



# An introduction to REDD+: science, policy and economics

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Stavros Papageorgiou**  
Conservation International

**Training Session,  
BIOECON Conference, Sept 29, 2010**



**CONSERVATION  
INTERNATIONAL**

# Why should you care about REDD+?

- REDD+ will have global impacts...
  - Shaping the future of land use (and particularly forest cover) in developing countries
  - Influencing conservation of biodiversity and the provision of ecosystem services
  - Impacting social communities (equity issues, poverty)
- Will play a key role in determining the magnitude and speed of climate change
- Almost all governments are actively involved in the REDD+ debate

**Everyone has a stake in REDD+**

# Welcome and introductions

Instructors from Conservation International:

- Celia Harvey, VP Global Change and Ecosystem Services, charvey@conservation.org
- Stavros Papageorgiou, Economist, REDD+ project management and training, spapageorgiou@conservation.org
- Jonah Busch, Economist, REDD+ economics, jbusch@conservation.org

## Participants?

- Name, institution, country
- Experience with REDD+?
- Who has followed REDD+ policy negotiations?
- Who has worked on the implementation of REDD+ ?
- Who is doing research on REDD+? On the economics of REDD+?

# Session objectives

- 1. Understand the importance of land-based opportunities (especially REDD+) for mitigating climate change**
- 2. Learn about REDD+ , a policy mechanism to reduce greenhouse gas emissions from deforestation and degradation in developing countries**
- 3. Discuss the potential challenges in designing and implementing REDD+ and ensuring that it delivers not only climate benefits, but also environmental and social co-benefits**
- 4. Discuss key economic issues related to REDD+ (and exciting research areas)**

# Schedule

**14:00- 15.00 Introduction to REDD+ science and policy  
(Celia Harvey)**

**15.00- 16.00 How to implement REDD+ on the ground  
(Stavros Papageorgiou)**

**16.00-16.15 coffee break**

**16.15-16.45 Discussion**

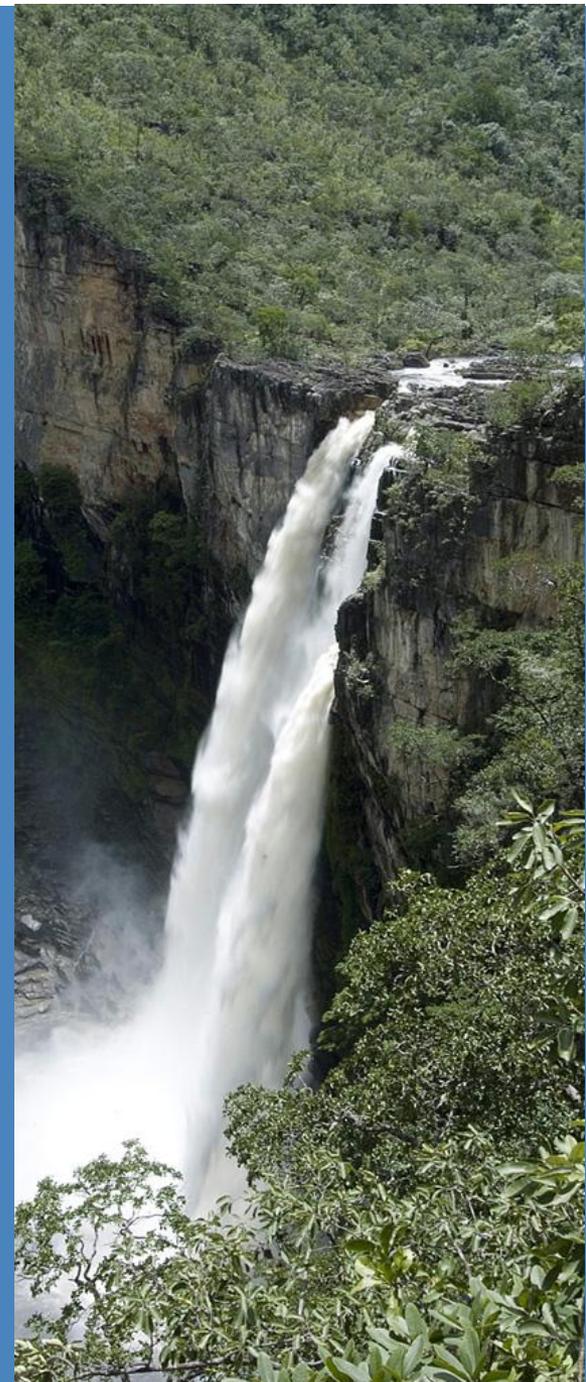
**16.45 –17.45 Economics of REDD+ (Jonah Busch)**

# An introduction to REDD+: science and policy

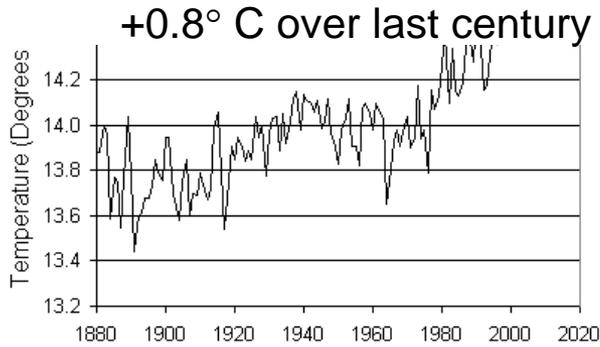
1. Introduction to the role of forest and land sector in climate change mitigation
2. Introduction to the general concept of REDD+
3. Potential risks and benefits from REDD+
4. Overview of the current status of international negotiations on REDD+



# 1. An introduction to the role of forests in climate change



# Rising global temperatures



Changes in precipitation patterns



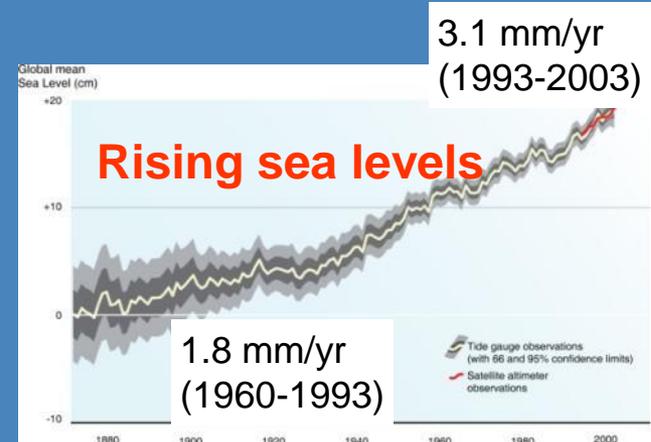
Greater frequency of extreme weather events

# Melting glaciers and ice sheets

Arctic Sea ice Loss: Greater than Land Area of Texas, California, and Maryland Combined  
2003 vs. 1979 Comparison



Shrinking glaciers



<http://maps.grida.no/go/graphic/trends-in-sea-level-1870-2006>

# Signs of climate change

# Climate change is already having important impacts- and these will intensify in the future

## Ecological



Increased vulnerability to flooding and other natural disasters

## Human



Increased spread of diseases

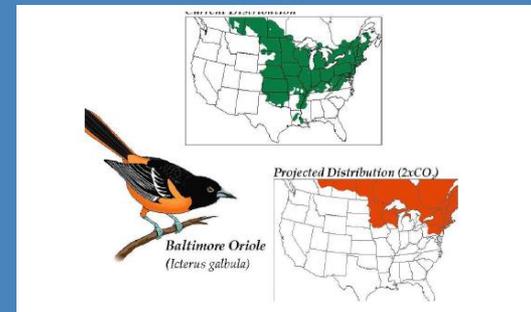
Habitat loss for certain species



Severe droughts, changes in crop yields and suitable land for agriculture

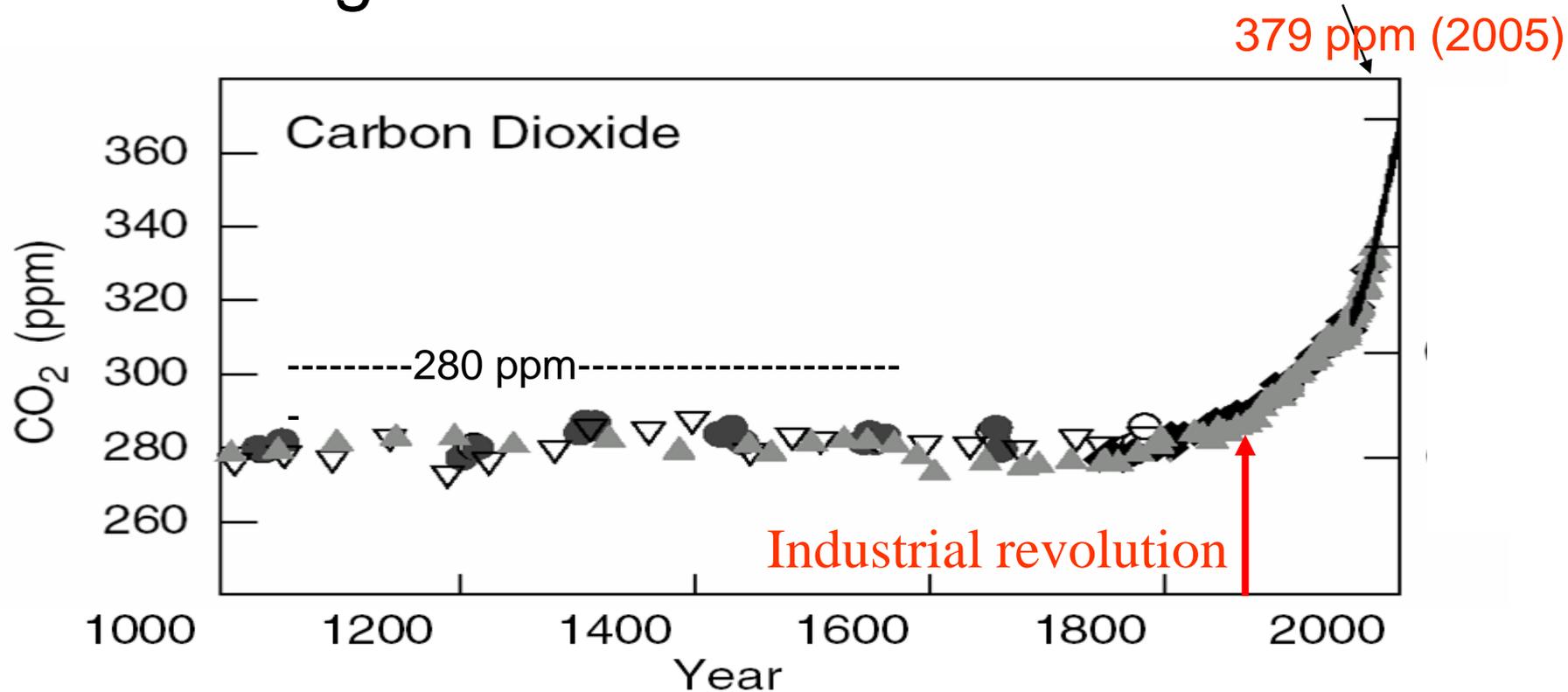


Coral bleaching due to rising ocean temperatures



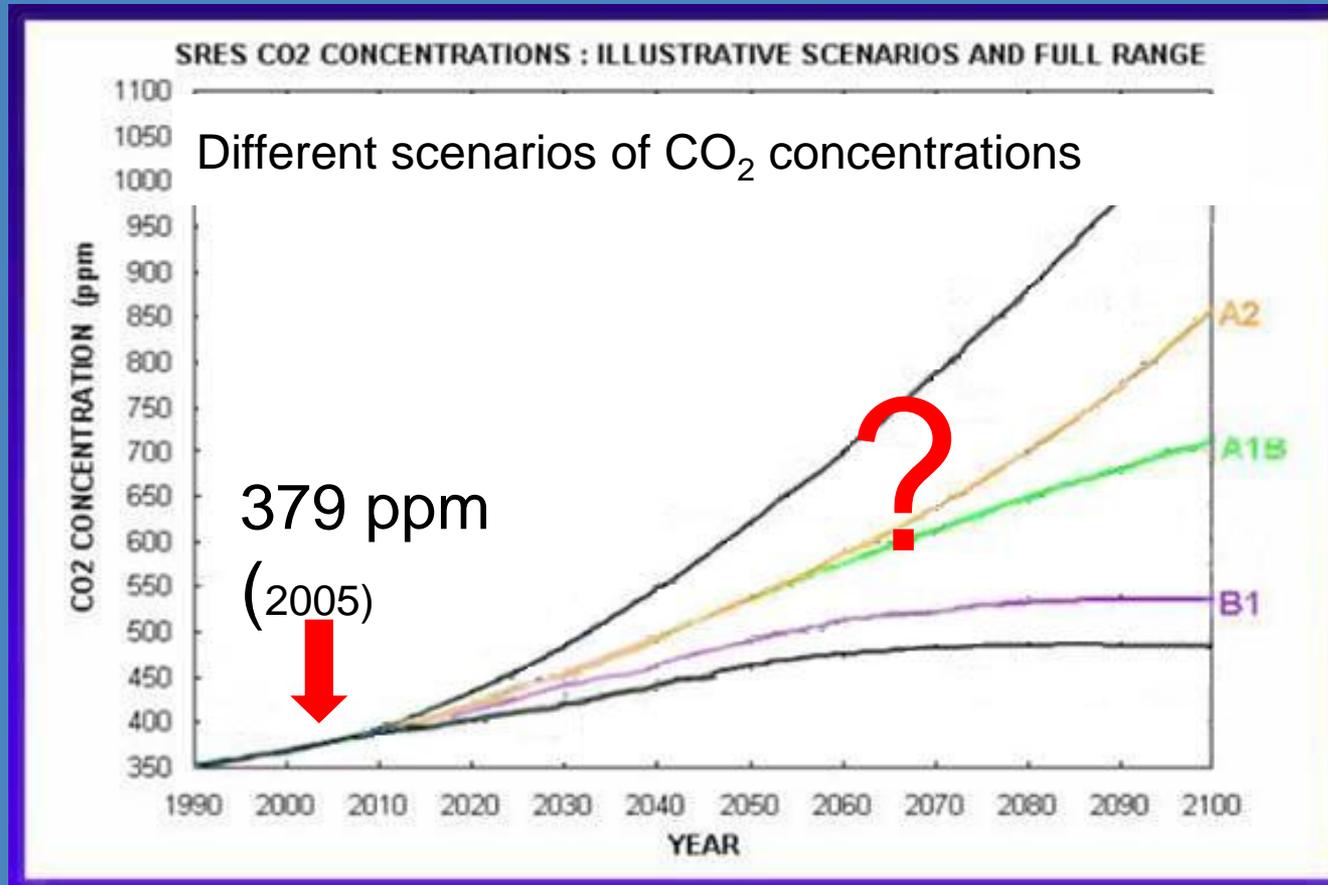
Shifts in distribution of suitable habitat

# Climate change is driven by emissions of greenhouse gases from human activities



- CO<sub>2</sub> levels are the highest in last 650,000 years
- In the last 50 yrs, CO<sub>2</sub> levels have grown more rapidly than ever before
- CO<sub>2</sub> levels are increasing 1.5- 2 ppm/yr

# How high will CO<sub>2</sub> levels go?

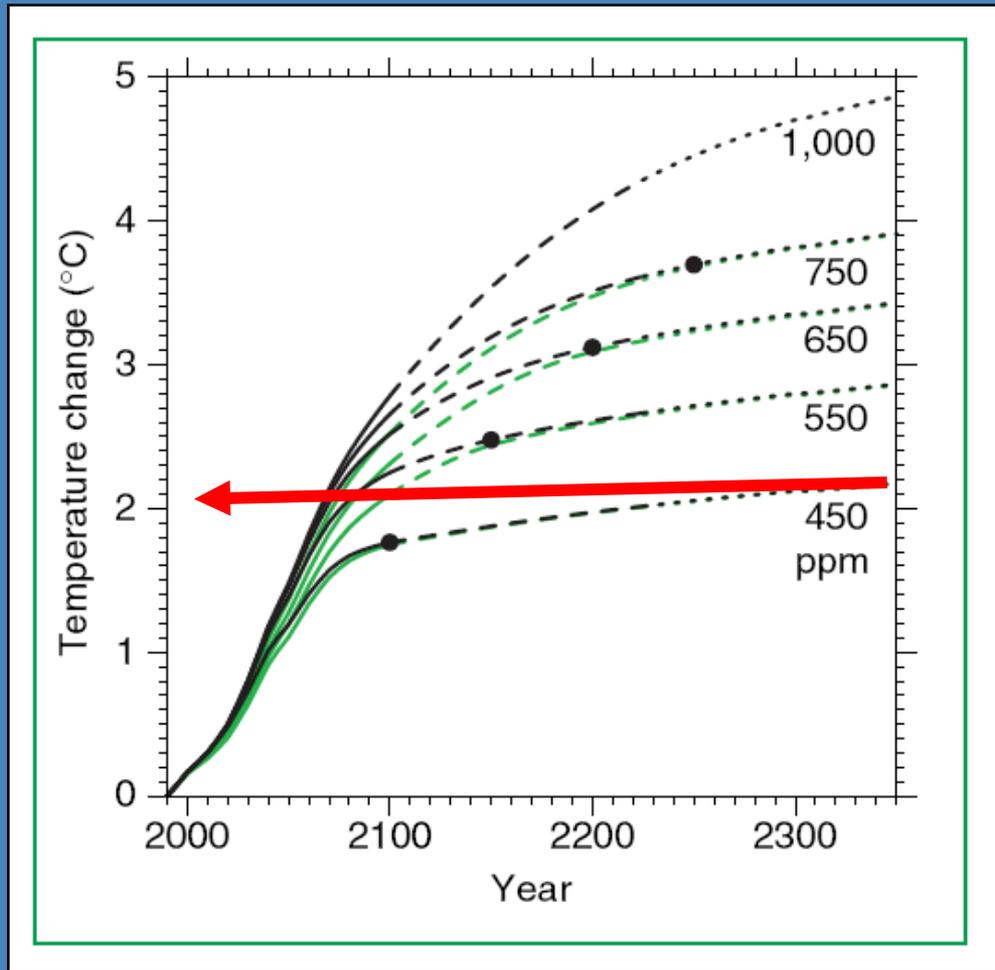


1100 ppm?

450 ppm?

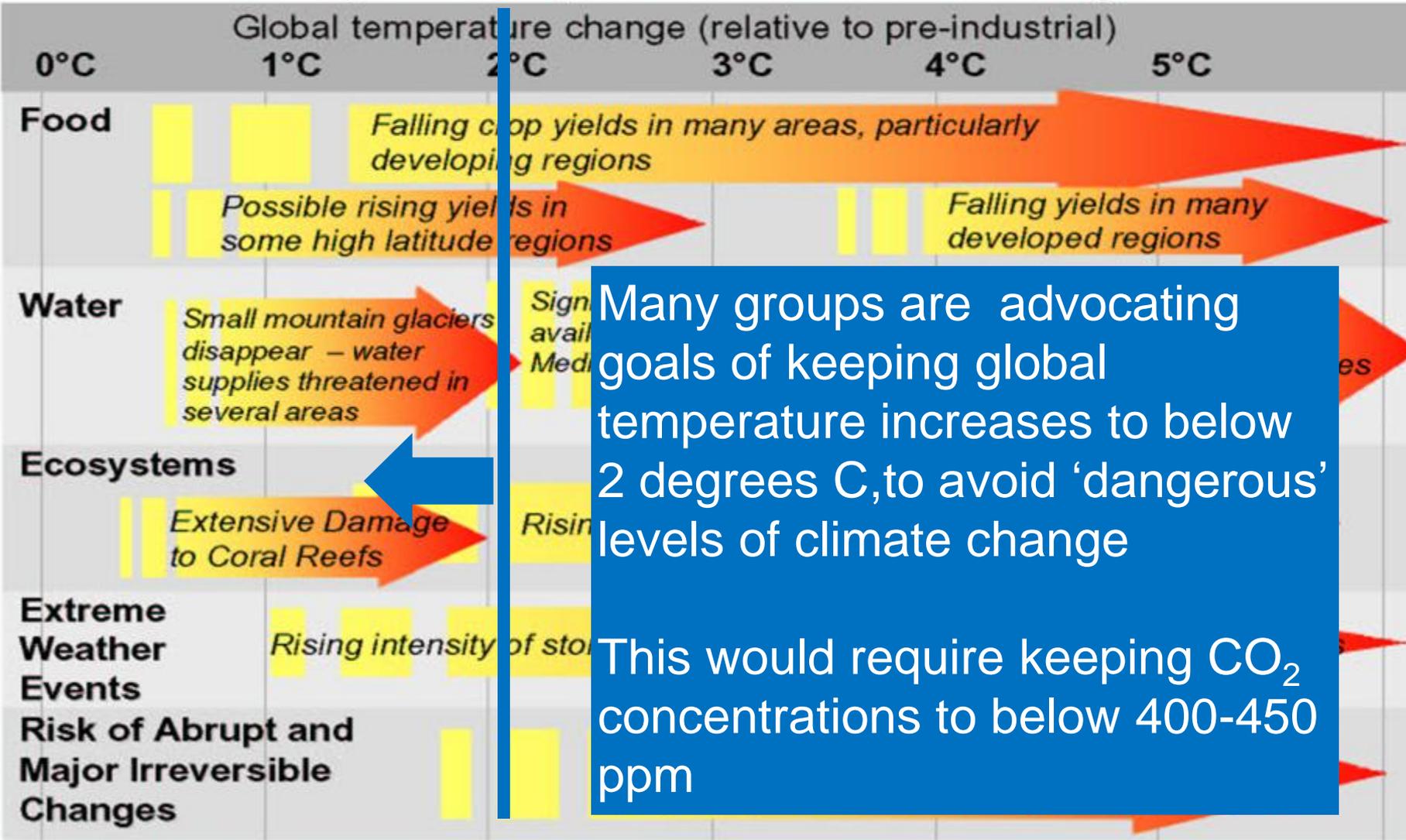
Depends on how quickly and significantly green house emissions are reduced

# Global temperatures will be determined by atmospheric GHG concentrations



- Many groups are advocating a target of 450 ppm (or lower) to prevent temperature changes of more than 2 °C

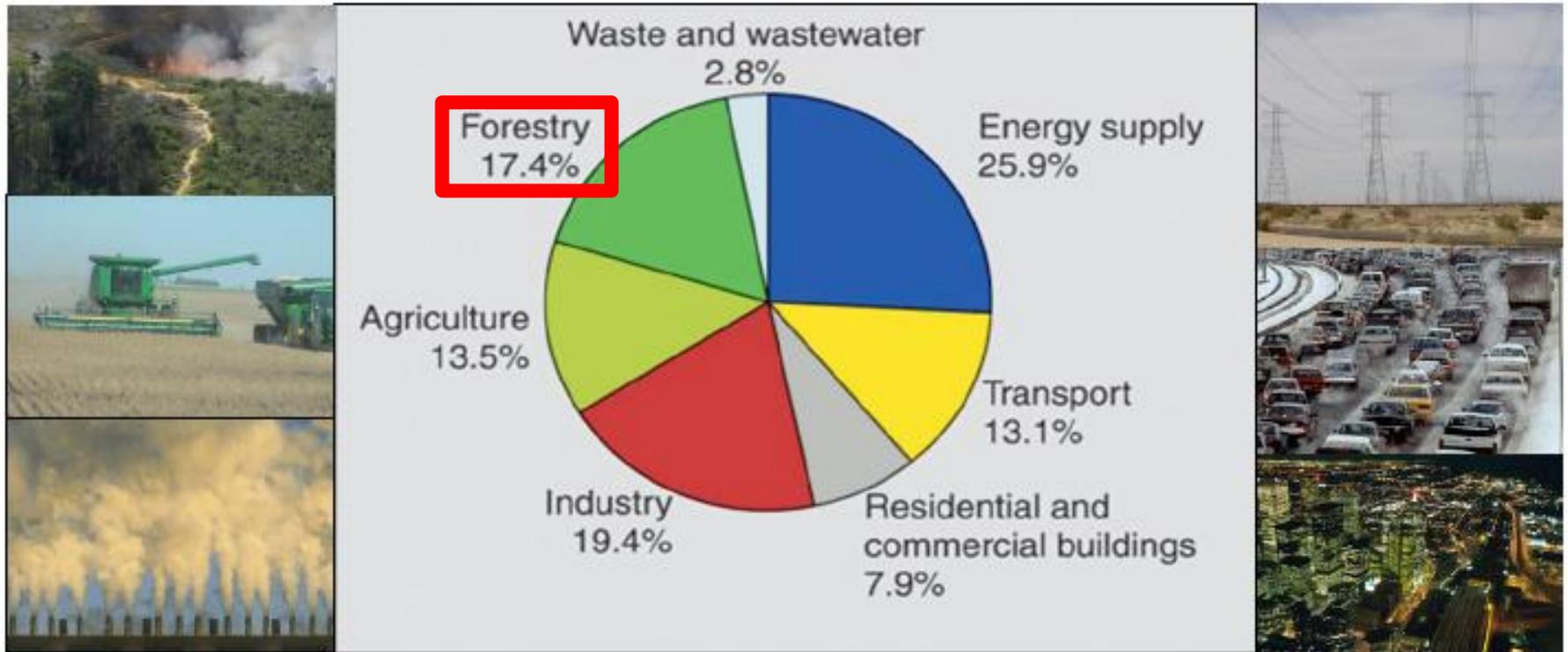
# The impacts of climate change will intensify as GHG levels increase and temperatures increase



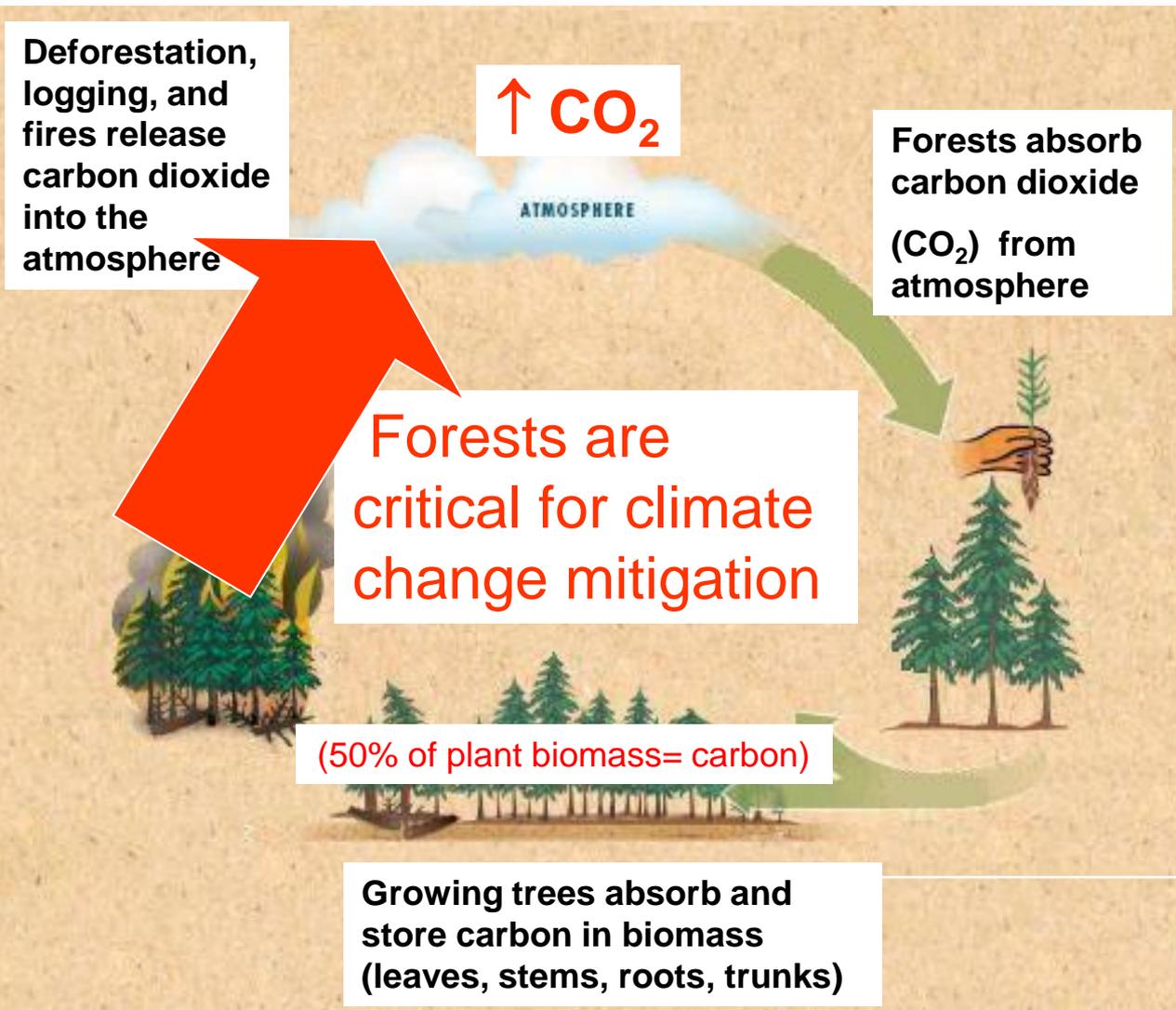
Many groups are advocating goals of keeping global temperature increases to below 2 degrees C, to avoid 'dangerous' levels of climate change

This would require keeping CO<sub>2</sub> concentrations to below 400-450 ppm

# Which sectors produce greenhouse gases?



# Forests and other vegetation play a key role in the carbon cycle



- ~13 million ha deforested annually
- Deforestation accounts for ~12-18% of global greenhouse gas emissions

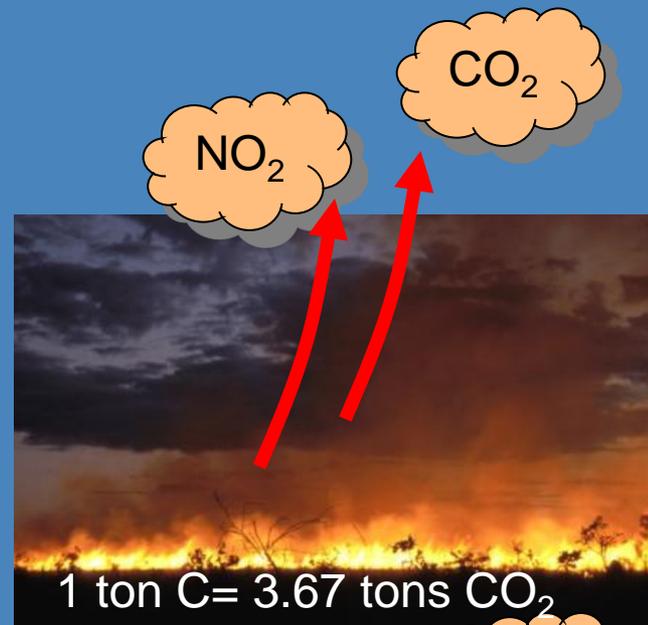
# Deforestation and degradation are a major source of GHG emissions

## Forests

An example: Deforestation and burning  
Intact forest with 150 t C/ha

Timber extraction and forest degradation

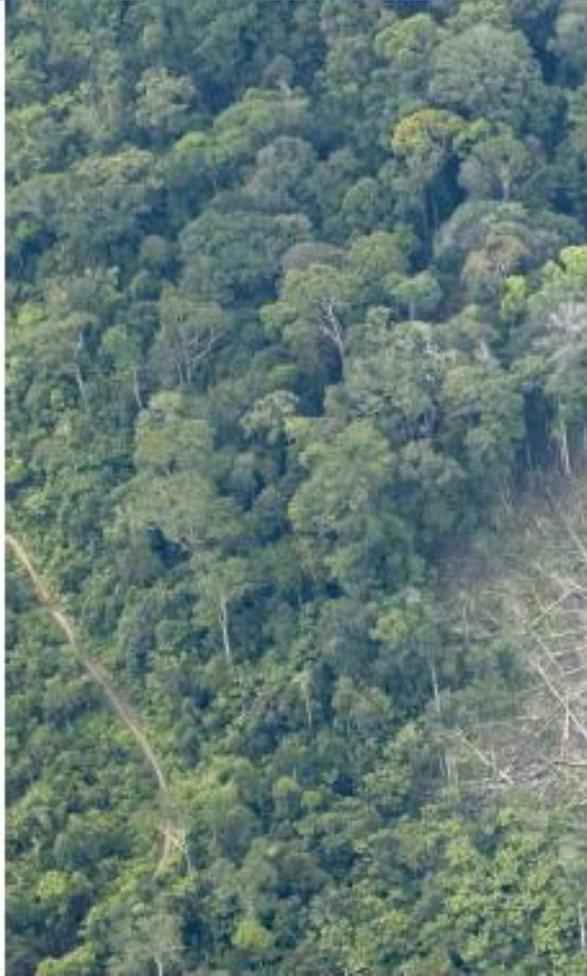
Emissions:  $150 \text{ t C/ha} \times 3.67 \text{ t CO}_2/\text{t C}$   
 $\text{CO}_2 = 550.5 \text{ t CO}_2/\text{ha}$



1 ton C = 3.67 tons CO<sub>2</sub>

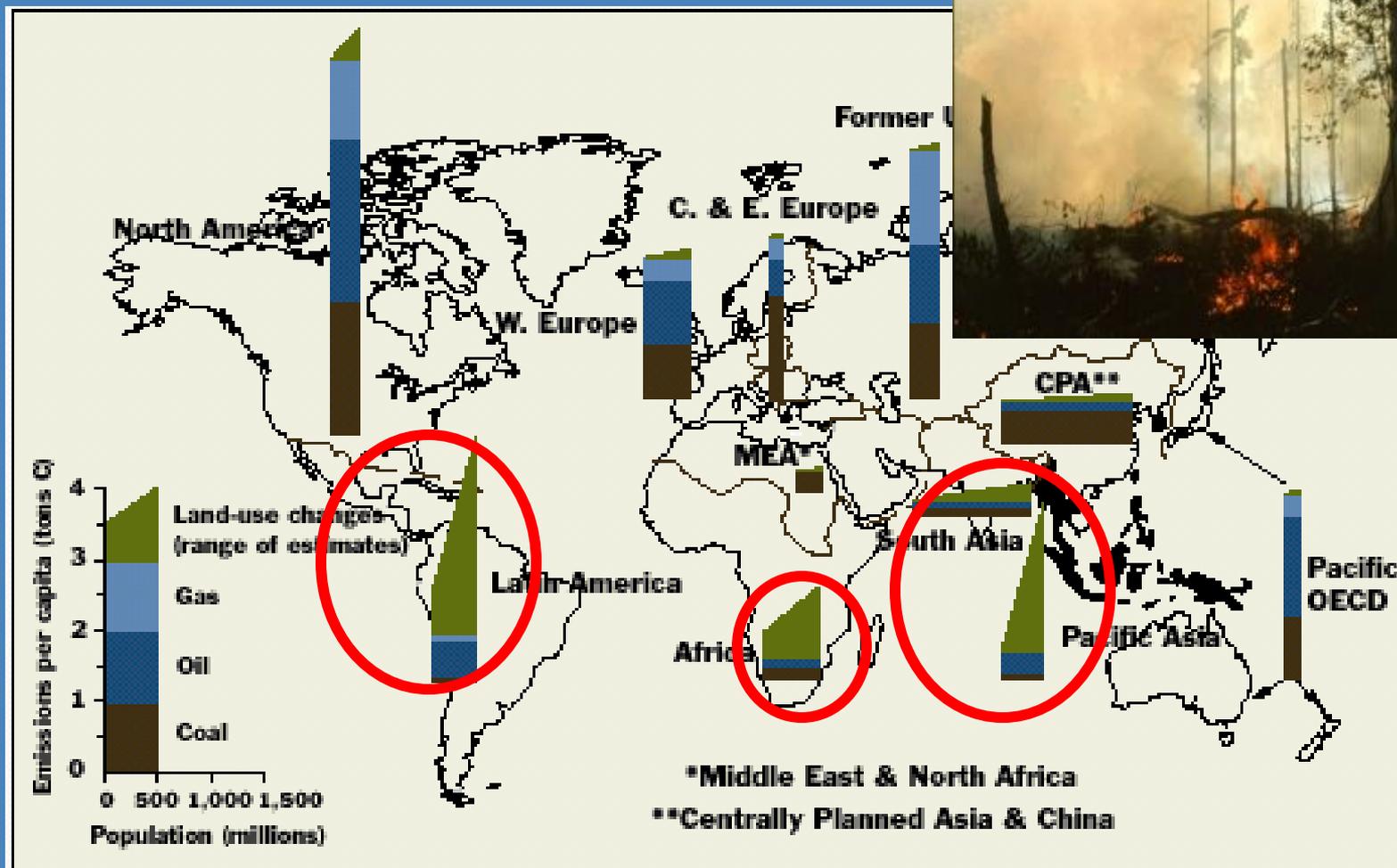


# How much CO<sub>2</sub> is released when forests are cleared?

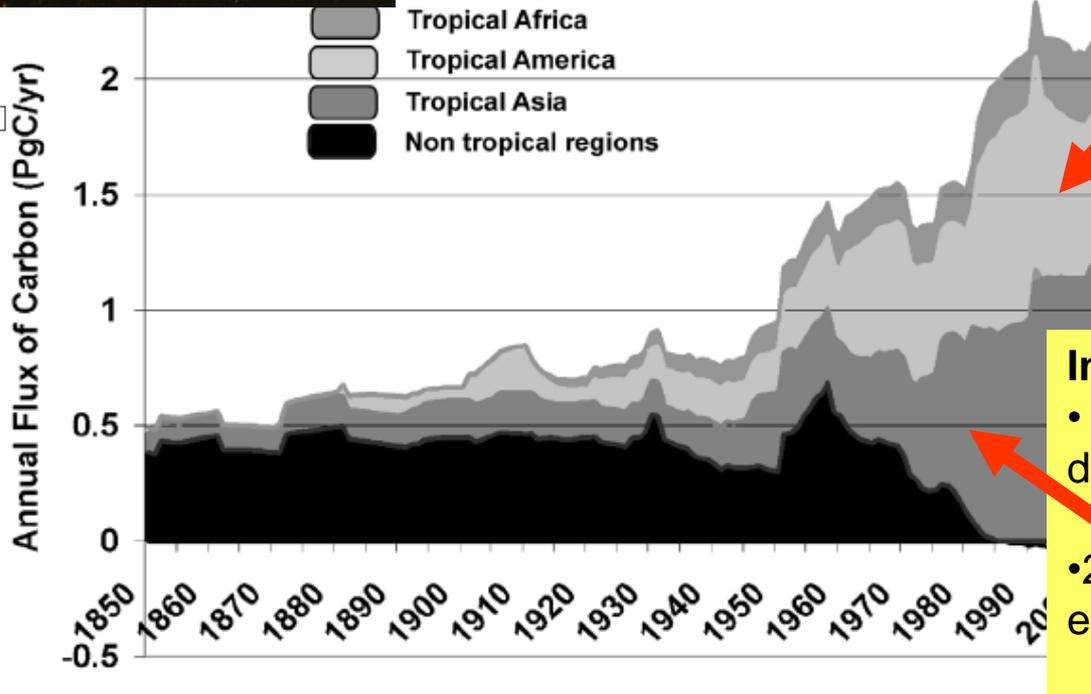


<b>Tropical Forest Type</b>	<b>t C/ha avoided</b>	<b>t CO<sub>2</sub>/ha avoided</b>
<b>Africa</b> - lowland moist forest	155-200	<b>569 - 734</b>
<b>Africa</b> - seasonal forest	60-70	<b>220 - 257</b>
<b>Africa</b> - dry forest	25-50	<b>92 - 184</b>
<b>America</b> - lowland moist forest	90-155	<b>330 - 569</b>
<b>America</b> - secondary or logged	63-95	<b>231 - 350</b>
<b>Asia</b> - lowland moist forest	95-200	<b>350 - 734</b>
<b>Asia</b> - dry forest	22-40	<b>81 - 147</b>

# Tropical deforestation and land use change is the major source of GHG emissions in developing countries



> 13 million ha of forests are cleared each year, releasing about 2.2 billion tons of CO<sub>2</sub>



### Brazil:

- Approx 3.5 million ha of forest cleared each year, between 2000-2005
- 1,372 MtCO<sub>2</sub>e/yr (75% of Brazil's annual emissions)
- About 20% of all global emissions from deforestation

### Indonesia:

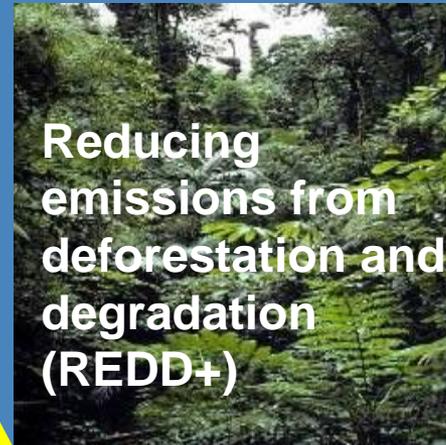
- Approx. 1.5 million ha of forest deforested per year from 2000-2005
- 2,563 MtCO<sub>2</sub>e/yr (85% of Indonesian emissions)
- About 30% of all global emissions from land use and forests

(Houghton, 2006)

Most of the current emissions from deforestation stem from the tropics

# What are our options for mitigating climate change?

## Industrial options



## Land and forest-based options



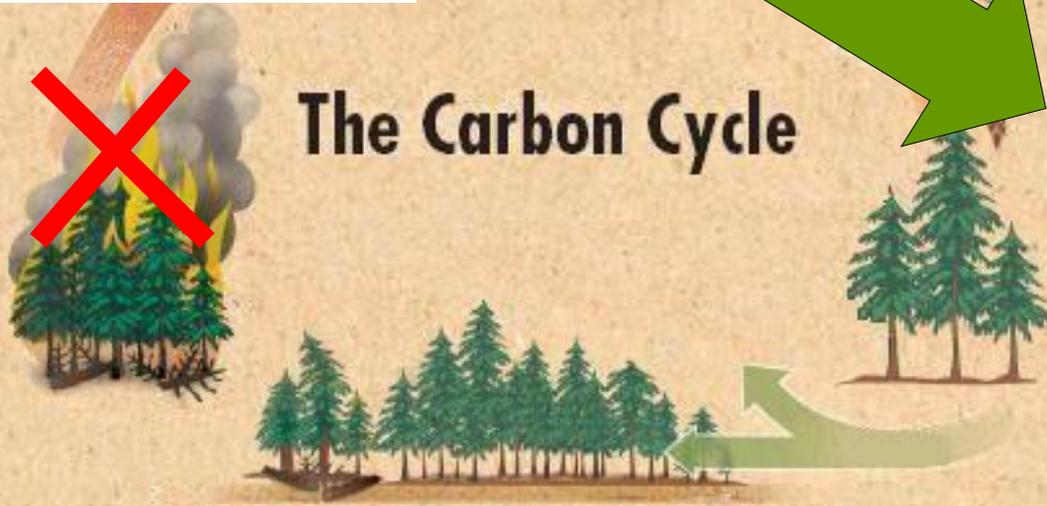
# What are the two ways forests can help mitigate climate change?

Forest conservation, or sustainable forest management

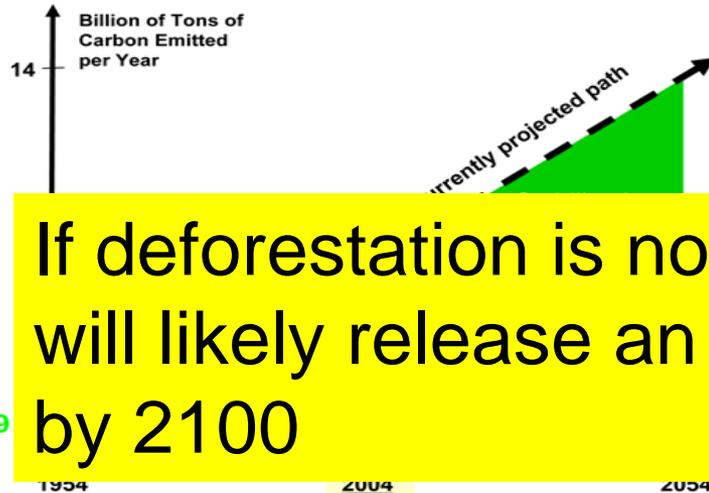
**Reduce emissions** from deforestation and degradation

**Increase uptake of carbon** by planting trees or restoring degraded areas

The Carbon Cycle



Reducing emissions from deforestation and degradation is critical for avoiding 'dangerous' climate change



Need to reduce emissions by ~400

If deforestation is not reduced, tropical deforestation will likely release an additional 87 – 130 Gt of carbon by 2100

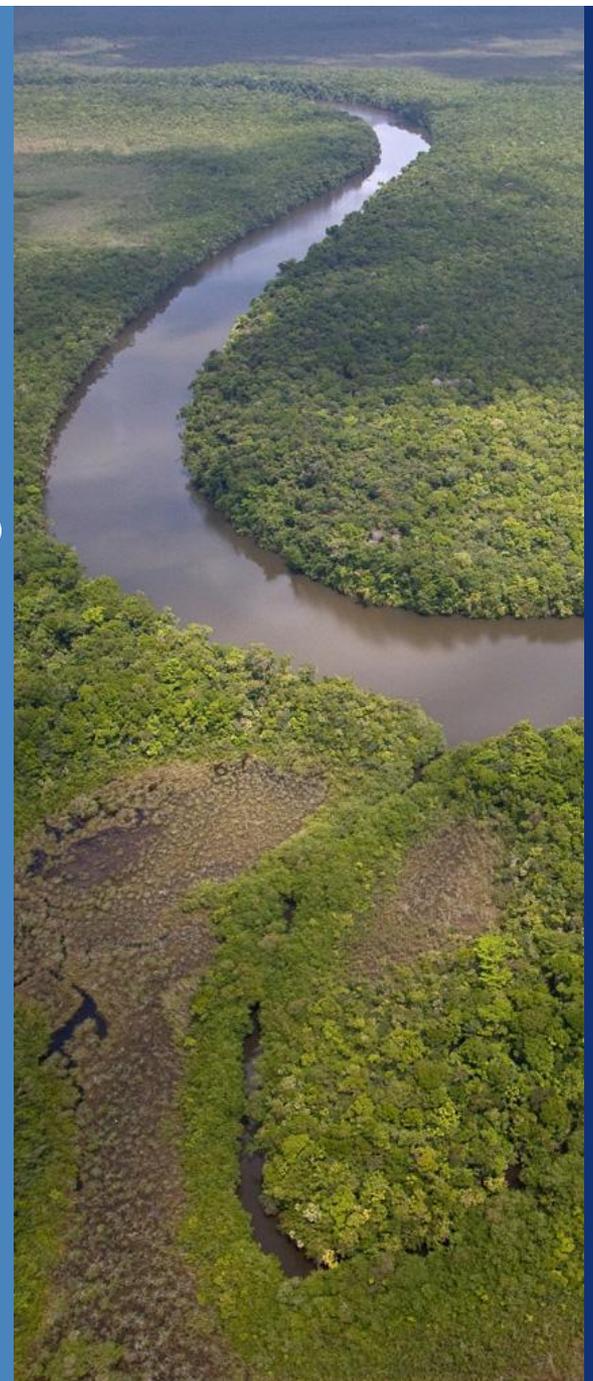
1.9

Of this, up to 100 billion t C could be achieved through forest and other land-based carbon offsets

100 billion tons from Land-based carbon offsets



## 2. What is REDD+? And how does it work?



# REDD+ is a mechanism designed to reduce GHG emissions from forests

## The concept has evolved from:

- RED means Reducing Emissions from Deforestation
- REDD means Reducing Emissions from Deforestation and Degradation

## Now:

- REDD+ means Reducing Emissions from Deforestation and Degradation, “plus” the role of **Forest Conservation, Sustainable Forest Management, and Carbon Stock Enhancement**

# What is the basic concept of REDD+?

- Tropical developing countries will receive benefits (finance) by other countries to reduce their emissions of greenhouse gases from forests
- The benefits will be linked to how much countries are actually able to reduce their greenhouse gas emissions below what would have happened in a baseline, or business-as-usual scenario (i.e., performance-based payments)

# What are the different activities that are eligible in REDD+?



- Countries can get credits for **reducing emissions** from:
  - Deforestation
  - Forest degradation
  - From forestry practices, by implementing sustainable management of forests
- Countries can also get credits for **maintaining and increasing carbon sequestration** through
  - Forest Conservation
  - Carbon stock enhancement (restoring or reforesting degraded forests, or improving the management of forest areas to increase carbon stock)

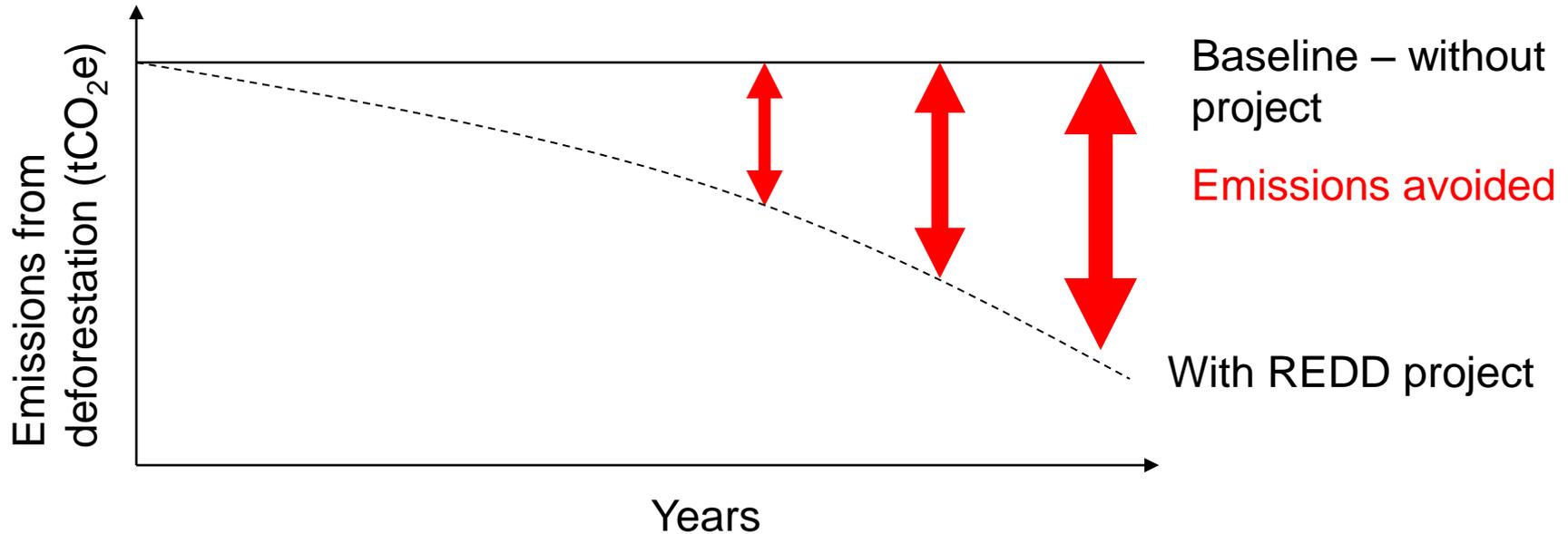
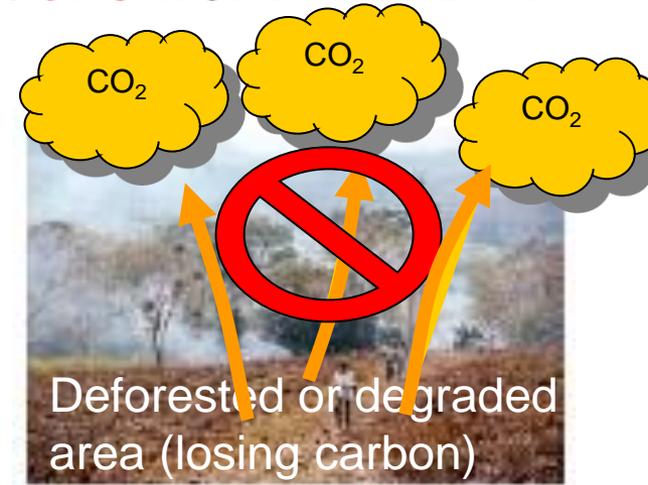
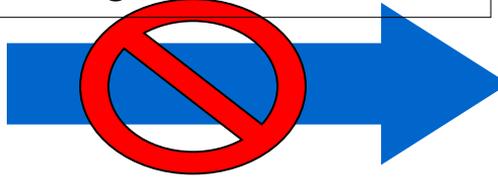
# How are the emissions reductions calculated?

1. Countries determine their baseline level of deforestation and degradation and associated GHG emissions
2. Take measures to reduce GHG emissions below the baseline scenario
  - (e.g., establish new protected areas, reduce forest fires, implement sustainable forest management practices, etc.)
3. Get credit for the total amount of GHG emissions that were not released into the atmosphere, as a result of the REDD+ activities

# An example of calculating **emissions reductions** from REDD+:



REDD+ initiative:  
Implement activities to  
reduce deforestation  
and degradation



Countries/projects get credits for the **emissions that were avoided** by conserving the forest

# A simple example of carbon accounting in a REDD+ initiative designed to reduce deforestation rates:

**Base line scenario** (forest area of 100,000 ha, with a carbon density of 150 tC/ha, and a 1% deforestation rate (losing 1,000 ha/year)

Annual GHG emissions= area deforested X forest carbon stocks (converted to CO<sub>2</sub>)

Annual emissions= 1,000 ha/yr X 150 t C/ha X 3.67 t CO<sub>2</sub>= **550,500** tons CO<sub>2</sub> /yr



REDD+

**Under REDD+ :**

0.7% annual deforestation = (100,000 ha X 0.07= 700 ha/yr)

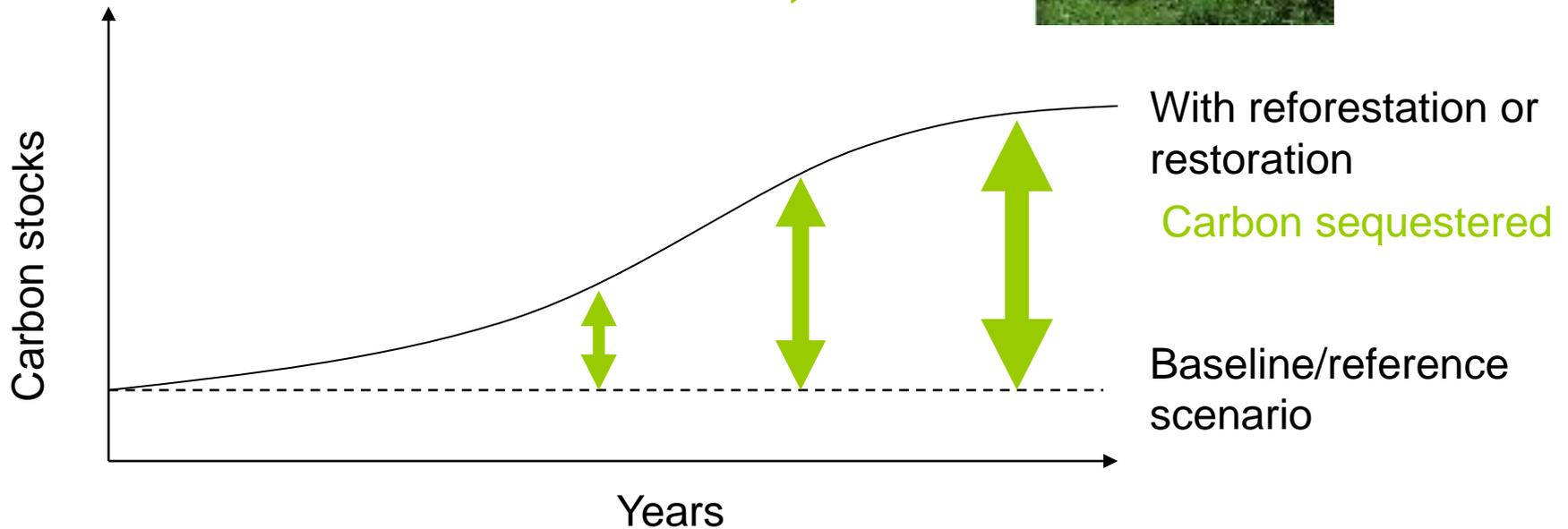
Annual emissions= 700 ha/yr X 150 t C/ha X 3.67 t CO<sub>2</sub>= **385,350** tons CO<sub>2</sub>/yr)



**Emissions reductions** (due to REDD+)= BAU emissions- REDD scenario emissions

**550,500 - 385,350 = 165,150** tons CO<sub>2</sub>/ yr

Under REDD+, you also get credit for carbon sequestered by intact forests, restored areas or reforested areas



Carbon credits = additional carbon that was sequestered in the growing trees

To calculate the net impact of REDD+ activities in a country or region, you need to keep track of both the emissions coming from deforestation and degradation, and the carbon sequestration occurring – and this becomes complex

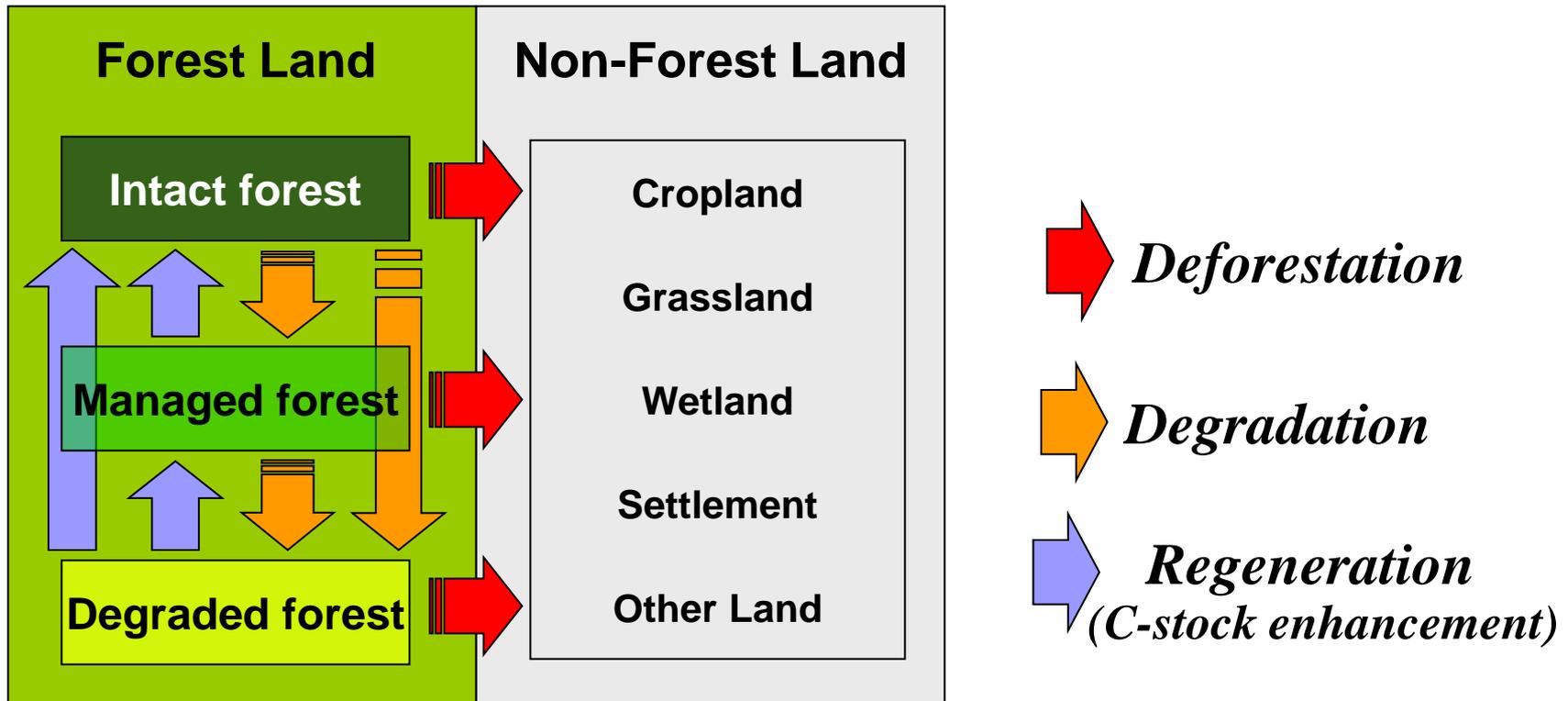


Figure: Lucio Pedroni

### 3. What are the potential risks and benefits of REDD+?

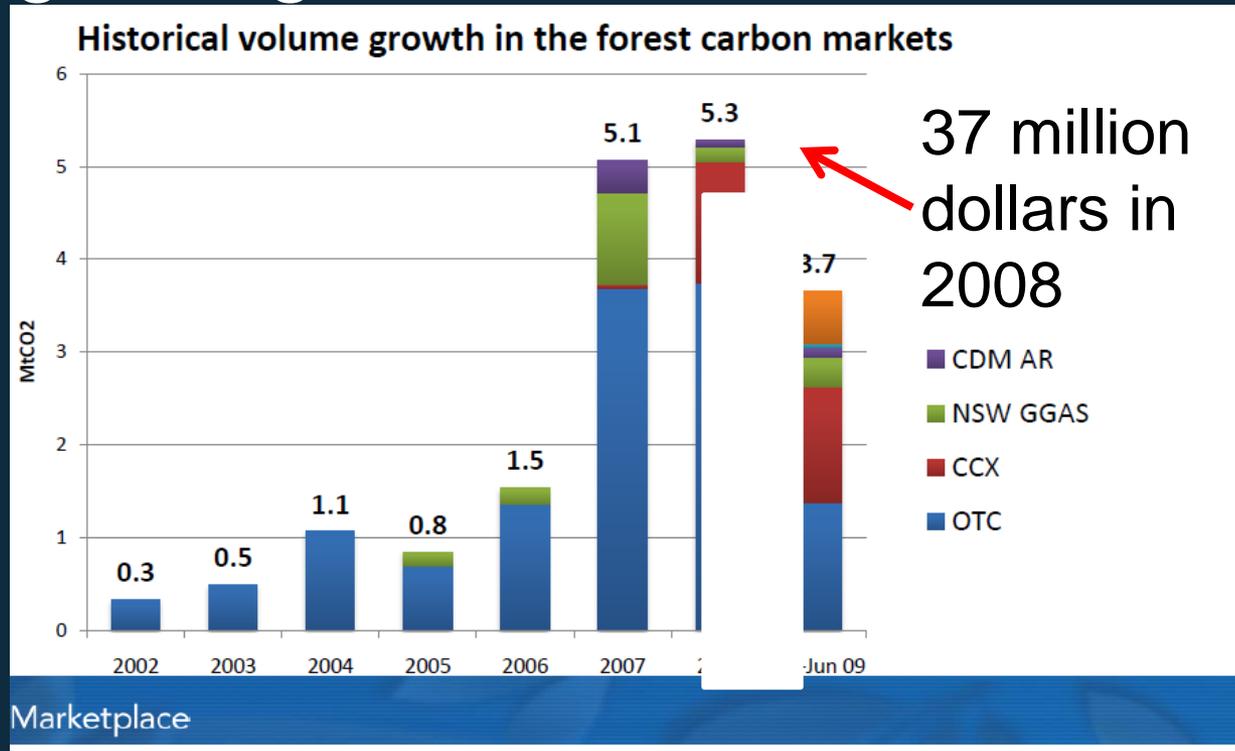
(And why is everyone so interested in it?)



# a) REDD+ is potentially a huge source of income to developing countries

- An estimated **25% reduction in deforestation** could be achieved with a financial commitment of 15-20 billion Euros (**US\$22-29 billion**) by **2015**
    - This translates into 1.5 cent of a dollar per day for each person in industrialized countries!
  - It is estimated that **reducing deforestation rates by 50% by 2030** could generate annual carbon finance of between \$15-30 billion dollars annually
- REDD+ finance will dwarf current annual investments on nature reserves (\$6 billion; James et al. 1999) and spending by conservation organizations (1.5 billion; Halpern et al. 2006)

# Markets for forest carbon credits are already growing...



- REDD+ credits already being sold on voluntary markets
- The regulatory market (\$60-70 billion) is currently closed to REDD, but if a post-Kyoto regime includes REDD, this will quickly change

**REDD+**



**Provide habitats and resources**

**Serve as sources of products, ecosystem services, employment and income**

**Store carbon and reduce GHG emissions**



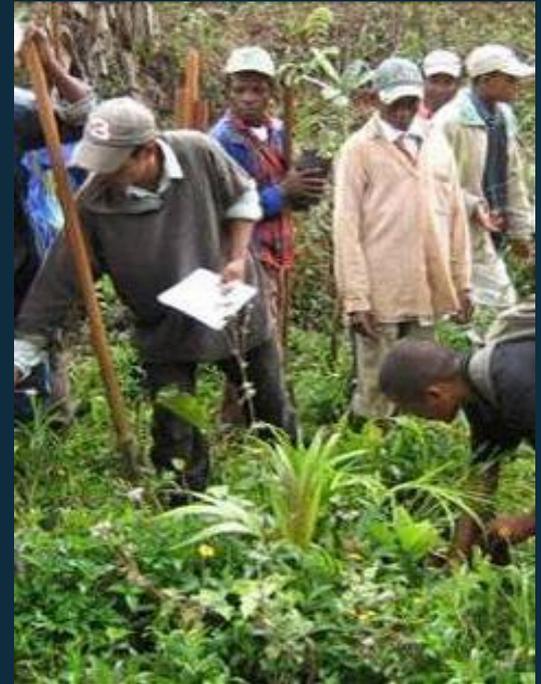
reduced impact

reduced impact

**Climate change mitigation**

# What potential social benefits could REDD+ bring?

- Enhanced income to rural communities
- Employment in tree nurseries, tree planting and forest protection/ management
- Improved land tenure and land security for forest-dwelling people
- Enhanced governance of forests and community organizations
- Agricultural intensification
- Alternative livelihood opportunities
- Protection of forests and watersheds → provision of ecosystem services (water provision, protection from flooding, etc.)



## What are the potential risks of REDD+?



- Loss of sovereignty and land use rights
  - Displacement of people from forest areas or traditional territories
  - Restrictions on forest use and access
  - Concern that REDD+ will restrict areas available for food production, affecting food security
  - Concern of benefit sharing- who will actually get the \$\$?
  - High potential for corruption
  - Risks of recentralization of forest management
- Impacts will likely differ across different stakeholder groups**

# REDD+ could have important implications for biodiversity conservation

## Potential benefits:

- Increased funding for forest conservation and sustainable management → greater biodiversity conservation

## Potential risks

- Potential displacement of deforestation to forests of high biodiversity value, but low carbon value
- Increased pressure to other non-forest ecosystems, affecting the biodiversity of these systems



# Standards are available to help ensure REDD+ provide co-benefits



## Standards for PROJECT DESIGN (site-level activities)

Assess the social and environmental impacts of land-based carbon projects, including:

- Poverty alleviation & Sustainable development
  - Biodiversity conservation
  - Watershed protection
  - Climate Adaptation

## **REDD+ Social and Environmental Standards Initiative:**

- Standards for NATIONAL REDD+ STRATEGIES
- A set of principles, criteria & indicators (PCI) and a process for monitoring, reporting and verification (MRV) on social and environmental aspects of REDD+ programs

# Key principles REDD+ Social and Environmental Standards

Principle 1: Rights to land, territories and resources are recognized and respected

Principle 2: The benefits of the REDD+ program are shared equitably among all relevant rights holders and stakeholders

Principle 3: The REDD+ program contributes to long-term livelihood security and enhances well-being of Indigenous Peoples and local communities with special attention to the most vulnerable people

Principle 4: The REDD+ program contributes to broader sustainable development, respect and protection of human rights and good governance objectives.

Principle 5: The REDD+ program maintains and enhances biodiversity and ecosystem services

Principle 6: All relevant rights holders and stakeholders participate fully and effectively in the REDD+ program

Principle 7: All rights holders and stakeholders and have timely access to appropriate and accurate information to enable informed decision-making and good governance of the REDD+ program

Principle 8: The REDD+ program complies with applicable local and national laws and international treaties and other instruments

You can also use spatial analyses to help identify the potential synergies and tradeoffs among climate mitigation, biodiversity and social goals

Examples from UN- REDD program and WCMC:



Important to include spatially-explicit information:

- carbon stocks
- biodiversity, ecosystem services
- deforestation risk
- socioeconomic variables (population size, poverty levels, etc)
- opportunity costs, transaction and implementation costs of REDD+

..and use this to identify synergies and tradeoffs

# How to design REDD+ initiatives to support sustainable livelihoods and maximize positive impacts?



- Prioritize activities in disadvantaged and poor communities
- Integrate reforestation, conservation and sustainable development activities with REDD+
- Provide local employment opportunities, including alternative livelihood activities
- Ensure equitable revenue distribution to local communities
- Ensure continuation of cultural livelihoods and activities
- Respect customary and legal tenure and use rights

(Net impact will depend on how, where and how REDD+ is implemented)

# How to design REDD+ activities for biodiversity conservation?

## Location:

- Prioritize the conservation of forests in areas critical for biodiversity \*
  - areas with endemic or threatened species
  - (e.g., use Key Biodiversity Areas, Important Bird Areas or Alliance for Zero Extinction Sites)
- Prioritize large contiguous forest areas or forests that form biological corridors
- Include altitudinal gradients, to allow animal movement in face of climate change

## Management:

- Prevent fires and illegal logging
- Prevent hunting



### Legend

- not suitable
- suitable

distribution/range

Source: BirdLife International

key biodiversity area

Source: CI Philippines/Haribon /DENR-PAWB



Philippine Eagle  
– Critically Endangered

# 4. What is the current status of international negotiations on REDD+?

What happened at the United Nations Framework Convention on Climate Change (UNFCCC) meeting at Copenhagen?

What aspects of REDD+ are still under discussion?



# What did people expect from Copenhagen?

A new, legally-binding climate agreement that would

- Ambitious targets for reducing global GHG emissions and limiting temperature increases below dangerous levels
- Commitments from both developed and developing countries to make significant reductions in GHG emissions
- Agreements on financing for both climate mitigation and adaptation
- (Agreement on a global REDD+ mechanism)



But after 2 exhausting weeks of discussions



The Conference of the Parties (COP) was unable to agreed on a comprehensive legally or politically binding agreement

# Instead, the conference resulted in the 'Copenhagen Accord'



**Not an official UNFCCC document (so it is not legally binding), but is recognized by COP**

**Basic 3-page text document that includes:**

- **Agreement to keep temperature increases below 2° C**
- **Voluntary pledges by developed + developing countries to reduce emissions**
- **Broad paragraph on adaptation highlighting need to support adaptation action in developing countries**
- **Financial commitments**
- **REDD+ paragraph**

# What is the current status of negotiations on REDD+?

- Parties agreed on:
  - The scope of REDD+
  - Safeguards for REDD+
    - Respect of Indigenous People's rights (including FPIC) and respect for national legislation and sovereignty
    - Must be consistent conservation of natural forests and biological diversity and not lead to the conversion of natural forests
    - Safeguards to prevent leakage and non-permanence

For latest version of draft REDD+ negotiation text, see:

<http://unfccc.int/resource/docs/2009/awglca8/eng/l07a06.pdf>

- Parties also agreed that REDD+ will be implemented in a phased approach

National commitment to REDD+

REDD+ strategy development

Consultations

Capacity building

Begin implementation of REDD+ strategy developed in phase I

- Policies, strategies, mechanisms

- Apply safeguards

- Monitor impacts and results

Full-scale implementation

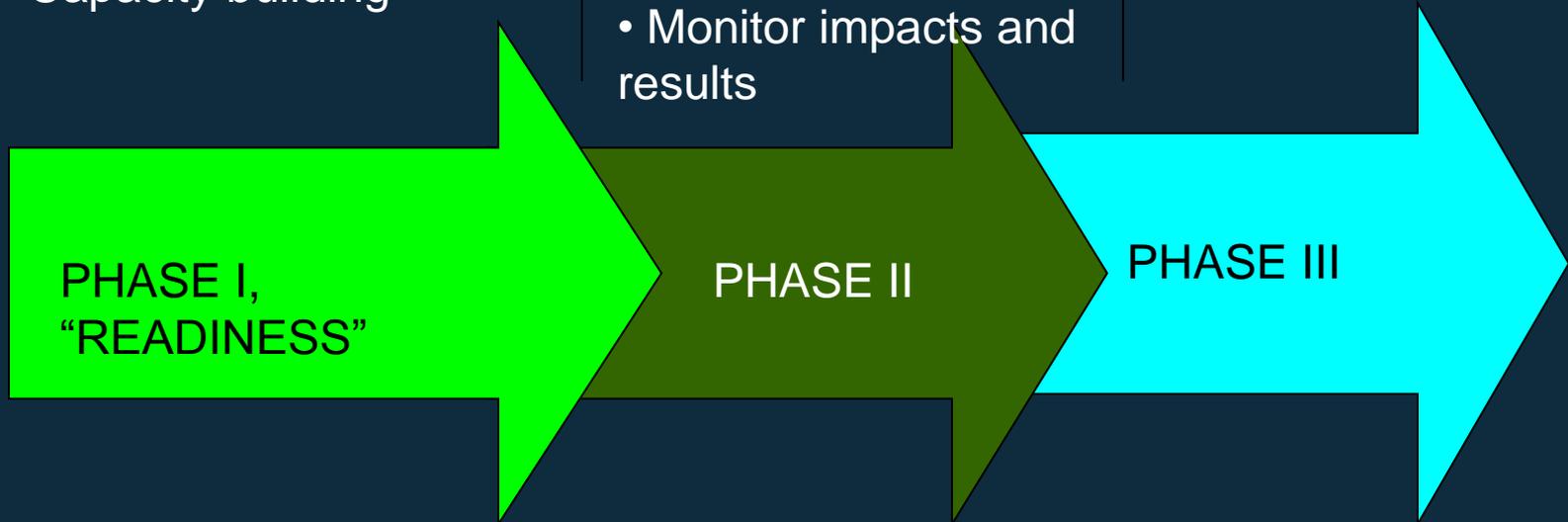
Implement the MRV plan

Performance-based incentives

PHASE I,  
“READINESS”

PHASE II

PHASE III



# Significant financial support is emerging to help move REDD+ forward

- REDD+ partnership = ~ \$4.5 billion pledged to address for REDD+ from 2010-2012
- Forest Carbon Partnership Fund: \$385 million
- UN REDD: \$104 million
- Norway's bilateral commitments to REDD: \$1B for Brazil, \$1B for Indonesia, \$250 million for Guyana



**UN-REDD**  
PROGRAMME

**FOREST  
CARBON  
PARTNERSHIP  
FACILITY**

# What aspects of REDD+ still need to be negotiated?

b) Baseline methodologies?

c) Payment mechanism?  
Distribution of revenues?

d) Monitoring, Reporting and Verification?

a) National, sub national or nested system?

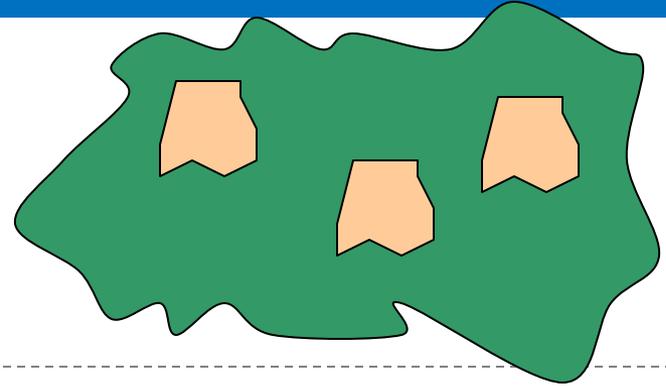
e) Safeguards for biodiversity conservation and indigenous and traditional communities



# a) At what scale should REDD+ be implemented?

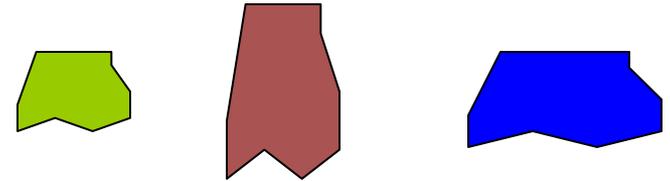
## National level?

- National level baselines, carbon accounting, monitoring + verification
- Credits owned and managed by national governments



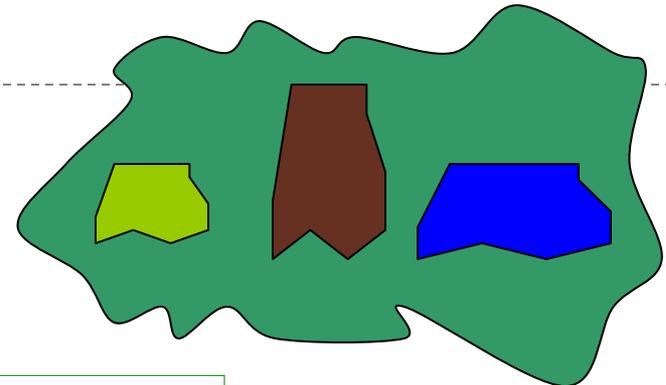
## Sub-national level?

- Sub-national baselines, carbon accounting, monitoring + verification
- Credits managed by project proponents



## Hybrid or nested approach?

- Sub-national activities are accounted for at the national level



The national-level approach currently has the greatest political support

# At what scale should REDD+ be implemented (cont'd)?

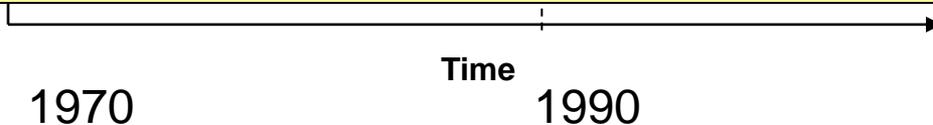
- National level
  - **Pros:**
    - Easier to prevent in-country leakage
    - Allows economies of scale in reducing emissions and could result in greater overall reductions
  - **Cons:**
    - Requires structures for national GHG accounting;
    - Greater complexity
    - May discourage private investors in REDD+
  
- Sub national
  - **Pros:** easier to implement (smaller scale, fewer partners), more attractive to private investors
  - **Cons:** leakage is likely within country; may not achieve emissions reductions at scale

# b) How to set the baseline or reference level?

Past | Future

Some key questions:

- Should baselines/ reference levels be based on historical rates or modeled projections?
- What historical time period is chosen?
- Are baselines recalculated over time?
- These issues are important, as they determine which countries will most benefit from REDD+



# c) How should countries get compensated for REDD+?

## Market mechanisms

(regulatory and voluntary)

### Pros:

- Larger potential scale of finance
- Will ensure REDD+ credits are competitive (relative to other mitigation options)

### Cons:

- Require burdensome monitoring and measurement
- Could cause land rights disputes because value of forests increases significantly
- Raises questions of sovereignty

AND /OR

## Non-market mechanisms

(e.g., international fund or development assistance)

### ■ Pros:

- less burdensome design and monitoring frameworks
- less infringement on national sovereignty

### ■ Cons:

- fewer financial resources available, so less likely to lead to significant emissions reductions

## d) How will REDD+ income be managed and distributed among stakeholders?

- **Who will manage financial revenues from REDD+ ?**
  - National scheme: national-level governments
  - Sub-national level: municipalities? NGO's? Community groups? Project proponents?
  
- **How will money be distributed among stakeholders?**
  - Private landowners?
  - Indigenous peoples?
  - Governments- national and local levels?
  - Others?
  
- **How to ensure equitability? Transparency?**
  
- **How to ensure money goes to the landowners implementing measures to reduce deforestation?**

# e) What safeguards will be put in place to avoid negative impacts on biodiversity and indigenous and local communities?

## ■ Potential safeguards:

### □ Biodiversity:

- **No conversion of natural forests to non-forested land uses**
- Ensure REDD+ activities comply with national biodiversity laws and relevant international conventions and agreements
- Other options being promoted by some NGOs:
  - no conversion of forests to plantations (including oil palm)



### □ Indigenous and local communities:

- **Respect for indigenous and local community rights**
- **Recognition of UNDRIP, especially principles of FPIC (free, prior and informed consent)**
- **No displacement of indigenous and local communities**

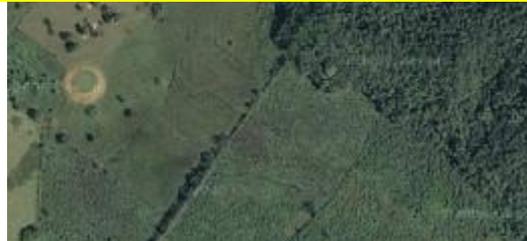


## ■ Not clear if there will be monitoring, reporting and verification of safeguards

## f) How will the emissions reductions from REDD+ be monitored, reported and verified?

- What methodologies will be used to monitor deforestation and degradation, and carbon stock enhancement?
- What carbon pools will be monitored? How frequently?
- What data sets will be used?
- How will information be verified? (to ensure emissions reductions have been achieved)
- How often will monitoring take place? Who will do it?

And will countries also be required to monitor and report on the social and environmental impacts of REDD+?

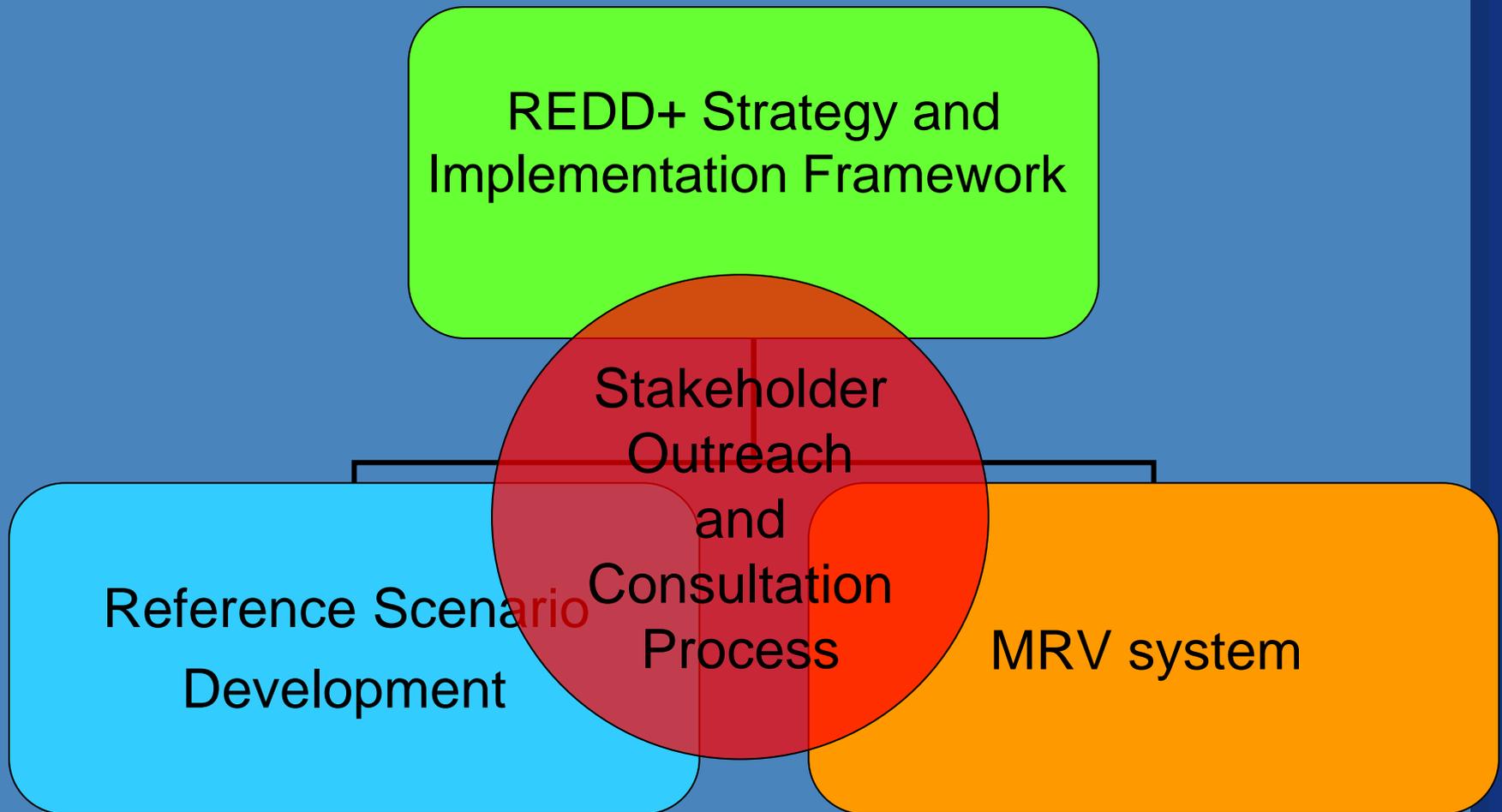


# What do we expect from the next COP in Cancun, Mexico?

- Hoping for a legally binding agreement, but most think this is now unlikely to happen in Cancun
- But may be able to finalize some parts of the agreement (including REDD+)
- Negotiations will likely continue into 2011...despite the need for urgent action



In the meantime, countries are getting 'ready' for implementing REDD+ at the national level...



# At the same time, many countries are also starting pilot 'demonstration' REDD+ initiatives



Pilot initiatives will help shape the future of REDD+ by testing methodologies, setting standards and demonstrating emissions reductions potential

Implementing sustainable management of forests

Preventing fires



Reforestation or restoring degraded areas



Conserving forests

# Take-home messages

- 1) Deforestation and degradation of tropical forests accounts for approx. 12-18% of the global GHG emissions → REDD+ is an essential part of the climate solution
- 2) REDD+ has the potential to provide biodiversity and social benefits- but the outcome depends on how REDD+ is designed and implemented
- 3) There is already a lot of movement on REDD+
  - Large amounts of financing available (and likely to grow)
  - Likely to be adopted as a formal mechanism by UNFCCC very soon
  - Many countries already moving forward with REDD+ readiness, and with demonstration activities
- 4) REDD+ will likely shape the future of forests and land use across developing countries for decades to come

An aerial photograph of a vast, dense tropical rainforest. A dark, winding river flows through the center of the forest, reflecting the sky. The forest extends to the horizon under a blue sky with scattered white clouds. The text "THANK YOU!" is overlaid in the center in a large, white, sans-serif font.

THANK YOU!