



# **THE FUNDAMENTAL ROLE OF SCIENCE IN INNOVATION**

*Brazilian Scenario*

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MCTI – Federal Government

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# Some Achievements in Education and Science

- ✓ Top federal and state **universities at international level**, plus some private ones;
- ✓ Over **14,000 doctoral degrees** granted per year;
- ✓ Strong graduate system with **tri-annual evaluation of all study programs**;
- ✓ Internet platform with all **CV's of scientists and researchers** (2.5 millions curricula);
- ✓ **Virtual library** of scientific publications (~ 32,000 journals);
- ✓ **Scholarships** from “scientific initiation” to post-doc and research;
- ✓ **Strong science** and leading position in some sectors as agriculture and tropical disease.

# Good Examples to Follow

- ✓ **Deep sea oil exploration - PETROBRAS;**
- ✓ **Agricultural research (orange juice, sugar, soybeans, coffee, maize, cotton, poultry, beef, pork) - EMBRAPA;**
- ✓ **Aircraft design and fabrication – EMBRAER;**
- ✓ **Flexible Fuel Vehicle – Ethanol and Gasoline;**
- ✓ **Banking Automation – Reliable and Efficient.**



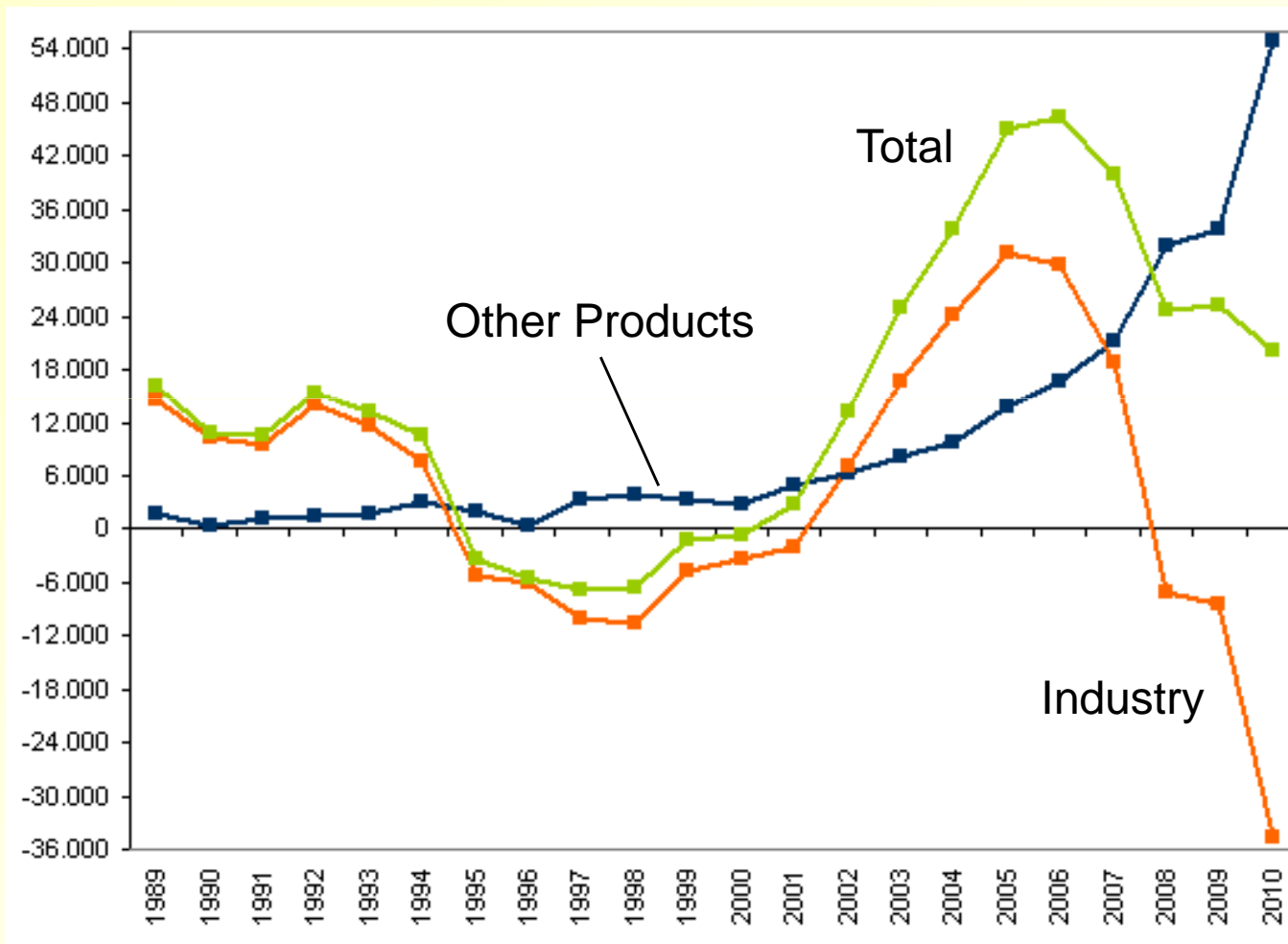
# General Picture

- ✓ **Brazil has a good Science;**
- ✓ **Our Science is “not converted at large” into  
Economic and Social Benefits.**

**Low innovation in many industrial sectors !**

# Exports and Imports

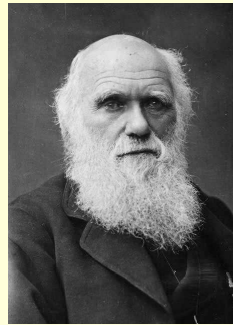
Brazil – Trade Balance (US\$ milhões FOB)



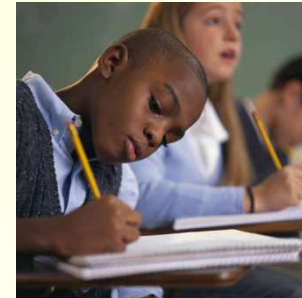
# Federal Government Guidelines

1. Expand and Strengthen **Democracy**;
2. Economic **Growth**;
3. **Sustainable** Development;
4. Protect the **Environment**;
5. Eradicate **Poverty** and Reduce **Inequalities**;
6. **Government** for All;
7. **Education**;
8. Infrastructure for the **Cities**;
9. Universalize **Health**;
10. Ensure **Security** and Fight Crime;
11. Promote **Culture**;
12. National **Sovereignty**;
13. **Place Brazil at the front line of Science and Technology.**

# National Priorities:



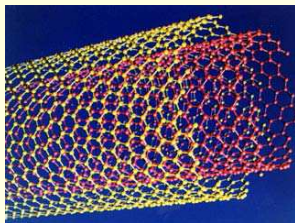
**Education**



**Science**



**Innovation**

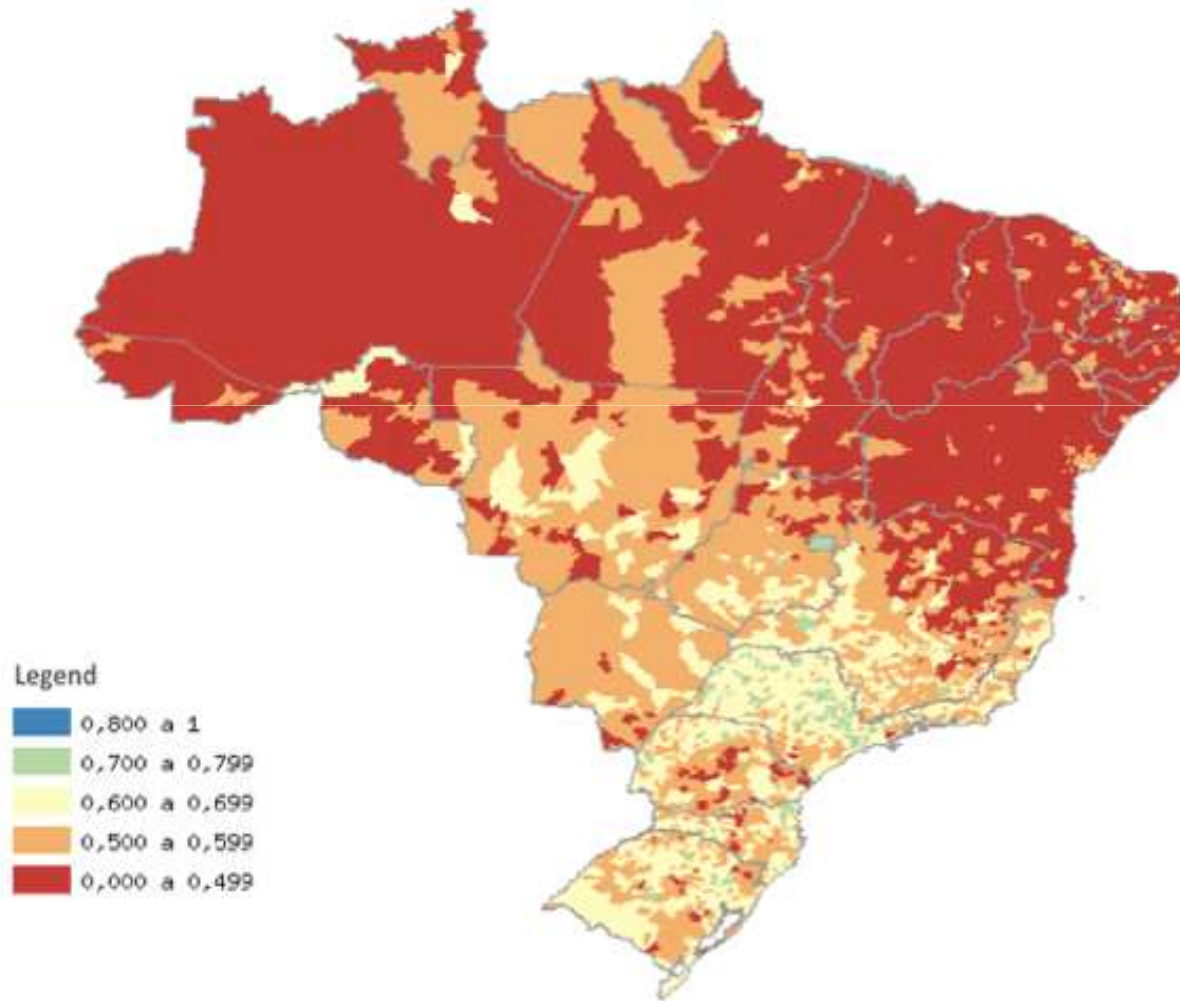


**Entrepreneurship**



# Inclusive Growth

Brazilian progress: HDI by municipality  
Brazil: 2000

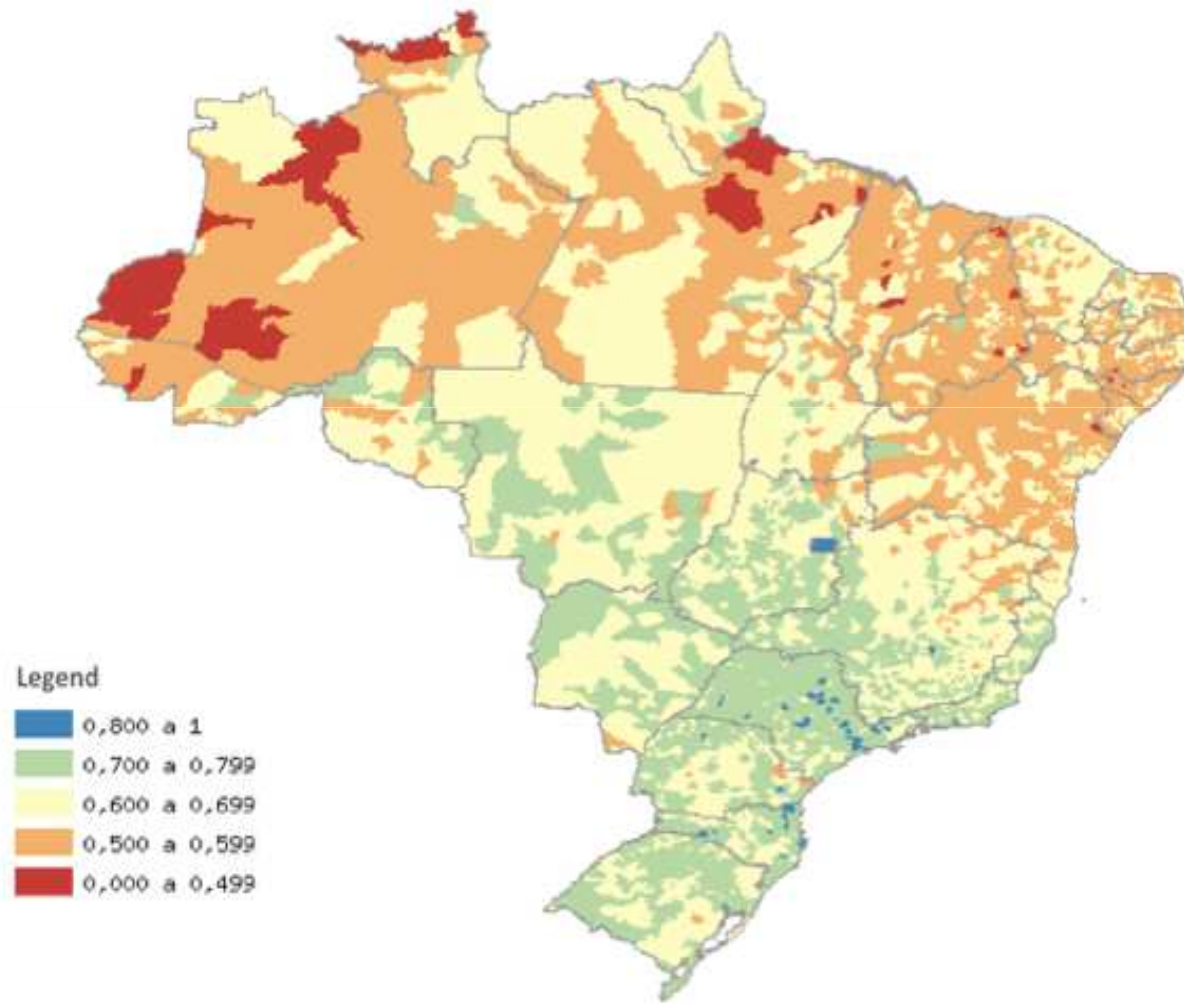


Source: SAE/PR, based on Demographic Census of 2000 and 2010 and HDI as calculated by the UNDP, Human Development Report.



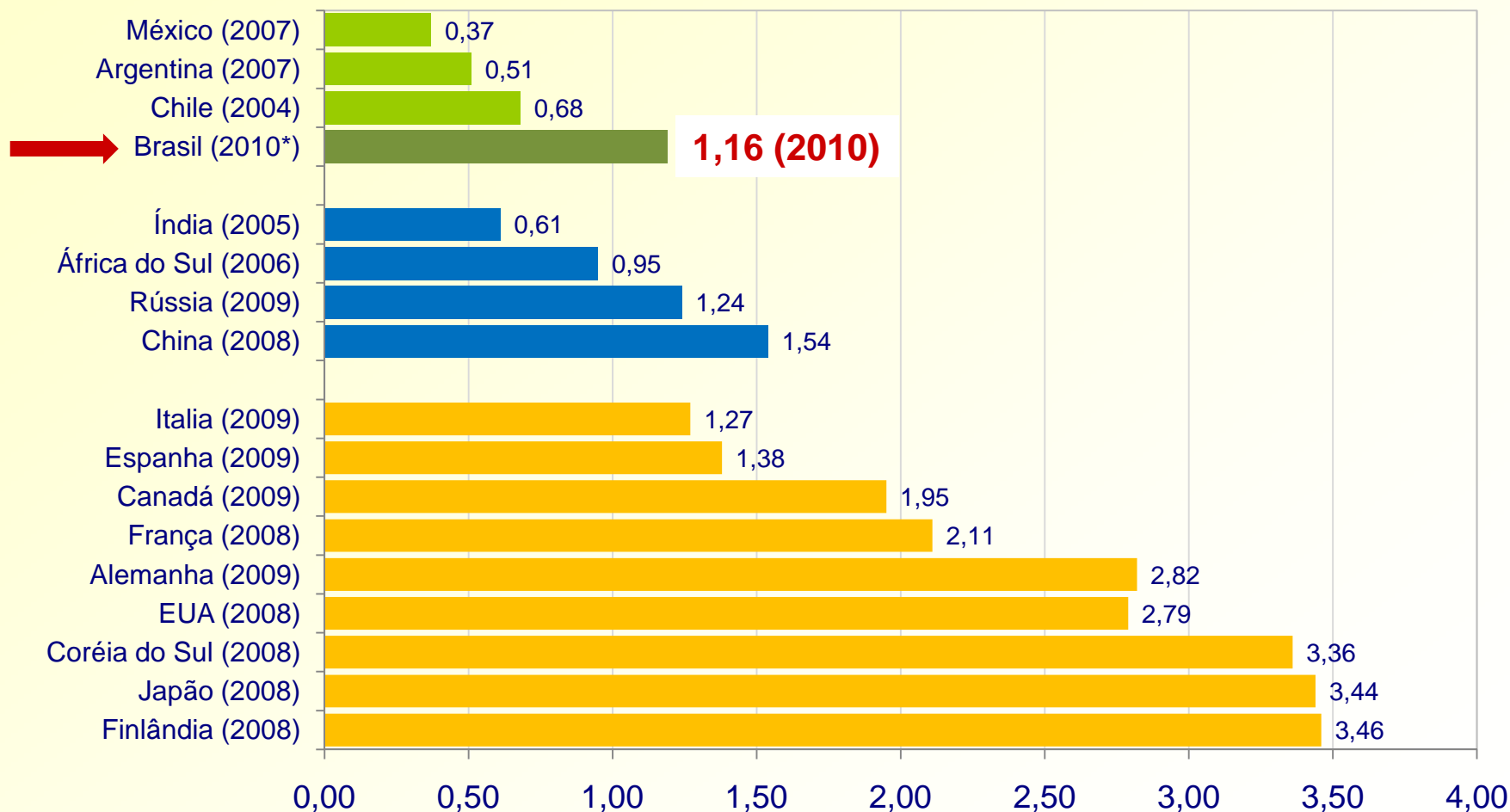
# Inclusive Growth

Brazilian progress: HDI by municipality  
Brazil: 2010



Source: SAE/PR, based on Demographic Census of 2000 and 2010 and HDI as calculated by the UNDP, Human Development Report.

## Gross Domestic Expenditure on R&D (GERD) as a percentage of Gross Domestic Product (GDP)



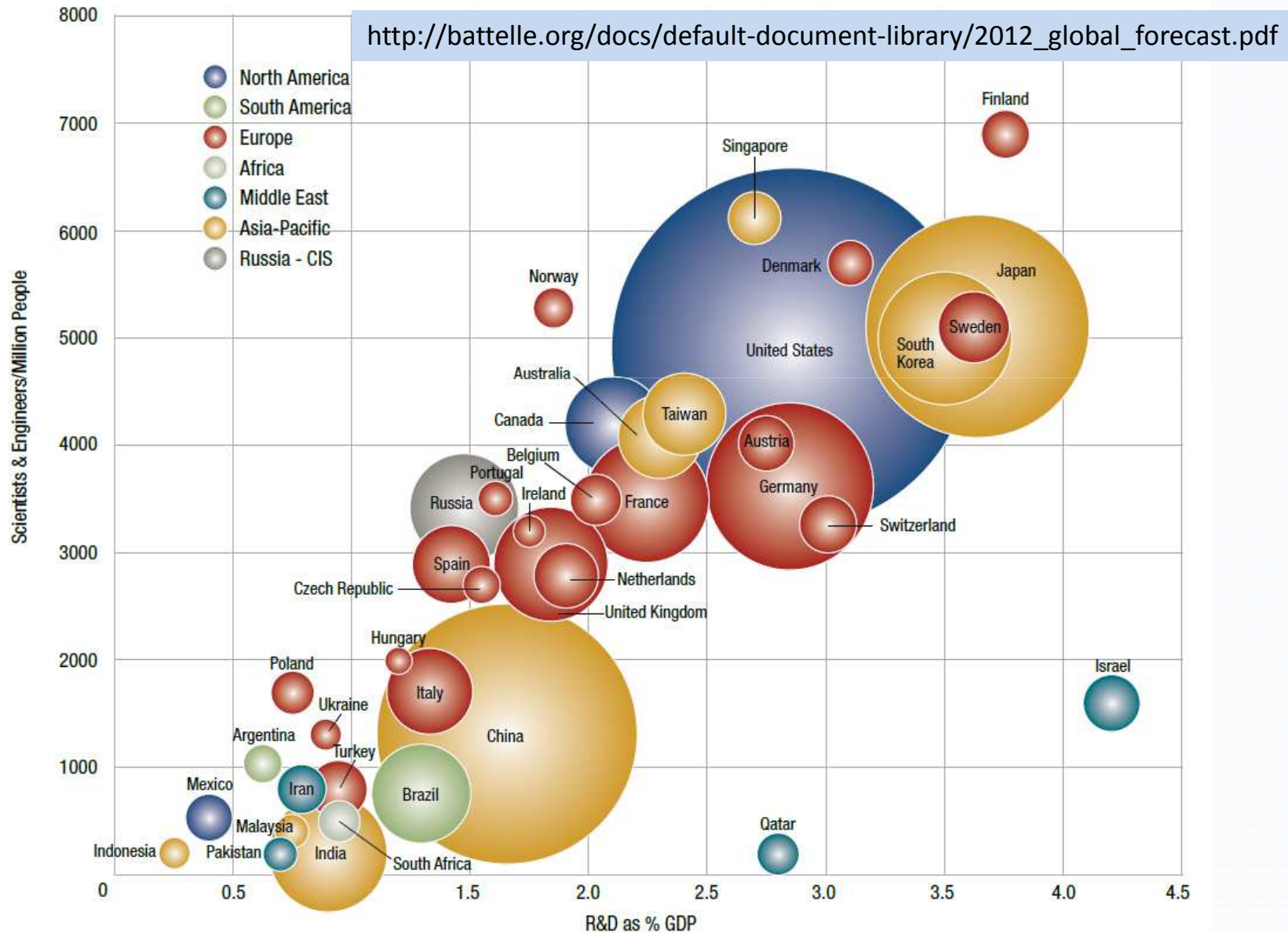
\* Brazil: estimate for 2010

Sources: National Main Science and Technology Indicators, 2009/1 - OECD; Brazil: MCT; Chile and India: World Development Indicators, 2008 - The World Bank

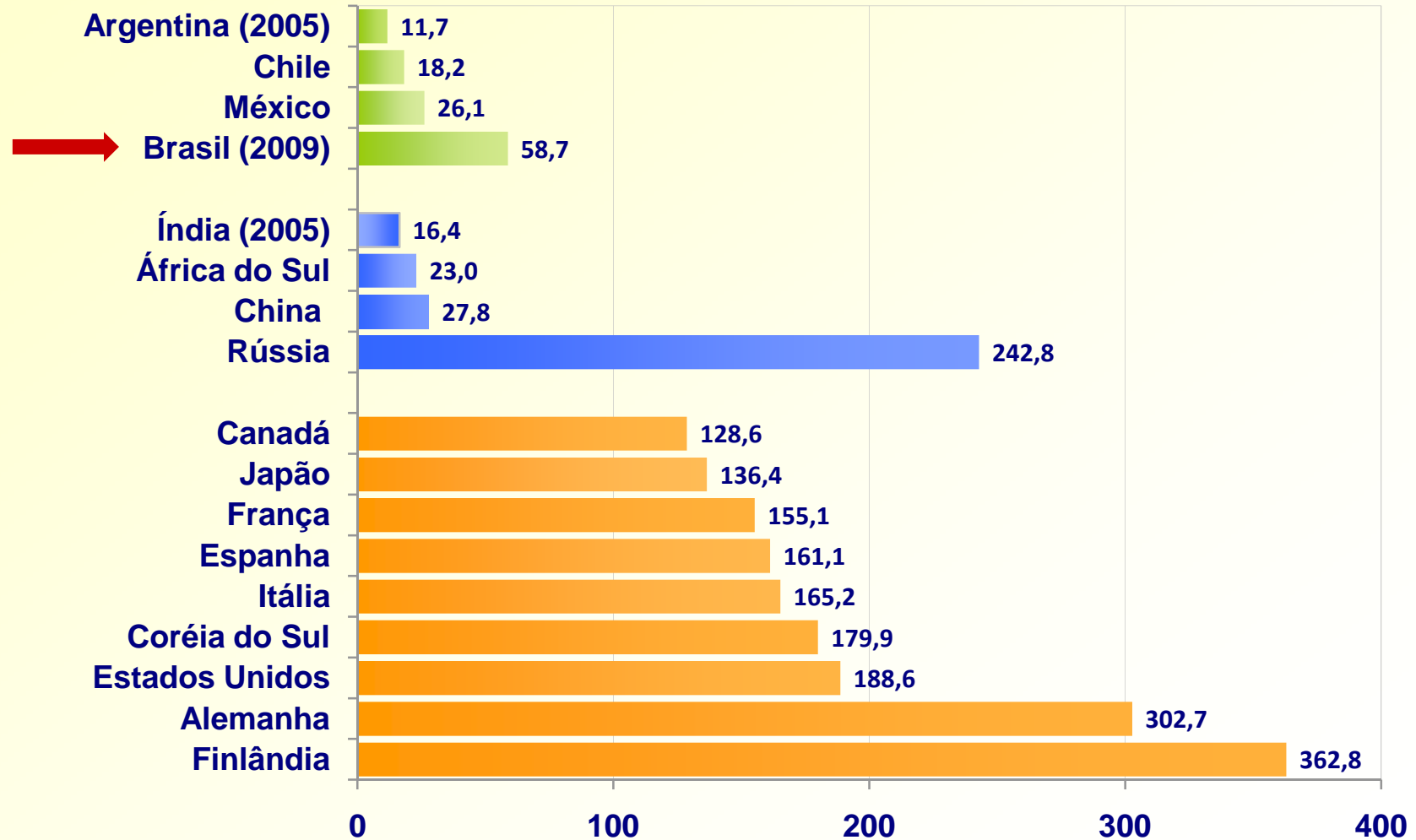
# Scientists & Engineers versus R&D Investment

## World of R&D 2012

Size of circle reflects the relative amount of annual R&D spending by the country noted.

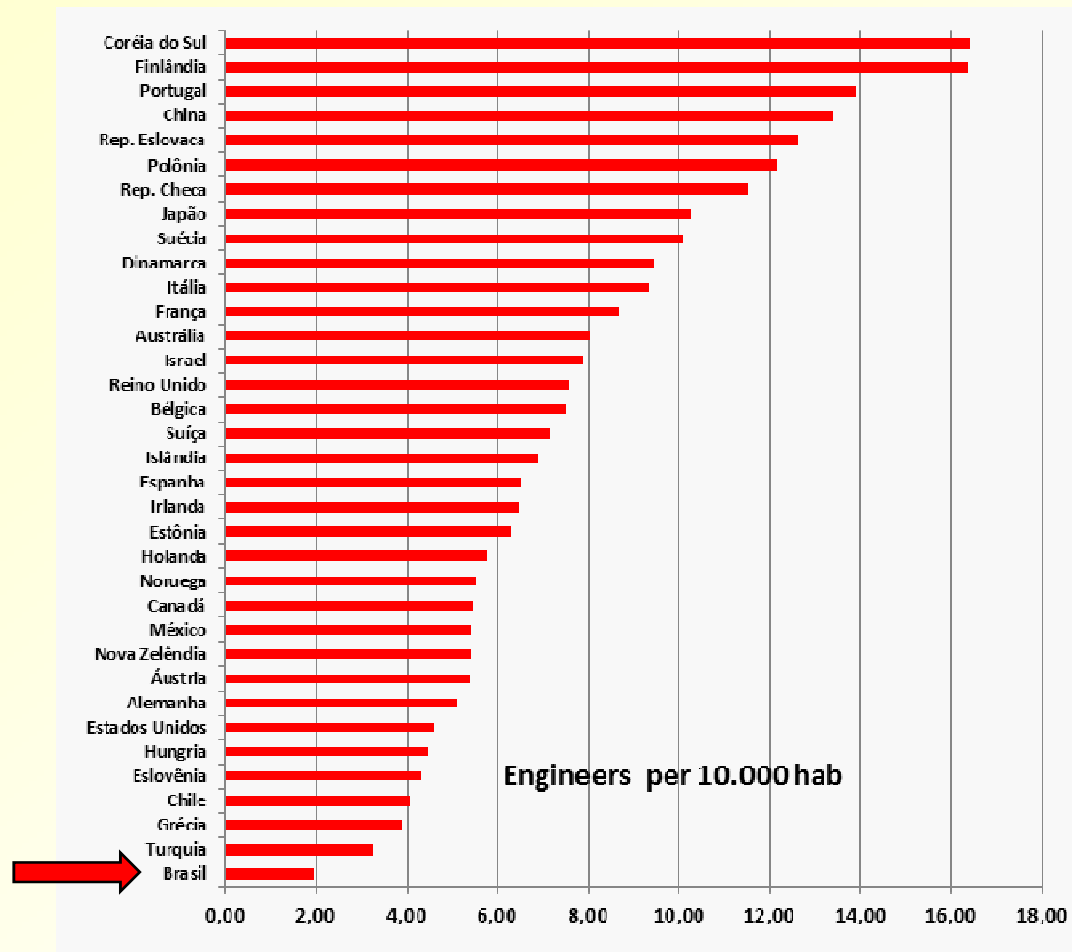


## Awarded doctoral degrees per million inhabitants: 2006 or most recent year



Sources: Capes/MEC and IBGE for Brazil; Science and Engineering Indicators – 2010 (data for 2006); U.S. Census Bureau, International Database

# Brazil needs Engineers !

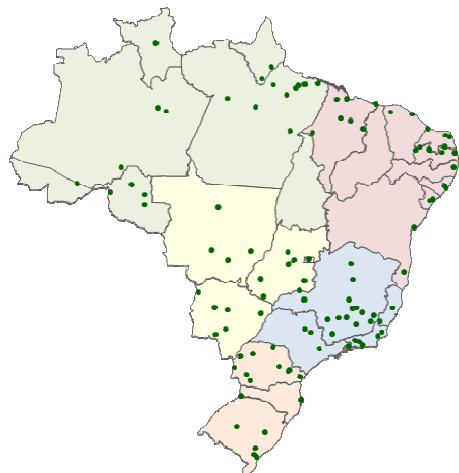


**Brazil: 1.95 Engineers per 10 thousand hab.**

# Decentralizing

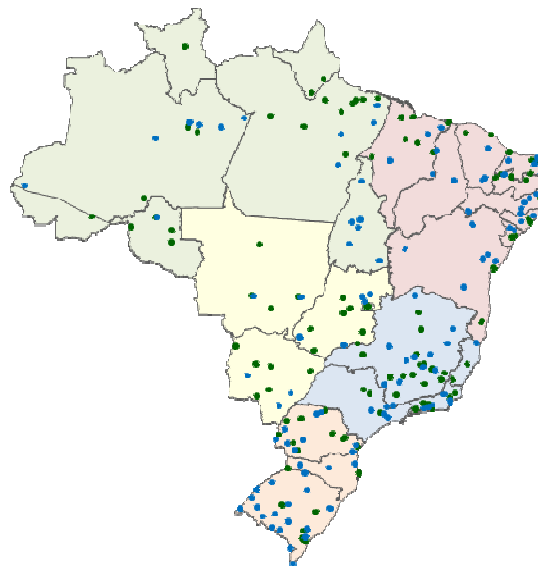
# Higher, Vocational and Technical Education

## Federal Universities:



**2002** (●)

**43** main campus  
**148** campi



**2010** (●)

**59** main campus  
**274** campi



**2014** (●) (forecast)

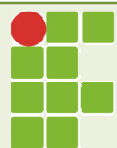
**63** main campus  
**321** campi



**2002**

**140** campi

INSTITUTOS FEDERAIS DE  
EDUCAÇÃO PROFISSIONAL E  
TECNOLÓGICA



**2010**

**345** campi

INSTITUTOS FEDERAIS DE  
EDUCAÇÃO PROFISSIONAL E  
TECNOLÓGICA



**2014** (forecast)

**362** campi

INSTITUTOS FEDERAIS DE  
EDUCAÇÃO PROFISSIONAL E  
TECNOLÓGICA

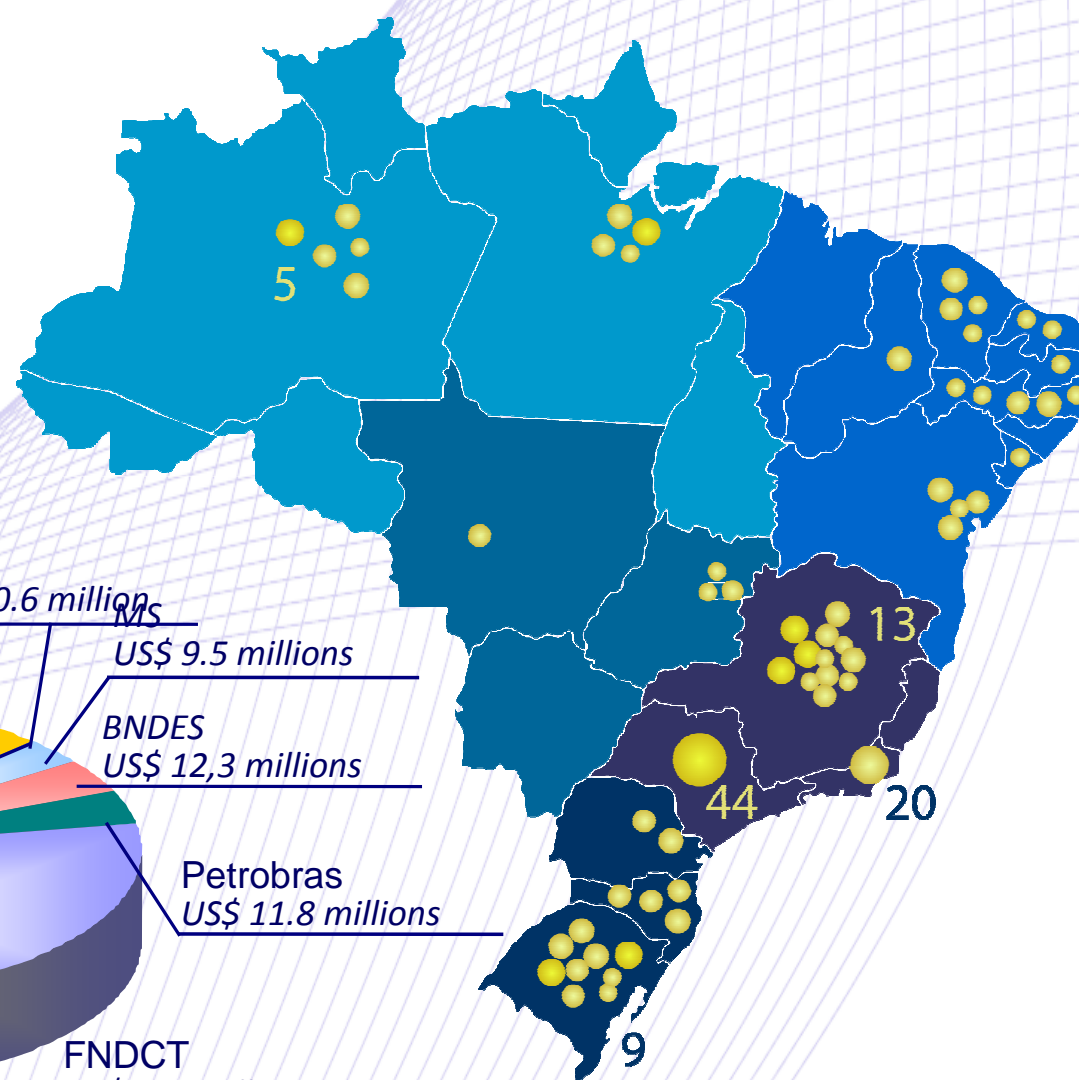




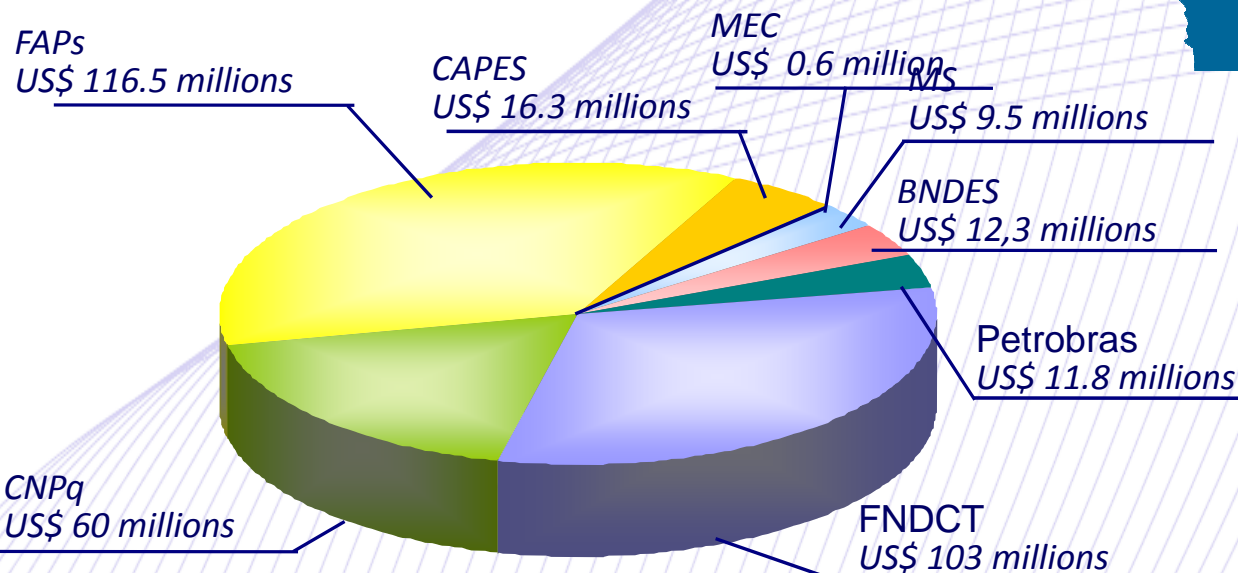
**INCT – National Institutes of Science and Technology**

**122**  
**inct**

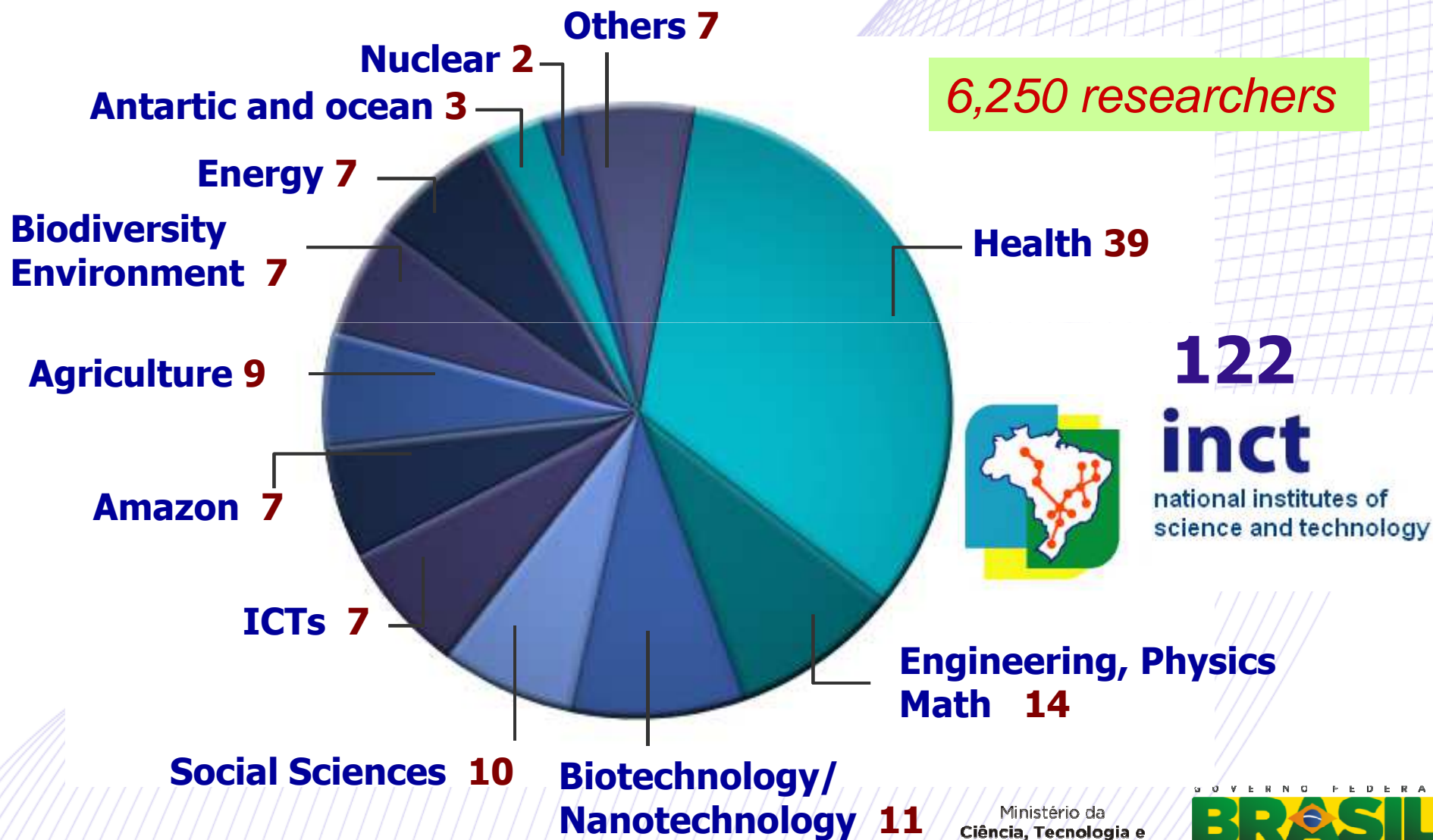
national institutes of  
science and technology



**US\$ 330 million**



## Areas of knowledge





# Structuring Initiatives

- ✓ National Institutes of Science and Technology;
- ✓ Sciences Without Borders;
- ✓ Legal Framework for Innovation;
- ✓ Inova Enterprise.



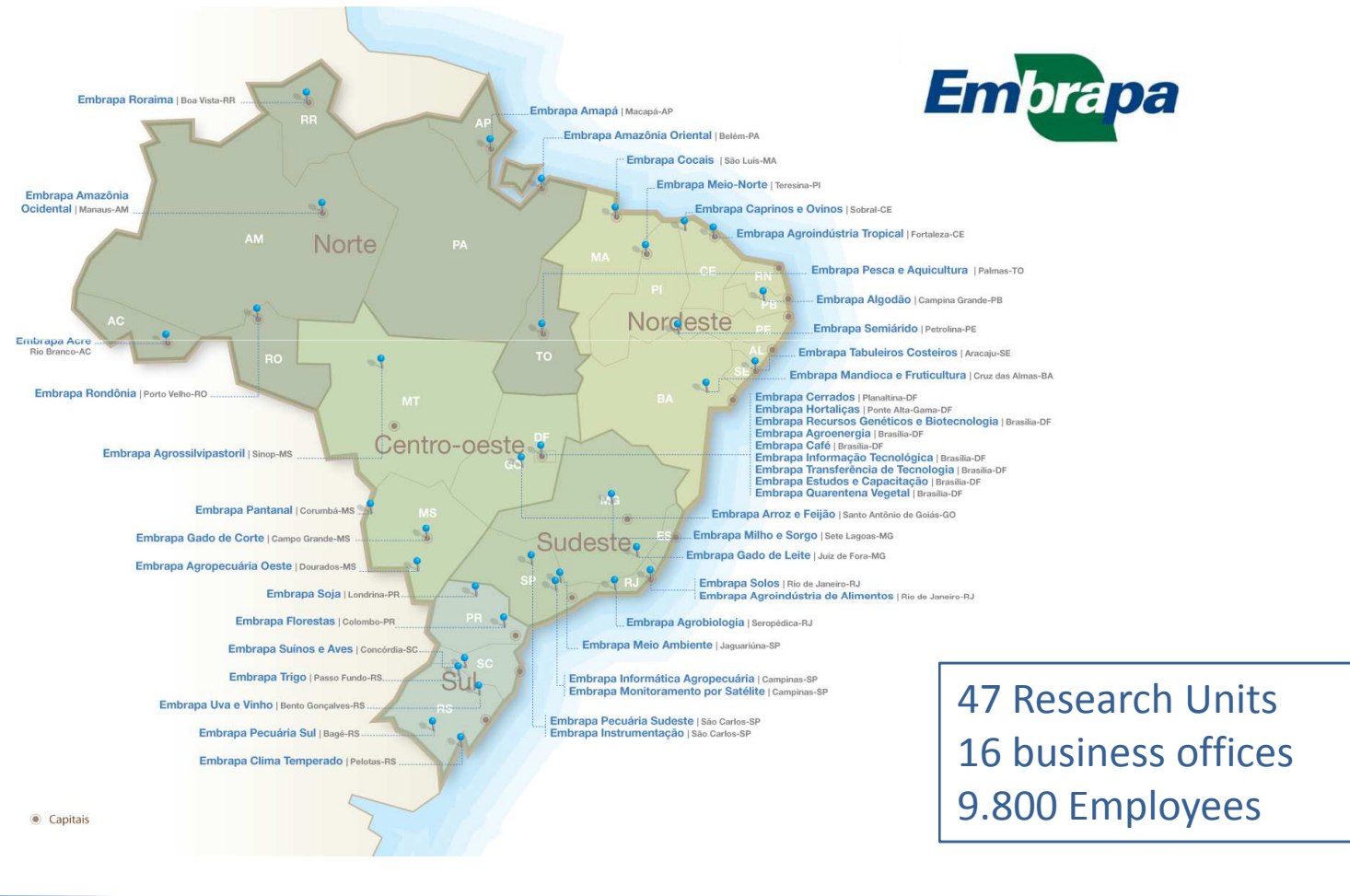
# Some Strategic Instruments

- ✓ Brazilian Initiative for **Nanotechnology**;
- ✓ Brazilian Networks for Technological Services and Innovation– **SIBRATEC**;
- ✓ **Incubators** and **Science Parks**;
- ✓ Brazilian Program for Industrial Research and Innovation – **EMBRAPII**.



# How to increase innovation in the Brazilian industry?

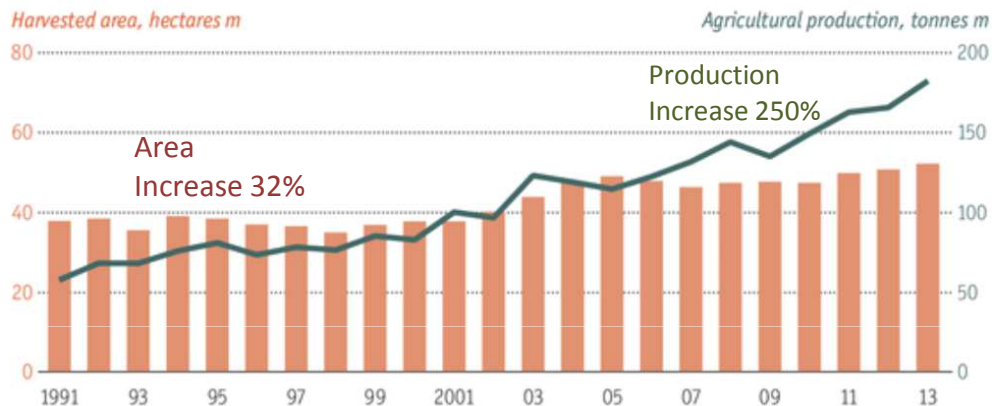
An Institution with large capillary all over the country and very attached to each regional identity.



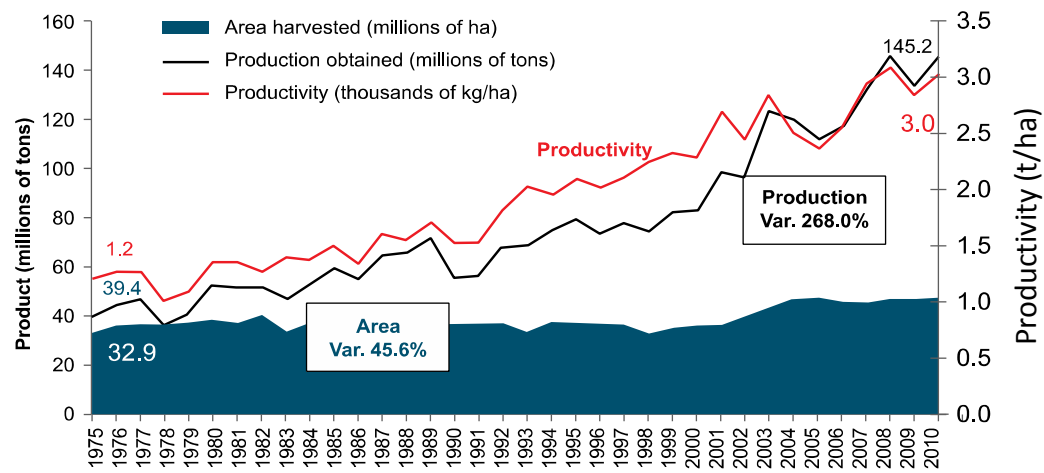
# How to increase innovation in the Brazilian industry?

The search for a R&D model able to produce productivity impact similar as the one made by **EMBRAPA** to our agricultural business was the **basic inspiration for EMBRAPII**

## More fruitful



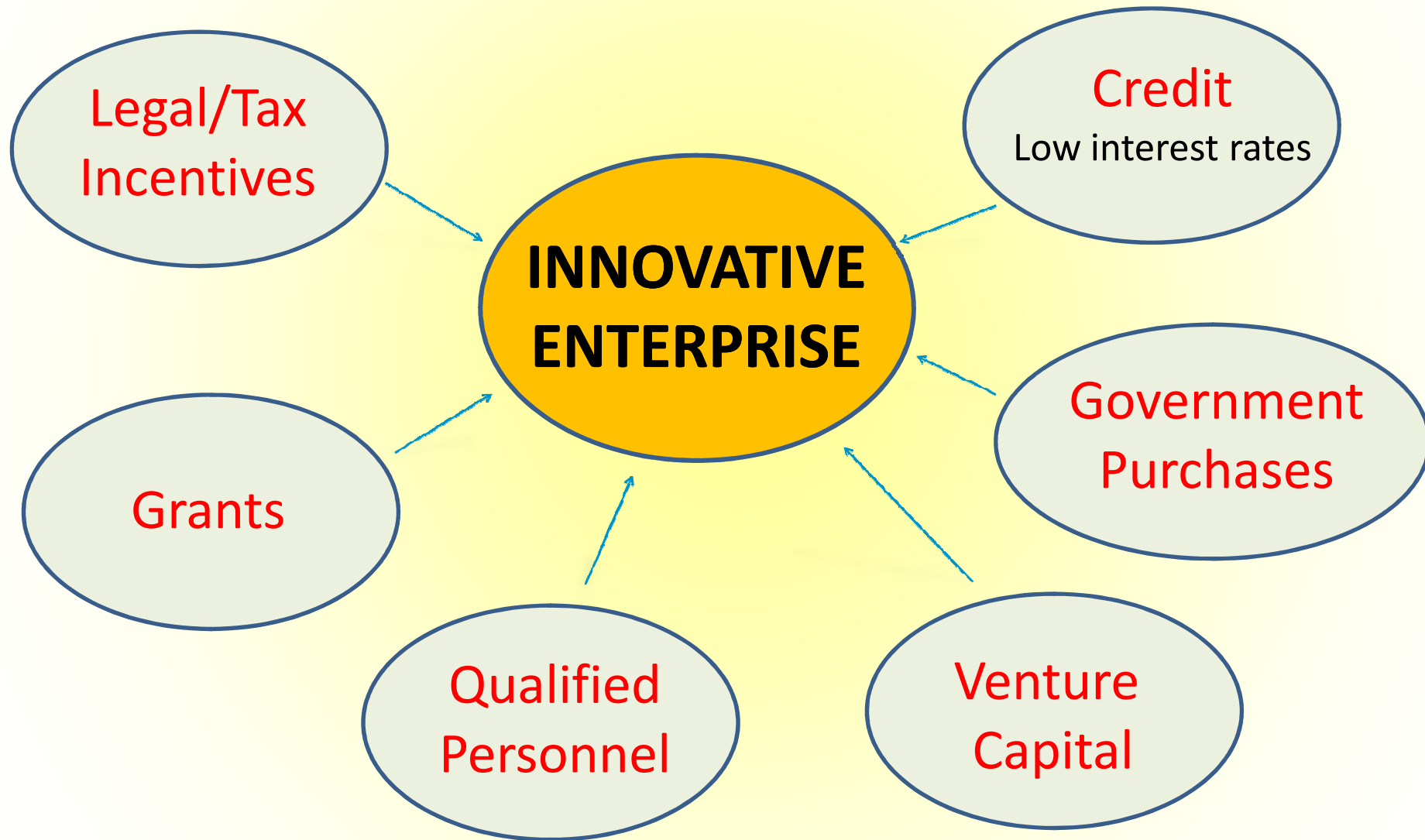
Source: Ministry of Agriculture



**Embrapii**

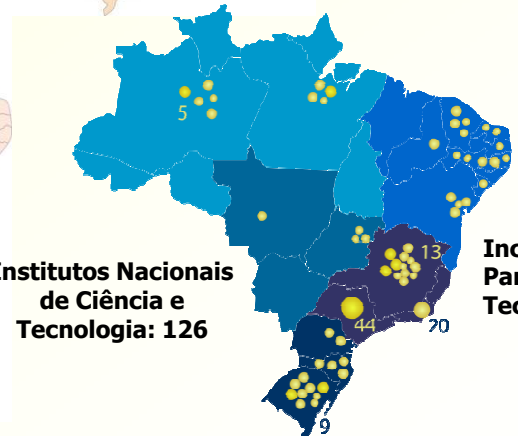
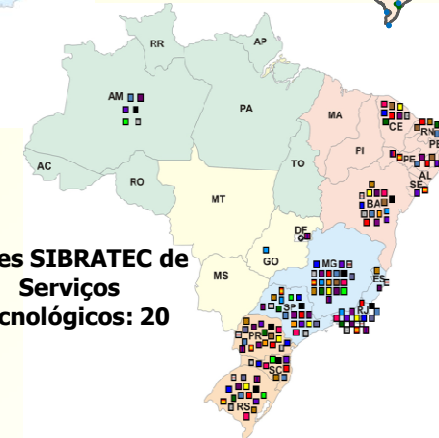
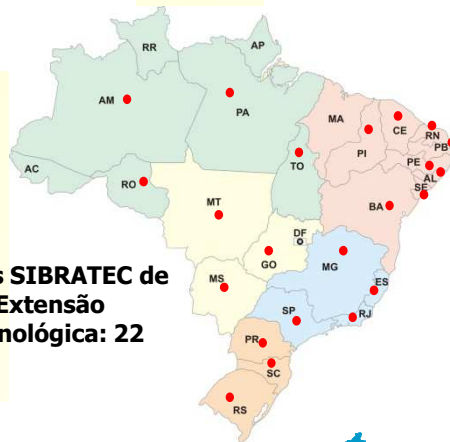
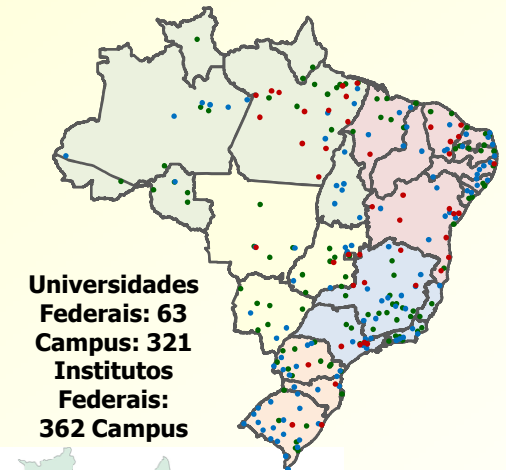
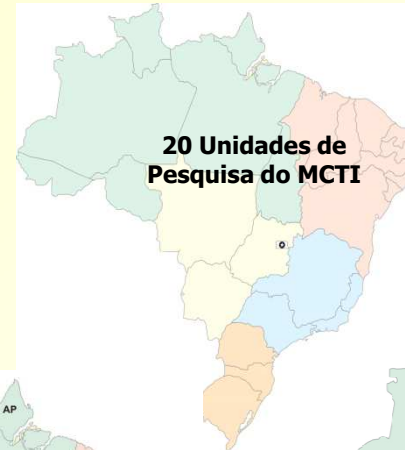
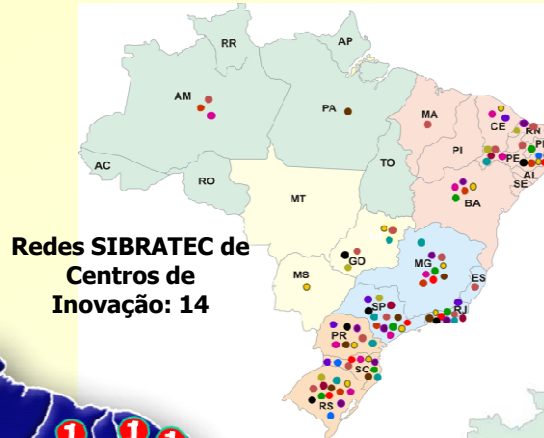
Sources: The Economist Sep. 2013, Embrapa and Ministry of Agriculture

# INSTRUMENTS TO SUPPORT S,T&I





# Some National Networks



# Brazil: Attractive Partner

- ✓ Move to become the world 5<sup>th</sup> economy;
- ✓ Strong investment in education, science and technology;
- ✓ Stable economy and democracy;
- ✓ No internal and external conflicts;
- ✓ Good university system.



**Thank you !**

