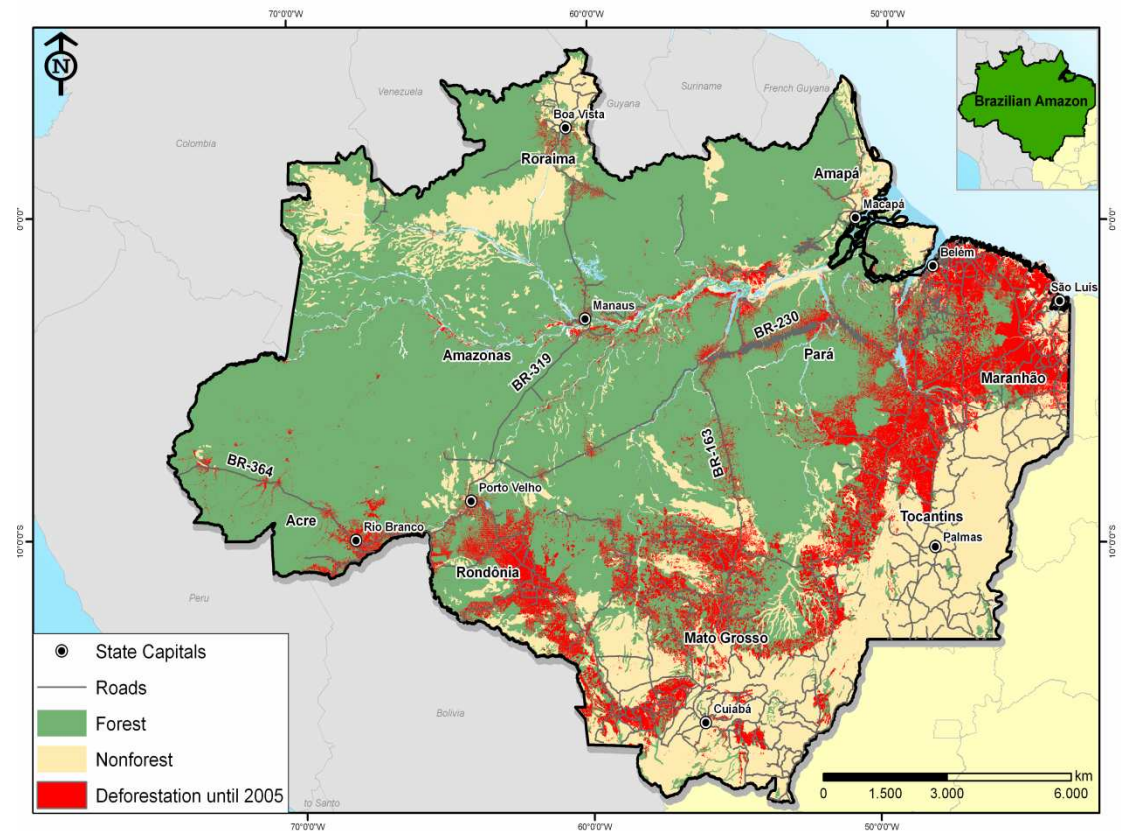# Enforcement of land use and forest regulations in the Brazilian Amazon
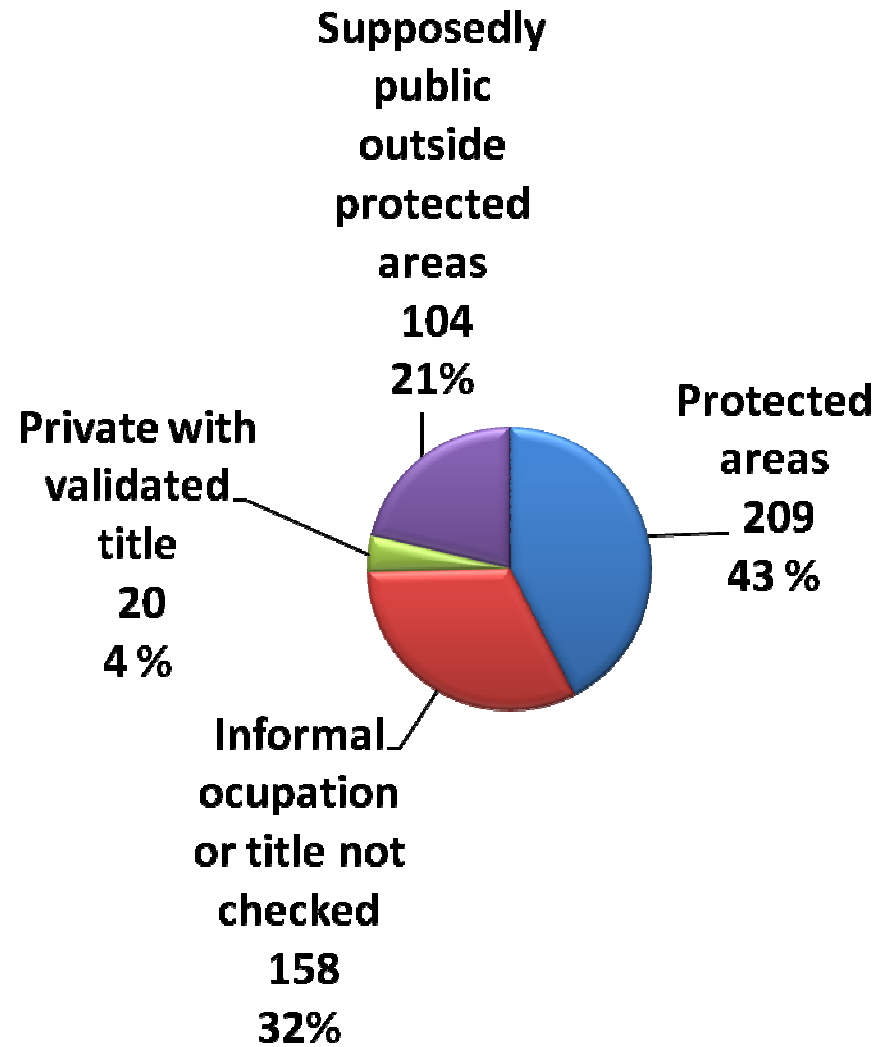
Paulo Barreto

IMAZON, Brazil

pbarreto@imazon.org.br

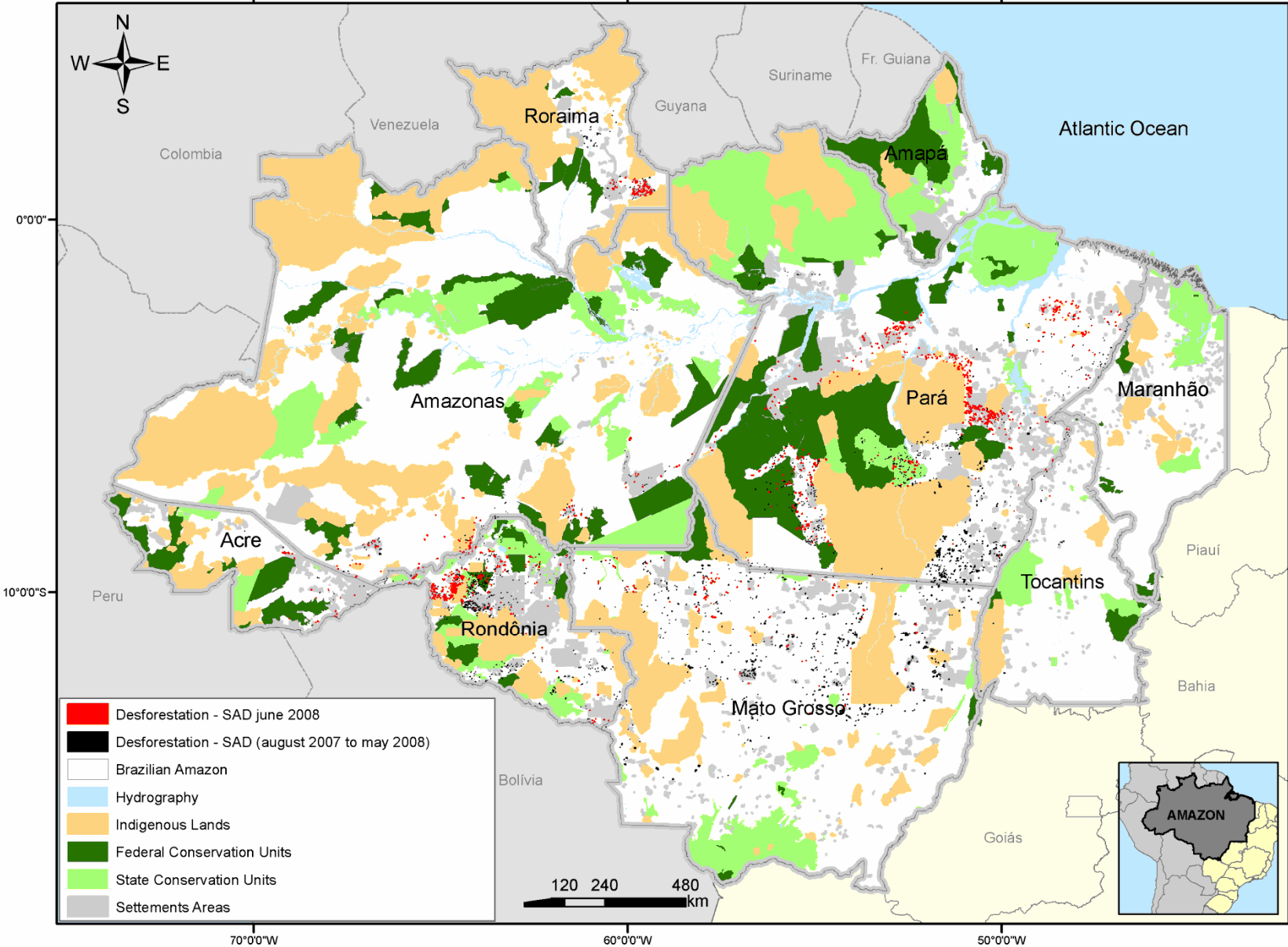# The Brazilian Amazon

- **~ 23 million people**

- **45% poor**

- **18% deforested**

Guesstimate of land tenure

Supposedly public outside protected areas
104
21%

Private with validated title
20
4 %

Protected areas
209
43 %

Informal ocupation or title not checked
158
32%

Protected areas

Legend:
- **Desforestation - SAD june 2008** (red)
- **Desforestation - SAD (august 2007 to may 2008)** (black)
- **Brazilian Amazon** (white)
- **Hydrography** (light blue)
- **Indigenous Lands** (tan/orange)
- **Federal Conservation Units** (dark green)
- **State Conservation Units** (light green)
- **Settements Areas** (gray)

Protected areas

Indigenous lands
- Uses only by indigenous people

Conservation Units
- Limited agriculture
- Sustainable extractive uses
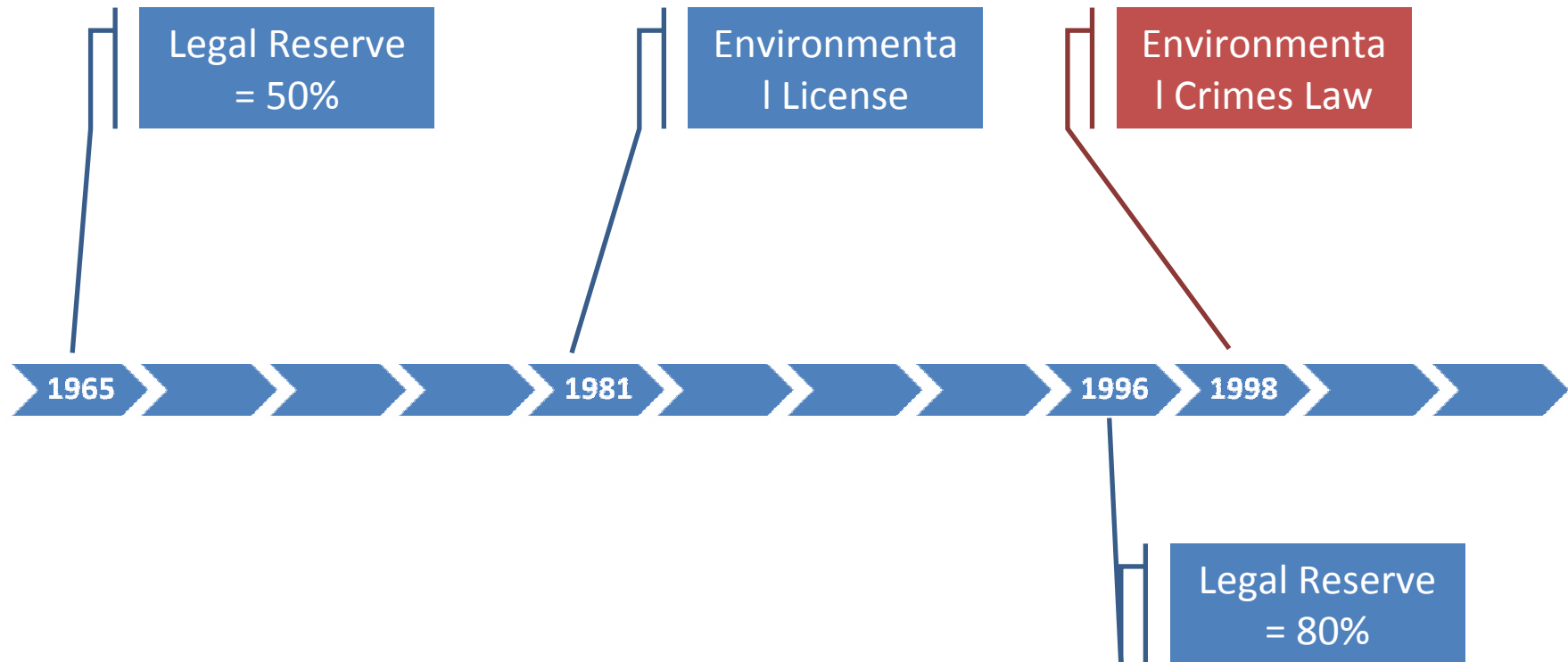- Tourism
- Research

Forest code: private areas

Legal Reserve
(sustainable use)
80% of each property

Permanent Protection Area
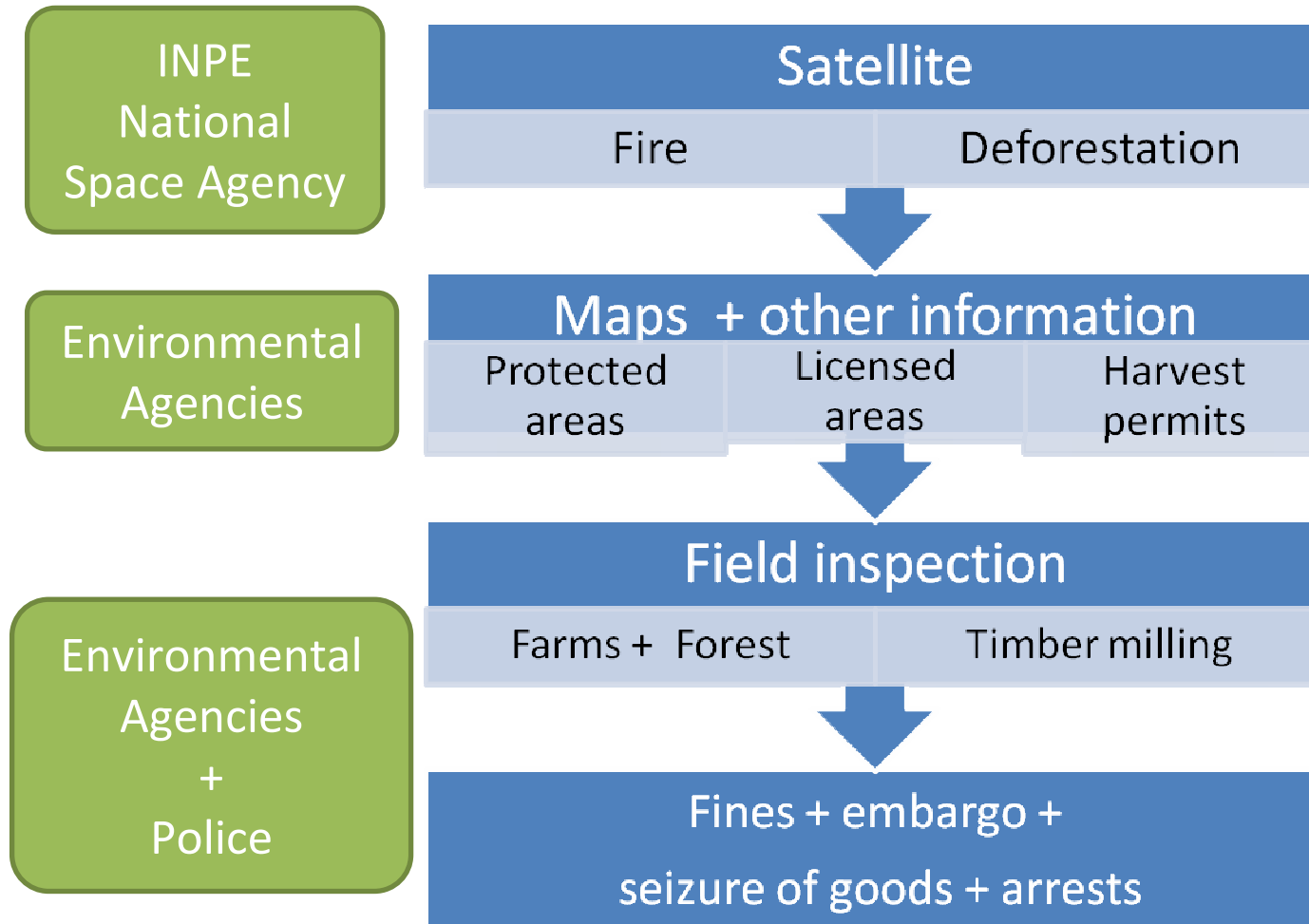(Riparian Forest, > 45°
inclination terrain)

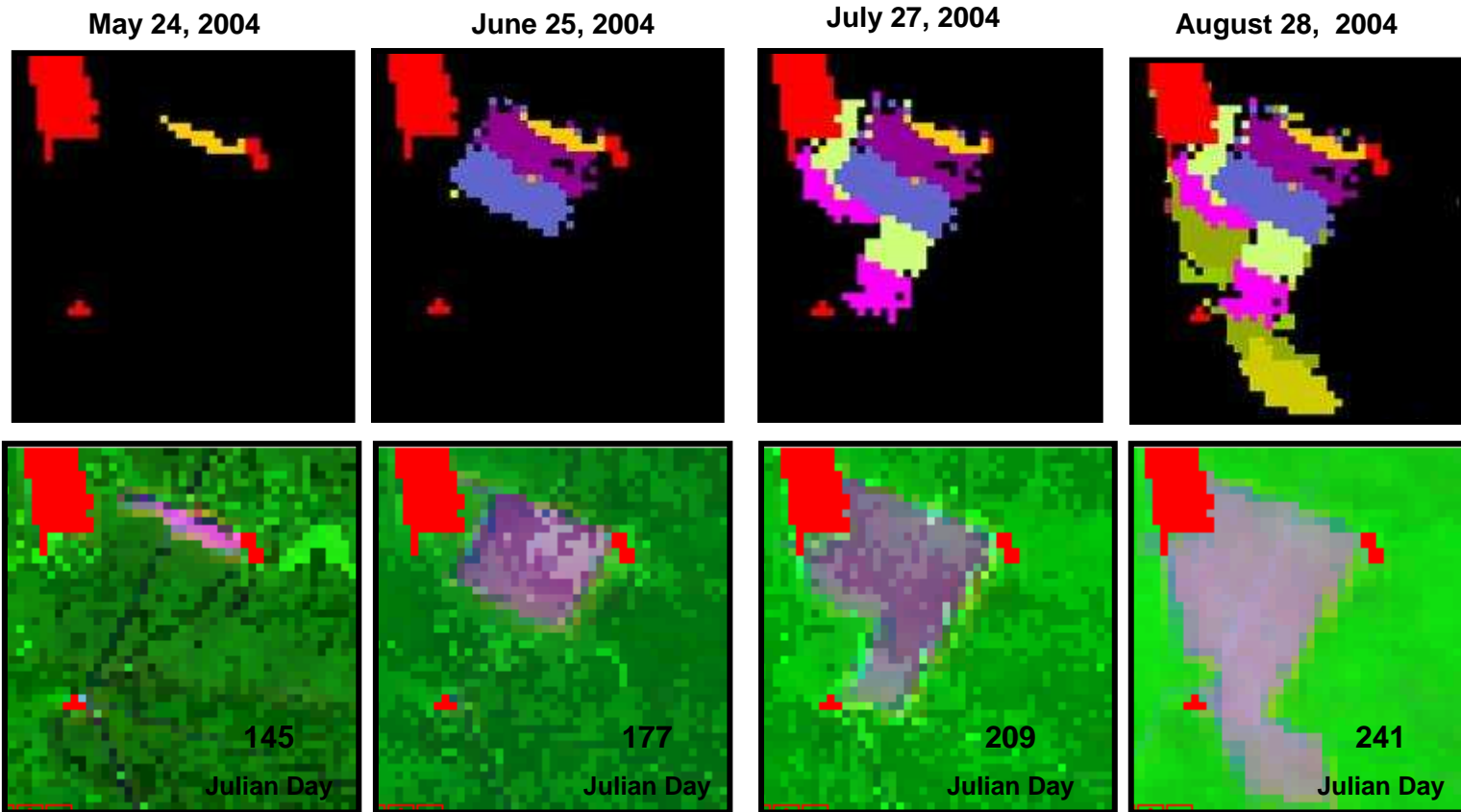- **Environmental licenses**

- **Transportation of logs is regulated**

  and tracked

Environmental crimes law

Detection of illegalities

INPE National Space Agency

Satellite

| Fire | Deforestation |

Environmental Agencies

Maps + other information

| Protected areas | Licensed areas | Harvest permits |

Environmental Agencies + Police

Field inspection

| Farms + Forest | Timber milling |

Fines + embargo + seizure of goods + arrests

Monthly deforestation data

May 24, 2004 **June 25, 2004** **July 27, 2004** **August 28, 2004**

145 Julian Day 177 Julian Day 209 Julian Day 241 Julian Day
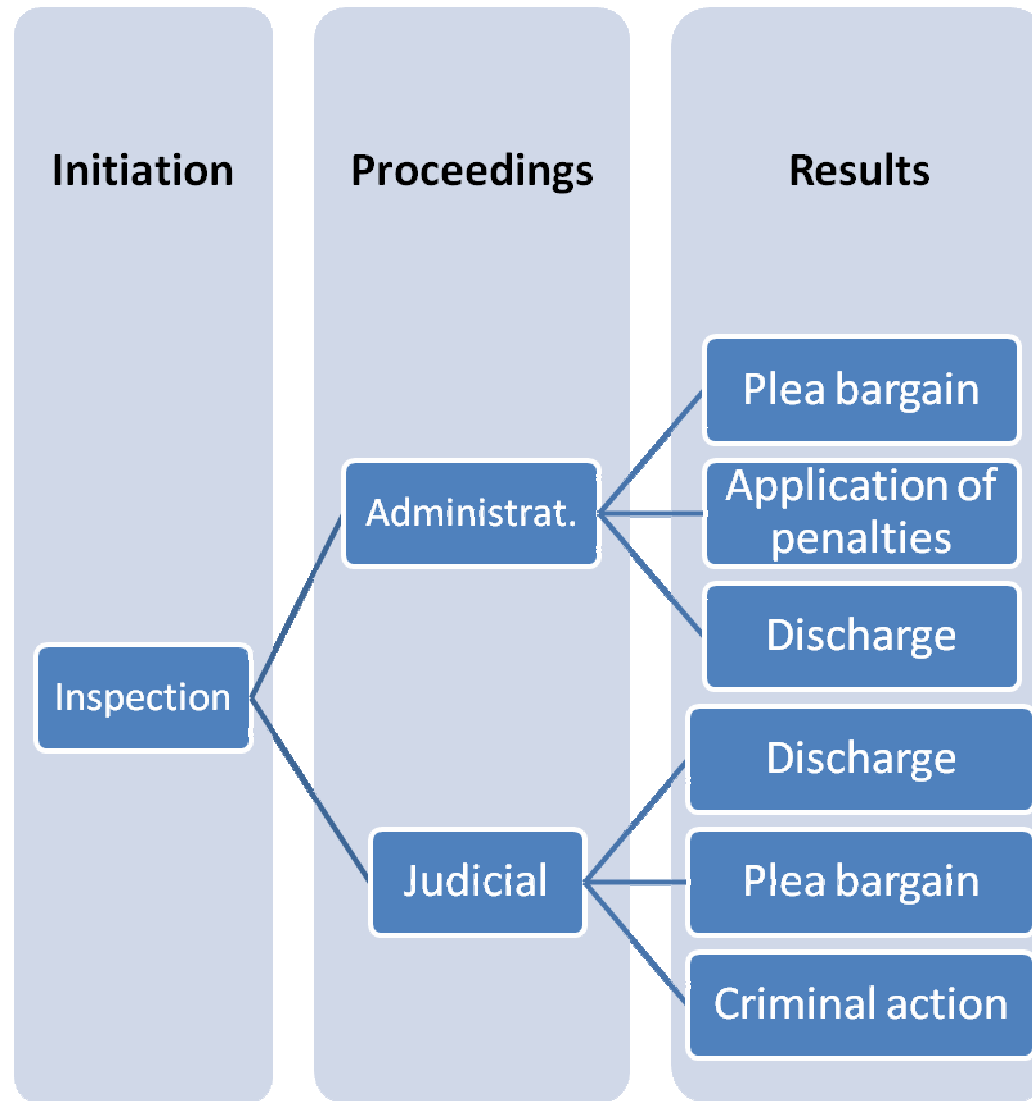
May 24, 2004
June 09, 2004
June 25, 2004
July 11, 2004
July 27, 2004
August 12, 2004
August 28, 2004
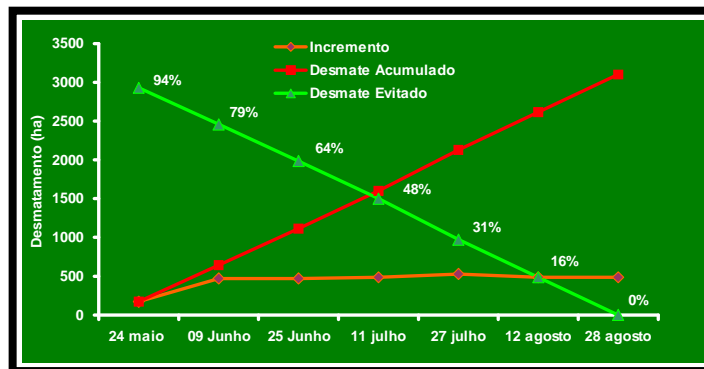
Total area = 3100 ha
Deforestation Rate = 30 ha/dia
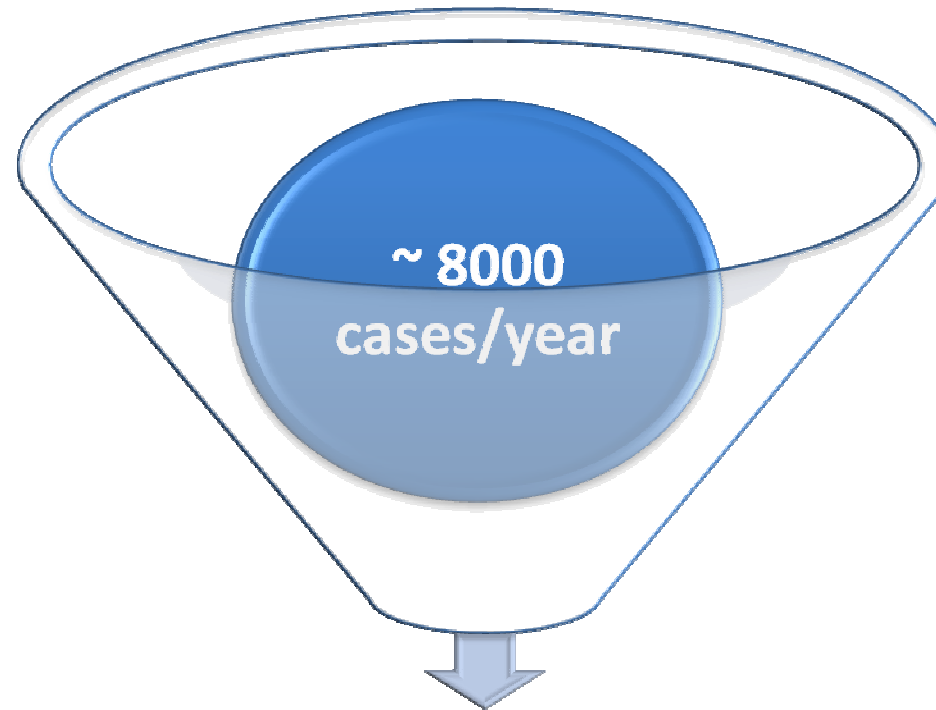
Proceedings for punishing environmental violators

Initiation **Proceedings** **Results**

Inspection

Administrat.
- Plea bargain
- Application of penalties
- Discharge

Judicial
- Discharge
- Plea bargain
- Criminal action

Good and bad news about enforcement
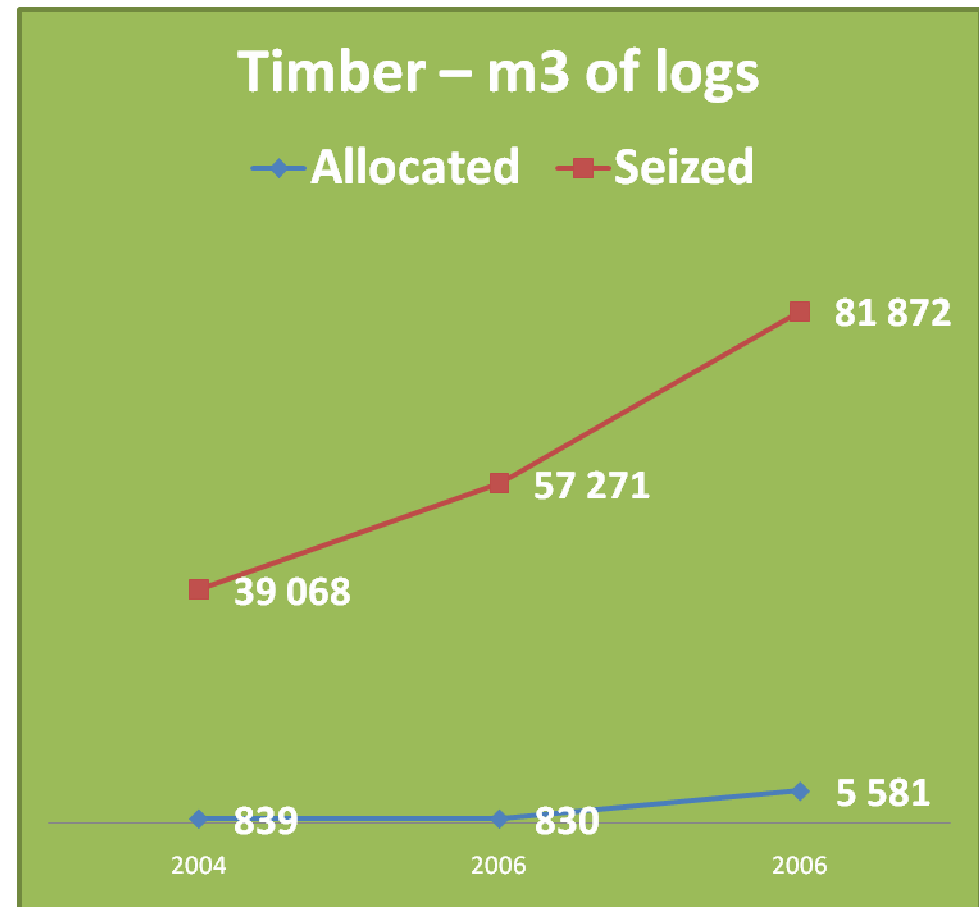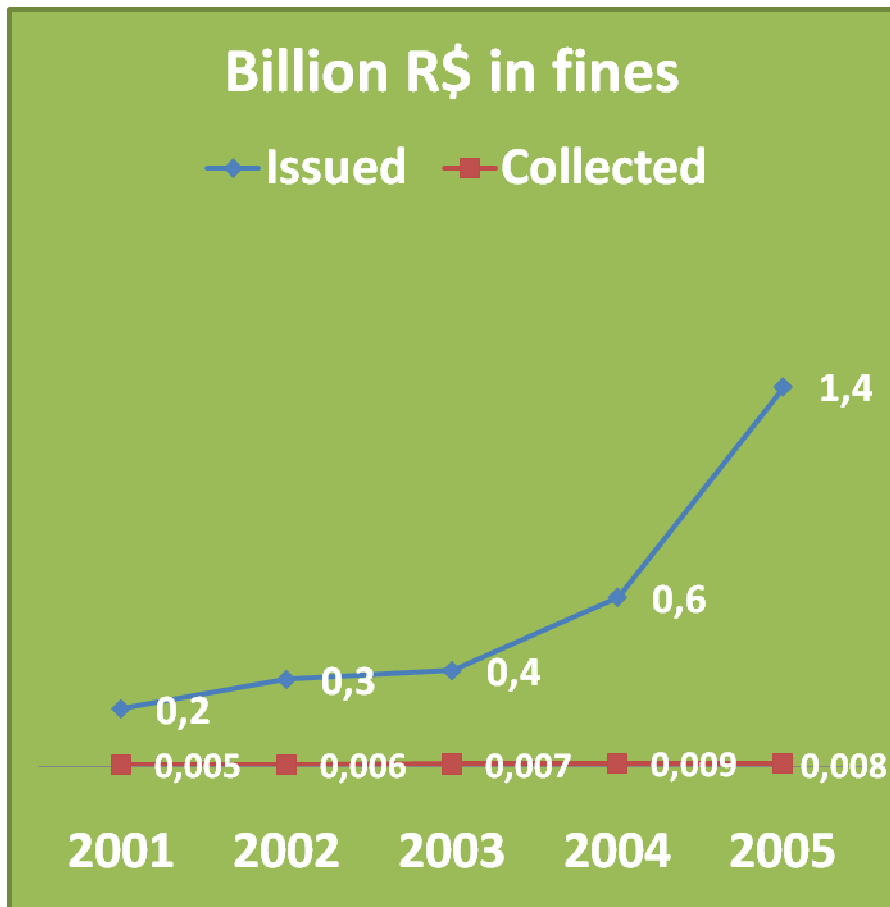
Poor enforcement strategy

~ 8000
cases/year

22

**IBAMA´s lawyers
in the Amazon**

4 levels of administrative appeals

1
- IBAMA - Local office

2
- IBAMA - Brasilia office

3
- Ministry of Environment

4
- National Environmental Council
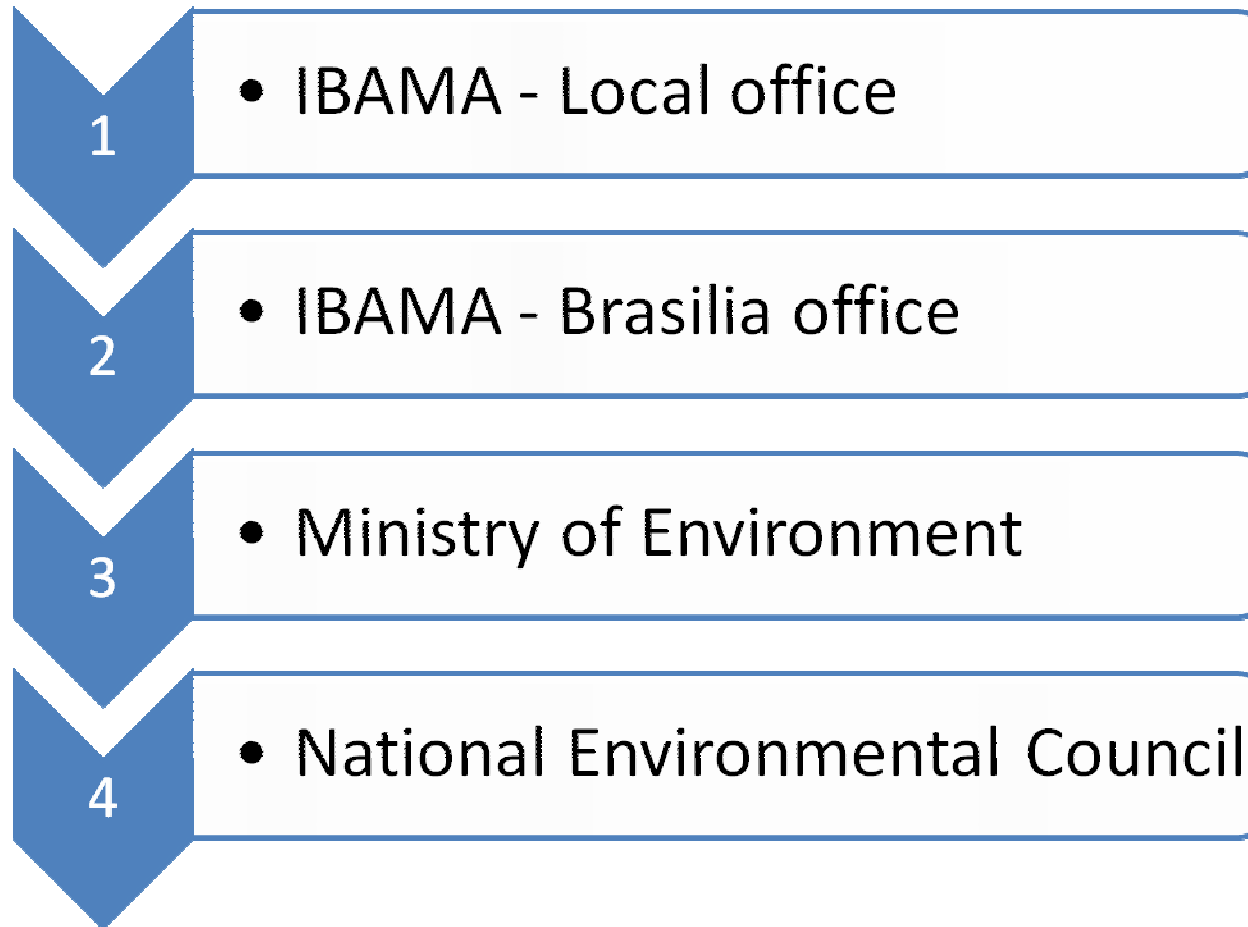
Deforestation rates from 1994 to 2006
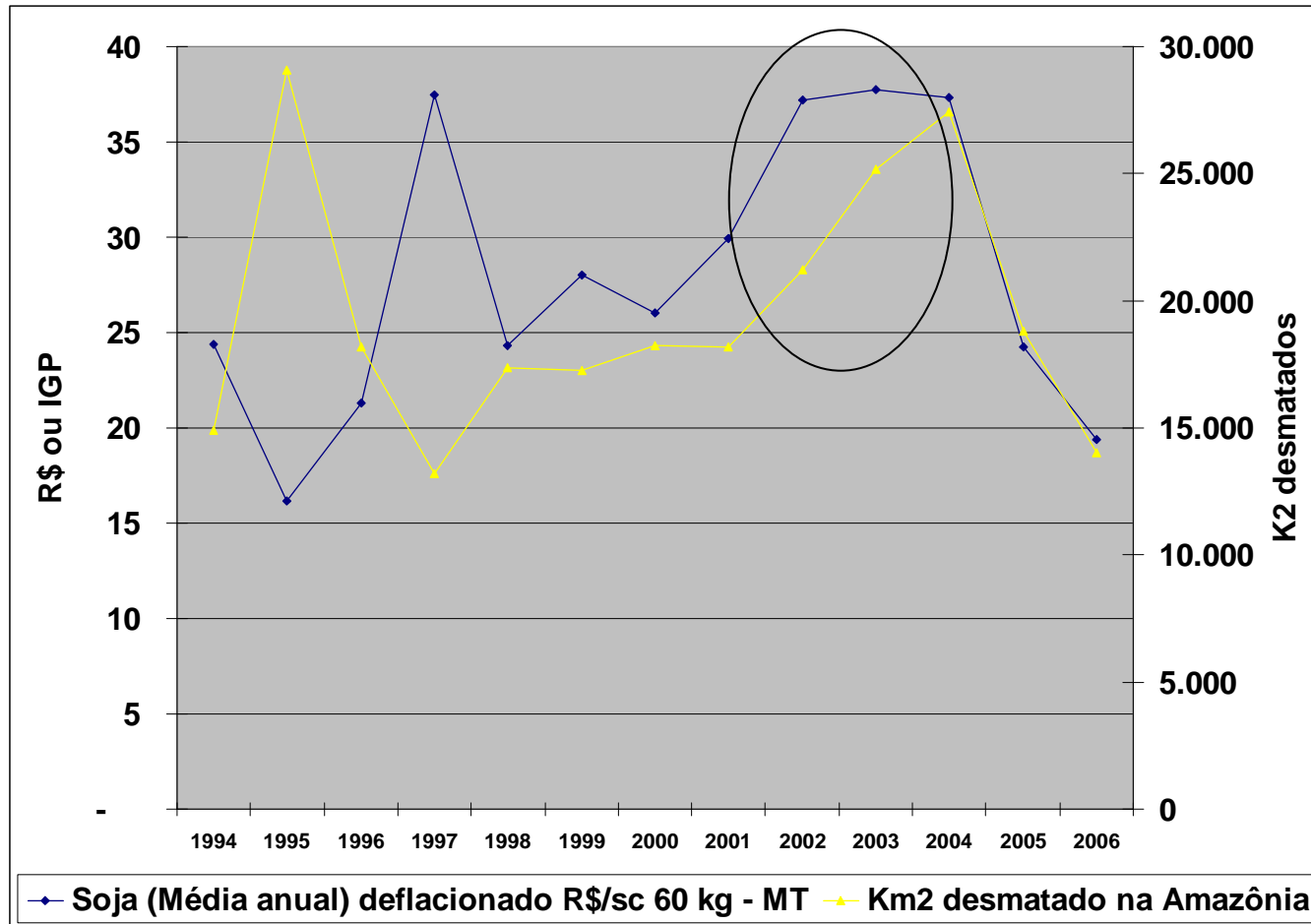

Fonte dados: Inpe
http://www.obt.inpe.br/prodes/index.html
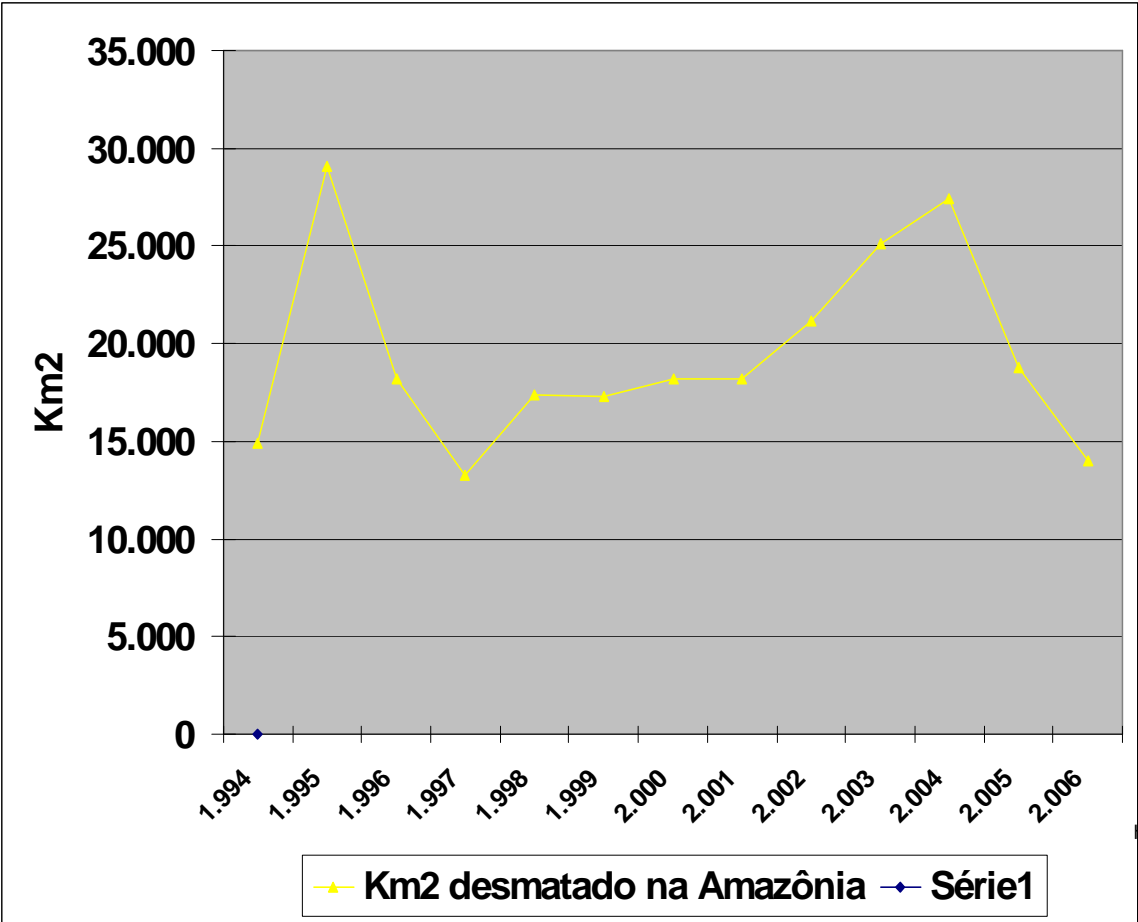
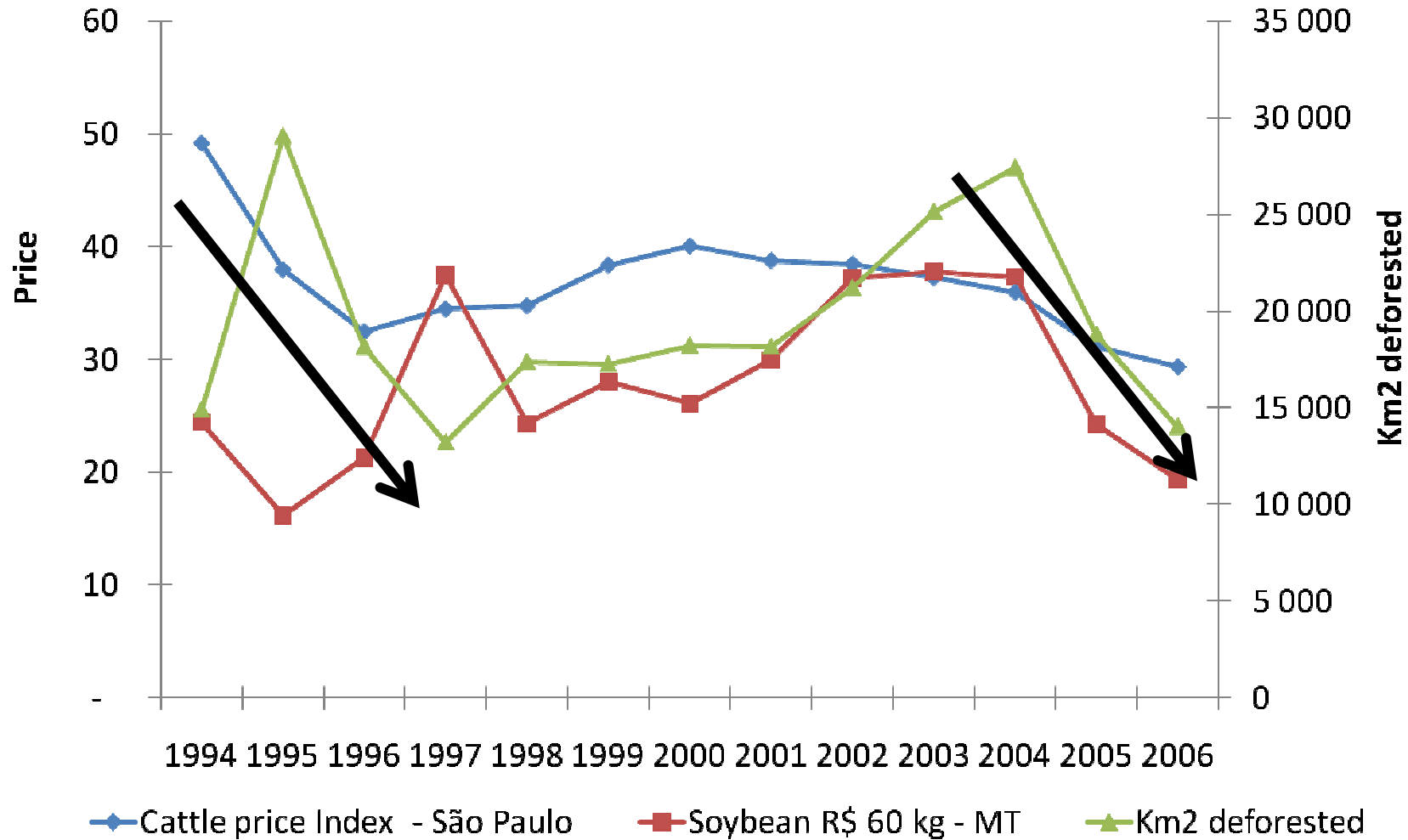# Cattle price x Deforestation rate
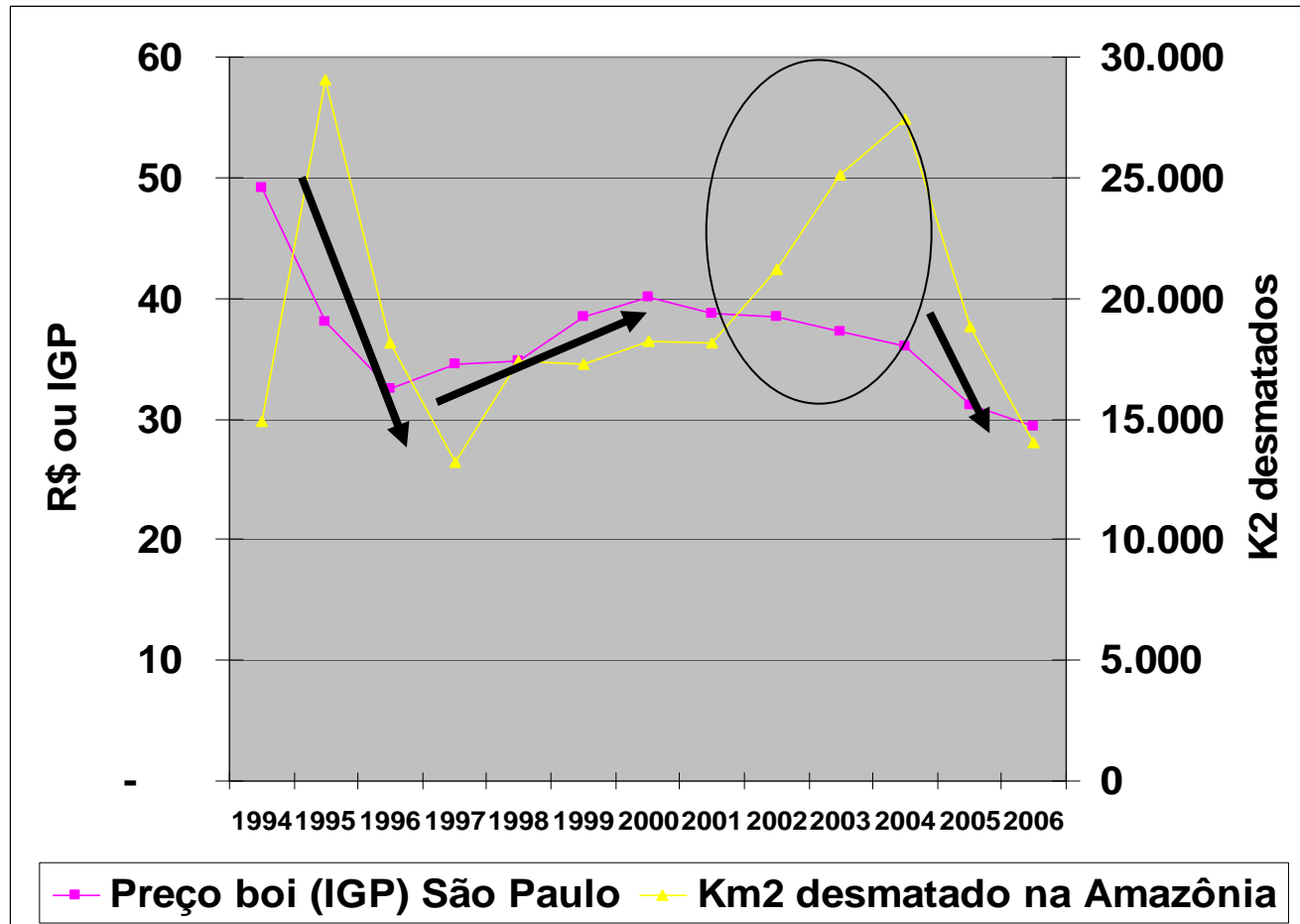
Soy price x Deforestation rate
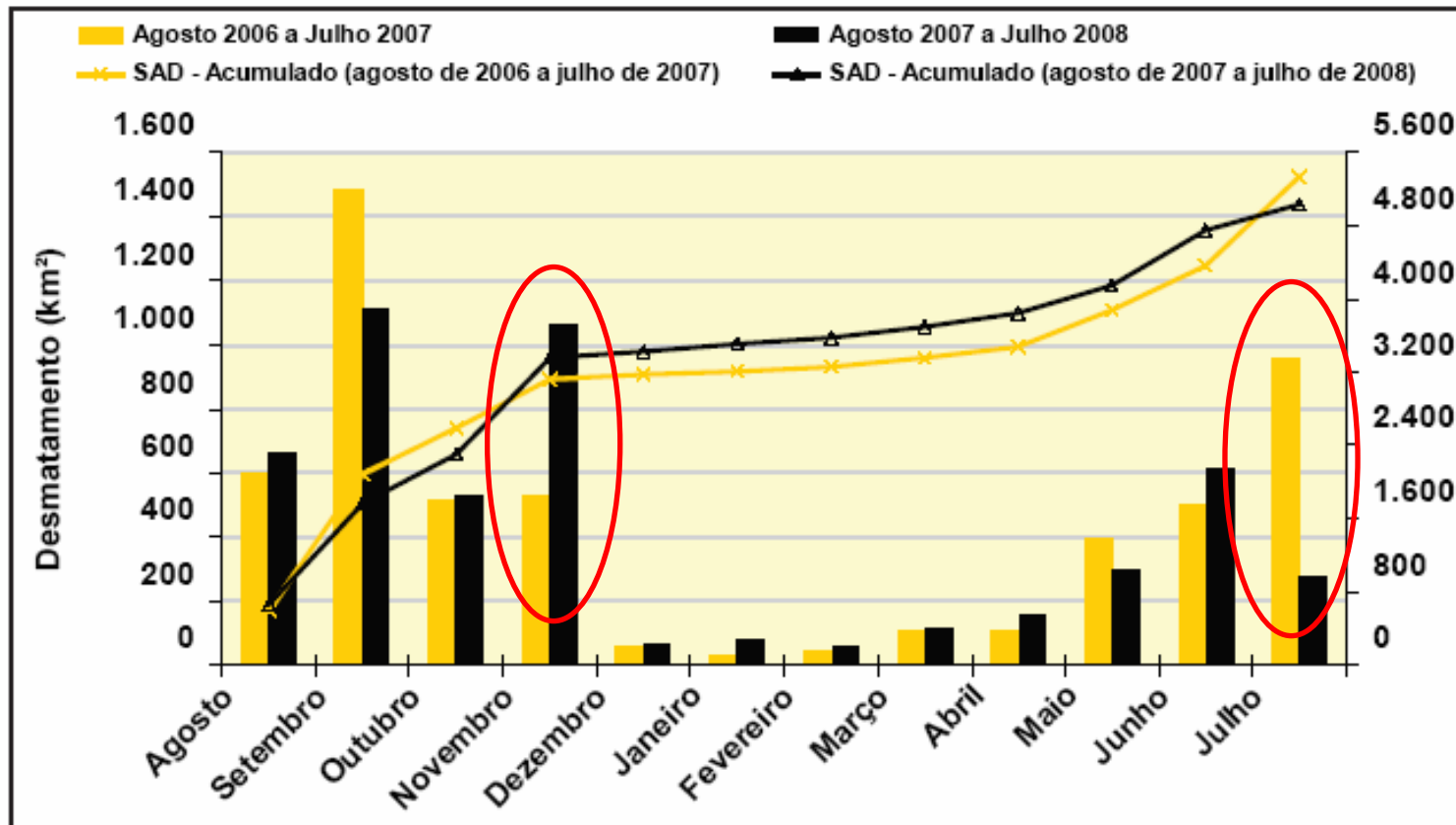

Dados preço soja: Anualpec vários anos. Fonte desmatamento: Inpe

When beef and soy prices declined toghether deforestation declined sharply

Cattle price Index - São Paulo   Soybean R$ 60 kg - MT   Km2 deforested

Monthly deforestation data
2006-2007 x 2007-2008

New measures against deforestation in 2008

Credit restriction

Embargo of areas illegally deforested

Buyers of products from embargoed areas liable to penalties

Call to re-register rural properties (georeferenced)

- 6% overall deforestation
- 25% within protected areas

Actual seizure of goods
3,000 cattle heads
30,000 m3 of logs
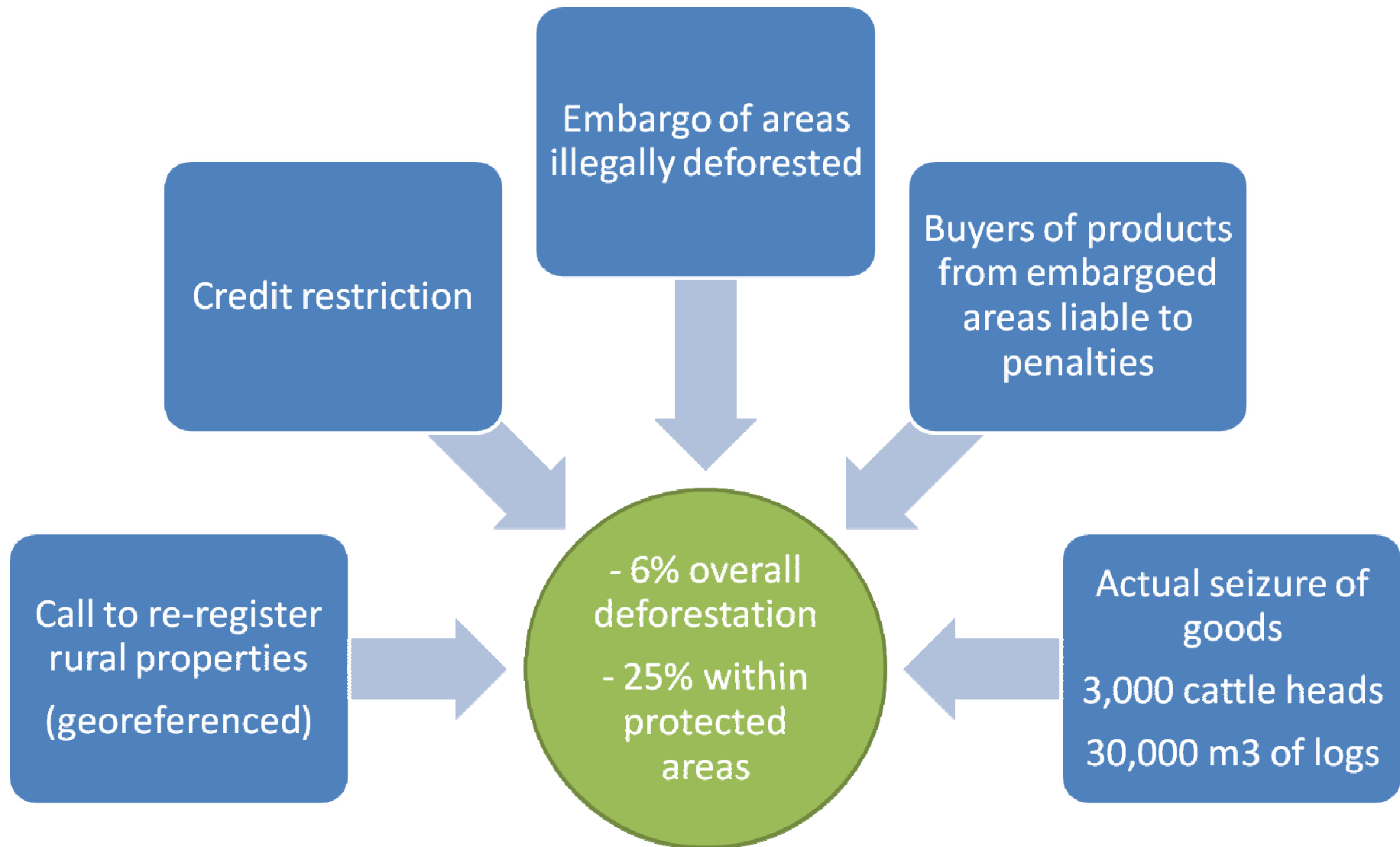
The role of protected areas
33% reduction of fires, but timber extraction is a problem
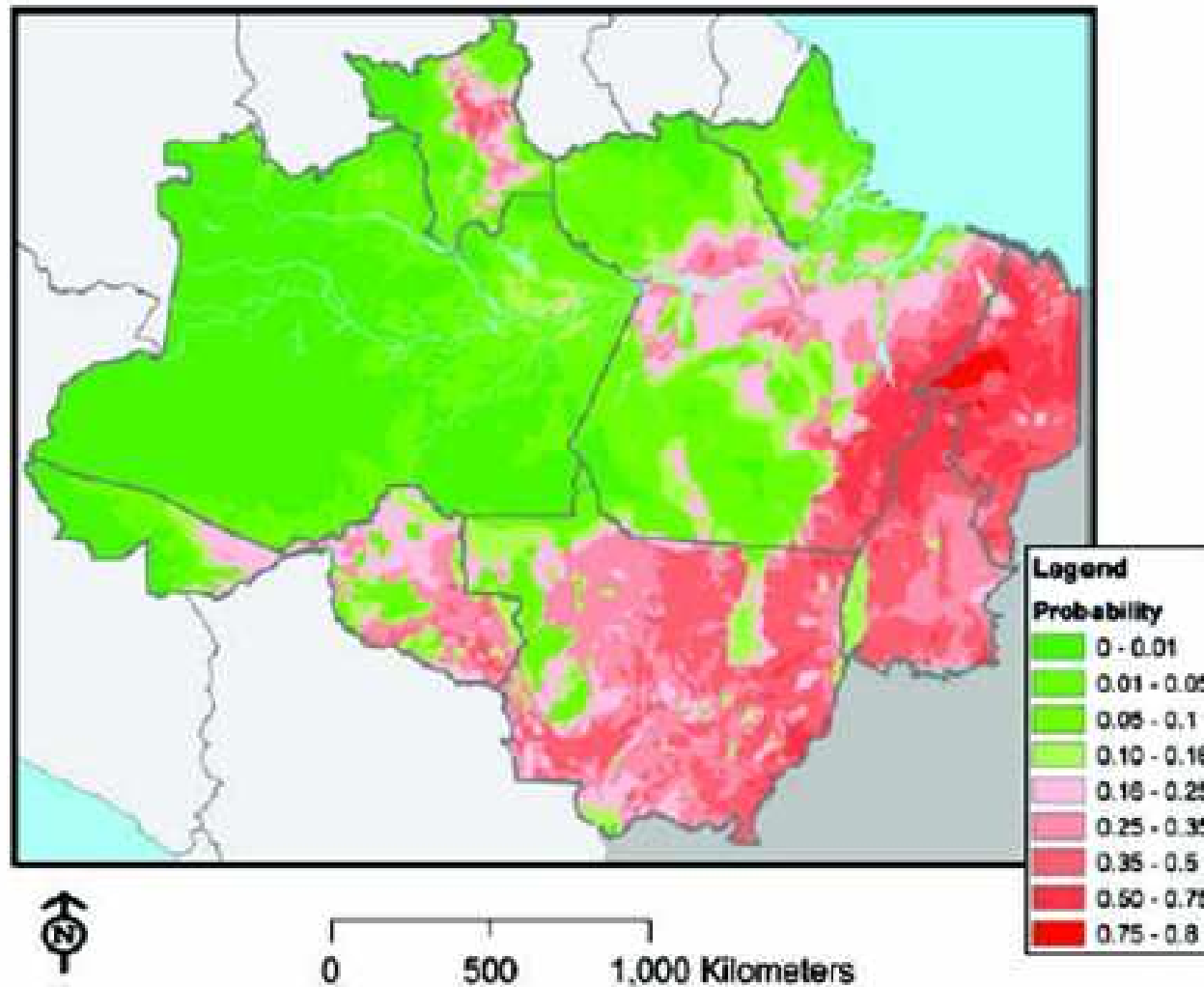
FIGURE 5: Estimated Probability of Fire in Amazonia—Base Case Scenario.

Reaction

Population against seizure of logs in Pará State – Feb 2008

Congressional hearing about enforcement – April 2008

Source of photo:
http://oglobo.globo.com/pais/mat/2008/02/20/madeireiros_presos_4_acusados_de_incitar_protesto_no_para-425745872.asp

Source of photo:
http://www.meuparlamentar.com.br/homeropereira/images/rsgallery/original/04_09_10_desmatamento.JPG

Conclusions

1. Detection + application of penalties

2. Commodity prices → deforestation rates

3. Change economic incentives – ex: credit

4. Social and economic impacts of reducing illegal activities

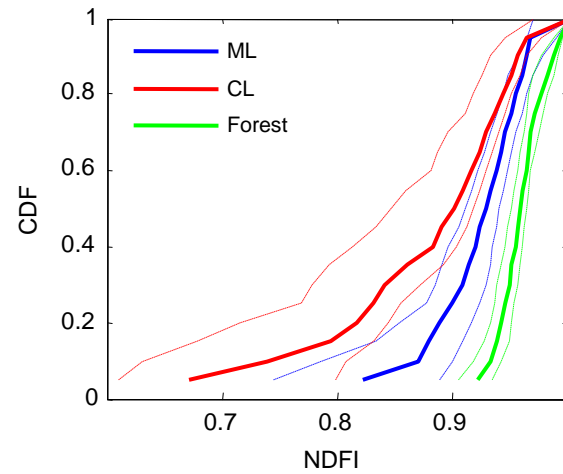NDFI – Normalized Difference Fraction Index (Souza Jr. et al., 2005)

Roads

Logged Forest

226/68 - 2001 (Sinop - MT)

NDFI*100

-100   -50   0   50   100
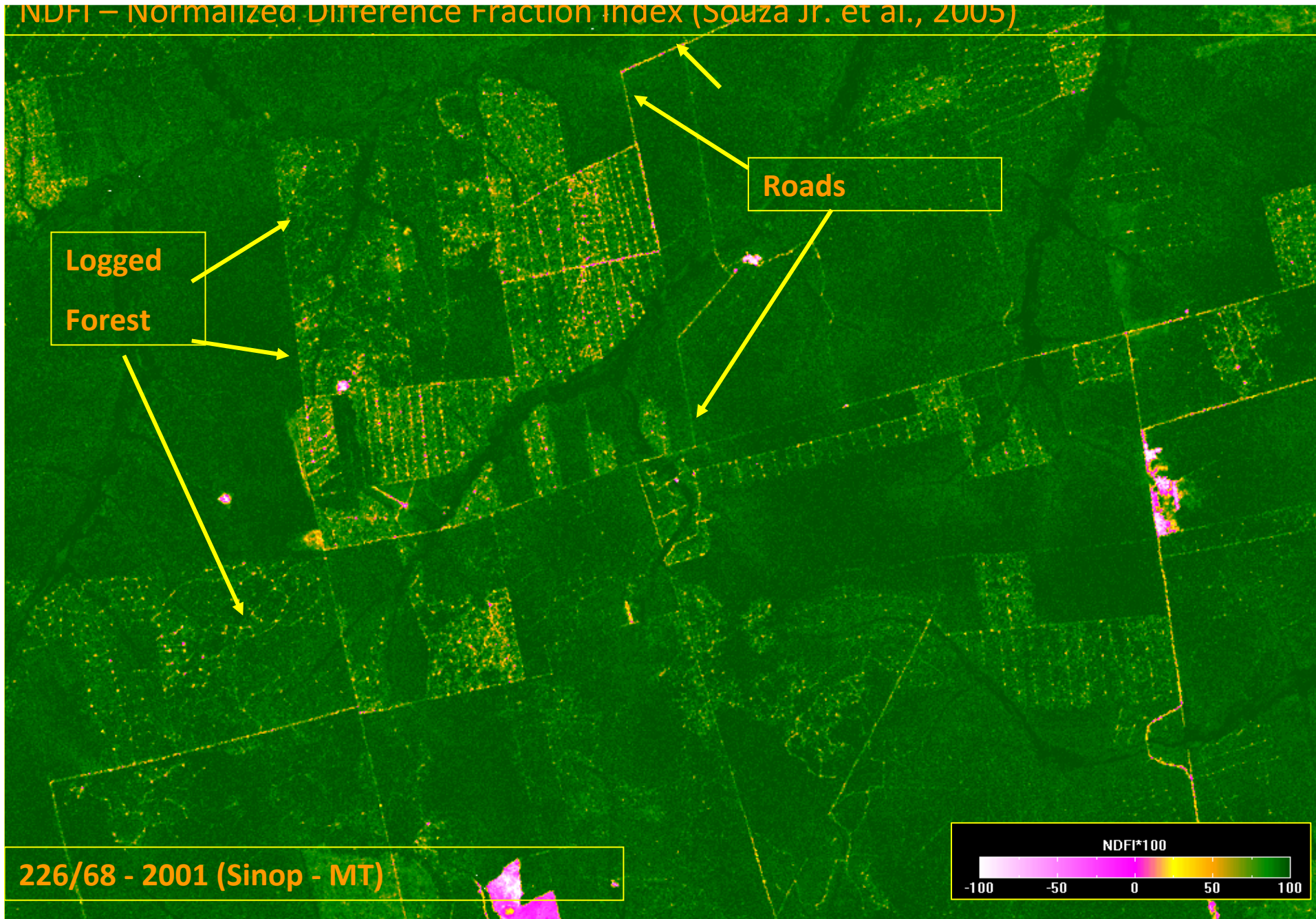
Forest Management Plan

Logging Damage Intensity

—— Native forest
—— Low impact logging
—— Conventional logging

Detection of illegalities

INPE
National
Space Agency

Satellite

| Fire | Deforestation |

Environmental
NGOs

Environmental
Agencies

Maps + other information

| Protected areas Licensed areas | Accounting harvest permits |

Press

Environmental
Agencies
+
Police

Field inspection

| Farms + Forest | Timber milling |

Public
Prosecutors