MITIGATING CLIMATE CHANGE IN BRAZILIAN AGRICULTURE SECTOR

Carbon in Soil Monitoring

Center for Research in Meteorology and Climatology Applied to Agriculture - Cepagri/Unicamp

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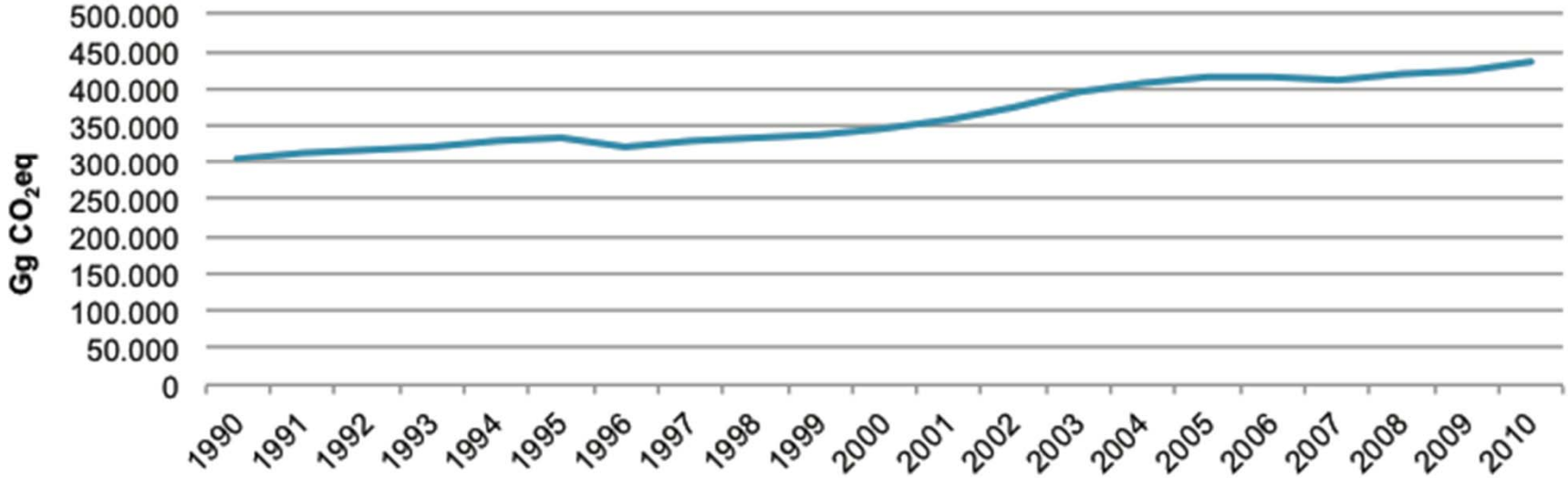
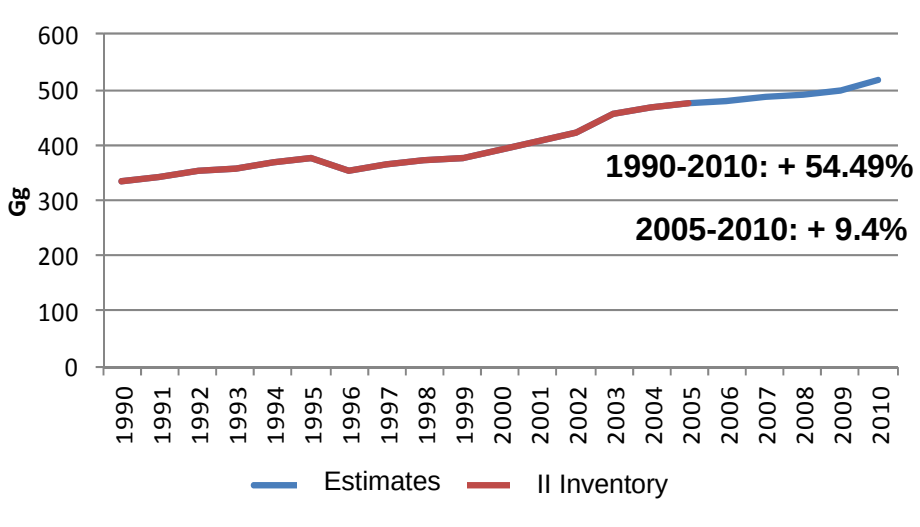
Source: Renato Rofrigues Embrapa

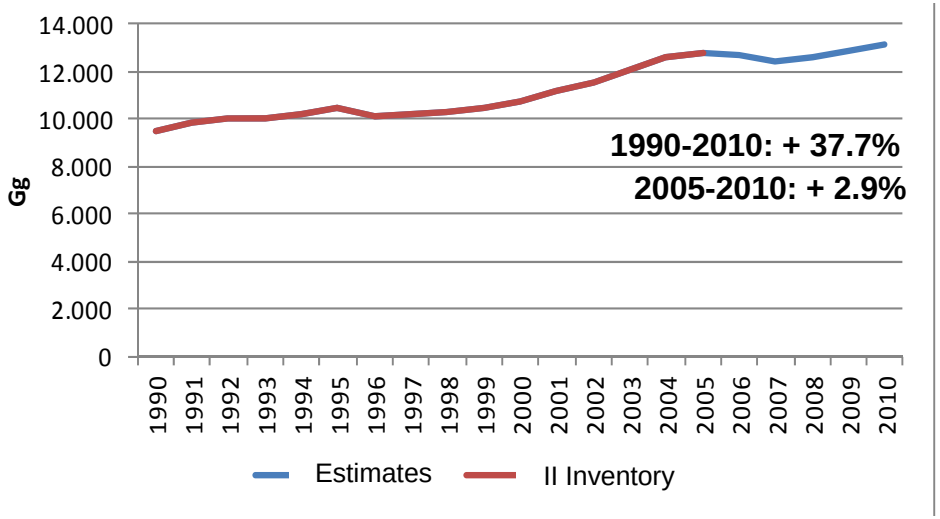
CO_2eq emissions in Agriculture Sector



N_2O emissions in Agriculture Sector



CH_4 emissions in Agriculture Sector



Why this work ?

COP15 Copenhague - 2009

Brazil offers commitment to GHG reductions between 36% and 39% in 2020

Official Baseline for the Brazilian ABC PLAN

(Agriculture of Low Emission of Carbon)

Plan for Mitigation and Adaptation to Climate Change. 2010 to 2020

Emissions in agriculture

- Enteric fermentation in ruminant herbivores (CH_4),
- Animal waste (CH_4 e N_2O),
- Flooded rice cultivation (CH_4),
- Burning of agricultural residues (CO_2, CH_4, N_2O,
- Nitrogenous fertilizers (NO2),
- Machinary operations - fossil fuel etc.(CO_2)
- Other energy use for spraying fertilizers and pesticides (CO2).

- *(WRI-GHG Protocol Sw)*

Reduction of Emissiom of GHGs in Agriculture

1. Reduction of area with degraded pasture
2. Reduction of Deforestation
3. Increase area of no tillage
4. Increase FLI (Farming-Livestock-Integration)
5. Increase FLFI (Farming-Livestock-Forest Integration)
6. Increase adaptation systems (plant breeding)
7. Increase the use of bacterias for nitrogem fertilazer.

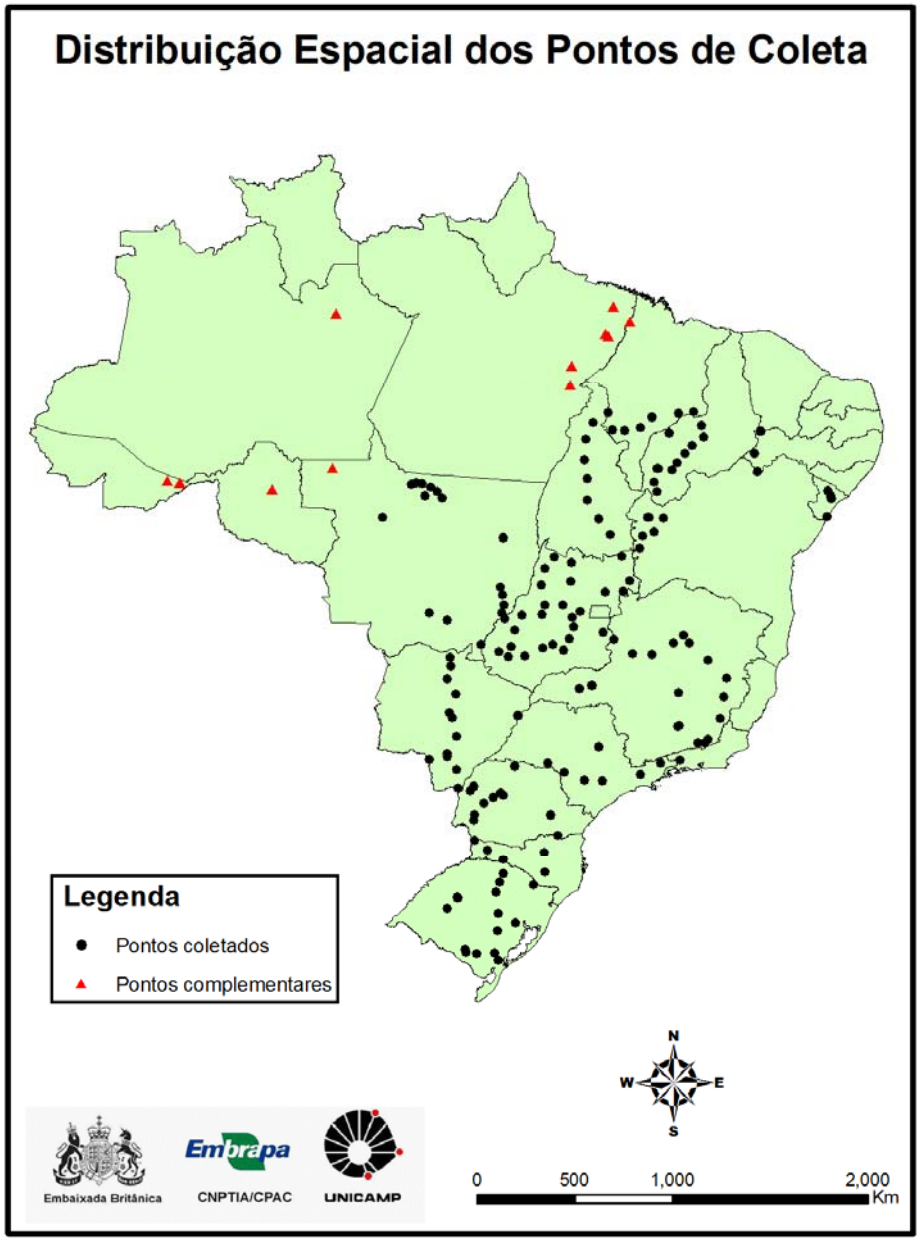
Campaign 1:

- Pastures (degraded and managed)
  102 points

Campaign 2:

- Pastures (degraded and managed)
- Integration Farming – Livestock – Forest
- Agroforestry System
- Native Vegetation
  140 points

South, Southeast, Midwest and Northeast



Degraded Pasture
“Savanna”
Clay Soil
CO_2 eq (0-30cm) = 79 t ha^{-1}
CO_2 eq (0-5cm) = 15 t ha^{-1}

Pasture with high stock of CO_{2eq}
“Savanna“
Clay Soil
CO_2 eq (0-30cm) = 373 t ha^{-1}
CO_2 eq (0-5cm) = 85 t ha^{-1}

Degradad Pasture
Atlântic Forest
Clay Soil
CO_2 eq (0-30cm) = 206 t ha^{-1}
CO_2 eq (0-5cm) = 44 t ha^{-}

Pasture with high stock of CO_{2eq}
Atlantic Forest
Clay Soil
CO_2 eq (0-30cm) = 339 t ha^{-1}
CO_2 eq (0-5cm) = 76 t ha^{-1}

ILP 4 years: summer rice + azevem and animals in the winter. Traditional ILP in Southern Brazil.

ILP 15 years: rotation 2 years soybean and 1 year summer corn + wheat, oatmeal and winter pea (Southern Brazil).

Procedure for collection of undisturbed sample

Soil sampling according to IPCC

Chemical and physical analysis;

Carbon stocks;

Soil density;

Retention curve;

NPP - Net Primary Productivity - Rate of biomass produced per unit area by plants (accumulation of C by plants) expressed as kg/ha.year-1 or cal/m2.year-1

Relationship: NPP x C in soil (Sat. Modis)

Sampled depths:

0-5 cm; 5-10cm; 10-20cm; 20-30cm – Campaign 1

0-5cm;5-10cm;10-20cm;20-30cm;30-40cm;40-60cm – Campaign 2

CO_2 eq storage in soil and Net Primary Productivity (NPP) in the 5 geographical regions in Brazil.

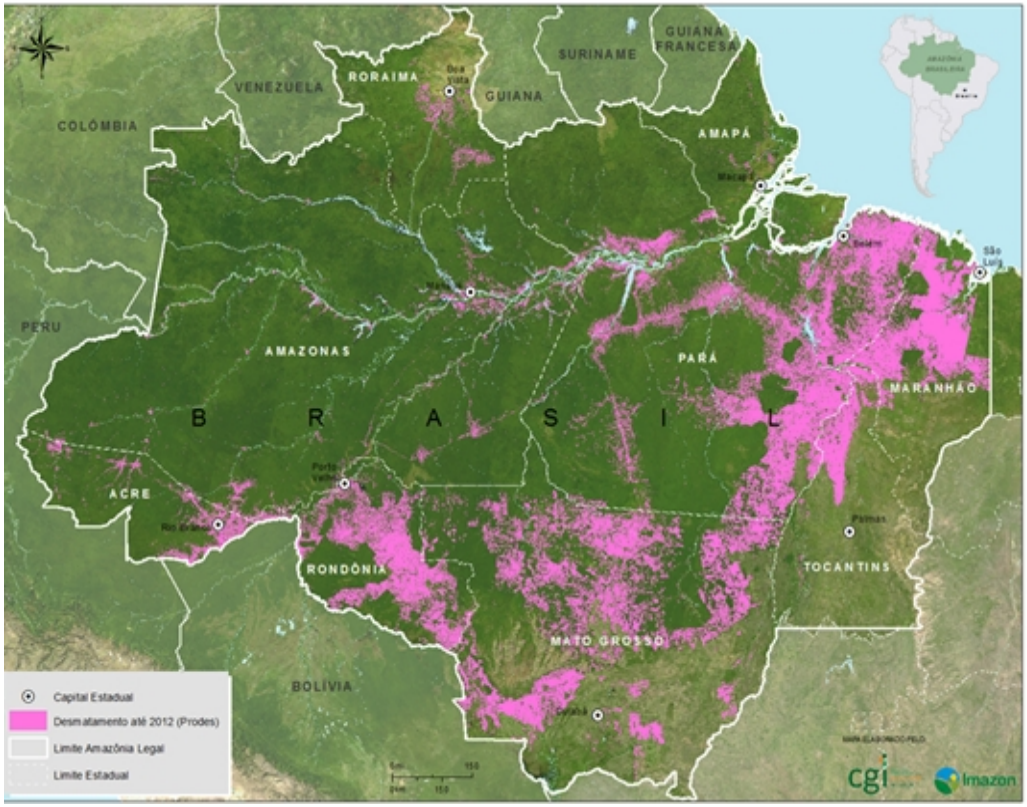
Campaign 1 - PASTURE

Region	CO_2eq (0-30cm)	CO_2eq (0-5cm)	NPP
	..... $t.ha^{-1}$		
South	285,62	78,43	9,01
Southeast	194,42	43,42	7,56
Center West	172,24	38,99	7,58
North	152,96	40,62	6,39
Northeast	122,92	36,59	7,72

Campaign 2 – Stored carbon in soil and NPP in agricultural systems: ILP (integration crop-livestock), ILPF (integration crop-livestock-forest and SAF (agro-forest system).

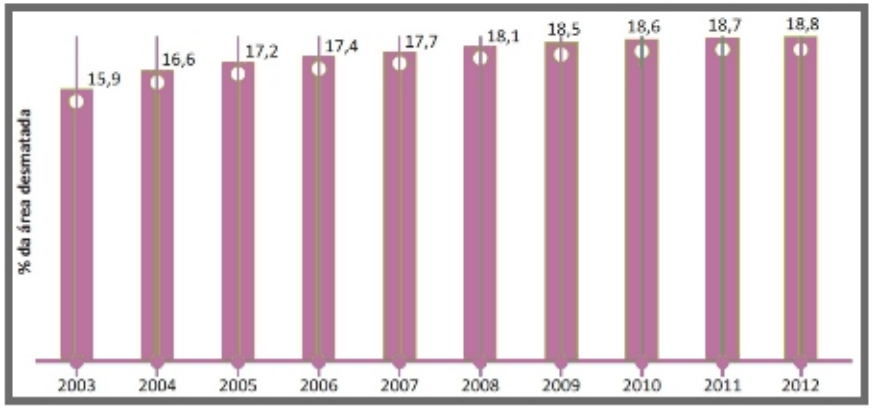
NORTHWEST BRAZIL.

Sistema agrícola	C	CO_2	C	CO_2	NPP
	·····30 cm (t/ha)·····		····60 cm (t/ha)·····		
Vegetação Nativa	59,54	217,91	70,44	257,82	7,09
Pastagem Convencional	51,02	186,73	63,89	233,82	7,01
ILP	47,71	174,61	59,44	217,55	7,90
ILPF	54,38	199,03	67,75	247,98	8,17



Áreas Desmatadas do Bioma da Amazônia no ano de 2012.

Aumento das áreas desmatadas (2003 a 2012)



Fonte: Inpe

Potencial for Agriculture Development with Low Carbon Emission in Amazon

- Pasture - bare soil 37.316 ha
- Regeneration of “Dirty” pasture 5.607.664 ha
- Regeneration of degraded Areas, with pasture 6.316.546 ha
- Total 11.961.526 ha

Fonte: http://www.inpe.br/noticias/noticia.php?Cod_Noticia=3302

THAT’S ALL FOLKS... THANKS.