



International Institute for  
Applied Systems Analysis  
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science for global insight

# COP21: From Decarbonization to Carbon Management

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Session: Global Climate, Ecosystems, and Biological Sequestration  
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IIASA, International Institute for Applied Systems Analysis

# Why (bio-)carbon management is important for Climate Change ?

Sources and fate of anthropogenic CO<sub>2</sub> emissions (2004-2013)

32.4±1.6 GtCO<sub>2</sub>/yr 91%

Fossil fuel emissions



+

3.3±1.8 GtCO<sub>2</sub>/yr 9%

Deforestation emissions

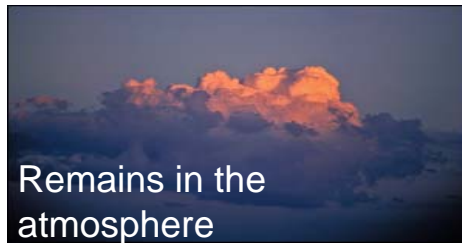


(Global Carbon project 2014)

15.8±0.4 GtCO<sub>2</sub>/yr

44%

Remains in the  
atmosphere



10.6±2.9  
GtCO<sub>2</sub>/yr

29%

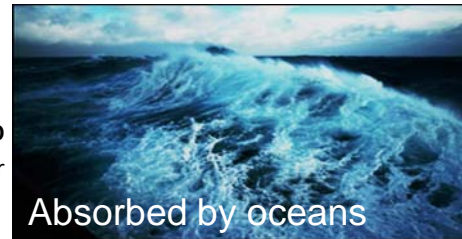
Absorbed by forests



26%

9.4±1.8 GtCO<sub>2</sub>/yr

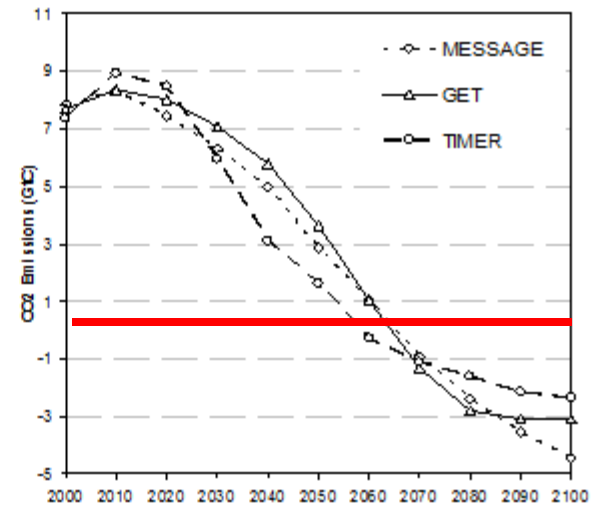
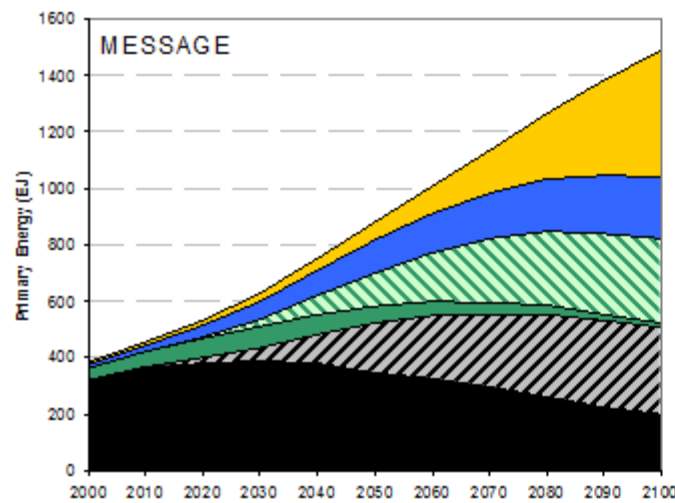
Absorbed by oceans



Carbon from land is part of the problem and part of the solution...

# Climate Risk Containment is about ensuring the option to reach 0-2DG target

*Major Land Use Challenge*



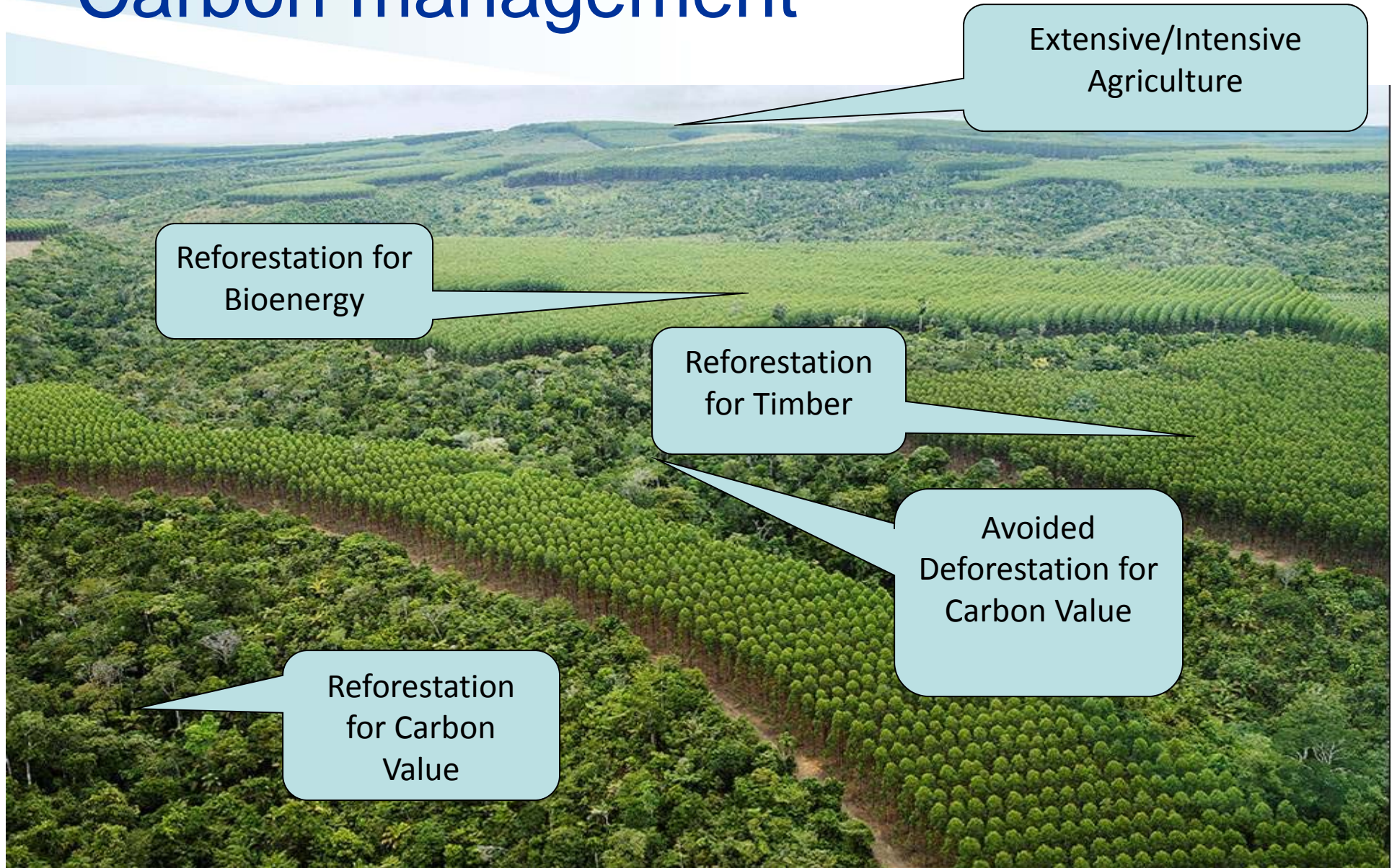


# Baseline Land Use



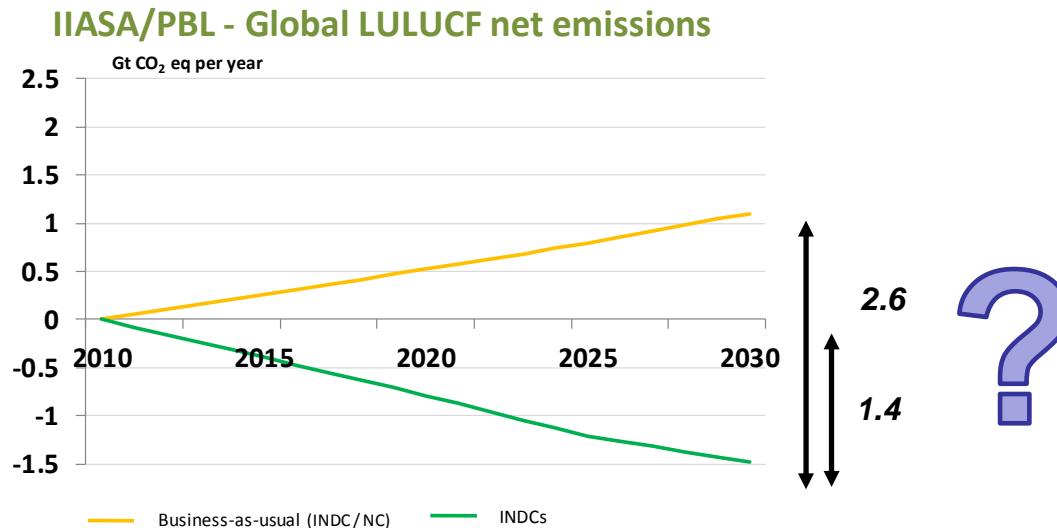


# Carbon management

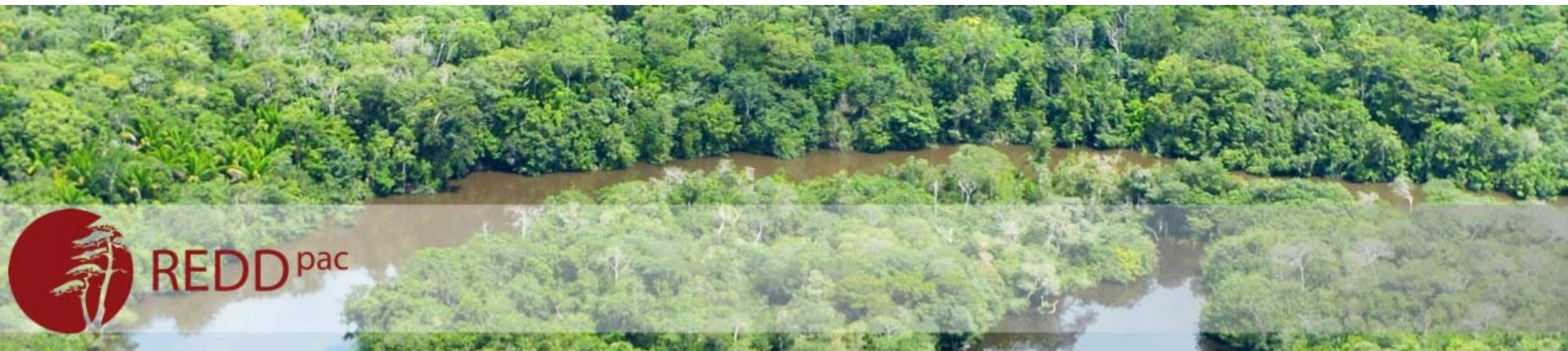


## INDCs impacts on the LULUCF sector

- The expected contribution from LULUCF in meeting INDC at global level is about 20-25% of total emission reduction.







# Background calculations for the Brazilian INDC



National Institute for Space  
Research - Brazil

GOVERNO FEDERAL  
**BRASIL**  
PÁTRIA EDUCADORA



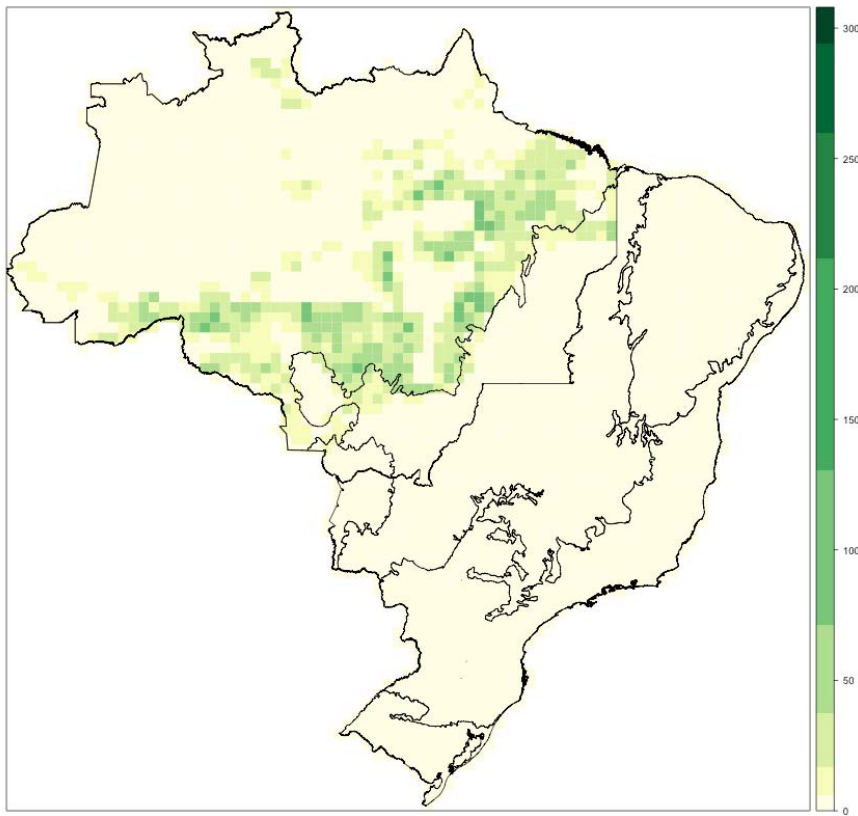
IIASA, International Institute for Applied Systems Analysis

# Validation



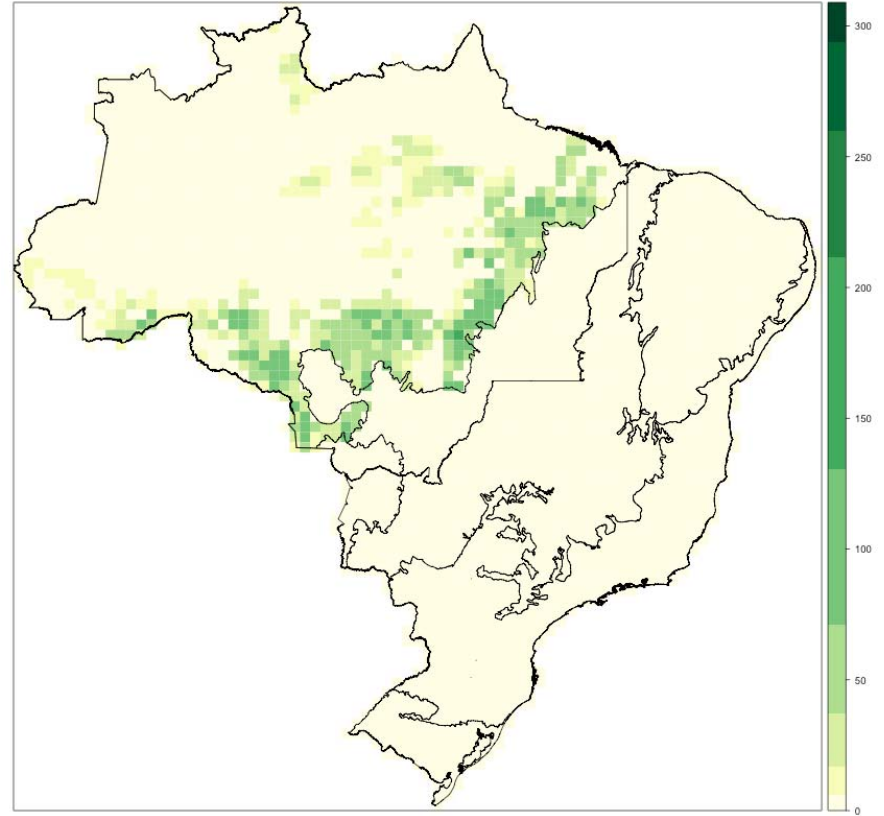
# Deforestation in Amazon Biome

PRODES



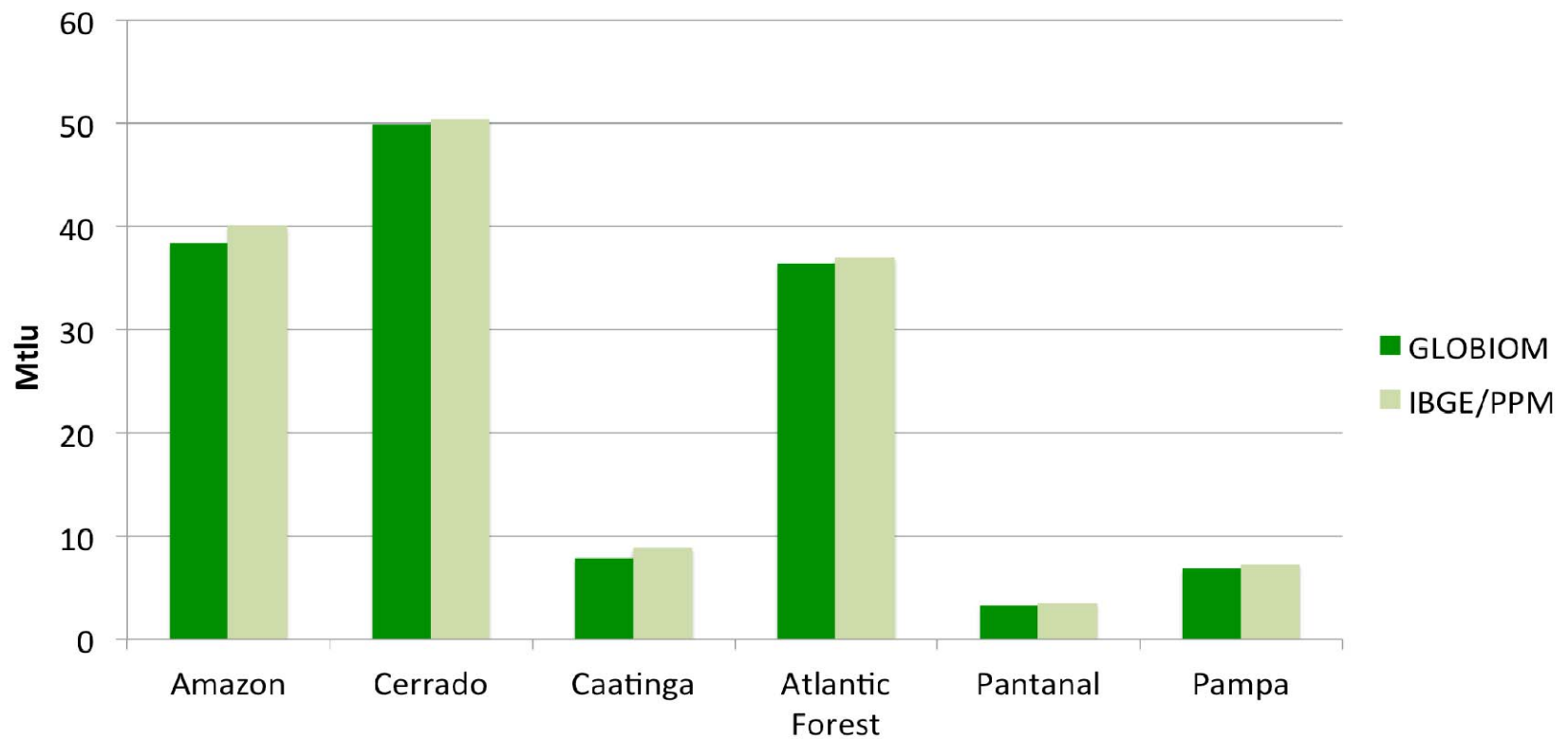
16.53 Mha

GLOBIOM



16.93 Mha

# Bovine Numbers – 2010

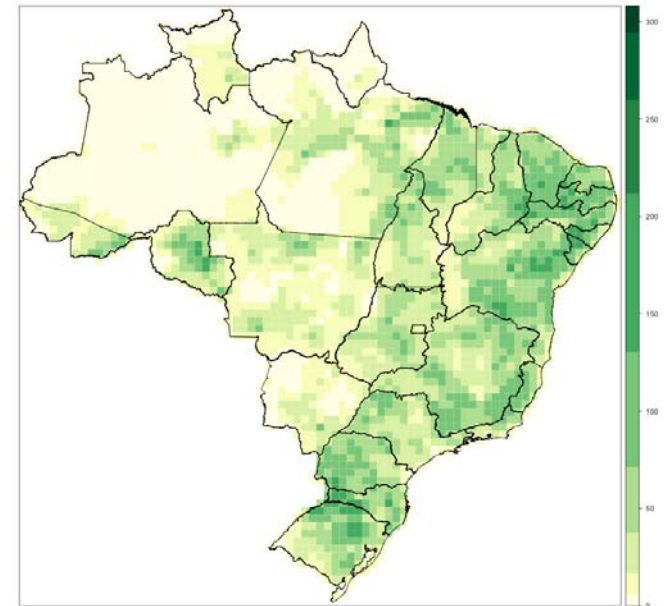
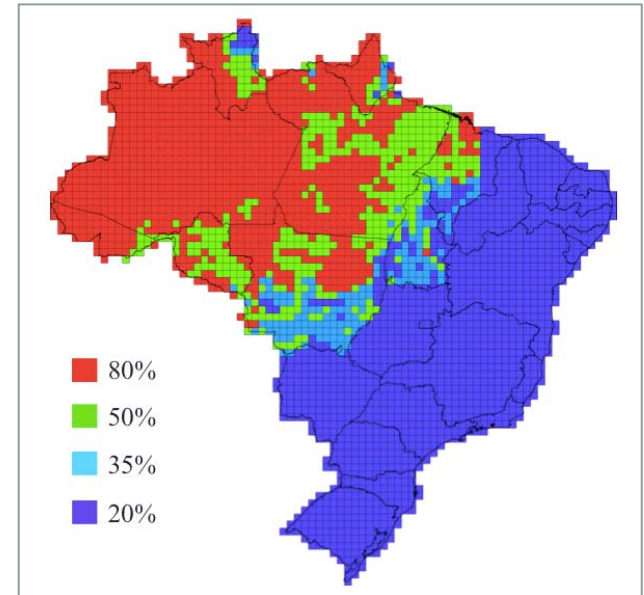


# INDC GLOBIOM-Brazil Scenarios



# Brazil's new Forest Code Main Dispositions

- Legal Reserves (LR)
- Small Farms Amnesty (SFA)
- Environmental Reserve Quota (CRA) mechanism
- Illegal Deforestation Ban (IDB)

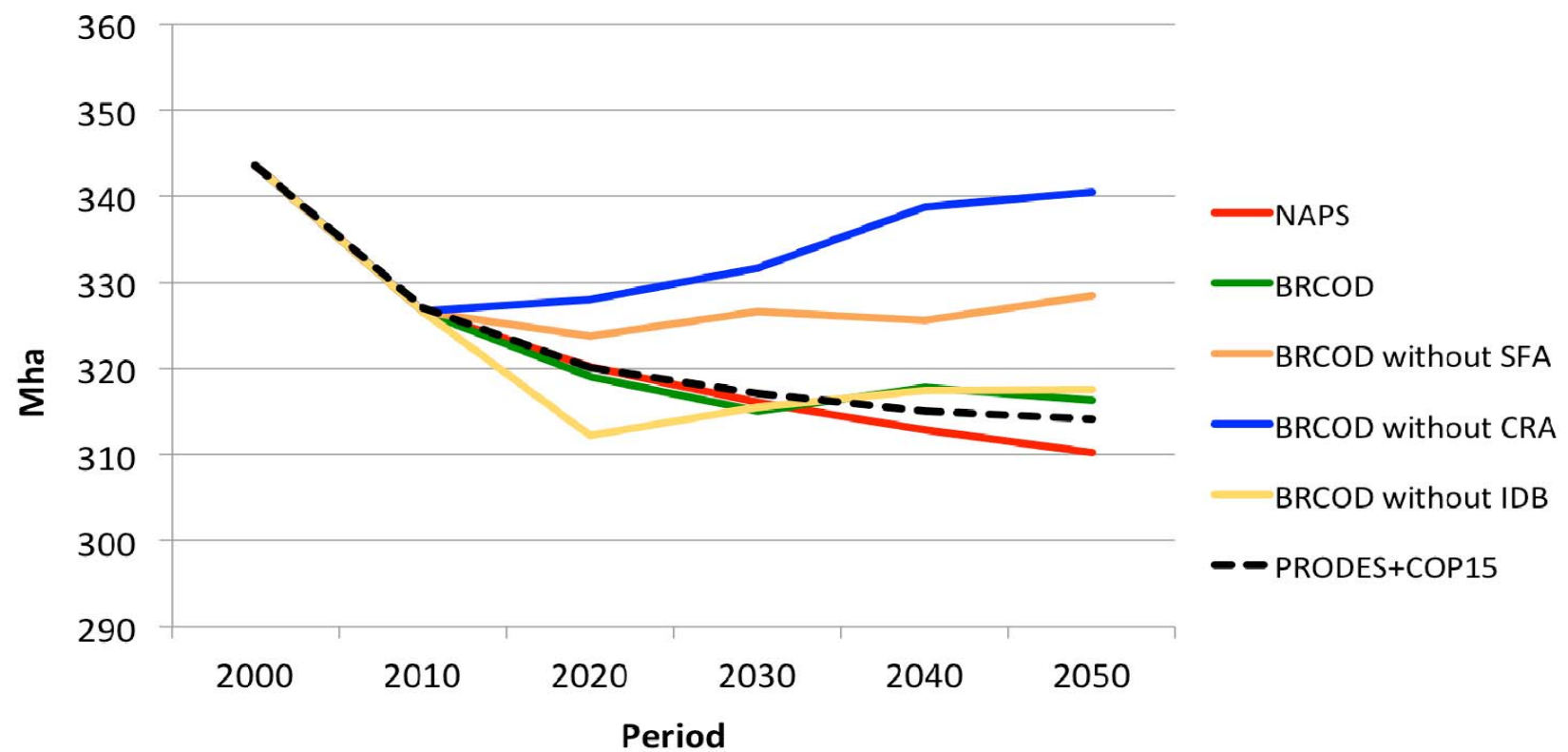


LEI Nº 11.428, DE 22 DE DEZEMBRO DE 2006.

**PPCerrado**

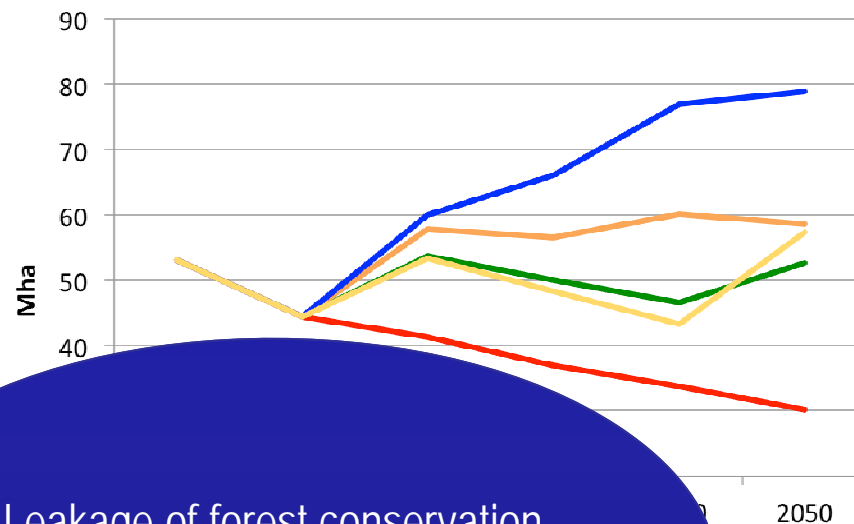
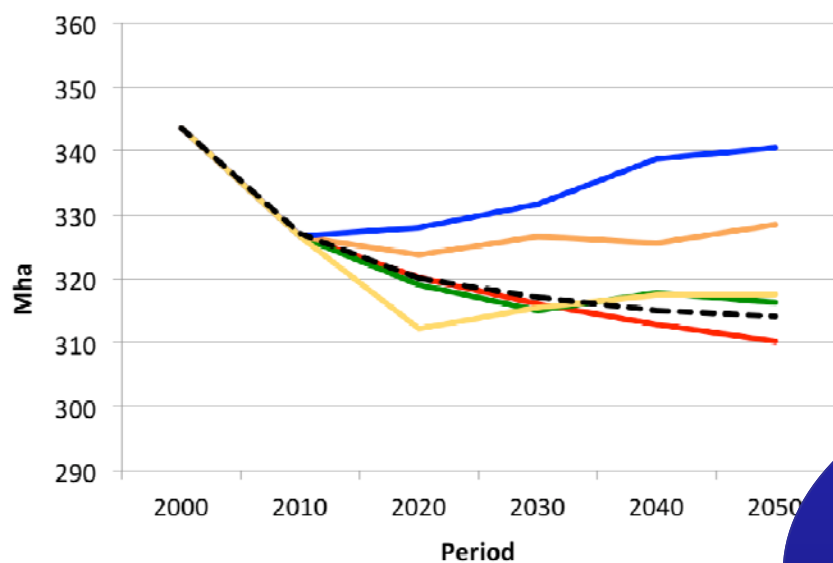
# Forest

# Forest – Amazon Biome

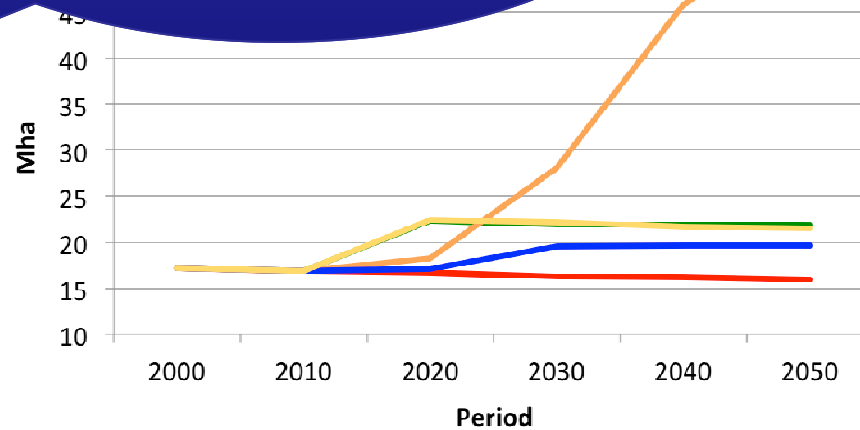
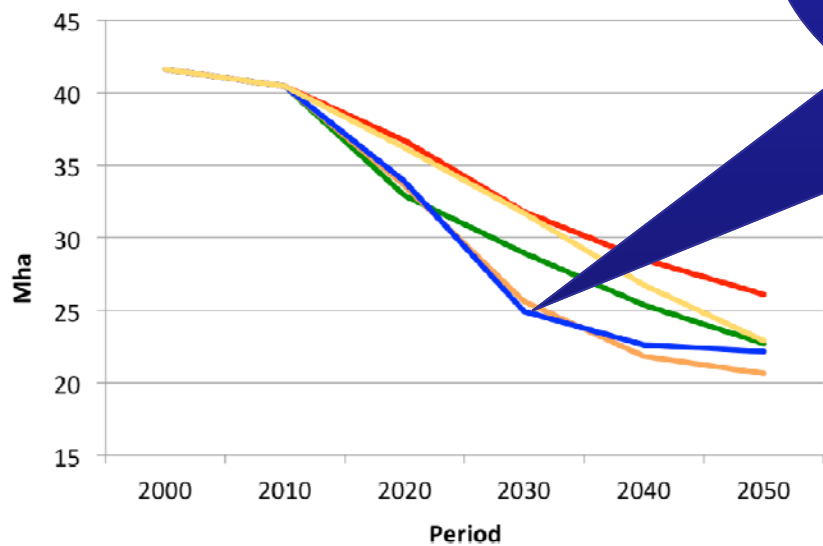




— NAPS — BRCOD — BRCOD without SFA — BRCOD without CRA — BRCOD without IDB

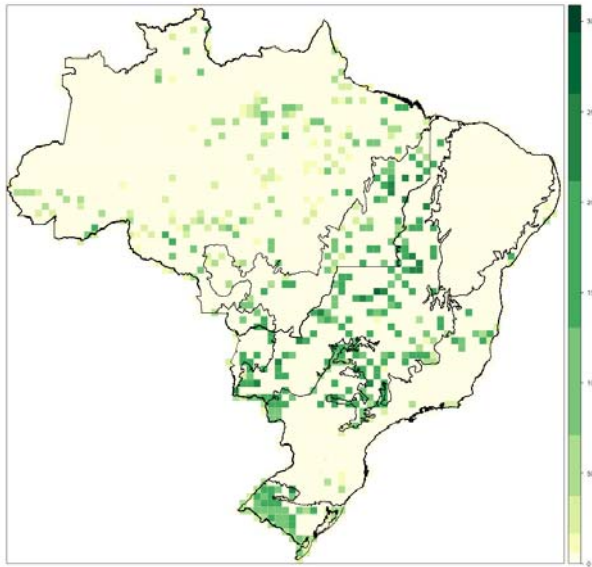


Leakage of forest conservation  
by driving the Ag Frontier into the  
Caatinga



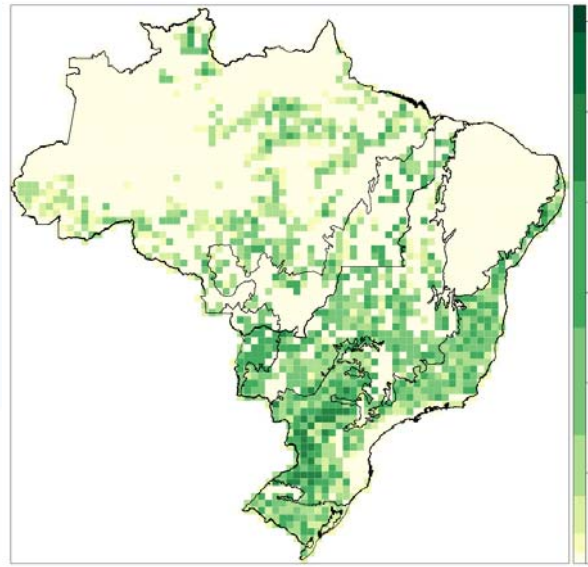
# Forest Regenerating – 2050

BRCOD



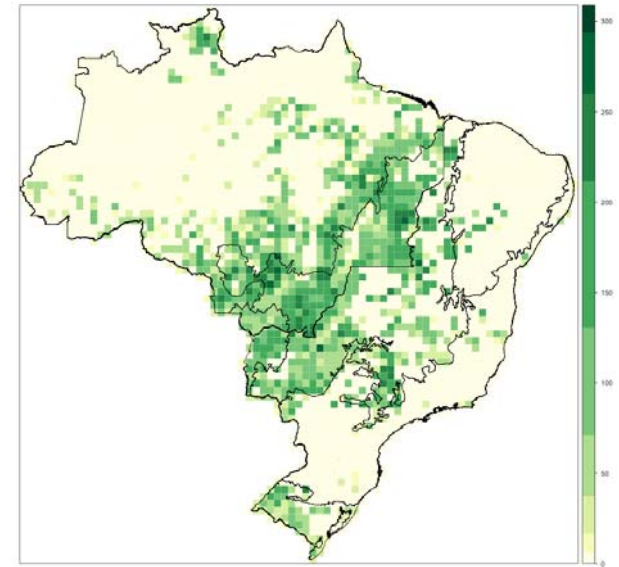
BRCOD without SFA

(Small Farm Amnesty)

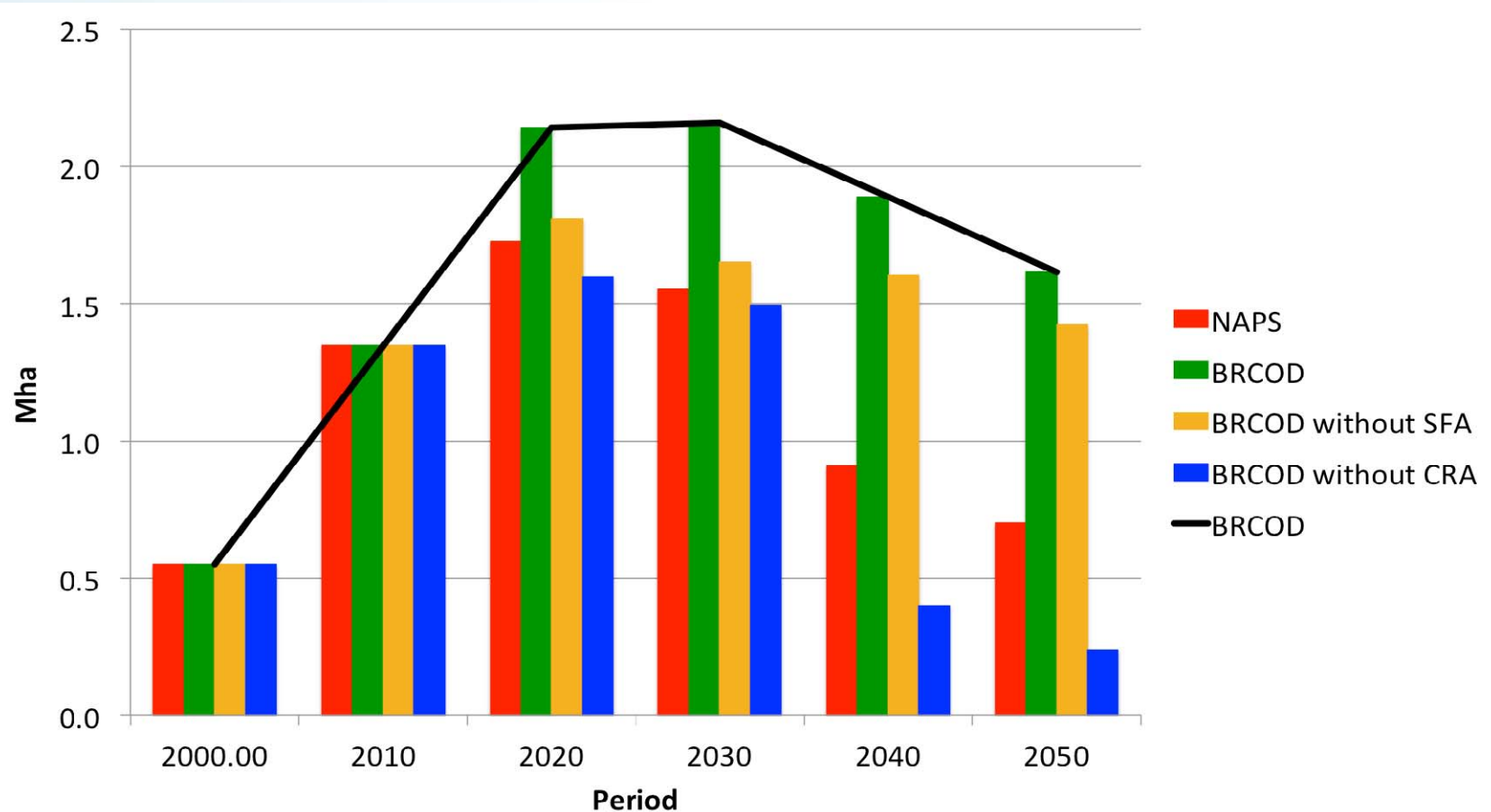


BRCOD without CRA

(Trading titles)

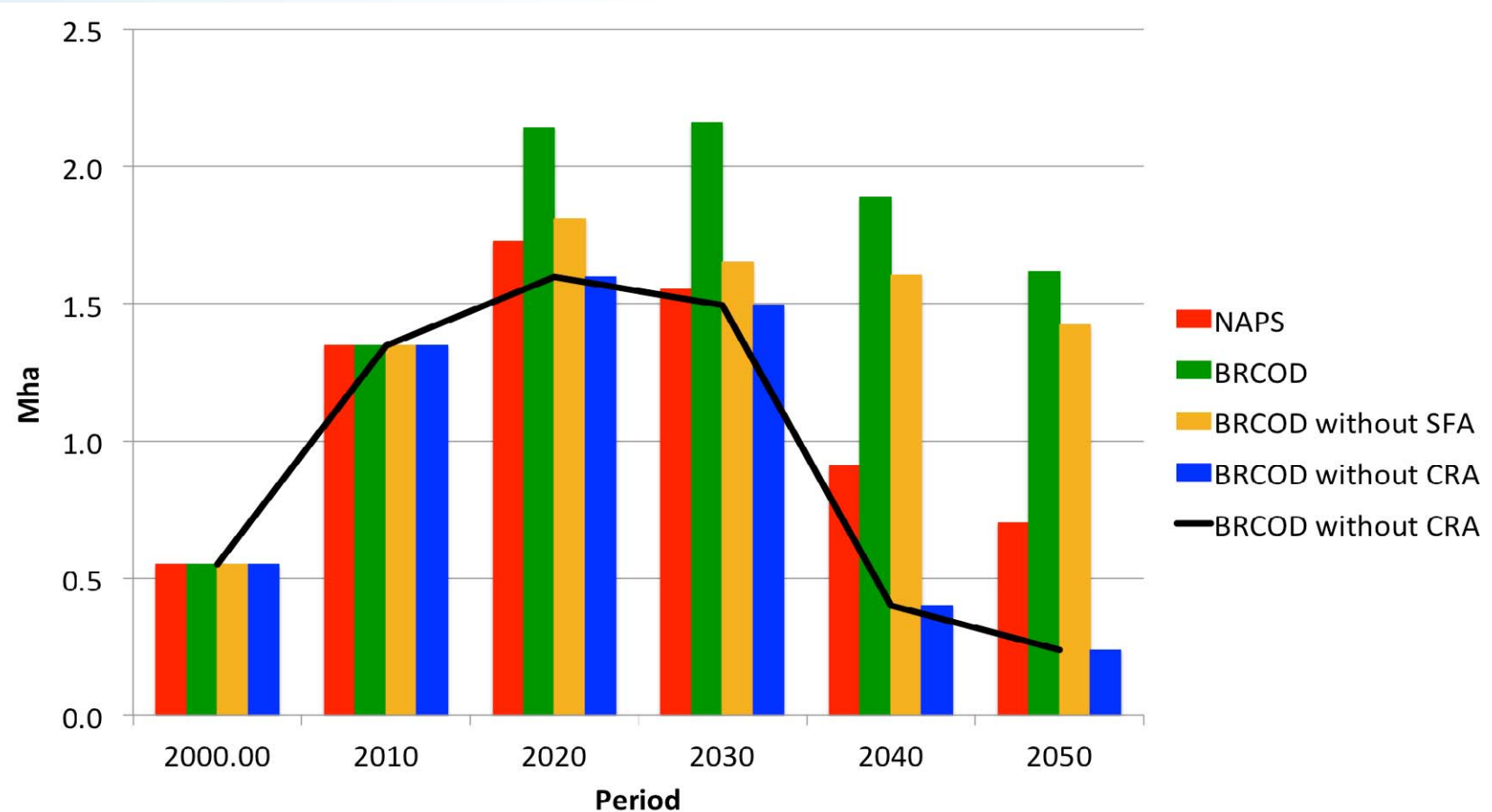


# Soya in Amazon Biome

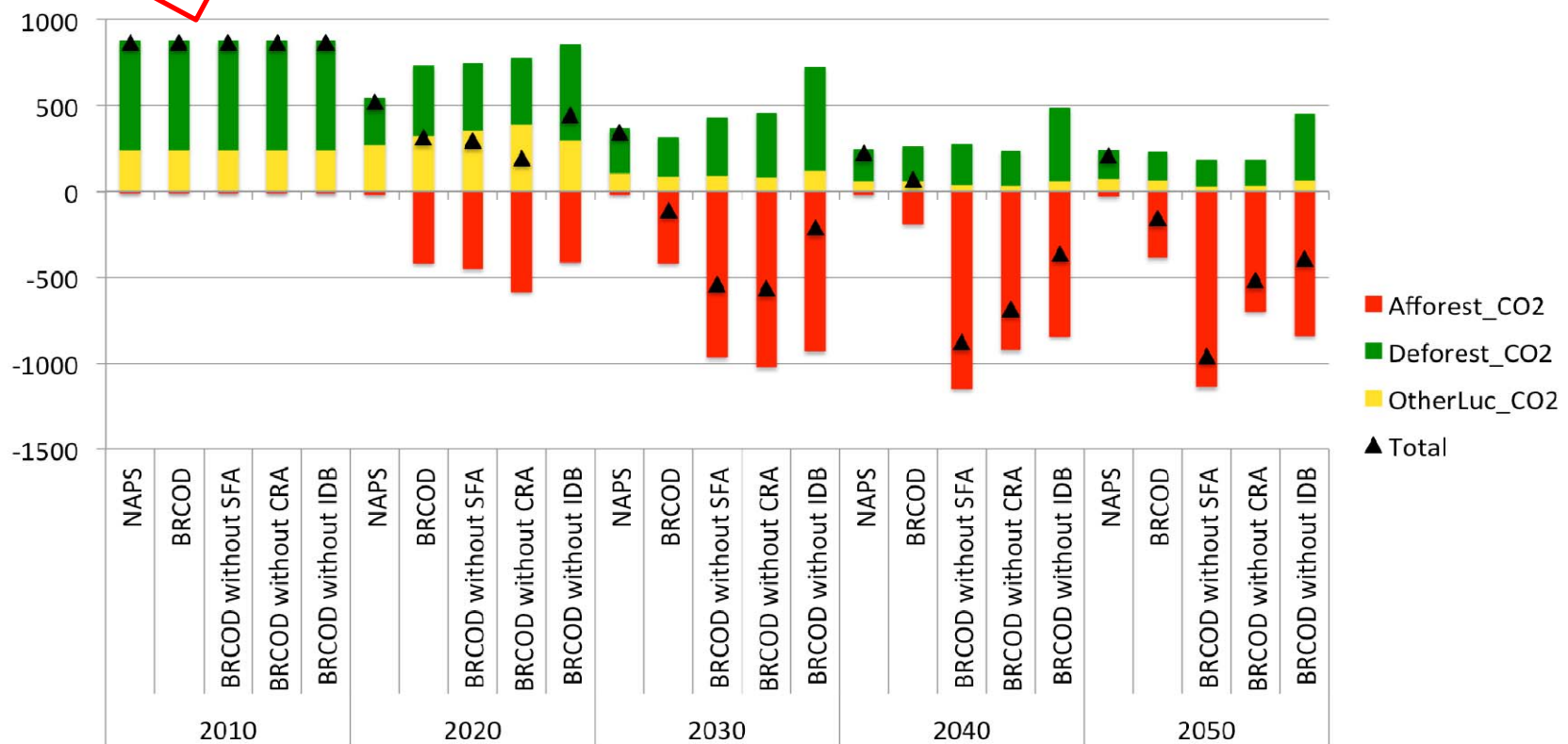




# Soya in Amazon Biome



# Peak Land use emissions occurred already!!!



# *Summary*

- **Decarbonization** is no longer enough
- Land Use emissions **peak(-ed)** earlier than fossil
- (IIASA tropical flagship)+ in support of **post INDC process**

# Ongoing Research

- Empirical evidence points to **weaker CO<sub>2</sub> fertilization**, but **stronger climate impacts**
- **Social and environmental implications** of this land use transformation are by orders of magnitude larger than in energy

=> Knowable Risks and Opportunities