IPAM - INSTITUTO DE PESQUISA AMBIENTAL DA AMAZÔNIA

Trade-offs of alternative land use policy scenarios for the Xingu River headwaters region

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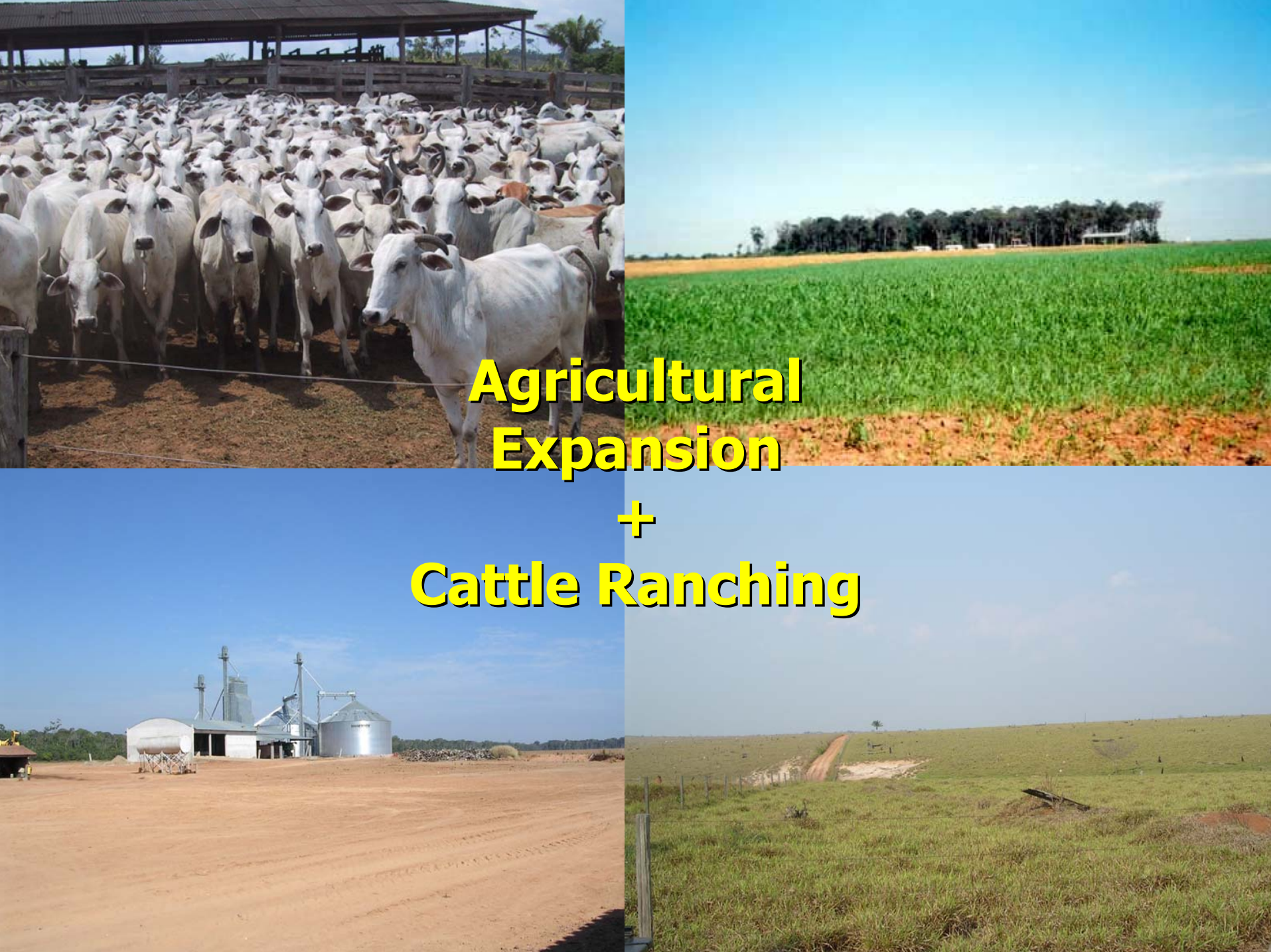
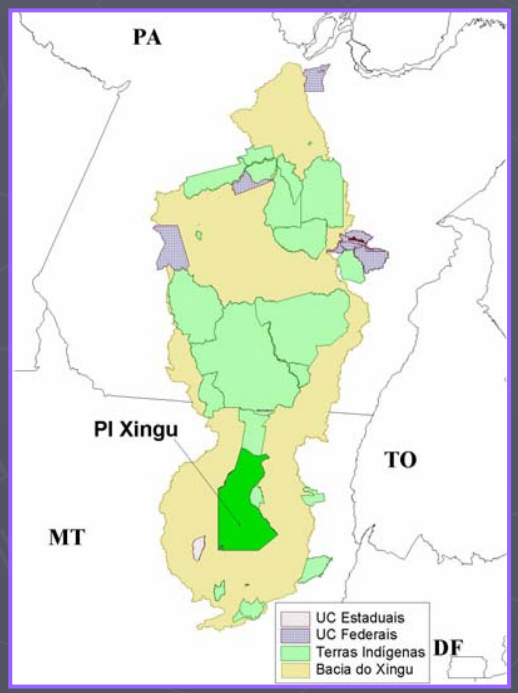
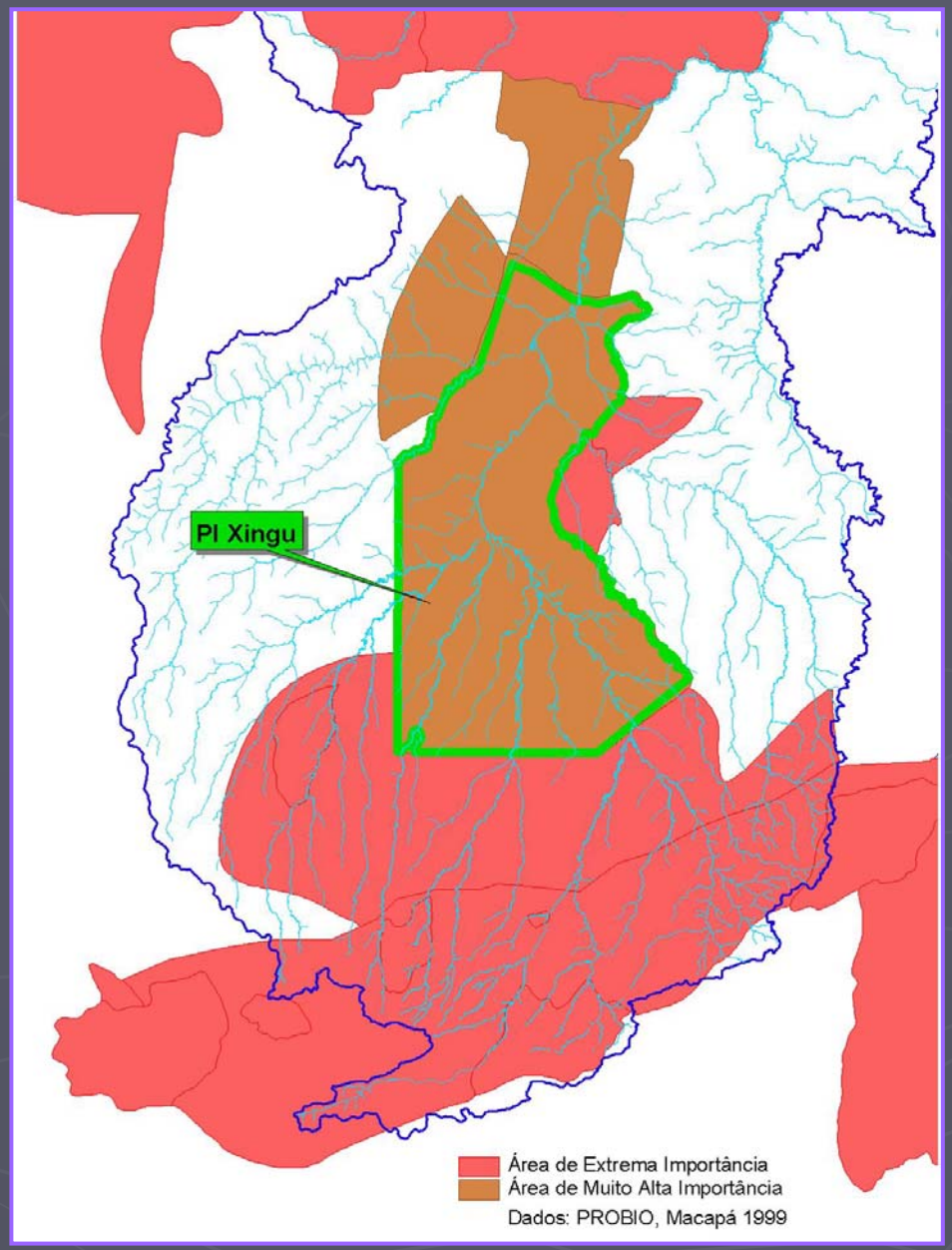
LBA NSF USAID


Agricultural
Expansion
+
Cattle Ranching


Deforestation, Forest Fragmentation & Degradation
+
Encroachment on Protected Areas
+
Land Conflict
+
Health Risks

Xingu Basin, Mato Grosso





(Fonte: Shimabukuru et al. 2003/ISA)

Regional Land Cover Assessment

Objective:

Preliminary analysis of trade-offs associated with land-use policy implementation (codigo florestal)

Also:

First step to develop dynamic, policy-sensitive land-cover model:

- to support regional land use planning initiative
- to provide scientific basis for evaluating environmental legislation

Participatory Planning

- Multi-stakeholder process: *'Y ikatu Xingu*
- Initial workshop October 2004

Photos: Raul Acosta

Codigo Florestal

- Legal reserve (80% Amazon forest, 35% *cerrado*, 20% other) = *reserva legal*
- Permanent protected areas (riparian areas, steep slopes) = *APP*

Reserva legal (RL)

APP

Scenarios

Scenario 1: "Current Scenario"

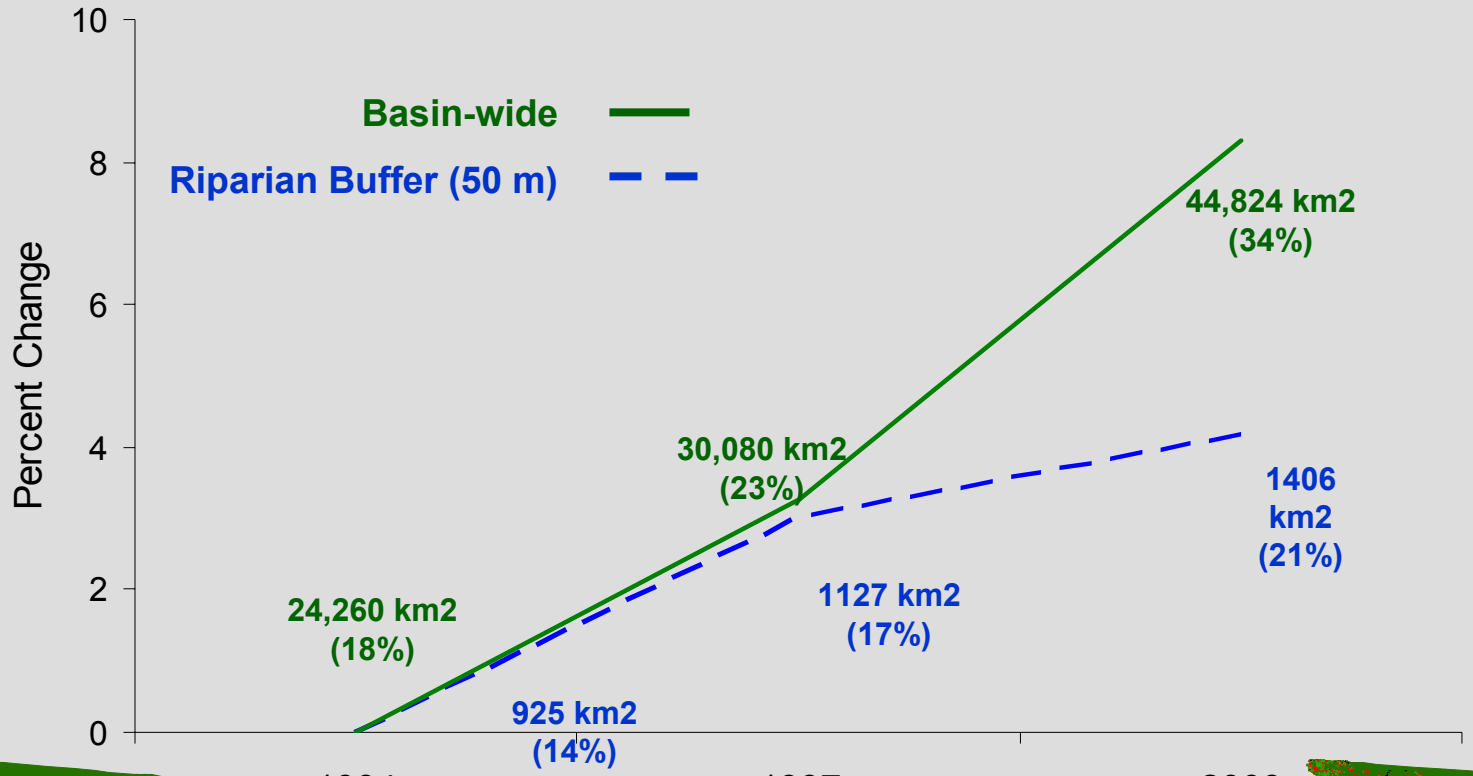
- Current Land Use/Land Cover (2003):
  - How much RL? How much APP?

Scenario 2: "Compliance Scenario"

- Current Forest Code
  - (80% RL & 50 m APPs)
  - How much RL and APP needs to be recovered compared to current land cover?

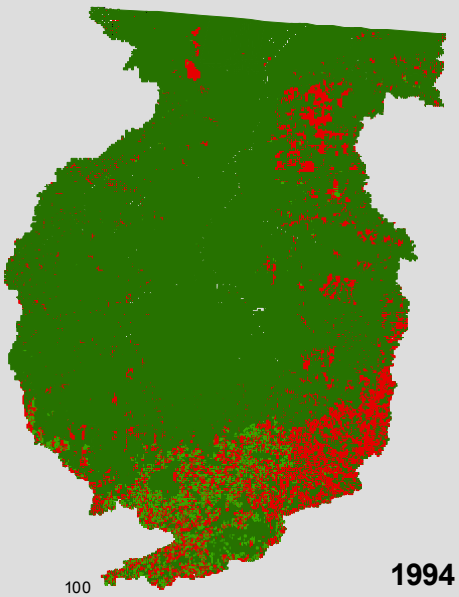
Evaluation

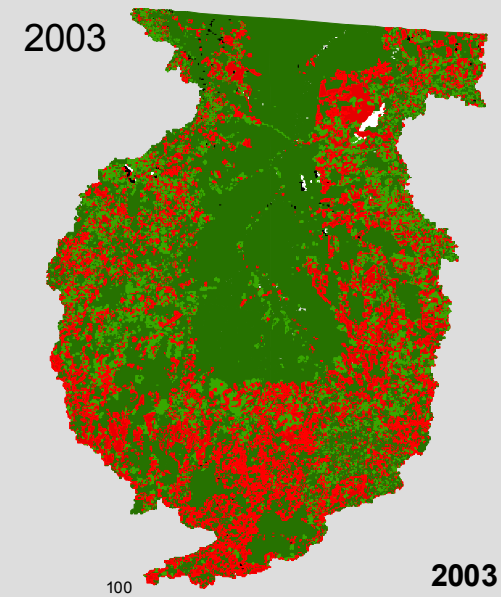
- Amount of forest/cerrado to be recovered
  - To meet legal RL across landscape
  - To meet legal APP requirements
- Cost of recovery vs. potential profit & opportunity cost
- Total landscape carbon sequestration and potential for carbon compensation



Deforestation

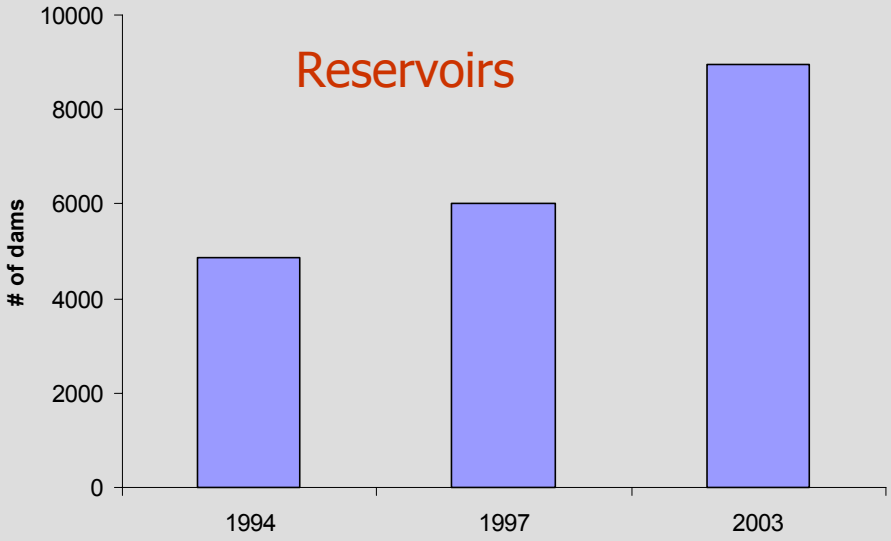
1994-2003



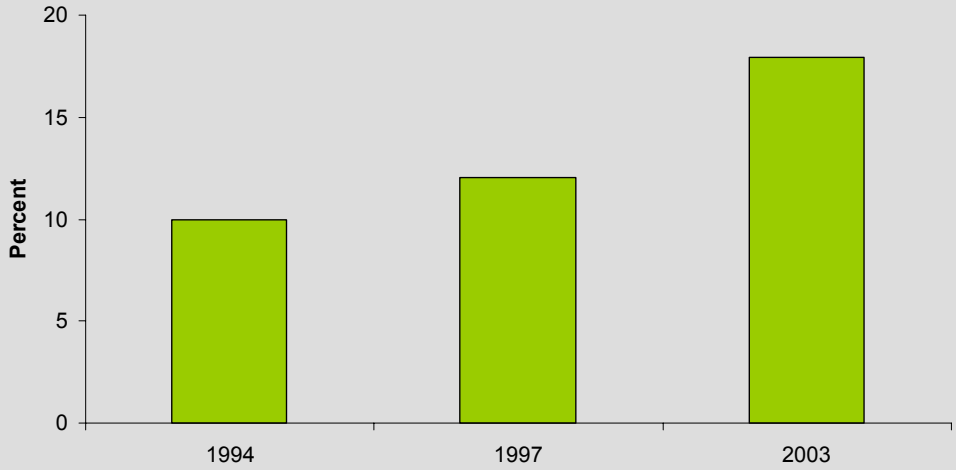


Trends

Reservoirs



Cropland



(IBGE, 2005)

Xingu River Headwaters

“Current Scenario”

Forest: 30,051 km2

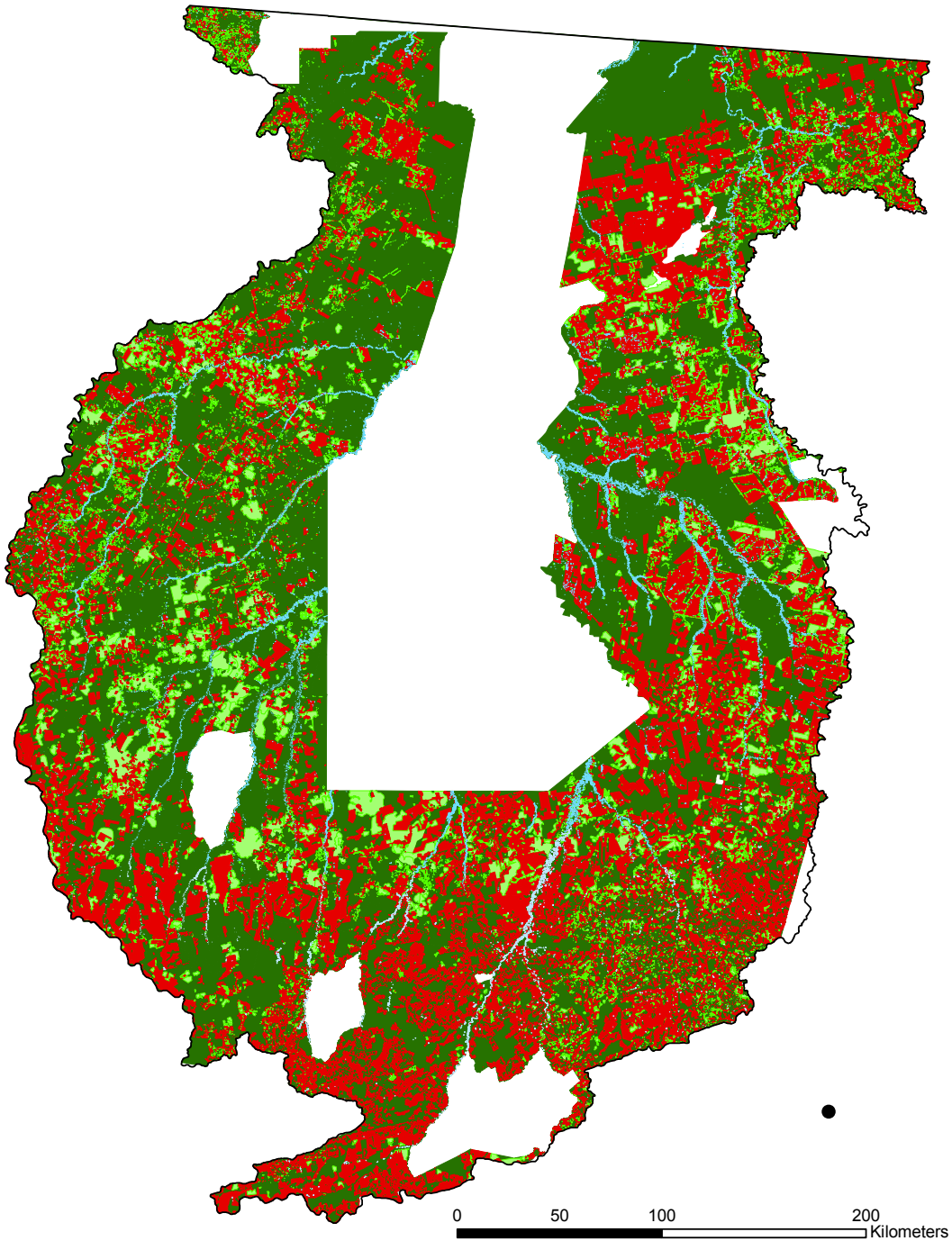
Cerrado: 14,772 km2

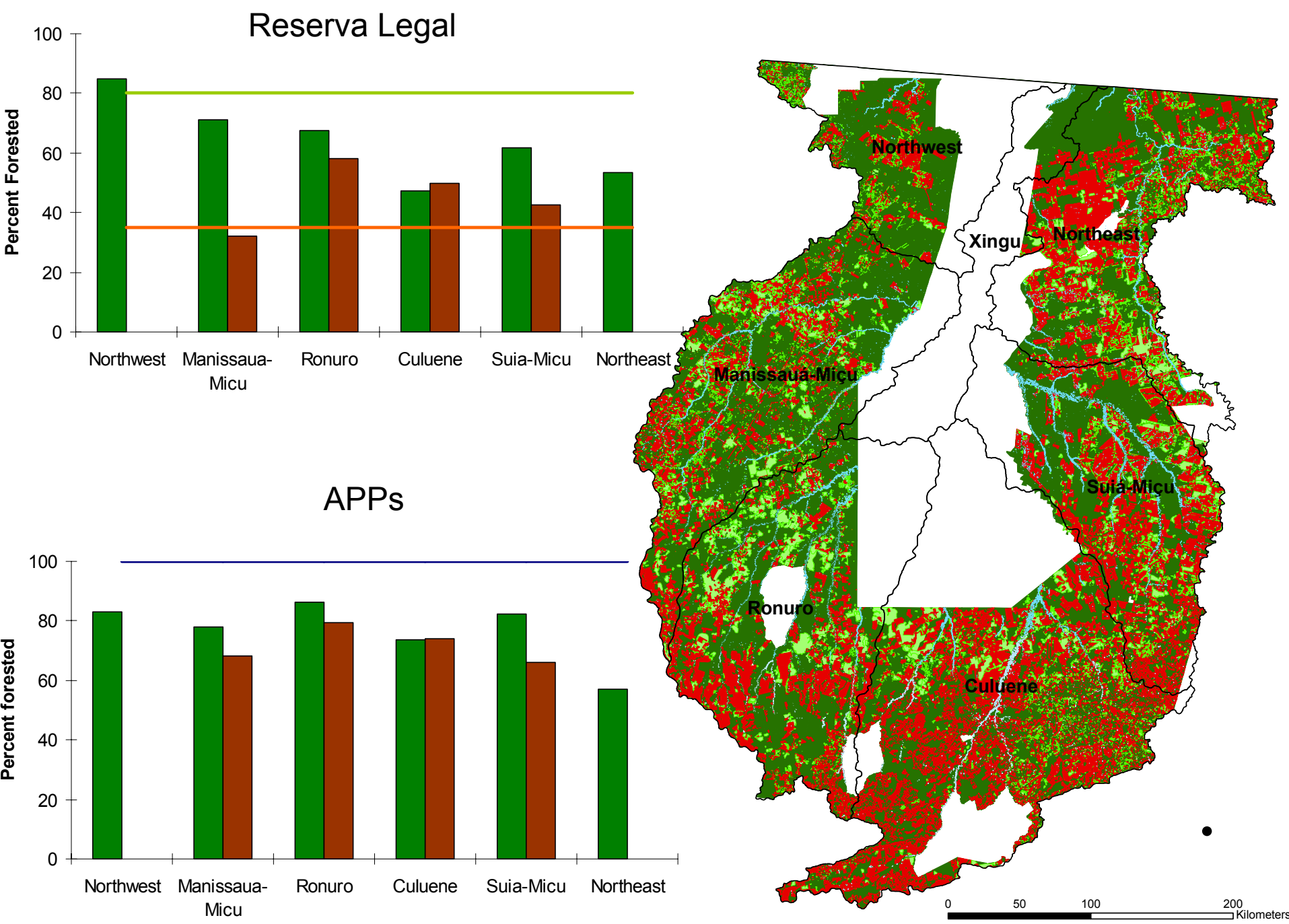
44,823 km2

“Compliance Scenario”

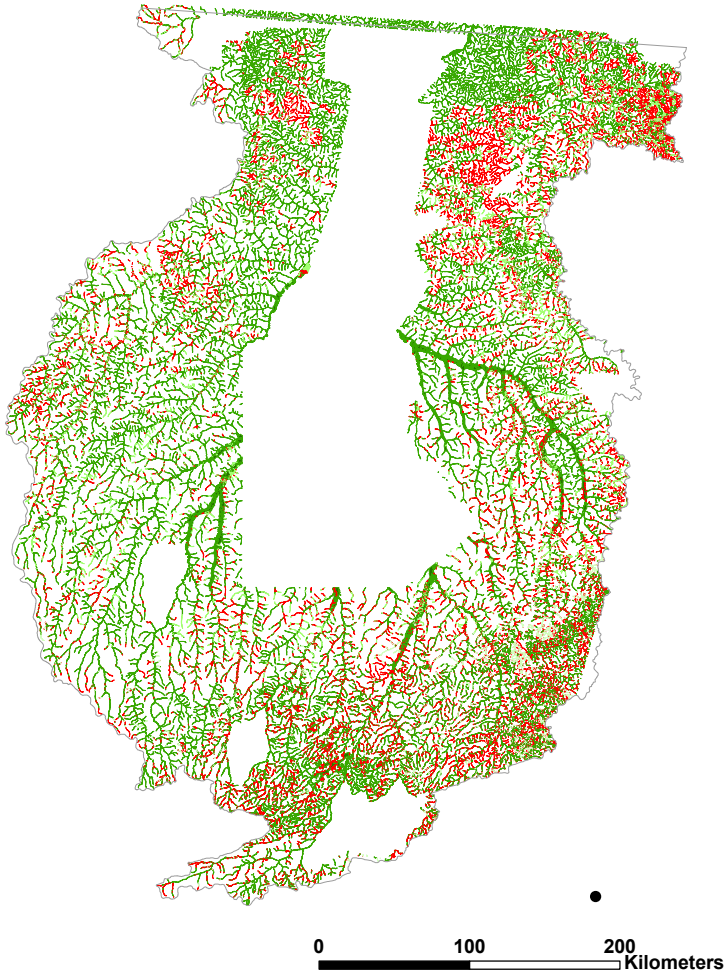
To reach 80% *reserva legal* (RL) in forest biome:

19,074 km^2

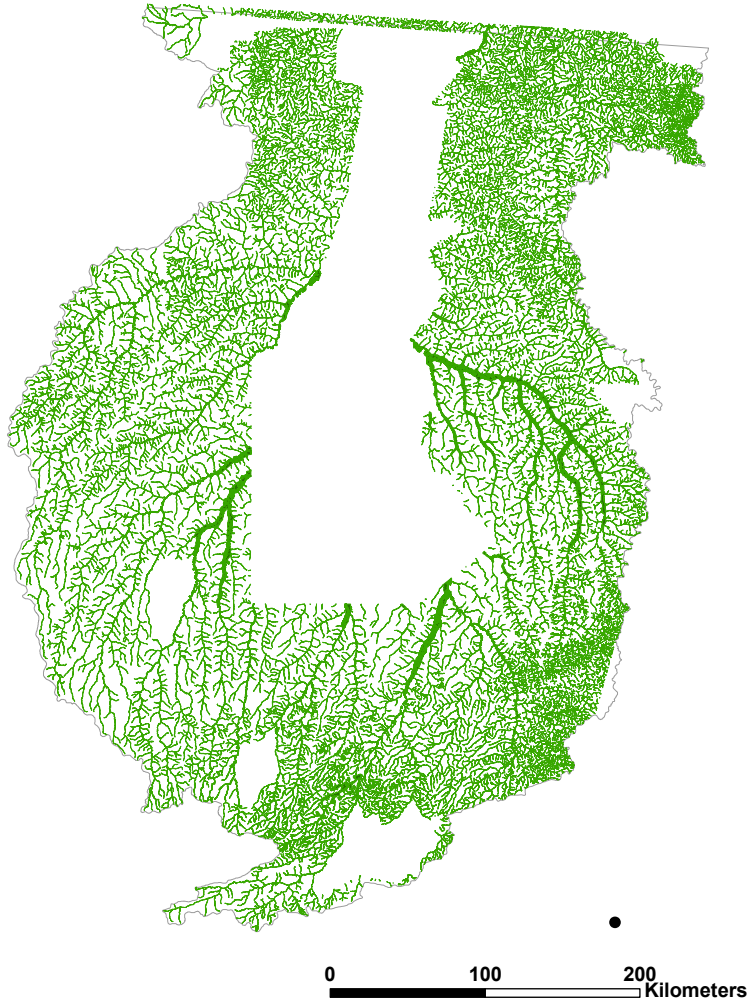



Reserva Legal
Percent Forested
100
80
60
40
20
0
Northwest
Manissaua-Micu
Ronuro
Culuene
Suia-Micu
Northeast
APPs
Percent forested
100
80
60
40
20
0
Northwest
Manissaua-Micu
Ronuro
Culuene
Suia-Micu
Northeast
Northwest
Xingu
Northeast
Manissaua-Miçu
Suia-Micu
Ronuro
Culuene
0
50
100
200
Kilometers

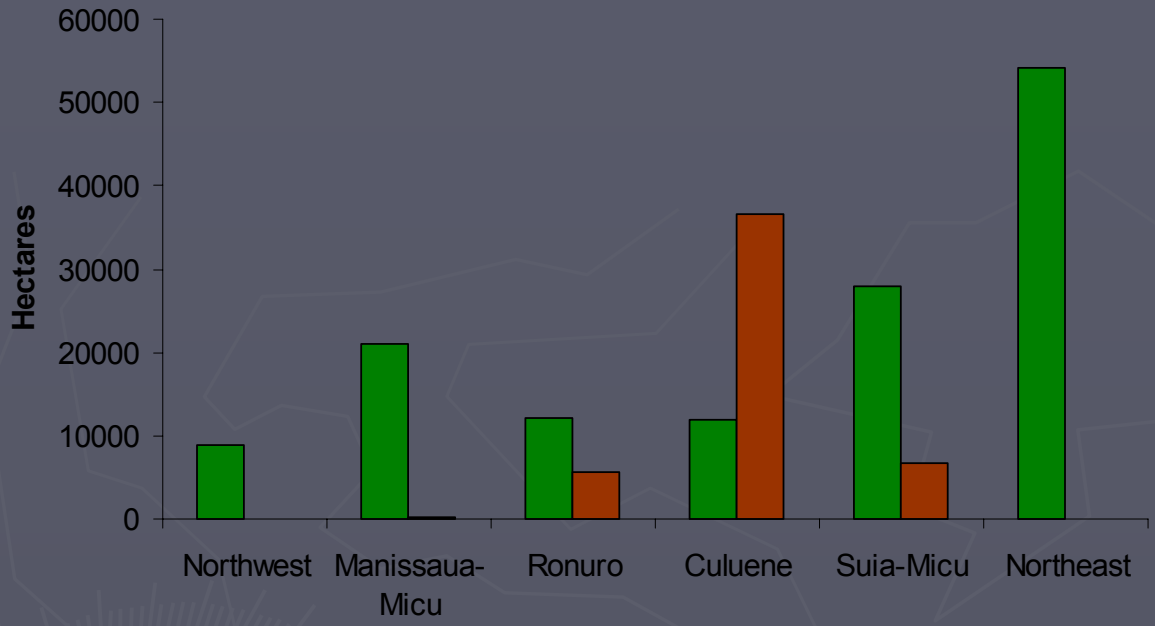
Degraded



Restored



Riparian Zone Restoration Costs



Cost of restoring 50 m APP

- 1759 km^2 (1081 km^2 forest; 678 km^2 cerrado)
- Using fencing: ~ $USD 59.3 million
- + Remove dams: ~ $USD 60.7 – 62.4 million

Potential Profit

Current Scenario

~ $USD 2.5 billion

Compliance Scenario (80% RL, 50 m APP)

~ $USD 1.1 billion

Difference: ~ $USD 1.4 billion

Almeida et al. in prep

Almeida et al. 1995

Annual Opportunity Cost

Price of land (forest) = $200/ha
Annual opportunity cost = 6%

Compliance Scenario (80% RL)
~ $USD 94 million

+ Lost Profit = ~ $1.5 billion

Landscape-Level Carbon

Current Scenario

0.71 Pg
(18% cropland)

Compliance Scenario (80% RL, 50 m APP)

0.92 Pg

(all intact forest)

Difference: 0.21 Pg

= Total Annual Amazon Basin-wide Emissions

Houghton et al. 2002

Compensated Carbon

To make up difference of
profit lost + opportunity cost

$USD 5.37/ton

To recover riparian areas
(fencing + dams)

$USD 4.62/ton

Conclusions

- The Xingu headwaters require at least 20,000 km^2 of forest to be restored to comply with the current *Codigo Florestal*
- Minimum cost of restoring APPs: $60 M
- Under compliance, one year's worth of deforestation-induced emissions would be sequestered
- Under compliance, profits to farmers and ranchers would decline as much as 50%

Acknowledgements

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