

A vertical collage of 10 images representing various aspects of nanotechnology and nanoscience. The images are: 1. Aerial view of a wetland or marsh with water and vegetation. 2. A gloved hand holding a test tube with a yellow liquid, next to a flask with a yellow liquid. 3. A close-up of a textured, woven surface, possibly a nanomaterial. 4. A large, yellow, cylindrical structure, possibly a nanowire or nanotube. 5. A man in a white lab coat and sunglasses, holding a small object, standing in a field. 6. A blue, grid-like structure, possibly a nanomaterial or a molecular structure. 7. A DNA double helix structure, with a red, coiled structure, possibly a protein or a nanowire, interacting with it. 8. A field of green plants, possibly a crop field. 9. A large, white, hexagonal structure, possibly a nanomaterial or a molecular structure. 10. A large, white, hexagonal structure, possibly a nanomaterial or a molecular structure, with a blue, grid-like structure, possibly a nanomaterial or a molecular structure, in the background.

A vertical collage of 12 images illustrating various aspects of agriculture and food production. The images are stacked vertically: 1. A blue DNA double helix structure against a dark background. 2. A close-up of a DNA microarray or gel electrophoresis result showing multiple lanes of colored bands (red, green, yellow, black). 3. A top-down view of a field with rows of crops, showing a mix of brown and blue soil/plant colors. 4. A DNA double helix structure with a glowing blue circuit board pattern inside it. 5. A yellow and black drone flying in a blue sky with white clouds. 6. A variety of fresh vegetables including corn cobs, tomatoes, and eggplants. 7. Several large black plastic silos or containers filled with different types of grains or seeds. 8. A close-up of a field of green corn plants. 9. A close-up of a field of green corn plants. 10. A close-up of a bee on a pink flower. 11. A black and white cow standing in a green field with a house in the background. 12. A close-up of a bunch of red and yellow berries on a vine.

1. What Embrapa is doing in Bioeconomy – Embrapa is a Bioeconomy Institution



Institutional Building and Strengthening

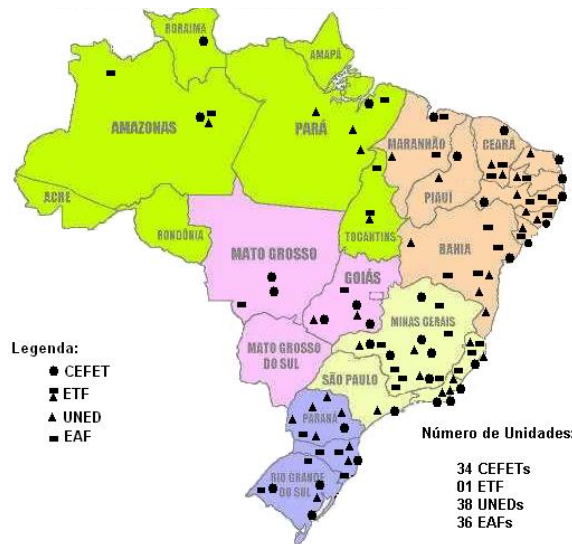
Brazil has created a large research and education system for agriculture

17 State Ag Research Centers

Large network of experimental stations



Federal Network of Professional Education



Agricultural Universities
Ag Technical Schools

The Brazilian Agricultural Research Corporation 46 Embrapa Centers Dedicated to Technology Development



Private Sector

Brazil has also an active and growing private sector, which supplies technologies and technical assistance mainly in farm inputs and food processing

The Brazilian Agricultural Research Corporation

Embrapa Agroenergy



The Brazilian Agricultural Research Corporation

Embrapa Soybean



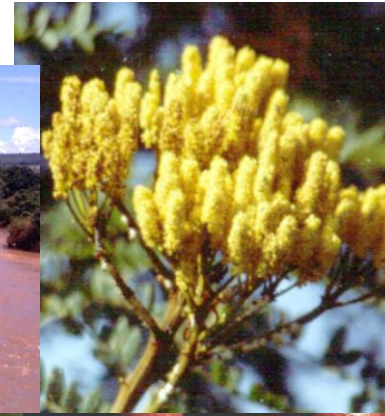
Plant Sciences: plant breeding, biotechnology, soil fertility, crop protection, agroenergy, irrigation engineering;



Animal Sciences: integrated crop-livestock-forest systems, animal nutrition, animal breeding, fodder crops breeding, animal reproduction;



Natural Resources and Environmental Sciences: ecology, agroclimatology, soil sciences, hydrology, land use, precision agriculture.



Research Projects related to Biofuels:

breeding, production systems & biochemistry

Macaw palm



Oil palm



Jatropha



Sugarcane



Soybean in Brazil



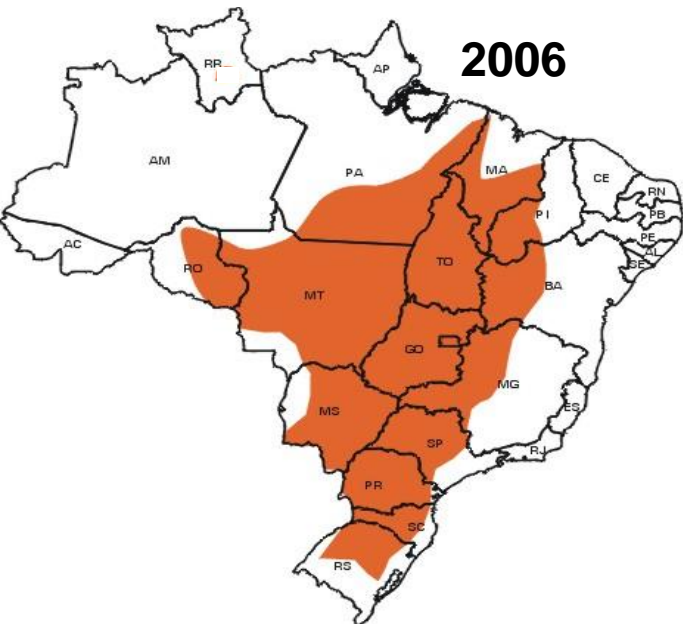
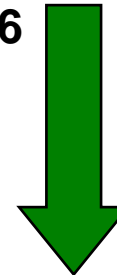
1968

**Area
(1000 ha)**

906

**Yield
(kg/ha)**

1.166



2006

23.500

2.916

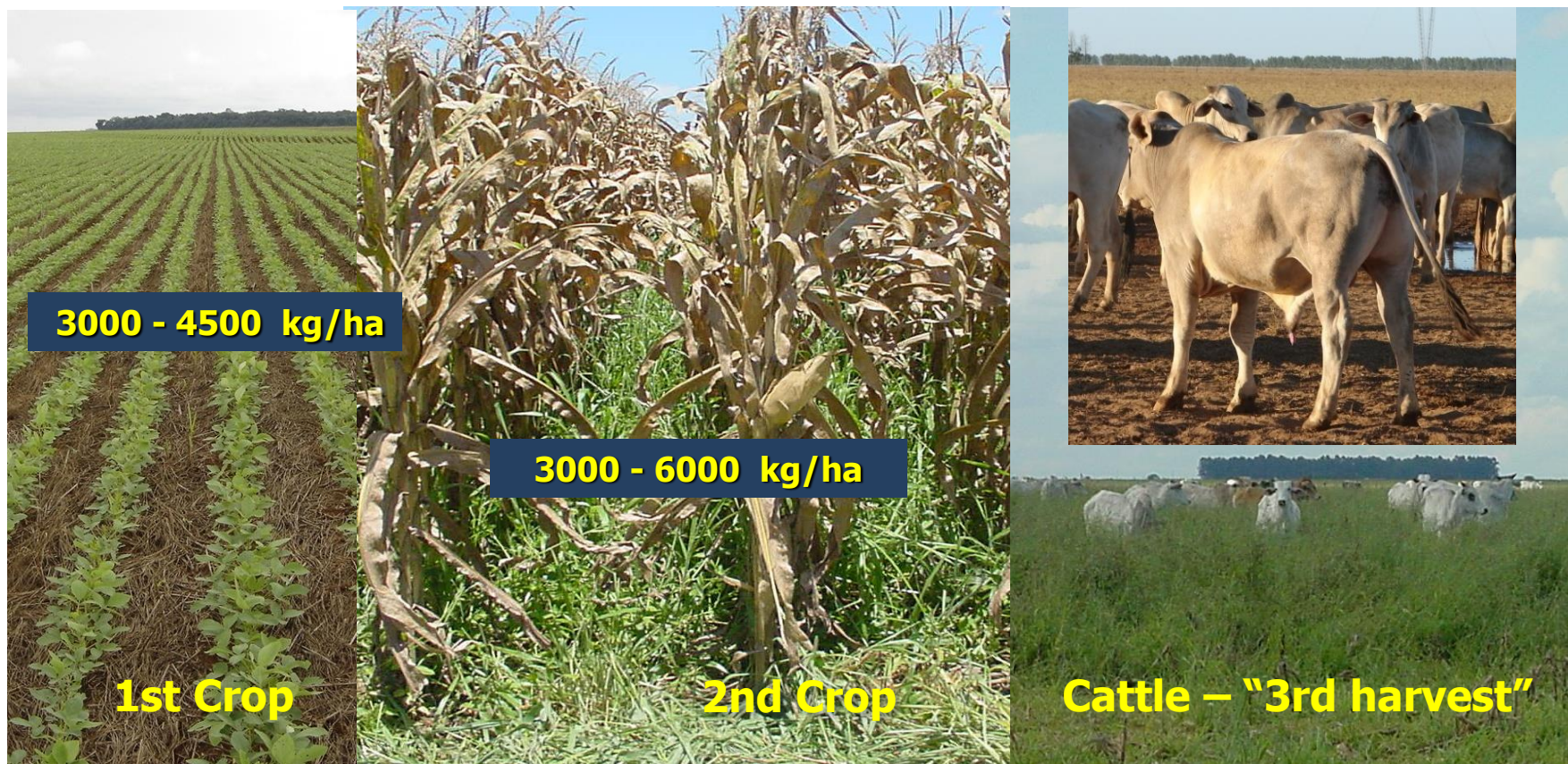


**Breeding program + soil management +
pests and diseases control
+ BNF**



Sustainable Intensification

Oct/Nov Feb/March Jun/Jul Sep/Oct



Activities/Time

Development of Tropical Agriculture in Brazil

Biological Nitrogen
Fixation

More Sustainable Cropping Systems in the Tropics

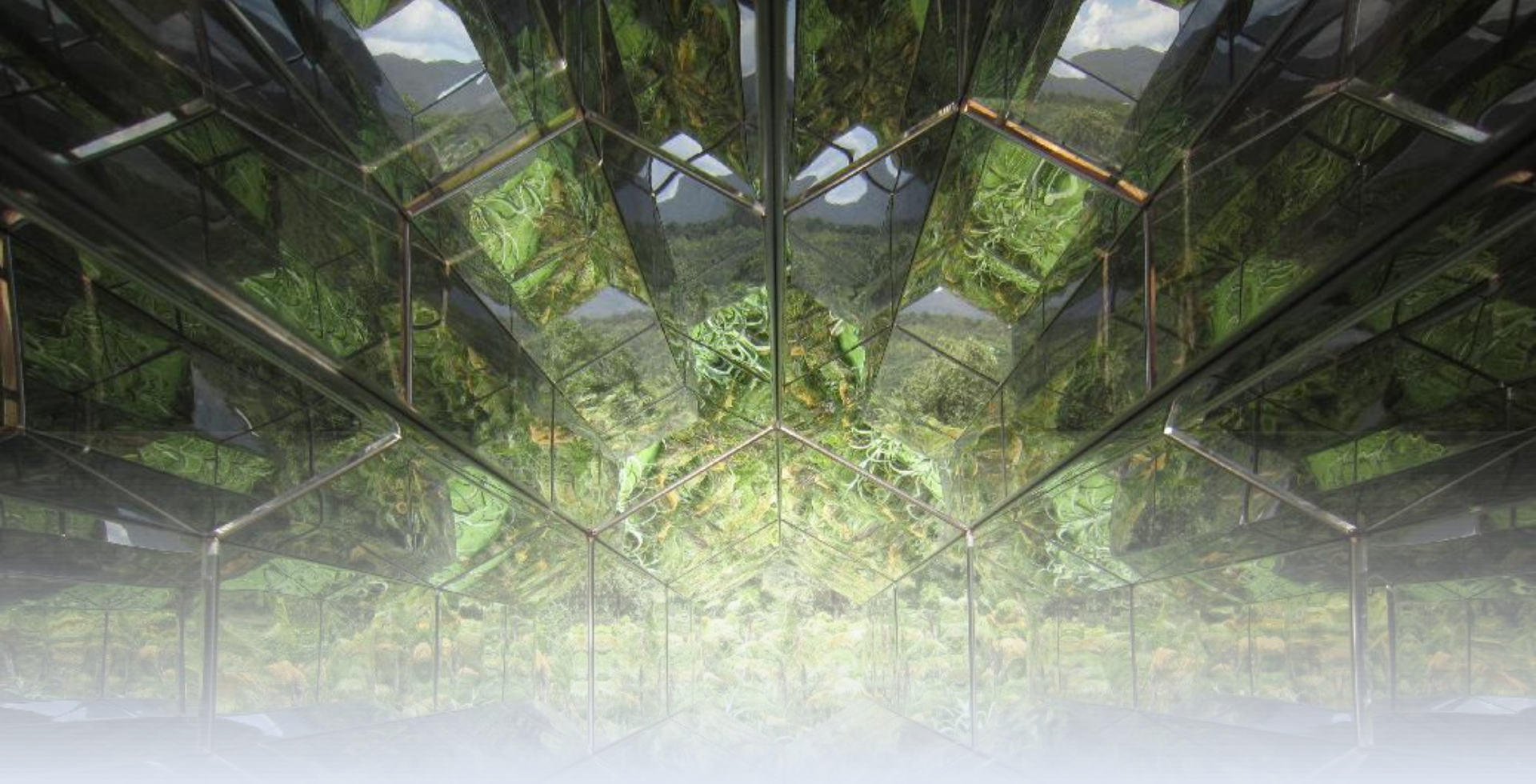


No Biological Nitrogen
Fixation



Biological Nitrogen
Fixation with
Bradyrhizobium strains

Annual economy:
> US\$ 5 billion



“THE FUTURE OF RESEARCH IN BIOECONOMY”

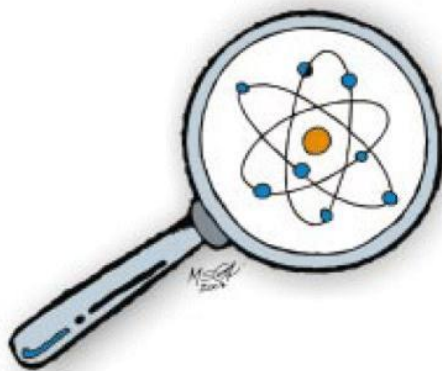
Science and Innovation for Sustainability

New Knowledge, Tools and Processes...

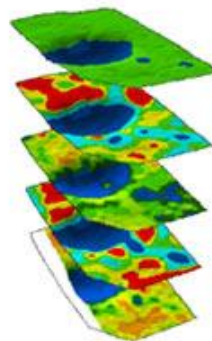
Bio



Nano



Geo



Data



The Next Frontier

Sustainable Intensification

Raise Productivity and Quality with Low Impact Technologies
Reduce Risks - Save Resources - Raise Income – Social Inclusion

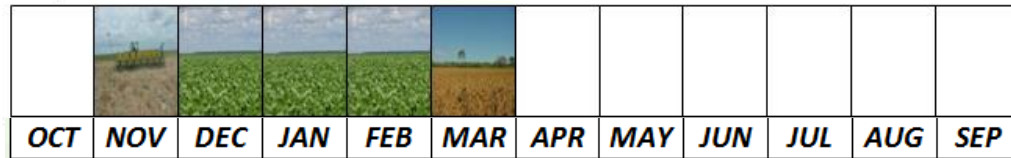
Diversification and Specialization

Sophisticated – Competitive – Profitable



New Frontiers in Conservation Agriculture in Brazil

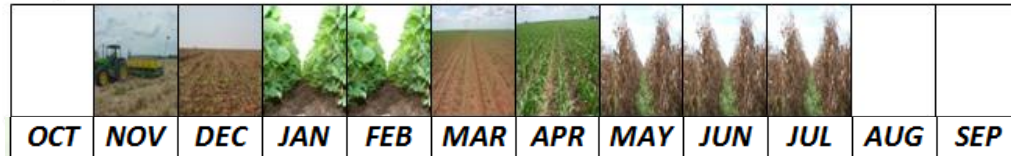
Soybean \pm 42% of the time



Corn \pm 50% of the time



Soybean + 2nd corn crop \pm 80% of the time



Soybean + 2nd corn crop + livestock \pm 92% of the time



Intensification of land use with integrated crop-livestock-forest systems



Target: 70 million ha of degraded pastures – the new agricultural frontier

- System's View and Complexity -
Combination of 70+ different technologies

The Need of Think Tanks and Strategic Intelligence

Strategic Intelligence Systems



Expand the knowledge base about the future;
Facilitate the establishment of agendas of common purpose;
Facilitate alignment of efforts.

Limits of Bioeconomy



- Natural resources
- New Technologies
- Competition of industrial products or inputs
- Bad Governamental Policies
- Decrease of the World Economy

An aerial photograph showing a winding river or stream that meanders through a landscape. The river is a deep blue color and is surrounded by dark green forested areas. The surrounding land is divided into large, rectangular agricultural fields in shades of brown, tan, and light green. The horizon is visible in the distance under a clear sky.

Thank You!

Elisio Contini, Dr rer pol
EMBRAPA