

# The Natural Fix

## -- the role of ecosystems in climate mitigation

**Soil, climate change and biodiversity:  
where do we stand?**

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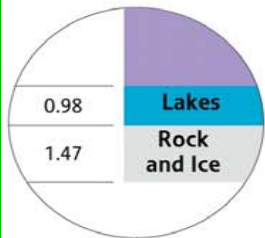


# Natural carbon capture and storage

- Natural systems from forests to grasslands have been capturing and storing carbon for millennia
- Currently, instead of maintaining and enhancing nature's carbon capture and storage capacity, they are being degraded at an alarming rate and becoming a source of GHG
- Protecting ecosystems is a cost effective and sustainable way to sequester carbon and provide other valuable ecosystem services

**Carbon stored by biome  
(Gigatonnes of C)**

547.8	Tropical, Subtropical Forests
285.3	Tropical and Subtropical Grasslands, Savannas, Shrublands
178.0	Deserts and Dry Shrubland
183.7	Temperate Grasslands, Savannas Shrublands
314.9	Temperate Forest
384.2	Boreal Forest
155.4	Tundra

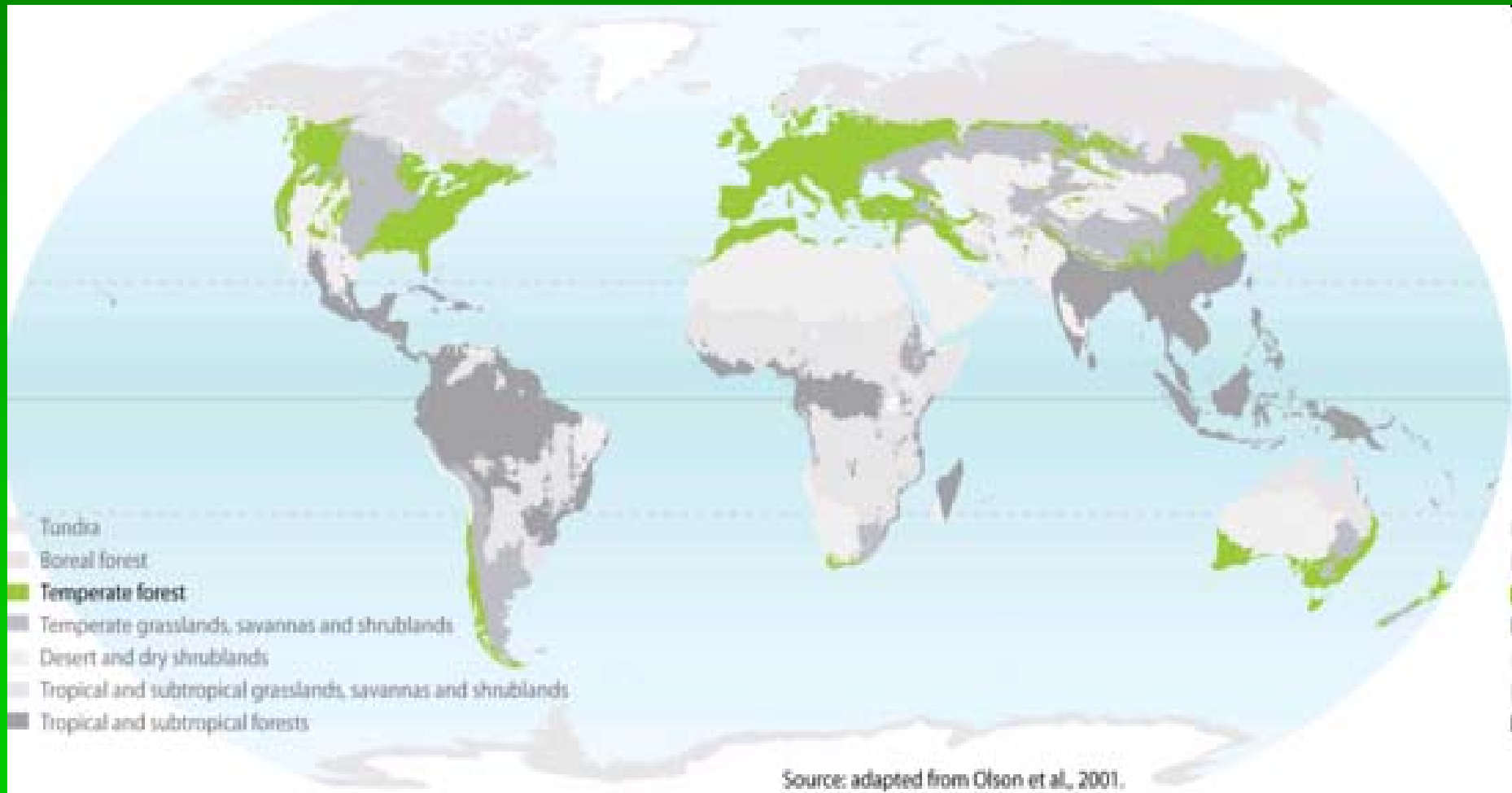


Source: UNEP - WCMC, 2009.

# Carbon storage in terrestrial ecosystems



# Temperate forests

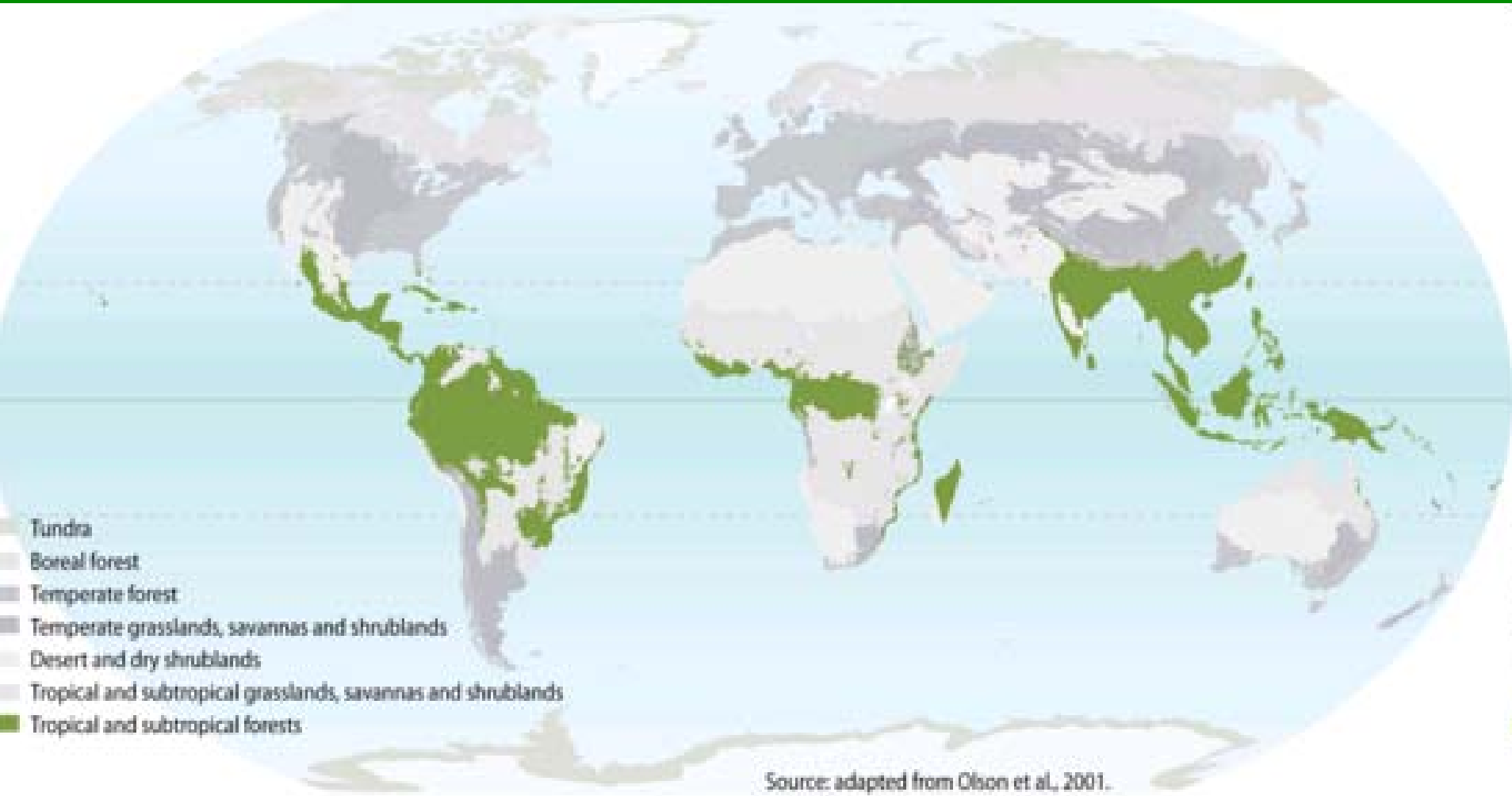


# Peatlands

Peat distribution in the World



# Tropical forests



# Ecosystem resilience

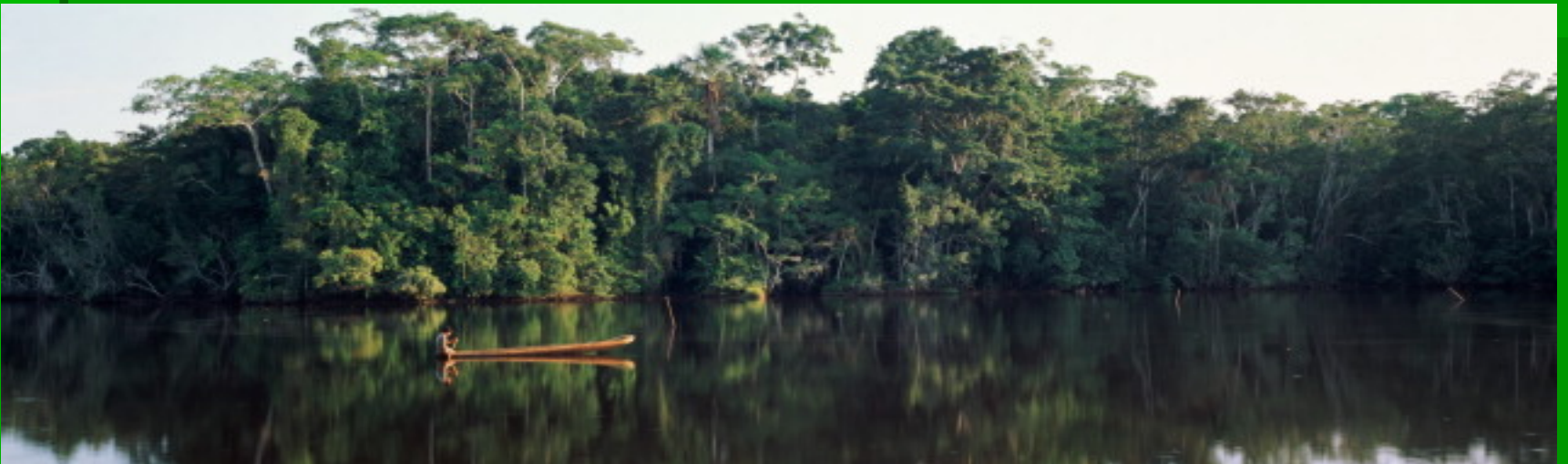


- Ecosystems are resilient up to threshold and then decline
- Biodiversity plays an important part in underpinning the resilience of biodiversity



# The Millennium Ecosystem Assessment

- Ecosystem services are critical for human well-being
- Ecosystems must be resilient to deliver services
- > 60% of ecosystem services in decline
- Biodiversity provides the basic building blocks for ecosystems

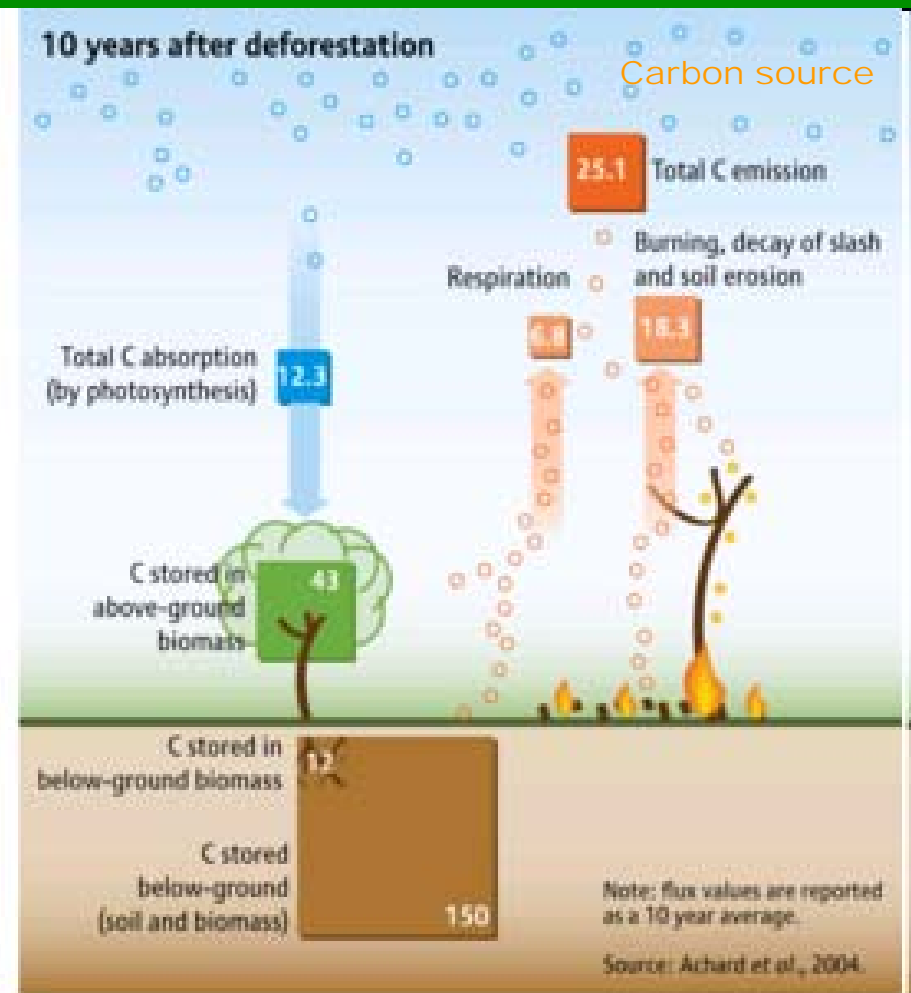
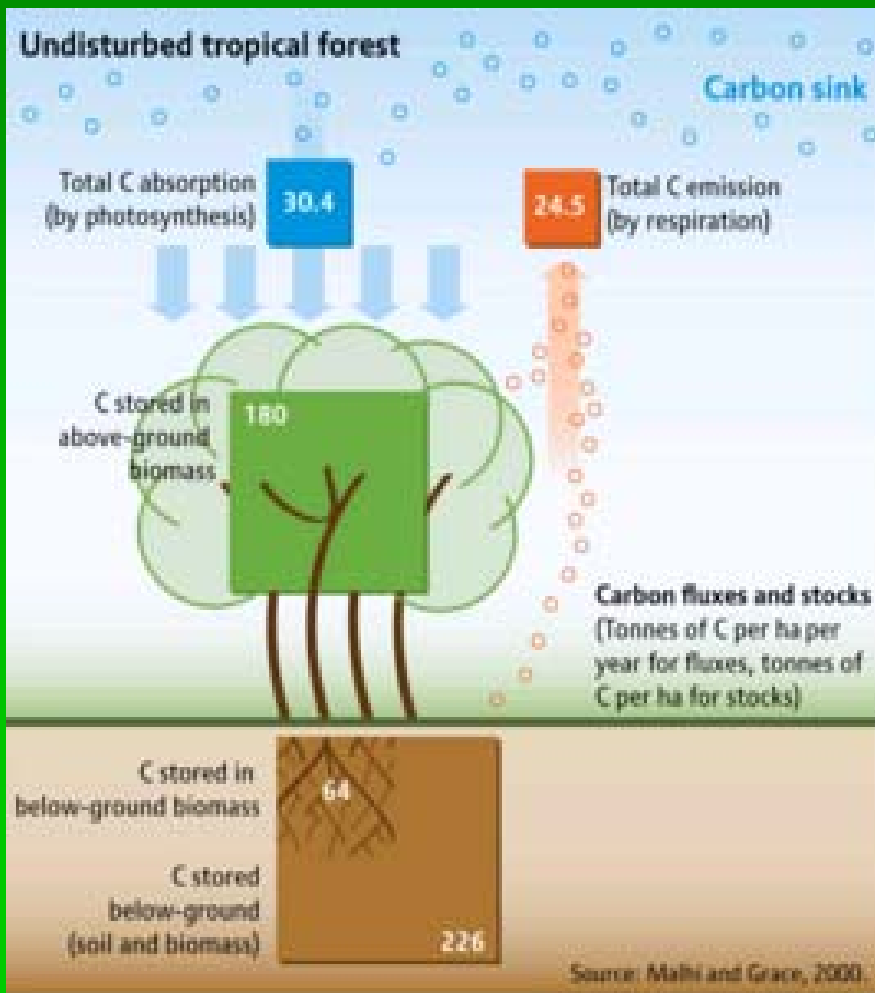


# Peatlands

- 0.5-0.8 Gt of C per year lost from peatlands;
- Tropical peatland drivers are largely palm oil production
- Results in losses of other ecosystem services such as fire regulation and control
- Need for special protection status – conservation of pristine peatlands and potential for emission reduction by rewetting (ecosystem restoration)



# Tropical forest degradation from sink to source



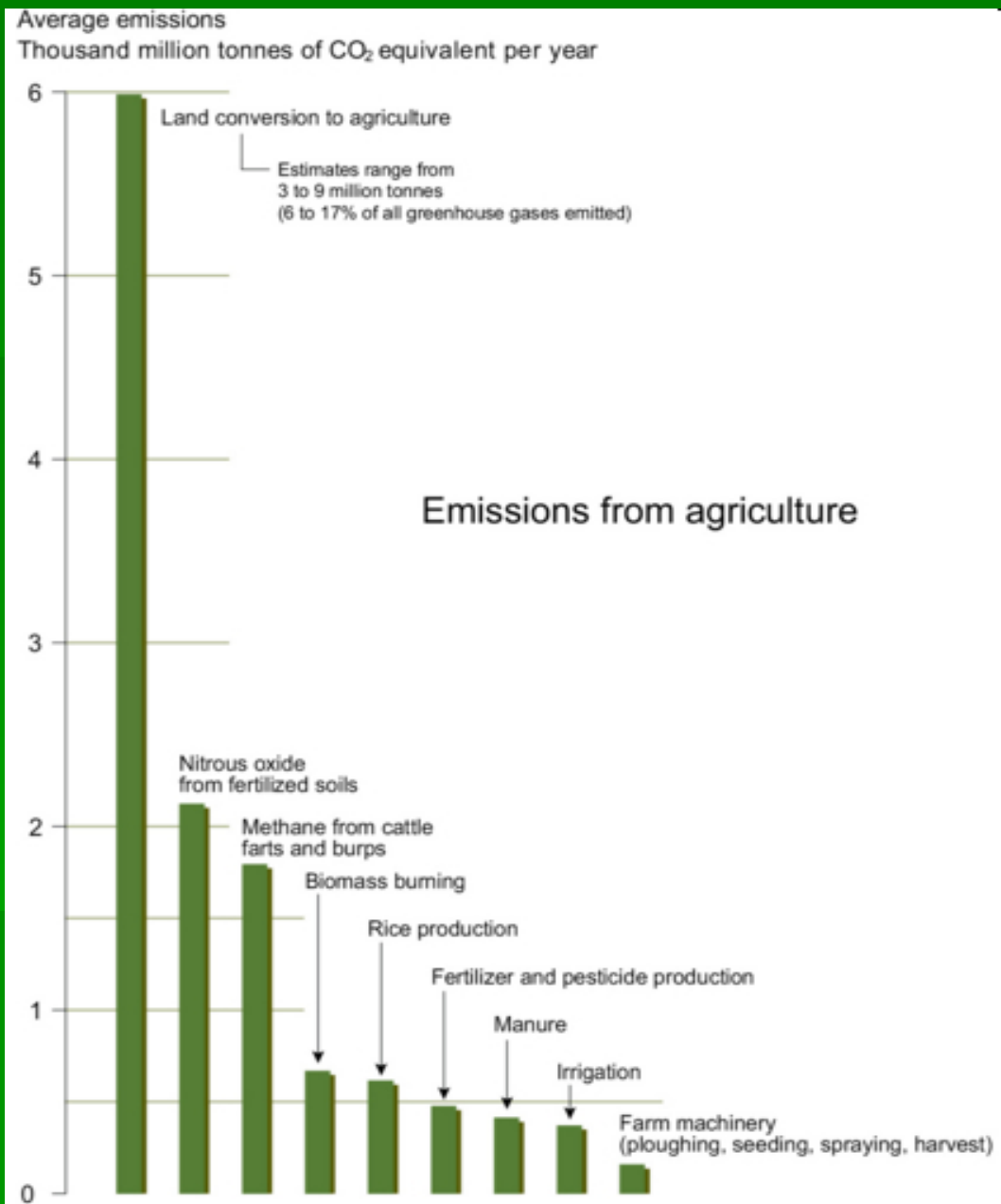
# Agriculture and Emissions Contributing to Climate Change

Agriculture accounts for 30% of global emissions (including deforestation and degradation)

Degraded soils represent half of the world's carbon sequestration potential (Lal, 2004)

Adoption of sustainable land management practices such as efficient water use, nutrient recycling and agroforestry

Win-win for productivity, livelihoods, climate change adaptation and mitigation and biodiversity



Source: Greenpeace, Cool farming: Climate impacts of agriculture and mitigation potential, January 2008 (data for 2005). Designer: UNEP Grid-Arendal

# Reducing ecosystem degradation requires a lesson in economics

- Need to look beyond single services to clusters
- Value those services
- Trade-offs and priorities need to be made
- Managing for delivery
- Futures scenarios



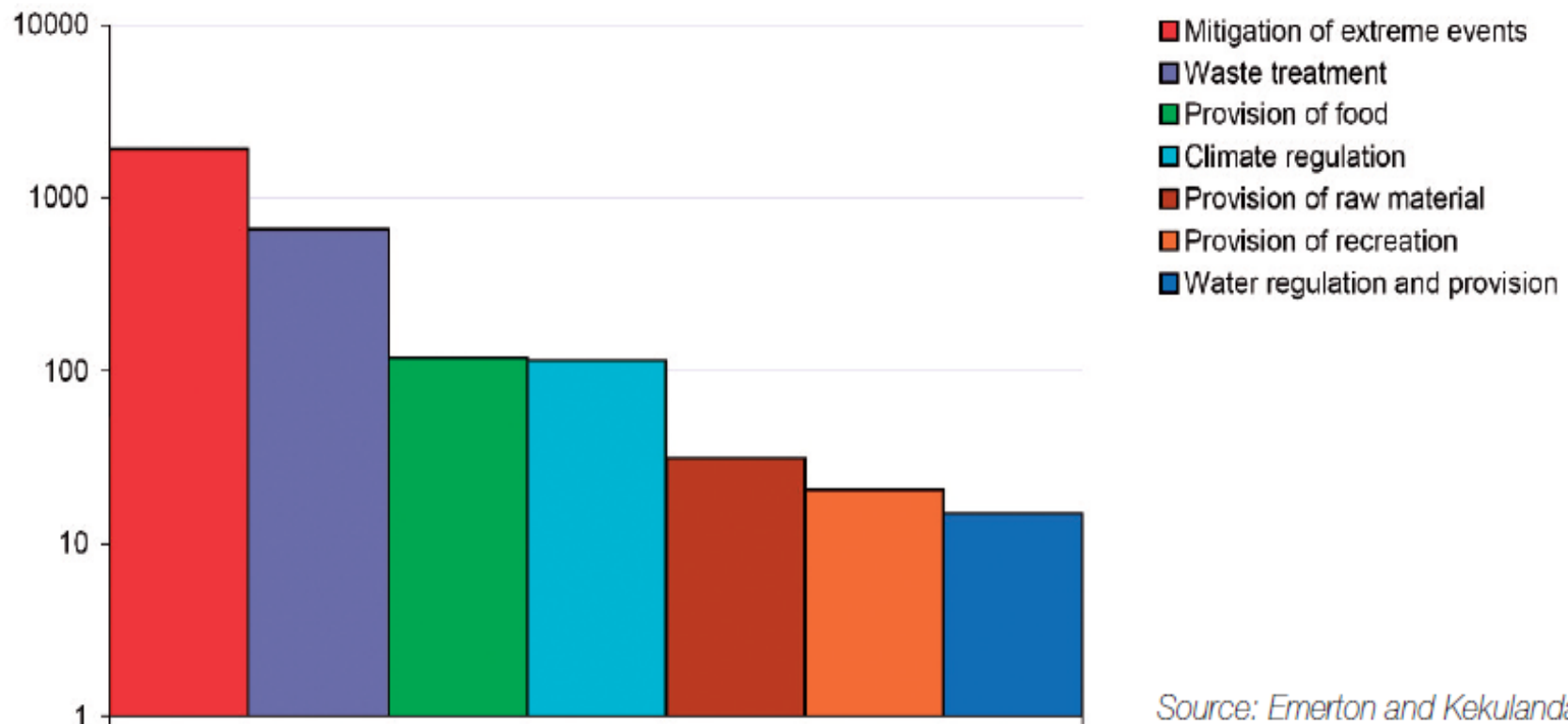
# Valuing Biodiversity and Ecosystems

- The Economics of Ecosystems and Biodiversity (TEEB)
- Need to look beyond today as the cost of replacing these lost ecosystem services is exorbitant (trillions of dollars)



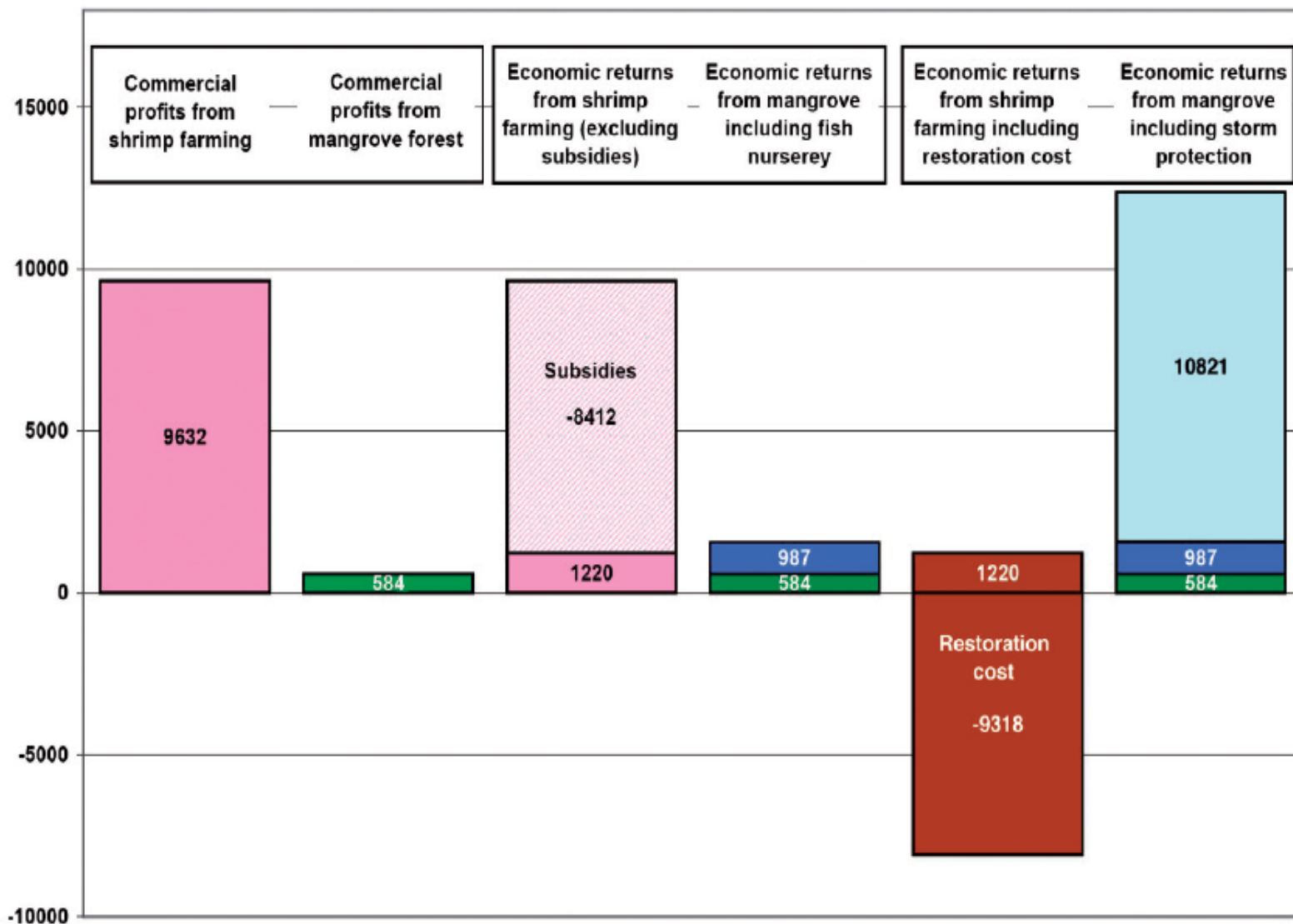
# Value natural capital for what it is worth.....

Values of seven Ecosystem Services in Wetlands  
in US\$ per ha per year



Source: Emerton and Kekulandala 2003

## Comparison of land use values per ha, Southern Thailand



# The REDD+ challenge

- Carbon payment regime to preserve the world's forests
- Support countries to develop strategies and capacities to create, sell and monitor forest based 'carbon assets' while realizing the multiple benefits of forests for sustainable development



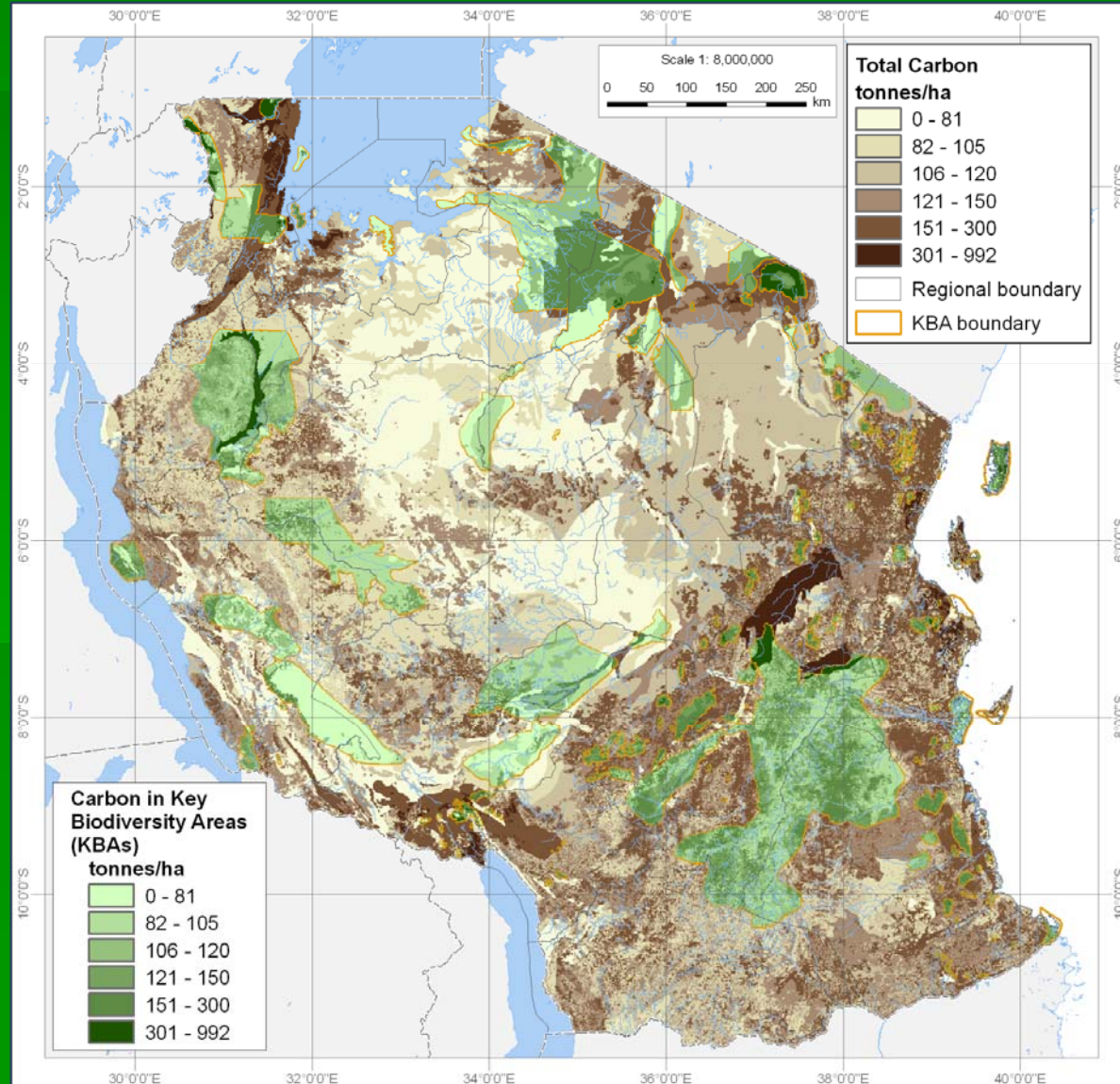
# Fundamental assumptions

- REDD+ will achieve its objectives if it:
  - is well monitored and verifiable
  - is efficient -- transaction costs are kept to a minimum, and are clear and transparent
  - promotes equitable, sustainable development – including local livelihoods
  - safeguards the multiple benefits of biodiversity and ecosystem services



# Biodiversity and other ecosystem services

## Carbon and Biodiversity overlays



# Ecosystem based adaptation

- Maintaining and enhancing ecosystems to make them resilient
- Focuses on green infrastructure
- Combined mitigation-adaptation scheme
- Provides other vital services for sustainable development and human well-being
- Win-win-win solution

# Where do we stand?

- Terrestrial ecosystems play a vital role for the delivery of a variety of services – including carbon capture, but the list goes on
- Must adequately measure value and benefits from multiple ecosystem services and integrating them into policies, plans and programmes
- “Win-win-win” -- *mitigation, adaptation and sustainable development* -- outcomes are possible -- biodiversity plays an crucial role in underpinning the resilience of ecosystems



# Thank you

## Tim Kasten

### UNEP

