGY, INNOVATION AND EMPOWERMENT FOR AN AMAZON IN CRISIS

Climate, Technology, and the Future of the Amazon

Go beyond the headlines to understand how carbon and climate change are affecting the greatest rainforest in the world.

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