An Agro-silvo-pastoral Production System in Brazil

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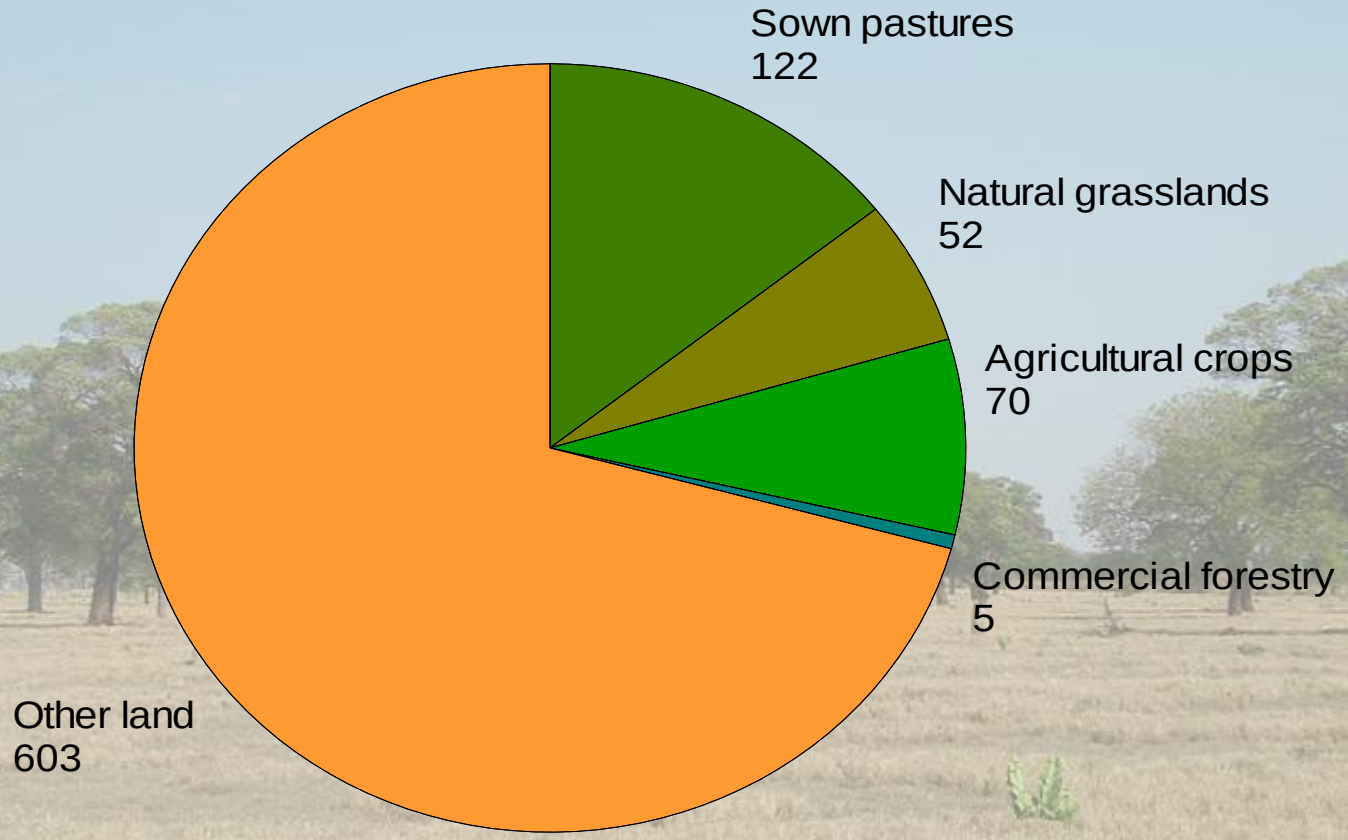
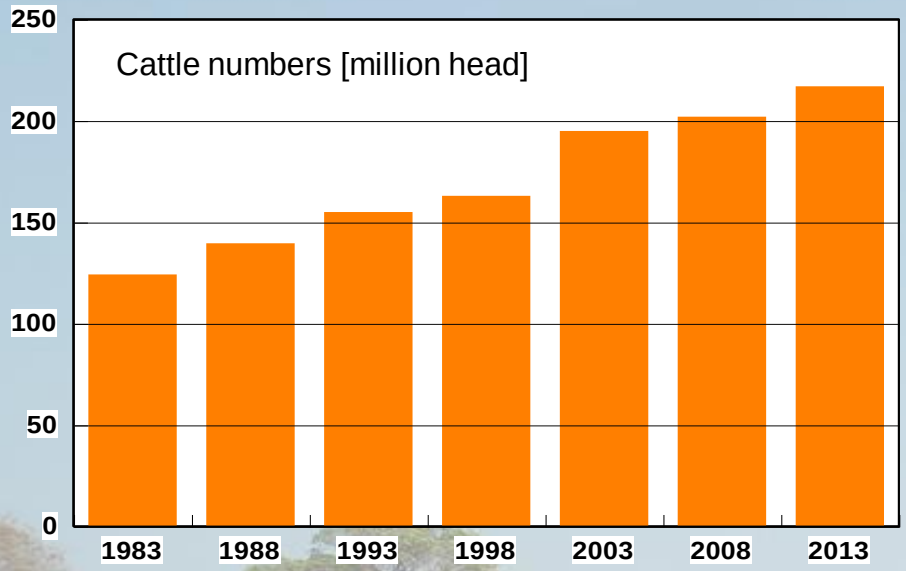
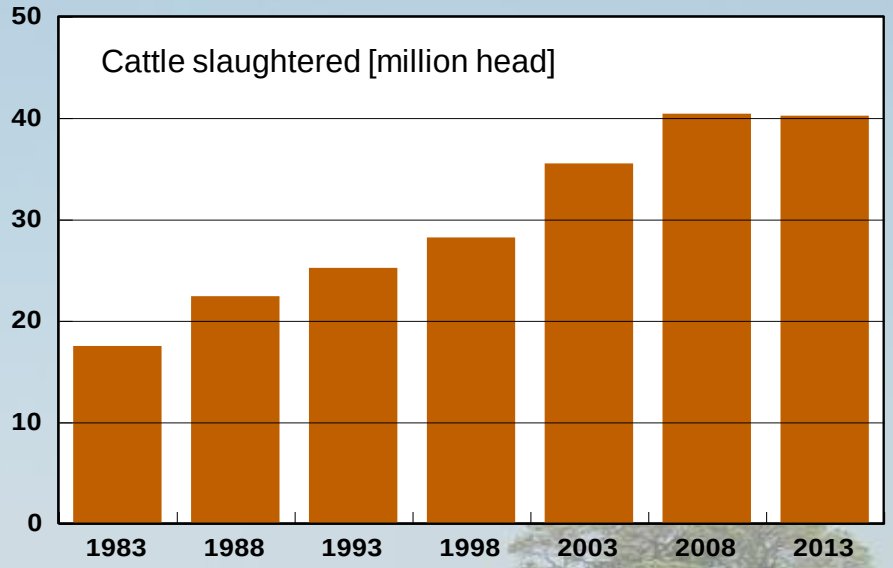
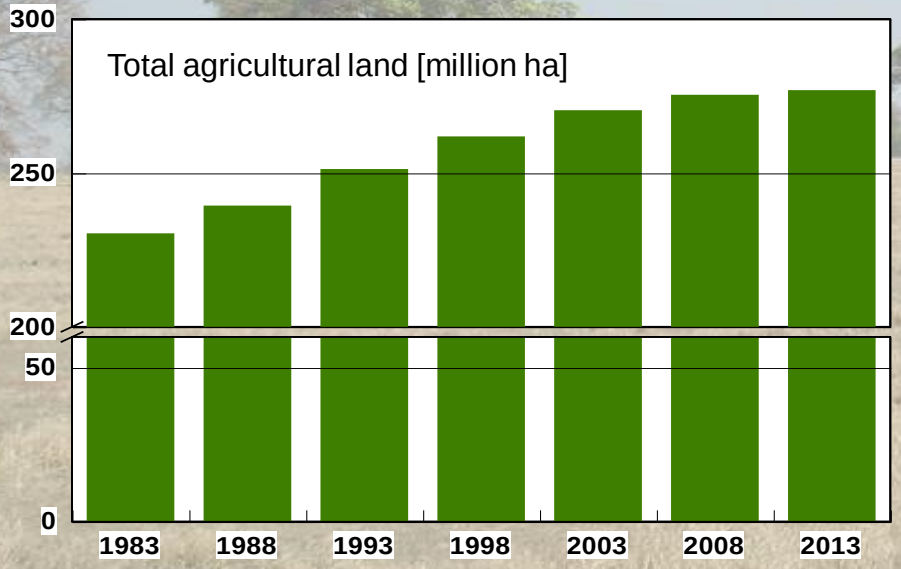
Tropentag, September 17-19, 2014, Prague, Czech Republic

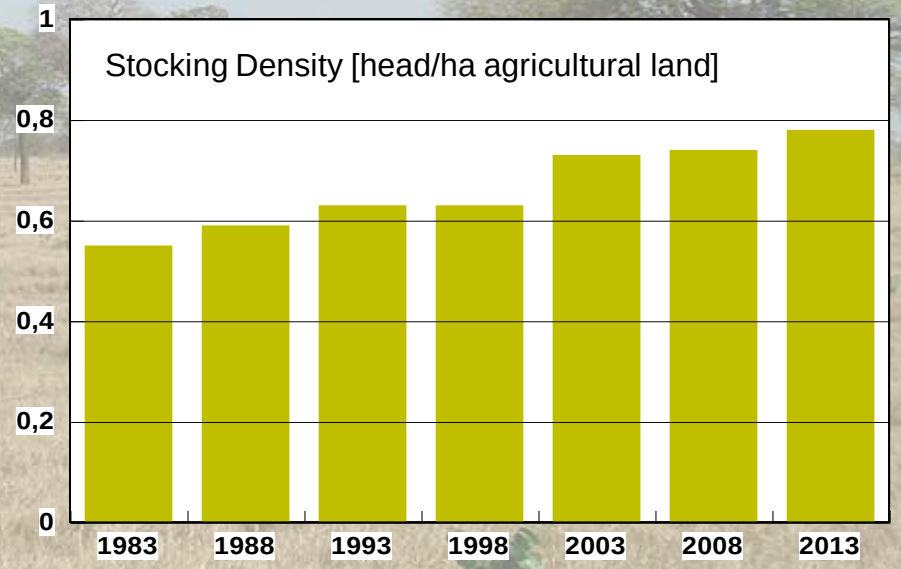
Land use in Brazil in 2013 [million ha]







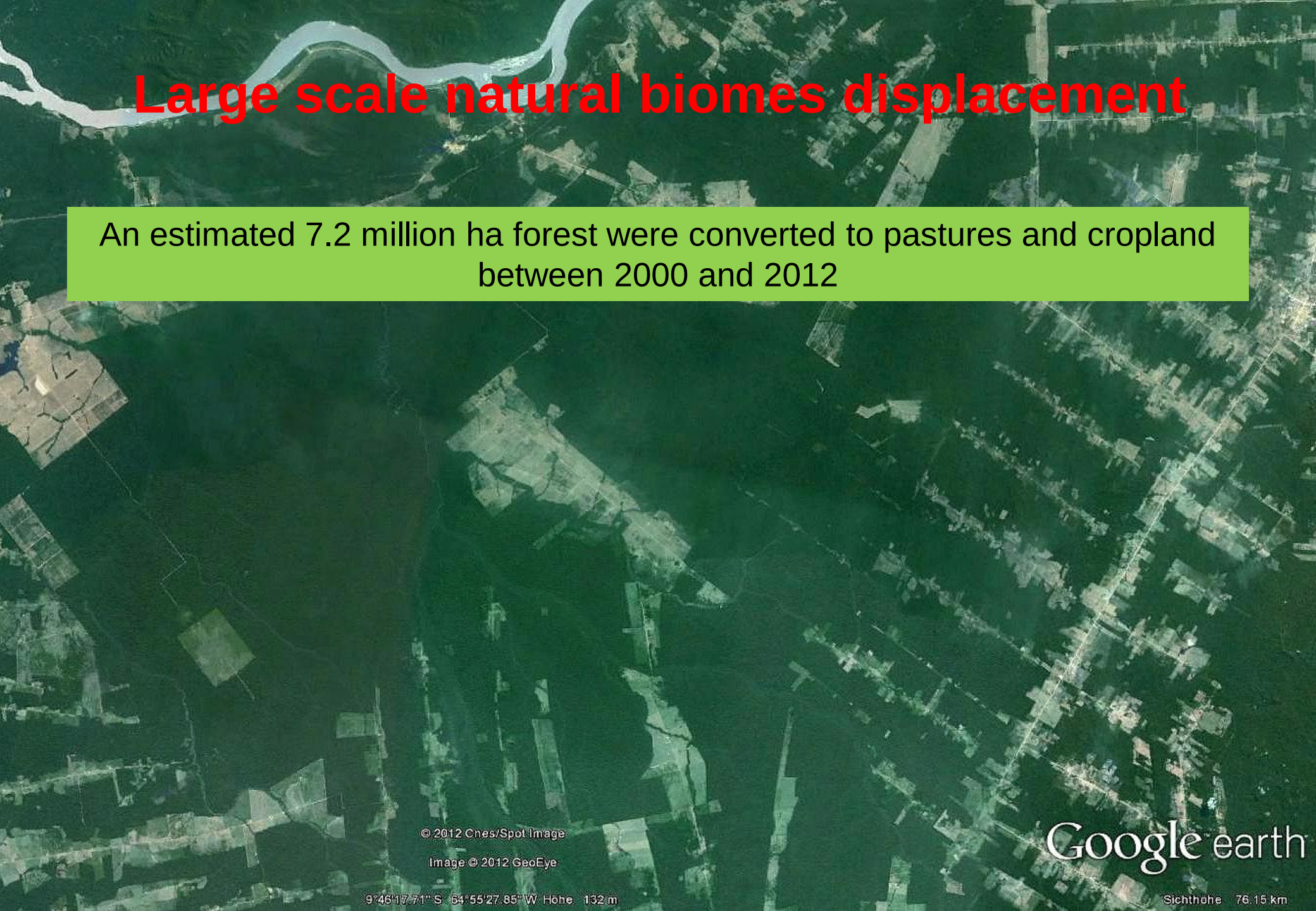




Source: FAOSTAT 2014

Large scale natural biomes displacement

An estimated 7.2 million ha forest were converted to pastures and cropland between 2000 and 2012



Widely spread pasture degradation

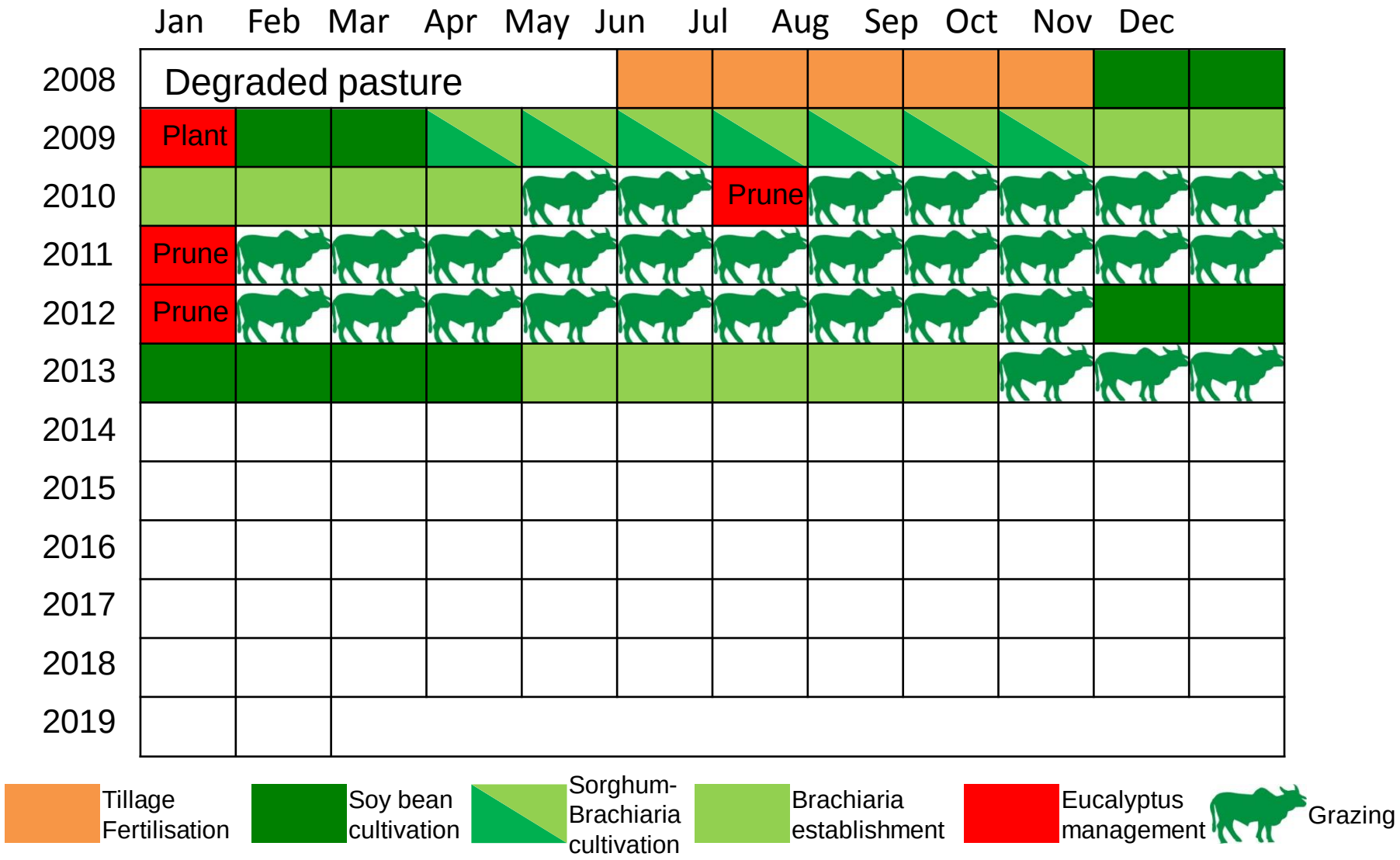
Out of 174 million ha pastures 30 million ha are severely degraded

The most promising remedy for this situation is seen in pasture rehabilitation through the integration of pastoralism with diverse cropping and forestry systems:

- Agro-pastoral systems
- Agro-forestry systems
- Silvo-pastoral systems*
- Agro-silvo-pastoral systems

As the leading Agricultural Research Organisation in Brazil EMBRAPA has actively contributed to the development and introduction of such systems for the past 40 years. In the following, one ongoing long-term experiment with an agro-silvo-pastoral system is described.

EMBRAPA long-term experiment with an agro-silvo-pastoral production system

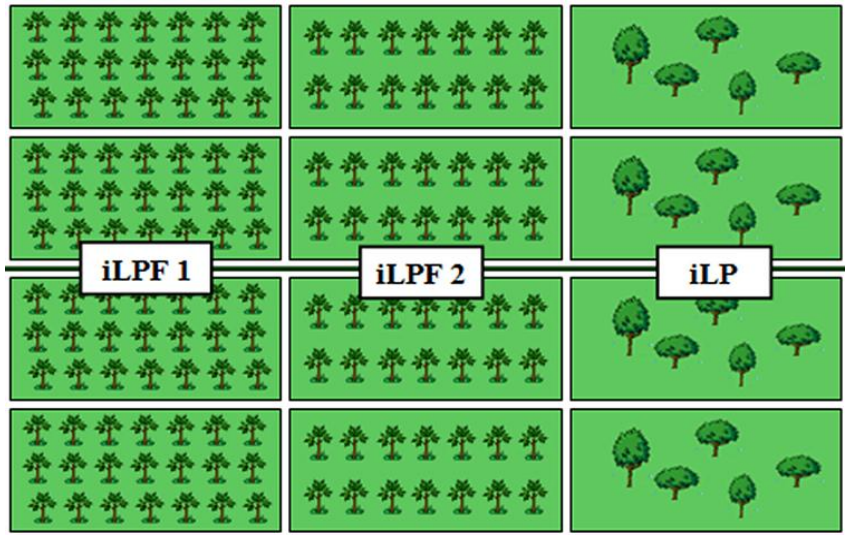



19/05/2010

Experimental variables

Two different tree densities, 357 and 227 trees/ha
Two sward heights, 30 and 45 cm above ground

Tree species: *Eucalyptus urograndis*
Grass species: *Brachiaria brizantha* cv. BRS Piatã
Intermediate crops: *Glycine max* cv. BRS 245 RR
Sorghum bicolor cv. BRS 310



The monitoring programme

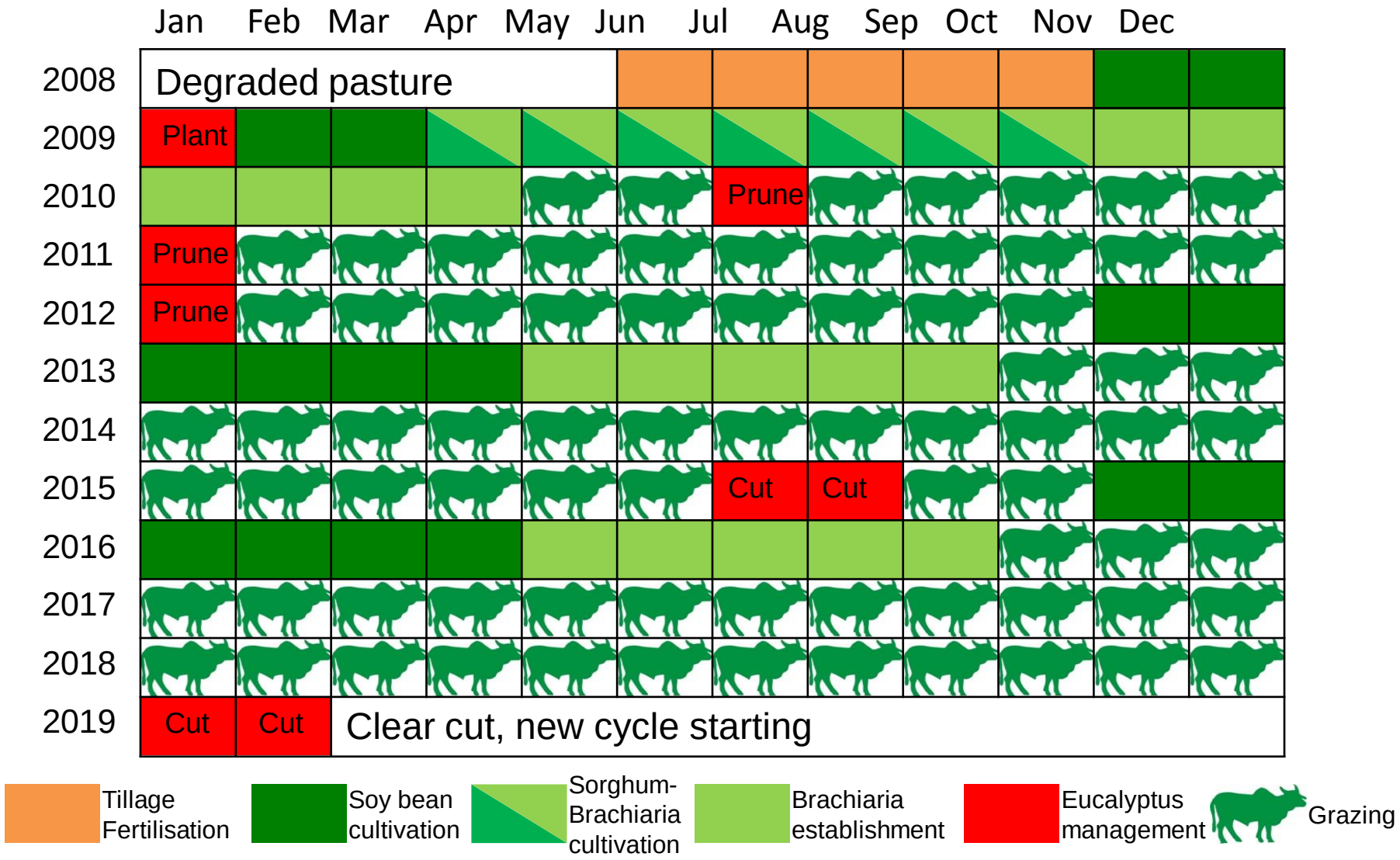
- Gain per hectare and gain per animal
- Crop and forage yields
- Timber yields
- Soil organic carbon within the scheme
- Other soil quality parameters (aggregate stability, soil nutrients etc)
- Potential of Eucalyptus for carbon sequestration and compensation of GHG emissions
- Spatial distribution of crop and forage yields in relation to tree shade
- Vertical distribution of biomass
- Effects of trees on microclimate
- Effects of trees on grazing behaviour
- Effects of trees on distribution of photosynthetically active radiation
- Net present value and cash flow

Forage production and animal performances				
Grazing year	System	Forage yield [kg DM/ha]	Season	Animal performance [kg LW/ha/day]
2011	227	2710	Rainy	0.73
2011	357	2403	Rainy	0.69
2012	227	4781	Whole year	1.51
2012	357	3441	Whole year	1.10

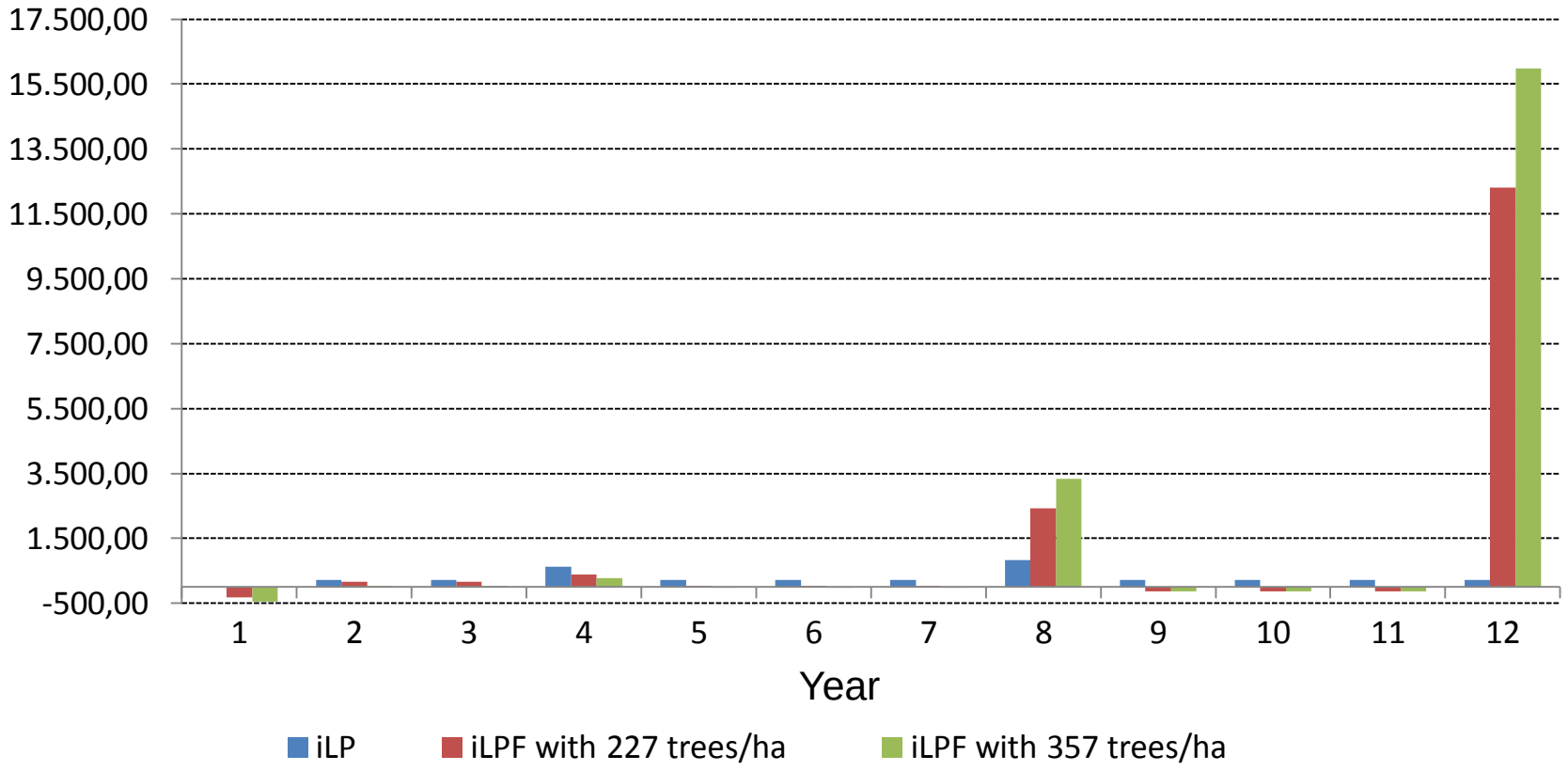
Soy bean production [kg/ha]			
No significant differences between treatments during both cultivation periods			
Year	227 trees	357 trees	Regional average
2009	2100	2100	2556
2012	2270	2035	
Sorghum yield was not measured because of mixed cultivation with Brachiaria for hay			

Eucalyptus performance at month 36					
System	Height (m)	DBH (cm)	Timber yield (m^3/tree)	Timber yield (m^3/ha)	Carbon (tons/ha)
227 trees/ha	17.29	16.0	0.17	38.83	11.07
357 trees/ha	18.56	16.5	0.20	70.42	20.09

EMBRAPA long-term experiment with an agro-silvo-pastoral production system



Projected cash flow [BRL/ha/year] of the three integrated systems

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