Desmatamento, Mudanças Climáticas e Biodiversidade – Aspectos Economicos e Políticas Públicas Internacionais

Instituto de Pesquisa do Jardim Botânico
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Estrutura da Apresentação

- Introdução ao REDD
- Importância do REDD para mitigação
- A jusitificativa econômica para o REDD
  - Teoria
  - Estimativas Empíricas
- Proposta do design do mecanismo
- Análise comparativa
- Análise do carbono e da biodiversidade em nível global

Redução de Emissões do Desmatamento (REDD)

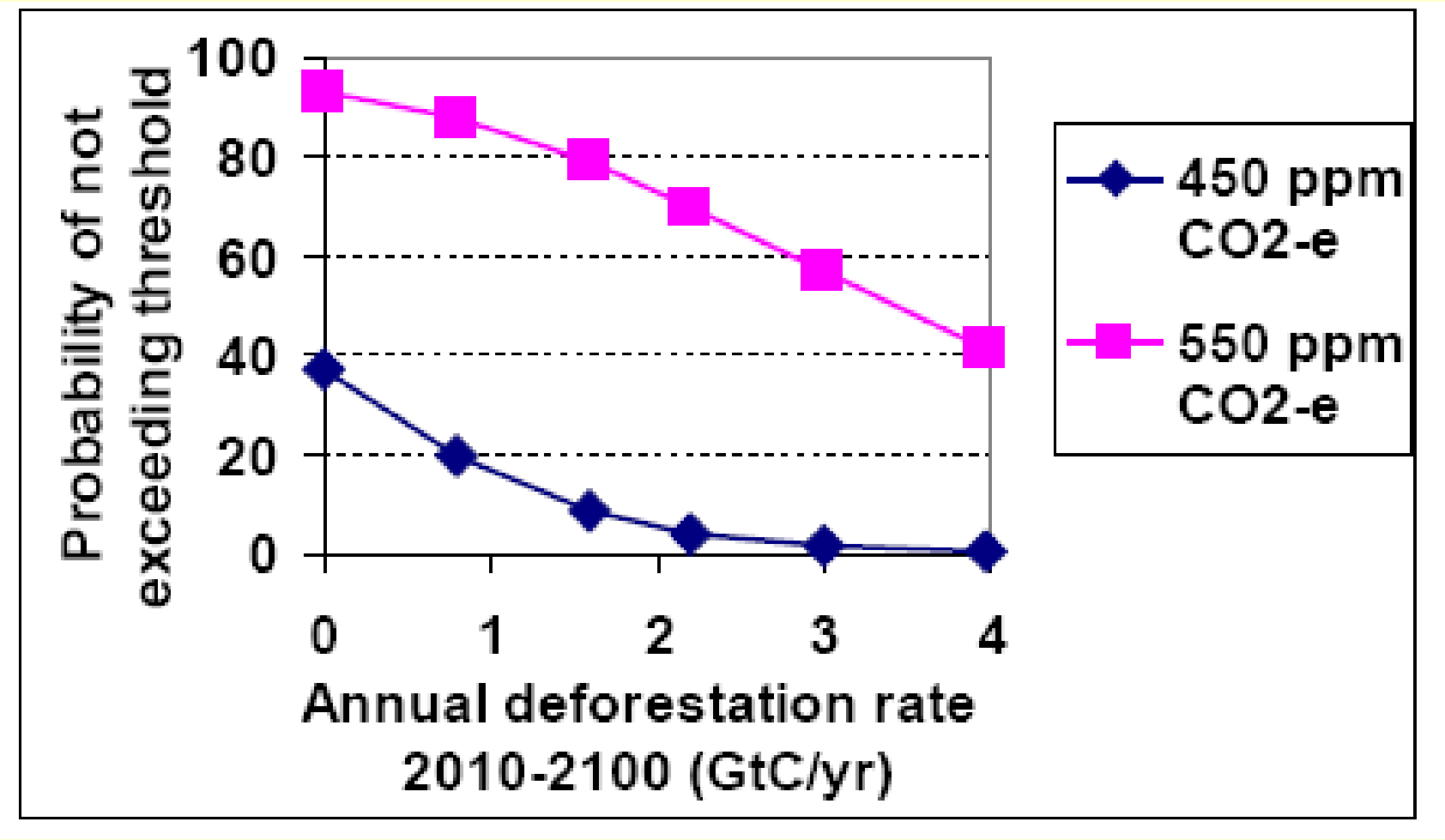
- Desmatamento responsável por 17-25% das emissões de carbono;
- Créditos para redução de emissões do desmatamento não foram incluídos no protocolo de Kyoto;
- Incentivos financeiros para a redução do desmatamento possivelmente serão incluídos no próximo acordo climático global;
- Estimativas do potencial de recursos gerados para países em deselvolvimento entre US$ 15 e US$ 50 bilhões por ano;

Importância da Redução do Desmatamento para as Metas Climáticas Globais

Importance of REDD for meeting mitigation targets

- SRES scenarios assume sharp decline in deforestation...
- ... But historical, current and projected trends offer little support to this assumption;
- What's the impact of curbing (or not) tropical deforestation for meeting mitigation targets ?
- Probabilistic climate modelling, assuming that global emissions are reduced in all other sectors by 80% in 2050;

Importance of REDD for meeting mitigation targets



"Reducing Tropical Deforestation is Central to Constraining Global Temperature Rise to 2°C " ; Warren, R., Price, J., Strassburg, BBN, Lowe, J., Raper, S. (submitted to *Nature*)

Importance of REDD for meeting mitigation targets

- Take home message #1:

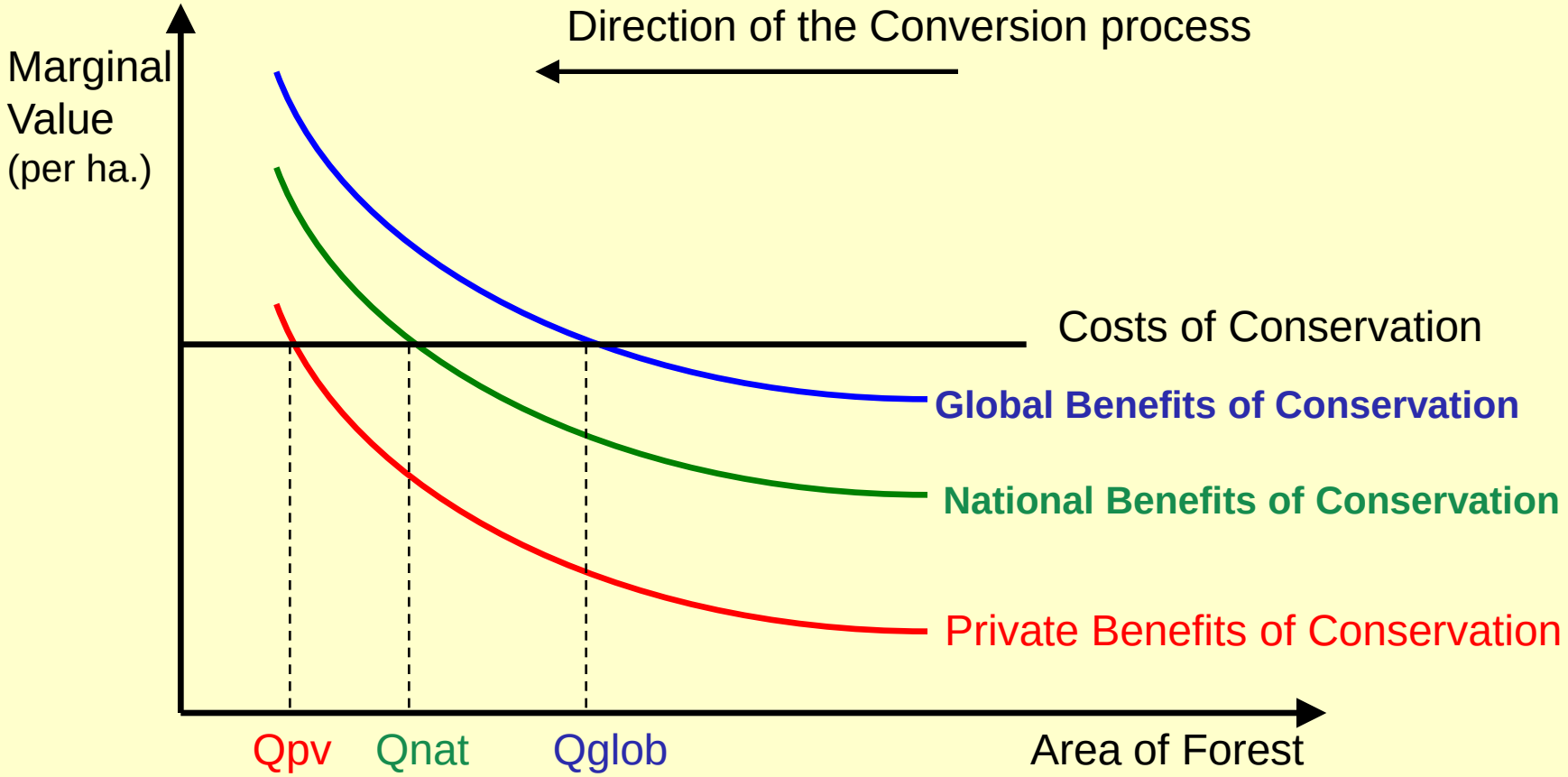
Failing to reduce tropical deforestation would reduce probabilities of reaching the 450ppm CO_2 target from 39% to 4%;

Justificativa Econômica para o REDD

Payments for Ecosystem Services & REDD

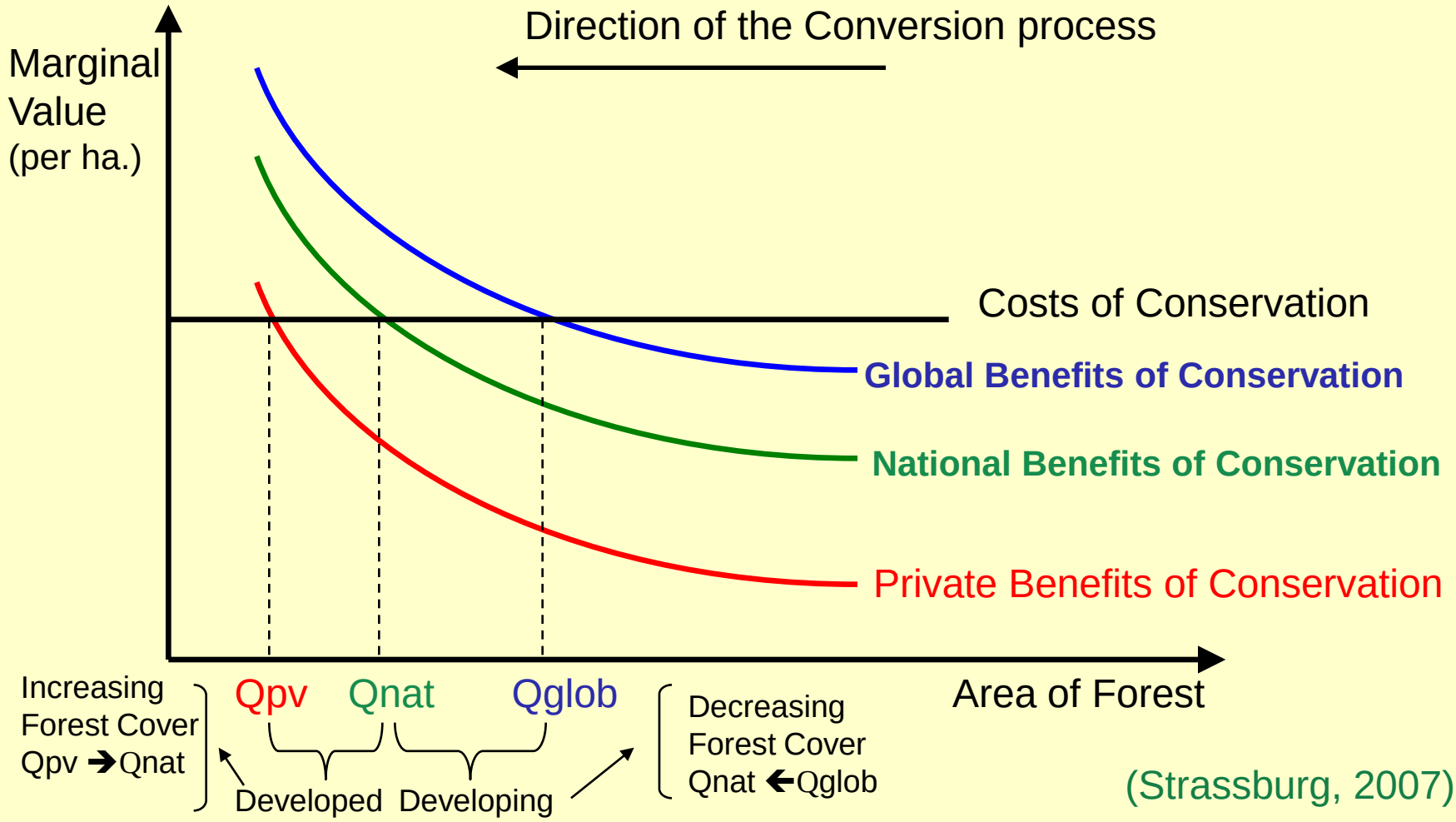
- Mismatch between providers (who bear the costs) and consumers (who enjoy the benefits) of ecosystem services;
- Can operate at several scales, from local to regional to global;
- Financial transfer to internalize part of the external benefits provided by the ecosystem;

The Cross-scale Dynamic Approach



(Strassburg, 2007)

The Cross-scale Dynamic Approach



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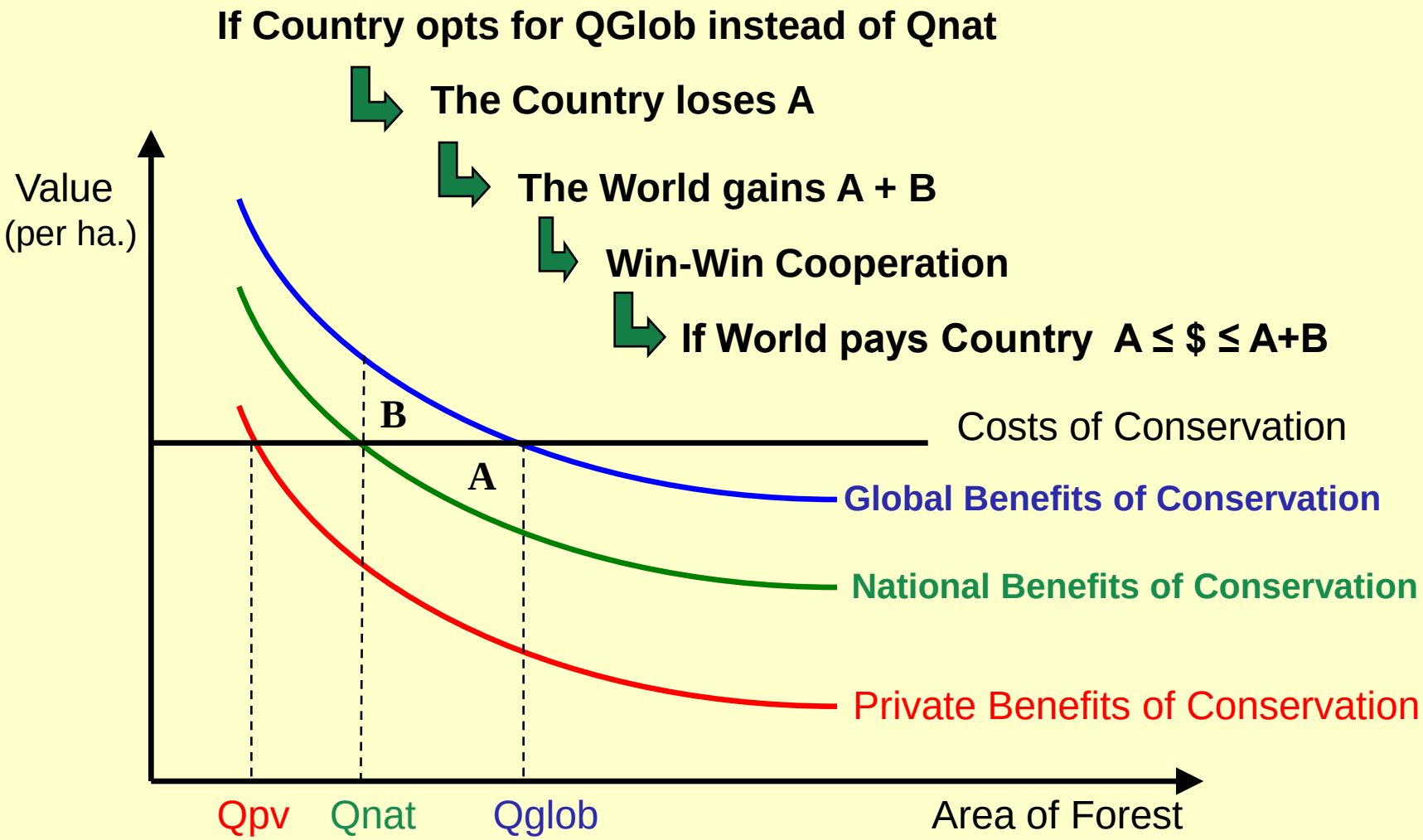


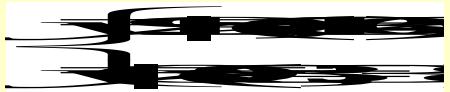
(Strassburg, 2007)

Justificativa Econômica para o REDD: Estimativas para a Amazônia

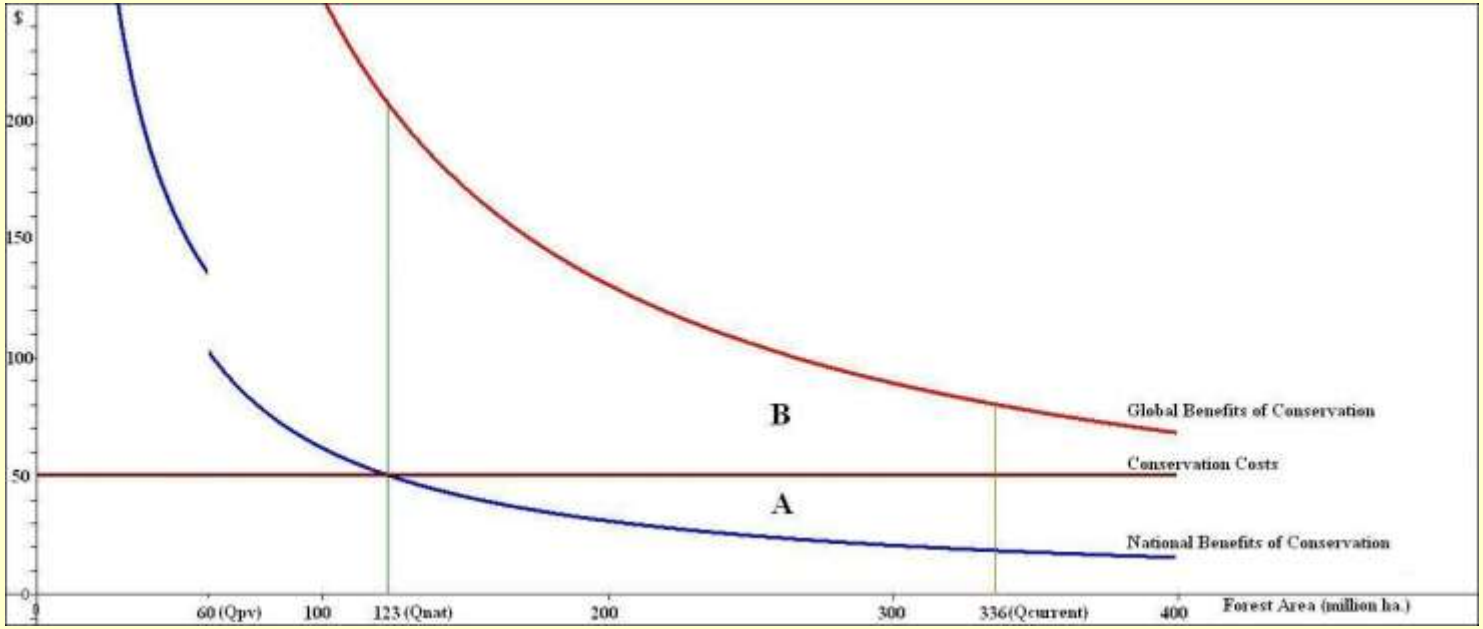
The Cross-scale Dynamic Approach Brazilian Amazon

- Attempt to estimate current value and dynamic behaviour of 12 ecosystem services
  - Different approaches for each categories of TEV
    - Direct use services, Indirect use services, Option value, Non-use values
  - Marginal values
    - Direct estimation
    - Adapted from other sources (Maximum & Average values)
  - Classify each value according to its scale
    - National x Global
  - Many limitations, but some research and policy insights

Strassburg, BBN; Dissertação de Mestrado; UFRJ (2005)

		Spatial Scale	Current Marginal Value (US$ / ha / y)	Marginal Function
Direct Use Values	Timber	National	US$ 0	
	NTFPs	National	US$ 0	
	Recreation	National	US$ 0	
Indirect Use Values	Climate Regulation	Global	US$ 43.13	y = 14.491.680.000/x | x E (1:336,000,000)
	Waste Treatment	National	US$ 5.08	y = 1.706.880.000/x | x E (1;336.000.000)
	Disturbance Regulation	National	US$ 0.51	y= 171.360.000/x | x E (1;336.000.000)
	Erosion Control	National	US$ 9.60	y = 3.225.600.000/x | x E (1; 336.000.000)
	Water Regulation	National	US$ 1.16	y = 389.760.000/x | x E (1;336.000.000)
	Water Provision	National	US$ 0.56	y = 188.160.000/x | x E (1;336.000.000)
Option Value	Option Value	Global	US$ 10.26	y = 25.462.546 x $^{-0,75}$ | x E (1: 336.000.000)
Bequest Value	Bequest Value	Global	US$ 6.59	y = 19.907.960x $^{-0,76}$ | x E (1:336.000.000)
Existence Value	Existence Value	Global	US$ 3.42	y = 10.314.899x $^{-0,76}$ | x E (1:336.000.000)
Forest Global Benefits			US$ 80.31	
Forest National Benefits			US$ 18.53	
Benefits of Conversion			US$ 50.36	

The Cross-scale Dynamic Approach Brazilian Amazon



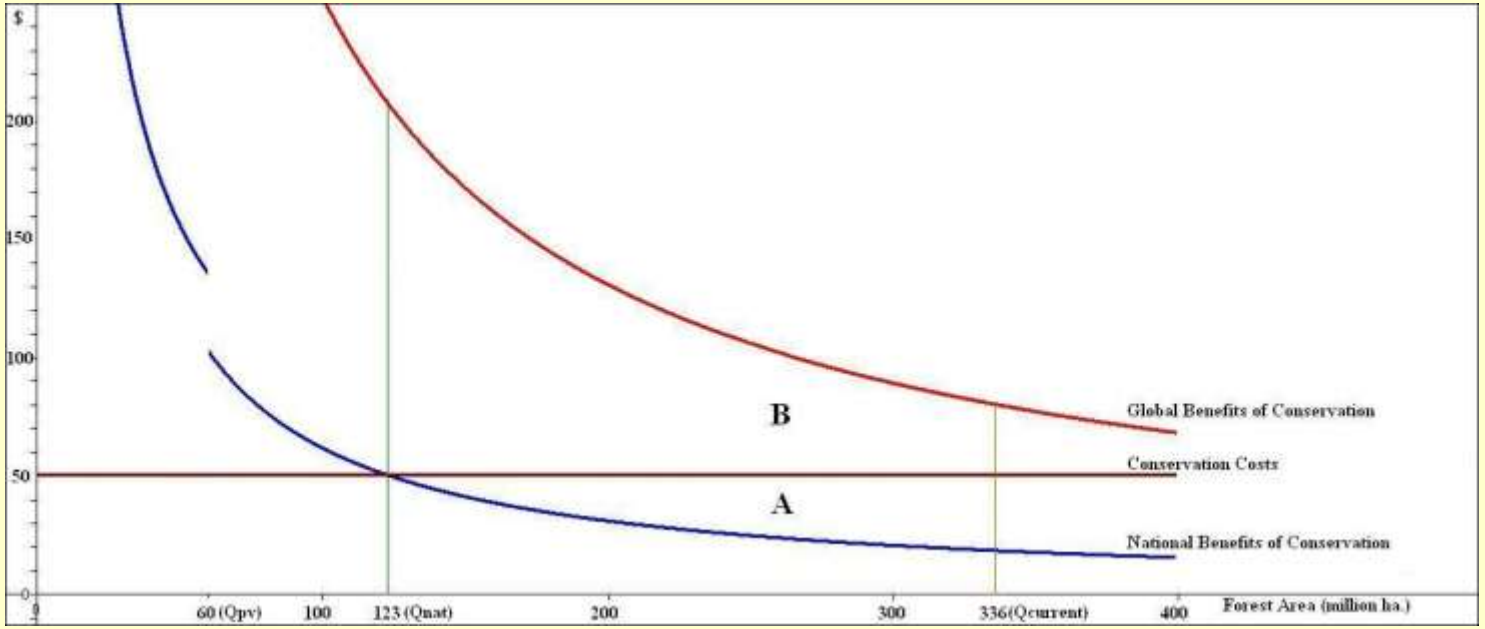
Current Total Ecosystem Benefits: US$ 80

Conservation Costs: US$ 50

Current National Benefits: US$ 18.5*

*includes 2.55% of global benefits

The Cross-scale Dynamic Approach Brazilian Amazon

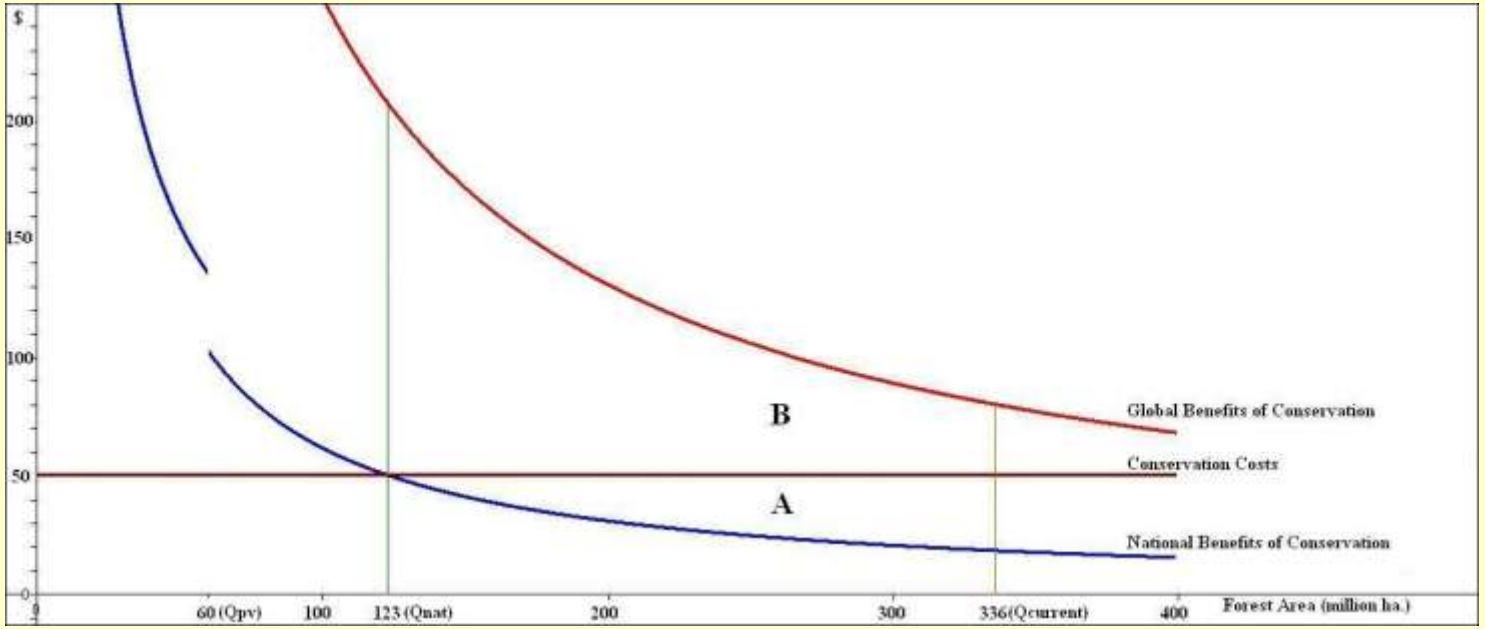


National Equilibrium = 123 million ha. (30% orig. area)
Private Equilibrium = 60 million ha. (15% orig. area)

MEA projections for 7 of 10 most prod. Ecos. Types by 2050 (30-40% orig. area)

Current Forest Cover (as % of the original):
Europe (excl. RUS) =33% (21%) Continental Asia (excl. RUS)= 21.5% N. Africa =8.4%

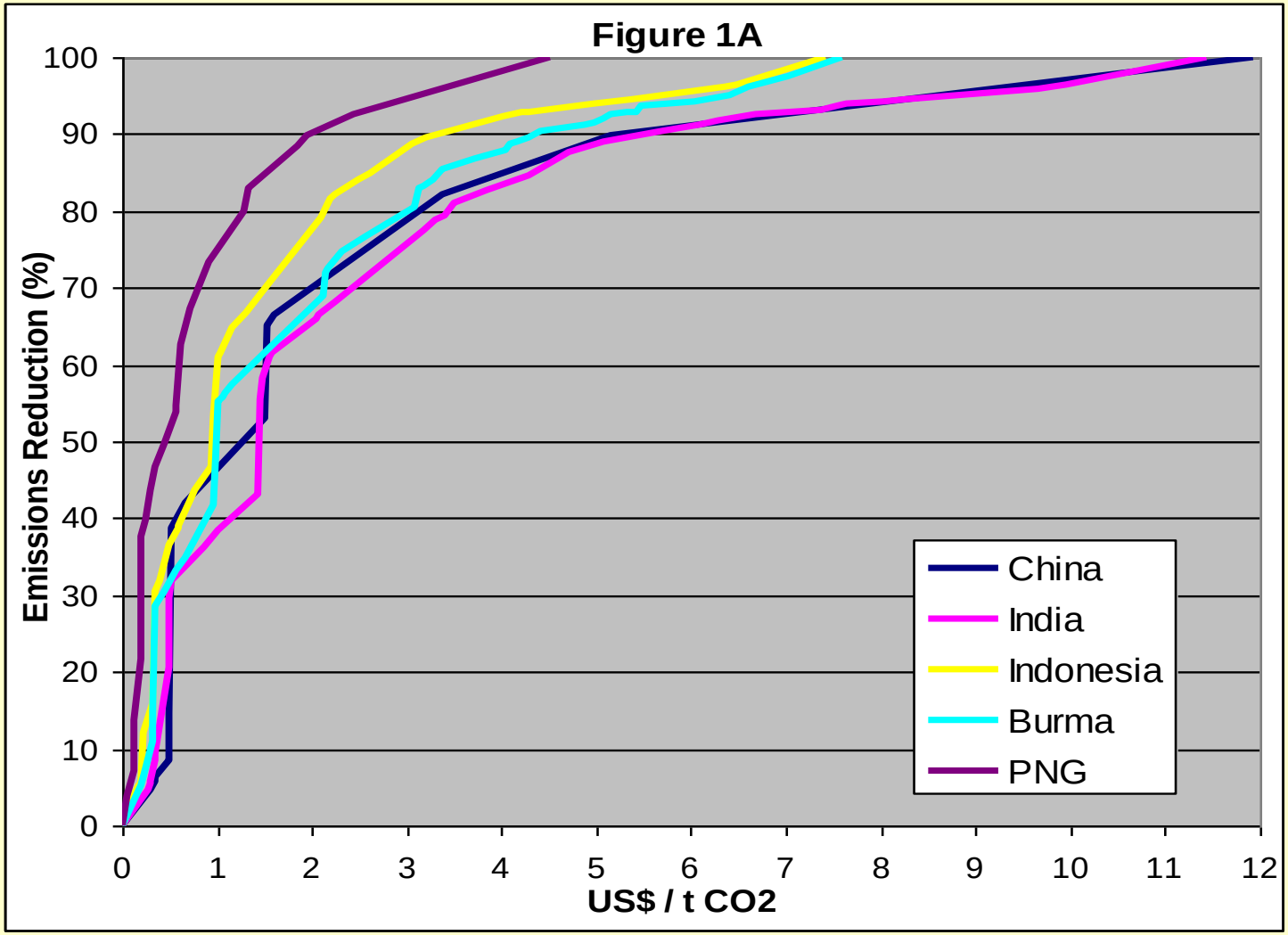
The Cross-scale Dynamic Approach Brazilian Amazon



Current Total Ecosystem Benefits:		US$ 80
Conservation Costs:		US$ 50
Current National Benefits:		US$ 18.5
Compensation Necessary (A):		**US$ 4,5 billion/yr**
		US$ 13,4 / ha / yr
Emission Reduction Cost	**=**	**US$ 3 / t CO2**
Opportunity Costs:		US$ 47.5
Op. Costs – Current Nat. Benefits:		US$ 29

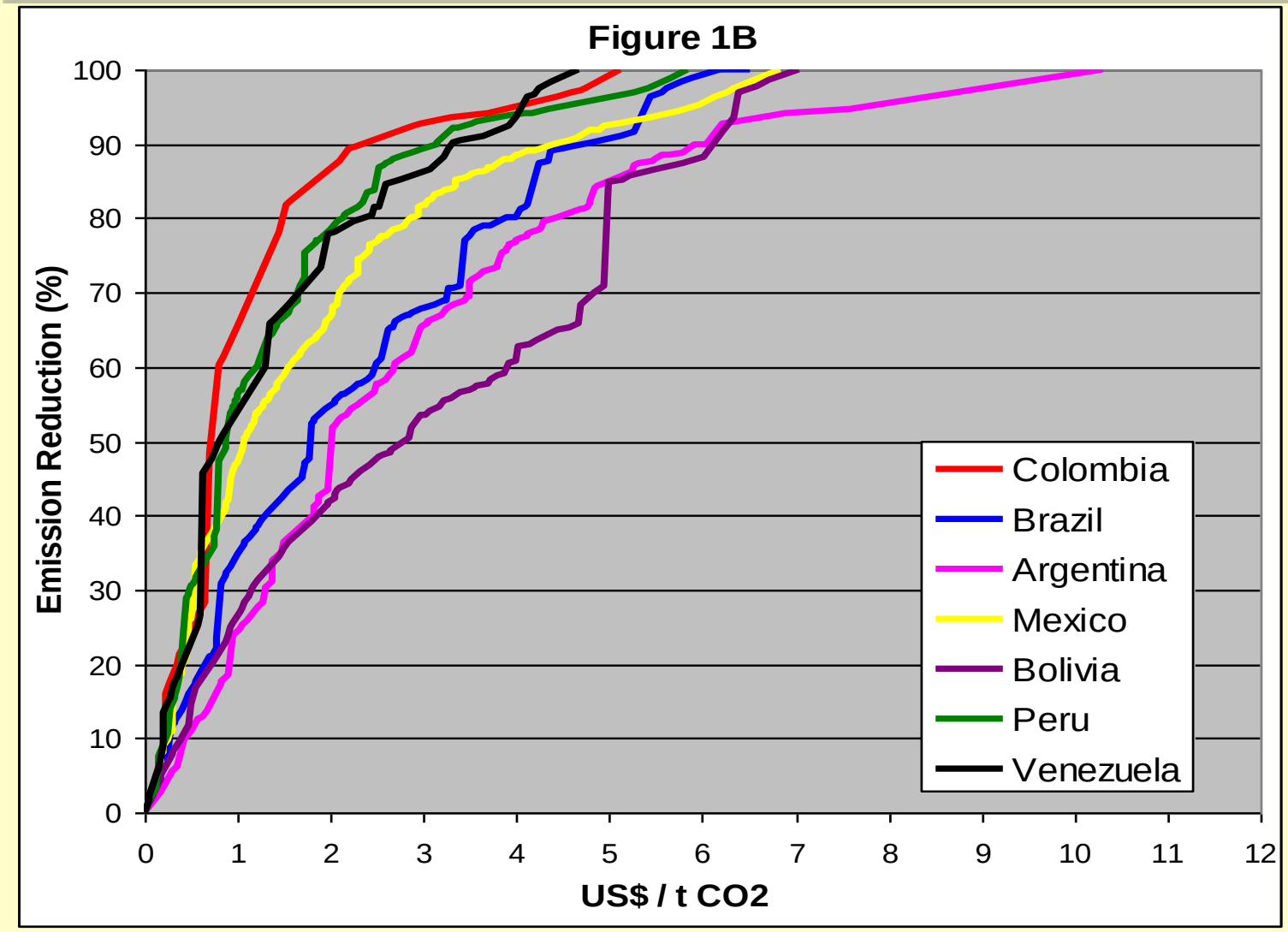
Custos do REDD:
Estimativas Nacionais e Globais

Potential Reductions per Base Incentive (Asia)



Strassburg et al., 2009 – Global Env. Change

Potential Reductions per Base Incentive (Americas)



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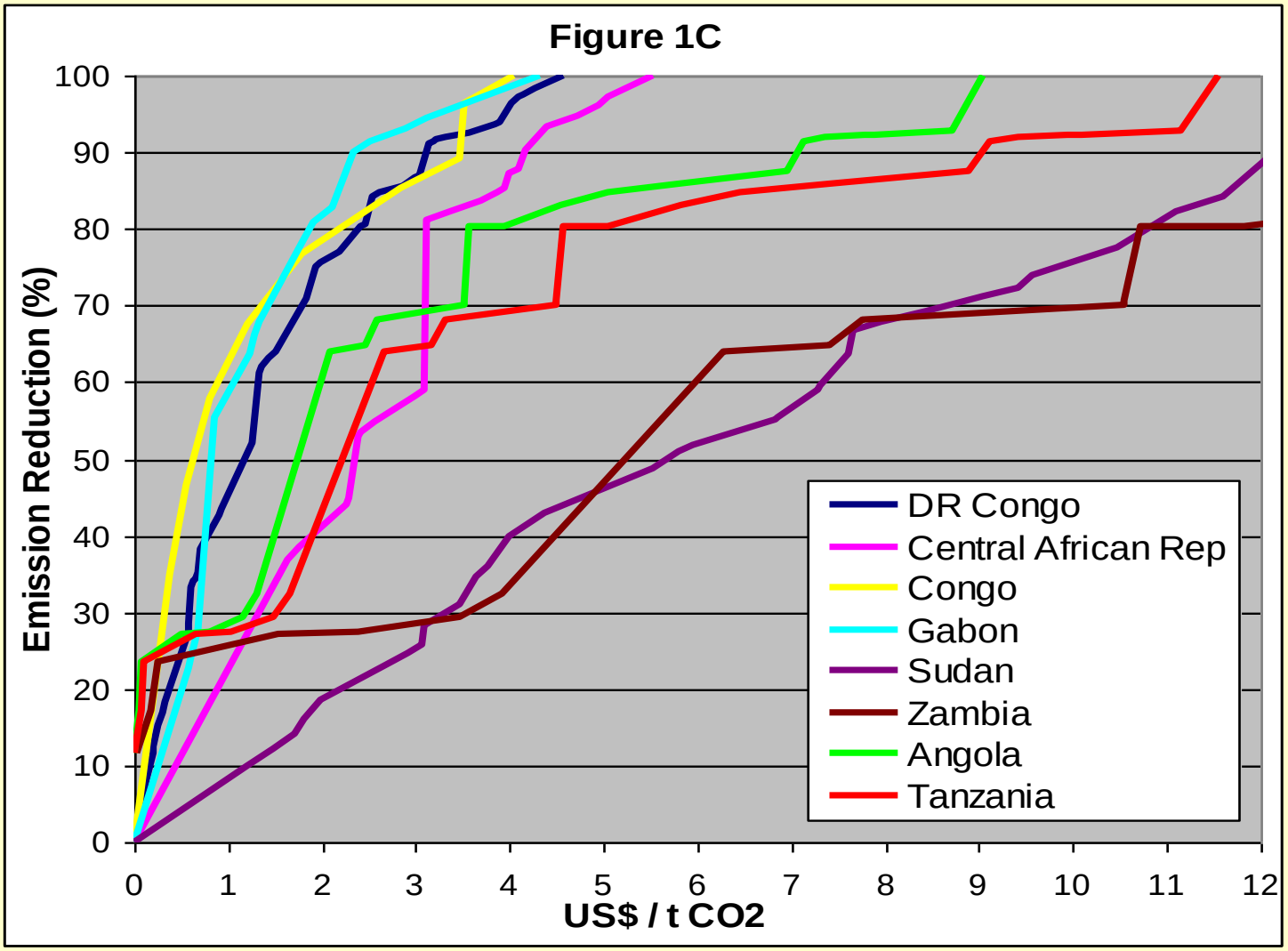
Potential Reductions per Base Incentive (Africa)



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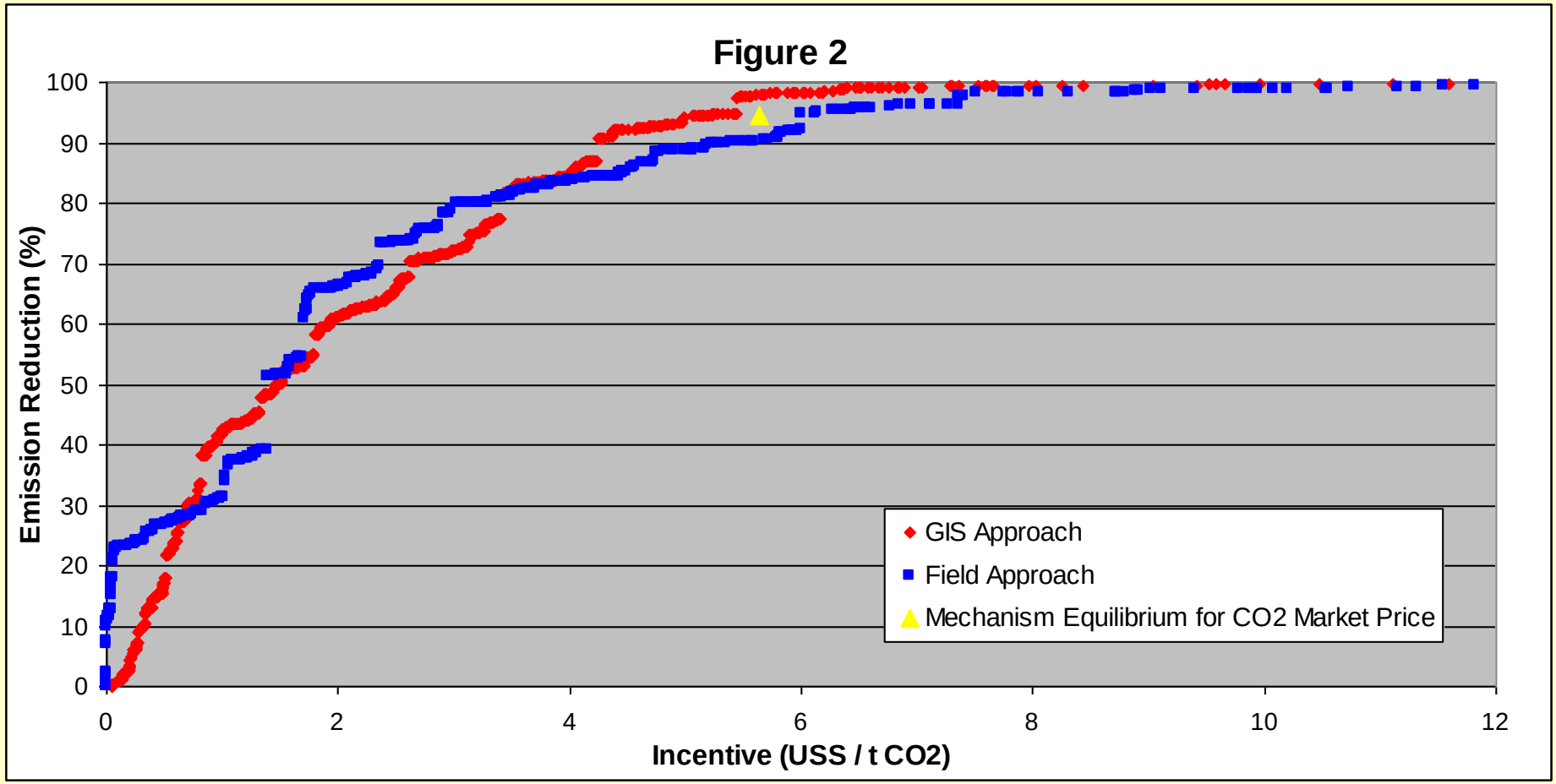
RED (%) per base incentive



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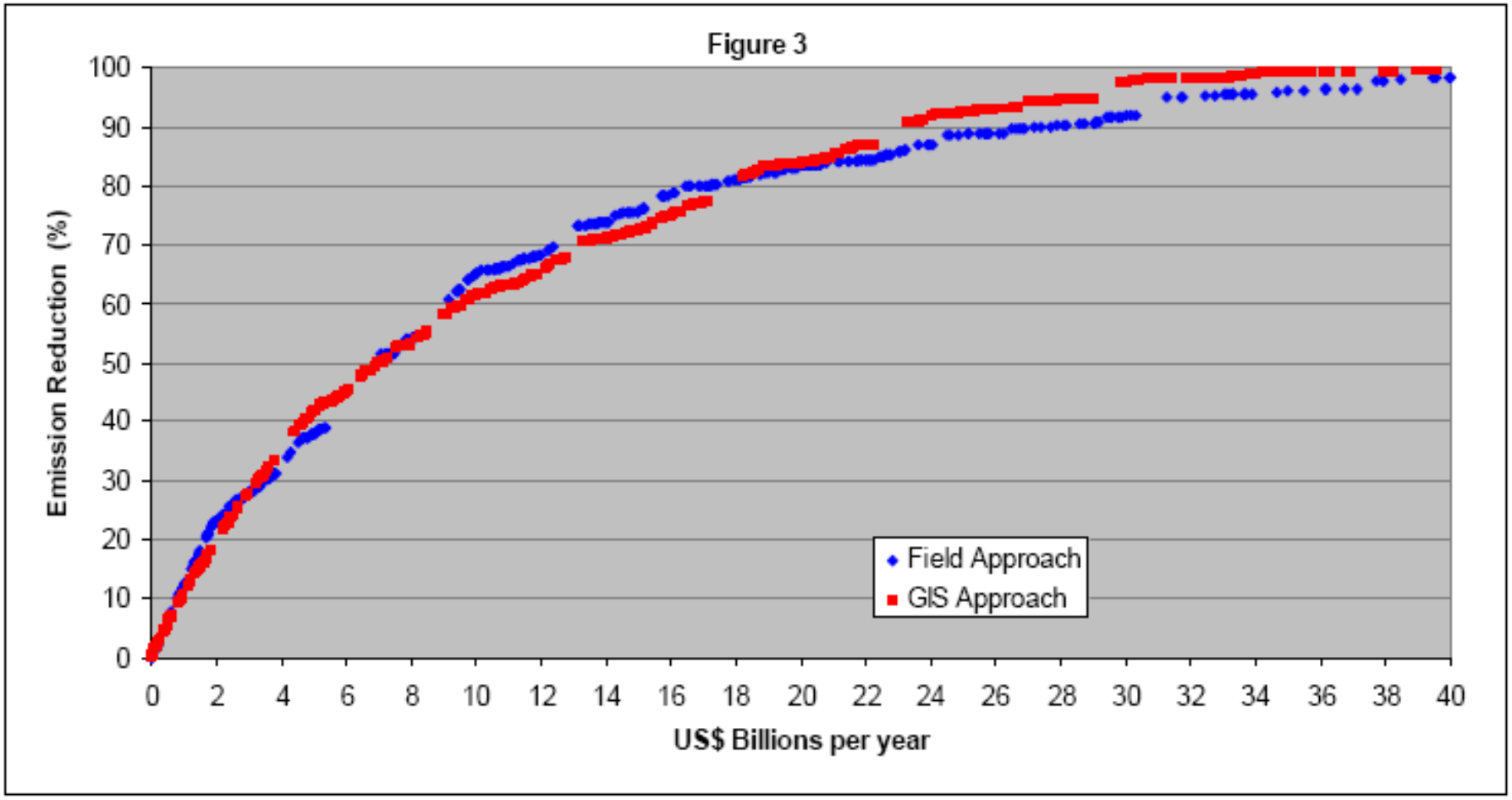
Global Costs of RED



Strassburg et al., 2009 – Global Env. Change

Costs of REDD

- Take home message #2:

REDD is one of the most cost-effective mitigation options: ~90% of emissions from deforestation can be reduced for less than US$ 20 / t C;

The “Combined-Incentives” Mechanism

Our Mechanism

- Based on simulated behaviours using recently available data;

- Designed to be
  - Comprehensive (targets all countries)
  - Flexible (RED,REDD,Conservation,Reforest/Afforest)
  - Adjustable (Both across countries and time)
  - Simple and transparent

Our Mechanism

- Financing sources flexibility*
  - Market oriented (demand created, credits traded);
  - Fund oriented (Rich countries provide resources);
  - Mix
    - ➥ As the mechanism is based on a incentive per avoided tonne, it works with all;
- “Downwards” flexibility*
  - Incentives have to reach local agents
  - Very diverse national circumstances
  - Mechanism open to all options of internal allocation of incentives

**Both fitting into the “extended version”*

Long-term mechanism

- Underlying causes of deforestation connected with long-term development policies of national governments;
- Sustainable RED must influence these;
  - e.g. Transport infrastructure
- Slightly different design might be necessary in the first few years

Our Mechanism – National Version

Operates at national level, each country an independent unit:

Each country is offered 2 kinds of incentive

- Incentive to reduce its emissions in from its past emissions

$$I1 = (PE - Et) \times \$k$$

- Incentive to emit less then it would emit if it followed the global baseline rate

$$I2 = (EE - Et) \times \$k$$

- The relative weight of each incentive might be different. The Combined Incentive formula is

$$CI = [\alpha(HE) + (1 - \alpha)(EE)] - Et \qquad (0 \leq \alpha \leq 1)$$

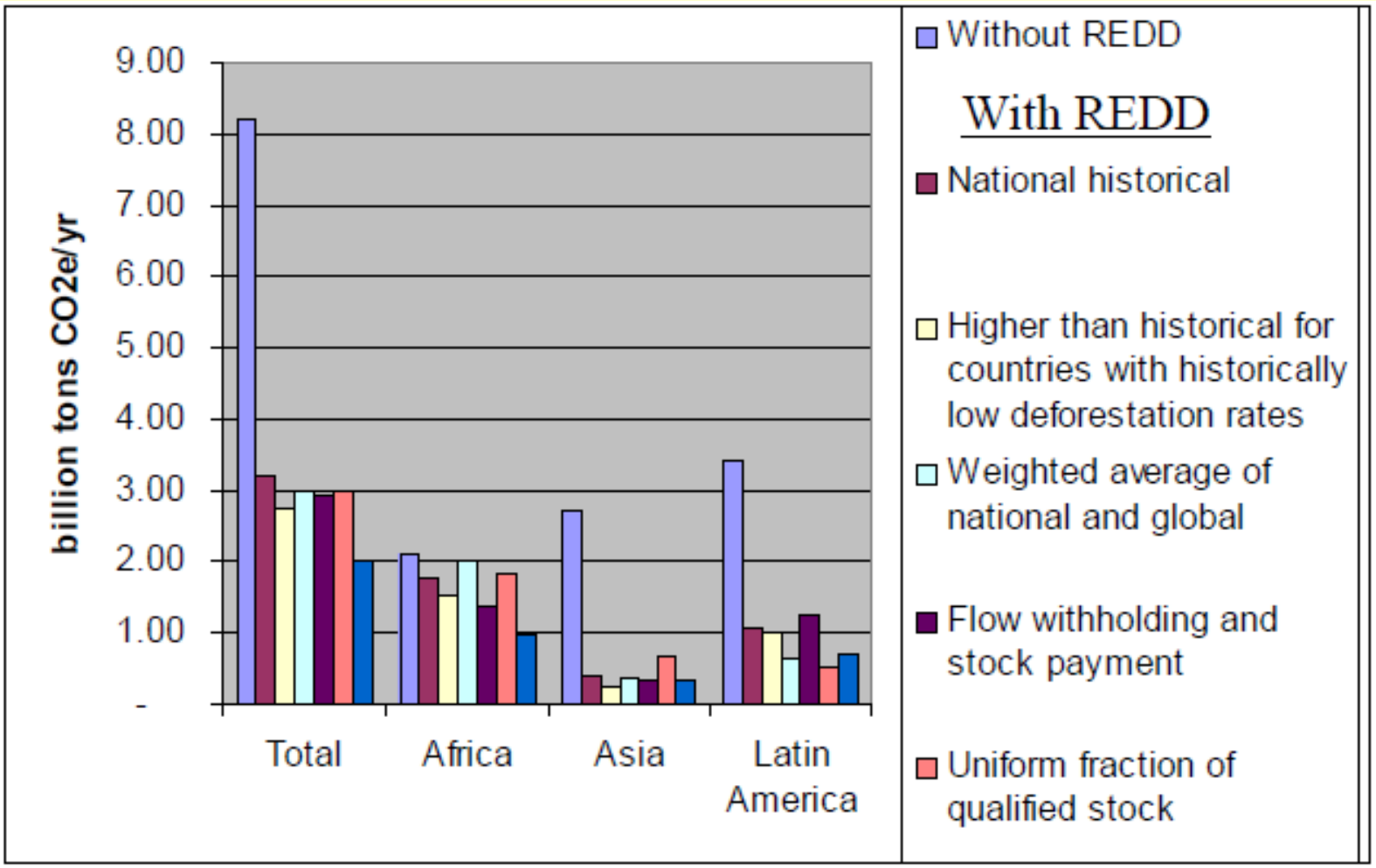
Combined Reference Levels

Country	Carbon Stock (Gt C)	Historical Emissions (Gt C)	Expected Emissions (Gt C)	Combined Reference Levels (Gt C)				
				α =1	α =0.9	α =0.75	α =0.5	α=0
Brazil	85,086	468	450	468	466	463	459	450
DR Congo	23,878	72	126	72	77	85	99	126
Indonesia	17,416	322	92	322	299	265	207	92
China	12,763	0	67	0	7	17	34	67
TOTAL	**242,857**	**1,284**	**1,284**	**1,284**	**1,284**	**1,284**	**1,284**	**1,284**

Strassburg et al., 2009 – Global Env. Change

Comparative Analysis of REDD mechanisms

REDD is an effective, efficient source of emissions reductions



Busch, J., Strassburg, BBN et al. (2009)
submitted to *Environmental Research Letters*]

Comparative Analysis of REDD Mechanisms

- Take Home Message #3:

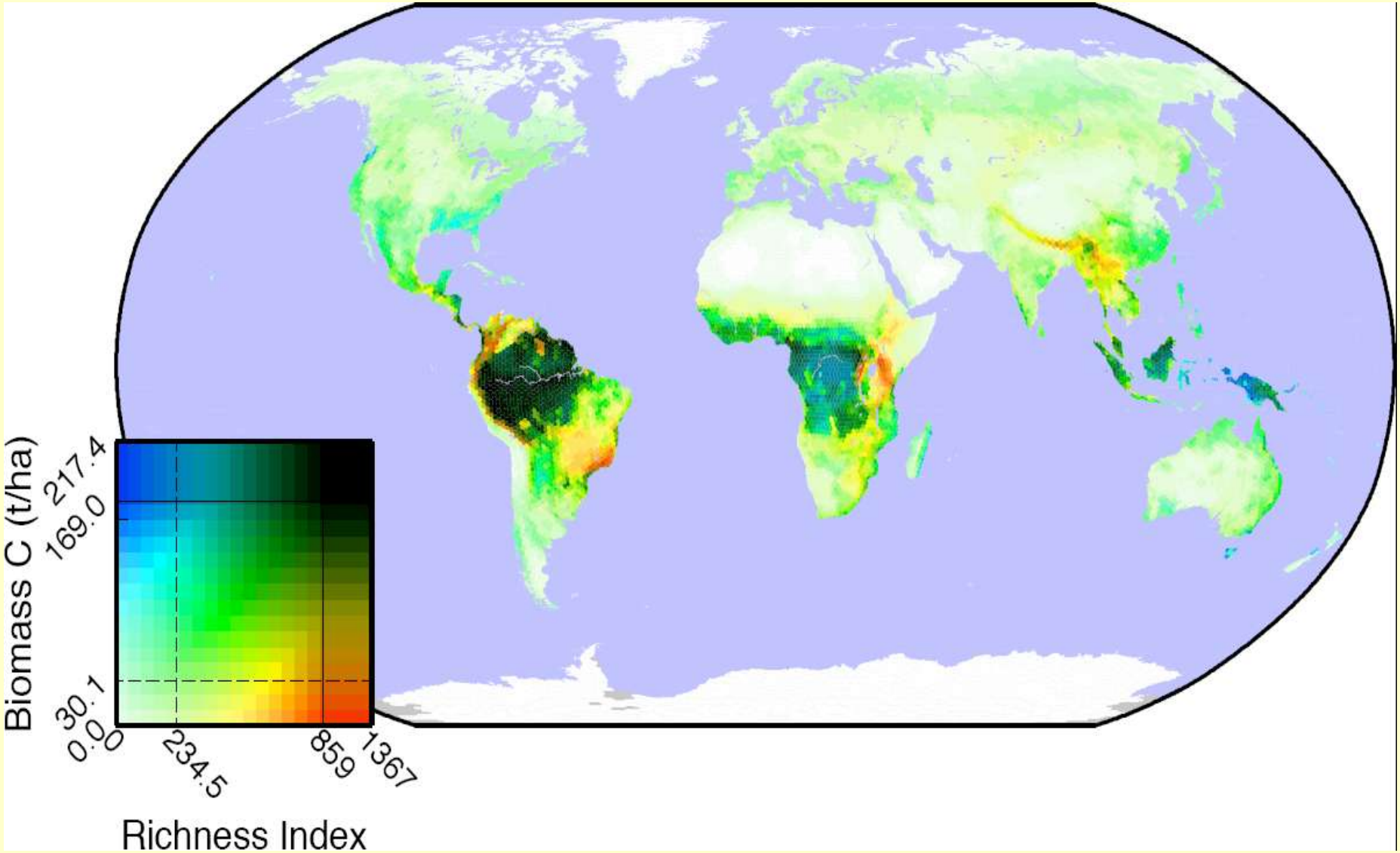
  The big difference is between no REDD and any REDD mechanism;

- Take Home Message #4:

  Incentives for low-deforesting countries are needed to avoid leakage

Carbono e biodiversidade em nível global: duplo benefício para a conservação ?

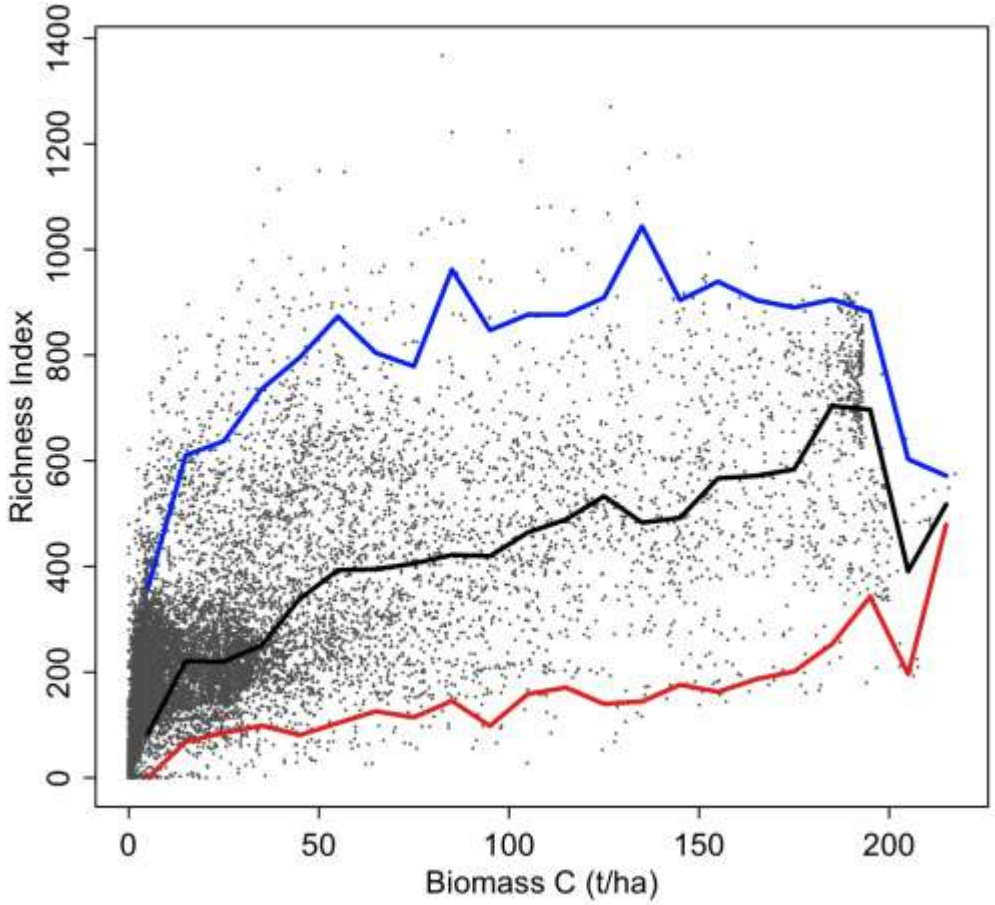
Global Biomass & (Vertebrate) Biodiversity Richness



Strassburg et al., 2009 – submitted to *Science*

Variability on biodiversity gains for similar biomass levels

Suggests potentially large gains for biodiversity conservation with minor or no losses for carbon storage if REDD is not blind for biodiversity;



Conclusões

Conclusões

- REDD é essencial para as metas climáticas globais;
- REDD é uma opção com custo relativamente baixo;
- Vários mecanismos sugeridos, todos muito melhores do que não fazer nada;
- Incentivos também devem chegar aos países com baixo desmatamento histórico;
- Grandes benefícios potenciais para biodiversidade, mas ganhos expressivos são possíveis, sem prejuízo para mitigação de carbono, se o REDD levar em consideração a distribuição de espécies;

Unprecedented opportunity

Regardless of which mechanism is adopted, a successful one would ***reduce*** a major part of ***GHG emissions***, ***improve*** the livelihoods of some of the ***poorest people*** on the planet and ***safeguard*** the habitat of more than half of ***Earth's species***.

Win – Win – Win

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Muito Obrigado

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