



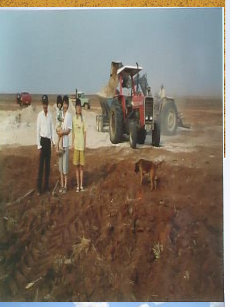











A Brazilian perspective

Koronivia workshop on "Improved soil carbon, soil health and soil fertility under grassland and cropland as well as integrated systems, including water management"

Gustavo Barbosa Mozzer

SB 50th - Bonn
June 18, 2019

Embrapa

How Brazil has been improving soil carbon, soil health and soil fertility under grassland and cropland as well as integrated systems, including water management

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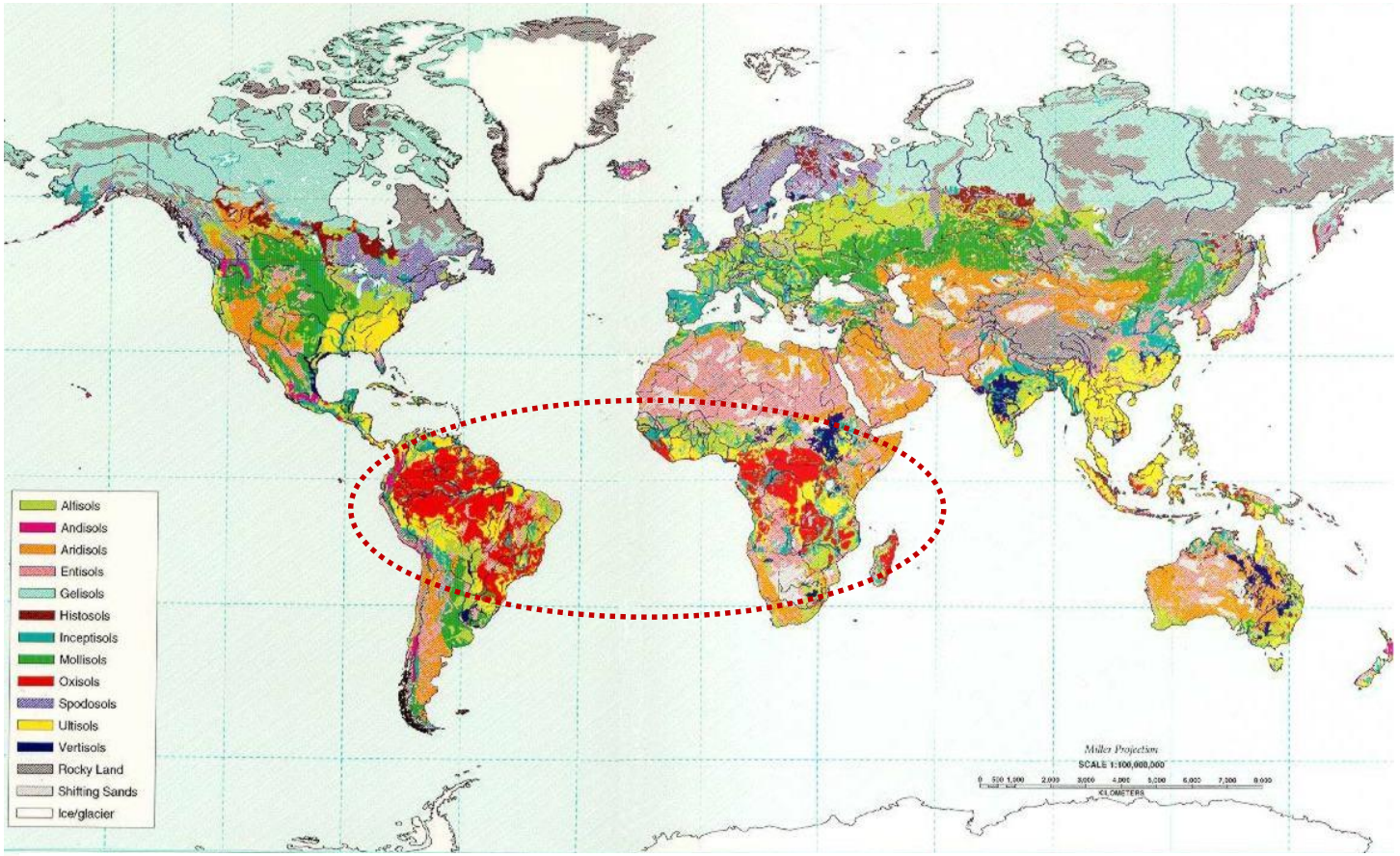
Constraints to agricultural development



Acid soils leading to → P fixation ↓ Ca+Mg+K ↑ Aluminium

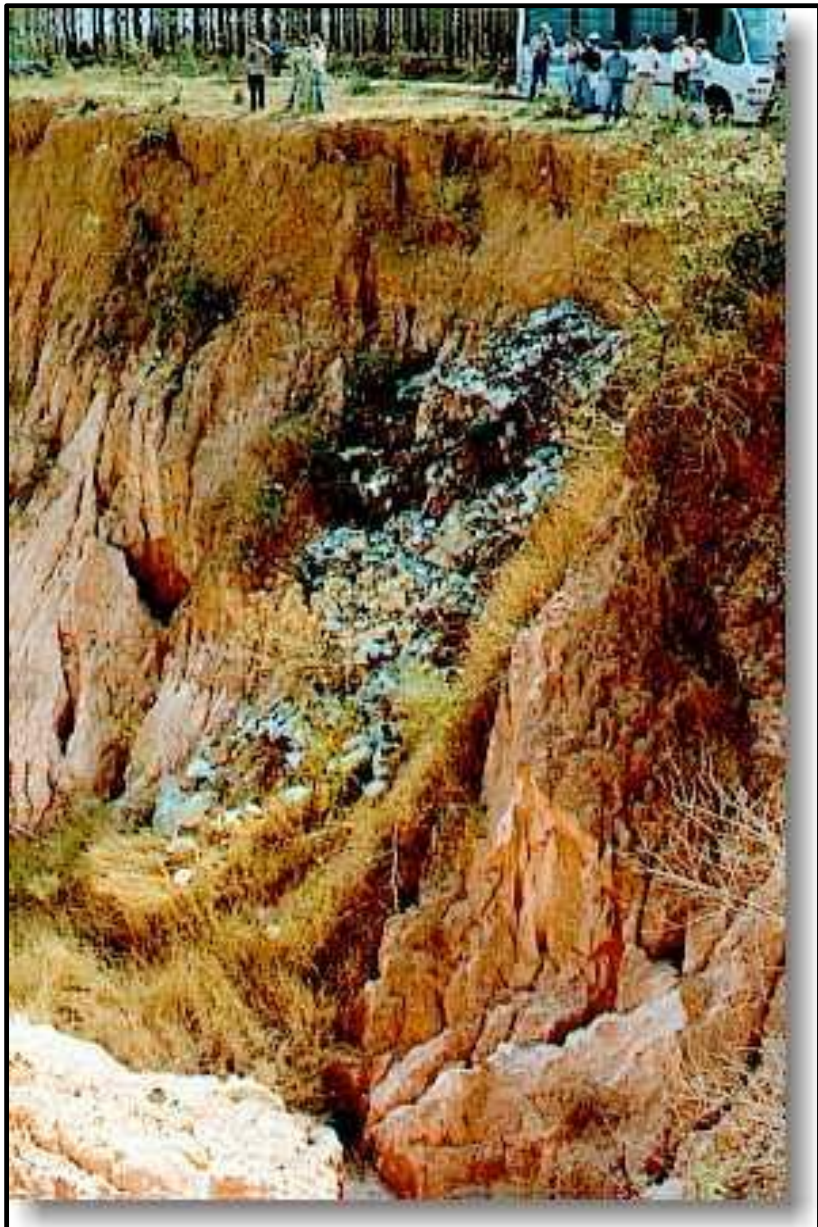
Source : NHQ/NRCS/USDA

- 1970s - Agricultural modernisation meant intensive tillage for seed-bed preparation and weed control.

Disc plowing and several harrowings

Loss of organic matter and expensive mineral fertilizers (P, K, Ca, Mg & micronutrients)

Gullies in the State of Parana



Before 1970


FOLHA DE S. PAULO

A carne falta aqui e no Interior

Um mau domingo para os favoritos

Reacende-se a luta pelo título mundial de xadrez

Fischer entrega a Dama e o jogo

No Caderno de Esportes, os 413 lances disputados entre Fischer e Spassky em Reikjavik

Fenomenal, a surpresa do GP *Toninho salvou o São Paulo*


FOLHA DE S. PAULO

Quatro horas na fila do leite

A batalha de Itaipu vai à ONU


FOLHA DE S. PAULO

São Paulo, terça-feira, 31 de julho de 1973

Carne congelada não aparece

Danificado o último "Demoiselle"

Far from being a food secure country

- Low agricultural production and low yields;
- Constant food supply crisis and rural poverty;
- Lack of specific knowledge in tropical agriculture;
- Lack of a national strategy on agricultural development;
- Brazil: a coffee and sugar producer.


Photo: Holambra

Investment and planning based on science

1973 – Start of Embrapa

. 6 research centers: wheat, rice and beans, soil survey, beef cattle and rubber tree.

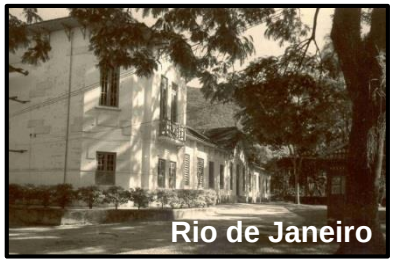
. Post-graduate studies abroad (US, Europe)

. 637 researchers (50% MSc and PhD)

Today:

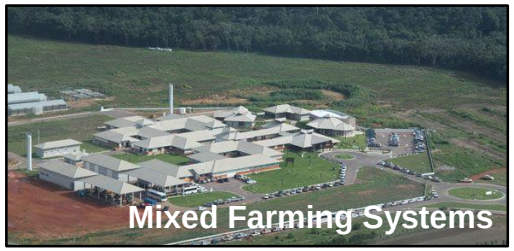
. 47 research centers

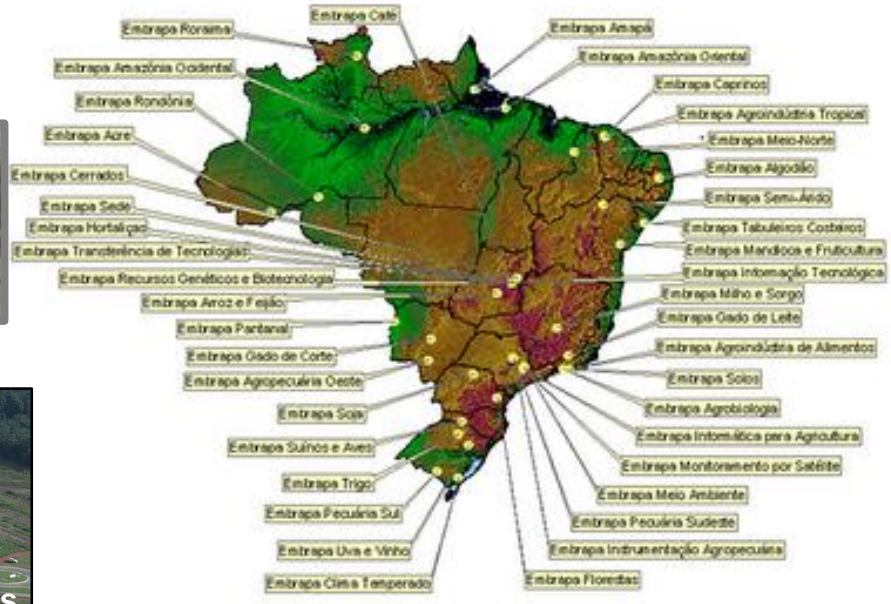
. 2 415 researchers (90,4% PhD)



Soils

Environment





Initiatives towards a science-based, advanced in tropical agriculture

Plant Breeding

Animal breeding and tropical forage breeding

Key scientific and technological advances

- Plant Breeding Programme;
- Animal Breeding Programme;
- Advanced Soil Conservation Practices;
- Biological Nitrogen Fixation
- Integrated Production System

Zero tillage

Biological N Fixation

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Brazil has been strongly investing in the improvement of soil health and soil fertility aiming to address multiple objectives and co-benefits

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Key Drivers of Agricultural Innovation

Improvents in fertilizer recommendation and acidity control

Soil erosion control – Zero tillage with *contour* terraces.

Crop breeding programs;

Quality and certified seeds

Government commitment and public policies;

Availability of mineral resources (limestone);

Biological nitrogen fixation

Farmers' will for entrepreneurship.

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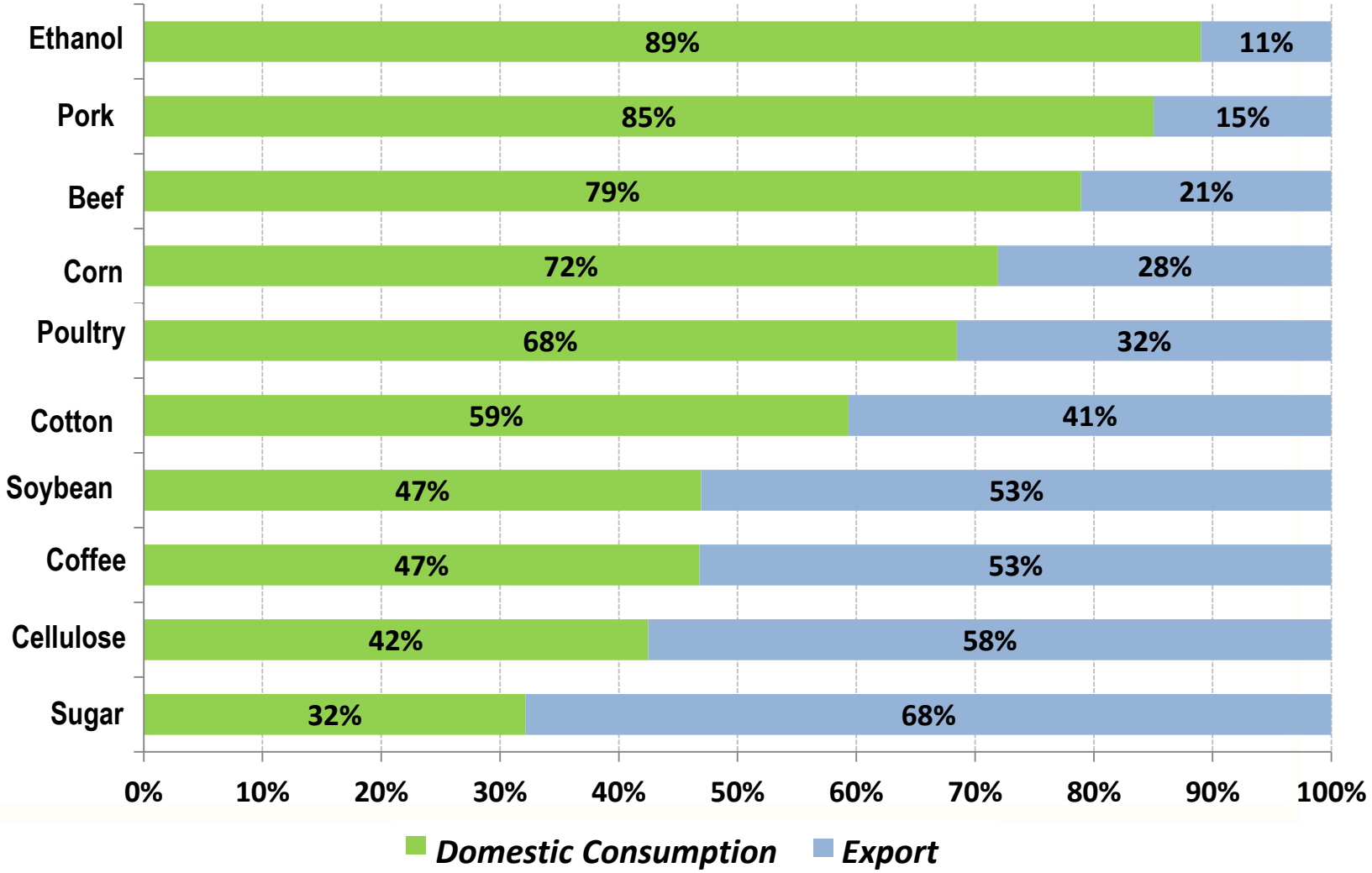
Key results and impacts

In 40 years Brazil became a relevant export country (2015)

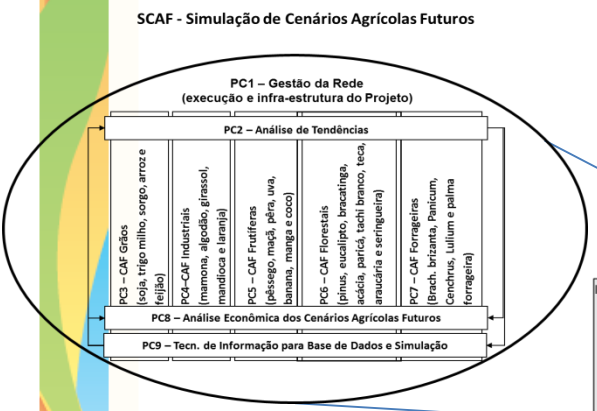


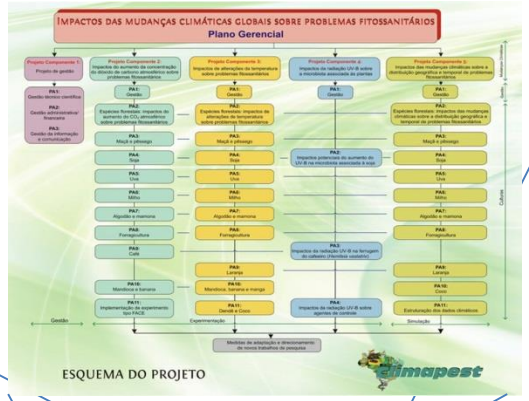
Sources: MAPA, Conab and ÚNICA

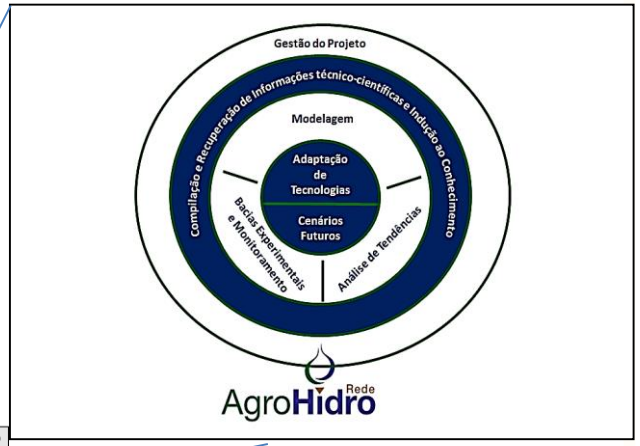
Climate change science-Based process

Climate Change Portfolio: Nation-Wide R&D Projects

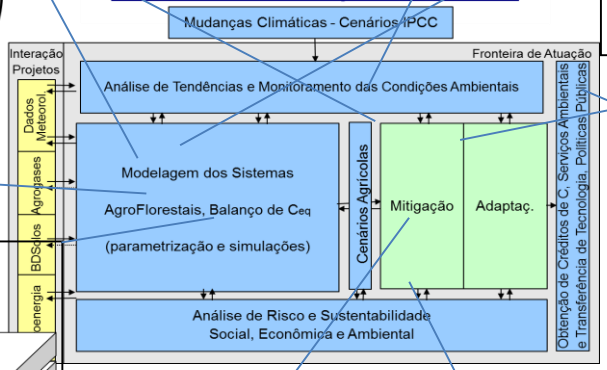
Vulnerability/Adaptation



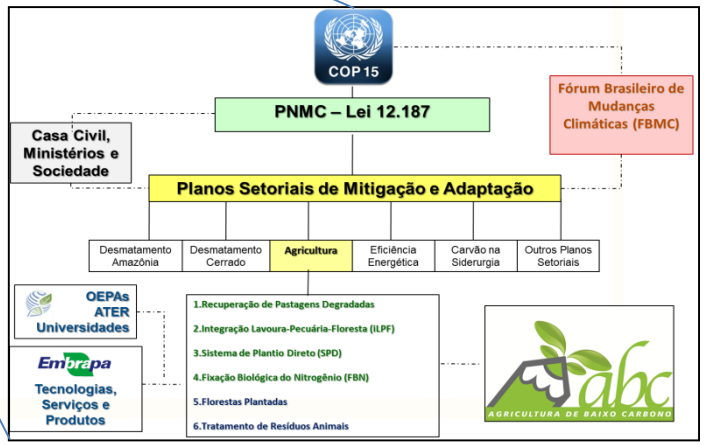


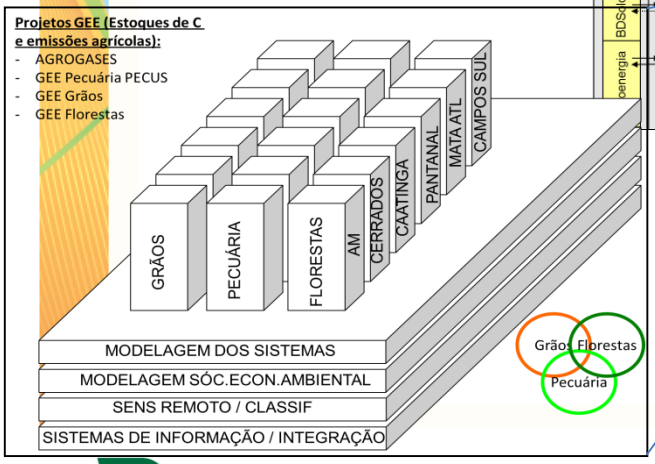


Plataforma Mudanças Climáticas



Support to ABC Public Policy





C Balance Projects

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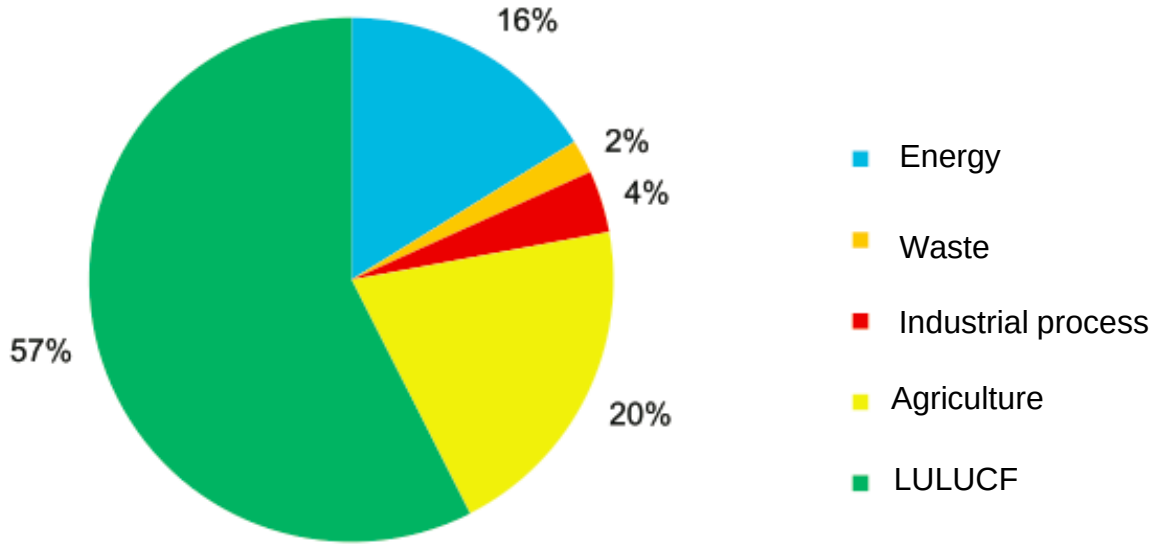
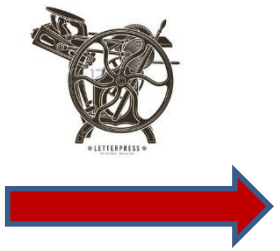
Sources: Embrapa's Climate Change Portfolio

Brazilian GHG Emissions – 2005 (CO_2e)



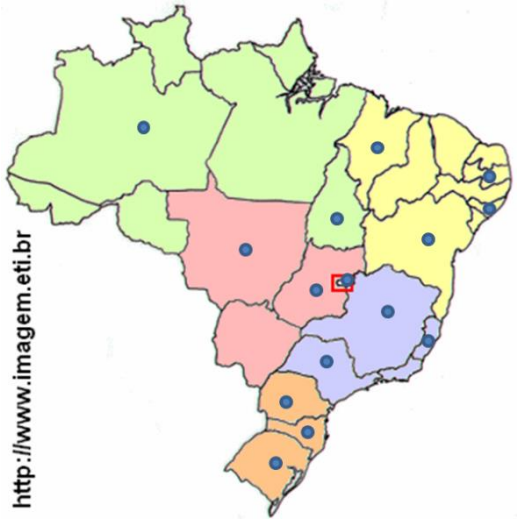
National Plan on Climate Change – PNMC (2008)

. 15 Ministries (Energy, Agriculture, Transportation, Economy, Science & Technology)



PNMC
National Plan on Climate Change

Construction of State and Municipal Plans



National Level - strategic, Interministerial Committee
National level – tactic, Executive Committee of ABC Plan
Coordination: Ministry of Agriculture, Ministry of Agrarian Development + Casa Civil, MF, MMA, Embrapa, FBMC

↕ Monitoring

State and municipal level - operational, Local committees

Elaborated for local conditions

- strengthening technical assistance
- training and information
- technology transfer strategies (field days, lectures, seminars, workshops),
- implementation of Technological Reference Units (URTs)
- publicity campaigns
- contracting for Technical Assistance and Rural Extension (ATER)

Until 2018

16 states+DF with Plan under implementation

10 states with elaborated Plan

1 states miss Plan (in elaboration)

abc
AGRICULTURA DE BAIXA EMISSÃO DE CARBONO

The program aims to promote the implementation of a large-scale project to enhance the development of the Low-Carbon Agriculture (ABC) Programme and encourage the implementation of agriculture technologies within rural properties under the Project. (ICF, DEFRA, IDB, IABS)

Set Aside R$ +70 million in direct benefits to support rural producers in:

350 UDs
(Demonstratives Units)
that already have one of the four low carbon technologies supported by the Project

3.360 UMs
Multiplying Units)
With the potential and interest to adopt one of the four low carbon technologies supported by the Project

11 m
Rural Producers Trained during Field Days

1.120
Trained Technical Assistant Agents

3.710
Trained Rural producers' family members

Brazil strategy towards measurement of progress in improving soil carbon, soil health and soil fertility

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SIGABC

ABC Plan Governance System

MAPA

Banking system

Monitoring the adoption of technologies by rural credit (ABC Program)

State Management Group - GGE

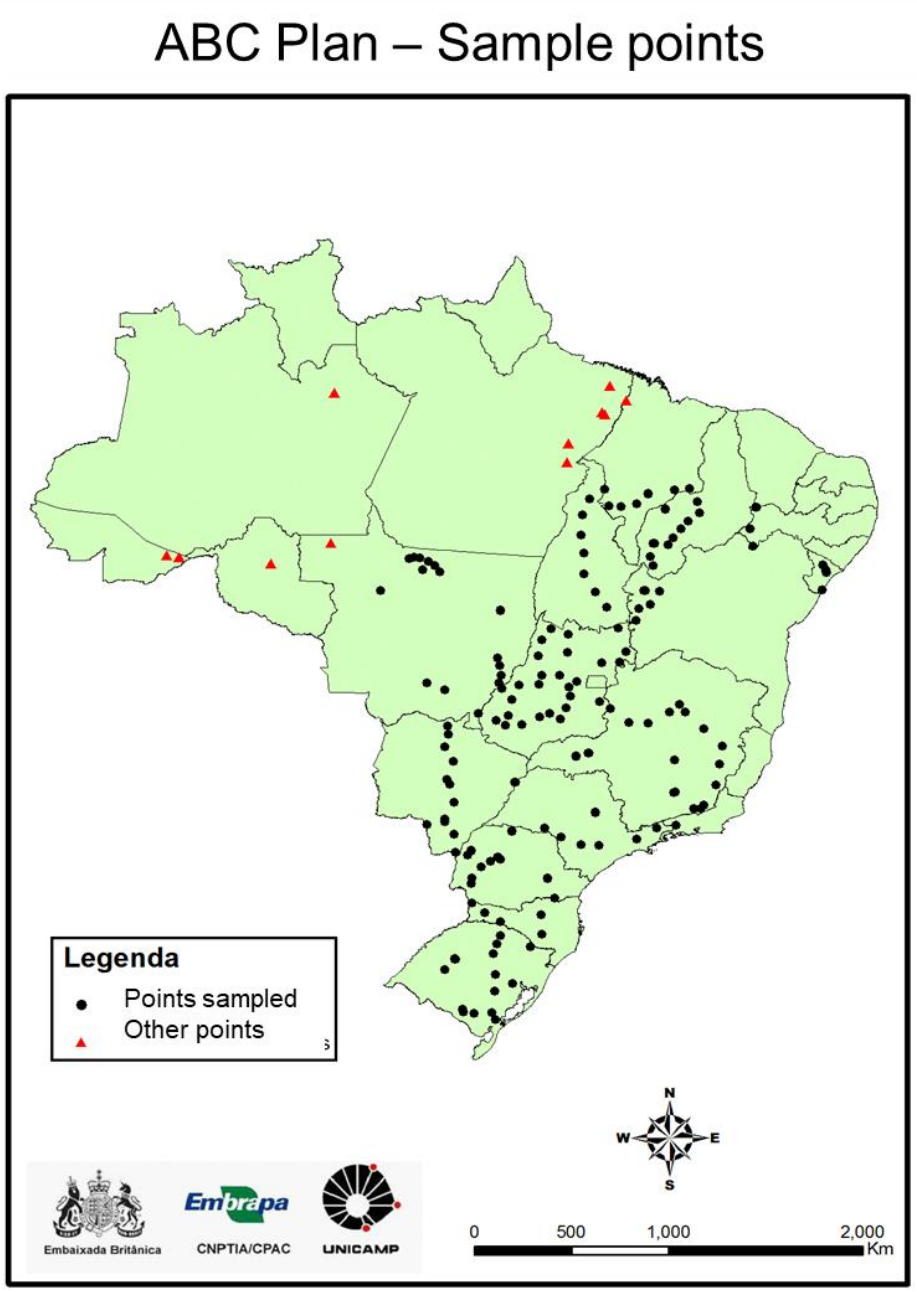
Monitoring ABC Plan activities

Plataforma ABC

Monitoring emissions reduction and elaborating national GHG inventories

Methodologies – *in situ*

- Points sampled until 08/25/2012
- 170 points sampled, including: Native Vegetation, Pastures, SAFs, iLP and iLPF.
- Several Biomes.
- **Soil sampling:** Chemical and physical analysis; Carbon stocks; Density of soil; Retention curve.
- **Depths sampled:** 0-5 cm; 5-10 cm; 10-20 cm; 20-30 cm (pastures); up to 60 cm (iLPF).
- Second phase of results in North Region finalized in March 2014.
- **Incremental process**: Based on the principle of incremental enhancement of the monitoring strategy

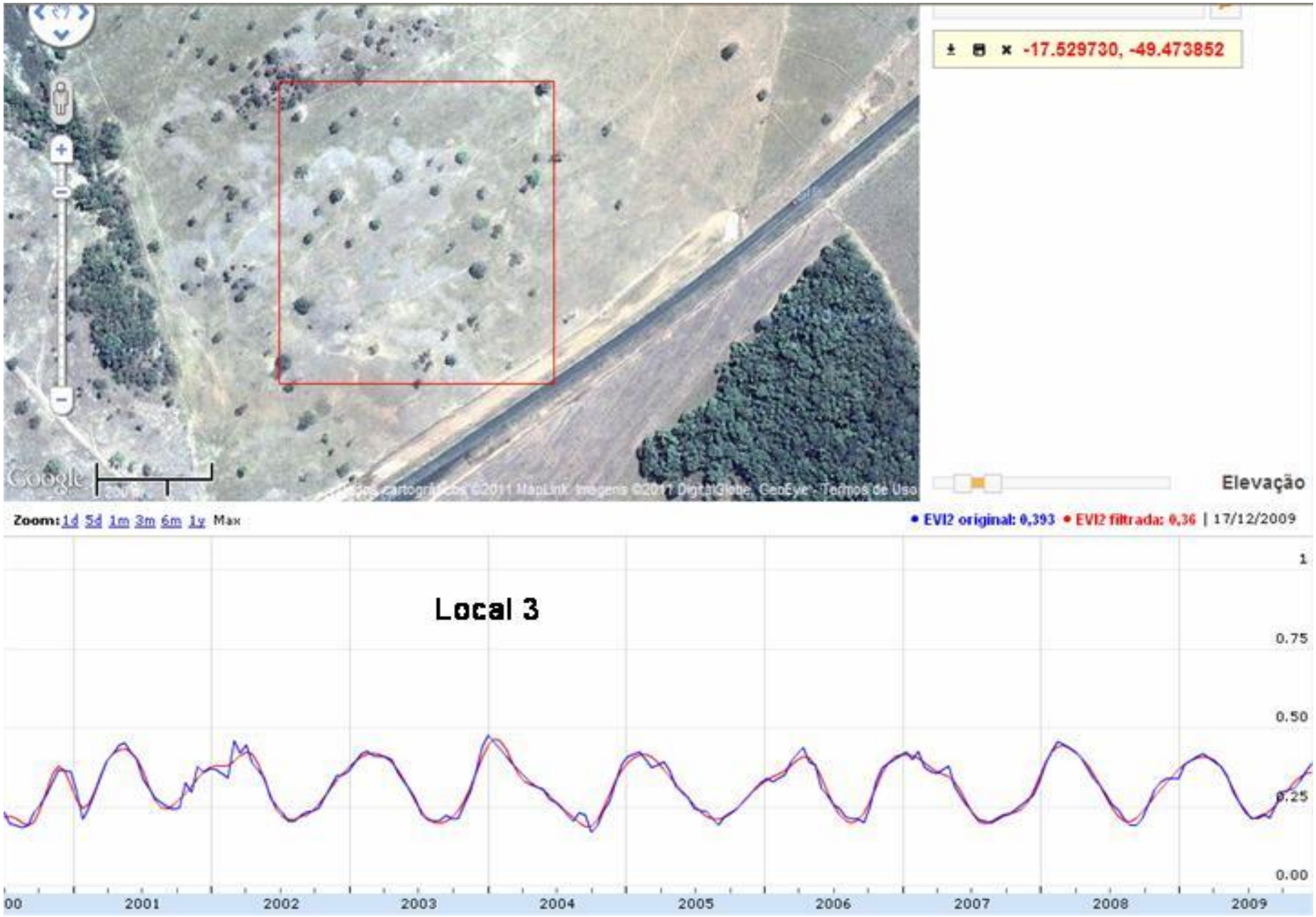


Methodologies – *in situ*

Automatic GHG collection and analysis system, installed in the ILPF experiment at Embrapa Agrossilvipastoril, Sinop-MTh

Micrometeorological system for monitoring the emission of N_2O e CO_2

Methodologies – remote sensing



Incrementing quality of data

National Soils Programme

Goal:

- Systematization of existing data
- Mapping 1.3 million km^2 of soils in the first ten years, and another 6.9 million km^2 by 2048, ranging from 1: 25,000 to 1: 100,000
- Improve in formation for land use management, adaptation and vulnerability assessment, prediction of catastrophic events, agricultural credit system

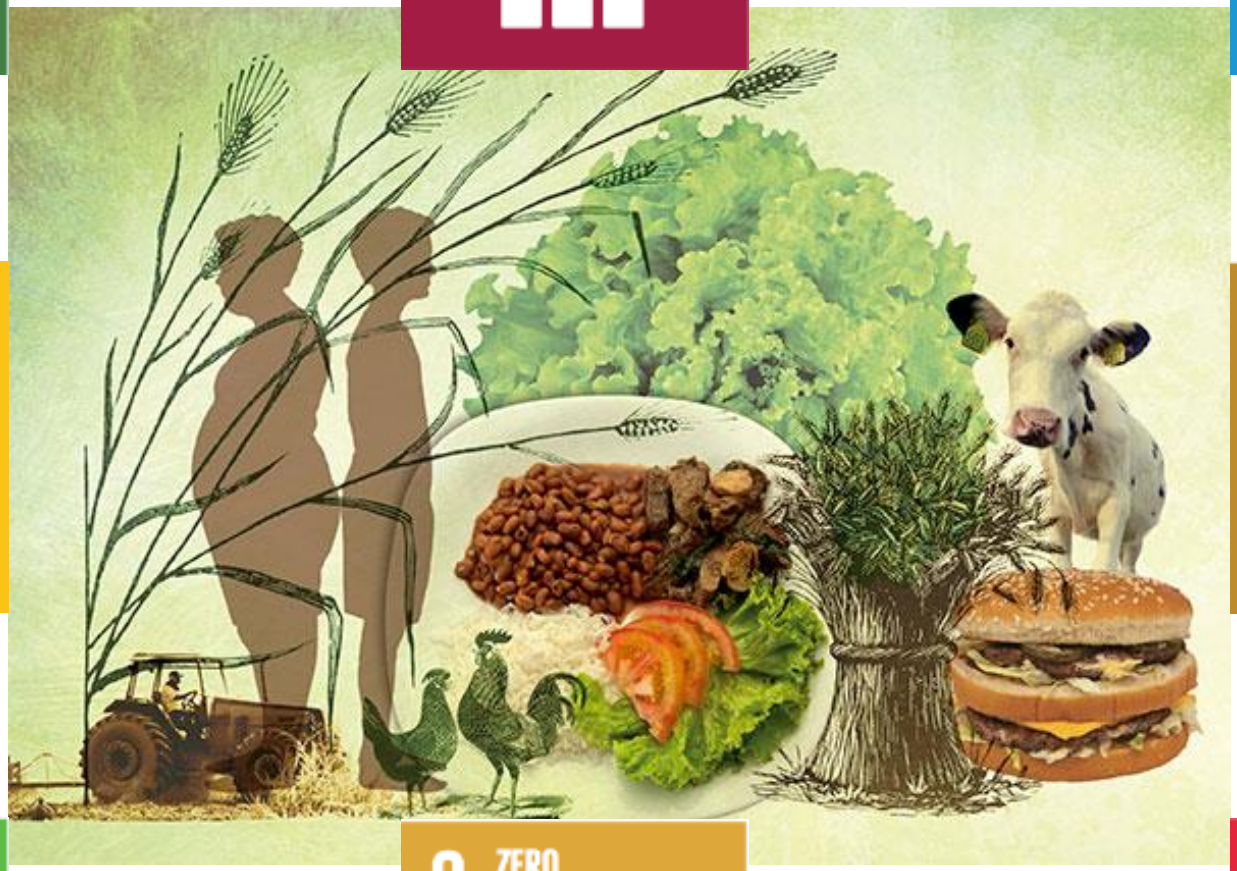
Cost / financing: R$ 4 billion in 30 years (national public and private)

Institutions: Embrapa, IBGE, SBCS, CPRM, UFRRJ, UFPI, UDESC, UFLA e Ministry of Agriculture, ...

13 CLIMATE ACTION

8 DECENT WORK AND ECONOMIC GROWTH

14 LIFE BELOW WATER



7 AFFORDABLE AND CLEAN ENERGY

12 RESPONSIBLE CONSUMPTION AND PRODUCTION

15 LIFE ON LAND

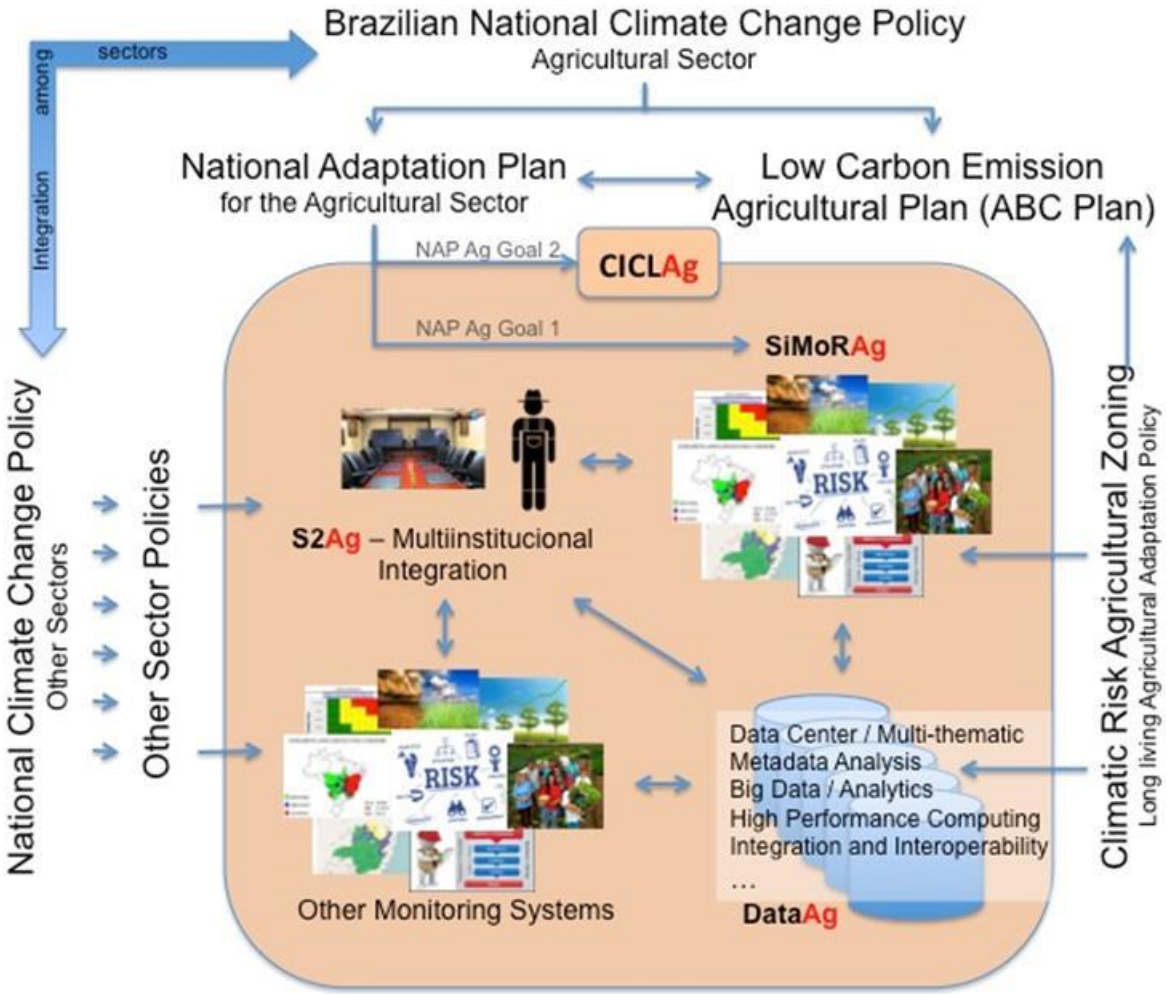
2 ZERO HUNGER

1 NO POVERTY

How to measure all this and make a difference?

CICLAg

Center for Agricultural Climate Intelligence



Challenges Brazil has faced in improving soil carbon, soil health and soil fertility, and how did the Koronivia Joint Work on Agriculture and UNFCCC constituted bodies help to address these challenges?

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. **Brazilian NAMA**:

- Amazon deforestation control (PPCDAm);
- **Agriculture (Precursor to the ABC Plan)**

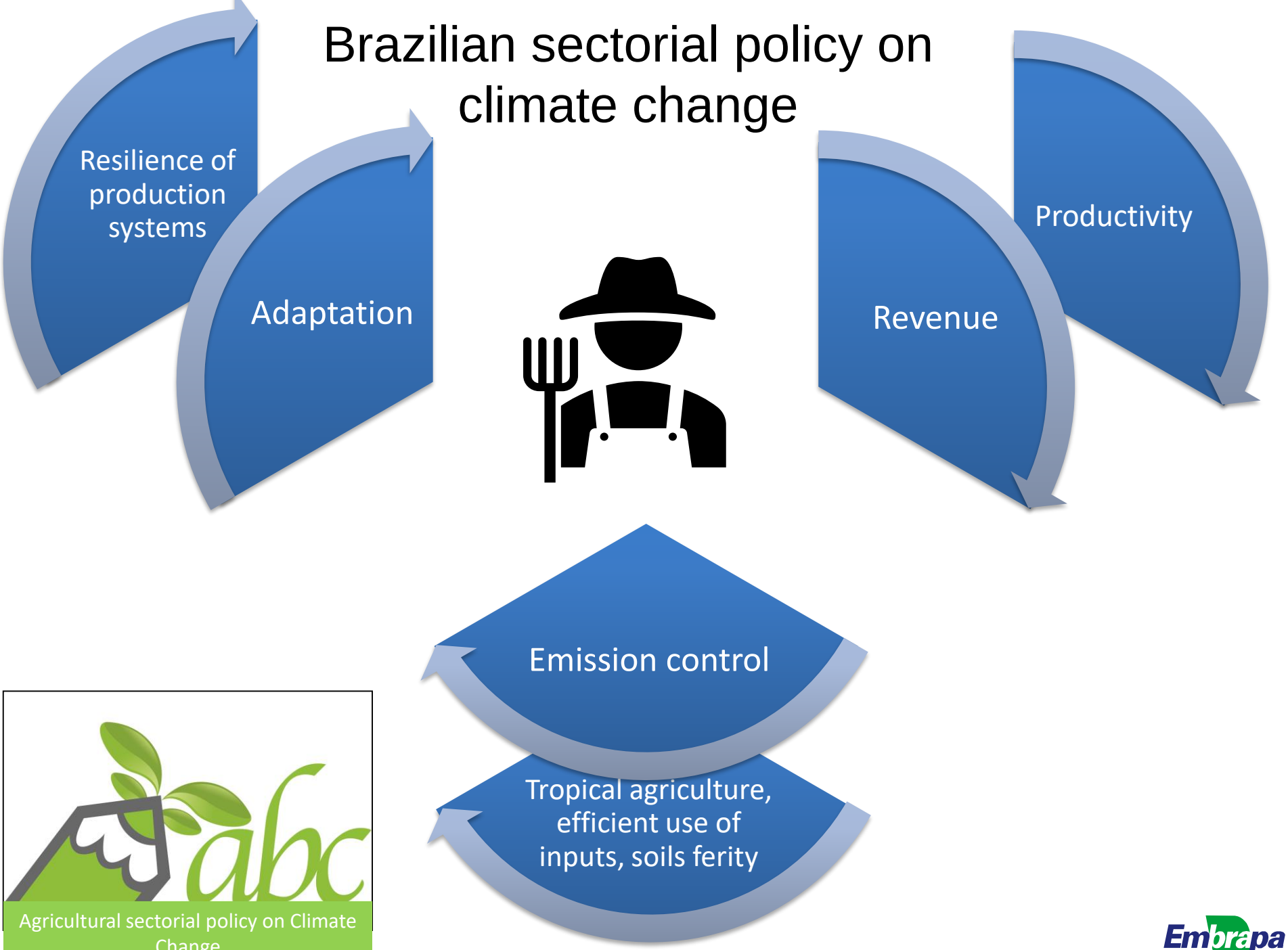
Before the COP 15

Brazilian agricultural sector had a **NEGATIVE** perception on the UNFCCC process

After the COP 15

Brazilian agricultural sector started to understand how strategical and **POSITIVE** the UNFCCC process could be

Brazilian sectorial policy on climate change



Agricultural sectorial policy on Climate Change

Activities planned in the ABC Plan

1 

2 

3 

Technology Process	Increase in area/use
1. Recovery of degraded pasture land	**15 million ha**
2. Integrated crop-livestock-forestry systems	**4 million ha**
3. No-till farming with cover crops	**8 million ha**
4. Use of biological nitrogen fixation	**5.5 million ha**
5. Planted forests	**3 million ha**
6. Treatment of Animal Waste	**4.4 million m^3**

4 

5 

6 

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Compliance with Brazilian environmental legislation

Agricultural production and Environmental preservation (Forestry Code)

1. APP top of the hill
2. APP spring contour
3. APP natural water course contour
4. APP natural pond contour
5. Forestry productive activity
6. Legal reserve
7. Livestock productive activity and infrastructure

Legal Reserve in "Legal Amazonia"

- ✓ 80% for properties located in forest area
- ✓ 35% for properties located in cerrado area
- ✓ 20% for properties located in grassland area

Source: Leis ambientais n.12.651 e 12.727)

Thank you for your attention!

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