

ODSMA
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OAS Department
For Sustainable
Development

Caribbean Biodiversity Mainstreaming and
Climate Change Integration
PAYMENTS FOR ECOLOGICAL SERVICES

Richard Huber

Trinidad and Tobago

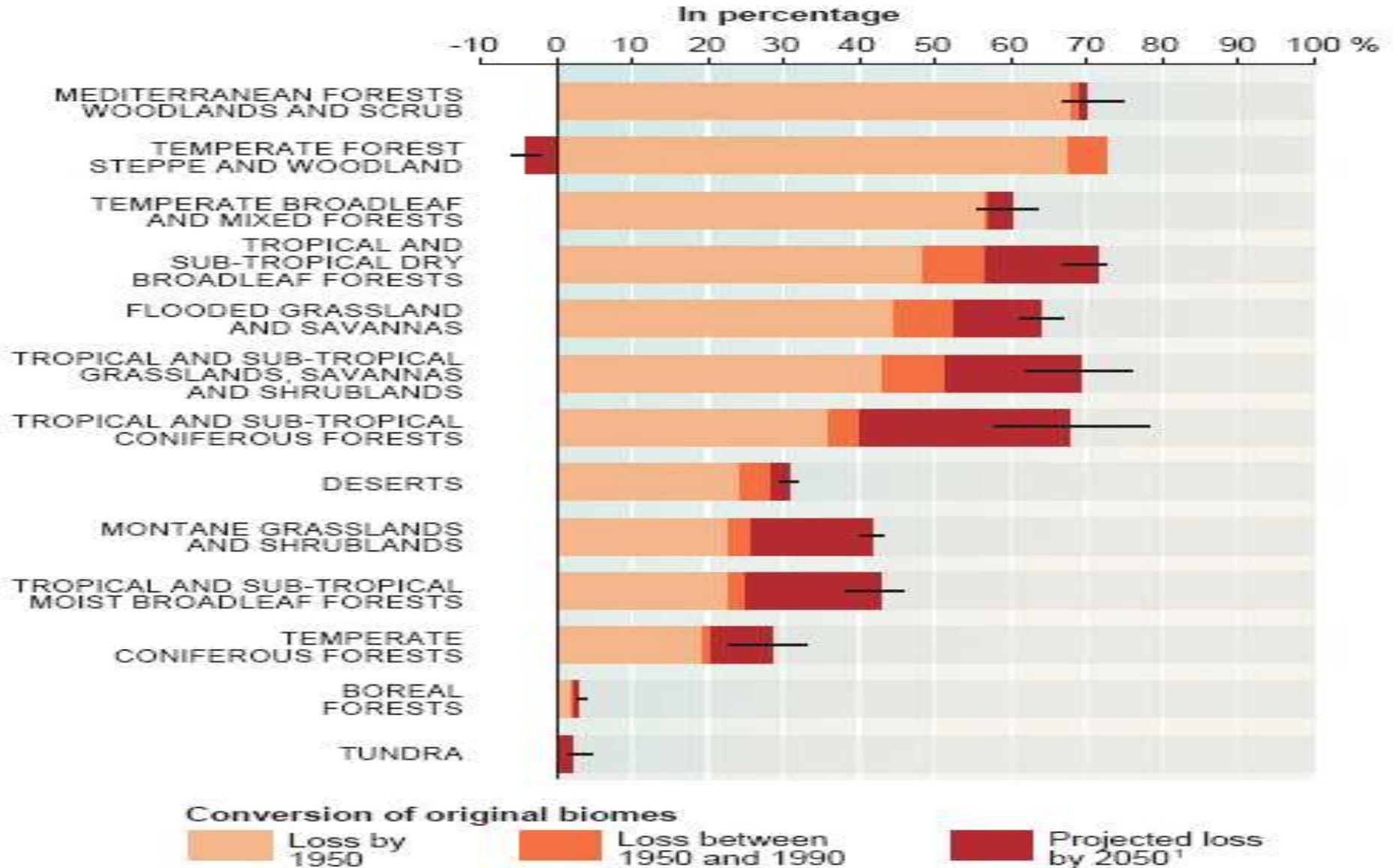
November 2008



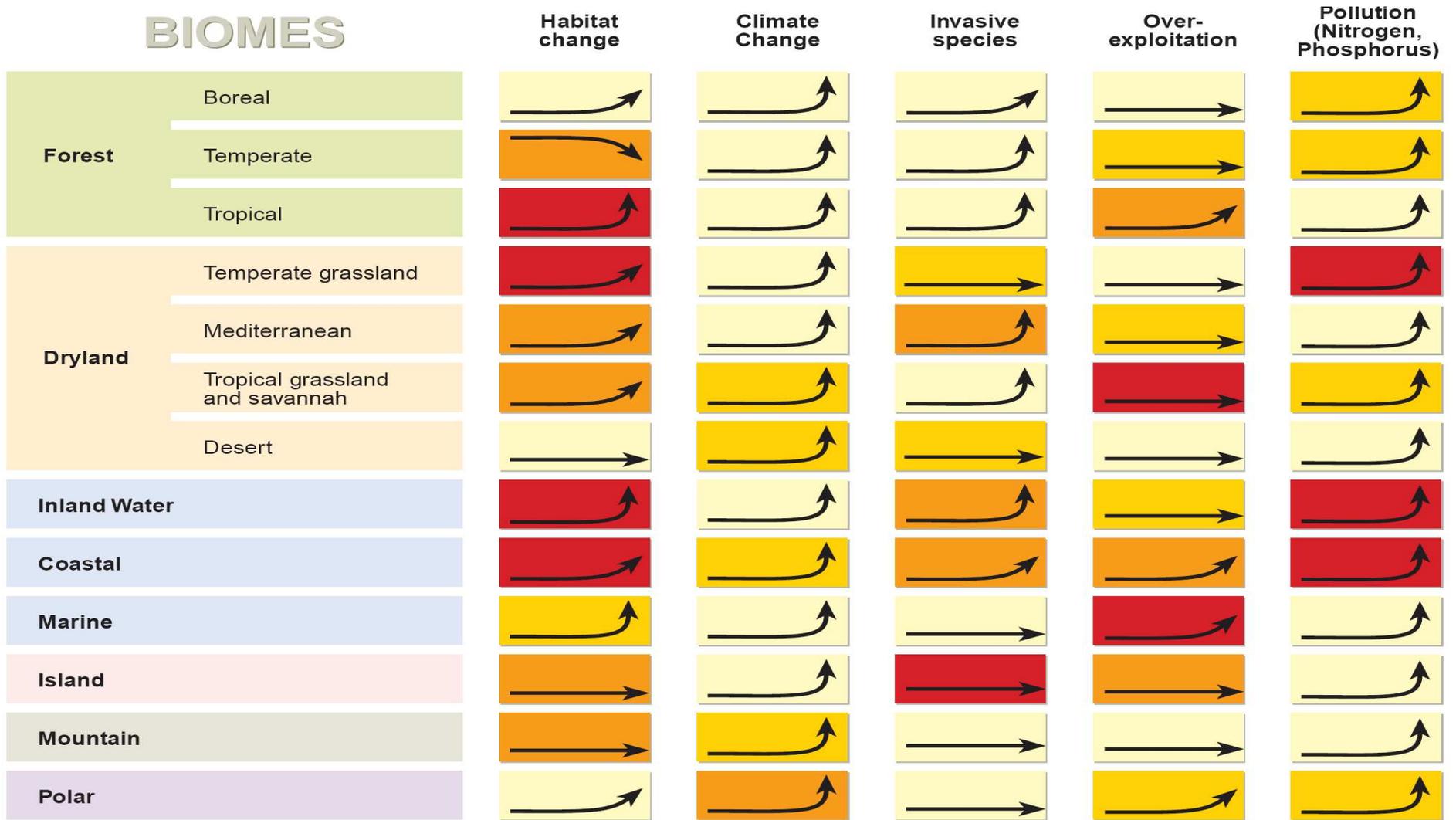
Department
For Sustainable
Development

Best Defense
is a Good Offence.
Protect Diverse
Ecosystems.

Ecosystem Change

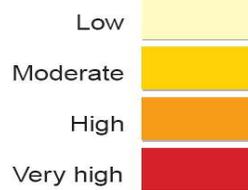


BIOMES



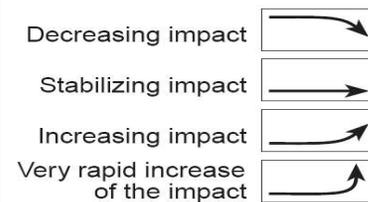
RESULT OF PAST EVOLUTION

Driver's impact on biodiversity over the last century



WHAT HAPPENS TODAY

Driver's actual trends





Conversion of forests to farmlands in Santa Cruz, Bolivia



- 1975: Forested landscape

- 2003: Large corporate agricultural fields transform the landscape





Shrimp farms replacing mangroves in Gulf of Fonseca, Honduras



1987-1999: shrimp farms and ponds have mushroomed, carpeting the landscape around the Gulf of Fonseca, Honduras, in blocks of blue and black shapes

Changes in Ecuador's largest sea port: Gulf of Guayaquil, Ecuador



Ecuador's primary city
and largest sea port

1985-2000: Loss of
mangrove and growth of
aquaculture can be seen



UNEP



Visible changes in Iguazú National Park South America



- 1973: Forest cover is extensive throughout the region

- 2003: Extensive deforestation in Paraguay

Changes in tropical forests of Rondonia Brazil



- 1975 -Healthy natural vegetation
- 1989 -“Fishbone” pattern on the landscape indicate agriculture fields
- 2001 -Agriculture continues to replace forest cover

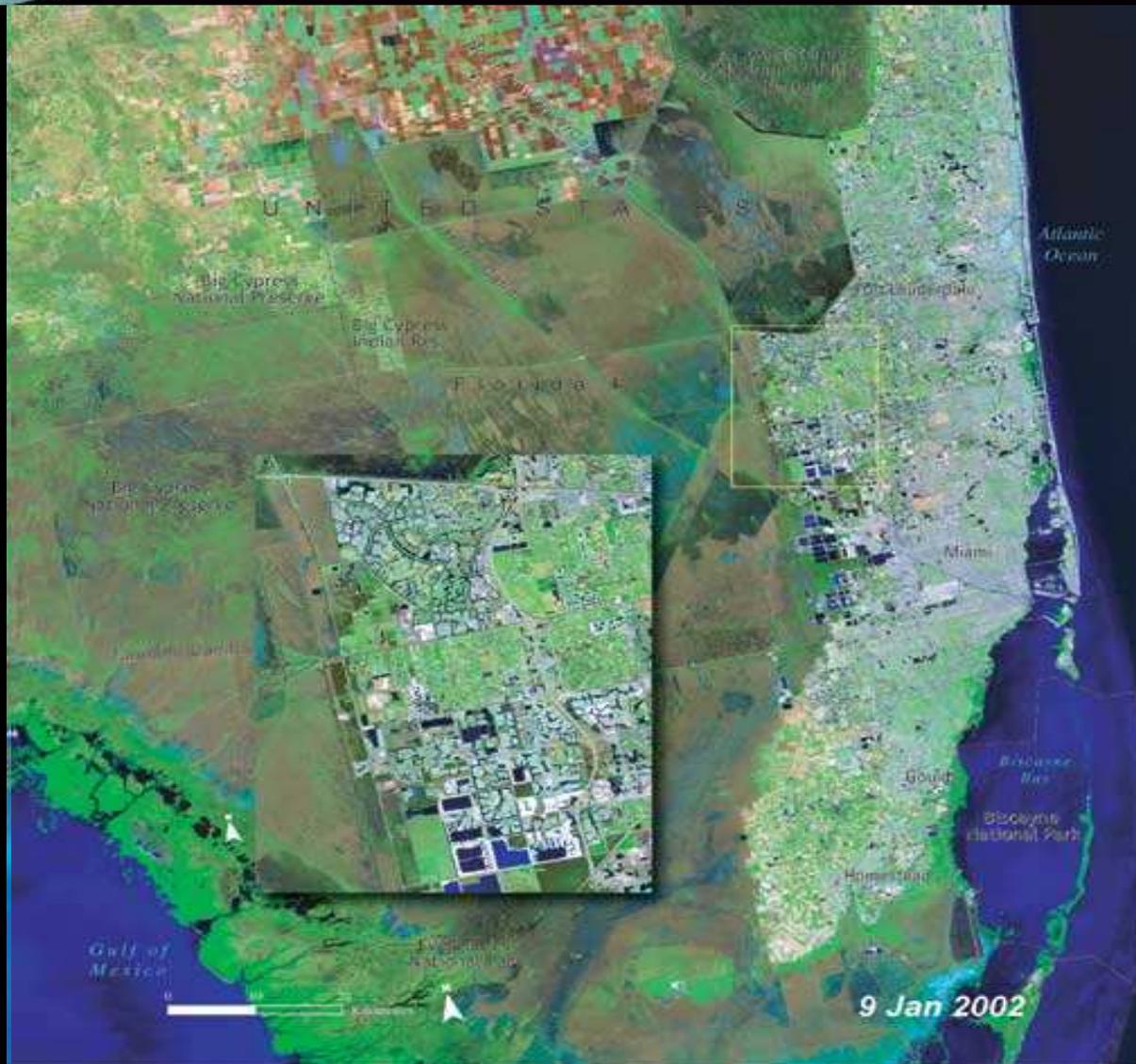
Mexico's largest natural lake – Lake Chapala, Mexico



- 1983: Level of the lake has declines; noticeable decreases in wetlands

- 2001: Alteration in the contours of the shoreline is clearly visible

Urban encroachment on Florida's Everglades, United States



- 1973: Rapid urban expansion has converted farmlands to cityscapes

- 2002: Existence of vast wetlands “Everglades” threatened by urban encroachment

Evolution of Solutions

Good soil, forest, ag mngt

ICZM

Debt for Nature Swaps

Ecotourism

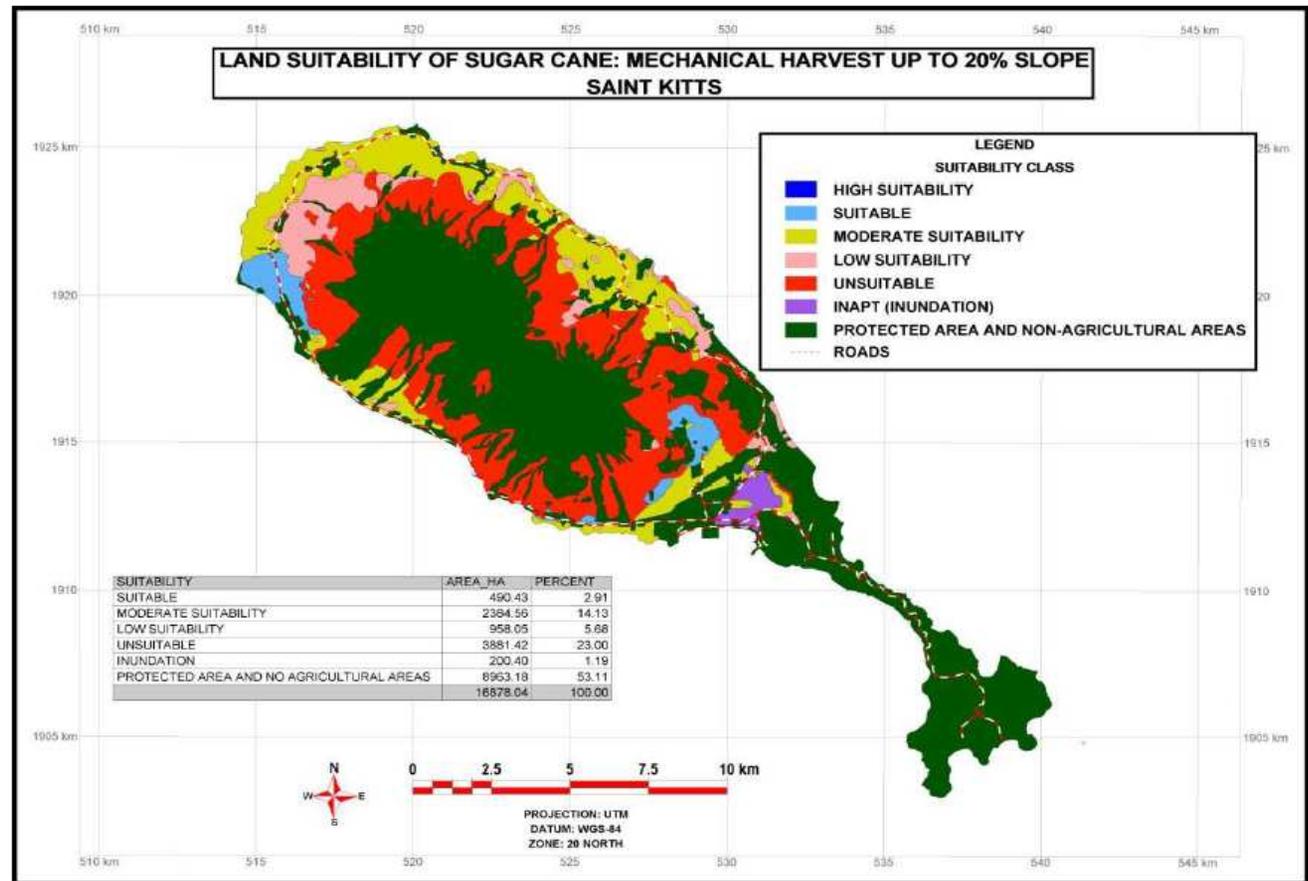
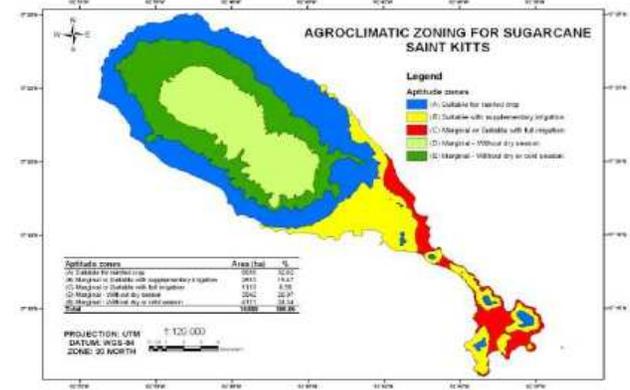
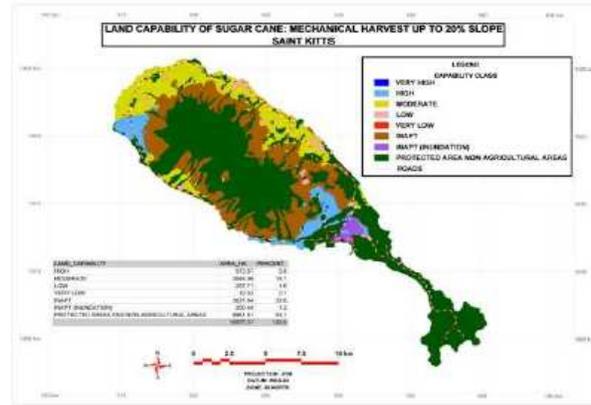
Non traditional forest products

Bioprospecting

Kyoto – REDD

Payment for Ecological Services

Land suitability,
land capability
and agroclimatic
zoning maps for
sugarcane
mechanical
harvest up to
20% slopes for
SKN



Payments for Ecological Services

Carbon markets the absorption of carbon dioxide from the atmosphere.

Water markets (Mexico) provide payments for nature's hydrological services filtering of water through wetlands, creation from cloud forest.

Biodiversity markets (Costa Rica) pay annual fee e.g. \$40/ha/yr for the management and preservation biological processes as well as habitat and species.

Bundled payments (T&T 0.1 percent tax – the Green Fund Levy , Caribbean?) secure all or a combination of carbon, water, and biodiversity services. Bundled payments also include certified timber or certified agricultural produce.

Classification of Policy Instruments Based on Decentralization and Flexibility in Individual Decisionmaking

<----Minimum Flexibility----> <---- Moderate Flexibility ----> <---- Maximum Flexibility ---->

<-- Maximum Government Involvement --> <-- Increased Private Initiative -->

<-Control-Oriented-> <-----Market-Oriented-----> <-Litigation-Oriented->

*Regulations
and Sanctions*

*Charges, Taxes,
and Fees*

*Market
Creation*

*Final Demand
Intervention*

*Liability
Legislation*

General Examples

Standards: Government restricts nature and amount of pollution or resource use for individual polluters or resource users. Compliance is monitored and sanctions imposed (fines, closure, jail terms) for noncompliance.

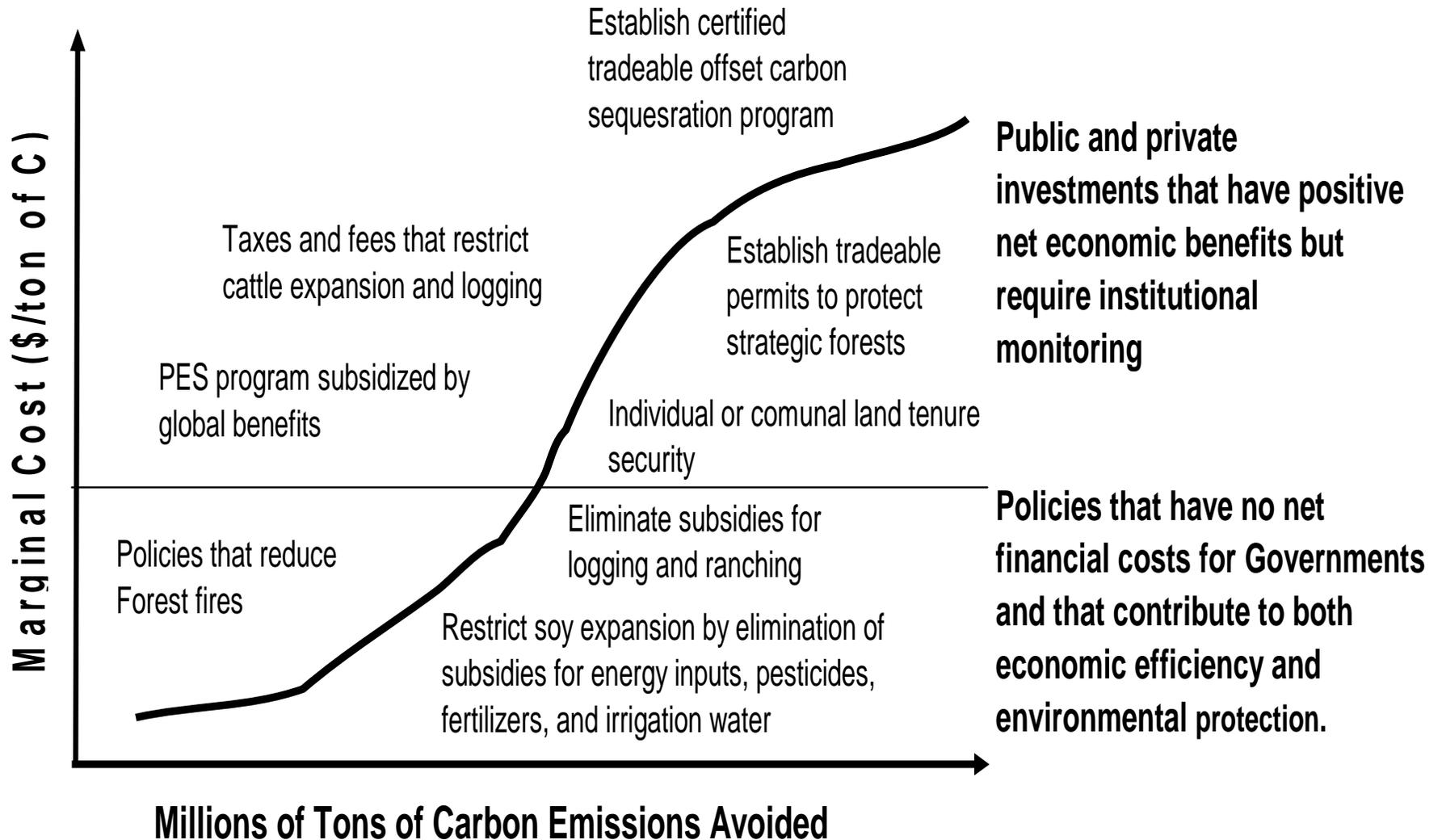
Effluent or User Charges: Government charges fee to individual polluters or resource users based on amount of pollution or resource use and nature of receiving medium. Fee is high enough to create incentive to reduce impacts.

Tradable Permits: Government establishes a system of tradable permits for pollution or resource use, auctions or distributes permits, and monitors compliance. Polluters or resource users trade permits at unregulated market prices.

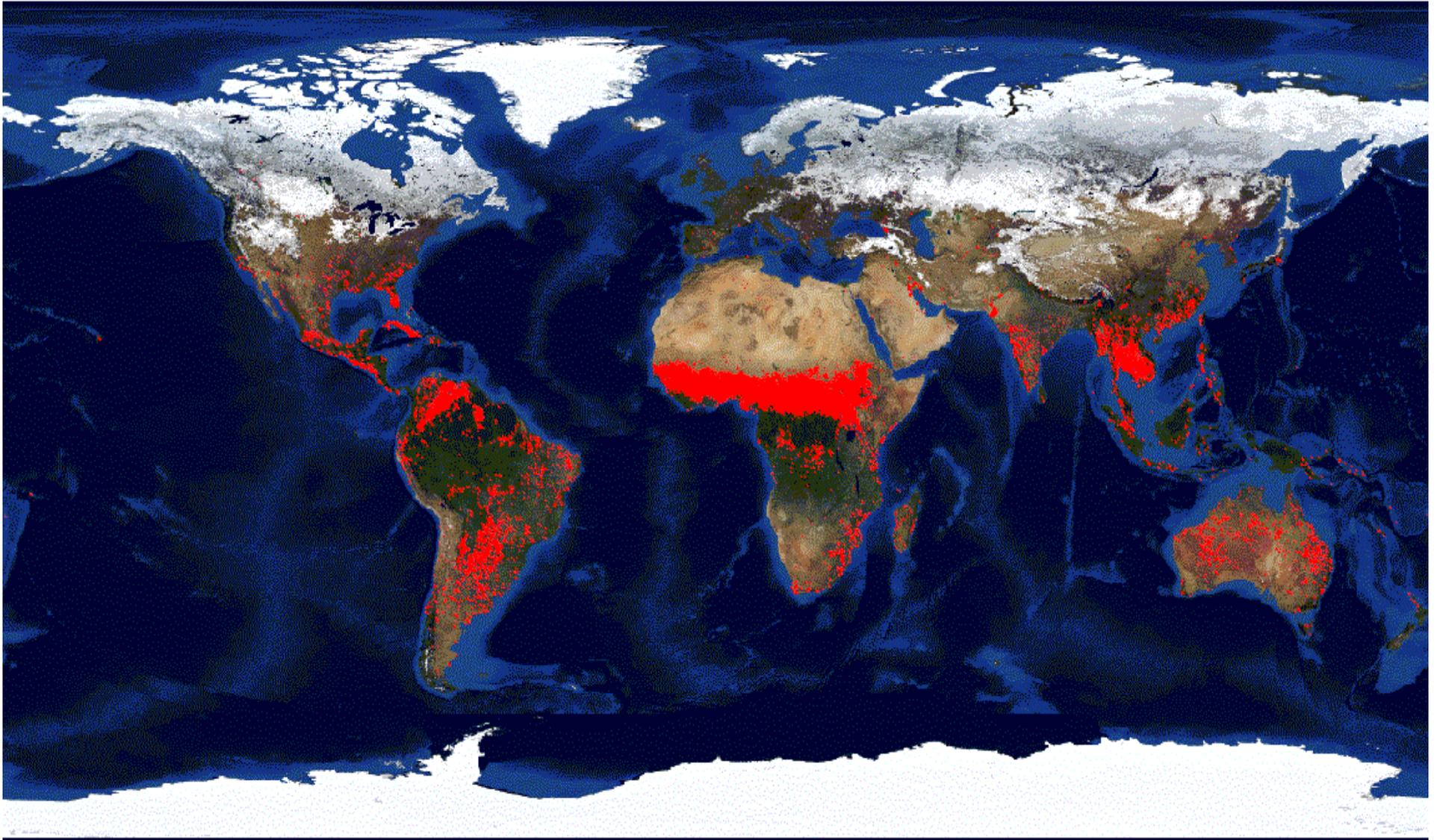
Performance Rating: Government supports a labeling or performance rating program that requires disclosure of environmental information on the final end-use product. Performance based on adoption of ISO 14000 voluntary guidelines (for example, zero discharge of pollutants,

Strict Liability Legislation: The polluter or resource user is required by law to pay any damages to those affected. Damaged parties collect settlements through litigation and the court system

Marginal Cost Policies for Reducing Forest Carbon Emissions



MODIS Rapid Response Fire Detections for 2004



JANUARY FEBRUARY MARCH APRIL MAY JUNE JULY AUGUST SEPTEMBER OCTOBER NOVEMBER DECEMBER

Market-Based Instruments Are Gaining Wider Application

	Barbados	Bolivia	Brazil	Chile	Colombia	Ecuador	Jamaica	Mexico	Peru	Trinidad and Tobago	Venezuela
Credit Subsidies	●		●		●	●		●			
Tax/Tariff Relief	●		●	●	●	●	●				●
Deposit-Refund Schemes	●	●	●	●	●	●	●	●	●	●	●
Waste Fee and Levies	●	●	●	●	●	●	●	●		●	●
Forestry Taxation		●	●		●						●
Pollution Charges			●		●		○	●			
Earmarked Renewable Resource Taxes			●		●	●					
Earmarked Conventional Tax Levy			●		●			●			
Tradable Permits		○		●				○			
Eco-Labeling		●	●	●		●		●			
Liability Instruments		●			●					●	

Can a Pigouvian optimum be achieved?

Colombia's Proposed Environmental Tax: Practical Difficulties of Implementation

Title VII of Colombia's new Environment Law 99/93 states that the environment ministry (MinAmbiente) or the regional autonomous corporations (CARs) will establish a system of tariffs to be levied on the effluents and emissions of polluting industries. The tariffs were to be based on the following factors and requirements:

- For each of the factors that are included in the establishment of a tariff amount, MinAmbiente or the CARs will define quantifiable variables that will permit the measurement of environmental damage.
- Each factor and its variables should have a coefficient that permits the weighting of damage together with the factors and variables considered.
- The coefficients should be calculated based on resource availability and scarcity, diversity of the regions, pollution assimilation capacity, the contaminating or polluting agents, the socioeconomic variables of the population affected, and the opportunity cost of the resources.
- The factors, variables, and coefficients thus determined and measured would be integrated into mathematical formulas that permit the calculation and determination of the corresponding tariffs.

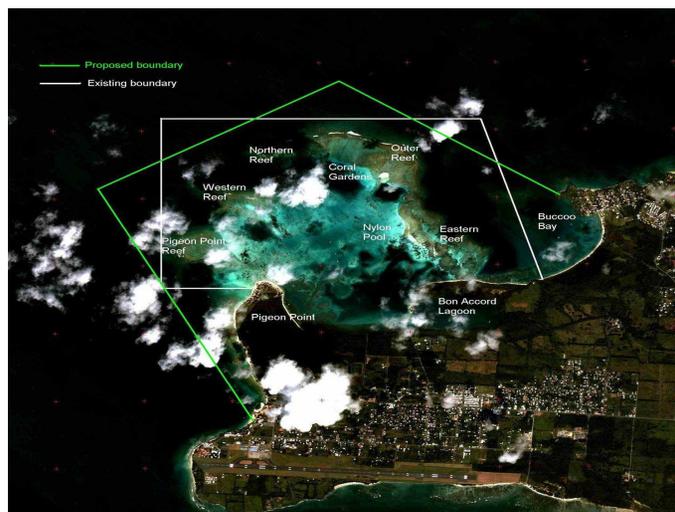
MinAmbiente set out to assess the costs of pollution treatment as a way of establishing the tariffs to be levied within this context. However, ultimately this environmental tax system was discarded because 90 percent of the CARs declared that the technical requirements were too rigorous for them to implement.

Ecosystems under threat from Climate Change

Coral Reef bleaching/ Marine Parks with no take zones



Deforestation/Smartwood



Integrated coastal zone management/ Ecotourism



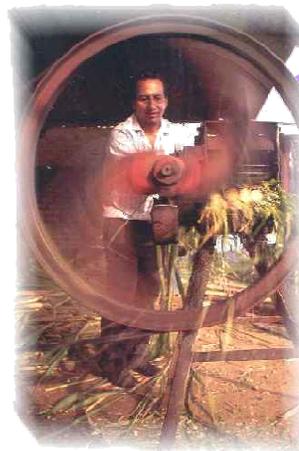
Monoculture/ Shade coffee alternative



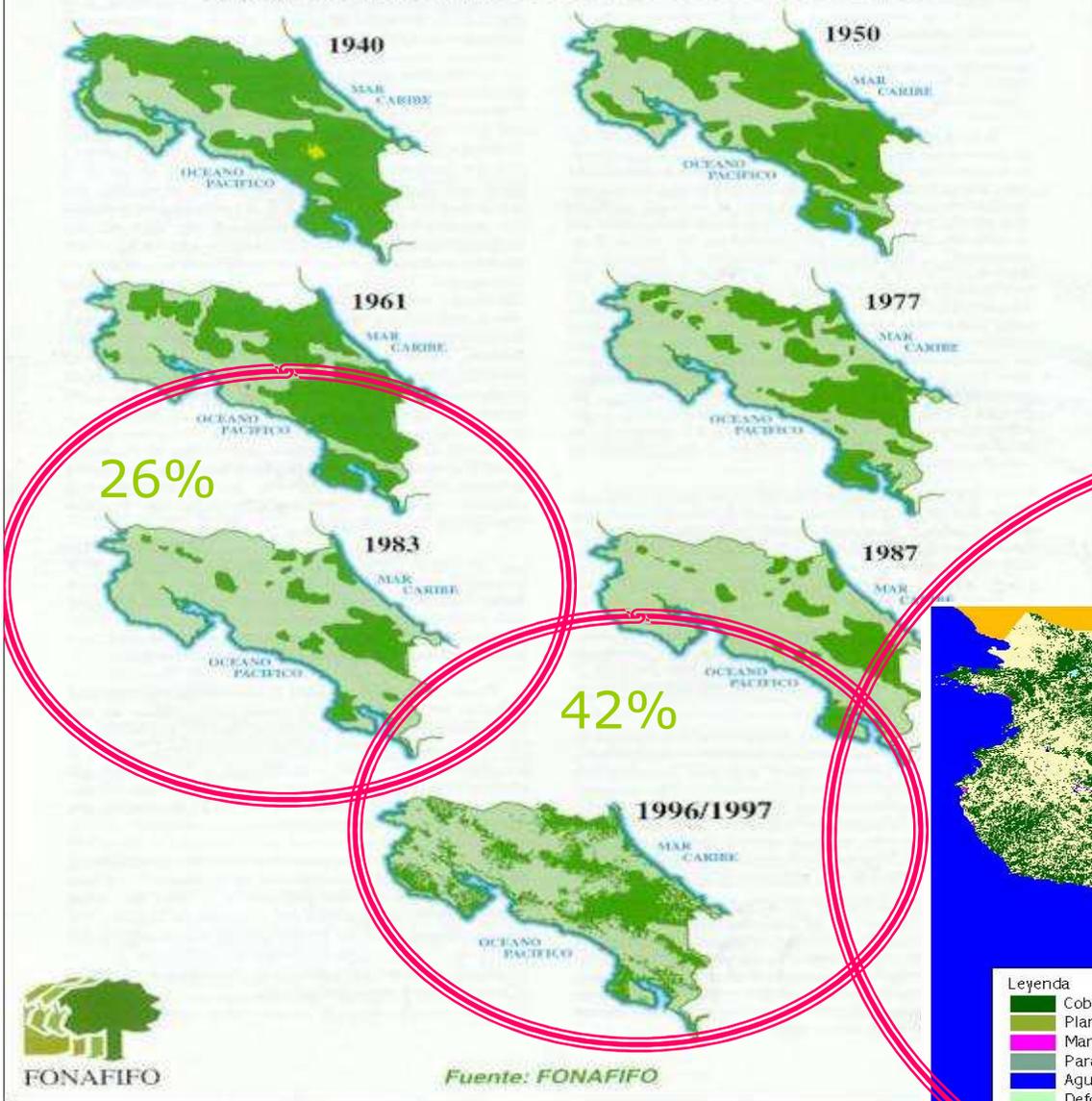
**Forest/wetlands
Payments eco services**



Areas of work: policy strengthening – technology transfer/data – capacity building - strategic alliances – adaptation measures –



Cobertura Boscosa Densa (80-100% de cobertura del suelo) en Costa Rica en los años 1940, 1950, 1961, 1977, 1983, 1987, 1996/1997



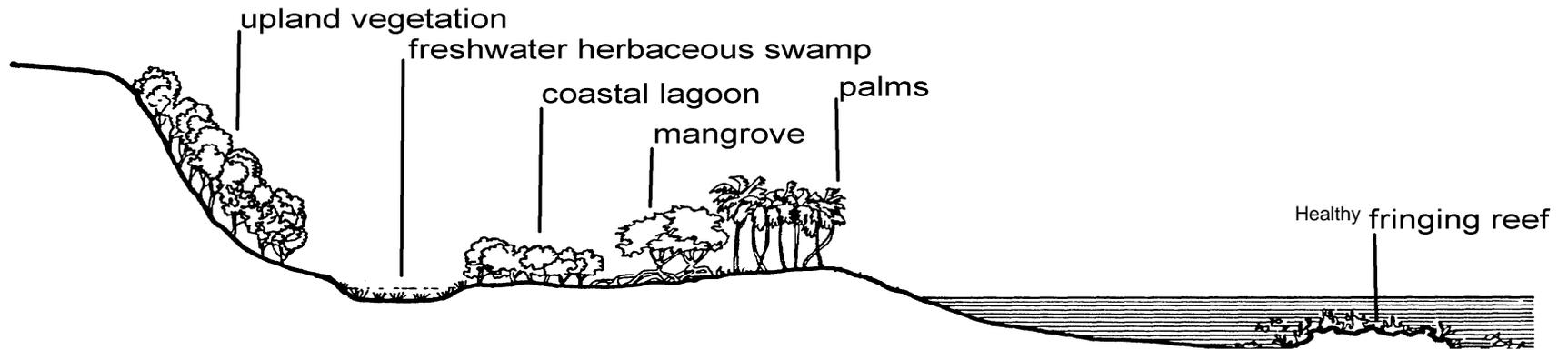
26%

42%

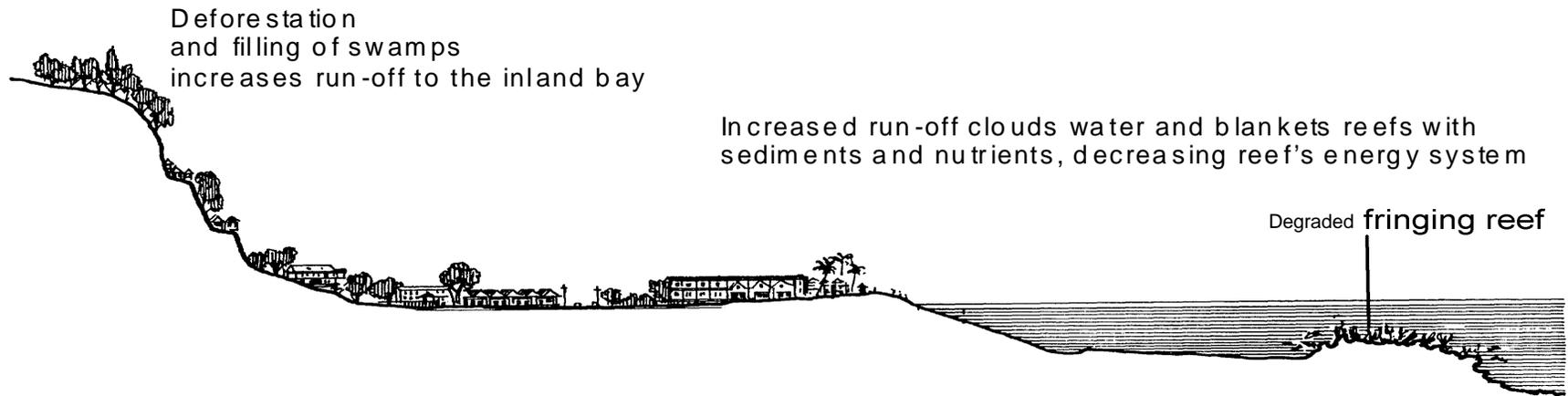
Year 2000



Natural Environment before Development



Impact on Ecosystem after Development





ReefFIX

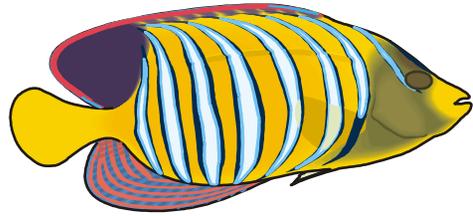
- **ReefFix (ICZM) Coral Reef and Mangrove Restoration and Watershed Management Demonstration program**
 - **Montego Bay Marine Park Trust, Jamaica**
 - **Parque Nacional del Este in the DR**
 - **Moriah Harbour Cay National Park in Exuma in the Bahamas**
 - **Haiti's Caracol's Mangroves Park (N-E of Haiti)**

Haiti – Value of Reefs, Mangroves

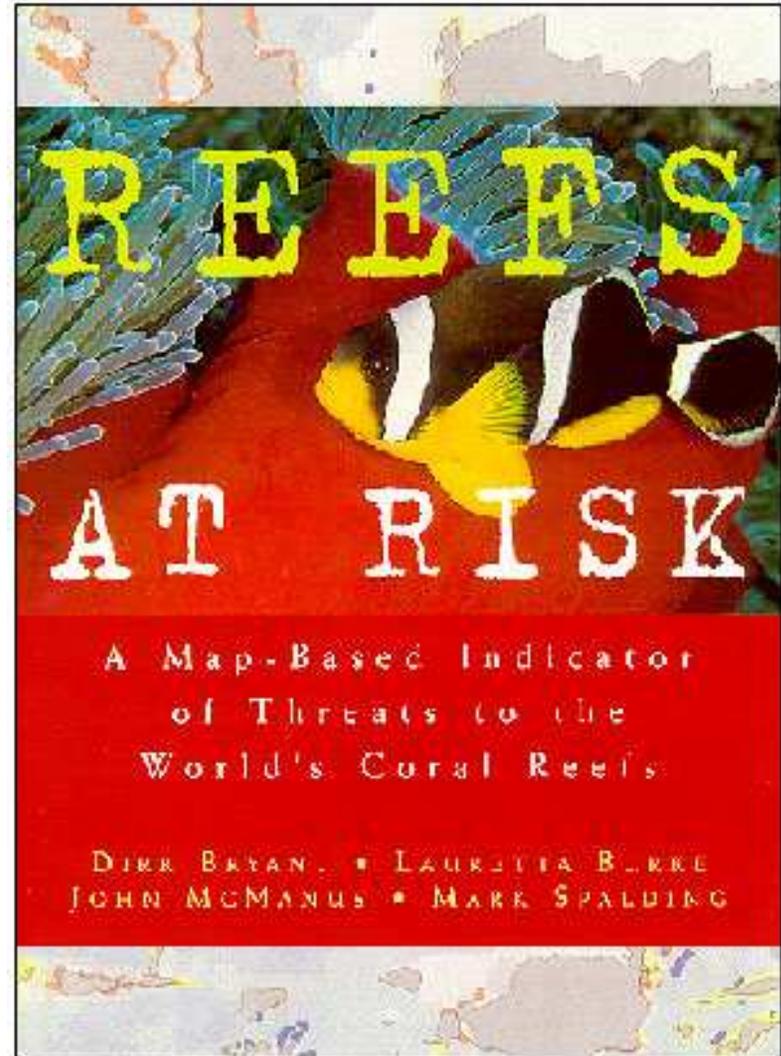


Ecosystem Service Values by Cover Type for Marine Parks and Environs in the Caribbean

Land Cover	Ave.\$/ha/yr	Lower Bound	Upper Bound	Area (ha)
Disturbed and Urban Beach	????			
Beach	88,000	77,000	99,000	
Beach near dwelling	117000	94,000	140000	
Coastal & Riparian Forest	1826	5542	13,000	
Freshwater Stream	1595			
Freshwater Herbaceous Swamp	72,787	32000	96000	
Grassland/pasture	118	118	118	
Near shore aquatic habitat	16, 283	4630	27935	
Coral Reef environ	100,000			
Mangrove	37,500			
Mangrove	500,000	200,000	900,000	
Mangrove restoration		225	216,000	



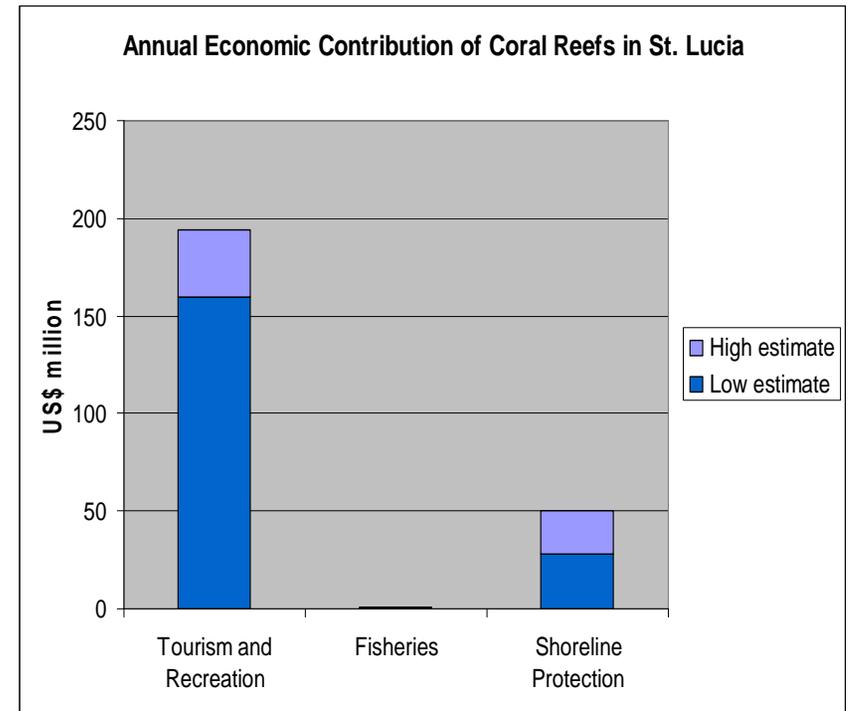
Coastal Capital: Fisheries and Tourism Economic Valuation of Coral Reefs in Tobago and St. Lucia



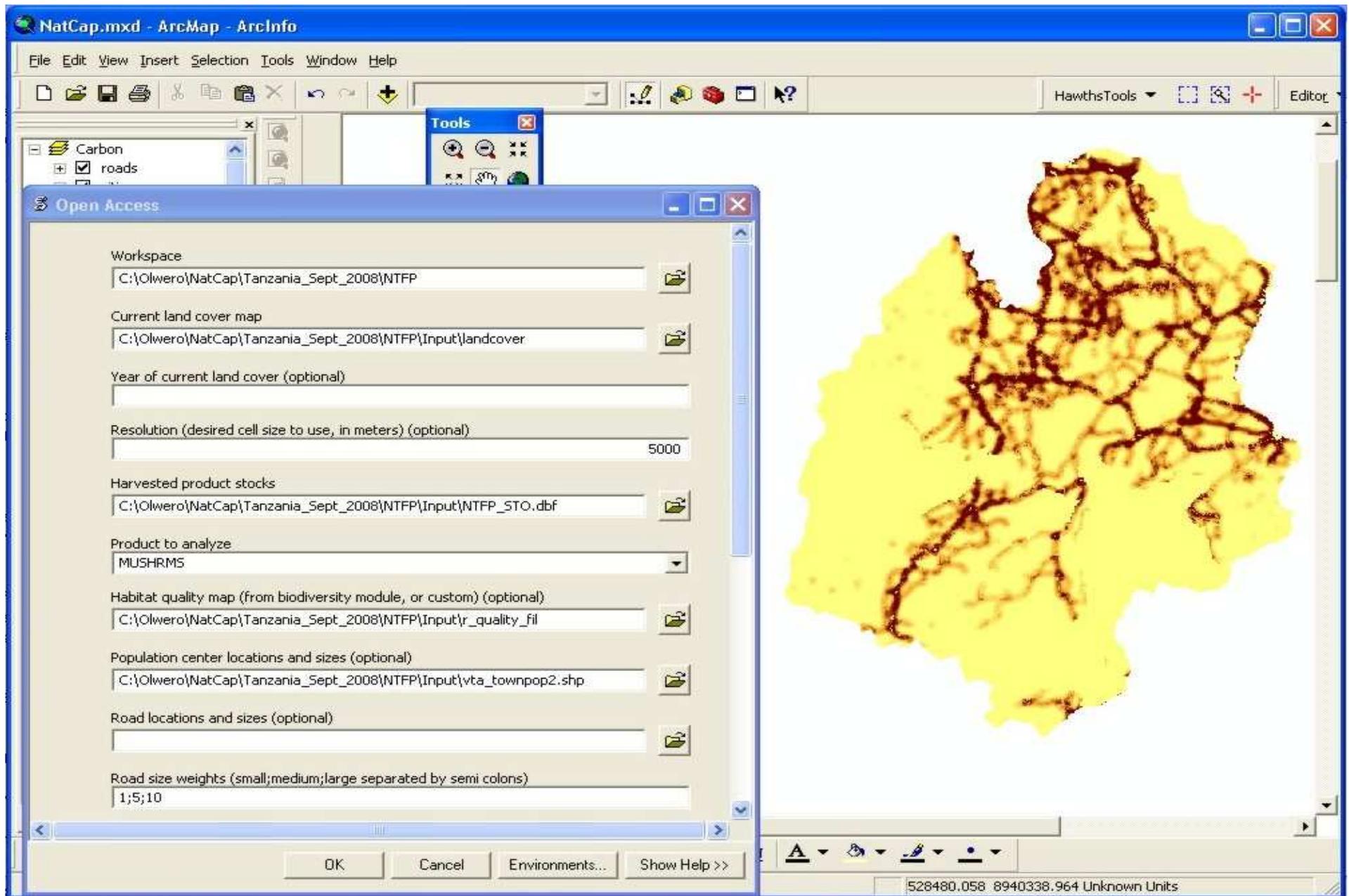
Coral Reefs – economically important to St. Lucia

- Tourism and Recreation - US\$160 to \$194 million in 2006.
- Coral reef-associated fisheries - US\$0.5 – 0.8 million / year
- Shoreline protection services – US\$28 and \$50 million per year.

These are significant compared to St. Lucia's GDP, which was \$825 million in 2005.

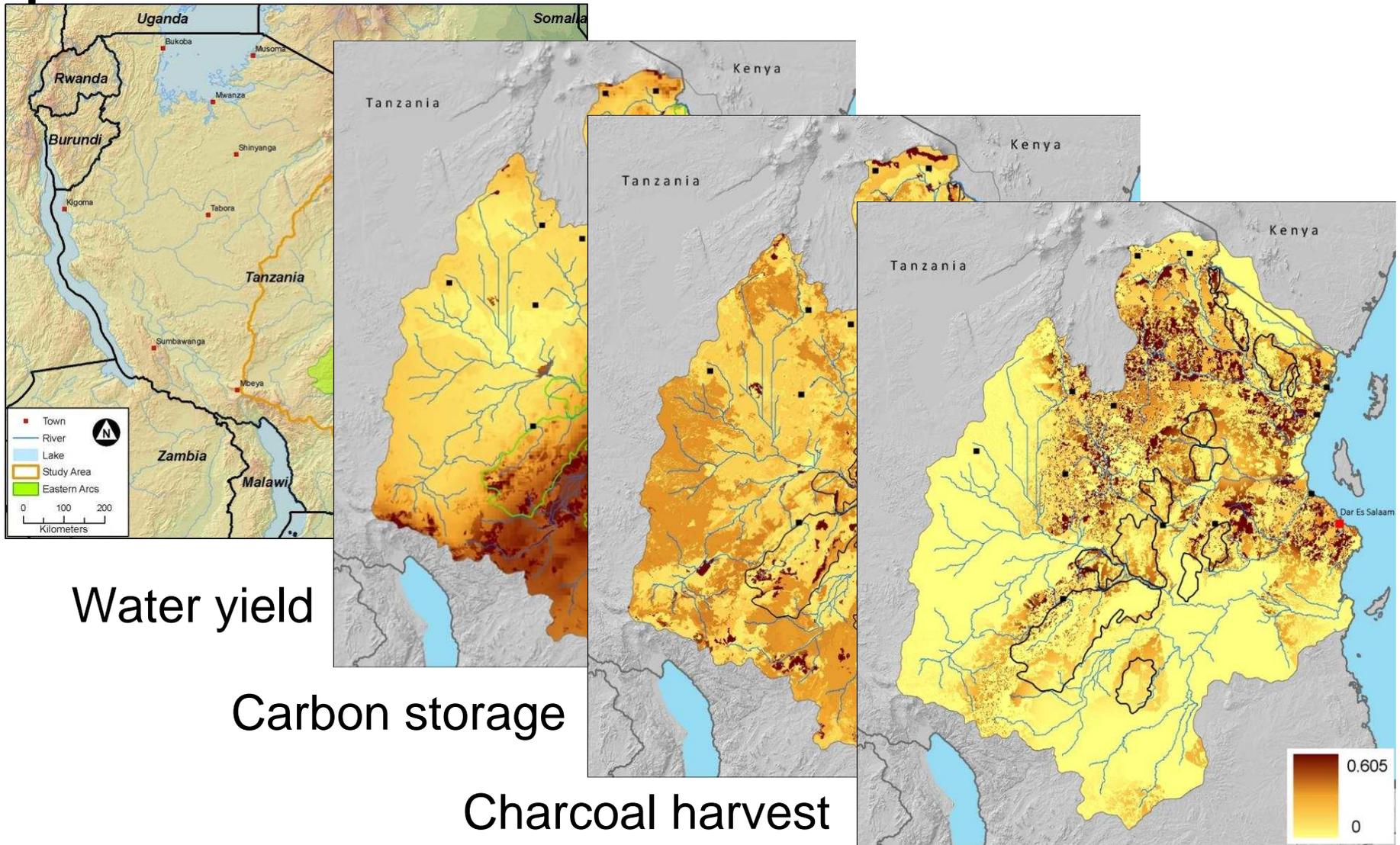


- Source: WRI. Coastal Capital: Economic Valuation of Coral Reefs in Tobago and St. Lucia. Coral reefs provide other important values not estimated in this study, and these numbers should be regarded as a lower bound estimate.

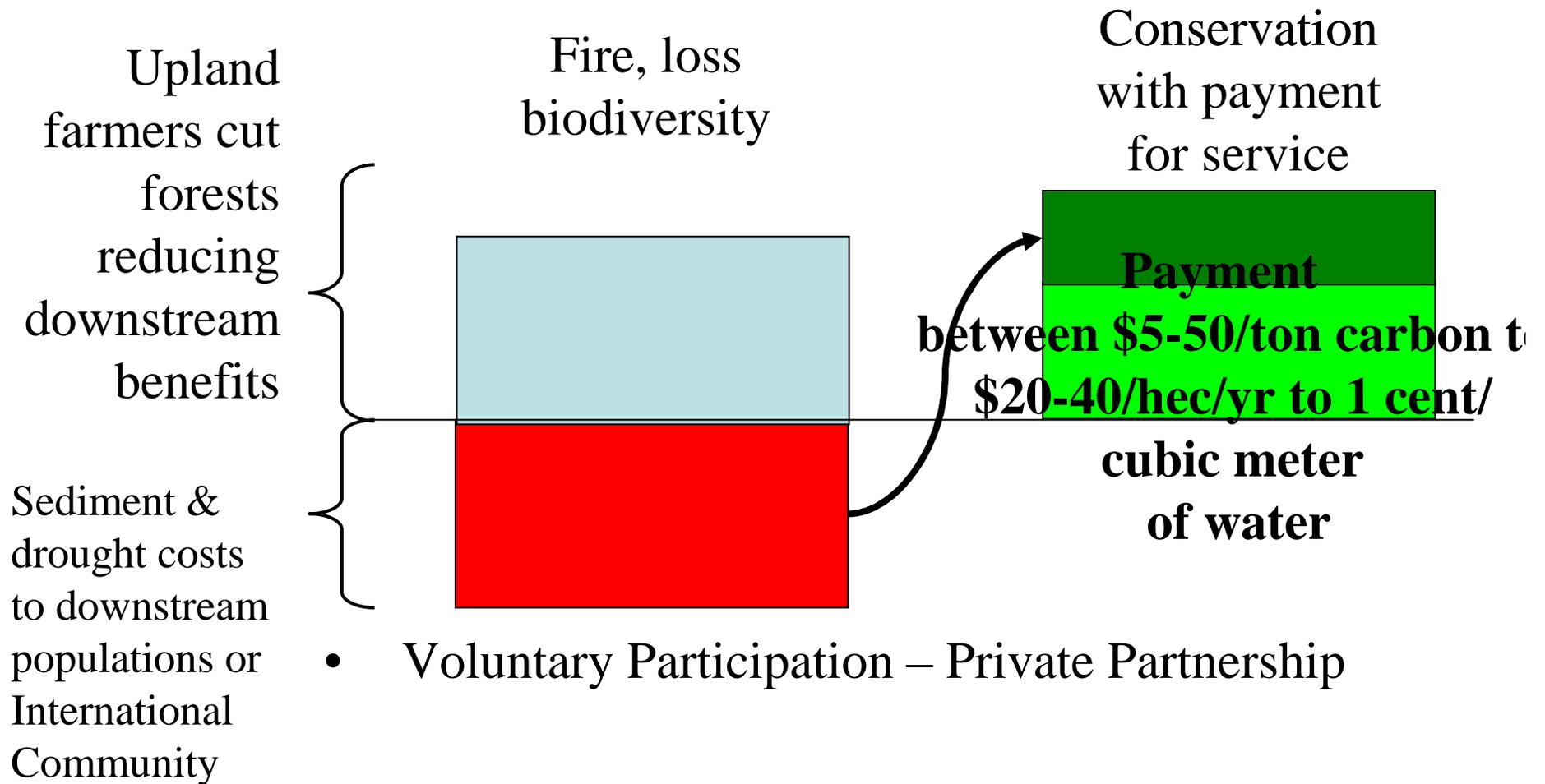


<http://invest.ecoinformatics.org> InVest

Costly but sophisticated production values

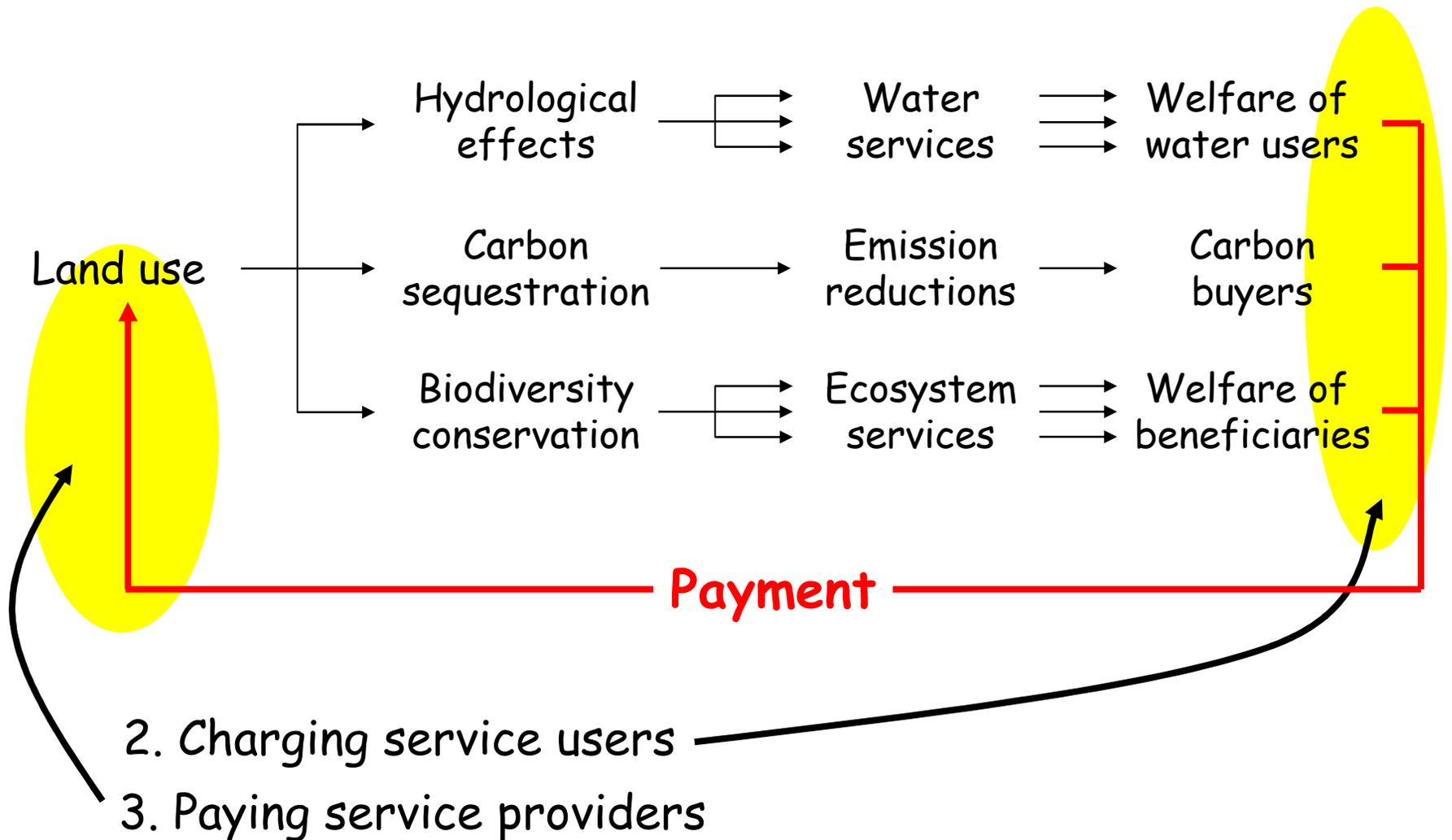


Logic PES

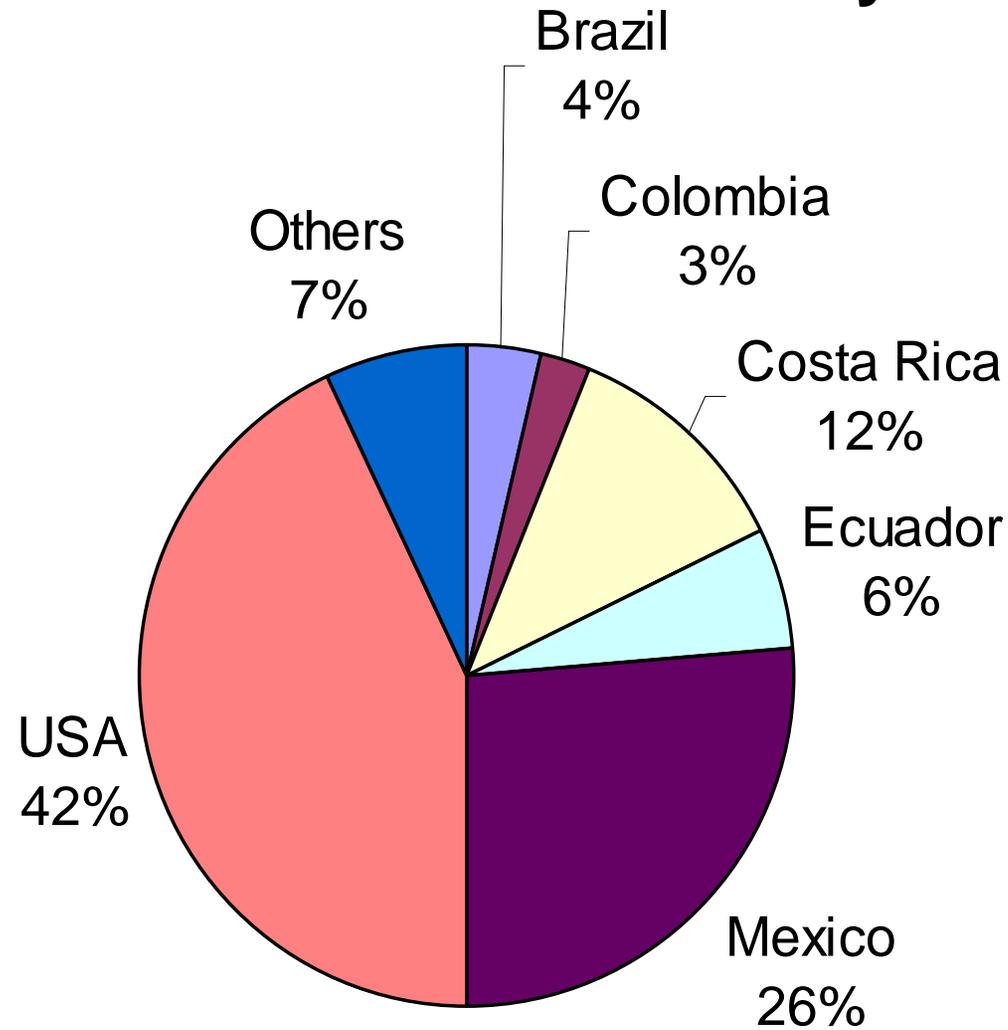


From theory to practice

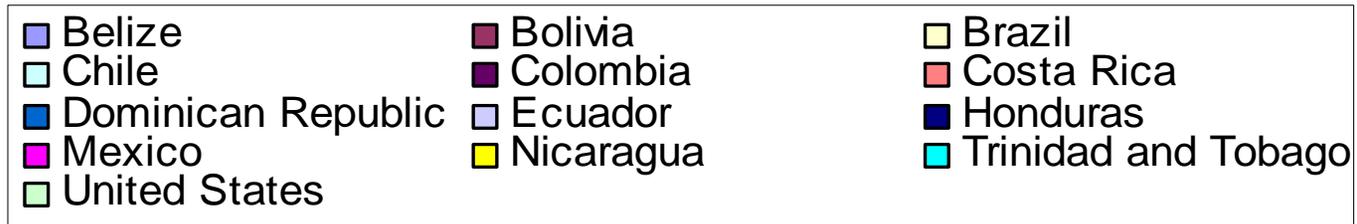
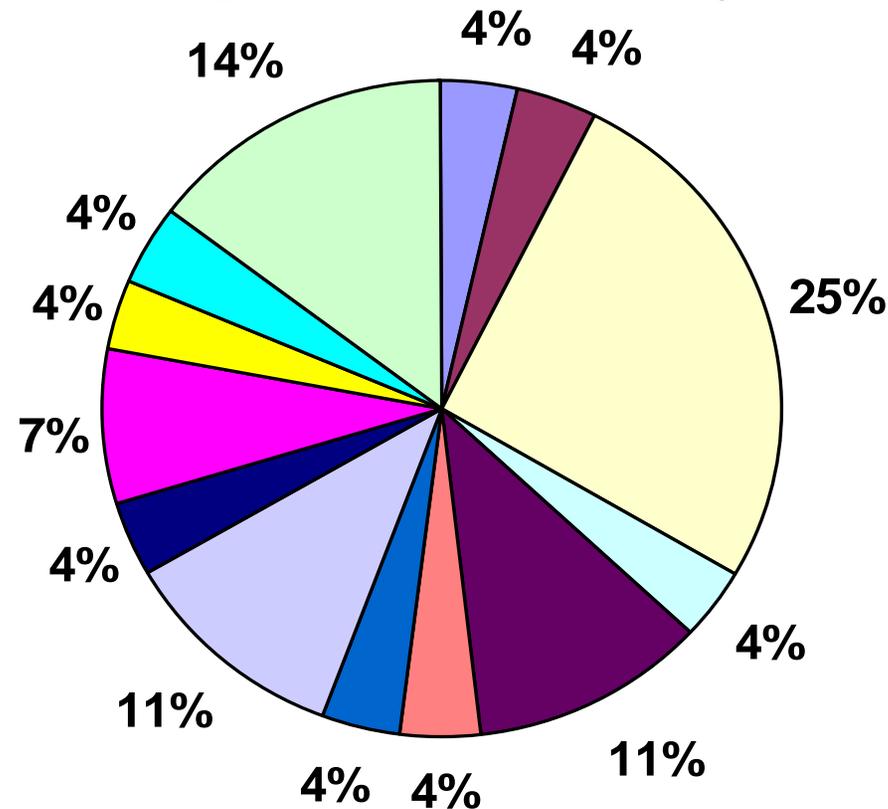
Trade in Carbon Credits



No. PES Schemes in Database by Country

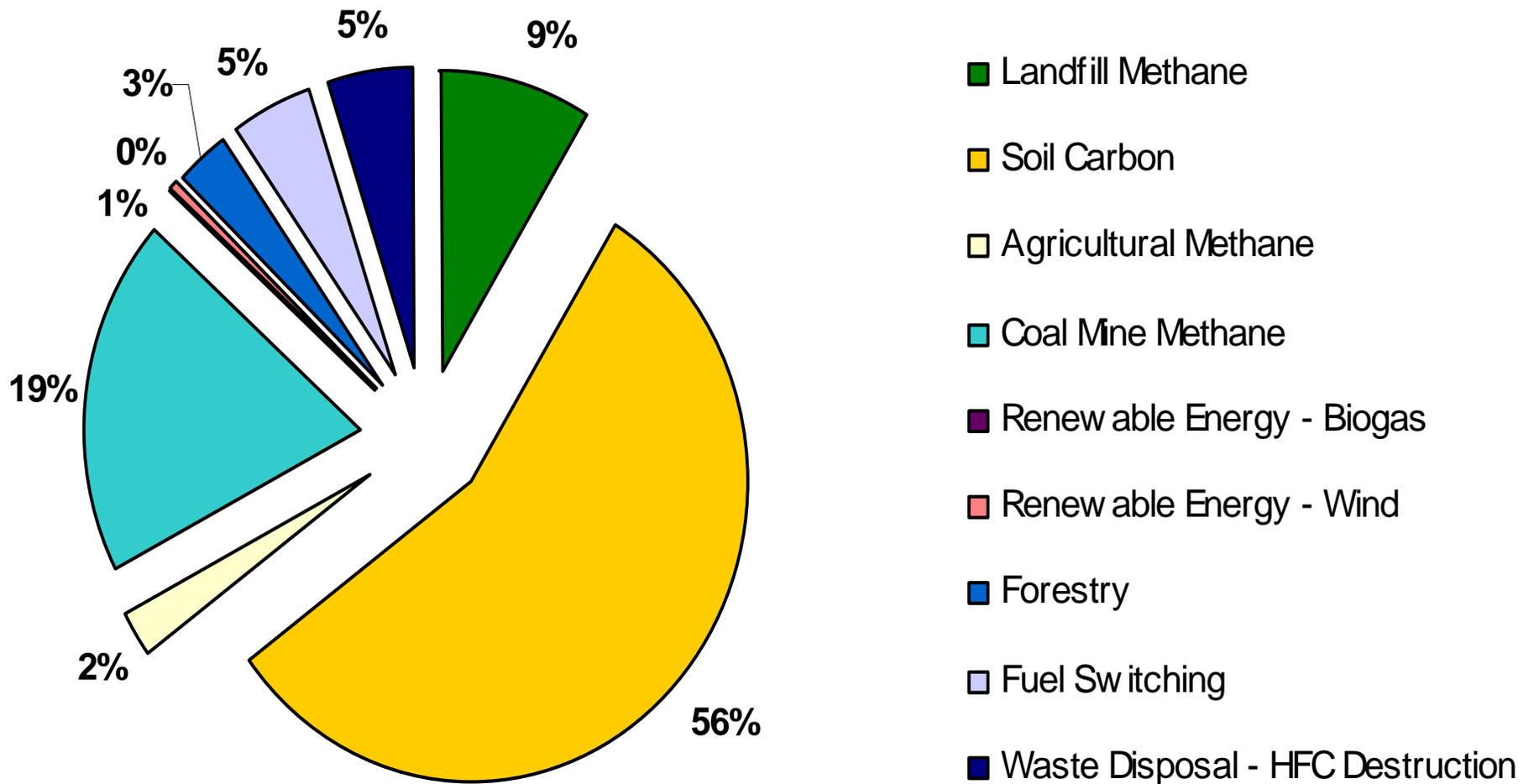


No. Carbon Sequestration Projects by Country



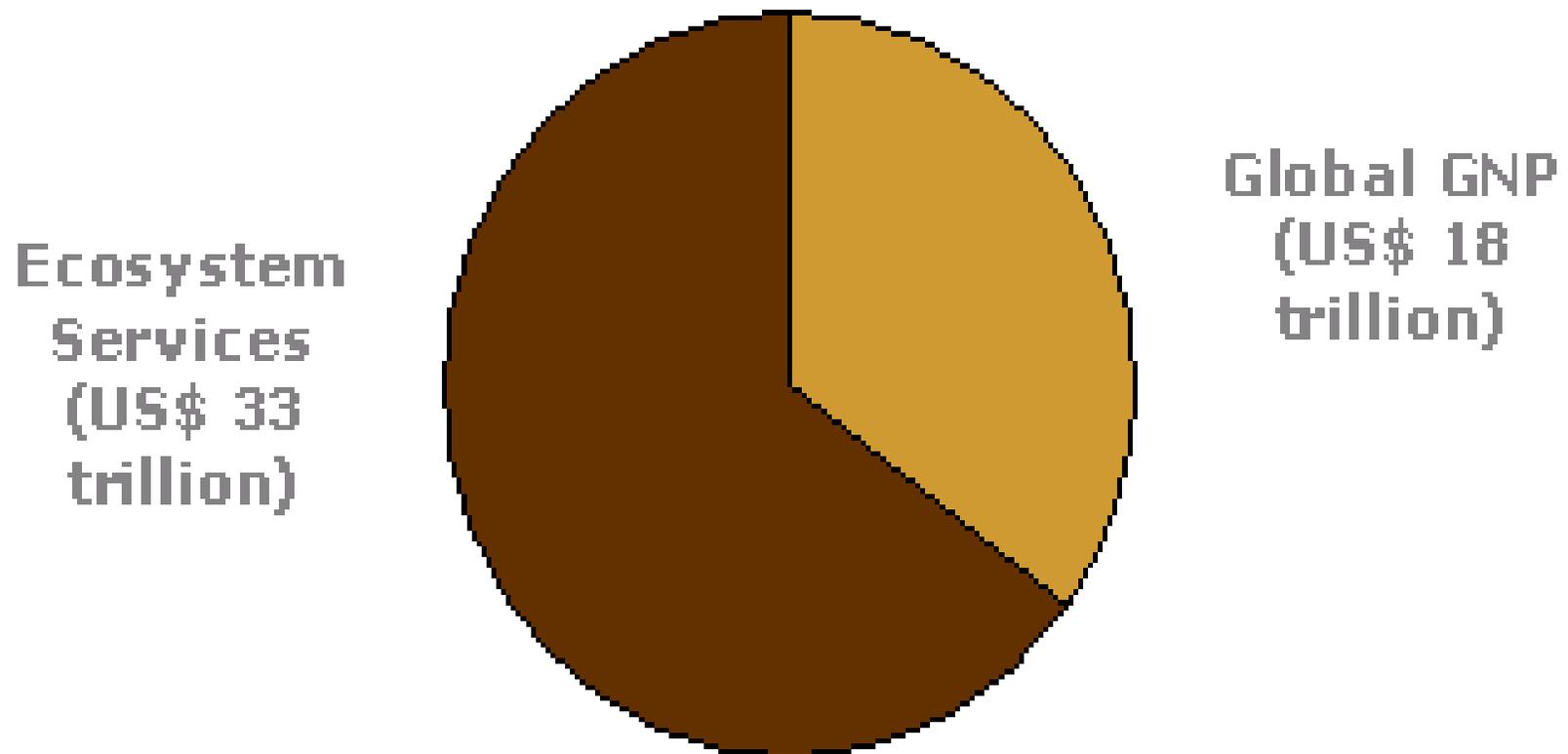
Offsets and Early Action Credits Worldwide Issued as of September 7, 2007

(All figures presented in metric tons of CO2)



How Much Are Nature's Services Worth?

Figure 1: Estimates of Human Economic Activities and Ecosystem Services, 1997



Source: Costanza et al. 1997:256.

Ecosystems Services: Free, But Valuable

Figure 2: Estimates of Various Ecosystem Services, 1997

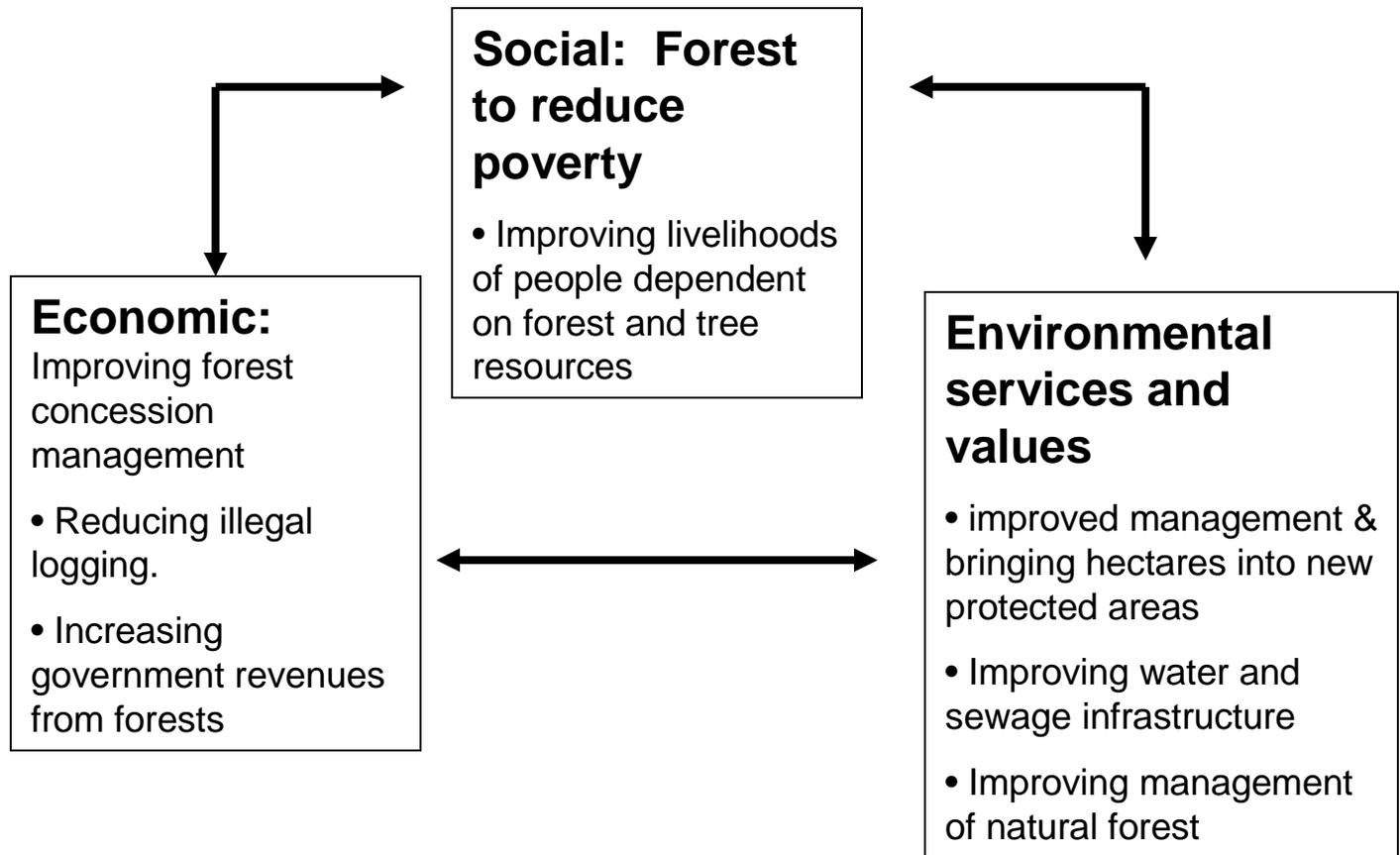
ECOSYSTEM SERVICES	VALUE (TRILLION \$US)
Soil formation	17.1
Recreation	3.0
Nutrient cycling	2.3
Water regulation and supply	2.3
Climate regulation (temperature and precipitation)	1.8
Habitat	1.4
Flood and storm protection	1.1
Food and raw materials	0.8
Genetic resources	0.8
Atmospheric gas balance	0.7
Pollination	0.4
All other services	1.6
Total value of ecosystem services	33.3

Source: Costanza et al. 1997:256

Economic indicators (GNP) are flawed

- do not account for the degradation in ecological services that industry and commerce cause:
- **EXAMPLE:** valuing forests only for timber ignores indirect costs that society bears:
 - soil erosion -- nutrient loss,
 - increased flooding,
 - declines in fisheries and water quality,
 - reduced carbon storage capacity,
 - changes in regional temperature and rainfall,
 - diminished wildlife habitat and recreational opportunities.

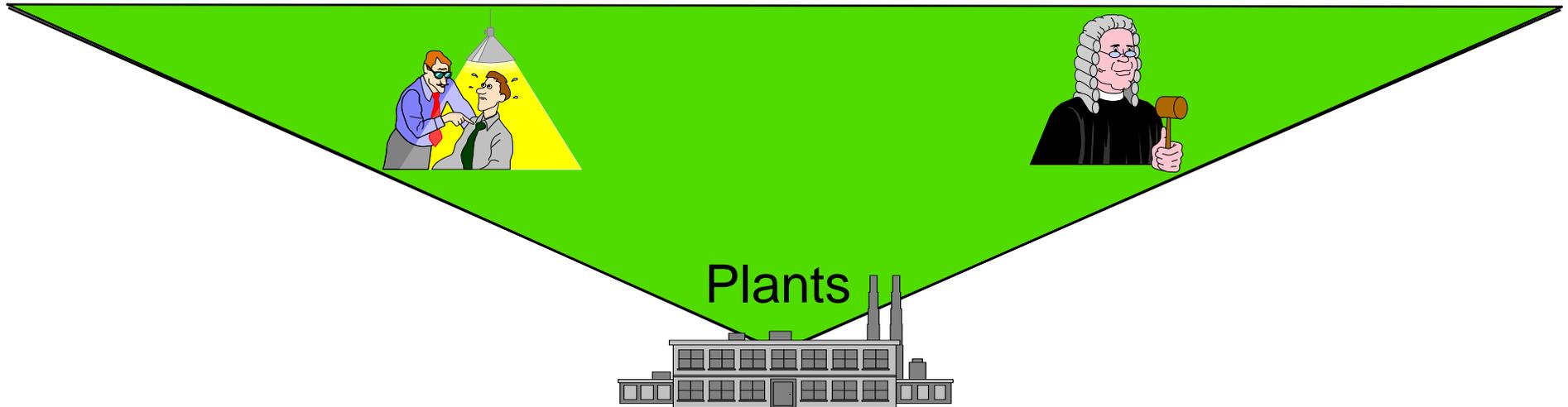
WIN-WIN Strategy Politically Difficult?



State

Regulators

The Law



- **Regulatory Standards**
- **Market-based Instruments**
- **Legal Liability**

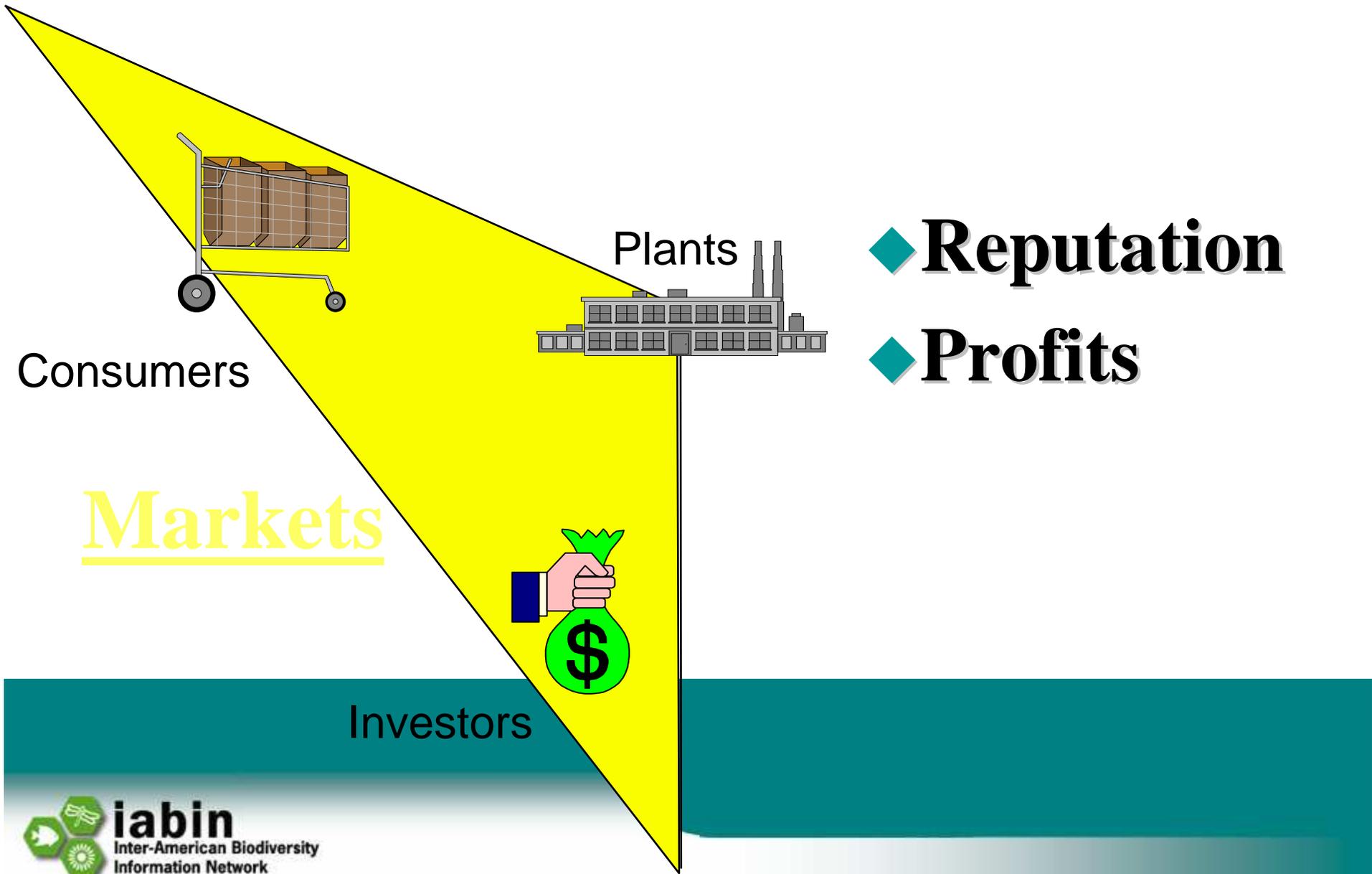
...and Other Actors are Important

- ◆ **Power**
- ◆ **Social Norms**
- ◆ **Negotiations**



Community





Consumers

Plants

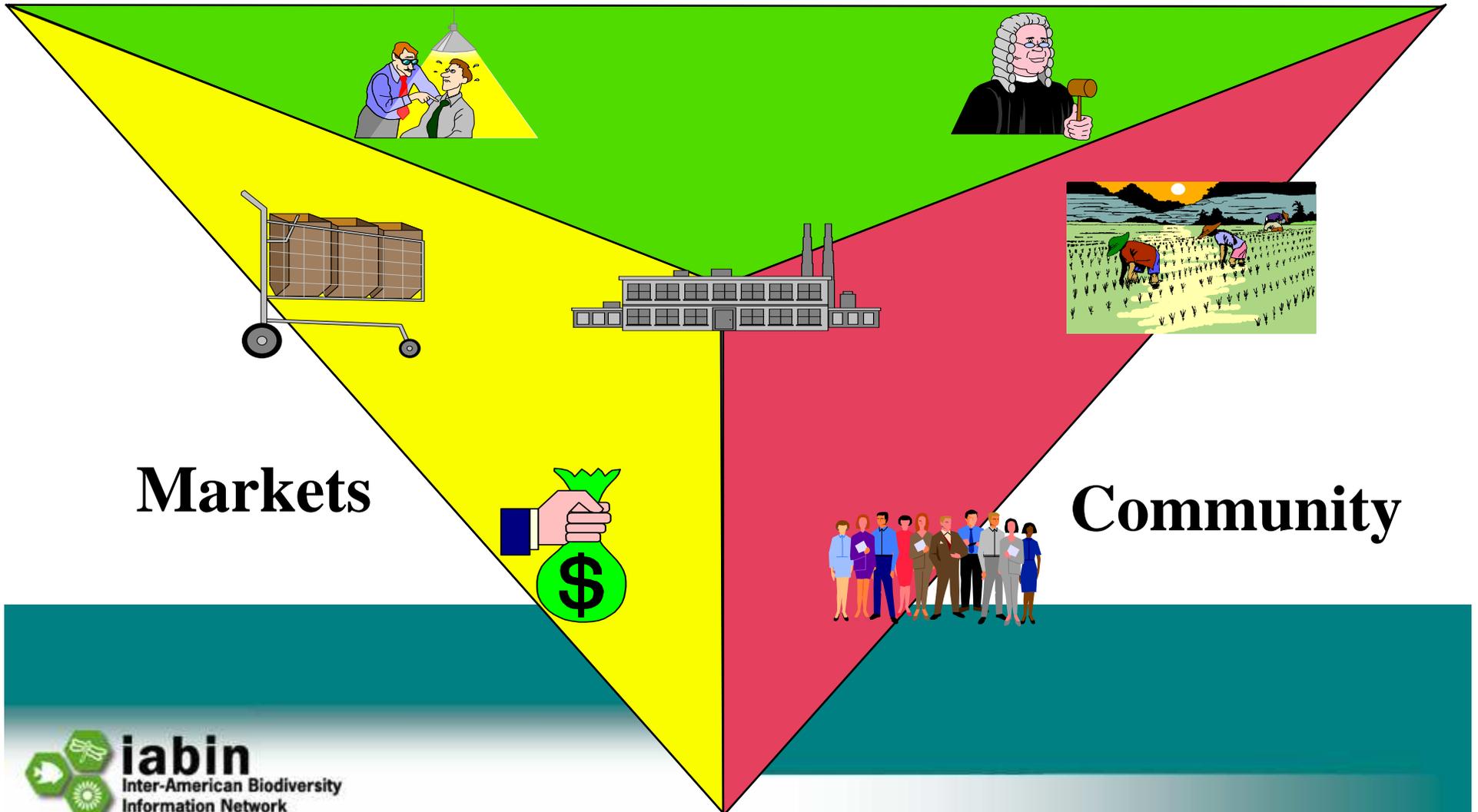
◆ **Reputation**

◆ **Profits**

Markets

Investors

The New Model: Multiple Agents, Multiple Incentives State



COUNTRIES

INDONESIA

DAY OF SHAME FOR POLLUTERS

BAD NEWS arrived in the post recently for 121 Indonesian companies. Inside each thick envelope was a stern warning from the Indonesian government's environmental impact management agency, known by its acronym BAPEDAL.

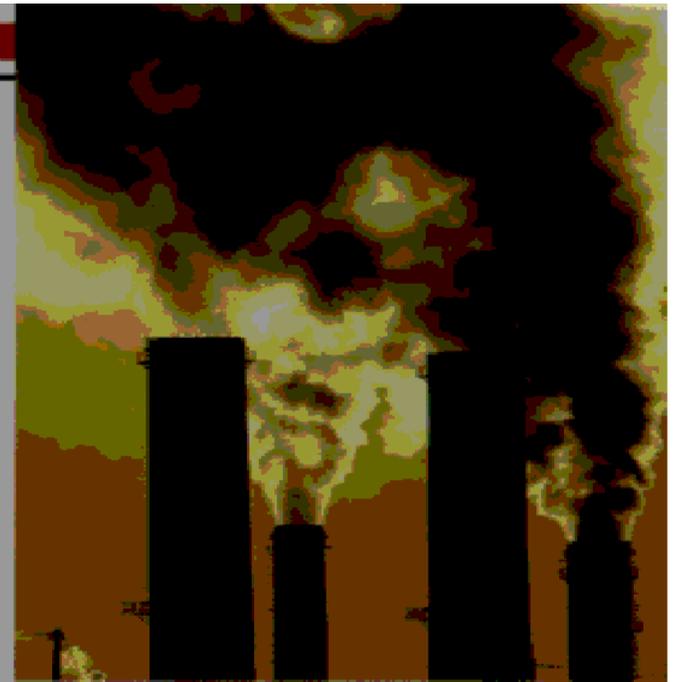
The companies were told that unless they acted immediately to clean up their waste, BAPEDAL would expose them in the media as the country's most appalling polluters.

That day of reckoning is now imminent: In December, the government will unveil its long-awaited initiative to rate compa-

'Before, companies didn't care,' says Inif, 'but now they're beginning to wake up. From a psychological point of view, PROPER helps a great deal.'

The new ratings also put more pressure on provincial officials, who have been generally hesitant to move against corporate polluters for fear of discouraging investment. The officials now worry that they will take the rap if too many companies in their areas get red or black marks.

'It's a political football,' says one environmental consultant. 'There's a lot of pressure from other ministries not to release the



Companies must clean up their act and face public scrutiny

Policy Experiment

PROPER

Indonesia's Public Disclosure Program

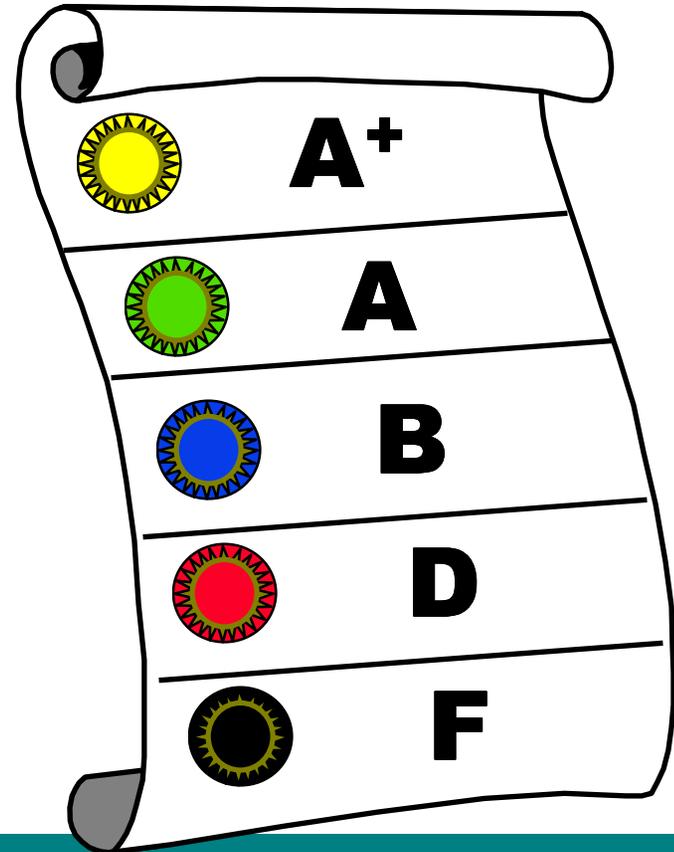
atra have been widely mentally harmful. explained that it was factory, just outside bjected to the initial , they hoped that the operations would be a public image of ntal awareness.

that PROPER will pon in the war against donesian public takes ing poor ratings. Only he mass media and ns can prove the prin- gain'. If it succeeds, a Asia may be inter- tings system a try.

Margot Cohen

*5 Color
Scheme for
Green*

Performance



PERFORMANCE
LEVELS

PERFORMANCE CRITERIA

GOLD

Clean technology, waste minimization, pollution prevention, conservation, etc.

GREEN

Above standards & good maintenance, housekeeping, sludge management, etc.

BLUE

Efforts meet minimum standards

RED

Efforts don't meet standards

No pollution control effort,
Serious environmental damages

INCENTIVES

GOLD

GREEN

BLUE

RED

Public Praise

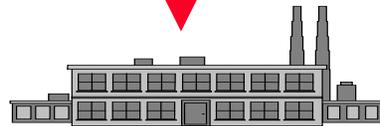
**Public Pressure &
Legal Enforcement**

Eco efficiency Voluntary Performance

*Information &
Ratings*

*Reputation
& Profits*

*Social Pressure
& Local
Enforcement*



Markets

Community