

Meeting the challenges for countrywide conservation

Britaldo Silveira Soares Filho



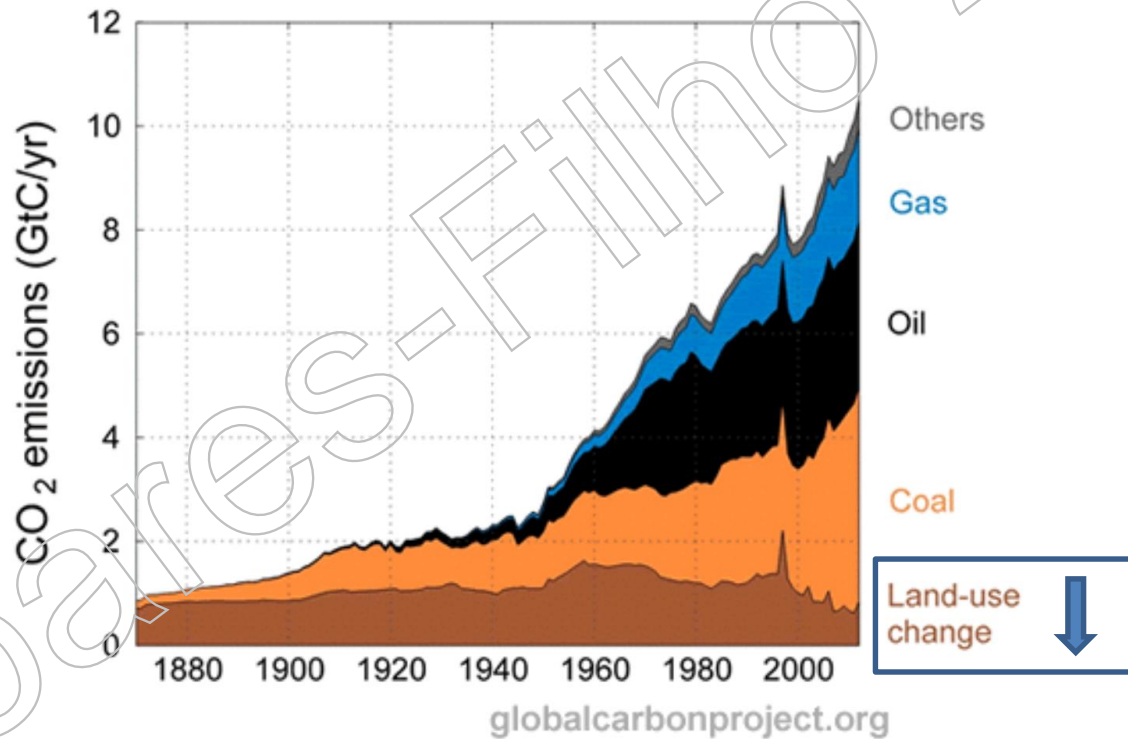
Centro de Sensoriamento Remoto
**UNIVERSIDADE FEDERAL DE
MINAS GERAIS**



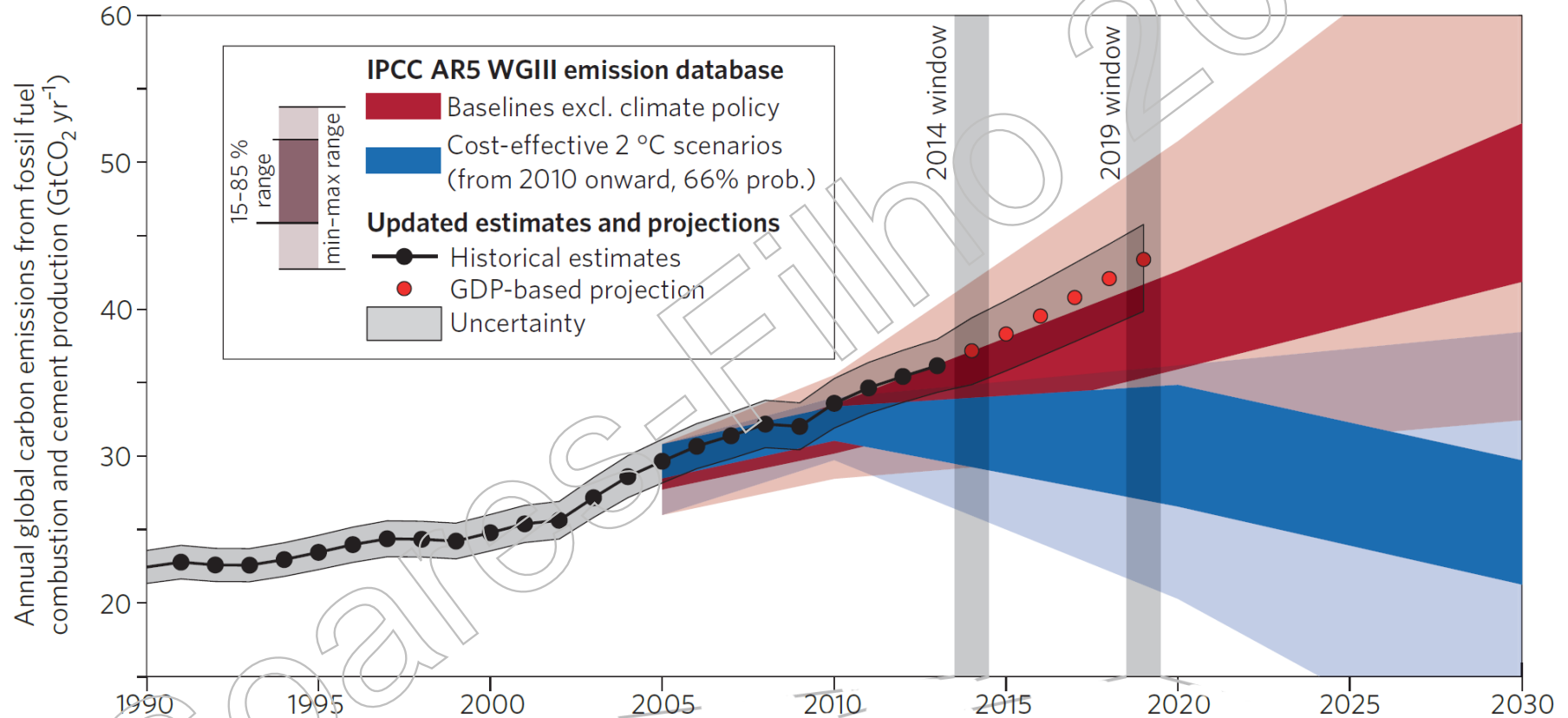
Bonn, March 30rd 2016

Global GH gases continue in full steam

Global Carbon Emissions By Source



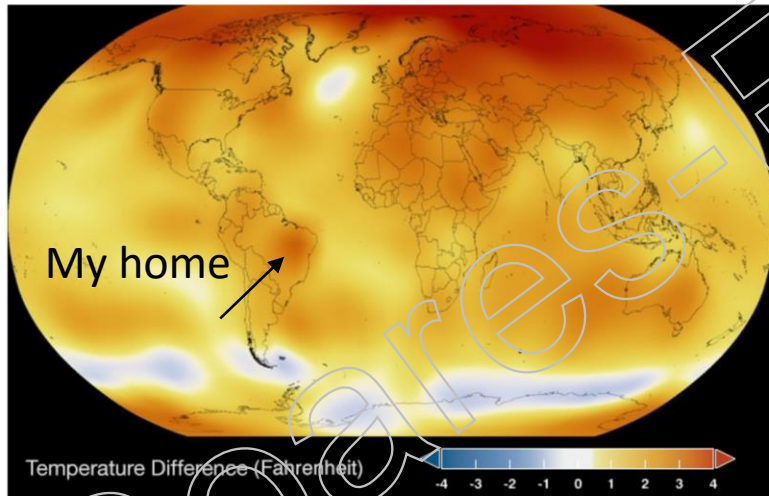
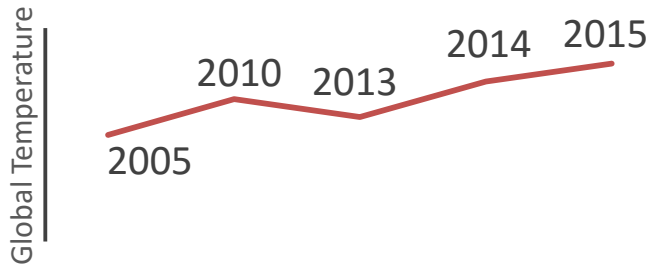
Window of opportunity is closing



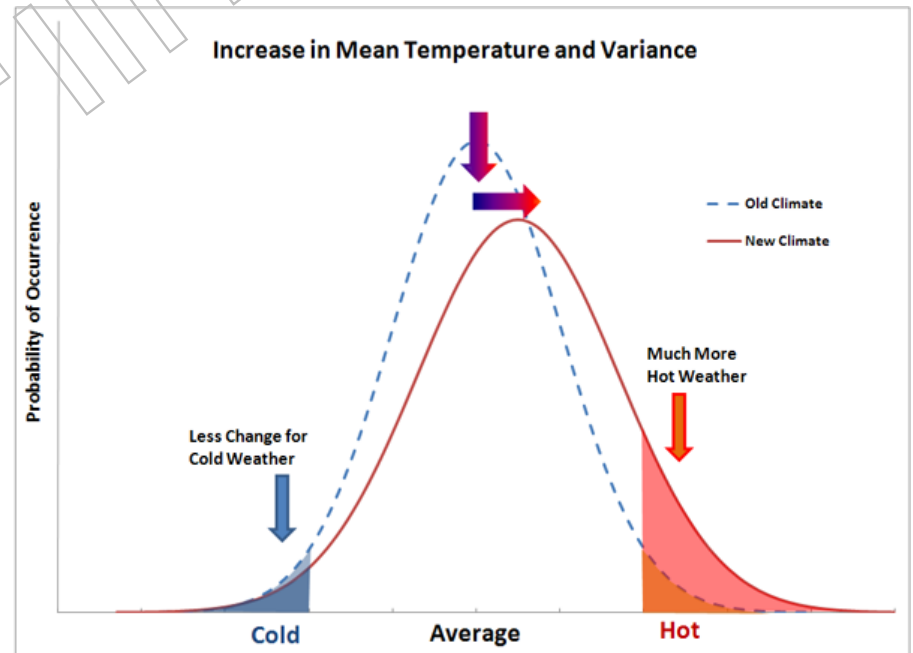
What to expect?

+0.87°.

The five warmest years ever:

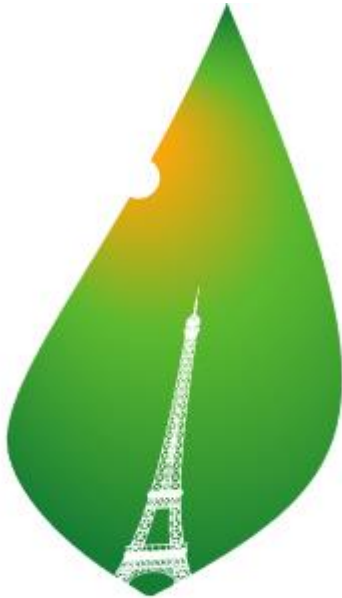


1884 2015
climate.nasa.gov/vital-signs/global-temperature/

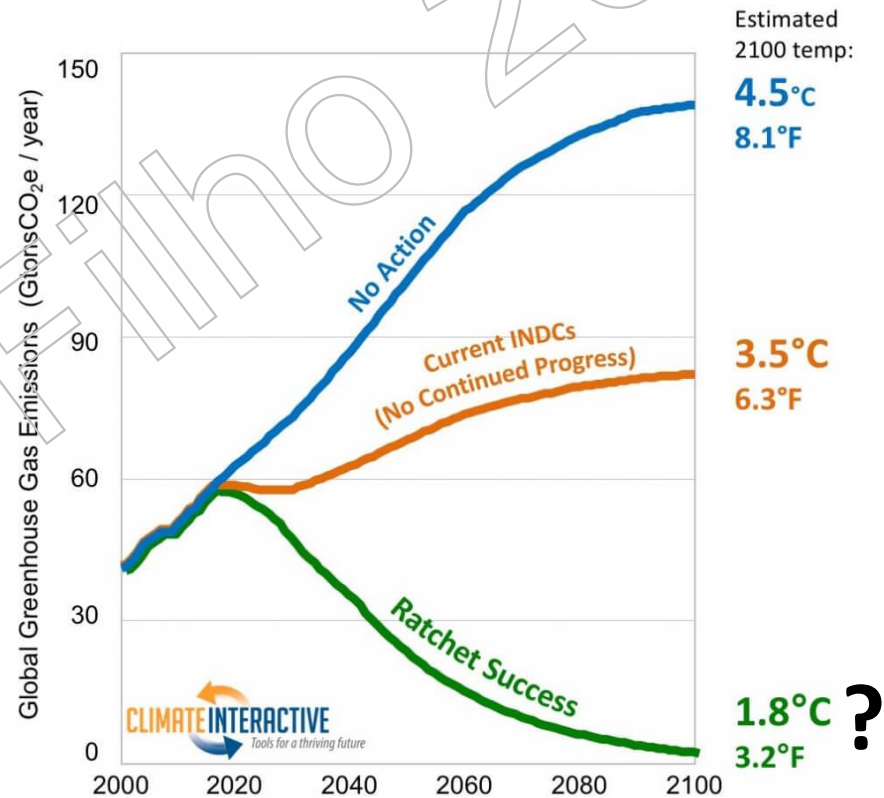


IPCC 2001

Paris 2015 agreement: Nationally Determined Contributions



PARIS 2015
UN CLIMATE CHANGE CONFERENCE
COP21·CMP11

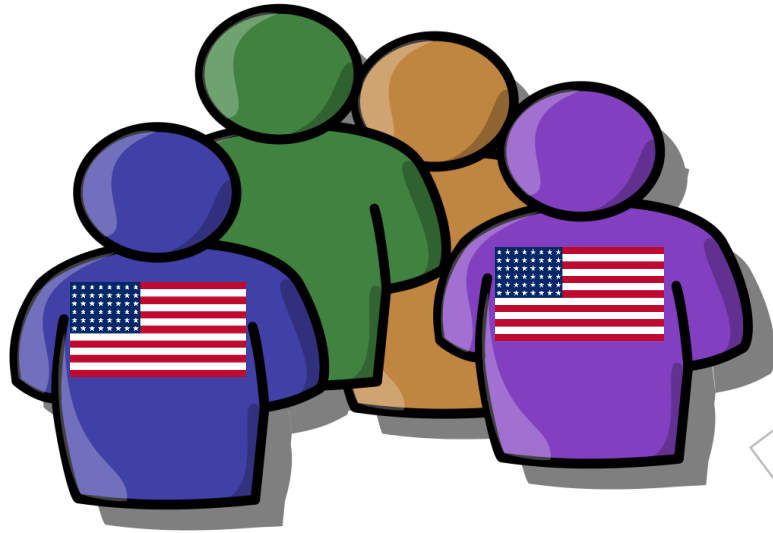


December 2015, www.ClimateScoreboard.org

Lessons from Brazil



Brazil is a leader in both achieving and committing to GHG reductions



17.2 CO₂eq tons.year⁻¹.person⁻¹



13.1 CO₂eq tons.year⁻¹.person⁻¹



5.7 CO₂eq tons.year⁻¹.person⁻¹

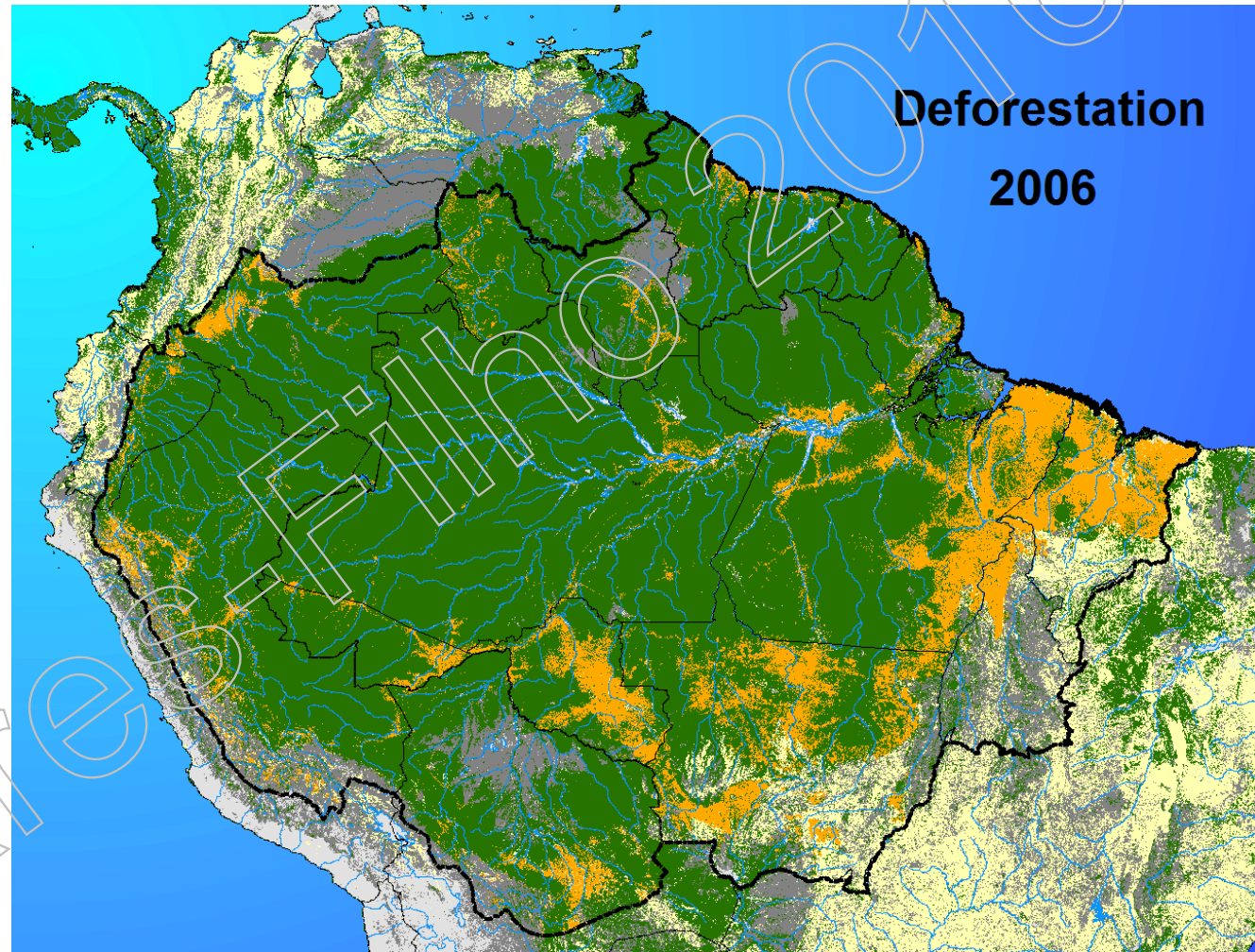


9.4 CO₂eq tons.year⁻¹.person⁻¹



5.4 CO₂eq tons.year⁻¹.person⁻¹

The fate of the Amazon under a BAU scenario

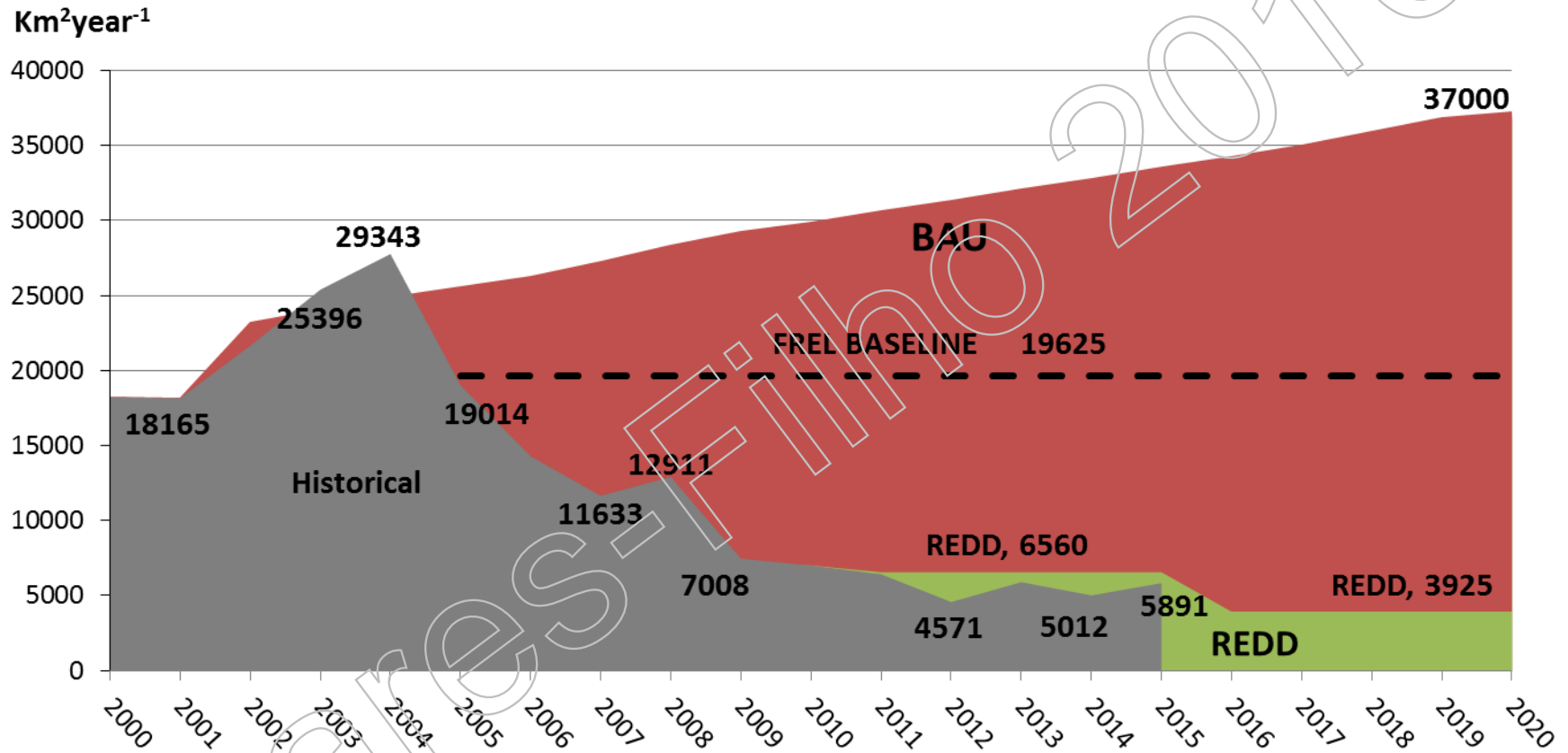


SimAmazonia. *"Landmark presentation of scenarios of development and conservation policies"*

Davidson et al. 2012

Soares-Filho et al. 2006

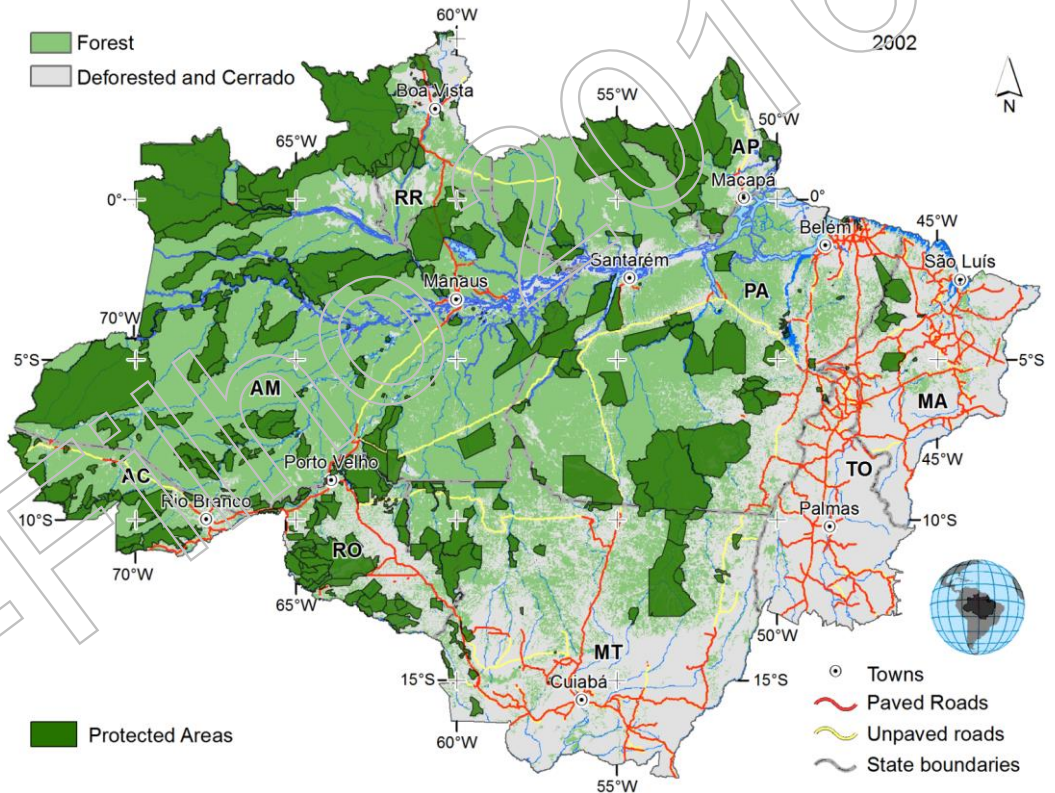
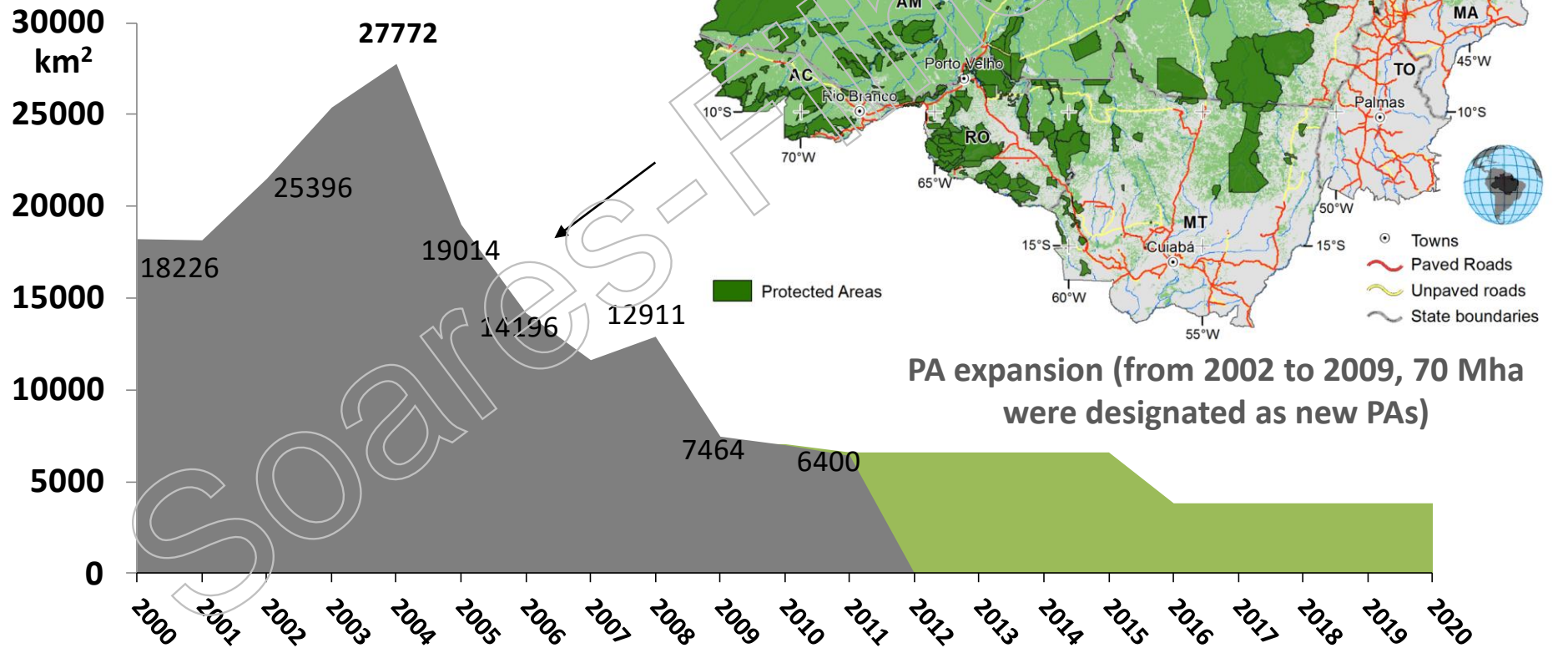
What happened?



From 2004 deforestation in the Amazon plummeted by 80%, more than 2 billion tons of CO_2 reduced from the 1996-2005 baseline.

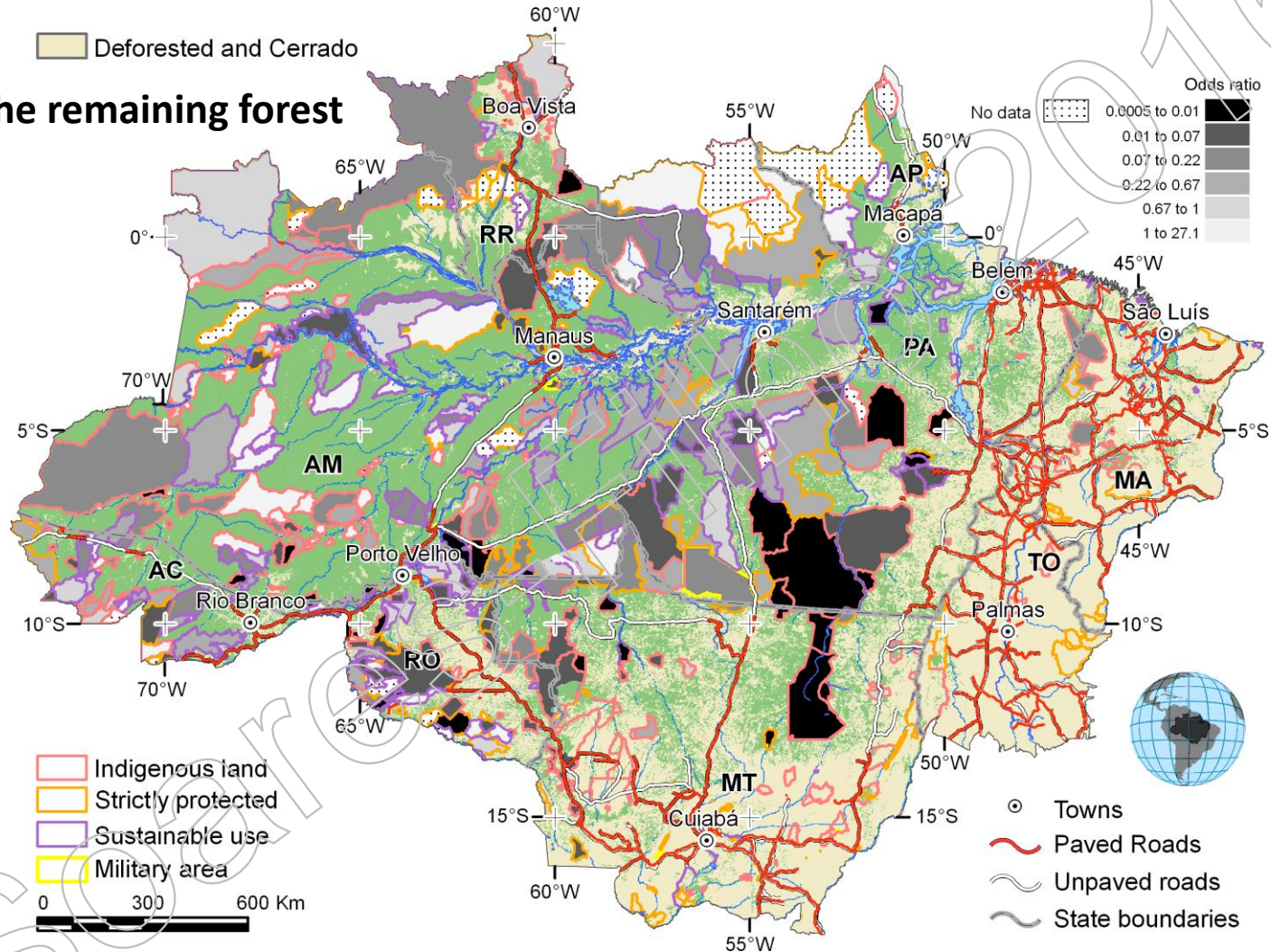
Nepstad et al. 2009

What caused this precipitous decline?



New paradigm in PA history (green barriers)

≈50% of the remaining forest



Effective in locally deterring deforestation without leakage

Soares-Filho et al. 2010

But what else? More command and control (IBAMA, Federal policy, public prosecutors)

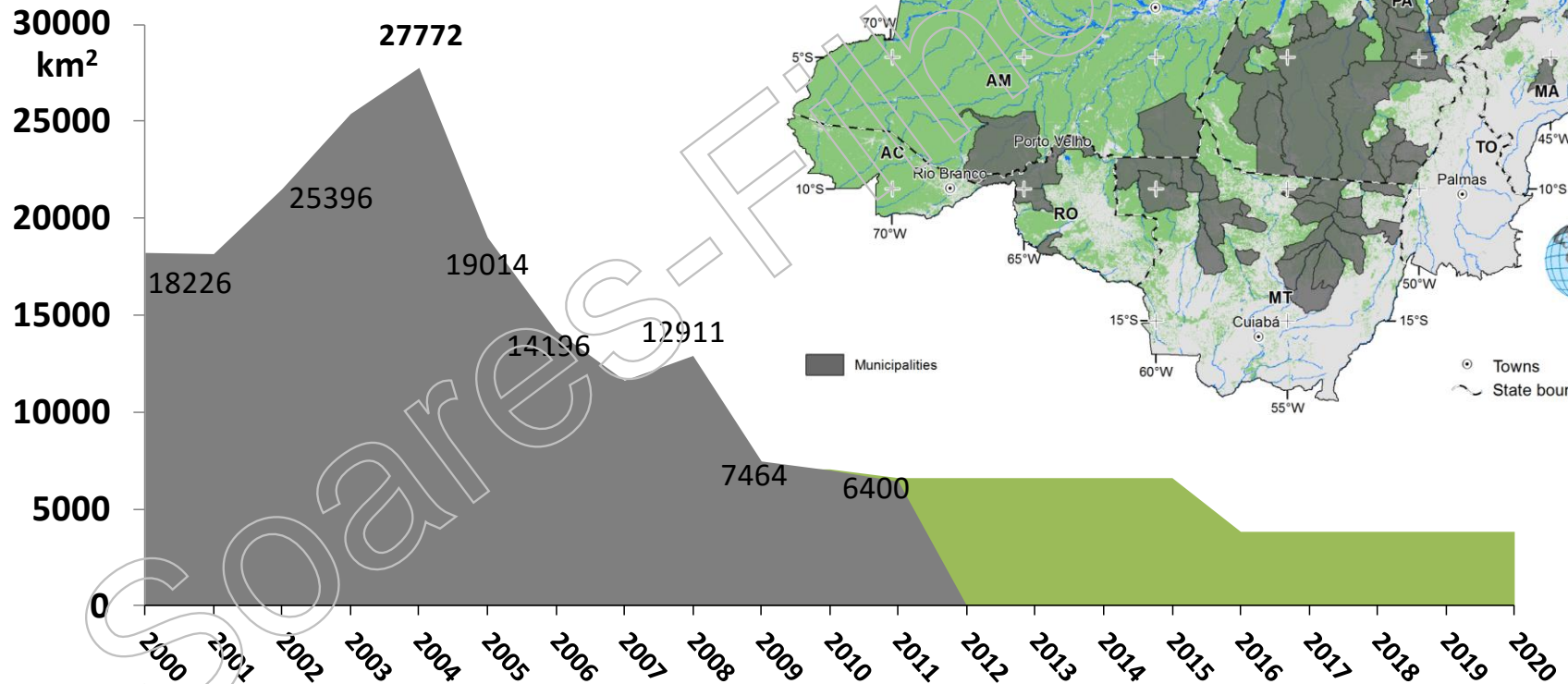
PRODES



Enforcement teams guided up by deforestation maps

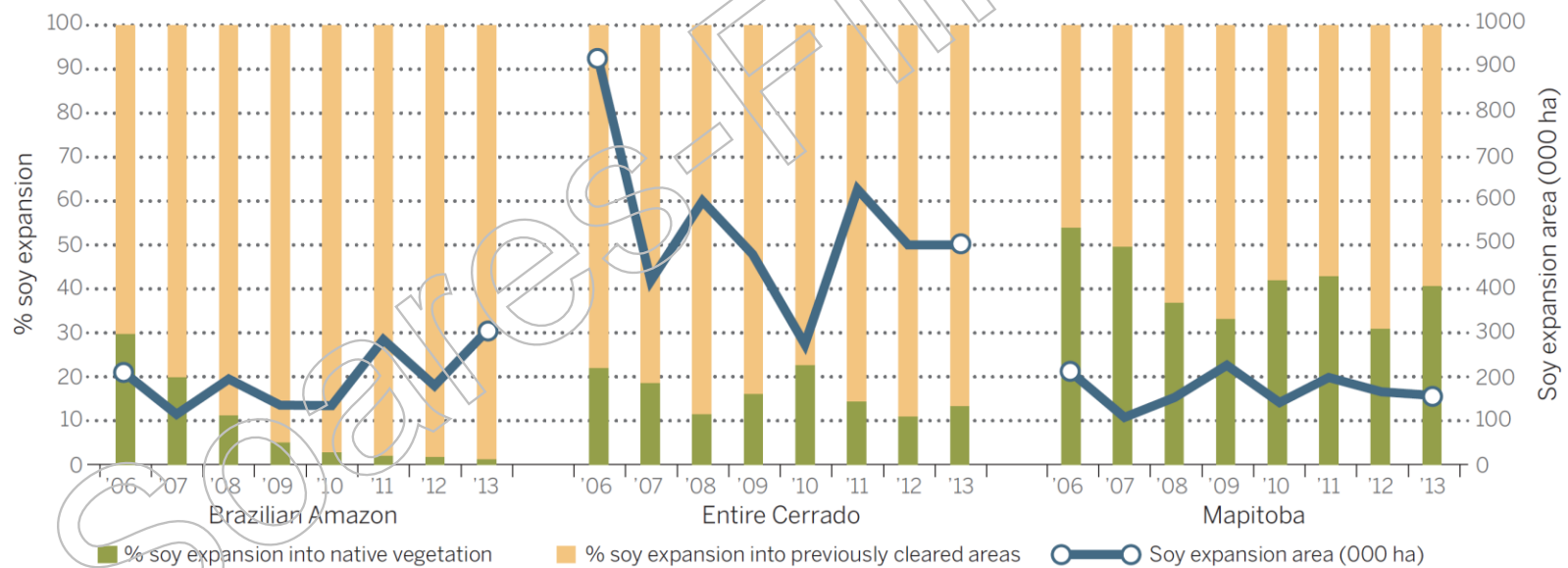
Credit ban to municipalities in the black list

Municipalities in the black list reduced deforestation from 2008 to 2010 27% more than others



Arima et al. 2014

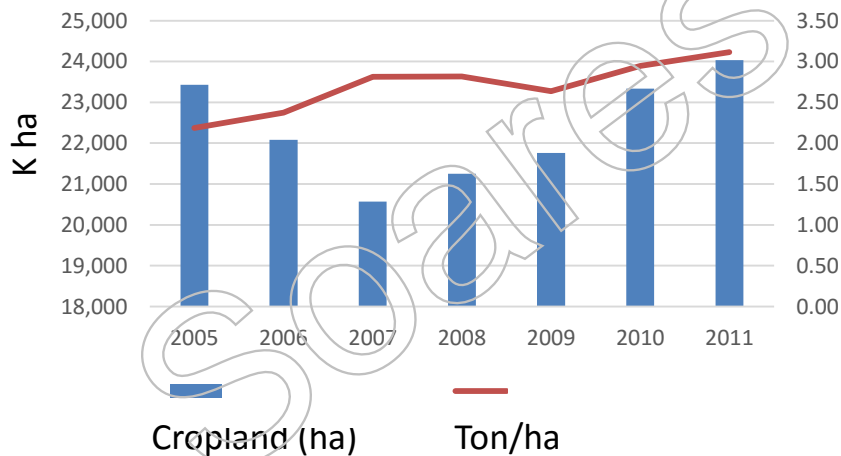
Soy moratorium



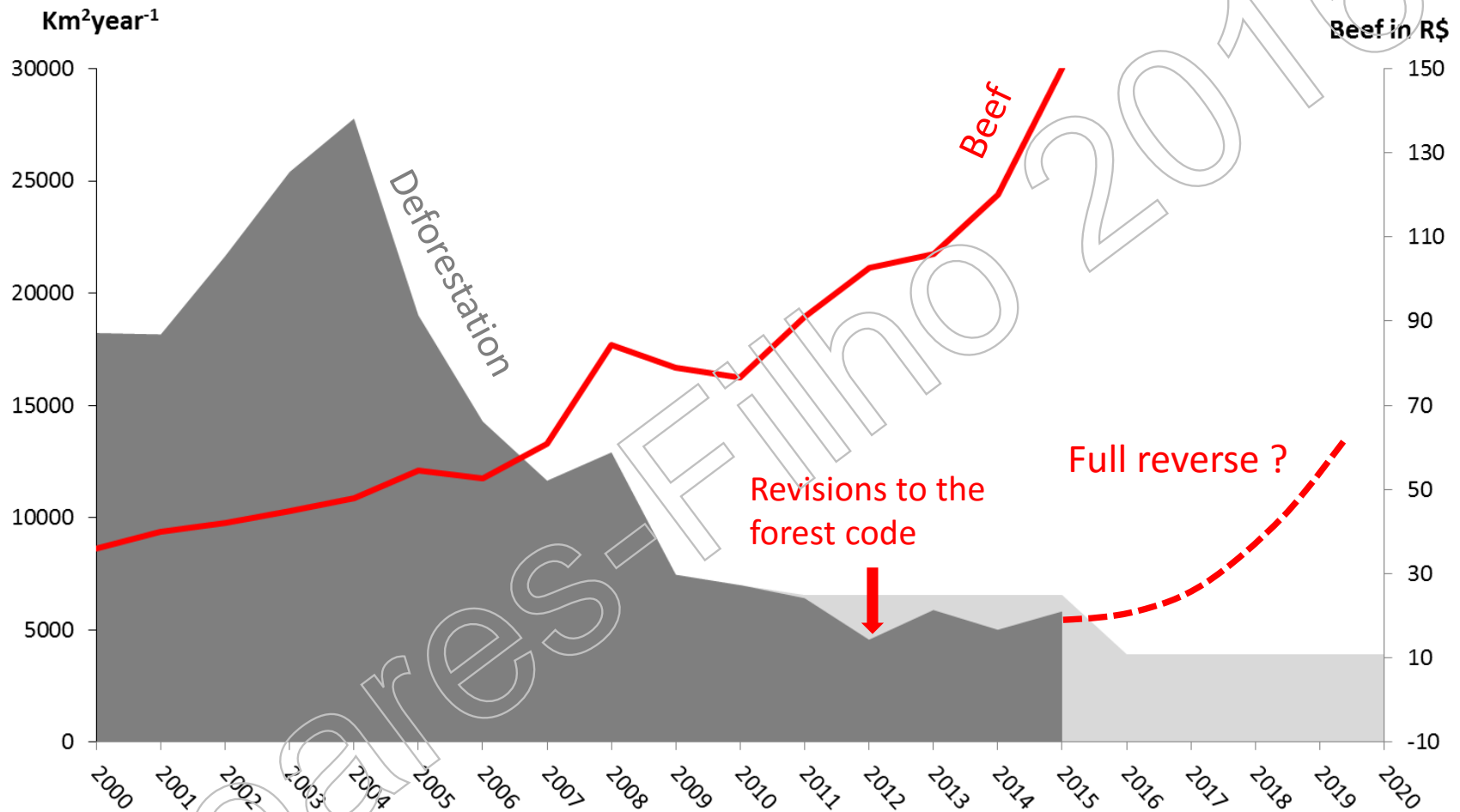
At the same time, Brazil has become the second largest producer of agricultural commodities



Cropland x Yields

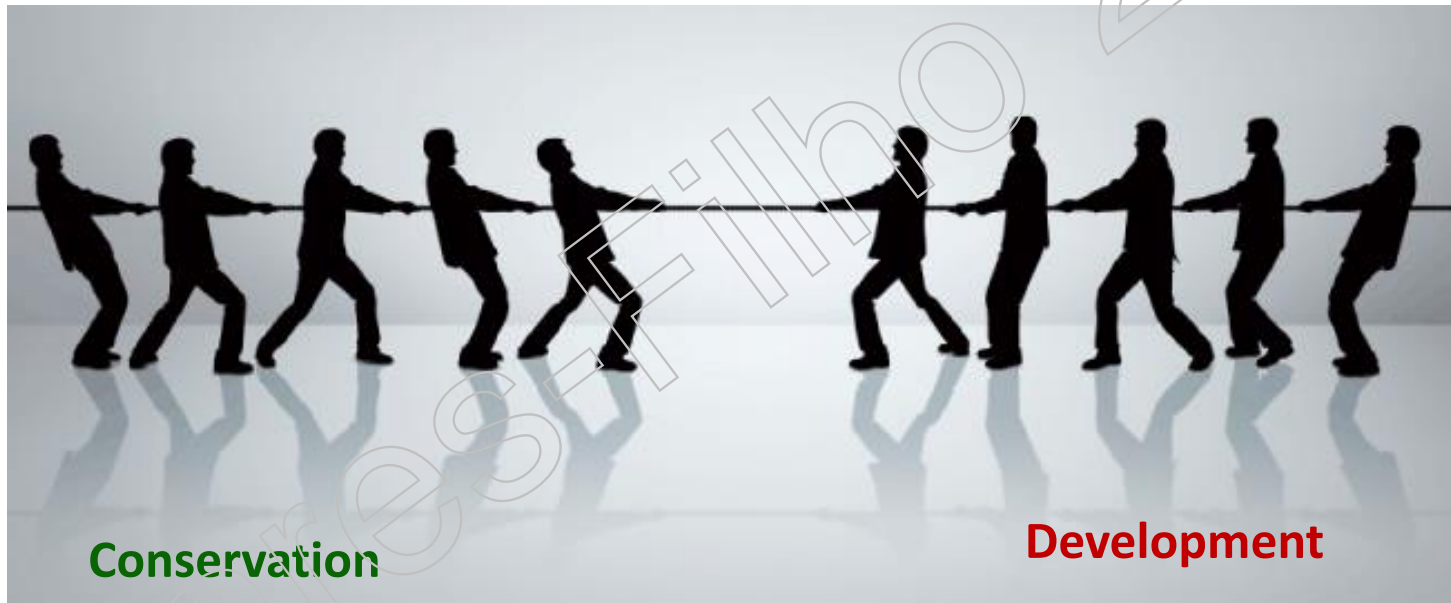


What can we expect?

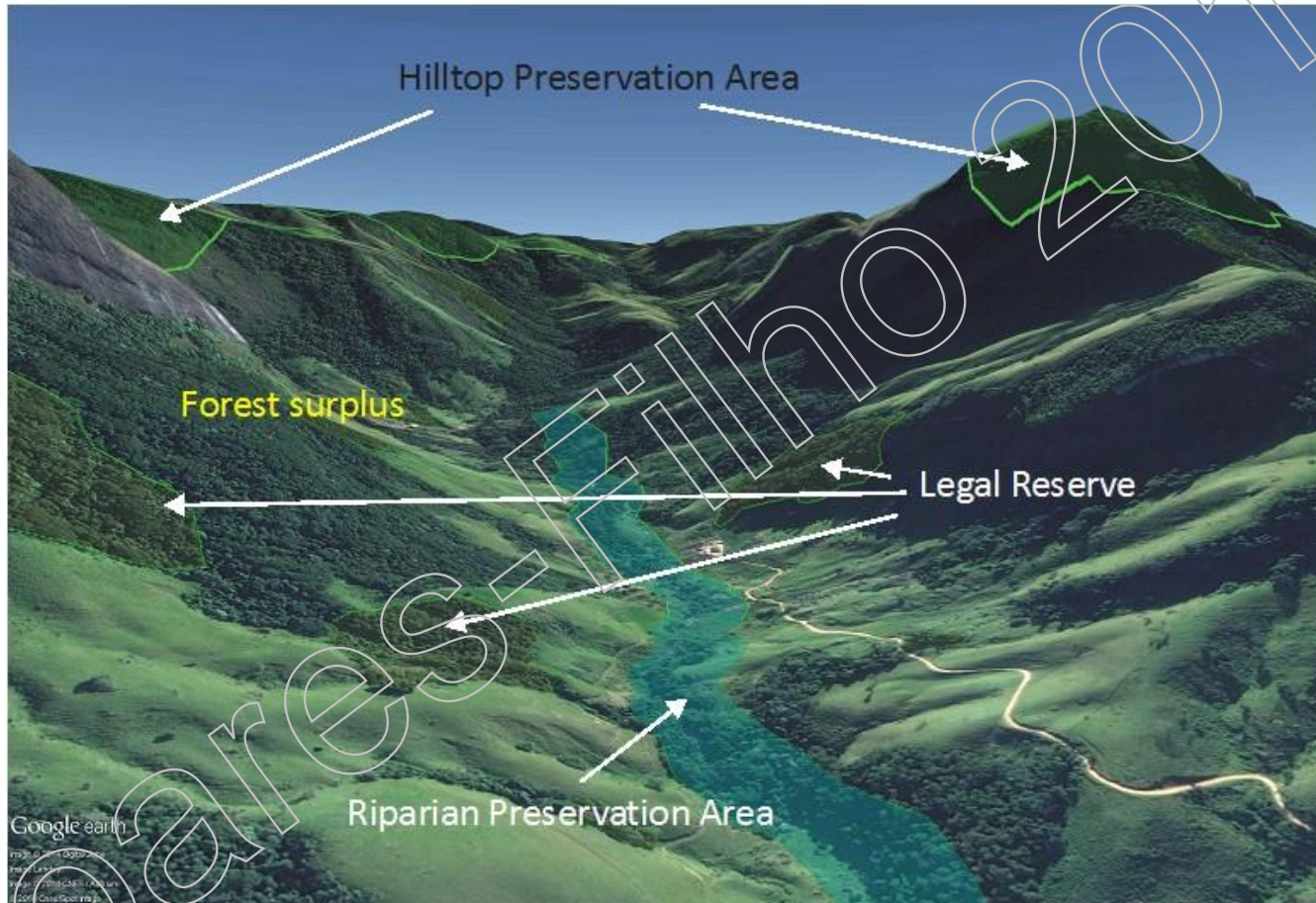


Continued trend of increasing demand for agricultural products from Brazil.
Production needs to **increase by 40%** to raise world production **by 20%** (OCDE 2015)

Conflicting interests

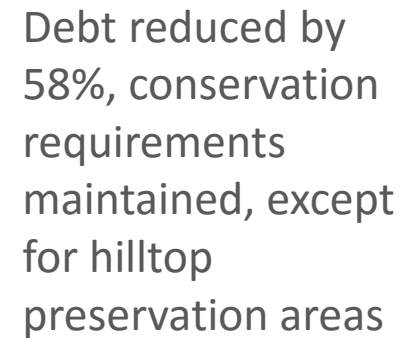


The forest code is the main conservation tool in Brazil



Roughly 53% of Brazil's native vegetation occurs on private properties

Brazil's controversial new Forest Code grants amnesty to illegal deforesters

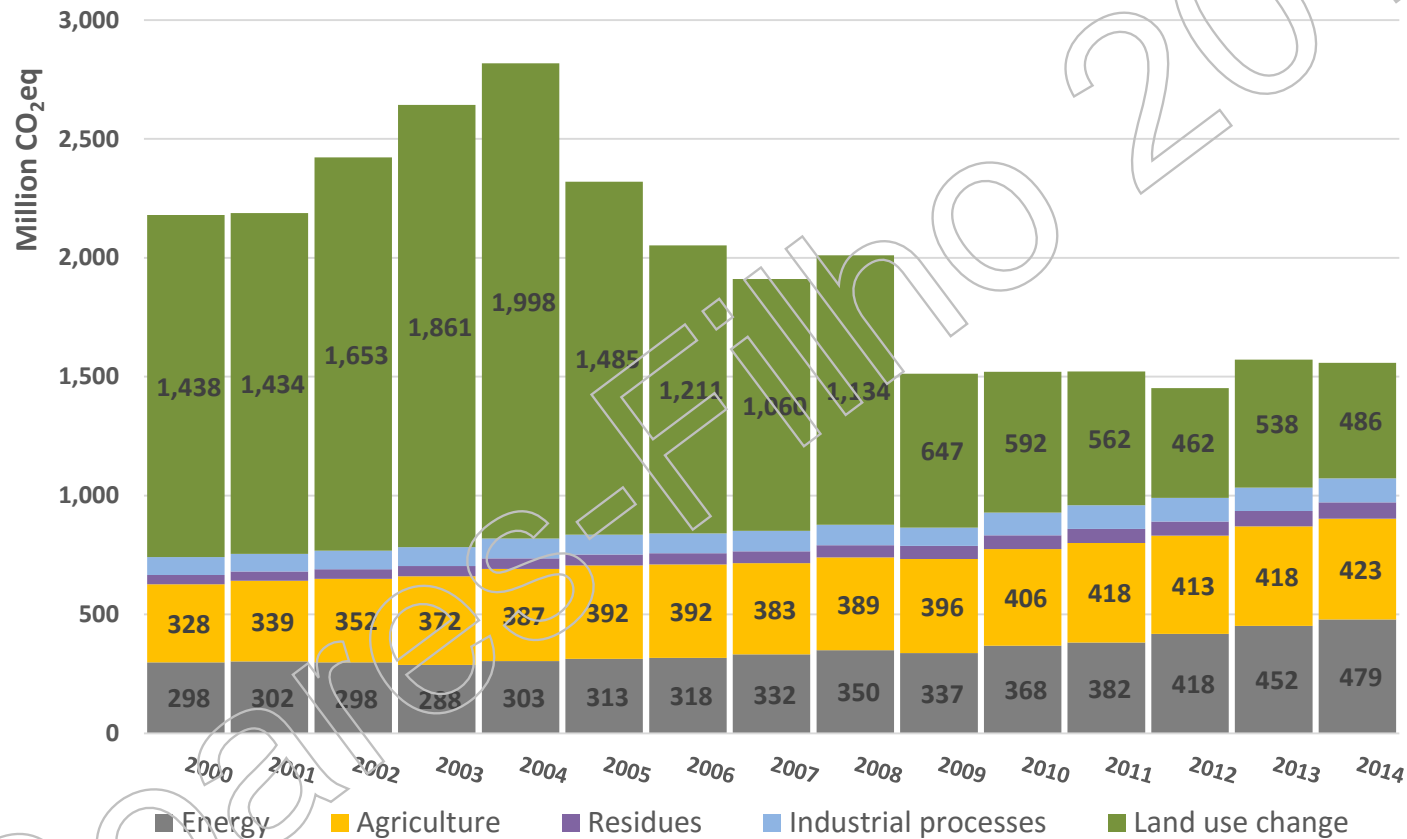


Challenges for Brazil



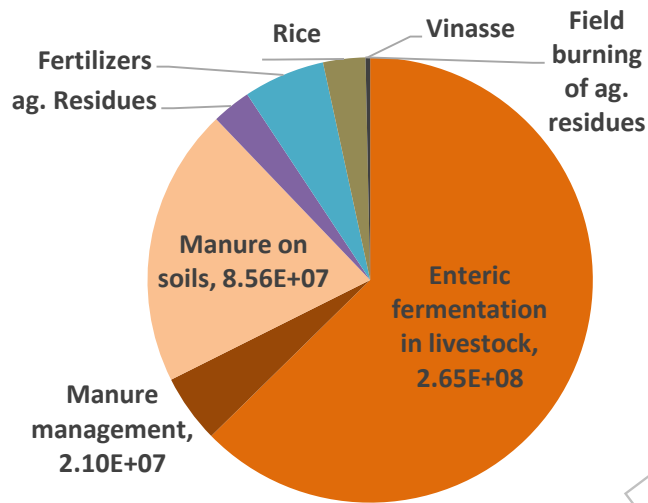
Brazil's pledge to reduce GHG (NDC) by 2030

Brazil's GHG emission profile

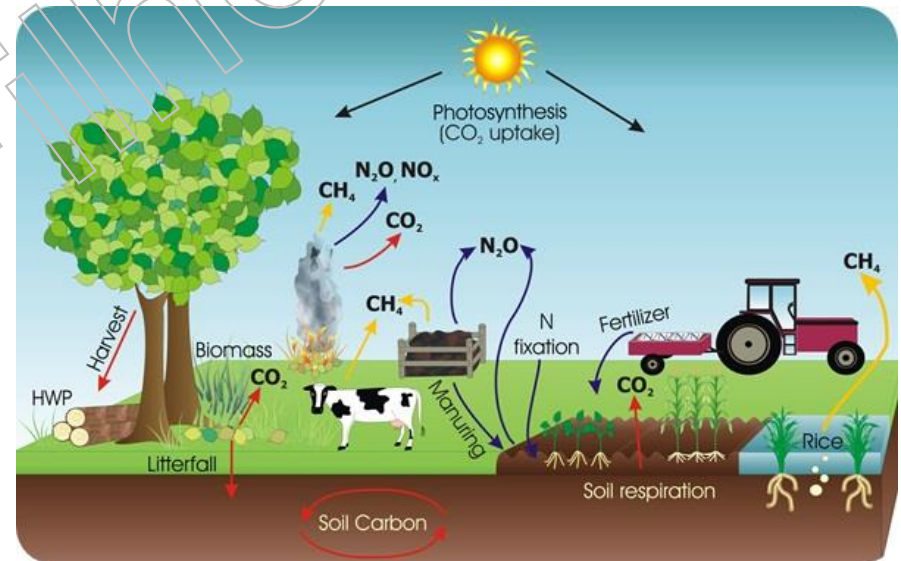


60% comes from the land-use sector

GHG in the agricultural sector



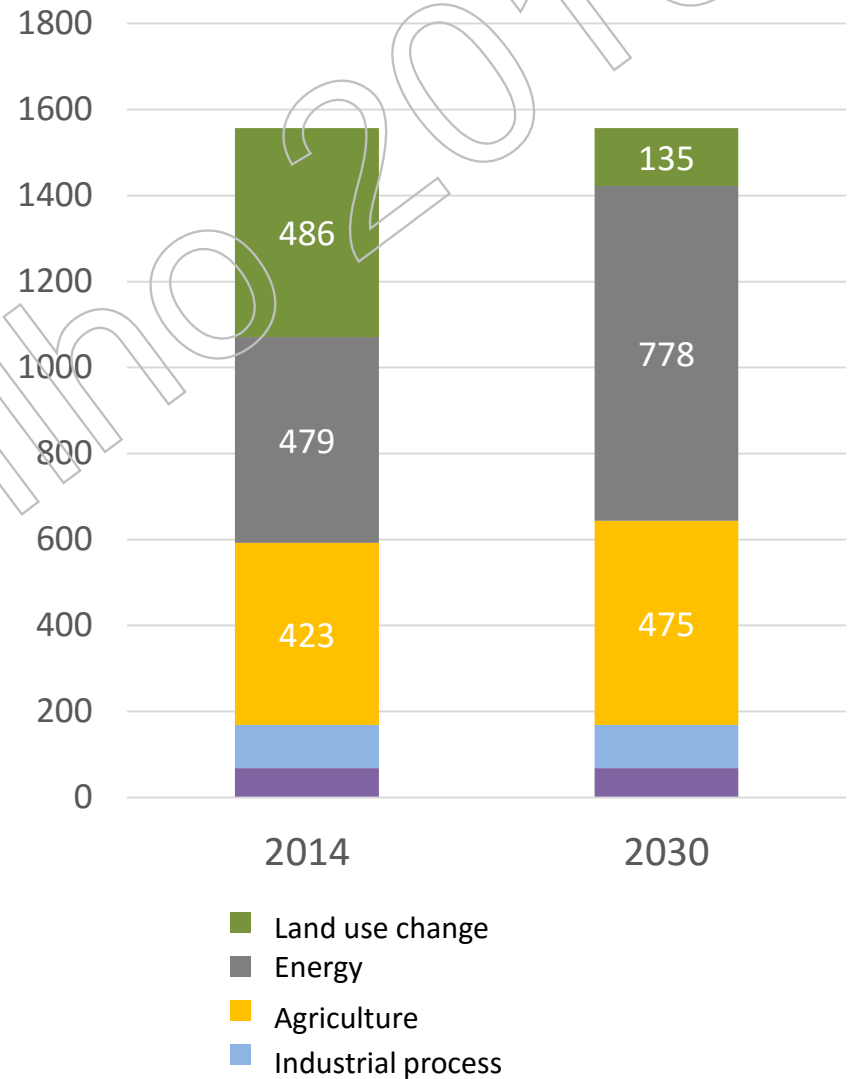
≈ 88% from livestock



Sources and sinks of GHG emissions in agriculture, forests, and other land use systems (IPCC 2006)

Brazil's NDC by 2030

- Develop a low carbon agriculture to compensate ag. expansion
- Although more efficient, emissions will increase in the energy sector due to more consumption
- Emissions from land use change must reduce by **≈ 70%**



(Spencer & Pierfrederici, R. , 2015)

Large-scale measures relating to land use change and forests

- 1. Strengthen** the Low Carbon Agriculture Program (ABC), including restoration of an additional **15 million ha of degraded pasturelands (totaling 30 Mha)**.
- 2. Enforcing** the implementation of the **Forest Code**, at federal, state and municipal levels.
- 3. Restoring and reforesting** 12 million ha of forests by 2030.
- 4. Zero illegal deforestation** by 2030 and **compensating for greenhouse gas emissions from legal suppression of vegetation** by 2030.

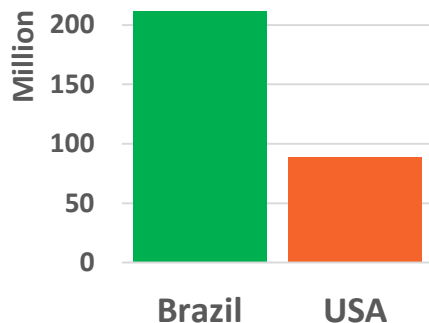


Solving Brazil's territorial equation

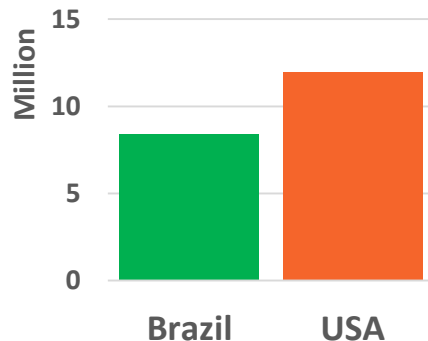


Cattle ranching in Brazil

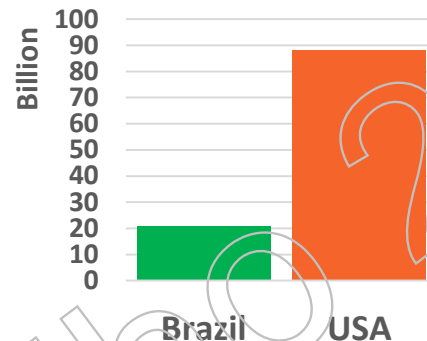
Heads



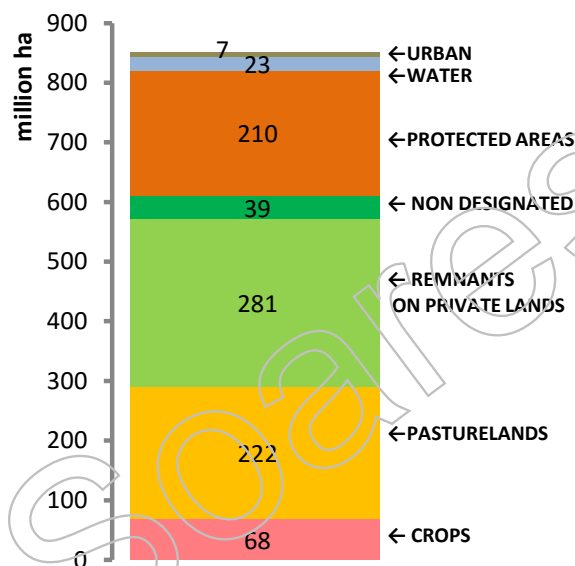
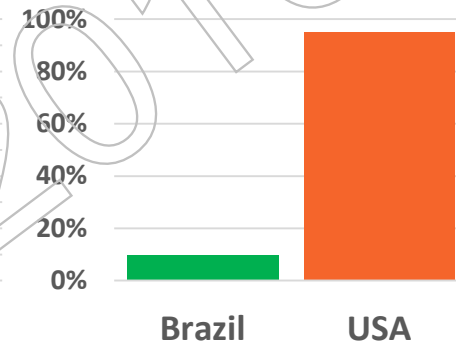
tons of beef



US\$

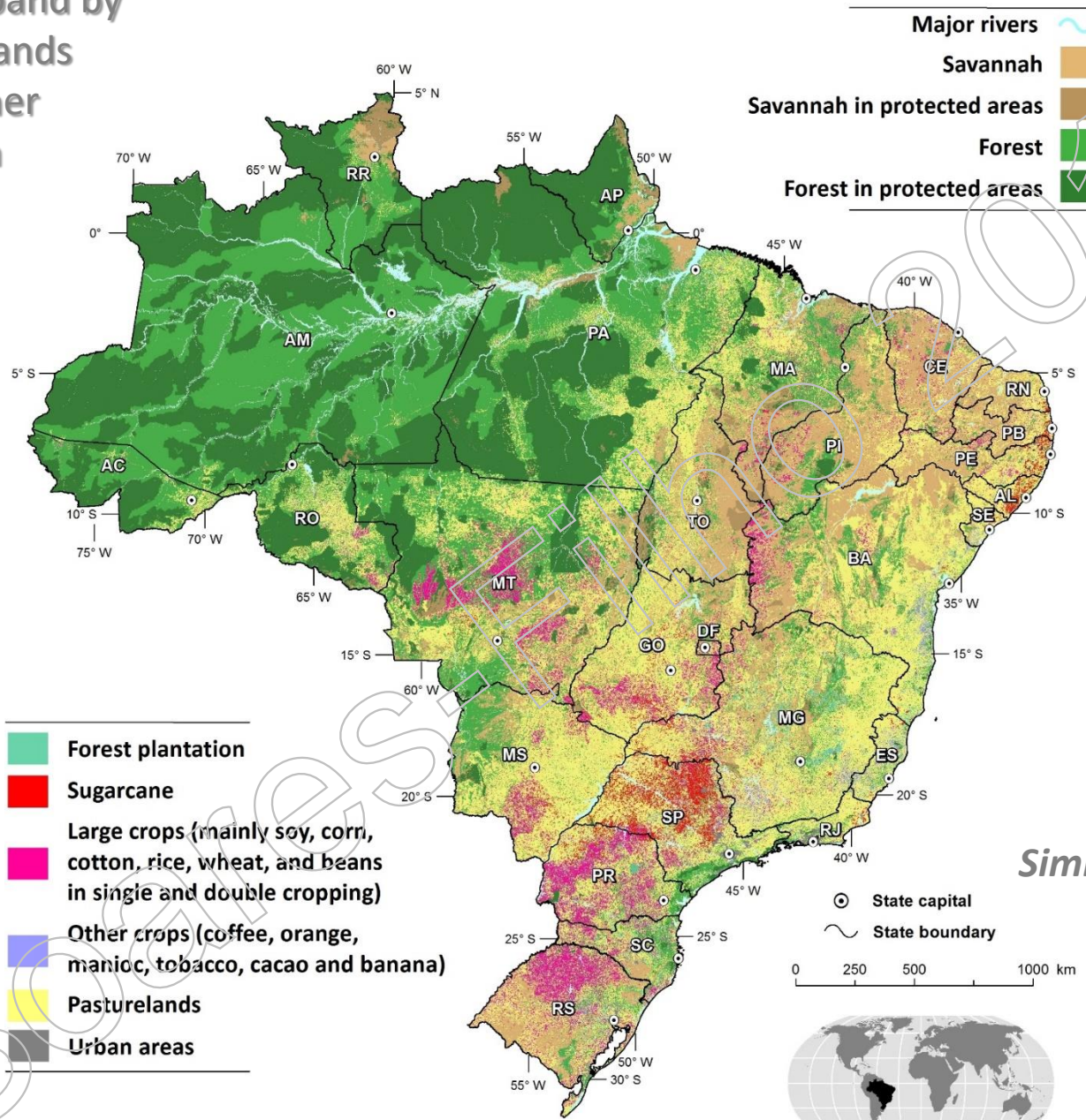


Finished in feedlots



≈ 1 head per hectare

Brazil can expand by
50% its croplands
without further
deforestation



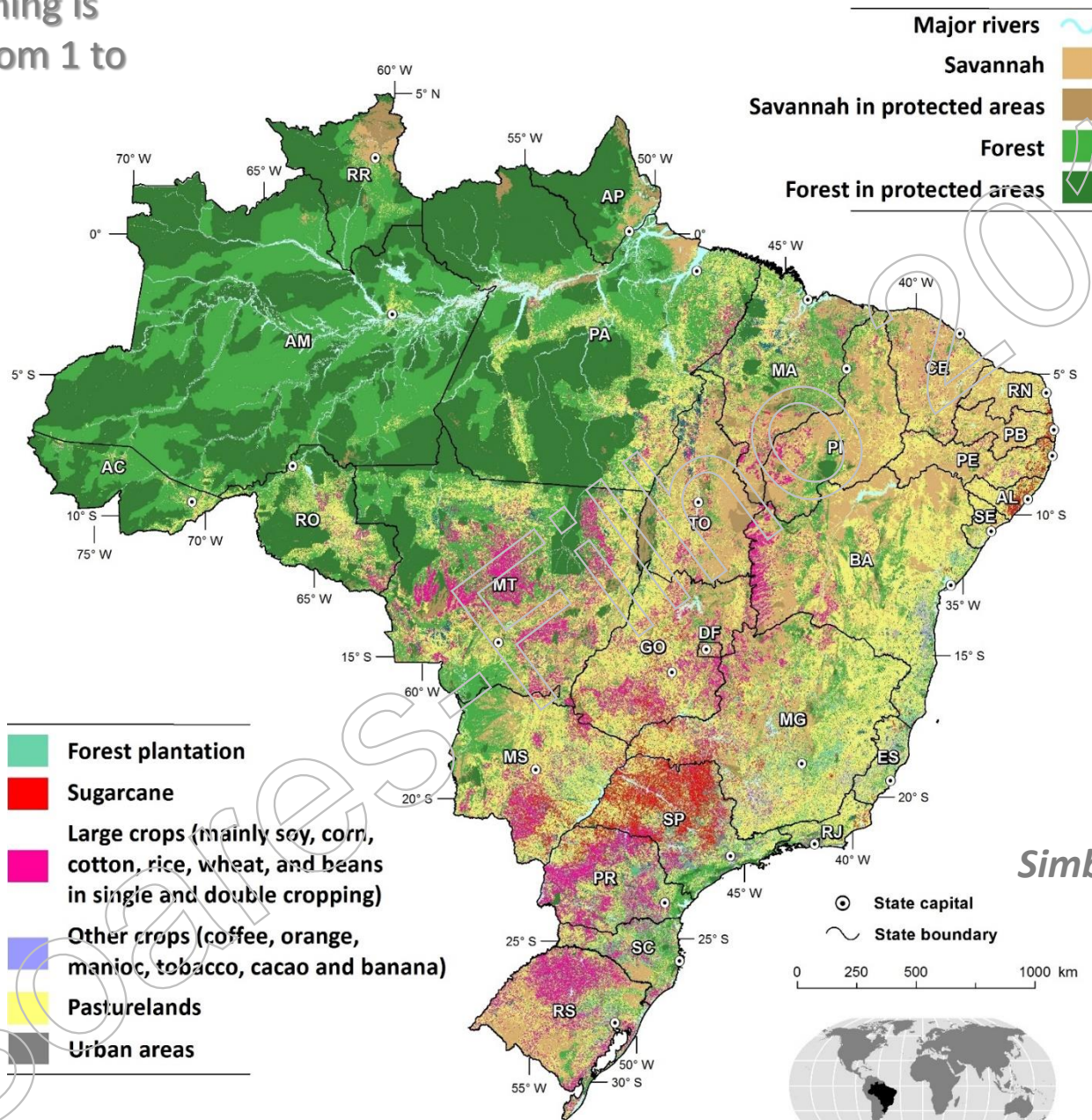
Simbrasil/Otimizagro



World Bank 2010

Soares-Filho et al. 2012

if cattle ranching is intensified from 1 to 1.5 head/ha



Simbrasil/Otimizagro



World Bank 2010

Soares-Filho et al. 2012

Meet Brazil's new conservationist



A spate of publications are suggesting that cattle intensification could spare land for conservation

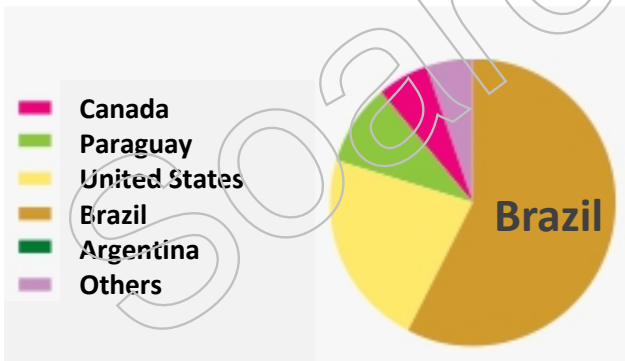
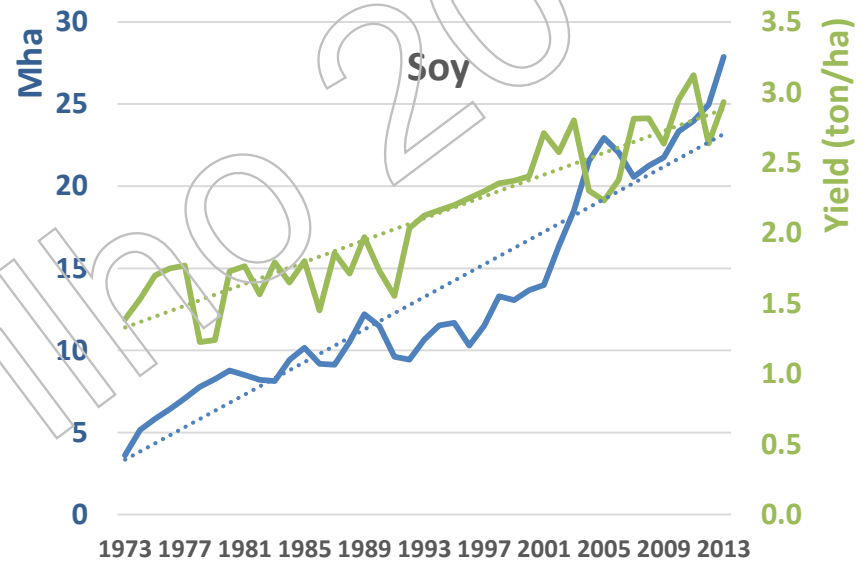
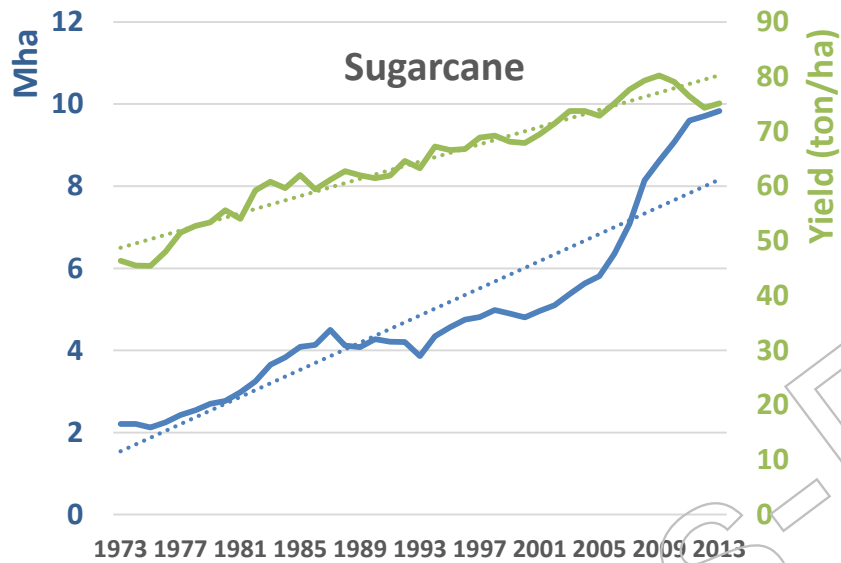
Based on the theory of land sparing



Does it work?

Green et al. 2005, Phalan et al. 2011

There is no evidence in Brazil



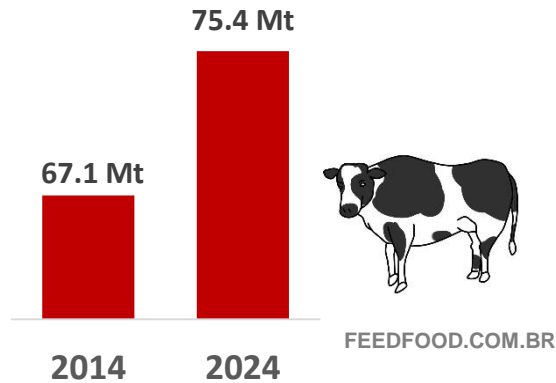
EU imports 35 million tons of soy and produces less than 1 million ton a year.

There is no causation relationship



*Deforestation is a quest for land,
cattle ranching the cheapest means*

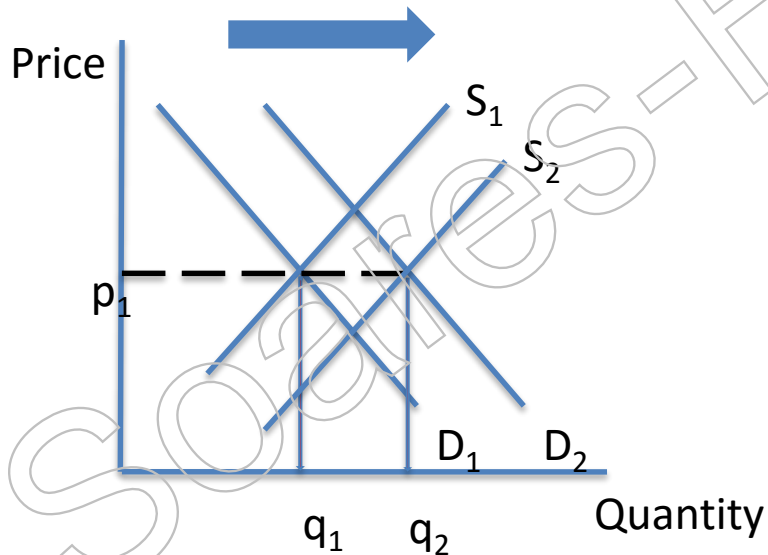
And there are market failures!



Plan to increase production by 40%



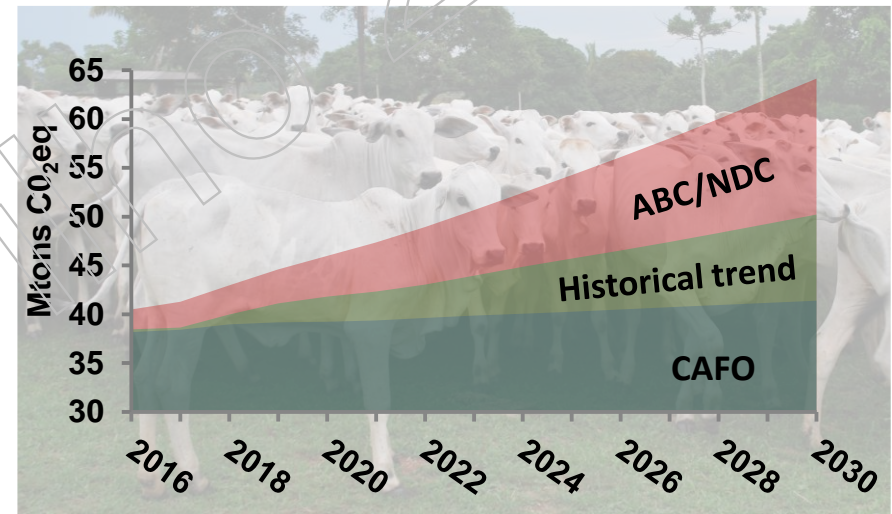
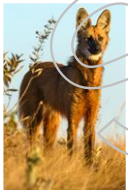
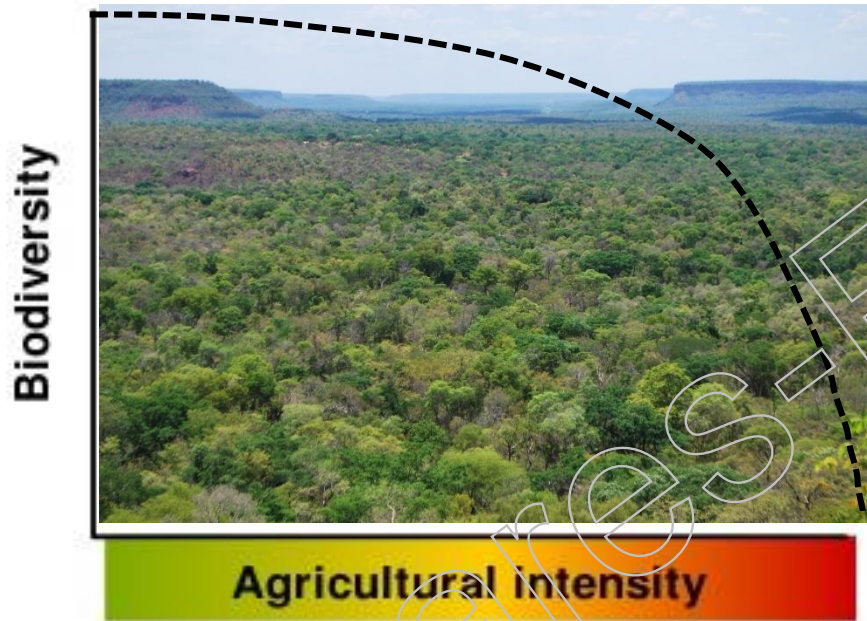
Four companies control 43%



Merry and Soares-Filho, in review

1. Restoration of 30 Mha of pasture

cornerstone of Brazil's ABC and NDC policies

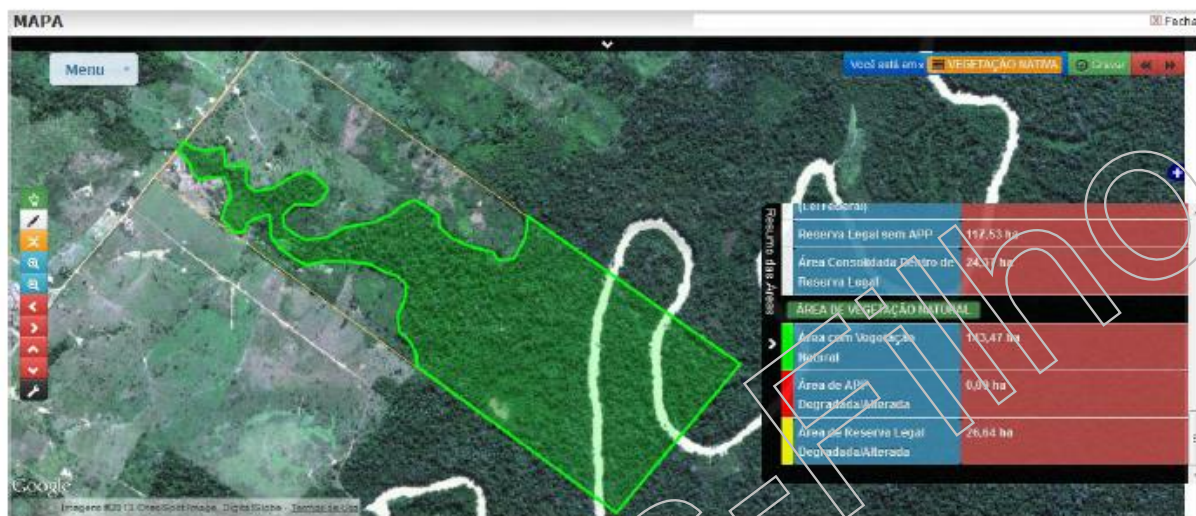


Enteric emission from cattle ranching scenarios for the state of Mato Grosso

Large impact on biodiversity and increased GHG emissions

2. Enforcement of the Forest Code

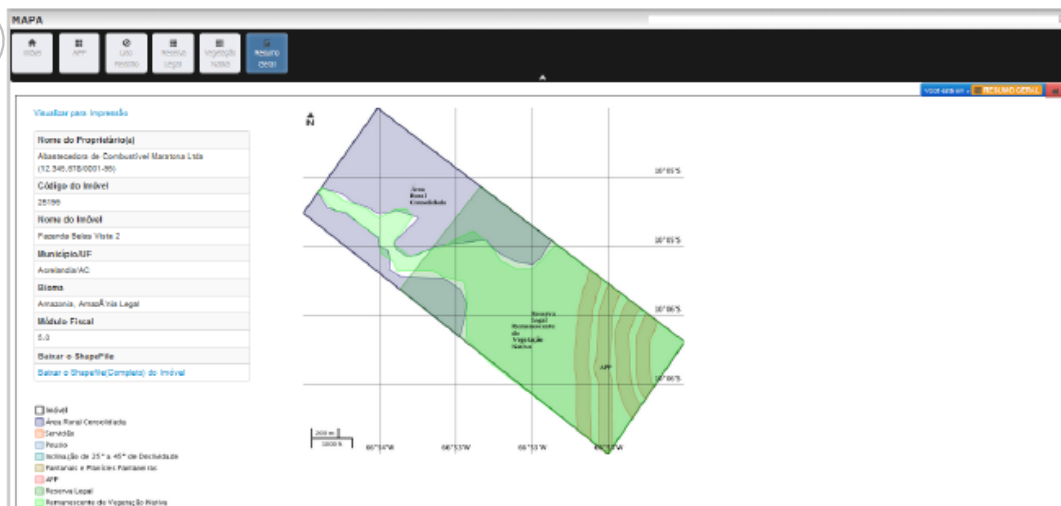
All properties (5.4M) must enter an online registry system (SICAR)



And start developing their **PRA**, landowners commitment to restore the FC debt.

2-year countdown period

By May 2005, 212 Mha, 54% of properties

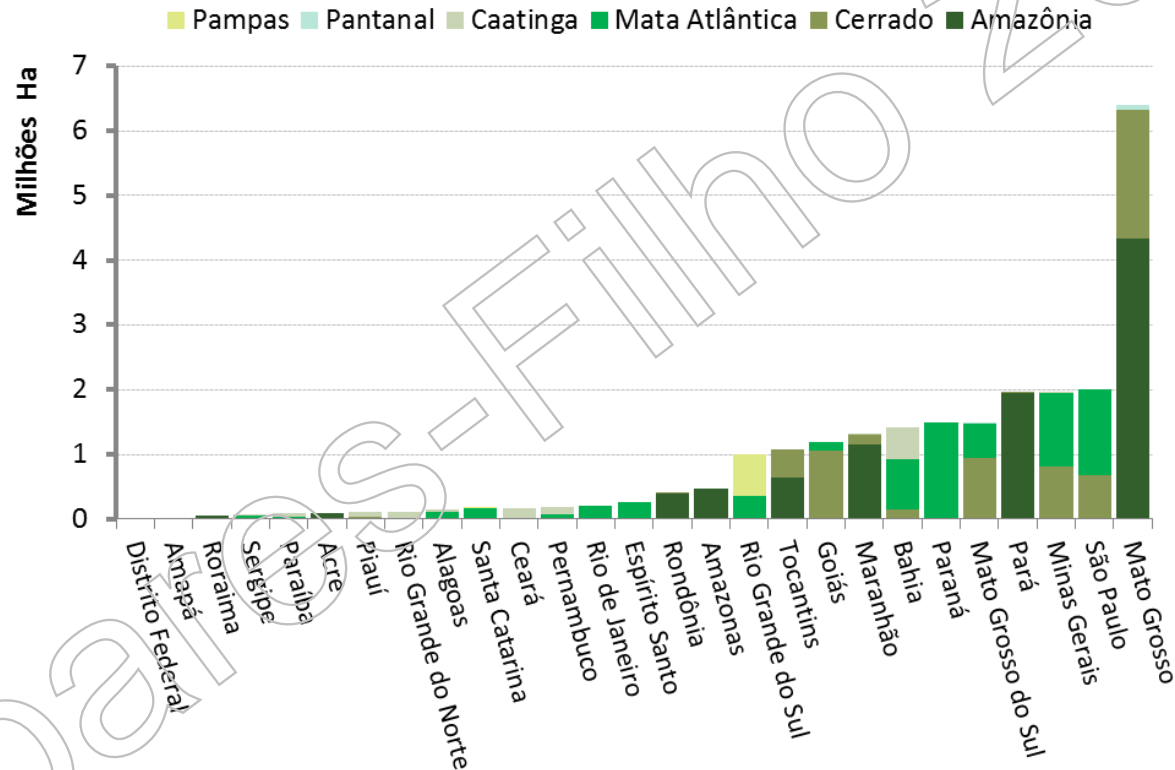


3. Restoring and reforesting 12 million ha of forests by 2030

35.7 Mha



Forest Code Debt



Legal reserves + Riparian protection areas $\approx 18.5 + 5.5 = 24$ Mha.

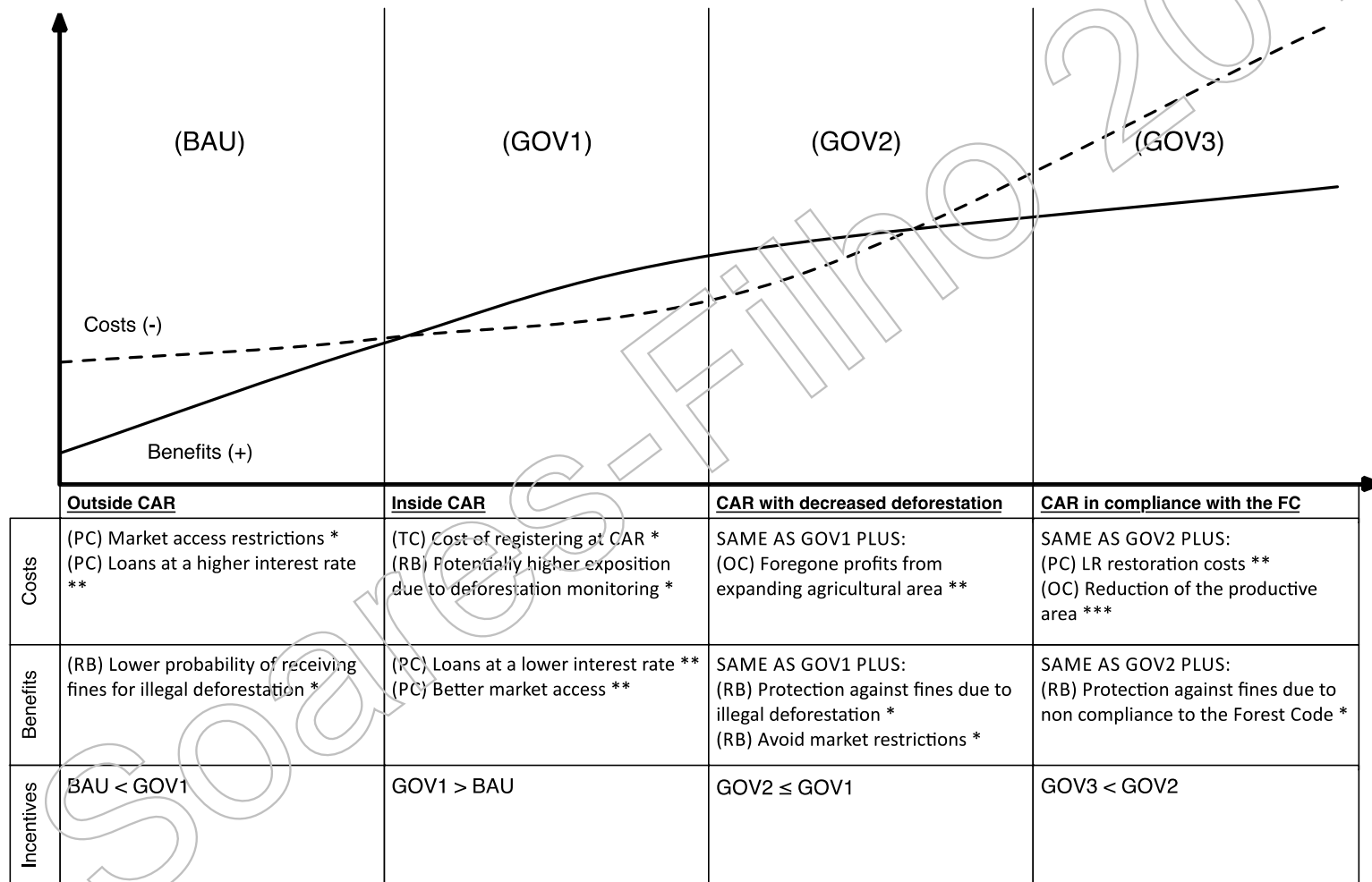
Induced restoration is costly

Too costly!!

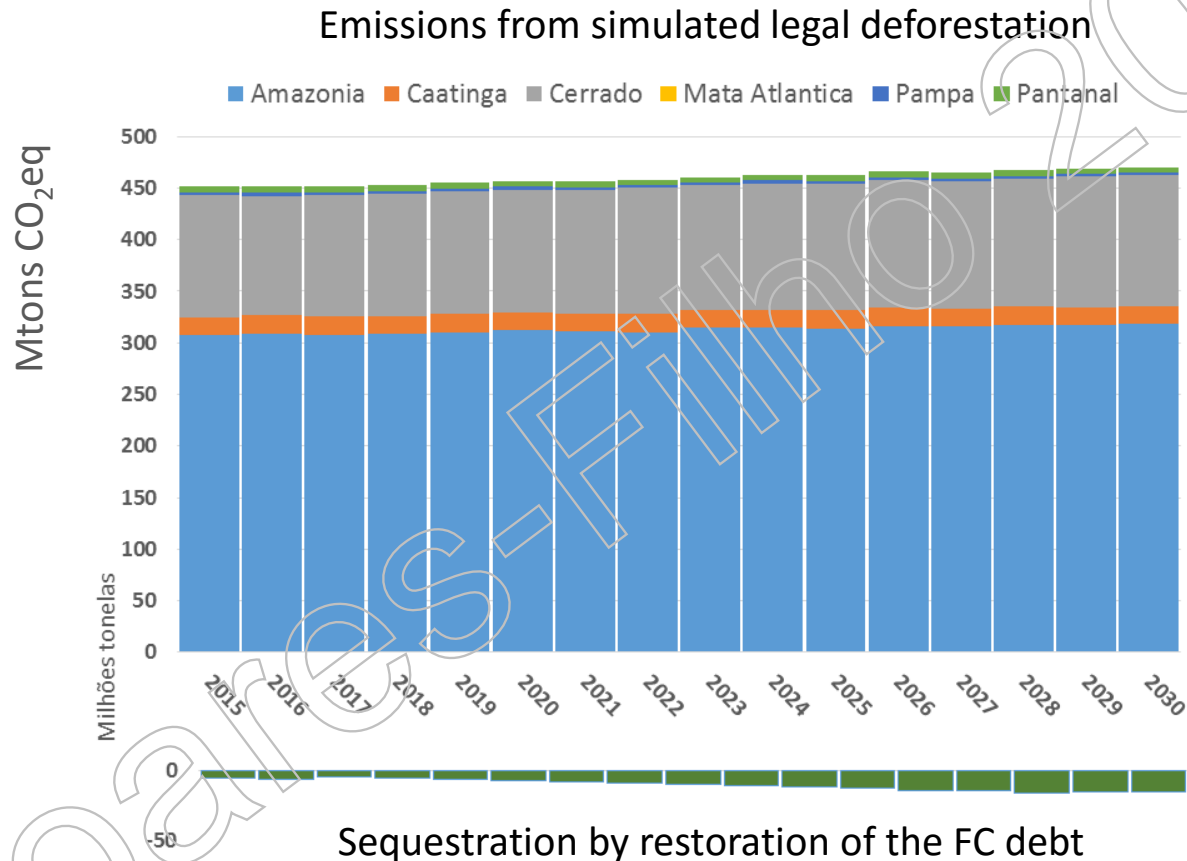
R\$ 42 million for 3 thousand ha ≈
US\$ 7,000 per ha



Costs/benefits of FC compliance



4. *End of illegal deforestation* and compensating for GHG from legal deforestation by 2030



Fallacy of zero net deforestation!

Ambitious targets but weak policies

FOLHA DE S. PAULO

★ ★ ★ UM JORNAL A SERVIÇO DO BRASIL

SEXTA-FEIRA, 30 DE OUTUBRO DE 2015 09:16

ambiente

desmatamento

Estudo lança dúvidas sobre meta brasileira do clima

Ayrton Vignola - 17 mai.05/Folhapress

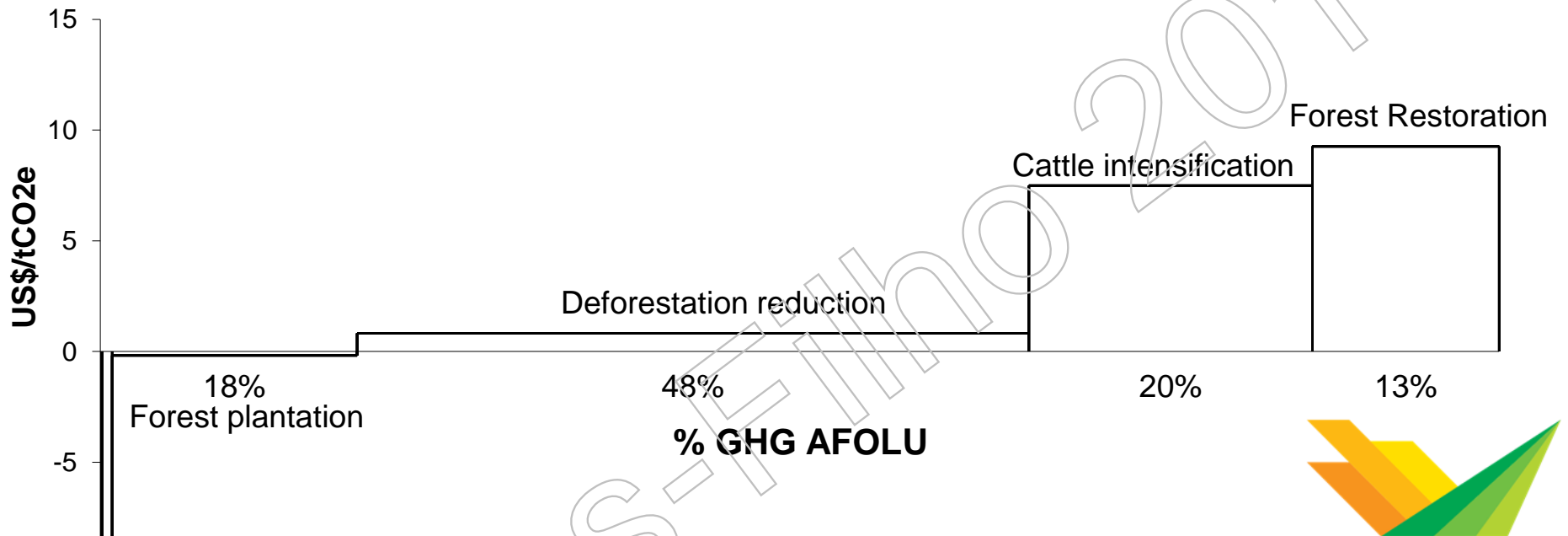


Área desmatada na floresta amazônica

Study casts doubts on Brazil's NDC targets

Rajão and Soares-Filho 2015

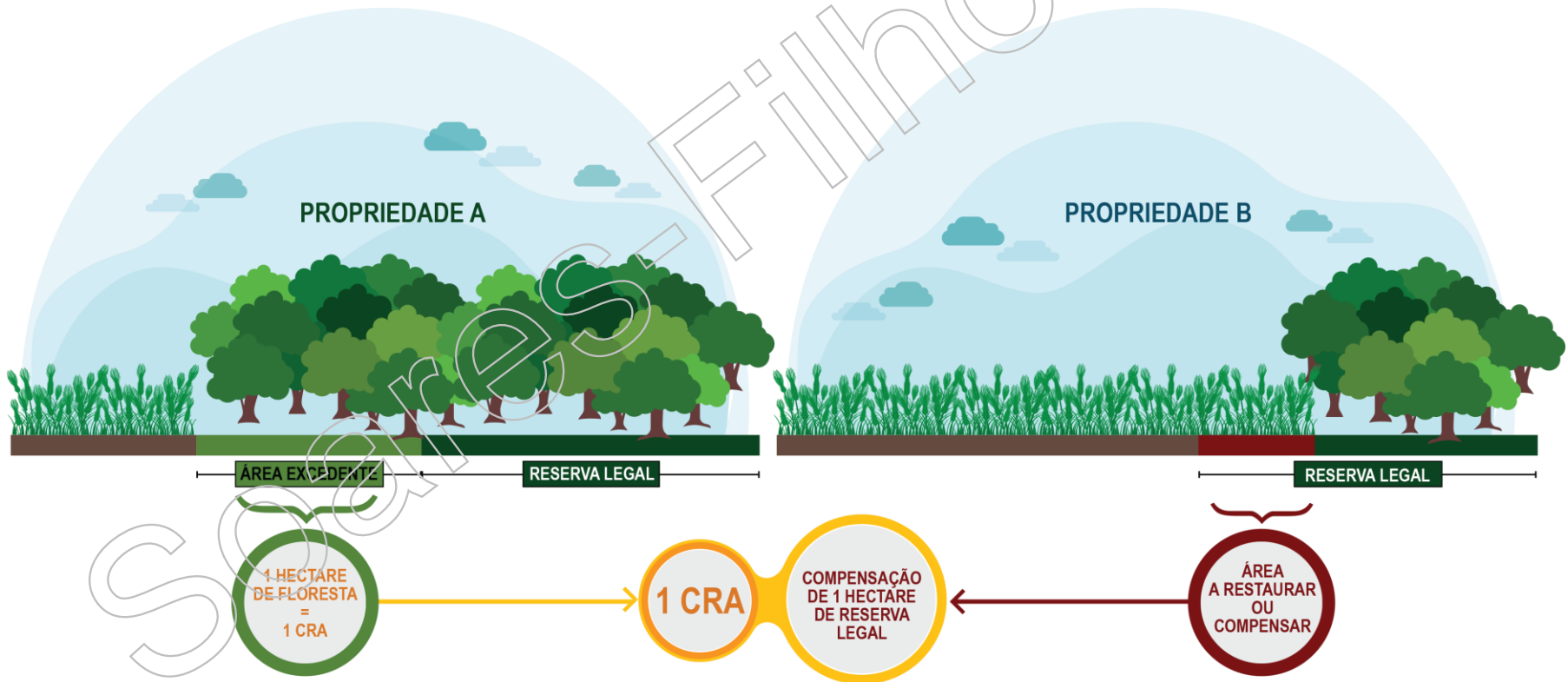
Marginal abatement cost curve



Oliveira et al. 2013

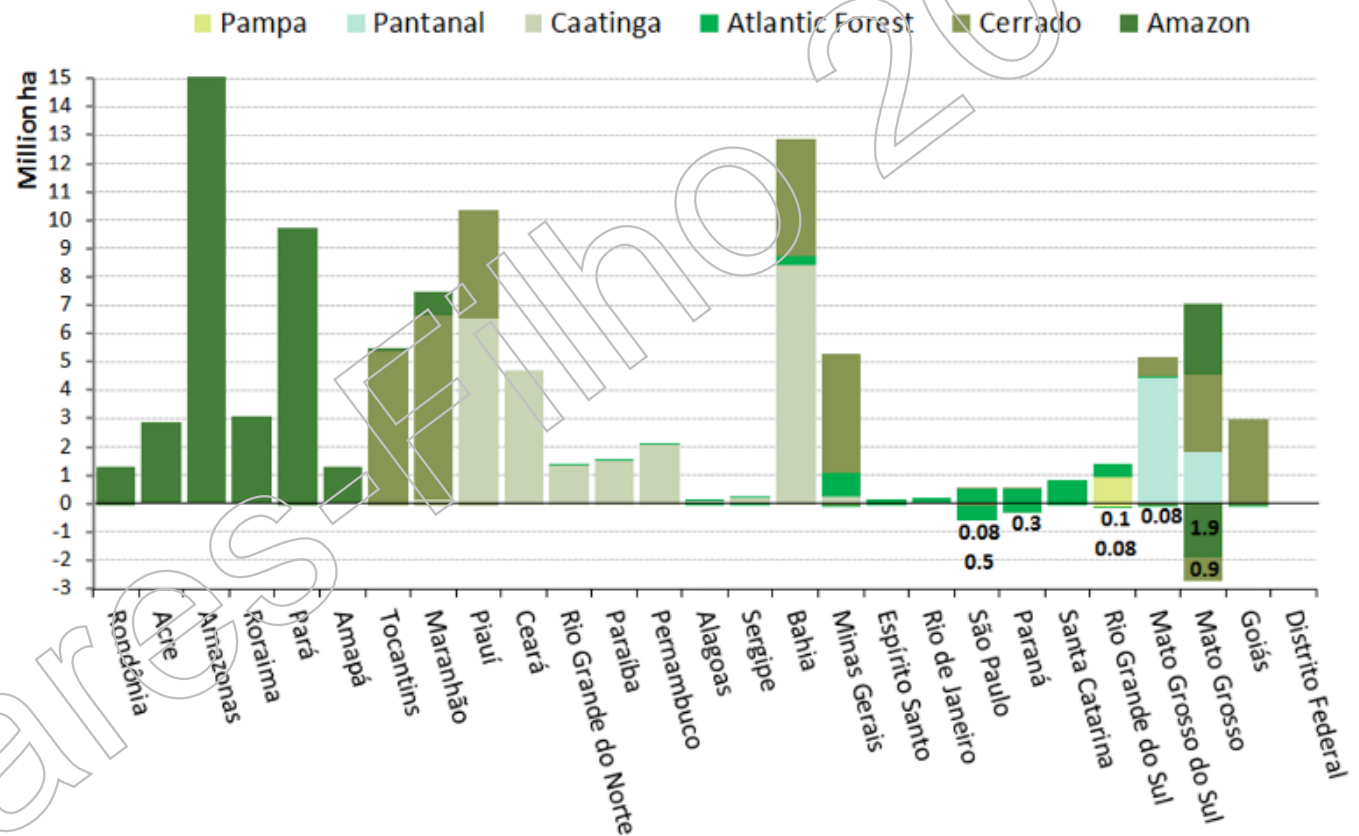
Brazil's market for trading forest

- Cota de Reserva Ambiental (CRA): Lower the cost of compliance



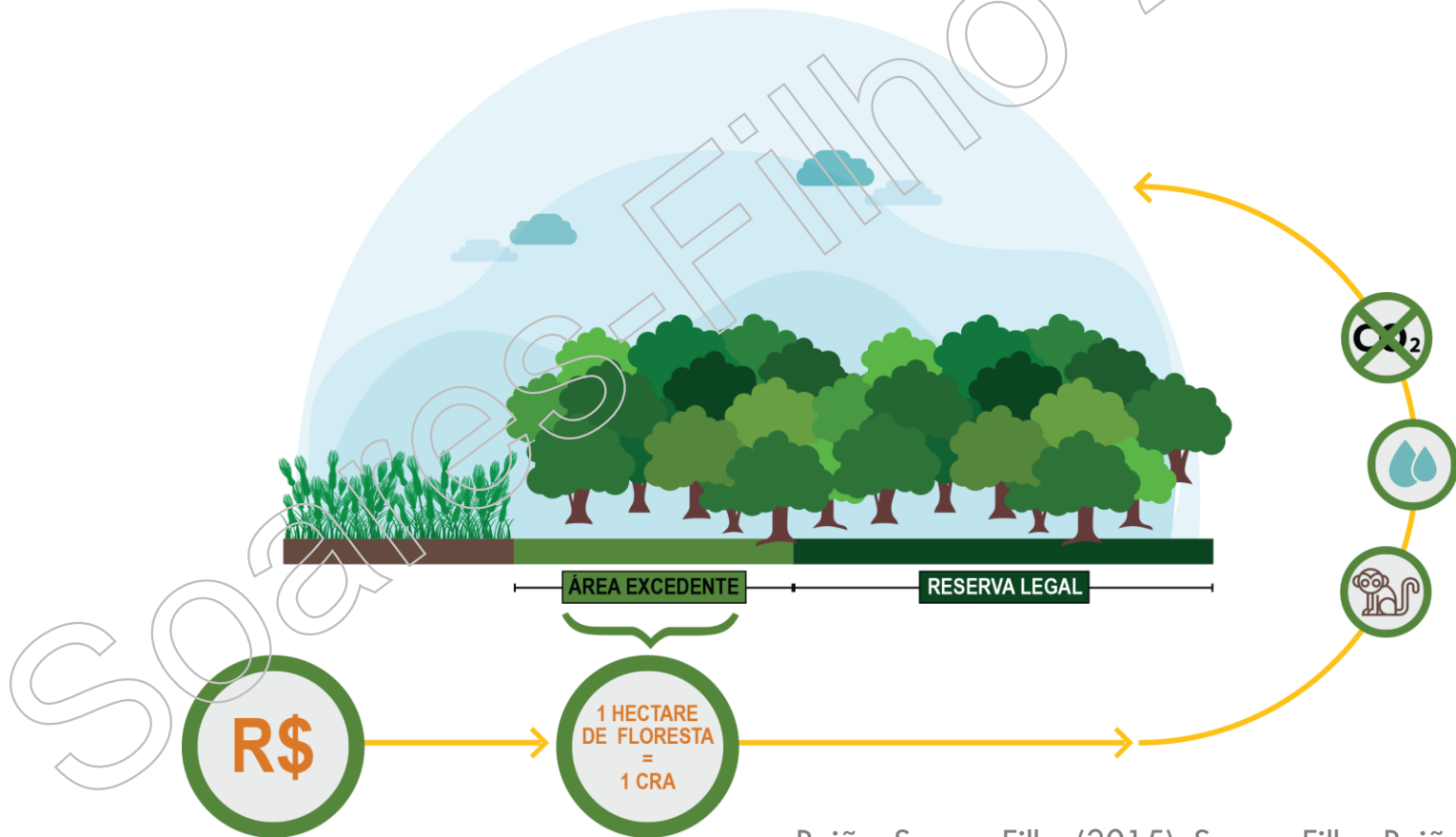
Offsetting FC debts with FC surplus (CRA)

≈ 4.2 Mha ≈ US\$ 9.2 billion

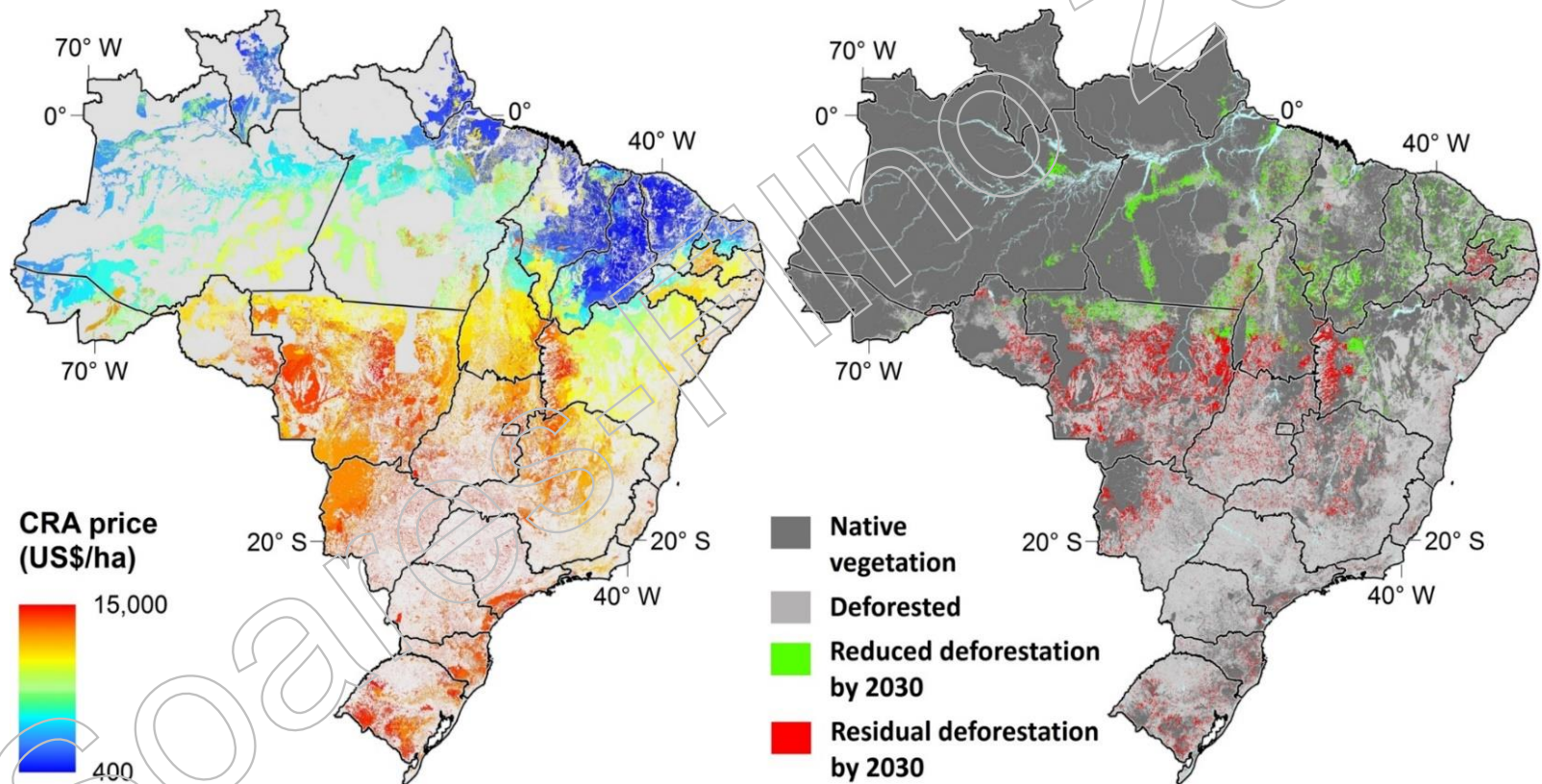


Going beyond Legal Reserve compensation

Brazil's forest certificates (CRA) open the door to ecosystem service payments



US\$ 8.4±2.0 billion to purchase low-cost CRAs could cut legal deforestation (19 Mha) in half, saving as much as **3.8±0.8 billion tons of CO₂ emissions**



Lessons for Brazil



Vielen Dank / Thank You / Obrigado

britaldo@csr.ufmg.br

Presentation and references available at
www.csr.ufmg.br/~britaldo/MeetingTheChallenges.pdf



Science in support of sound policy