

# Tropical Forests & Climate: the forgotten 20%+



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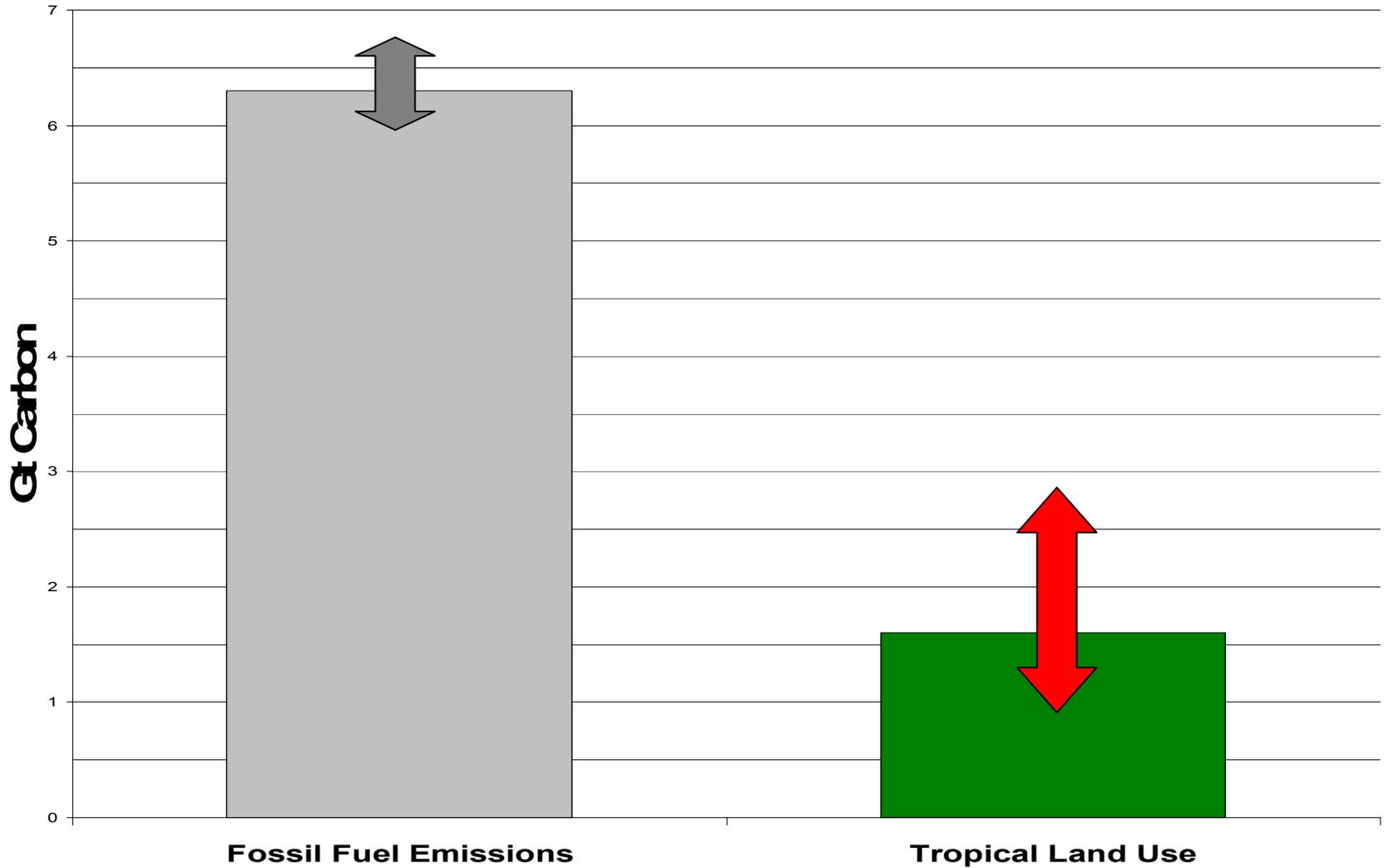
# Goals of talk

- Demonstrate 3 (forgotten?) climate benefits of tropical forest conservation
- Recommend \$5 billion in forest conservation
- Promote policies that achieve multiple benefits

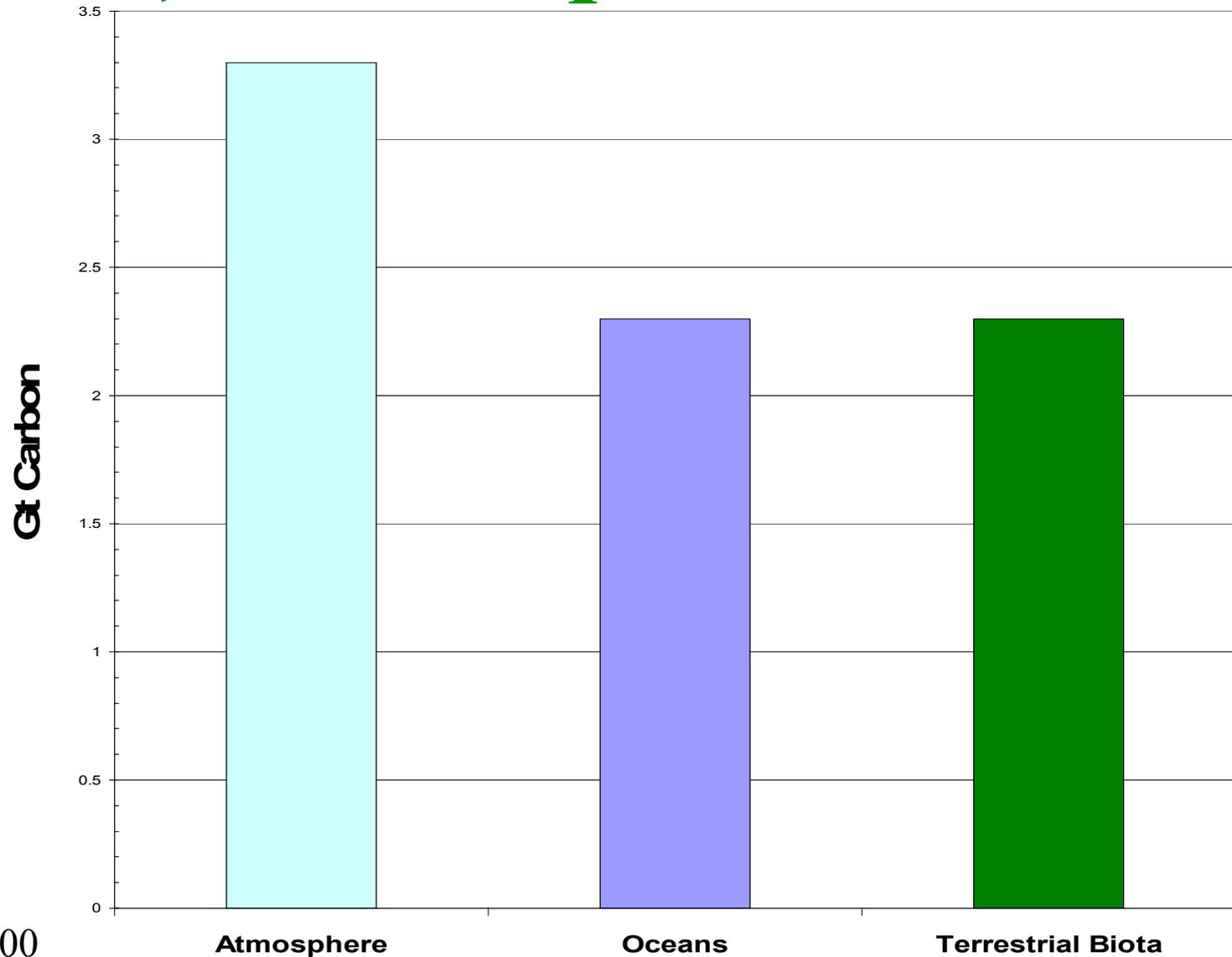
# Deforestation is bad for climate – triple punch

- 15-25 % of global emissions
- Lost sequestration
- Destabilizes the equator

# 1) First insult: emissions



## 2) Lost sequestration



## 2 b) Sinks in tropical forests

- Two types of sequestration:
  - Re-growth is not additional
  - *Mature* uptake (via CO<sub>2</sub>, ash, other ecological changes)
- Sink in *mature* forests variable –space & time
- *Mature* tropical forests and soils may sequester around 0.75 GtC/yr (~ 0.5 tc/ha/yr)

# Sinks in mature tropical forests

- If tropical forest sinks last 25 or 50 or 100 years, BONUS SINK equals:
  - $BS = 25\text{yr} * 0.5\text{tc/ha/yr} = \mathbf{12.5\ tC/ha}$
  - $BS = 50\text{yr} * 0.5\text{tc/ha/yr} = \mathbf{25\ tC/ha}$
  - $BS = 100\text{yr} * 0.5\text{tc/ha/yr} = \mathbf{50\ tC/ha}$
- Protect carbon, get BONUS sequestration without tradeoffs!

# Forests also....

- influence planetary boundary layer
- alter sensible & latent heat fluxes
- maintain a lower albedo
- buffer soil temperatures
- elevate soil moisture
- provide heat storage
- elevate surface humidity
- reduce sunlight at the surface
- slow and elevate winds
- cool riparian waters
- moderate evapotranspiration
- maintain vigorous convection
- maintain vigorous precipitation
- inhibit anaerobic soil conditions
- maintain historical micro-climate
- maintain stable hydrological cycle

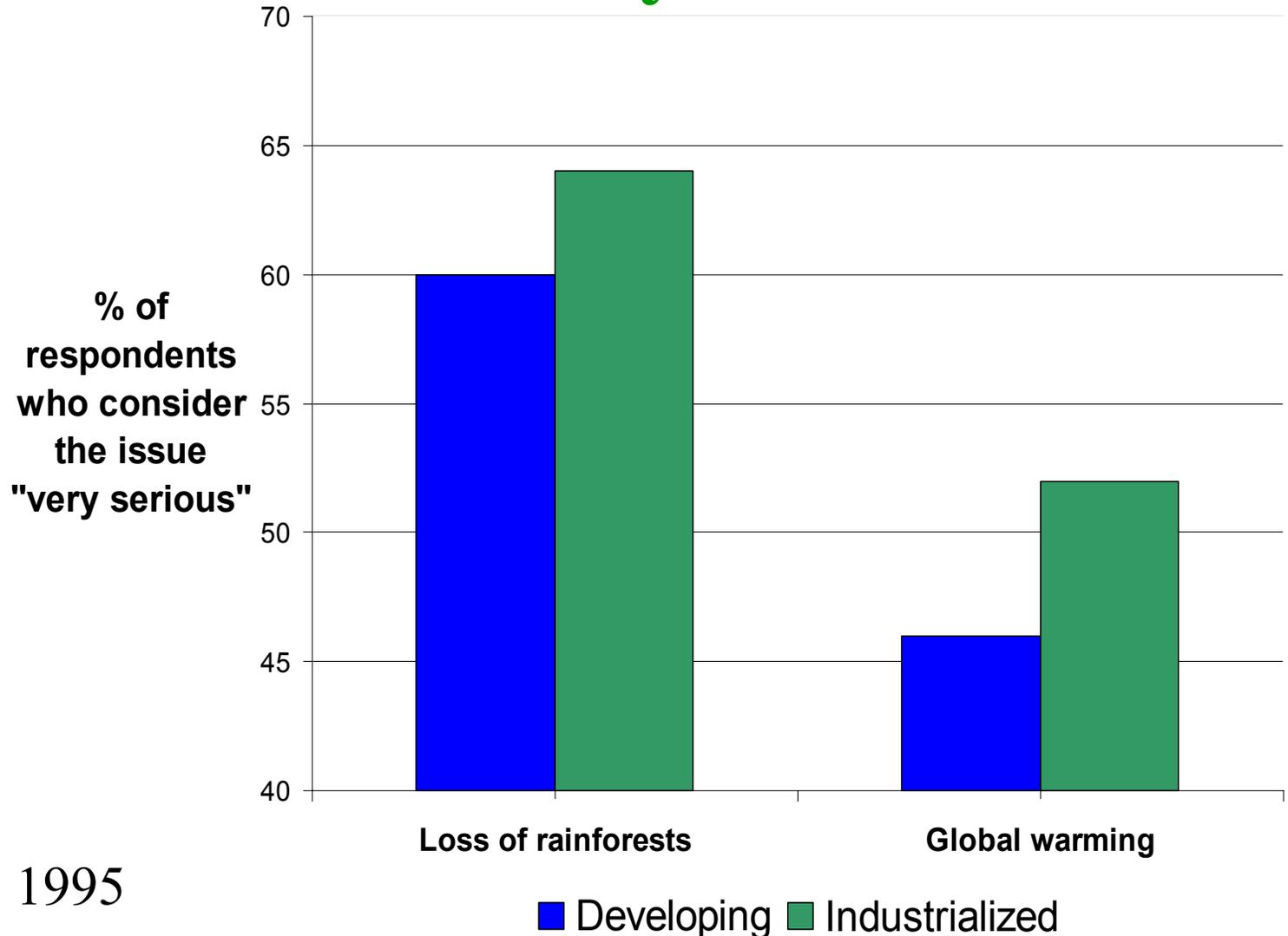
# Deforestation is bad for people

- Exacerbates poverty and illness
  - Respiratory
  - Water quality
- “Direct connection between deforestation and spread of diseases”
- Disrupts communities

# Deforestation is bad for non-humans

- Leading cause of species extinctions
- Religious, ethical, moral concerns
- Lost genetic material
- 25% of commercial pharmaceutical plants derived from tropical plants

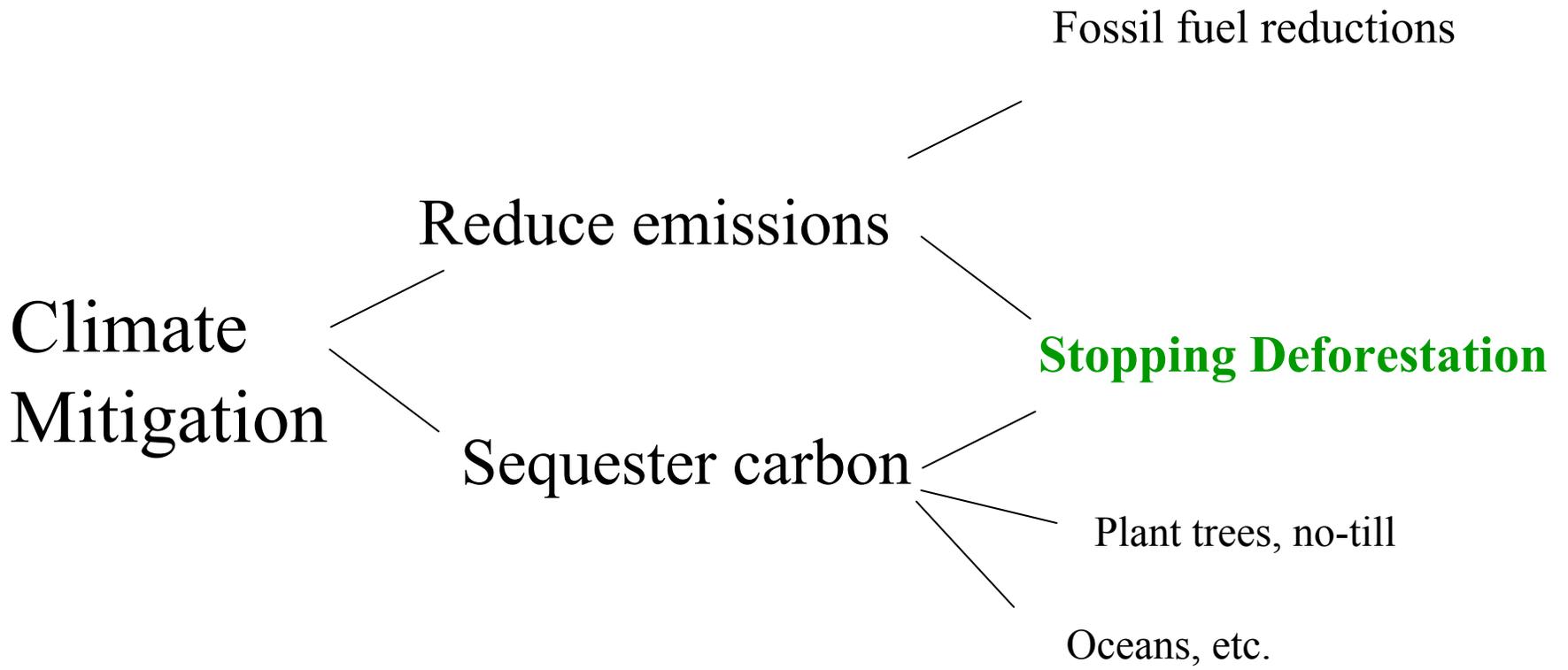
# Global opinion: rain forests or climate “very serious”?



Bloom, 1995

# Deforestation is bad for US security

- Greenhouse gas concerns
- Destabilizing the equator is dangerous
- US crops and disease exports
- Illegal \$ not used for good governance



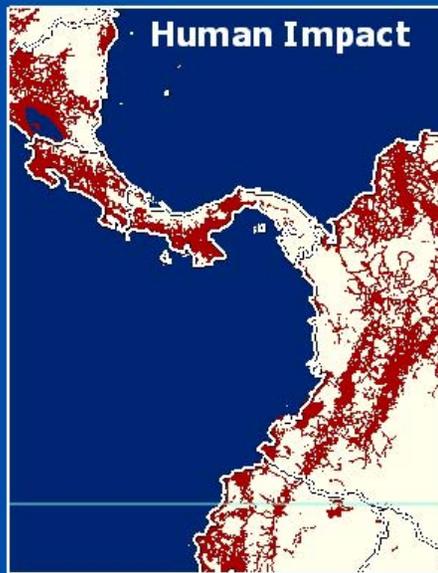
# Climate policy leadership

- Prioritize tropical deforestation
- Find robust areas to conserve or restore
- Promote multiple-benefit policies
  - Keep transaction costs down
  - Begin climbing the steep learning curve
  - Carbon, biodiversity and community impacts

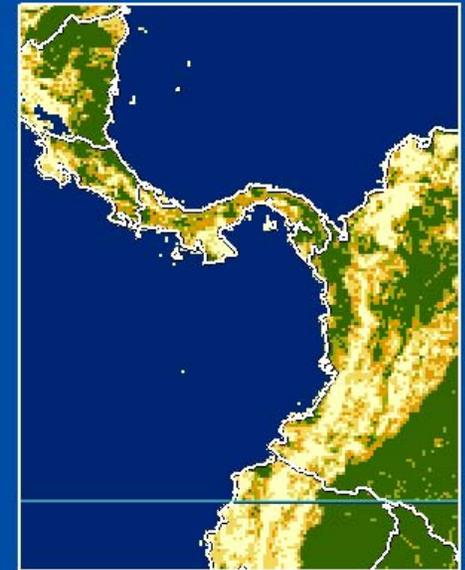
**Biological Importance**



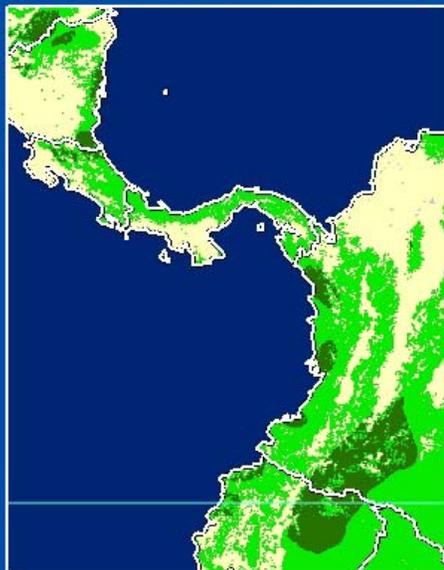
**Human Impact**



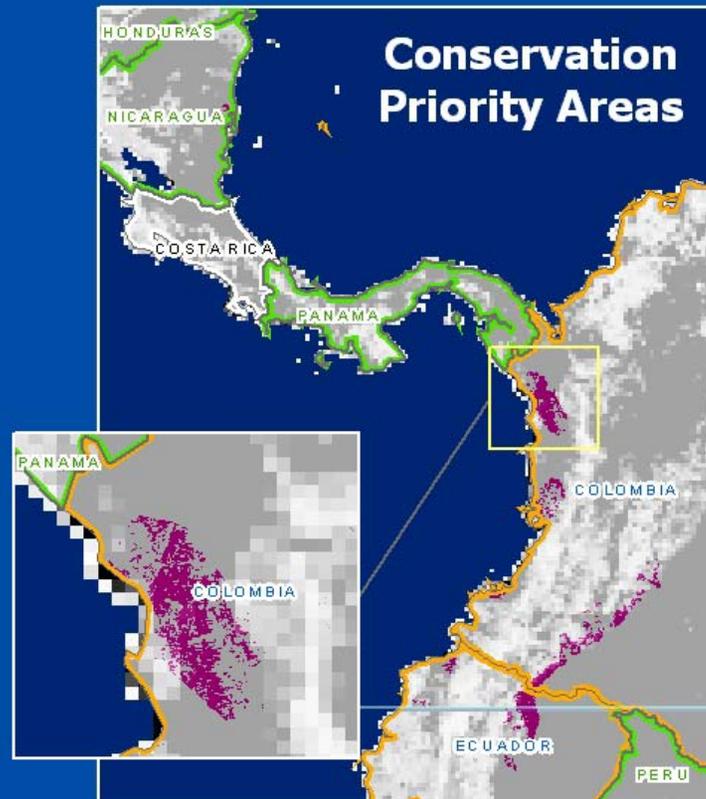
**Carbon Storage**



**Deforestation Threat**

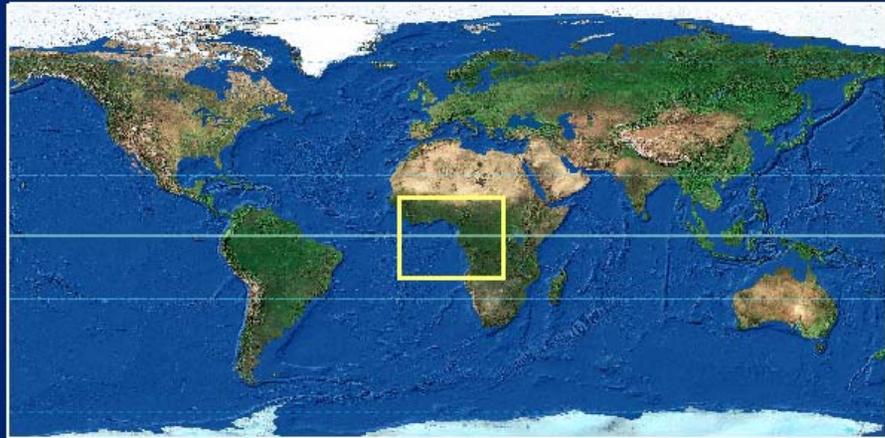
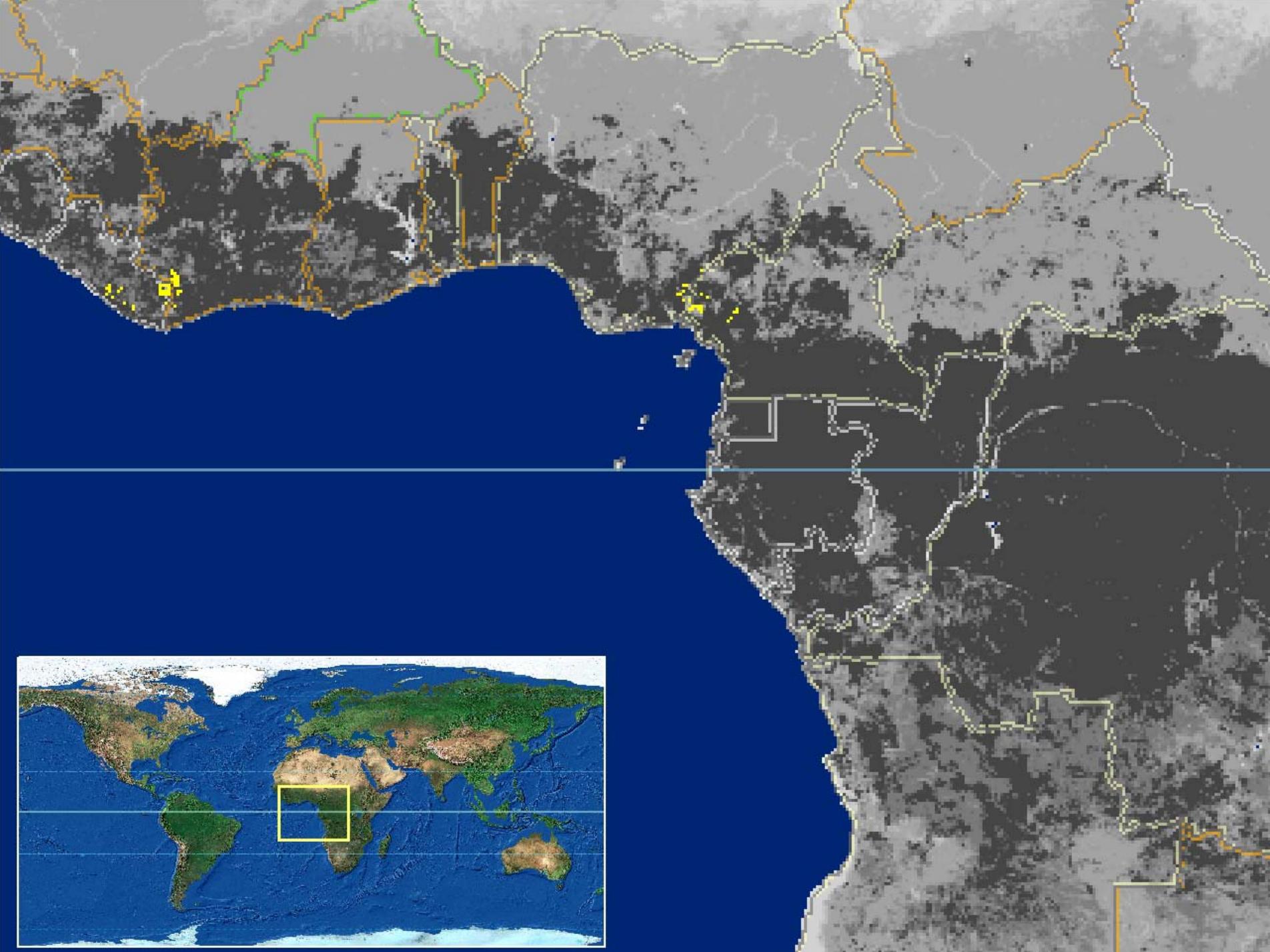


**Conservation Priority Areas**



**Project Success**





# Super critical conservation areas

Cover	Forested		
Impact	Low Impact		
WB_rank	High		
Threat	Threatened Humid		
Biodiversity	Both		
	Data		
Country	Total Area (ha)	Wtd C (mT/ha)	Total C(mT)
Malaysia	2,554,100	222	565,817,000
Brazil	2,287,400	230	526,712,000
Peru	1,010,200	190	191,443,000
Bolivia	413,900	153	63,126,500
Thailand	289,300	217	62,727,800
Vietnam	226,600	218	49,488,600
Nicaragua	23,800	208	4,951,690
Honduras	9,000	126	1,138,350
Grand Total	6,814,300	215	1,465,404,940

# The Climate & Biodiversity Alliance

- Corporate partners
  - *BP and SC Johnson*
- Non-governmental organizations
  - *Conservation International, Environmental Defense, The Nature Conservancy, Institute of Environmental Research for Amazonia*
- Developing three standards
  - *Community, biodiversity and carbon*
  - *Promote triple benefit projects*