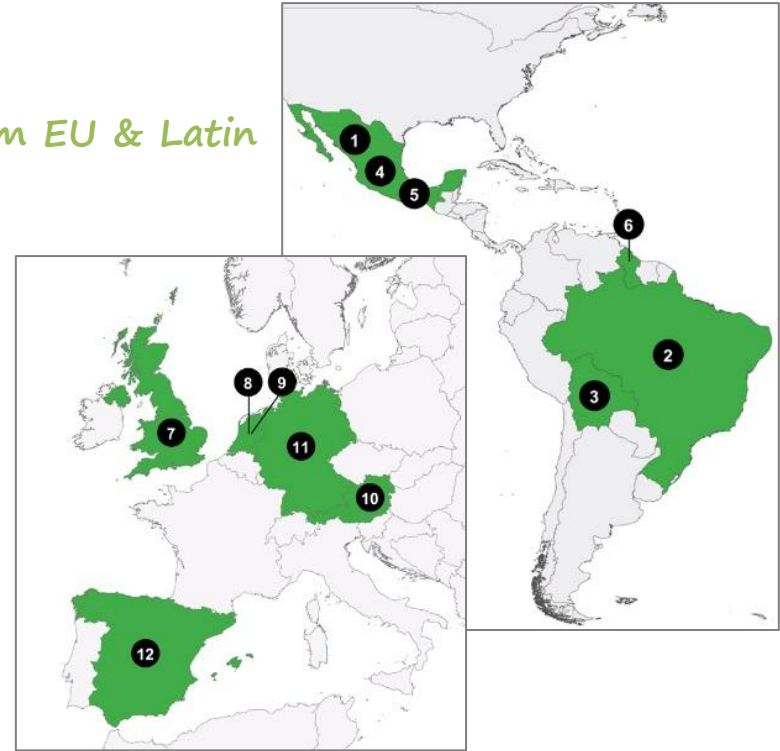




## ROBIN

### Role of Biodiversity in Climate Change Mitigation

*An inter-disciplinary collaboration of 12 partners from EU & Latin America*



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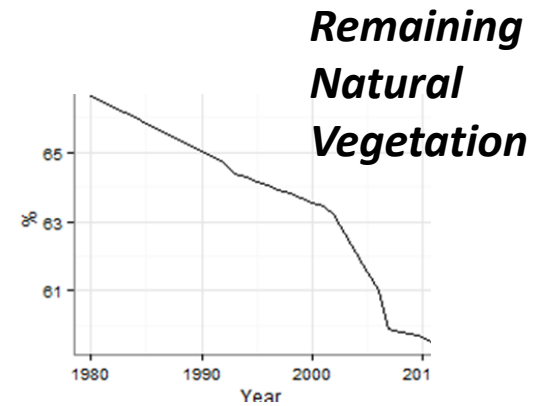
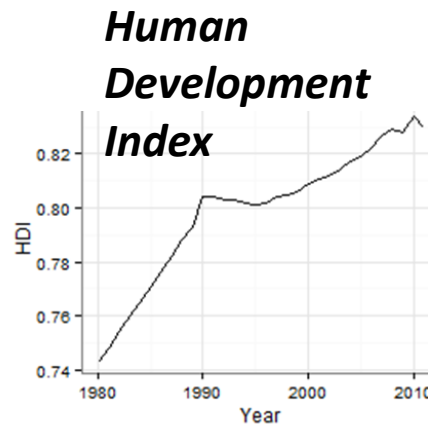
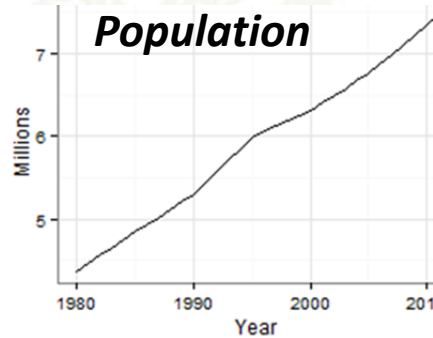
# Forest Landscapes: solutions for climate change mitigation



- ◉ Key messages & policy context
- ◉ Does biodiversity matter?
  - In mature forests?
  - In managed or restored forests?
  - To future resilience?
- ◉ Trade-offs in multi-functional landscapes
- ◉ Nature based options & solutions – management and policy

# The grand challenge: decoupling economic growth from environmental degradation

State of Jalisco, Mexico – 19`80 - 2010



## UN Sustainable Development Goal 8.4

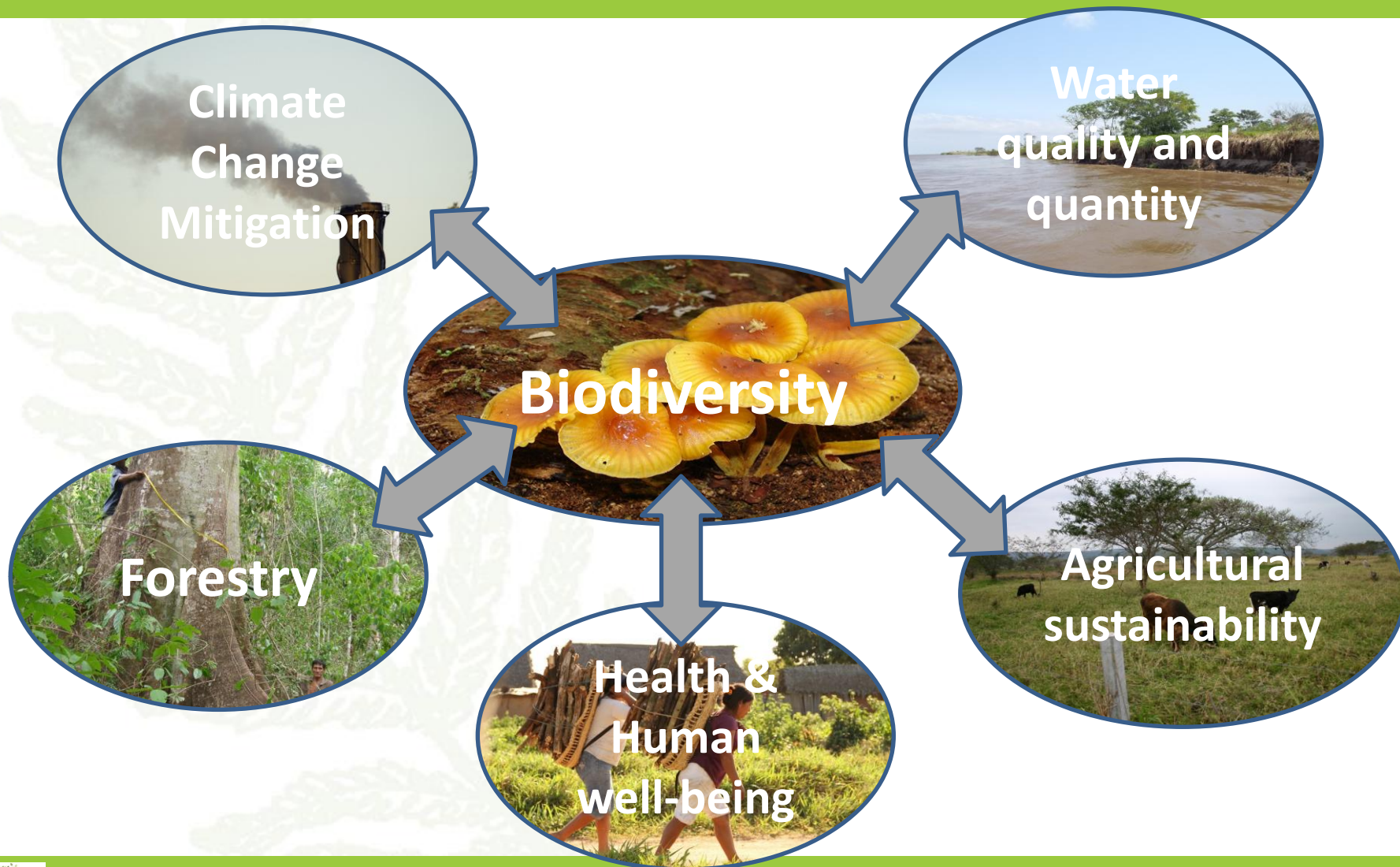
*“...endeavour to decouple economic growth from environmental degradation...”*



*.... is biodiversity part of the solution?*



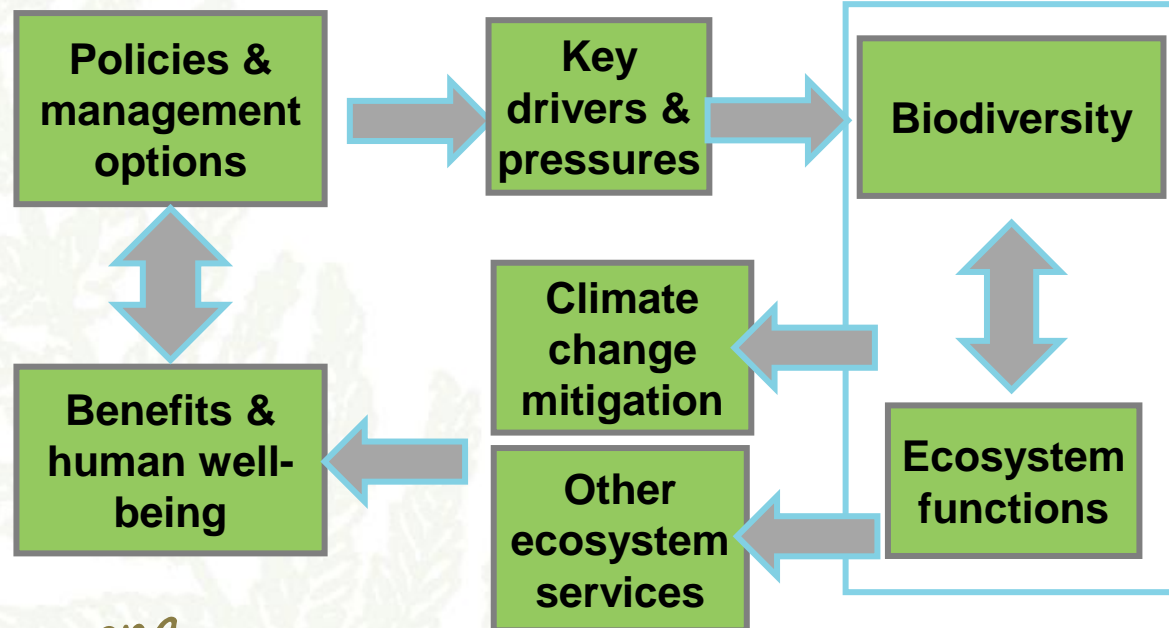
# Biodiversity and ecosystem services linked to many other environmental and socio-economic issues



# Whole-system approach : linking biodiversity to human well-being and policy

*Environmental, agricultural & development policies should be integrated*

*Biodiversity matters! Diverse forests store more carbon & are more resilient*



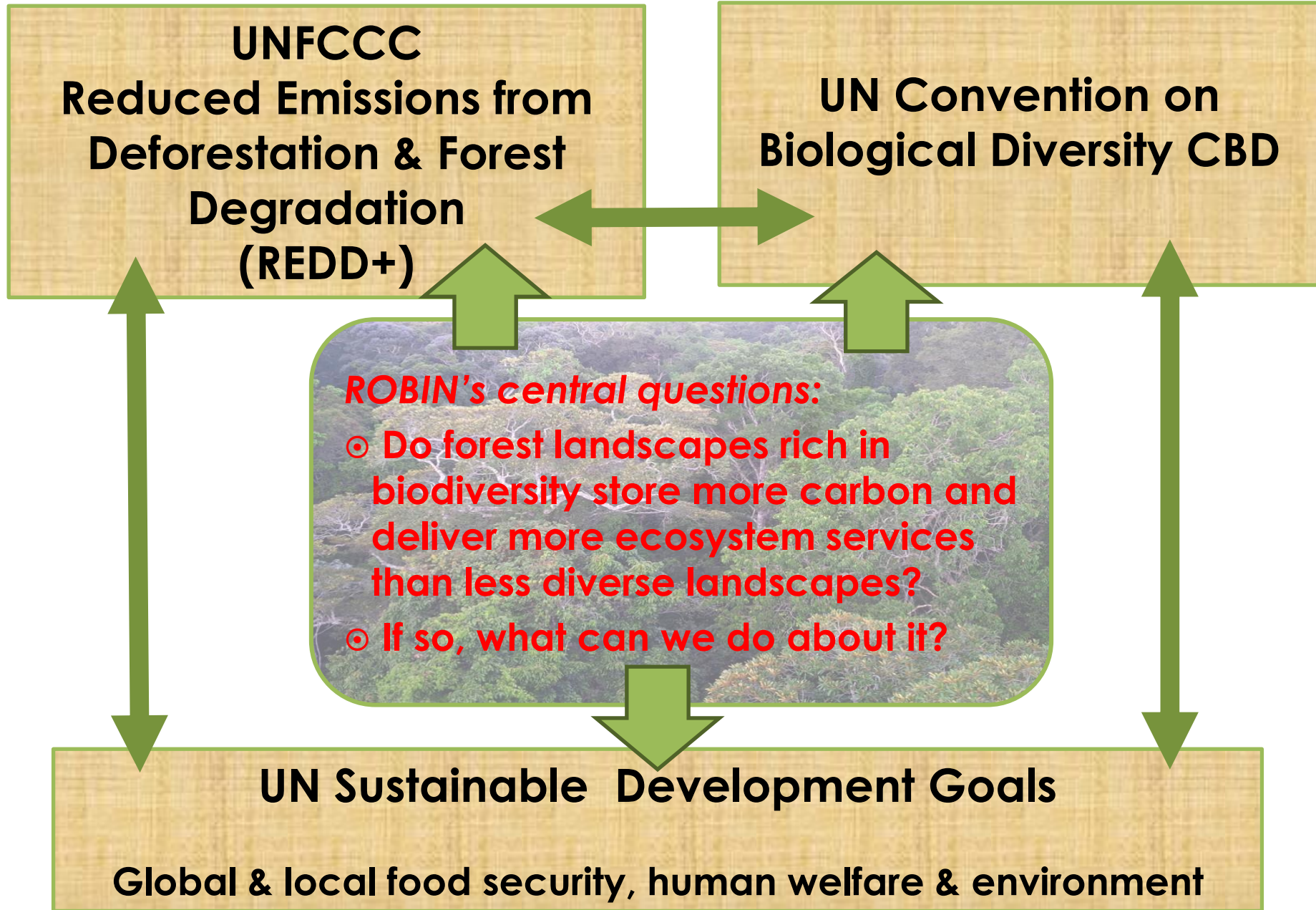
*The most effective policies improve well-being at a local scale*

*Trade-offs among ecosystem services change across scales & contexts*

*Biodiversity also matters in restored forests and landscapes*

*Ecosystem integrity is a useful measure of health, degradation and ecosystem services.*

# “linked” policy issues





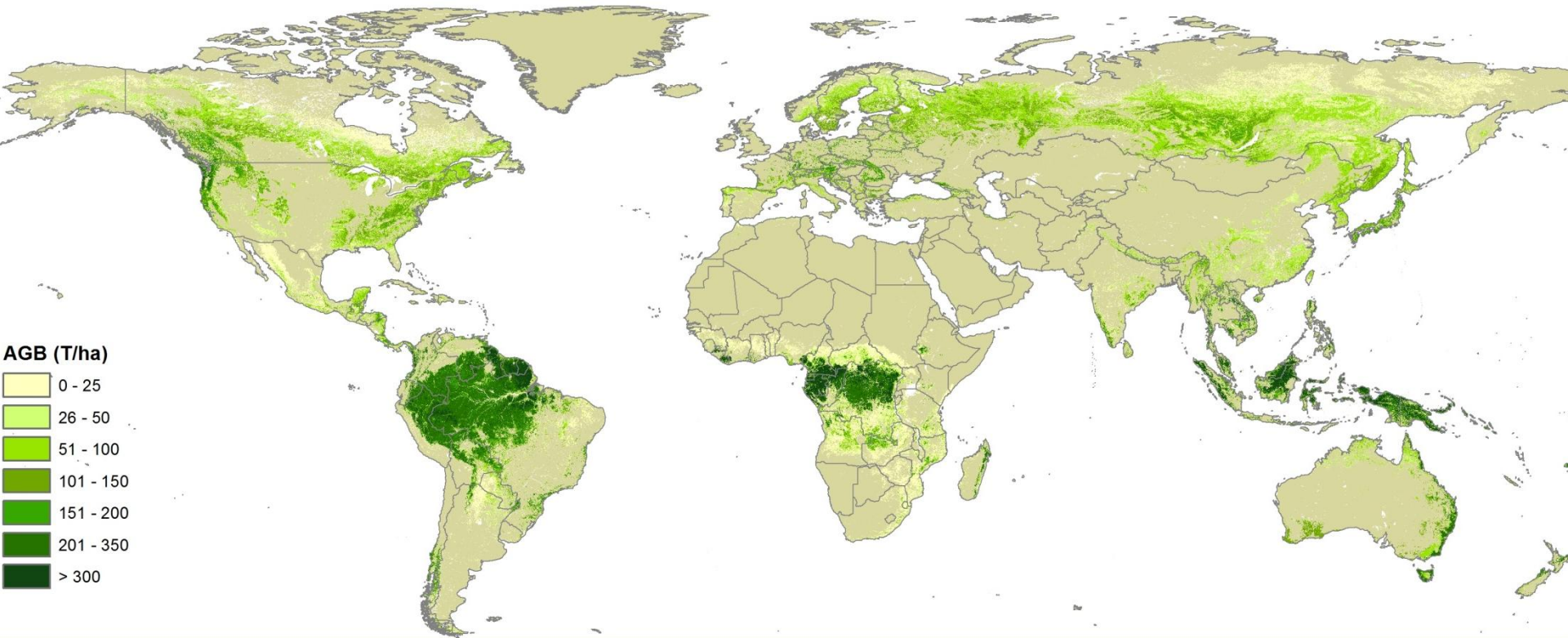


# **IMPLICATIONS FOR REDUCING EMISSIONS FROM DEFORESTATION AND FOREST DEGRADATION AND ENHANCEMENT OF CARBON STOCKS (REDD+)**

**MARTIN HEROLD  
WAGENINGEN UNIVERSITY**



# Distribution of aboveground forest biomass

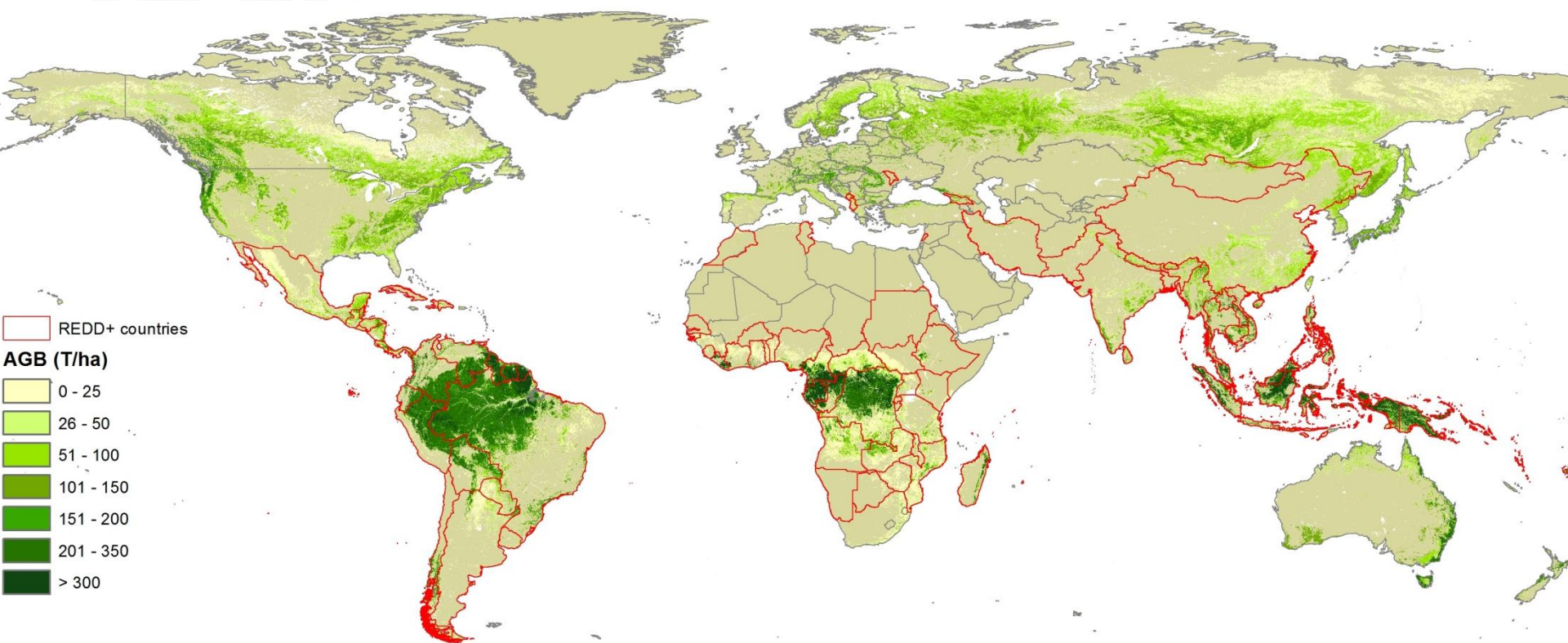


<https://www.wageningenur.nl/grsbiomass/> (free data download)

Avitabile et al., 2015, Glob. Change Biology

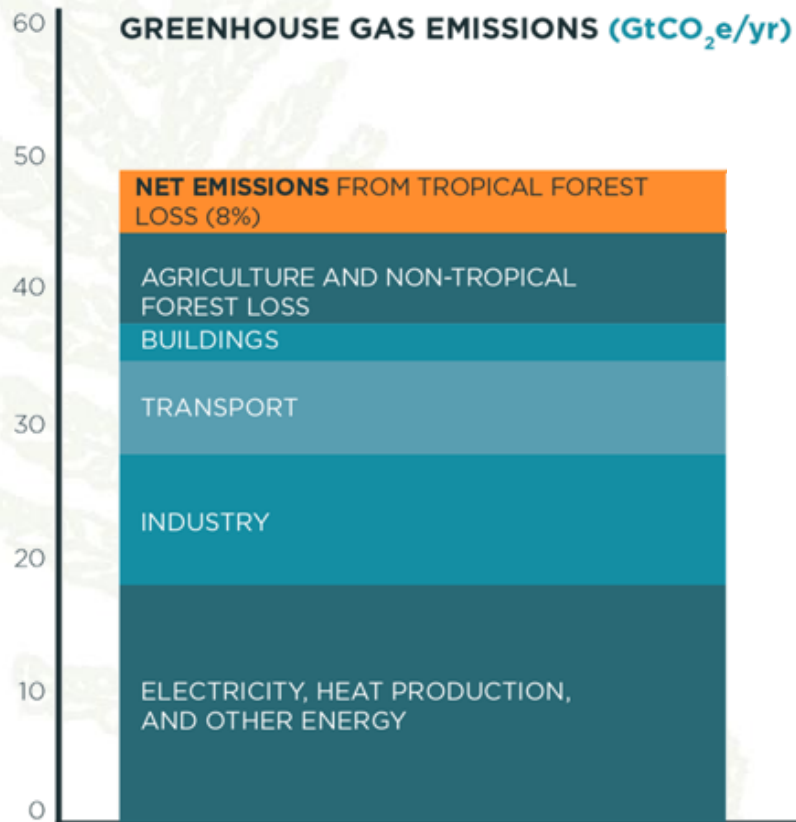


# Country engagement in REDD+



- **39 countries list REDD+ in Intended Nationally Determined Contributions (INDCs)**
- **Strong momentum for tropical country engagement in upcoming climate agreement (REDD+ and Sustainable Development Goals)**

# Tropical forests offer ~25% of mitigation potential



Source: Pan et al 2009, Baccini et al 2012, IPCC WGIII



See also: [Goodman and Herold, 2014](#) and related [blog](#)

# Key messages

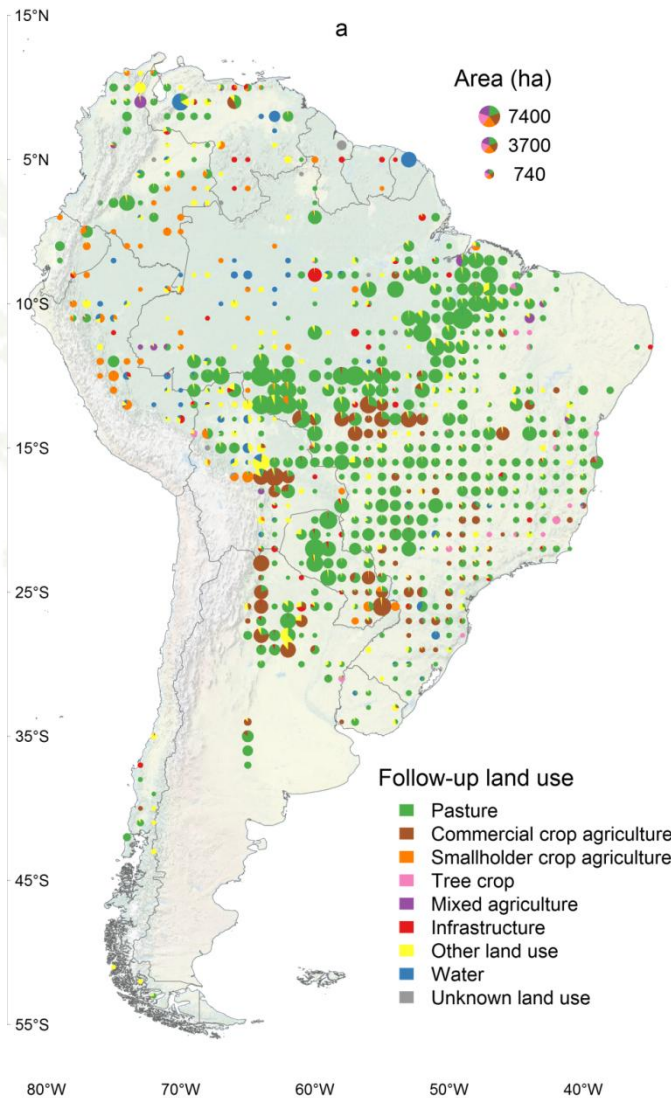
## **Tropical forests and climate change:**

1. Forest-related mitigation includes both sinks and sources and potential is ~25% of total greenhouse gas emissions



# Agriculture causes 90% of deforestation

Assessing land use following deforestation as part of the global forest remote sensing survey (1990-2005)



Follow-up land use	Area (10 <sup>3</sup> ha)	%
Mixed agriculture	505	0.8
Smallholder crop agriculture	1557	2.4
Commercial crop agriculture	8448	13.2
Tree crops	263	0.4
Pasture	46347	72.1
<b>Agriculture</b>	<b>57121</b>	<b>88.9</b>
Infrastructure	1029	1.6
Other land use	4168	6.5
Water	1802	2.8
Unknown	124	0.2
<b>Other</b>	<b>7123</b>	<b>11.1</b>
<b>Total</b>	<b>64243</b>	<b>100</b>

Source: Niki de Sy, WU

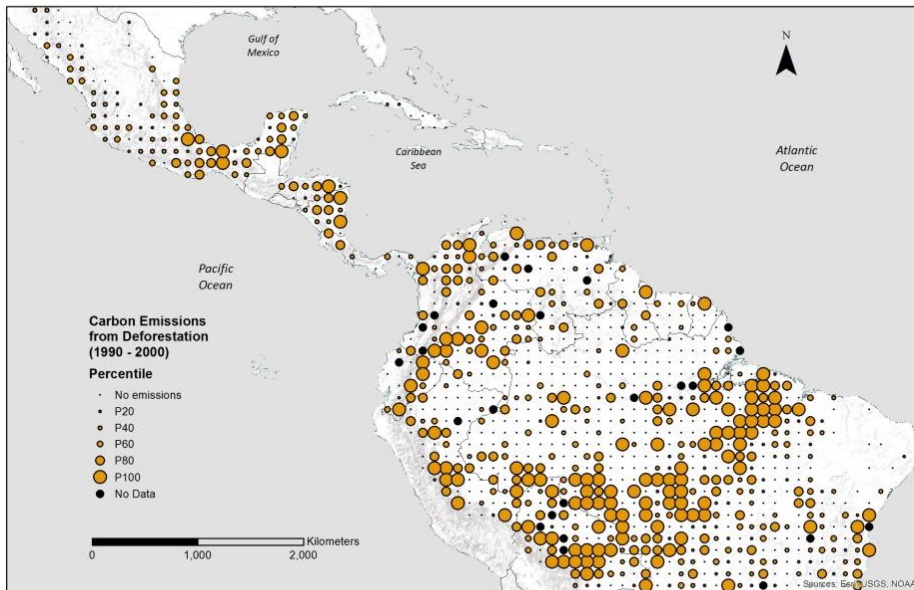
# Key messages

## **Tropical forests and climate change:**

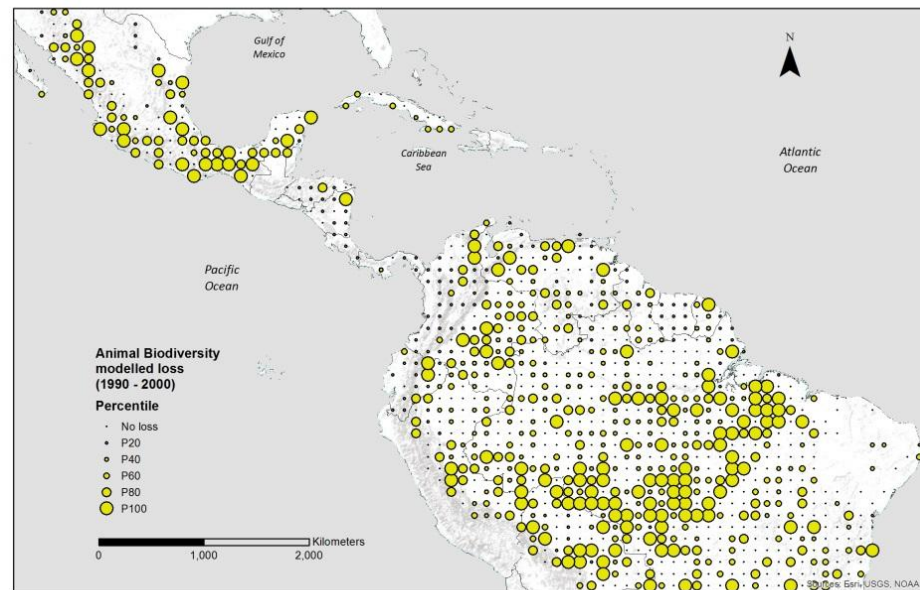
1. Forest-related mitigation includes both sinks and sources and potential is ~25% of total greenhouse gas emissions
2. No successful climate smart development/agriculture in tropical countries without considering forests

# Deforestation impacts: carbon and biodiversity

## Carbon emissions from deforestation



## Decline in animal diversity





# Key messages

## **Tropical forests and climate change:**

1. Forest-related mitigation includes both sinks and sources and potential is ~25% of total greenhouse gas emissions
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## **Biodiversity and REDD+:**

3. Reducing carbon emissions also preserves biodiversity but varies regionally (**co-benefit**)

# Key messages

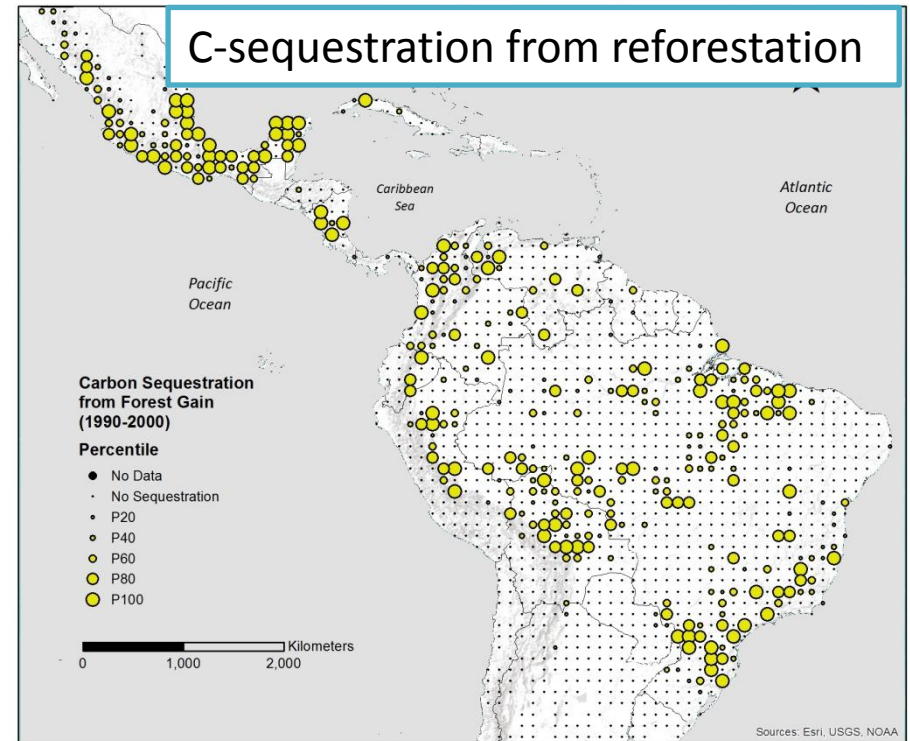
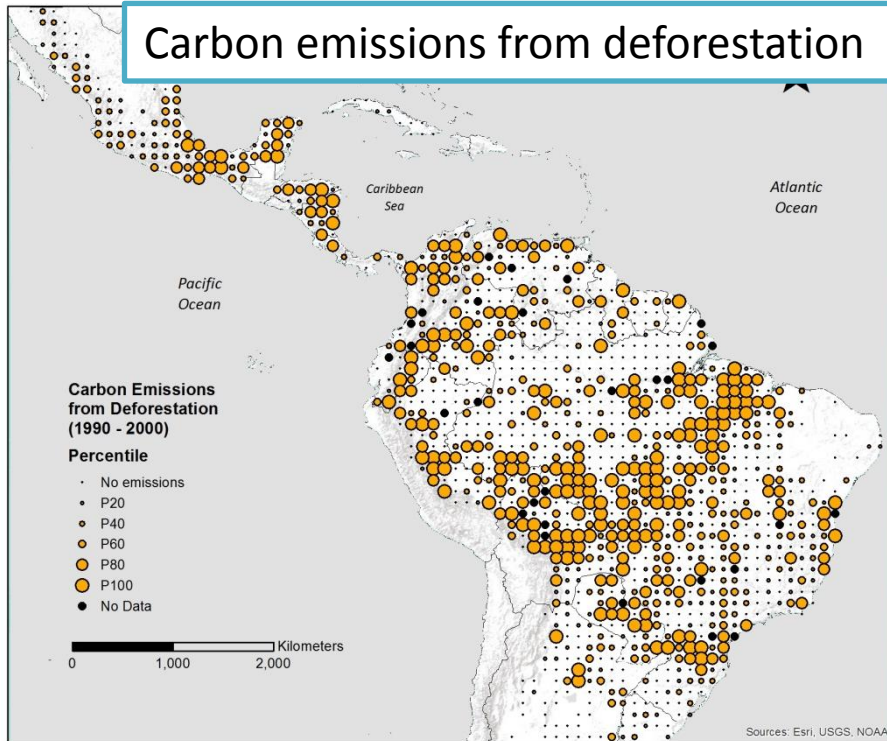
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4. Biodiversity fosters forest resilience to climate change and reducing risk of reversals (**safeguard**)

# Deforestation versus reforestation





# Key messages

## Tropical forests and climate change:

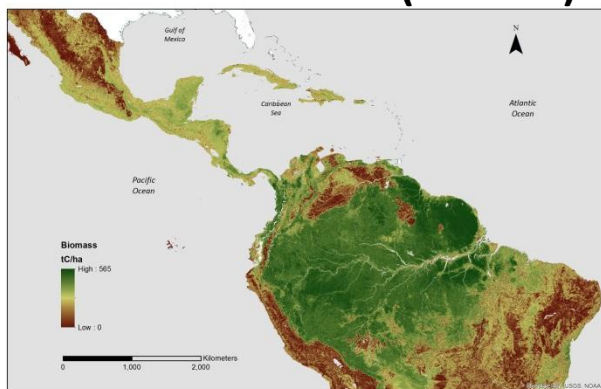
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## Biodiversity and REDD+:

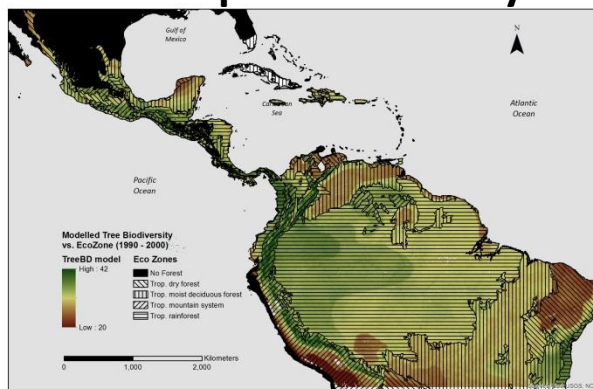
3. Reducing carbon emissions also preserves biodiversity but varies regionally (**co-benefit**)
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5. Enhancing forest (carbon stocks) requires functioning forest ecosystems (**requirement**)

# New data for targeted implementation

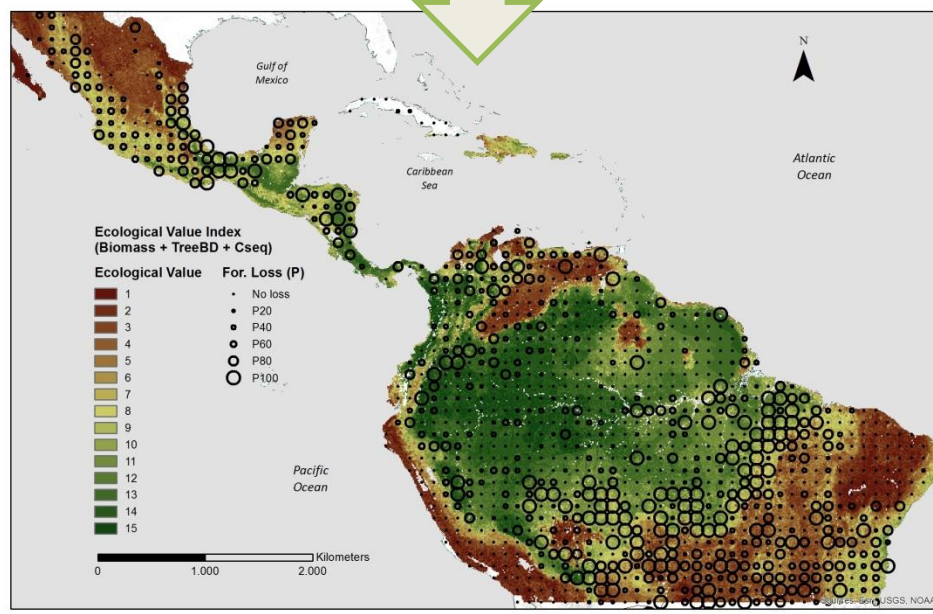
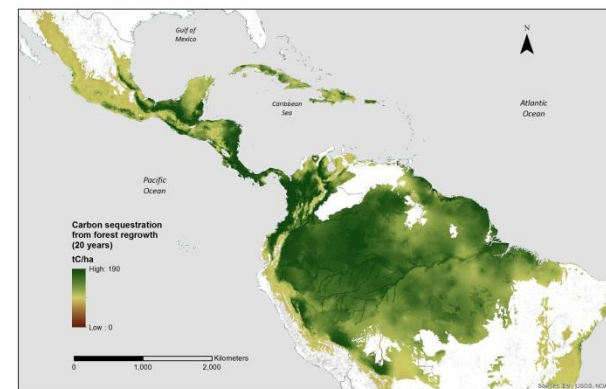
## Forest biomass (carbon)



## Tree species diversity



## Resilience (Sequestration rate)



# Key messages

## **Tropical forests and climate change:**

1. Forest-related mitigation includes both sinks and sources and potential is ~25% of total greenhouse gas emissions
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## **From knowledge to action:**

6. New data and impact for national and sub-national strategies and implementation

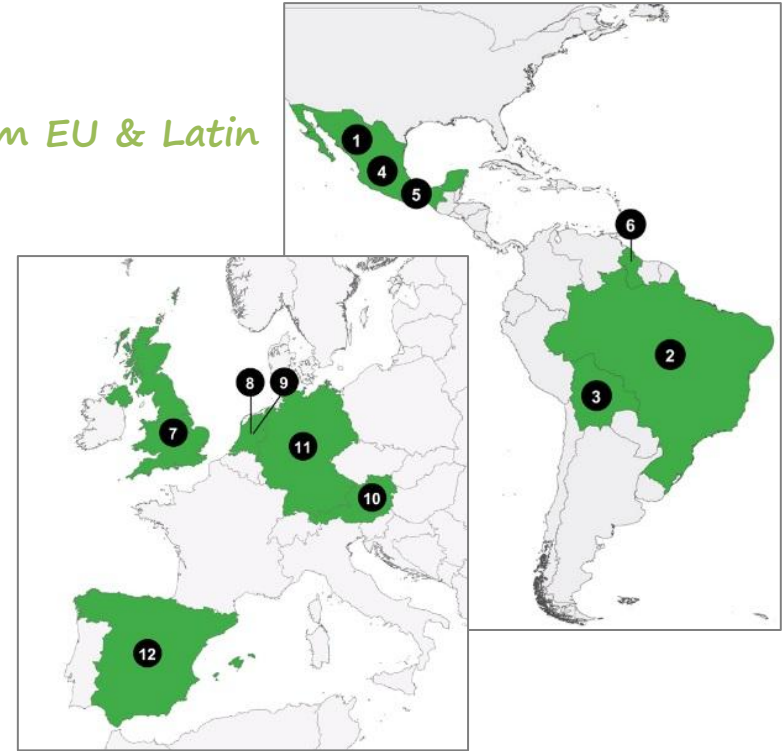




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