



RESEARCH, DEVELOPMENT AND INNOVATION TO TROPICAL AGRICULTURE

Lucio Brunale

Technology Transfer Department

May 2012



Ministry of
Agriculture, Livestock
and Food Supply



Brazilian Agriculture

»»»» Food, fibers and energy production

Brazil	Million(km²)	%
Total area	8.5	100
Preservation	4.6	54
Urban areas	0.2	2
Agriculture	2.7	31
Areas to expand	1.0	12



Ministry of
Agriculture, Livestock
and Food Supply



Brazilian Agriculture

»»»» Brazilian Agricultural Contribution

- 28% GDP
- 37% Labor
- 42% Exports

»»»» Brazil

- » 3rd largest world exporter: US\$ 76 billion (2010)
- » Largest world exporter of beef, coffee, sugar, orange juice, ethanol and poultry in 2010

Source: IBGE, Conab and MDIC.



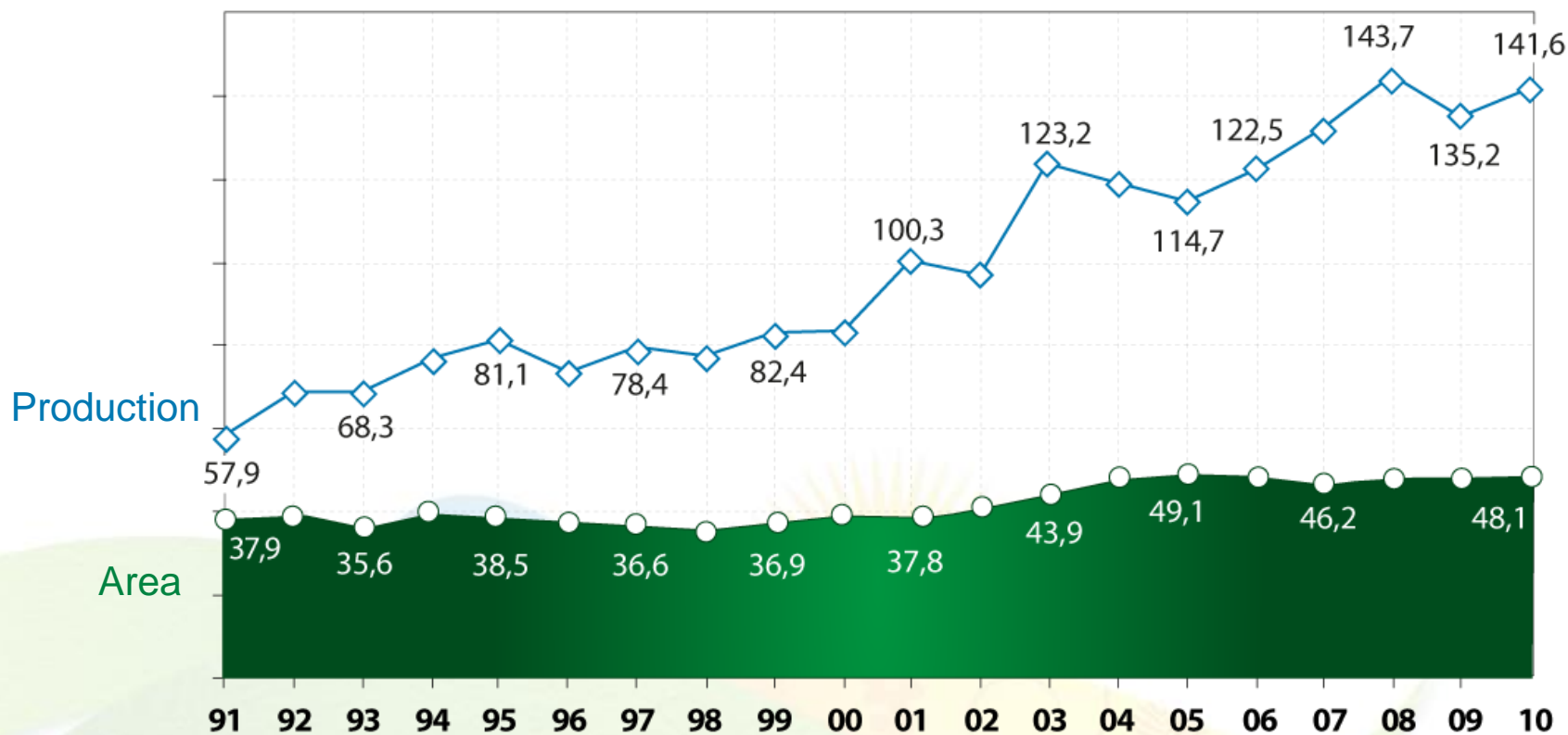
Ministry of
Agriculture, Livestock
and Food Supply



Brazilian Agriculture

➤➤➤ Growth of Agricultural Productivity - Grains

Grain production/area (million tons & ha)



Source: Conab.



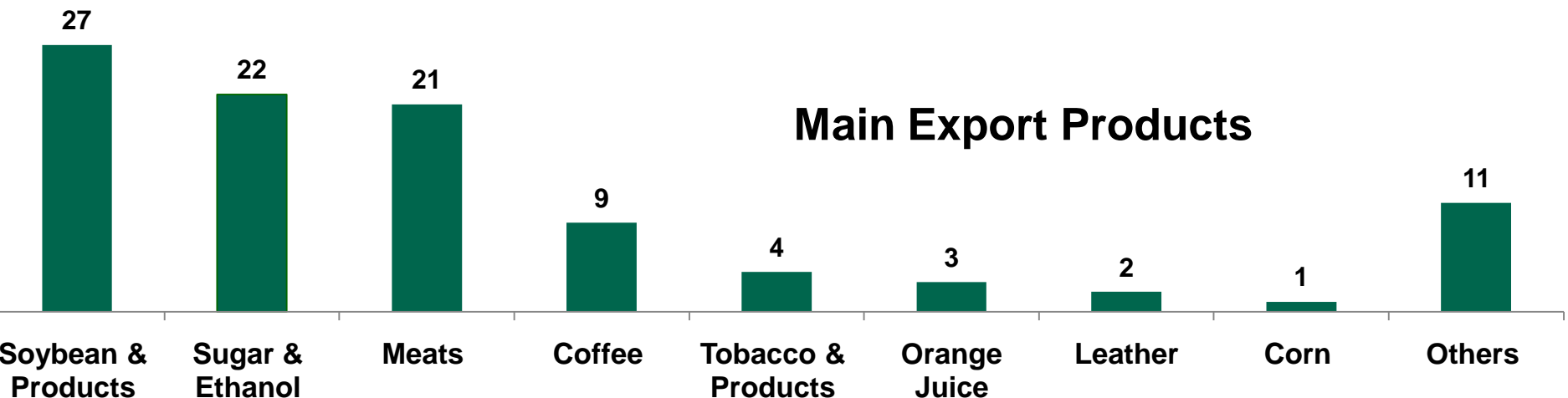
Ministry of
Agriculture, Livestock
and Food Supply



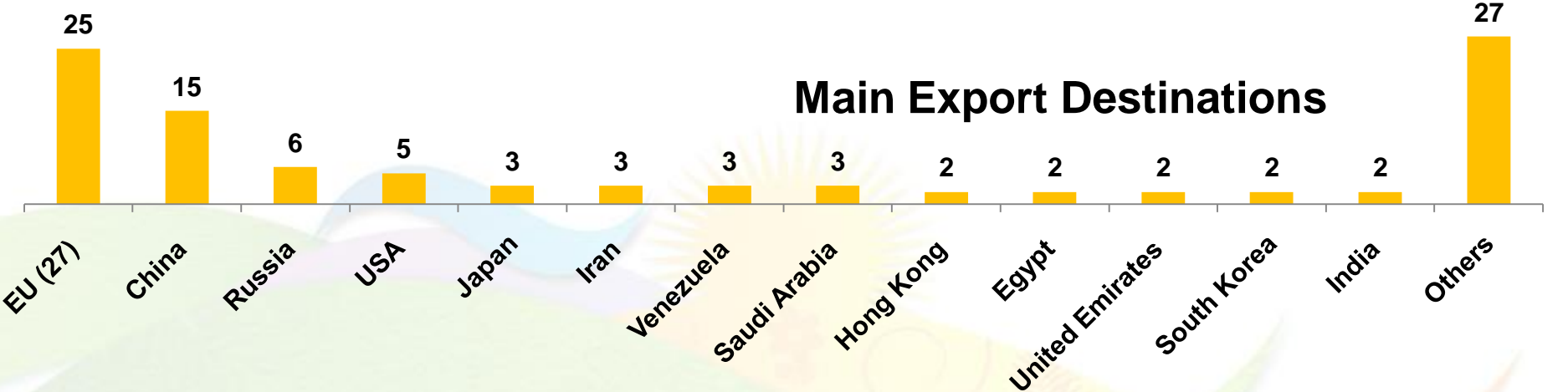
Brazilian Agriculture – 2010

Exports – 76 billion – Net surplus 63 billion

Main Export Products



Main Export Destinations



Source: Ministry of Development, Industry and Trade and Ministry of Agriculture Livestock and Food Supply, 2011



Ministry of Agriculture, Livestock and Food Supply



Brazilian Science and Technology in Agricultural Research

»»»» NARS - National Agricultural Research System

- » Private companies
- » 17 Public State Agricultural Research Organizations
- » Public Universities
- » Private Universities
- » Funding agencies (CNPq, Finep, Capes, FAPs...)
- » **Embrapa**

»»»» Total Investment in S&T: 1% of GDP

Source: Ministry of Science and Technology and CNPq.



Ministry of
Agriculture, Livestock
and Food Supply



Tropical Agriculture

»»»» Achievements and NARS's contributions

- » Fibers and wood (Cotton, *Eucalyptus*)
- » Tropical grasses (*Brachiaria*)
- » Biotechnology
- » Agriculture in the Cerrado
- » Biological pest control
- » Nitrogen fixation
- » No-tillage system
- » Animals and plants under tropical conditions
- » Tropical and temperate horticulture
- » Zebu cattle
- » Poultry
- » Soybean production (Photoperiodism)
- » Integrated Crop-Livestock-Forest-Systems (ICLFS)



Ministry of
Agriculture, Livestock
and Food Supply



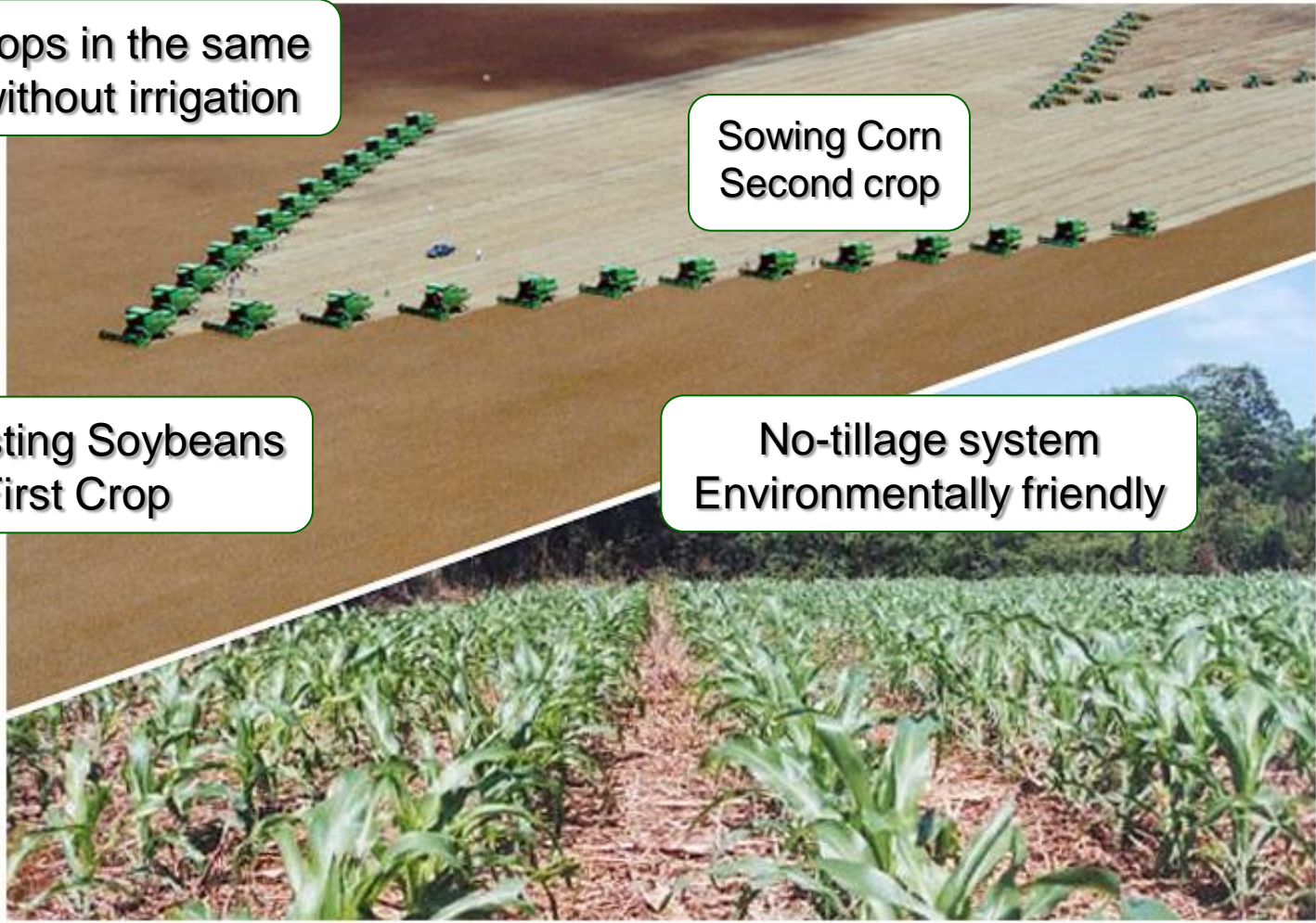
No-tillage System

Two crops in the same year without irrigation

Sowing Corn
Second crop

Harvesting Soybeans
First Crop

No-tillage system
Environmentally friendly



Ministry of
Agriculture, Livestock
and Food Supply



Embrapa

»»»» Mission

To design research, development and innovation solutions for the biodiversity of Brazilian agriculture and the benefit of the Brazilian society.

»»»» Institutional Profile

- » Established in **1973**
- » ~ **9,600** employees (~2,400 researchers, from those ~2,000 are PhD researchers)
- » 2011 Budget: ~**US\$ 1 billion**
- » **47** Research Centers and Services



Ministry of
Agriculture, Livestock
and Food Supply



Embrapa's Centers

- » Headquarter
- » National Thematic Centers
- » National Product Centers
- » Agroforestry and Ecoregional Centers
- » Services



Ministry of
Agriculture, Livestock
and Food Supply

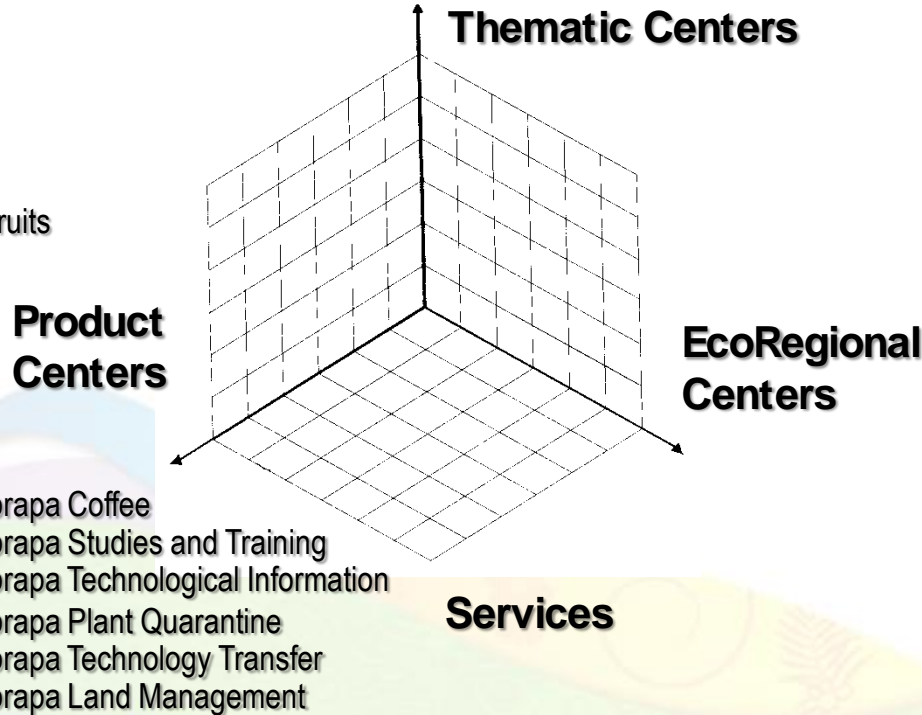


The Brazilian Agricultural Research Organization



1. Embrapa Cotton
2. Embrapa Fisheries and Aquaculture
3. Embrapa Rice & Beans
4. Embrapa Goats & Sheep
5. Embrapa Cocais
6. Embrapa Forestry
7. Embrapa Beef Cattle
8. Embrapa Dairy Cattle
9. Embrapa Vegetables
10. Embrapa Cassava & Tropical Fruits
11. Embrapa Maize & Sorghum
12. Embrapa Soybean
13. Embrapa Swine and Poultry
14. Embrapa Wheat
15. Embrapa Grape & Wine

1. Embrapa Agrobiology
2. Embrapa Agroenergy
3. Embrapa Food Technology
4. Embrapa Tropical Agroindustry
5. Embrapa Agriculture Informatics
6. Embrapa Agricultural Instrumentation
7. Embrapa Environment
8. Embrapa Satellite Monitoring
9. Embrapa Genetic Resources & Biotechnology
10. Embrapa Soils



1. Embrapa Coffee
2. Embrapa Studies and Training
3. Embrapa Technological Information
4. Embrapa Plant Quarantine
5. Embrapa Technology Transfer
6. Embrapa Land Management

1. Embrapa Acre
2. Embrapa Western Region Agriculture
3. Embrapa Agrosilvopastoral
4. Embrapa Amapá
5. Embrapa Western Amazonia
6. Embrapa Eastern Amazon
7. Embrapa Cerrados
8. Embrapa Temperate Agriculture
9. Embrapa Mid-North
10. Embrapa Pantanal
11. Embrapa Southeast Livestock
12. Embrapa South Livestock
13. Embrapa Rondônia
14. Embrapa Roraima
15. Embrapa Tropical Semi-arid
16. Embrapa Coastal Tablelands



Ministry of
Agriculture, Livestock
and Food Supply



International Cooperation

»»»» International Partnerships

- » Bilateral agreements: **78**
- » Countries: **56**
- » Institutions: **89**
- » Multilateral agreements: **20**

»»»» Scientific Cooperation

- » *Labex United States*:.....USA
- » *Labex Europe*:..... France, United Kingdom and Germany
- » *Labex Korea*:.....South Korea
- » *Labex China*:.....China
- » *Labex Japan*:.....Japan

»»»» Technical Cooperation

- » *Embrapa Africa* : TTxTC Projects (Ghana, Mozambique, Mali, Senegal)
- » *Embrapa Americas* : TTxTC Projects (Panama and Venezuela)

* TTxCT Projects = Technical Transfer Projects x Technical Cooperation Projects



Ministry of
Agriculture, Livestock
and Food Supply



Virtual Laboratories and Embrapa Projects Abroad



● Embrapa Virtual Laboratories

● Embrapa Projects Abroad



Ministry of Agriculture, Livestock and Food Supply



INNOVATION MANAGEMENT SYSTEM

ADM (Hum. Res., Mat. & Log. Res. & Fin. Res.)

Legal Process

Research & Development

Strategic Intelligence

Partnerships

Networking

Intellectual Property

**INNOVATION MANAGEMENT
EMBRAPA**

Communication

Information Security

Business Ventures

Knowledge & Information Management



Ministry of
Agriculture, Livestock
and Food Supply



Technology Transfer

Established in May, 2010, the Department of Technology Transfer works on planning, coordinating and evaluating all processes of Technology Transfer and market relations, focusing in agriculture sustainability.



Ministry of
Agriculture, Livestock
and Food Supply



Technology Transfer

»»» Target Audience

- ✓ Private and Public Companies
- ✓ Public and Private Extension Services
- ✓ Associations, Organisations and Rural Institutions
- ✓ Government
- ✓ Smallholders, Medium and Large Farmers



Ministry of
Agriculture, Livestock
and Food Supply



Technology Transfer Guidelines at Embrapa

»»» Structuring

- Prepare a new Technology Transfer policy
- Describe the process of TT and allocate responsibilities
- Establish internal and external governance of TT
- Capacity building e definition of professional profiles for TT
- To mobilize financial and material resources
- Integrate R&D and TT
- Strengthen public and private agencies of Rural Extension and technical assistance



Ministry of
Agriculture, Livestock
and Food Supply



Technology Transfer Guidelines at Embrapa

»»» Processes

- Identify States networks for TT
- Articulate Embrapa TT networks
- Identify demands for technological solutions
- Classify and organizing knowledge / technologies by demands
- Identify best practices and strategies for TT
- Stablish a TT agenda
- Assess impacts of technologies, strategies and programming
- Evaluate technological developments in micro-regions and territories
- Evaluate the efficacy of Technology Transfer's methods and strategies

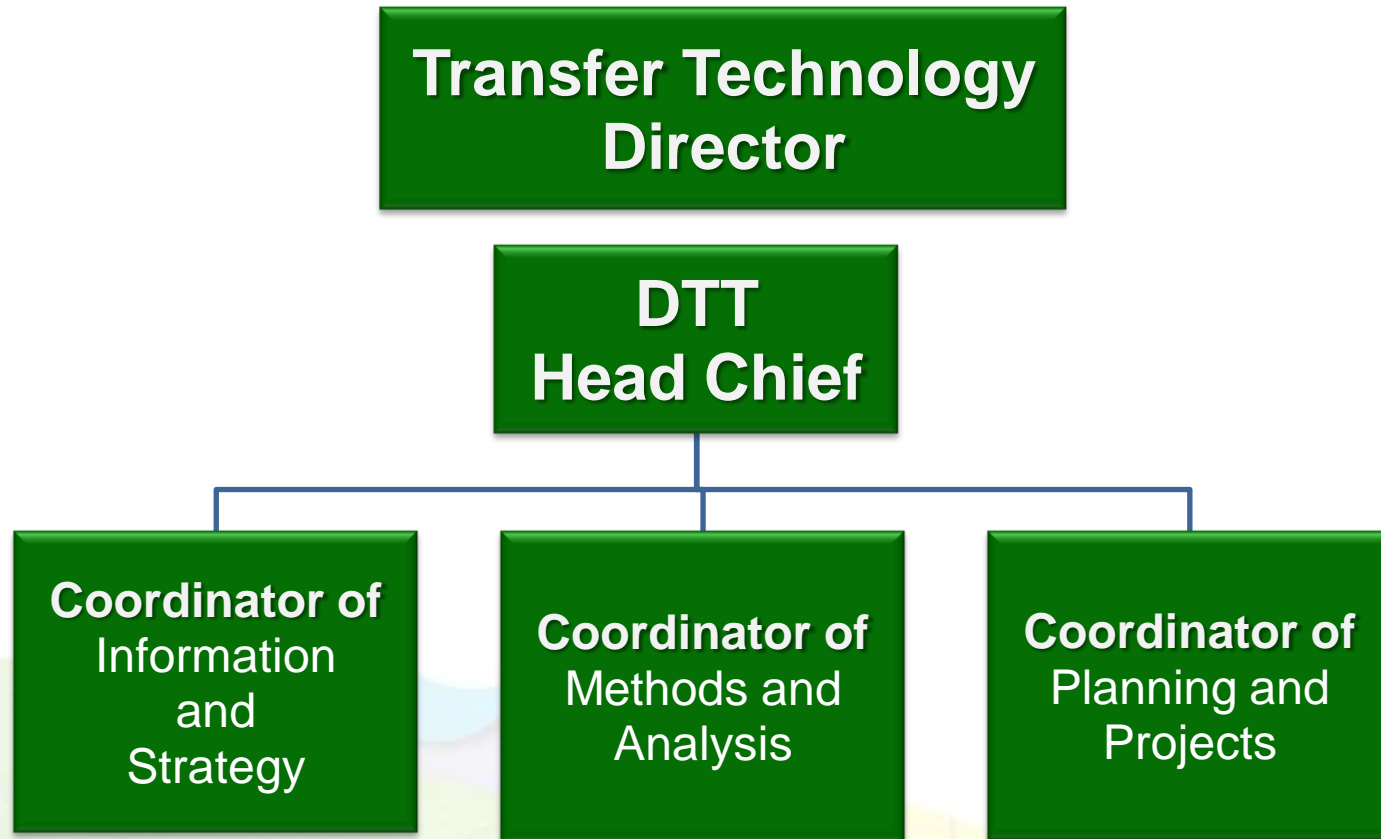


Ministry of
Agriculture, Livestock
and Food Supply



Technology Transfer

Headquarter

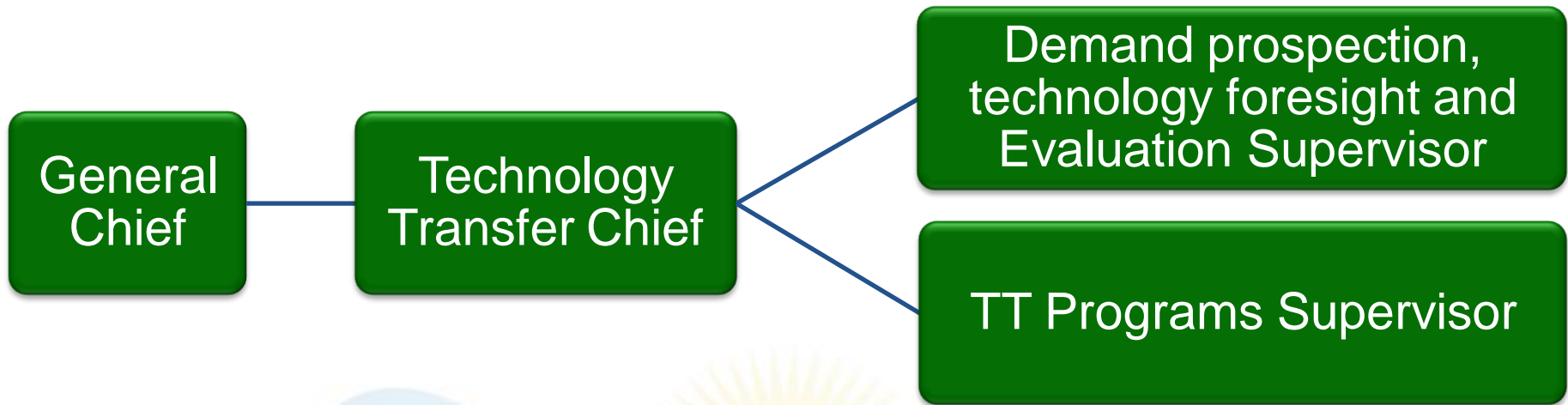


Ministry of
Agriculture, Livestock
and Food Supply



Technology Transfer

Embrapa's National Centers Structure



Embrapa Management System

- ✓ **Macroprogram 1** – Great national challenges;
- ✓ **Macroprogram 2** – Sectorial Competitiveness and Sustainability Setorial;
- ✓ **Macroprogram 3** – Incremental Technological Development of Agribusiness;
- ✓ **Macroprogram 4** - Technology Transfer and Business Communication;
- ✓ **Macroprogram 5** – Institutional Development;
- ✓ **Macroprogram 6** – Family agriculture development and Rural Sustainability support.



Ministry of
Agriculture, Livestock
and Food Supply



Technology Transfer

»»»» Macroprogram 4

- ✓ Partnerships Networks
- ✓ International Projects Included
- ✓ Focused in TT and Communication
- ✓ 211 projects



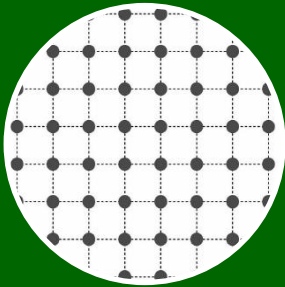
Embrapa

Ministry of
Agriculture, Livestock
and Food Supply

BRAZILIAN GOVERNMENT
BRASIL

Technology Transfer

Challenges



**COORDINATE 47
NATIONAL
CENTERS
STABLISHING A
NEW STRUCTURE
IN TT**



**BUILD NETWORKS
IN AND OUT SIDE
EMBRAPA S
AMBIENT**



**COORDINATE
BUDGET
PLANNING AND
STABLISH NEW
FUNDING
SOURCES**



TT Staff – National Centers

Region	Total of employees	% of total	Average staff	Number of farms	Number of municipalities
Mid-west	114	21,8%	11	317.478	466
South	88	16,8%	13	1.006.181	1.188
Southeast	115	21,9%	12	922.049	1.668
North	80	15,3%	11	475.775	449
Northeast	127	24,2%	16	2.454.006	1.794
TOTAL	524	100%	-	5.175.489	5.565



Ministry of
Agriculture, Livestock
and Food Supply



TT Staff – National Centers

Profile of TT Staff in the National Centers

Agronomics	29,96%	157
Technicians (High School)	20,61%	108
Administration	9,35%	49
Economics	4,20%	22
Biology	3,44%	18
Animal Science	3,24%	17
Library Science	2,86%	15
Veterinarian	2,48%	13
Journalism	1,72%	9
Language and Literature	1,72%	9
Forest Engineering	1,53%	8
Law	1,15%	6
Other graduations (57)	17,72%	93
TOTAL	100%	524

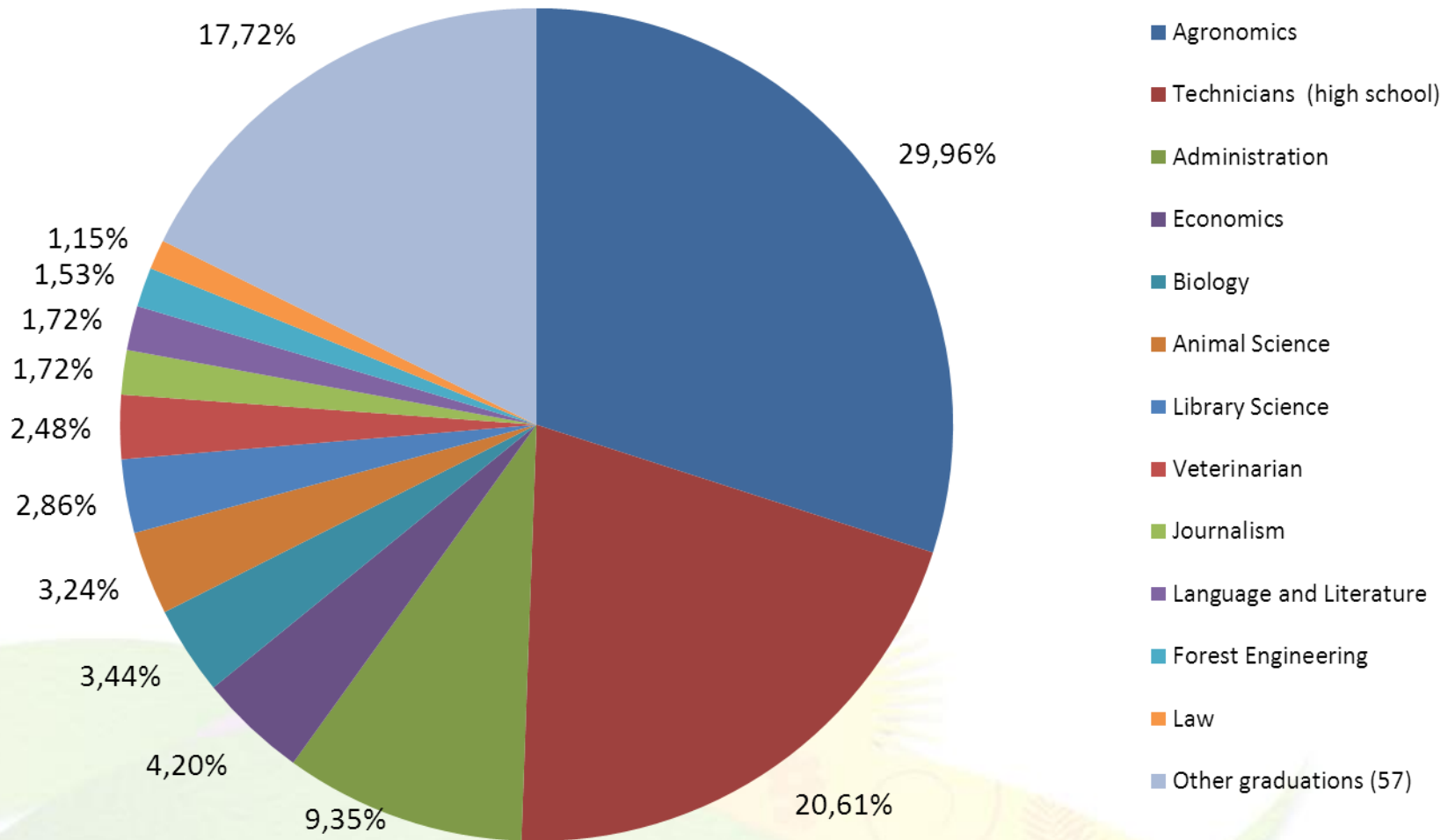
Source: Questionaries from 42 National Centers / 2011



Ministry of
Agriculture, Livestock
and Food Supply



TT Staff – National Centers



Source: Questionnaires from 42 National Centers / 2011



Ministry of
Agriculture, Livestock
and Food Supply



Technology Transfer

Business for Innovation

TT Models

- ✓ Licensing
- ✓ Incubation
- ✓ Development Partnership
- ✓ Knowledge transfer
- ✓ Consulting

Business Structure

Department of TT

Business Secretariat

Products & Market Service



Ministry of
Agriculture, Livestock
and Food Supply



Technology Transfer

Strategic Partnerships



- ✓ *Abimaq*
- ✓ *Vale*
- ✓ *Petrobras*
- ✓ *Itaipu Binacional*
- ✓ *Fundação Banco do Brasil*
- ✓ *Contag*
- ✓ *CNA-SENAR*
- ✓ *MAPA – Plano ABC*
- ✓ *MDA/MDS – Brasil sem Miséria*
- ✓ *MMA – PPCDAM*
- ✓ *Brazilian Cooperatives Organization - OCB*



Ministry of
Agriculture, Livestock
and Food Supply



Thank you!



Lucio Brunale

E-mail: chefia.dtt@embrapa.br