



Low carbon agriculture in Brazil: technologies and sustainability

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At a glance

Science-based tropical
agriculture

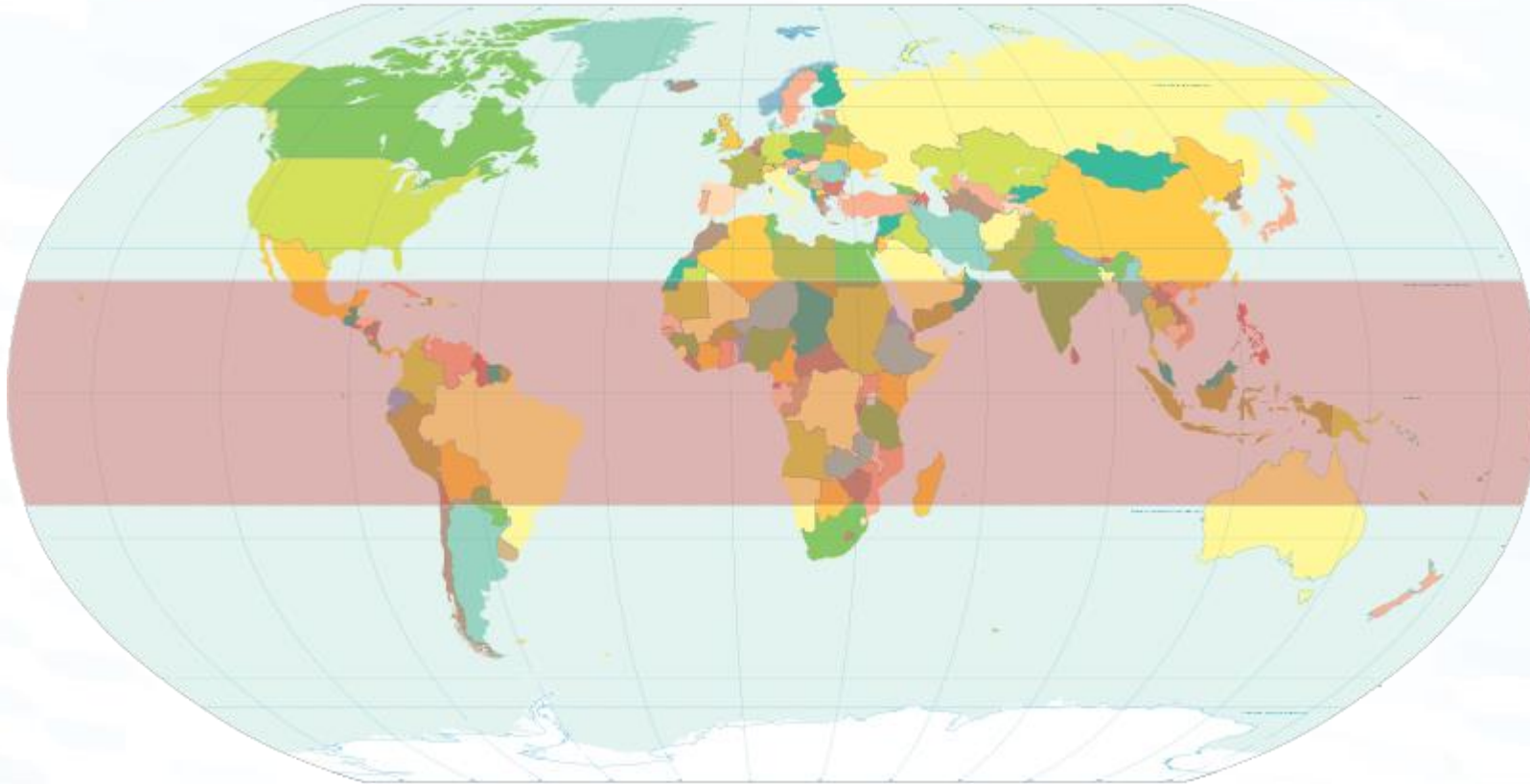
Research and
Innovation

What the science
says

To be continued



Challenging the tropics

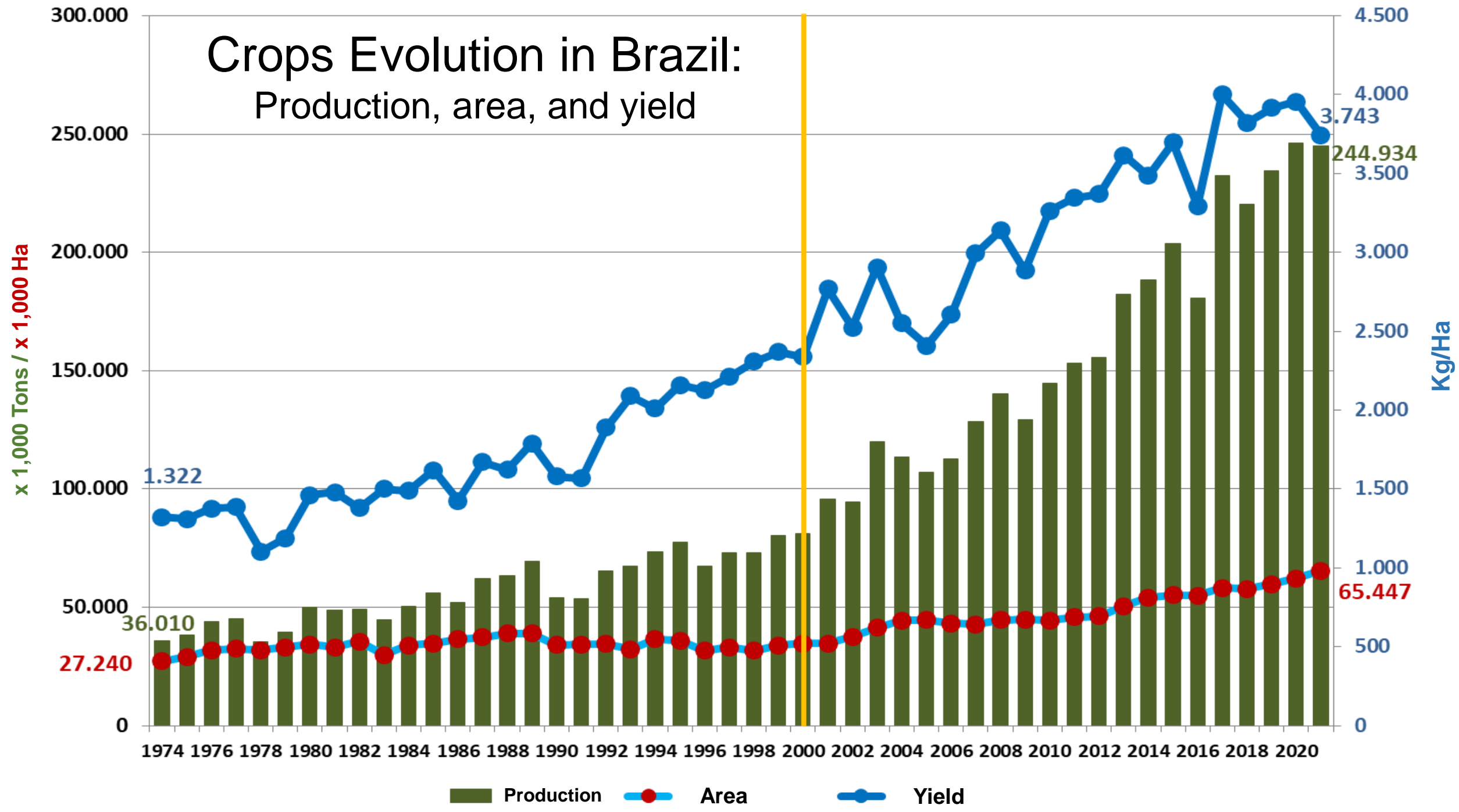


**Tropical belt:
The most challenging area for agriculture**



**In less than five decades, Brazil developed a science-based,
tropical agriculture without parallel in any part of the world**

Crops Evolution in Brazil: Production, area, and yield



A Robust Research and Innovation System

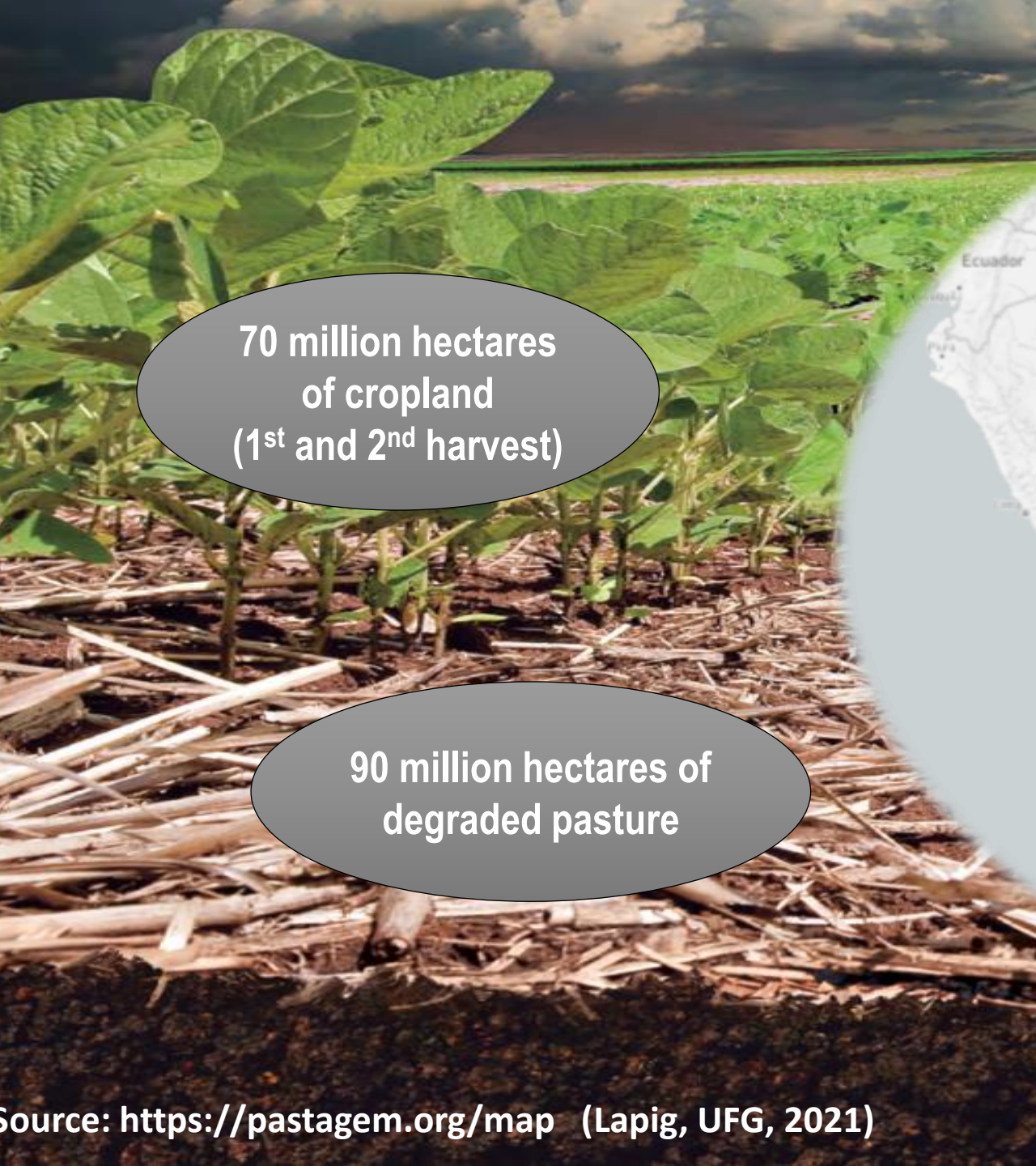
- . Employees: 8,000
- . Total Scientists: 2,200 (PhD)
- . 43 Research Centers
- . 600+ laboratories
- . 34 Portfolios of projects / 1,110 projects
- . 93 breeding programs
- . Offices in North America and Europe



A Robust Research and Innovation System



**Embrapa Agro-Forestry R&D Center
Sinop - MT**



70 million hectares
of cropland
(1st and 2nd harvest)

90 million hectares of
degraded pasture

The Amazon Biome



BRAZIL

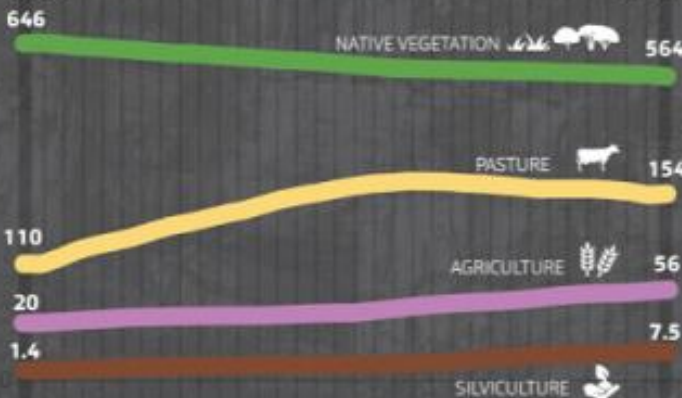
Land use and land cover annual evolution (1985-2020)

82 Mha

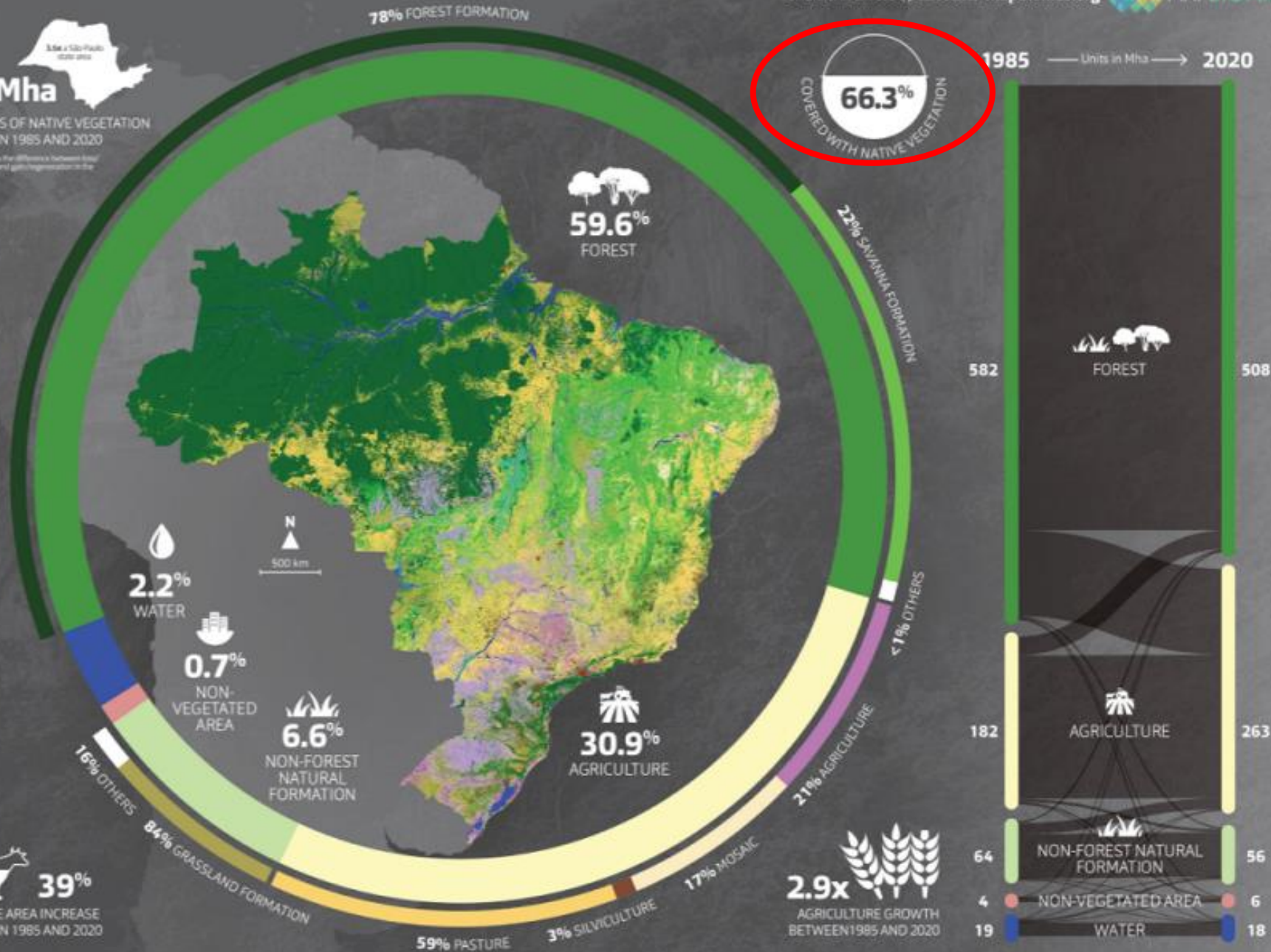
NET LOSS OF NATIVE VEGETATION
BETWEEN 1985 AND 2020

Net loss: shows the difference between total
deforestation and gains/regeneration in the

1985 — Units in Mha —> 2020



39%
PASTURE AREA INCREASE
BETWEEN 1985 AND 2020



What the science says

✓ Low carbon agriculture:

- . protects the soil and saves water
- . can reduce the use of fossil fuel fertilizers
- . recovers degraded pastures
- . mitigates GHG emissions, including methane
- . generates carbon credits
- . increases competitiveness and sustainability
- . provides subsidies for public policies
- . allows the development of environmental services

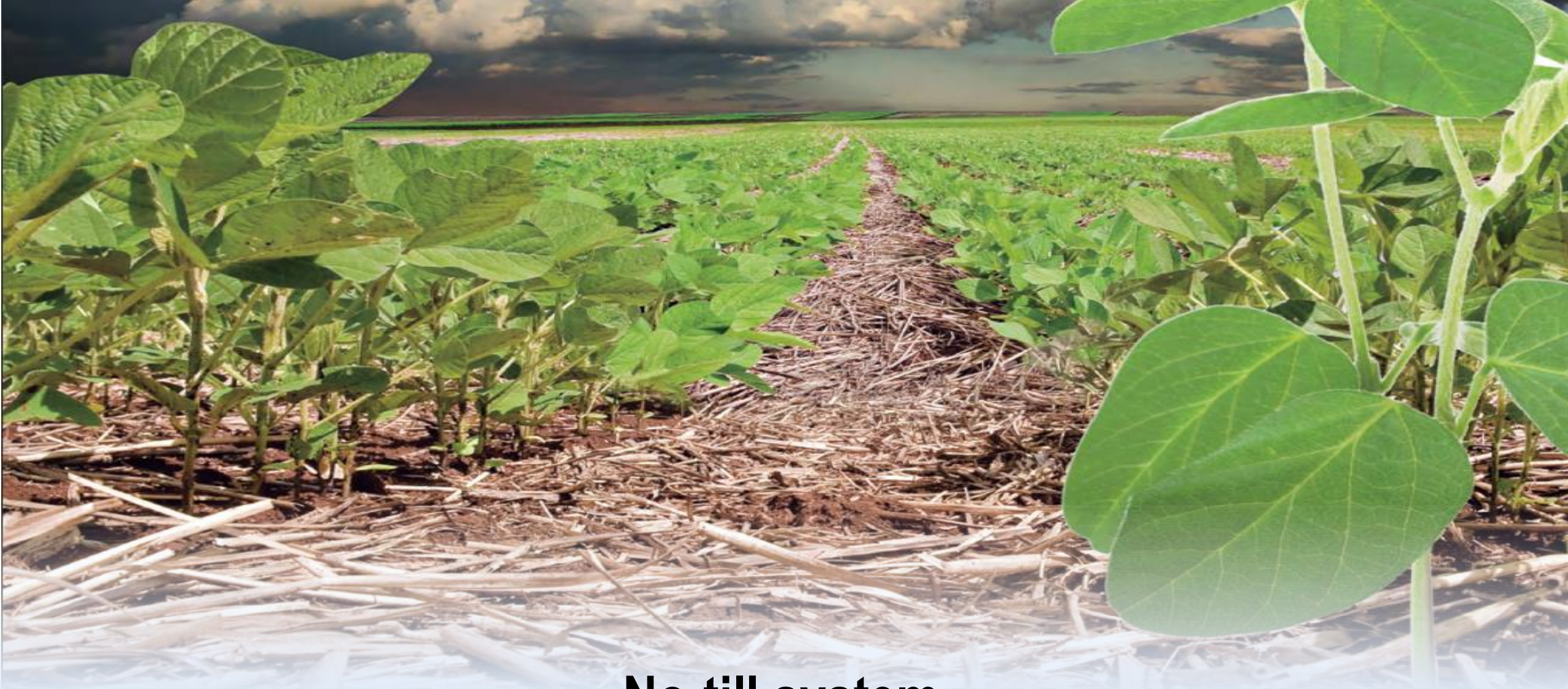
. . . .

An aerial photograph of a vast, flat, tan-colored desert landscape. Scattered across the terrain are numerous green trees and shrubs of varying sizes. Some are isolated, while others form small clusters. The trees cast long, dark shadows to the right, indicating a low sun position. The overall scene suggests a focus on reforestation or sustainable land use in arid regions.

Low carbon agriculture

Low carbon agriculture

- ✓ No-till system (~ 35 million ha / yr)
- ✓ Biological fixation
 - . ~ 35 million ha soybean / yr (90%)
 - . 100+ million tons of CO₂ equivalent
- ✓ Degraded pasture recovery
- ✓ Planted forests
- ✓ Integrated crop, livestock and forestry systems
- ✓ and more!



No-till system

Protects the soil, incorporates carbon and saves water

**Nitrogen fixation
saving resources and reducing green house gases emissions**





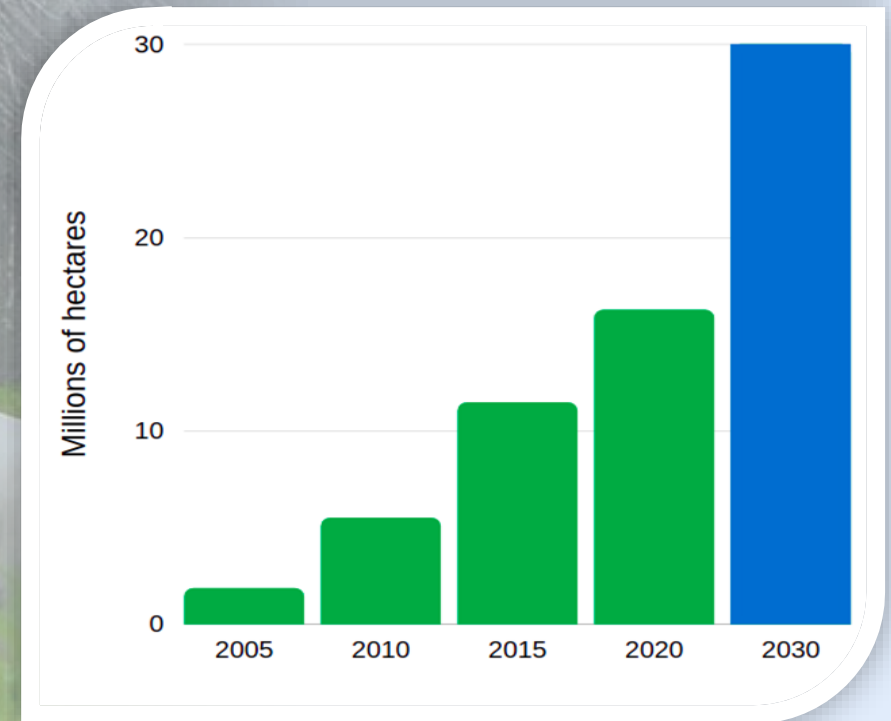
Recovery of degraded pastures



Integrated crop, livestock and forest systems

- Competitiveness and Sustainability -

Growth of integrated crop, livestock and forest systems



Carbon neutral beef



Low carbon milk

In three years conversion of 20 farms in different biomes using distinct production systems



The Global Methane Initiative

- Strategies of the Brazilian agribusiness

1. Reduction of emissions

- . Plant breeding: more digestible forages
- . Animal breeding: early slaughtering of animals
- . Adding additives to feed: tannins; essential oils, others

2. Compensation of emissions

- . Integrated crop, livestock and forestry systems





Public Policies Supporting Sustainability and Decarbonization

Forest Code

Smart and planed agriculture expansion

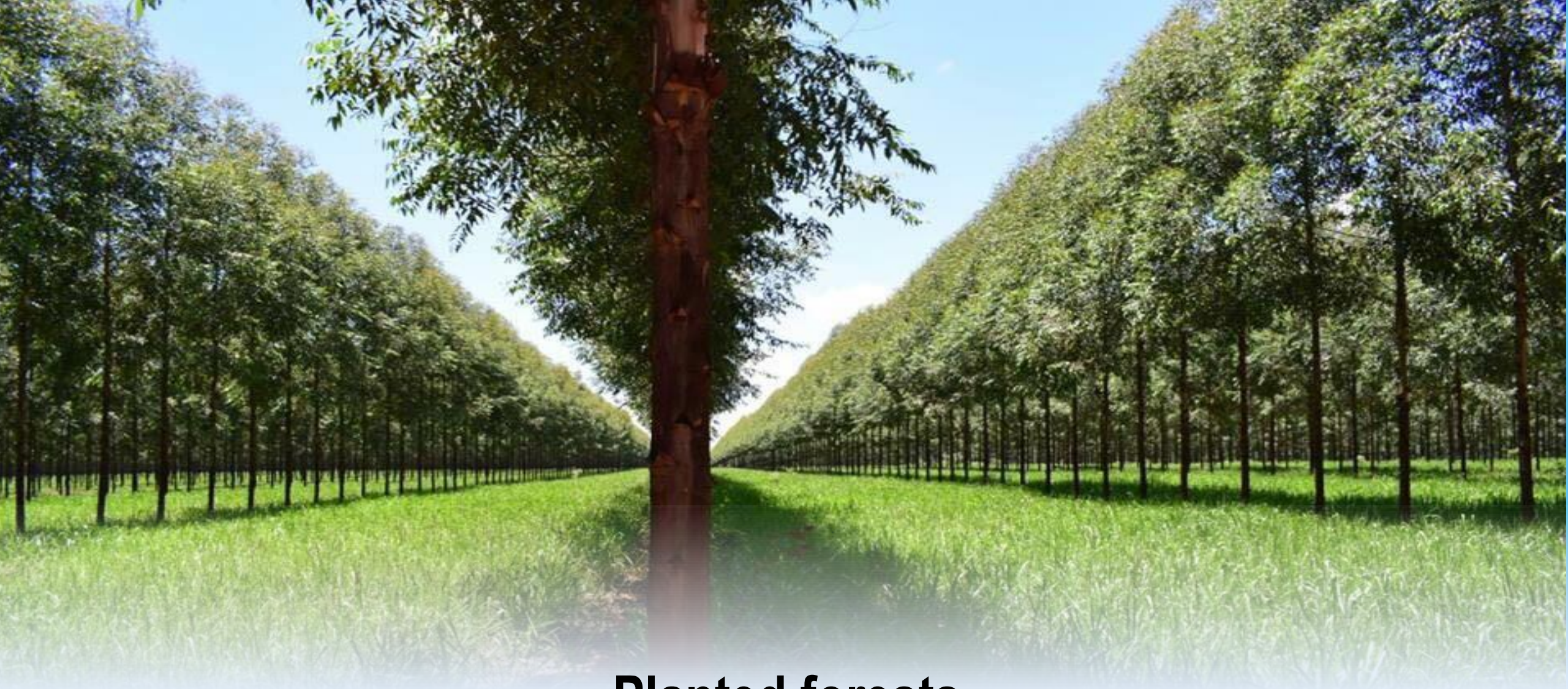
Low carbon agriculture plan

Reducing impact with gains in resilience

Renovabio (biofuels)

Increased energy efficiency and reduction in emissions





Planted forests

GHG sequestration and environmental services

To be continued ...

Science and technology will significantly contribute to reduce GHG emissions:

✓ Low carbon / carbon neutral:

- . Coffee

- . Cotton

- . Leather

- . Calves

...



**Brains, not tractors, are the symbol
of Brazilian agriculture!**



Thank you!

Ministério da Agricultura,
Pecuária e Abastecimento

