Bioeconomy and Agriculture in the context of Climate Change Challenges

13th G20-MACS (15-17 May, 2024)
Session III : Climate Change and Agrifood Systems Resilience

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Bioeconomy

There is not a "single" concept or vision….

Biotechnological

Bioresources

Bioecological

Transition that can guarantee food security and climate resilience

FOSSIL → BIO

LONG TERM PLANING

Fertilizer
Pesticide
Additive
Fuel
Energy

Bioenergy
Biofuel
Bioinoculant
Biopesticide
Biofertilizer

Bio insumos

Bioinputs National Program

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Bioinputs developed from Brazilian Microbial Biodiversity (Public Private Partnership)

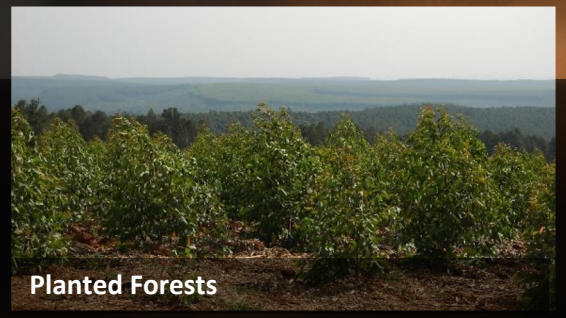
Auras is made with *Bacillus aryabhattai*, isolated from Semi-Arid soils (Caatinga)

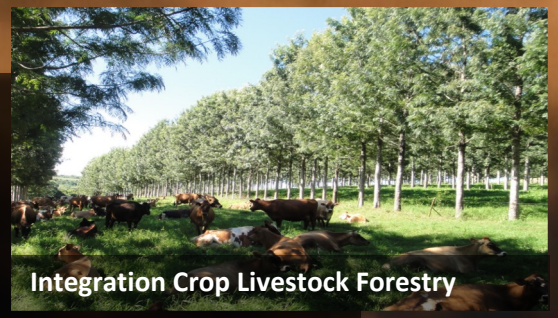
BiomaPhos - Phosphorous biosolubilization By Bacilus subtilis and Bacilus megaterium isolated from soil and corn stalks

Combio - bacterial strains for biological nitrogen fixation, growth and preventing fungal attacks on soybean.


Recovery of Degraded Pastures


Irrigation


Planted Forests


Integration Crop Livestock Forestry


No-till system


Intensive Fattening


Bio-based agriculture and bio-inputs


Manure Treatment (biogas)

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2010/11 abc AGRICULTURA DE BAIXA EMISSÃO DE CARBONO

LONG TERM PLANNING

National Policy Low Carbon Agriculture (medium-long term investment)

Sustainable intensification with adaptation of food systems to climate change

2023/2030/2035 ABC+

Exploring the potential of the BLUE Bioeconomy

FISH CULTURE

Peixes redondos


Tambaqui


Pacu


Tambacu

Rasguido 2005

Siluriformes


Cachara


Jaú


Catfish americano


Pirarara

- *Pseudoplatystoma coruscans* - Pintado/surubim

- *Pseudoplatystoma fasciatum* - Cachara

- *Brycon cephalus* – Matrinxã

- *B. microleps* - Piraputanga
- *B. orbignyanus* – Piracanjuba

- *Salminus* sp.- Dourado

- *Astyanax sp.* – Lambari

- *Prochilodus sp.* - Curimatã

- *Leporinus* sp. - Piau

Pirarucu

GOVERNO FEDERAL
MINISTÉRIO DA PESCA E AQUICULTURA
BRASIL
UNIÃO E RECONSTRUÇÃO

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Exploring the potential of the BLUE Bioeconomy

Embrapa Aquaculture and Fisheries

Amazonian native species: Tambaqui (Colossoma macropomum)

- Genomic edition , conservation , breeding , genetic improvement of native aquatic species
- Nutrition and new sources of feeding
- Methods of reproduction of aquatic species
- Desease control
- Aquatic production systems
- Processing
- Market analyses
- Geographic origin and information

Strategies to foster bioeconomy should consider different realities, specificities and vocations of each territory

Mixed and Integrated Systems

Traditional Agricultural System in the Southern Espinhaço Range, Minas Gerais, Brazil (2020)

Food and Agriculture Organization of the United Nations | Globally Important AGRICULTURAL HERITAGE Systems

Bioecological bioeconomy = Socio-bioeconomy

Conservation/Preservation + inclusive development + community well being

Women empowerment – 1st Surui coffee barista, producer of Robusta Amazônico cooffee in agroforestry systems.

Sustainable use of biodiversity must include the development of local bio-economy

Harvest of Amazon Nuts and products

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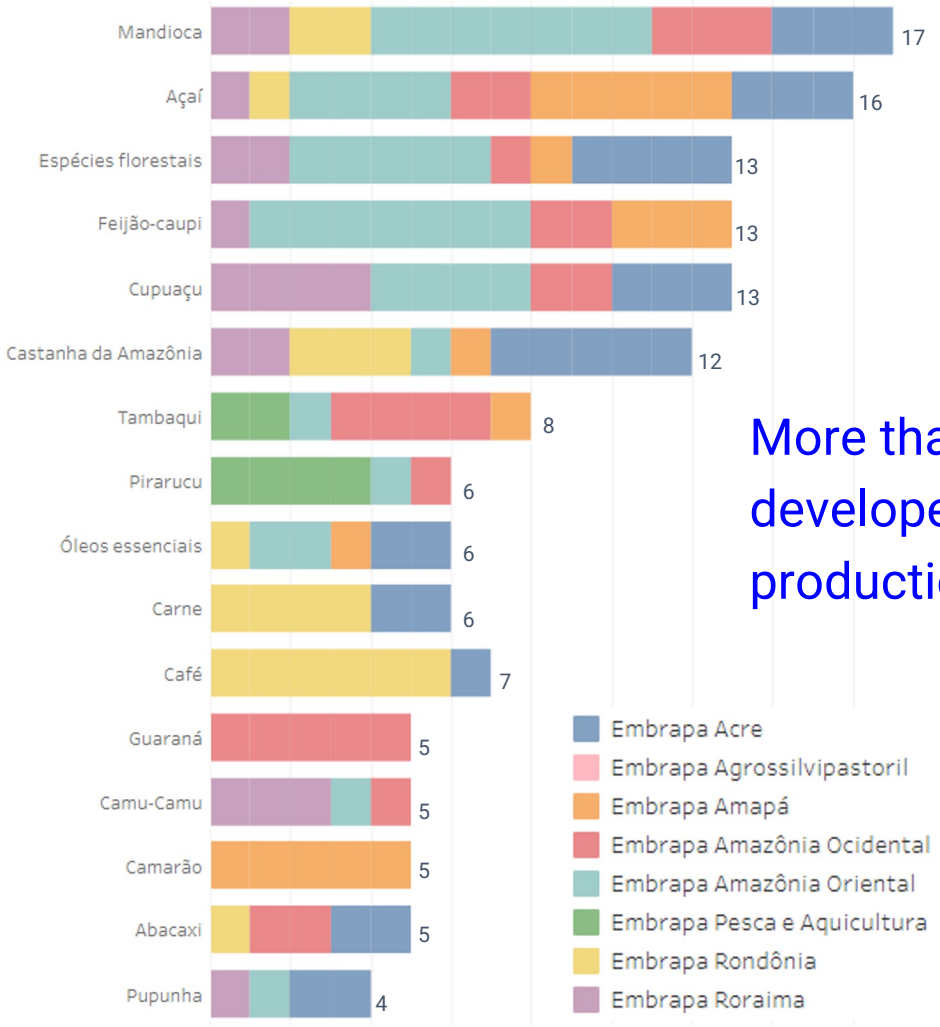
Embrapa in the **Amazon**

Research and technology transfer facilities

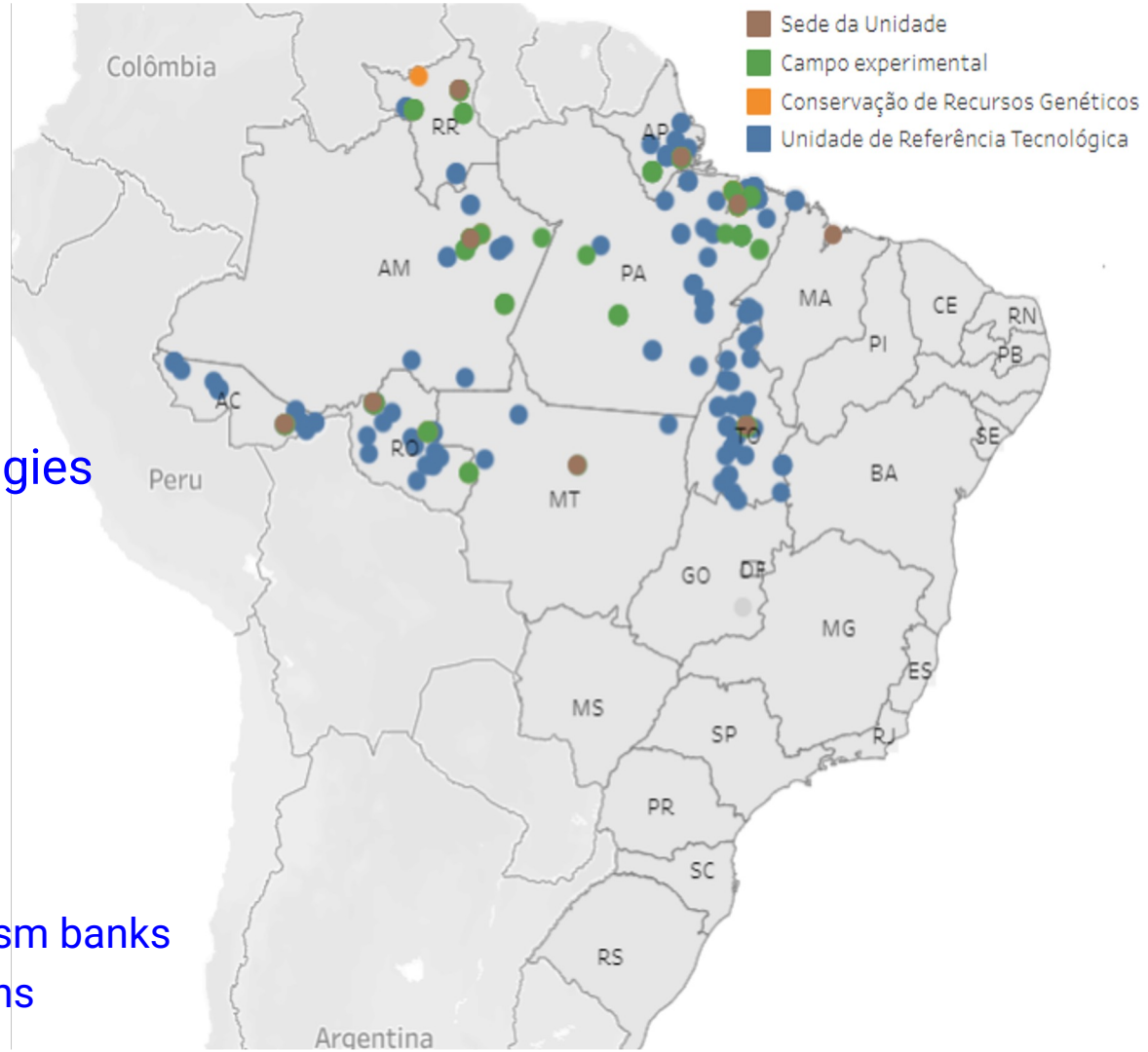
Number of technologies associated to native production chains



More than 100 technologies developed related to 50 production chains.

* 73 Labs

* 63 germplasm banks and collections



Embrapa in the **Amazon**

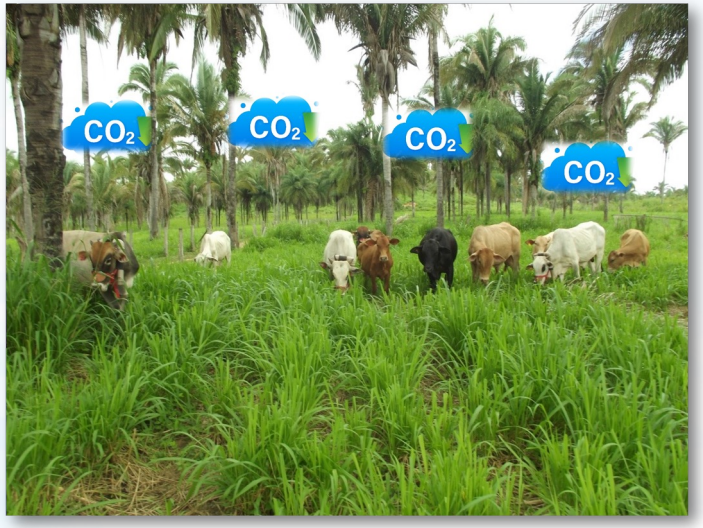
In 2021, technologies related to Embrapa's research focusing socio-bioeconomy in the Amazon generated ~ 3000 direct jobs, with an economic impact of more than US$30 million.

Rosa, R (2016)


Rosa, F (2015)


Rosa, R (2019)

Production systems with low environmental impact and valuation of ecosystem services



Integrated crop-livestock- forest system

Agroforestry systems for family farmers

Agriculture without fire – rotation and integration

Small scale integrated system (Sisteminha)

Examples of sustainable technologies and products developed by Embrapa and partners focused on socio-bioeconomy in the Amazon

Embrapa's techs for partner

PRODUÇÃO VEGETAL | CULTIVARES

Cupuaçu 5.0 - Kit de cultivares de cupuaçuzeiro de alta produtividade e boa resistência à vassoura-de-bruxa

PRODUÇÃO VEGETAL | AGROQUÍMICOS, FERTILIZANTES E DEFENSIVOS BIOLÓGICOS

Bioinseticida a base de Metarhizium anisopliae para controle da mosca-da-carambola

ALIMENTOS E BEBIDAS

Néctar misto de açaí

Cassava flour with Geographical Indication

Vegan "cheese" of babaçu

SISTEMA AGROPECUÁRIO

Sistema de Produção do Guaraná no Estado do Amazonas

***Plant-based* hamburger (babaçu)**

ALIMENTOS E BEBIDAS

Sucos mistos (blends) de frutas amazônicas

PRODUÇÃO VEGETAL | AGROQUÍMICOS, FERTILIZANTES E DEFENSIVOS BIOLÓGICOS

Óleo essencial de pimenta-de-macaco como inseticida






Bioeconomy & Country Challenges

- **Promote food security and sorveigneity, eradicating the hunger;**
- **Develop Science & Technology adapted to national capabilities and needs;**
- **Prospect, promote and ensure the use of biodiversity in a sustainable way;**
- **Trains multipliers, construct collective knowledge, generate opportunities;**
- **Promote local value aggregation, geographical origin recognition and access to markets;**
- **Expand and strengthen networks, cooperation, partnerships and funding**

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Thank you!

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