

# Tropical Forests and Global Change: Science & Policy Disconnects

John-O Niles

UC Berkeley/Stanford University

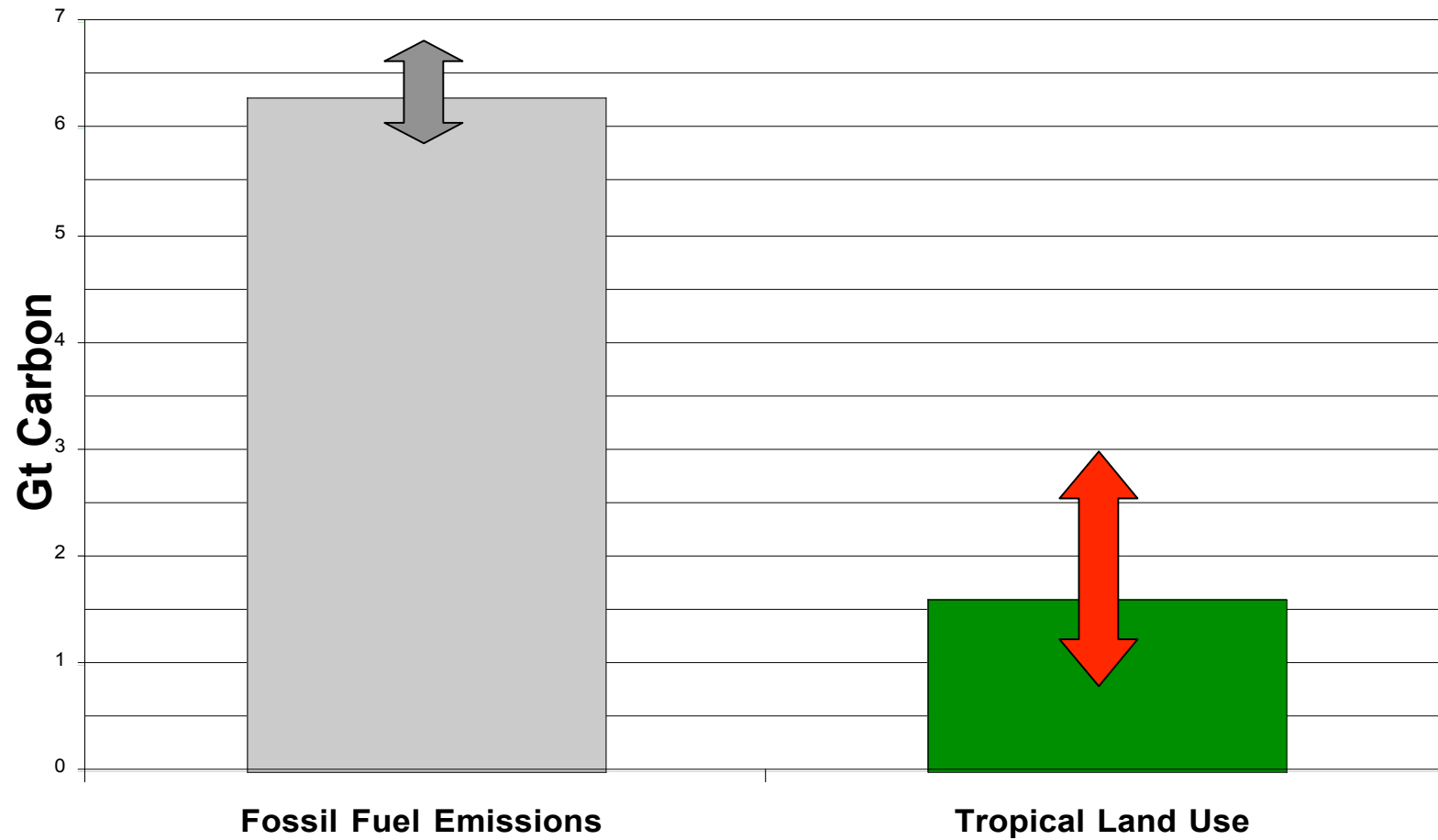
Aspen Global Change Institute

October, 2001

# Tropical Deforestation #1

- Significant source (20%?) CO<sub>2</sub>
- Loss of sink
- Fragmentation → additional forest loss
- Destabilizes equator
- Human impacts:
  - loss of genes pre-adapted to “warmer” climes
  - source for unwanted pathogens, pests

# Carbon Balance: Sources

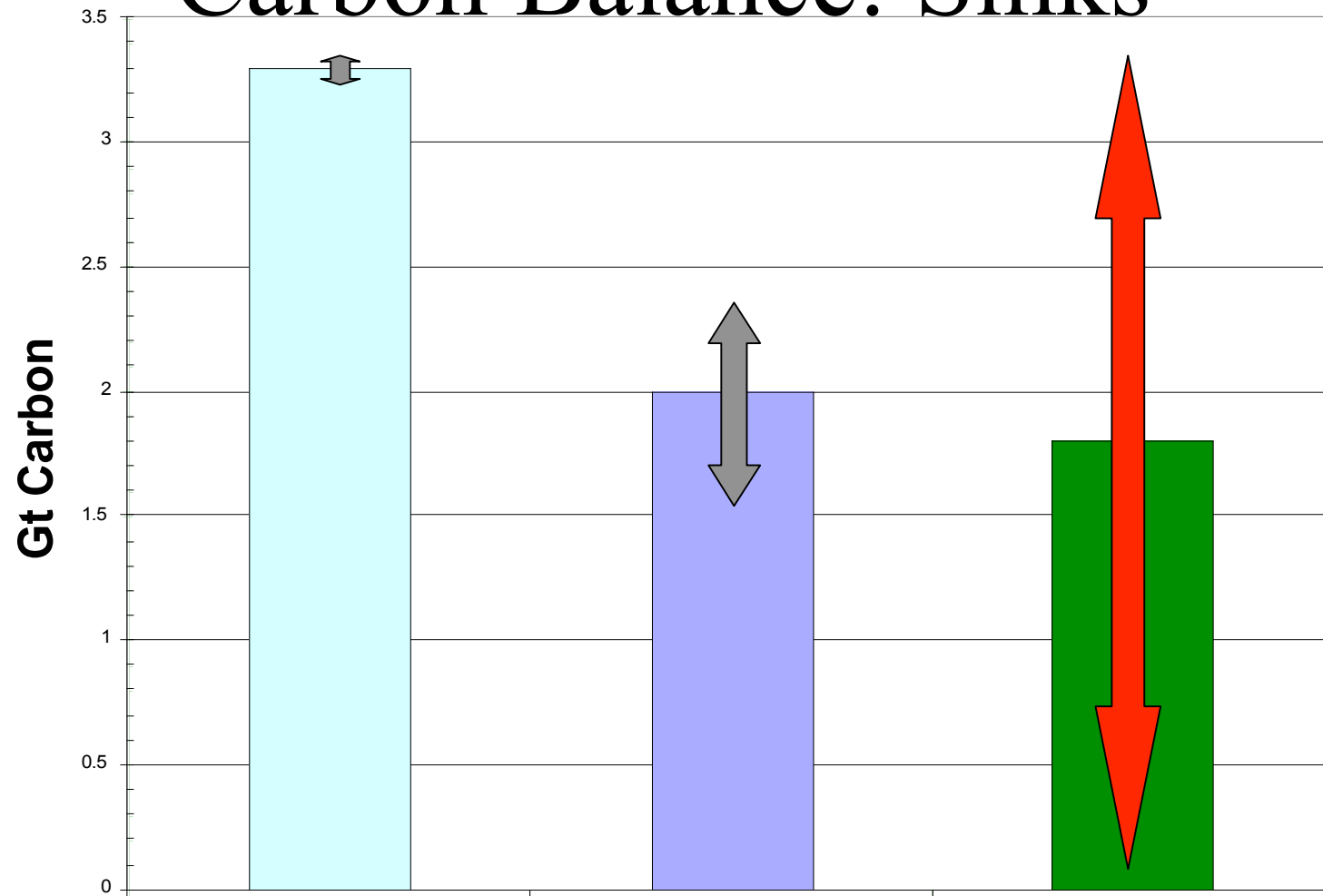


IPCC, 2000, Malhi and Grace, 2000

# Policy Makers

- NGOS's - Influential NGOs do not acknowledge tropical deforestation as a cause (WWF, Greenpeace websites as of October 15, 2001)
- Integral part of US/Umbrella flexibility plan.
- Europe – A(nother?) political distraction. Not integral to managing global change.

# Carbon Balance: Sinks



IPCC, 2000

Atmosphere

Oceans

Terrestrial Biota

# Size of sink – mature tropical forests

Study	Method	Tropical forest sink (original estimate in bold)		Comment
		Gt C worldwide*	t-C/ha*	
IPCC, 2000 <sup>a</sup>	Literature review	1.58	<b>1.00</b>	From studies of mature forests; median of reported values
Phillips et al., 1998 <sup>b</sup>	Tree measurements	<b>0.77</b>	0.49	Mean value. Some regions stronger sinks than others.
Malhi and Grace, 2000 <sup>c</sup>	Integrated analysis	<b>2.00</b>	1.26	Estimated global value for old-growth tropical forests and associated soils.
<i>Average of studies</i>		<i>1.45</i>	<i>0.92</i>	
Multiplied by 2/3 to use a conservative estimate		<b>0.97</b>	<b>0.61</b>	

(Niles, 2000)

# Sink in tropical forests

## EU Science

- Over next 50 years, sink should *grow*
- Should level off out around 50 years
- Parts of the Amazon may face die-offs

## EU Policy

- Climate change is a major threat
- Protecting tropical forests non-permanent
- Smoking, gun analogy?

# Double Dividend

Estimated longevity of the sink (years)	Net carbon uptake per hectare (tons) *	Emissions avoided per hectare (tons) <sup>+</sup>	Carbon sequestration as a percentage of emissions avoided (%)
<b>25</b>	<b>15</b>	<b>118</b>	<b>12.9%</b>
<b>50</b>	<b>31</b>	<b>118</b>	<b>25.9%</b>



# Altered Land Surface Parameters

- Kyoto has focused on GHGs
- Widespread dismantling of equatorial land surface can alter regional climate/weather
- Forest fragmentation “weakens” adjacent forests. This is a robust scientific conclusion for all types of ecosystems, but especially tropical forests. (Laurance et al, 1997)

# A matrix of leakage types

<b>Causes</b>	Project		Policy
<b>Sectors</b>	LULUCF (biomass)		Energy (fossil carbon)
<b>Effects</b>	Positive		Negative
<b>Mechanisms</b>	Socio-Economic (1)		Ecological
	Market-Driven	Activity-Shifting	
<b>Scales</b>	Local		Global
<b>Immediacy</b>	Direct		Indirect (2)

(1) Market-driven leakage is mediated by a change in the price of goods; activity shifting occurs when capital moves to another location. (2) Life-cycle type leakage.

# Ecological leakage (conservation)

- Reduce fragmentation
- Peripheral forest resiliency
- Natural pests, pathogens, ecology
- Country side biogeography - bats
- Reduced export of pathogens
- Maintain key historical climate parameters

# “Science” of Equity Debate

- Was it equitable to exclude rural poor from international transfers?
- Currently, opportunity costs support conversion.
- “*Clean the US, clean up ‘pollution’ - that is equitable*”. What would a farmer in Peru say?
- “*Credits too cheap – that’s not fair!*”

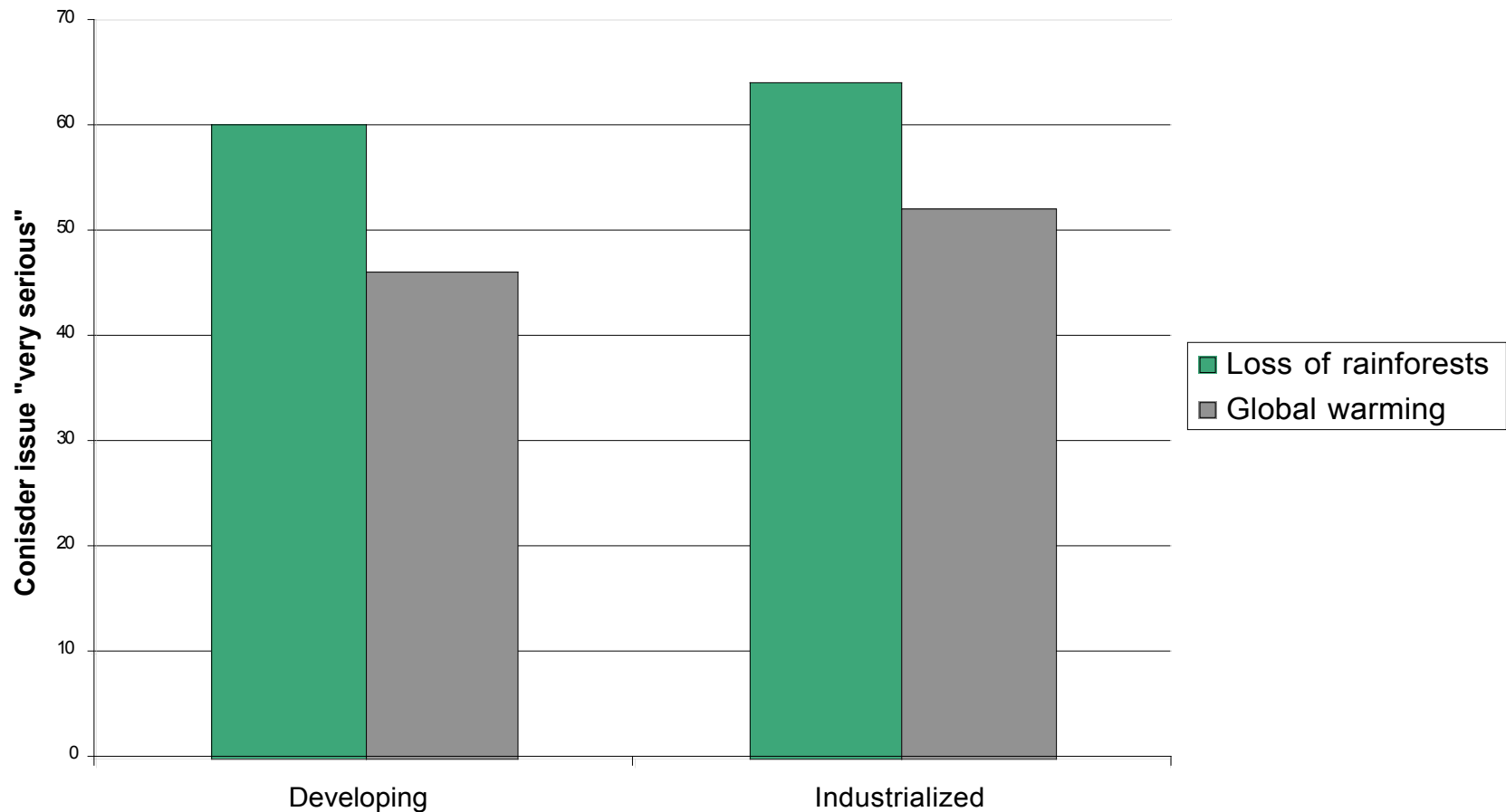
# Summary of Benefits & Costs for Forest Conservation (ICDP)

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Discount rate	3%	10%	20%	Time span of Net Present Values	30 yr	10 yr	30 yr	10 yr	30 yr	Per village benefit of
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# Public Opinion: Forests or the Climate?



Bloom, 1995

# Scale-swamping the market

- All results contingent on rules
- Top-down models create impression of swamping
- Bottom up models suggest it is a concern
- Reality suggests the scale issue is really a political issue
- Arguments against forest conservation logically opposed w/ good rules.

# Long-term mitigation probability

- Substantial forest conservation in tropics unlikely
- Orders of magnitude difference in international resources between fuels and forests
- Developing country capacities substantially challenges long-term protection



# Main Policy Disconnects

- Greenhouse gases *are* climate change
- Tropical deforestation is peripheral to fossil fuels
- Tropical forest conservation produces less climate stability benefits than fossil fuels
- It is not fair to include tropical forest conservation in a GHG treaty
- It is the wrong time to include trop. forests