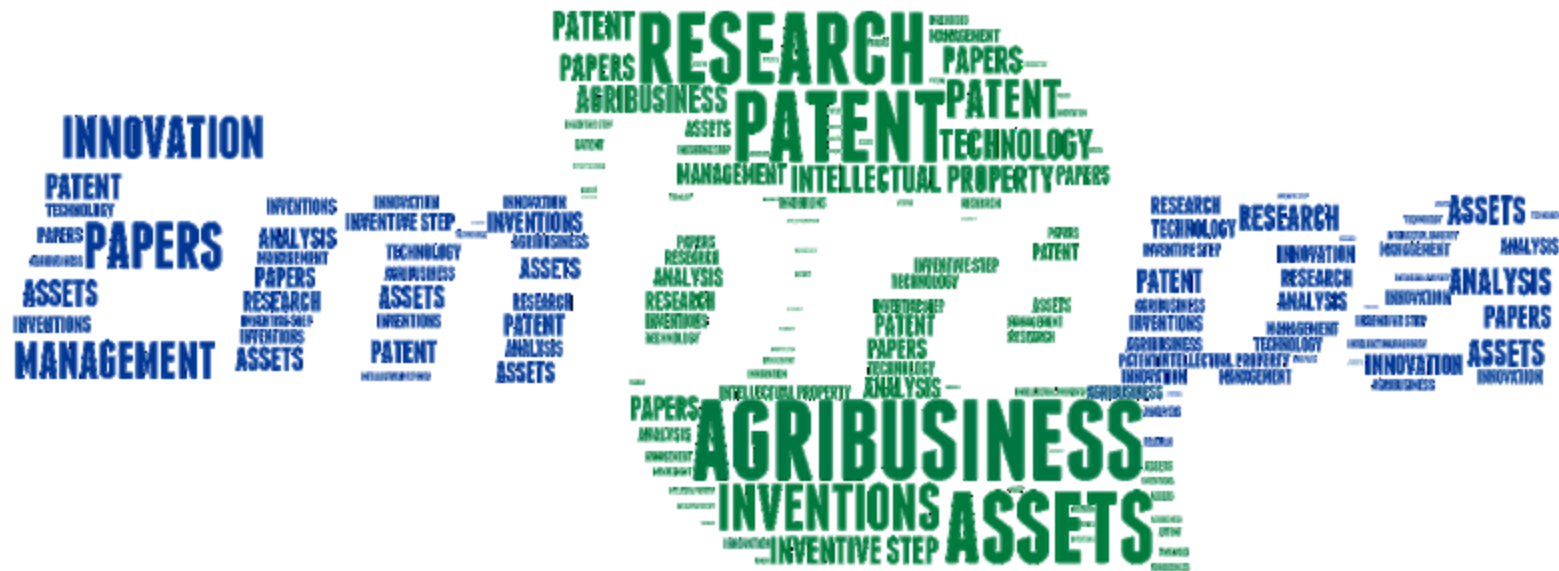




# Innovation and Intellectual Property as Engines for Competitive Agribusiness: Empowering Women Researchers and Entrepreneurs in Africa



Promoting new Plant Variety for enhanced agricultural productivity and food security



Sibelle de Andrade Silva  
Casablanca – Morocco – 15<sup>th</sup> November 2017

# Overview

- ✓ Brazil and the Brazilian Agricultural Research Corporation – Embrapa
- ✓ Embrapa's contribution to the development of new plant varieties and their impact on Brazilian agriculture
- ✓ Cotton-4 Project



# There is a Brazil that most people know...

Amazon forest



Soccer



Carnival



Rio de Janeiro



**It keeps being successful,  
but there is still more to know...**

# The Brazil you must Know



**Techonoly, Innovation, Development, Competitiveness**

**Strong Emphasis in Science-Based Development**

**>10.000 doctor trained every year**

**>230.000 researches in activity**



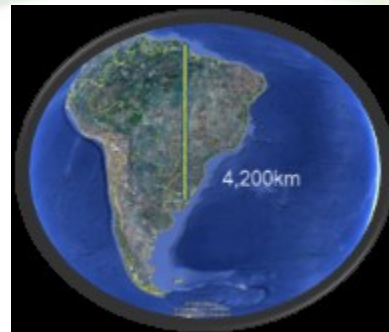
# Institutional Building and Strengthening: Brazil has created a large research system for agriculture

## THE BRAZILIAN AGRICULTURAL RESEARCH CORPORATION

- ✓ 47 Research Centers Dedicated to Technology Development
- ✓ Largest Agricultural Research Organization in Latin America



**Size &  
Environmental  
Complexity**



*City of Brasilia  
(Federal District)  
(capital of Brazil)*

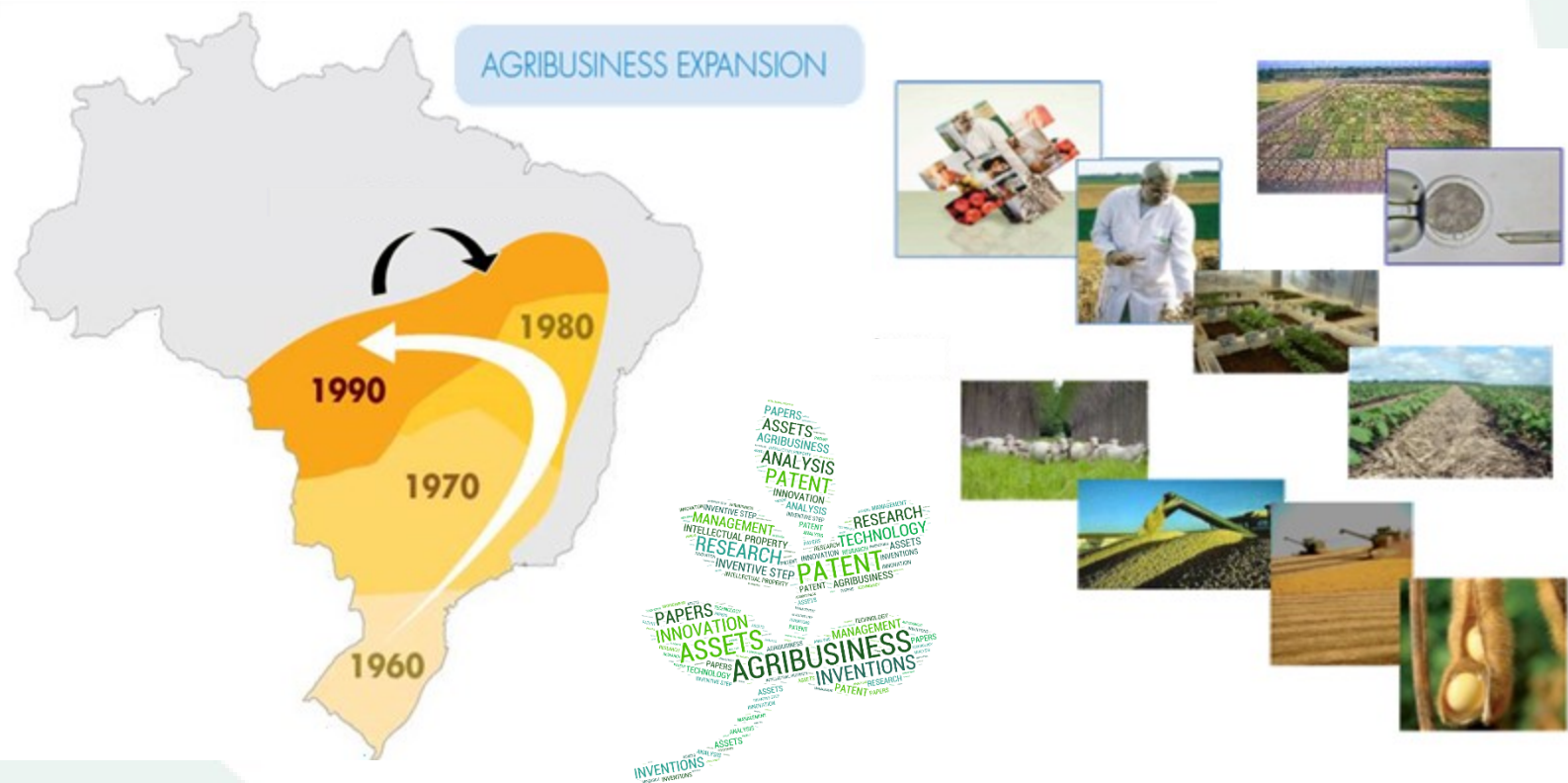
# Technology, Innovation and Agriculture

✓ Employees: 9,843

✓ Total Scientists: 2,415

✓ Researchers with PhD/DSc: 2,182

*Embrapa has been helping Brazil to developed a Science-Based, Advanced Tropical Agriculture*

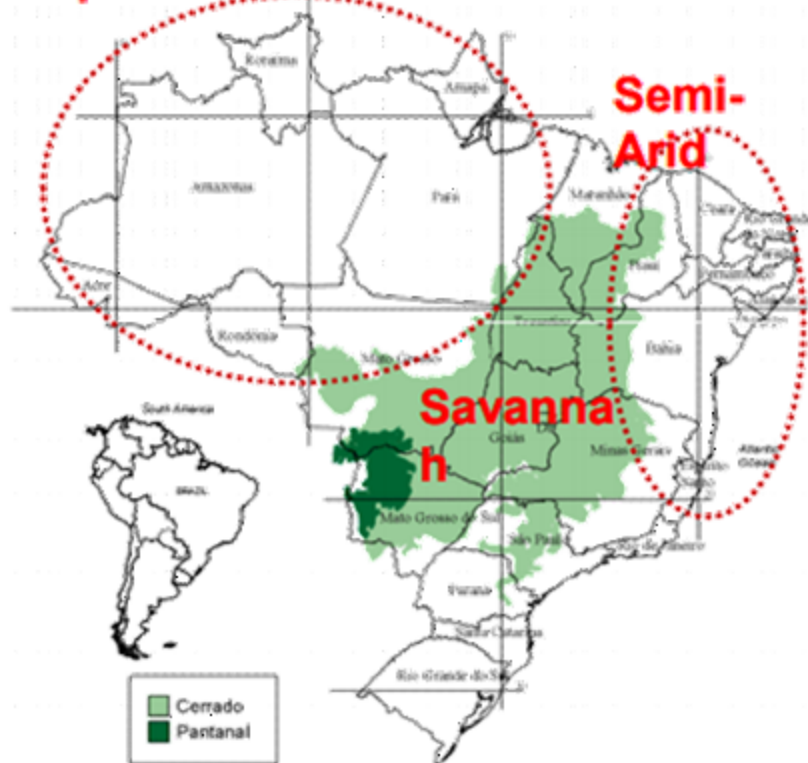


Women at Embrapa  
30% of total employees  
31% of the management positions



# Challenges to Agricultural Production in Brazil

## Tropical Forest

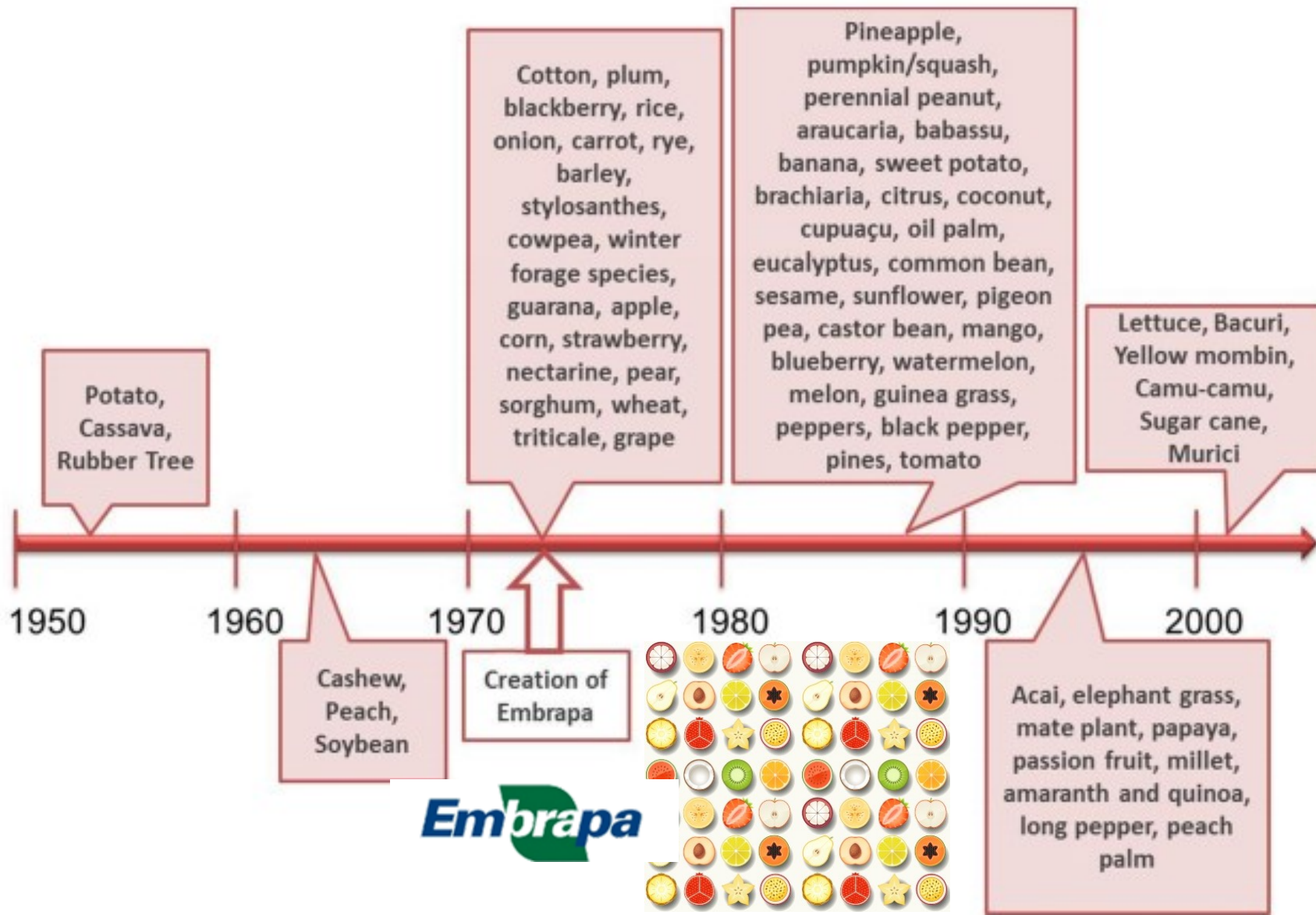


Before the 1970's Brazil was not a food secure country.

- Low agricultural production and low yields;
- Production concentrated in the South and Southeast Regions;
- Constant food supply crisis and rural poverty;
- Lack of specific knowledge in Tropical Agriculture;
- Lack of adequate agricultural development policies;
- Brazil known as coffee and sugar producer.



# Period corresponding to the beginning of the activities of plant breeding programs conducted by Embrapa



## Brazil Developed a Science-Based Advanced Tropical Agriculture

Brazilian Scientists had to “Tropicalize”  
Soybeans and Other Species.

Embrapa invested vigorously in genetic  
resources, searching for germplasm suitable  
for tropical and subtropical conditions.



# Soybean

## Soil fertility built

## Natural Soil

## More Sustainable Cropping Systems in the Tropics

**Biological Nitrogen  
Fixation**



**No Biological Nitrogen  
Fixation**



**Biological Nitrogen  
Fixation with  
*Bradyrhizobium*  
strains**

**Annual economy:  
> US\$ 7 billion**

# Embrapa and partner institutions are responsible for the conservation of approximately 300,000 accessions in Germplasm Banks of distinct plant species distributed



## Cereals

Amaranth  
Barley  
Corn  
Millet  
Oat  
Rice  
Rye  
Quinoa  
Sorghum  
Triticale  
Wheat



## Fruit species

Apple	Mamme
Avocado	apple
Bacuri	Mango
Banana	Murici
Barbados	Papaya
cherry	Peach
Baru	Pear
Blackberry	Pequi
Blueberry	Pineapple
Brazil nut	Pitaya
Camu-camu	Plum
Cashew	Psidium
Cashew	Pummelo
apple	Sapote
Chicha	Sapucaia
Citrus	Sorva
Coconut	Strawberry
Cupucaçu	Surinam
Genipap	Cherry
Grape	Umbu
Guava	Uxi
Jaboticaba	Yellow
Loquat	mombin



## Vegetables and spices

Arracacha  
Bell peppers  
Black pepper  
Bottle gourd  
Brassicas  
Carrot  
Chili peppers  
Cucumber  
Eggplant  
Garlic  
Jacatupe  
Lettuce  
Melon  
Okra  
Onion  
Sponge gourd  
Squash  
Pumpkin  
Watermelon  
Tomato



## Leguminous, Oleaginous, Fibrous plants

Castor bean  
Chickpea  
Coomon bean  
Cotton  
Cowpea  
Curaua  
Fava bean  
Lentil  
Moringa  
Pea  
Peanut  
Safflower  
Sesame  
Sisal  
Snap bean  
Soybean  
Sunflower



## Industrial use

Cocoa  
Coffee  
Sugar cane  
Oil palm  
Mate plant  
Guarana  
Rubber tree



## Forest trees and palms

Acacia  
Acai  
Acrocarpus  
Amburana  
Araucaria  
Babassu  
Bacaba  
Caiaue  
Calophyllum  
Centrolobium  
Cryptomeria  
Cypress  
Eucalyptus  
Fiber palm  
Gonçalo- alves  
Grevillea  
Imbuya  
Mahogany  
Pataua palm  
Peach palm  
Pink Pepper  
Pinus  
Spiny cedar  
Sweet gum  
Tabebuia



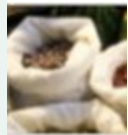
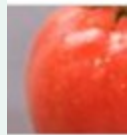
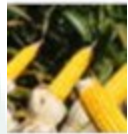
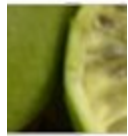
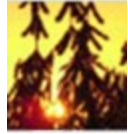
## Roots and tubers

Potato  
Sweet-potato  
Yam  
Taro  
Cassava

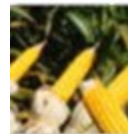
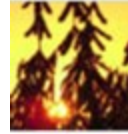


## Forage species

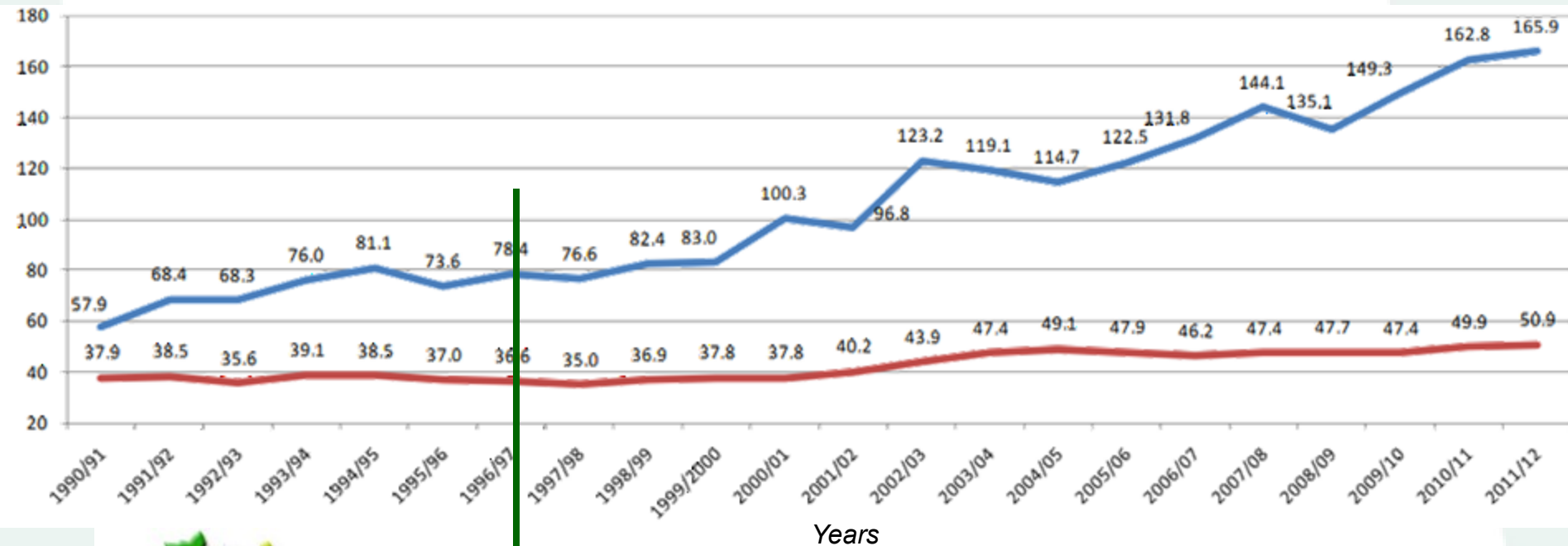
Alfalfa  
Andropogon  
Axonopus  
Brachiaria  
Bromus  
Buffelgrass  
Centrosema  
Cratylia  
Desmanthus  
Echinochloa  
Elephant grass  
Hemarthria  
Leucaena  
Mesosetum  
Panicum  
Paspalum  
Pennisetum  
Perennial peanut  
Ryegrass  
Stylosanthes



Genetic diversity adequately preserved, accessed and used will continue to be the basic foundation for the continued success of breeding programs aimed at developing new varieties, cultivars and lines.



# Evolution of domestic grain production (in millions of tons) and of the respective planted area (in millions of hectares)



1997: Plant Variety Protection Act in Brazil



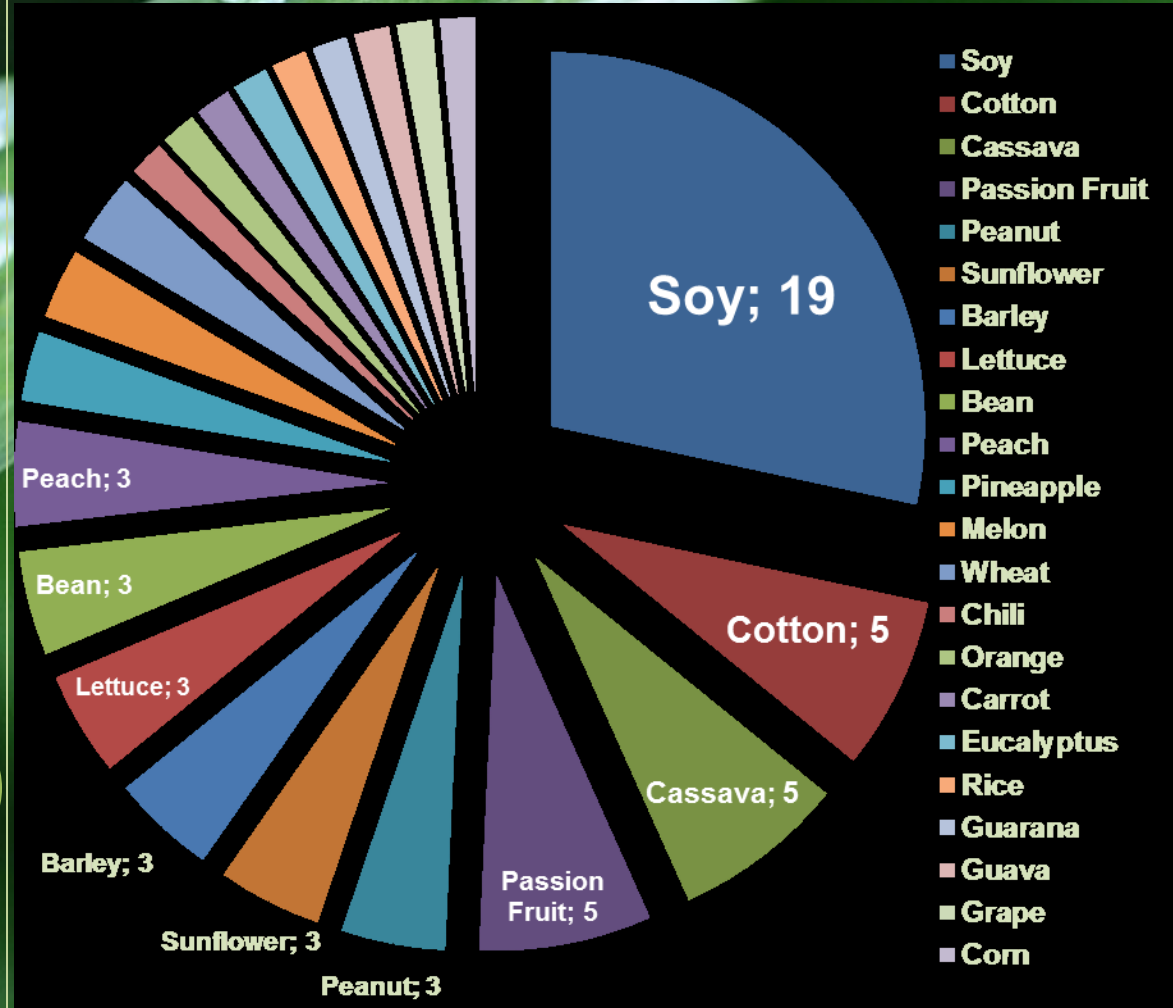


Year	2016	2017
<i>PVP applications</i>	32	35



**710**  
PVP applications in Brazil

**12**  
PVP Processes outside Brazil (US and Latin America)





## Cultivar BRS Vitoria



**BRS Vitoria is a black seedless grape with medium sized, elongated, droplet-shaped berries. The flavour is the most interesting aspect of the grape for consumers**

# STRUCTURING PROJECTS

Development projects implemented in partnerships between Embrapa and one country or a group of countries

- ✓ Strengthen their technological, institutional, and human resource bases necessary for sustainable agricultural development.
- ✓ Example: Embrapa has implemented the **Cotton 4 + Togo** project in Benin, Burkina Faso, Chad, Mali, and Togo in partnership with the Brazilian Cooperation Agency (ABC).





*If you have any questions, I would be happy to answer them.*

**شكرا**  
**Shukran.**

**Je vous remercie de votre attention.**

**Thank you for your attention.**

