Embrapa and Tropical Agriculture Development

Silvio Crestana
Director-President
Dr. Norman Bourlaug stated: “the development of the Cerrado is one of the great achievements of agricultural science in the 20th century”, which, “has transformed a wasteland into one of the most productive agricultural areas in the world.”
The Building of Tropical Agriculture
Brazilian Tropical Agriculture: Today

Brazilian Major contributions to the World production - 2005

* Corn, rice and wheat

- Milk: 4.9%
- *Grains: 7.9%
- Beef: 15.2%
- Poultry: 15.9%
- Sugar: 18.8%
- Soybeans: 23.8%
- Sugar-cane: 27.0%
- Ethanol (billions liters): 35.4%
Brazilian Tropical Agriculture: Today

Economic and social impacts:

- Inward development
  increased Human Development Index
  higher income, education, health, and jobs

- Stable food supply

- Increased agricultural exports
  trade surpluses, diminished financial vulnerability
Brazilian Tropical Agriculture: before 1970's
Brazilian Tropical Agriculture: before 1970's

• Low Ag Production (few items)
• Low Productivity
• Yield Shortages, Food Supply Crisis
• Expensive Food, Inflation, Poverty
• Inadequate Ag Public Policies
• Lack of Specific Knowledge about Tropical Ag
• Institutional void (ag research, education, markets, midia and governmental agencies, etc)

THE TASK: TO MOVE FROM AGRICULTURE APPLIED TO THE TROPICS TO TROPICAL AGRICULTURE
What was done

• The needed public policies
• The needed tropical knowledge
• The needed institutional building
The needed public policies

• **AG CREDIT** - **LAND, TECHNOLOGY** (SEED, FERTILIZERS, AGROCHEMICALS, MACHINERY, EQUIPMENTS, IRRIGATION)

• **AG MARKET** - MINIMUM AG PRICES
  FOOD REGULATORY STOCKS

• **AG RISK INSURANCE**

• **AG RESEARCH & EDUCATION & EXTENSION**

• **INFRA-STRUCTURE**
  ROADS, STORAGE FACILITIES, ETC
The needed public policies

Building Research Capability 1974 - 2005

- The graph shows the growth in research capability from 1974 to 2005, with significant increases in BSc, MSc, and PhD levels over the years.

- Key milestones include:
  - 1974: BSc: 15, MSc: 36, PhD: 1
  - 1982: BSc: 89, MSc: 226, PhD: 162
  - 1990: BSc: 404, MSc: 298, PhD: 274
  - 1998: BSc: 1143, MSc: 1135, PhD: 1150

- The data indicates a steady increase in research capability across all levels, with BSc showing the highest growth in recent years.
The needed tropical knowledge

• Tropical plants and animals:
  soybeans (photoperiodism)
  tropical and adapted-temperate fruits
  zebu cattle and poultry, etc.
• Fibers and wood (cotton, *Eucalyptus*)
• N fixation
• No-tillage practices
• Sugarcane and ethanol
• *Cerrado* Agriculture
The needed tropical knowledge

**Cerrado Agriculture: Contribution to Brazilian Production (2004-2005)**

The chart shows the contribution of different agricultural products from the Cerrado region in Brazil between 2004 and 2005. The products and their contributions are:

- Soybeans: 60%
- Corn: 44%
- Beans: 45%
- Rice: 37%
- Sorghum: 81%
- Cotton: 89%
- Coffee: 59%
- Meat: 55%

The chart indicates that cotton and sorghum contribute the most to the Cerrado's agricultural production, with 89% and 81% respectively. Sorghum, cotton, and coffee show the highest contributions among the listed products.
The needed institutional building

• The Ag Graduation Net
• The Ag Research Network
• The organization of Ag Production Chains
• The modern Tropical Agroindustry
• The new ways of marketing
  (trading companies, commodities future exchange, etc)
The needed institutional building

Embrapa’s Innovation Network

North
- Embrapa Acre
- Embrapa Amapa
- Embrapa Western Amazonia
- Embrapa Eastern Amazon
- Embrapa Rondônia
- Embrapa Roraima

Northeast
- Embrapa Mid-North
- Embrapa Tropical Semi-arid
- Embrapa Coastal Tablelands
- Embrapa Goats
- Embrapa Cassava & Tropical Fruits
- Embrapa Cotton
- Embrapa Tropical Agroindustry

Midwestern
- Embrapa Western Region Agriculture
- Embrapa Rice & Beans
- Embrapa Coffee
- Embrapa Cerrados
- Embrapa Beef Cattle
- Embrapa Vegetables
- Embrapa Pantanal
- Embrapa Genetic Resources & Biotechnology
- Embrapa Technological Information

Southeast
- Embrapa Agrobiology
- Embrapa Food Technology
- Embrapa Dairy Cattle
- Embrapa Agriculture Informatics
- Embrapa Agricultural Instrumentation
- Embrapa Environment
- Embrapa Maize & Sorghum
- Embrapa Satellite Monitoring
- Embrapa Cattle-Southeast
- Embrapa Soils

South
- Embrapa Temperate Agriculture
- Embrapa Forestry
- Embrapa South Animal Husbandry & Sheep
- Embrapa Soybean
- Embrapa Swine & Poultry
- Embrapa Wheat
- Embrapa Grape & Wine
Tropical Agriculture: a fine case of international scientific cooperation

THE REVOLUTION AND SOME OF ITS HEROES
Dr. Colin McClung, Dr. Edson Lobato and their ways...
(R&D cooperation, technology transfer and public policies)

Dr. Alysson Paolinelli...
(ag education, public policies, Ag laws,
business leadership and consulting, etc)

AND...
Dr. Norman Borlaug (a supportive action on R&D)
Tropical Agriculture: Challenges for the future
The global technological divide

Technology innovators have 10 patents or more per million population in 1997.
Technology adopters have high-tech exports of at least 2 percent of GDP in 1997.
Based on country data for 1997. Some sub-country regions are shaded where the criteria are judged likely to be met.

Center for International Development, 2000
Tropical Agriculture: Challenges for the future

Ten major challenges for mankind in the coming 50 years

2003: 6.3 billion people
2050: 10 billion people

Energy  Education
Water  Democracy
Food  Population
Environment  Diseases
Poverty  Terrorism & War

(Nobel Prize winner Alan MacDiarmid. at Embrapa. São Carlos. SP. on April 2005)
Brazil: Responsability to feed the world

World projections for soybeans and corn

Source: Bunge.
Tropical Agriculture: Challenges for the future

Environmental Degradation

Globally
40% cultivation areas already degraded
20 to 30% forests already cut down
40% of fish reserves already explored
70% of the water is used on irrigation

Climate Changes
Temperature increases will affect tropical agriculture.
Tropical Agriculture: Challenges for the future

Sustainable Utilization of Altered Areas
Humid Forests Sustainable Use
Biotic and Abiotic stresses
Crop-Pasture-Forest Integration
Public Private Partnerships
Bioenergy (ethanol, biodiesel): Embrapa Agrienergy
North-South-South Dialogue: Embrapa Africa
Crop-Livestock-Forest Integration
“Eventually, the Cerrado technology or one similar to it, will move into the llanos in Colombia and Venezuela and hopefully, into central and southern Africa where similar soil problems are found”.

“This will bring tens of millions of previously marginal acres into high-yield agriculture. Hundred of millions of people will benefit from their work.”
Life or Science is about:
5% inspiration
95% transpiration

So, it’s time to translate rhetoric into action!

Einstein’s advice
Tropical Agriculture: a fine case of international cooperation

- Labex USA
- Labex Europe
- Embrapa Africa

Input C&T
Output C&T
It’s time to build a more equitable world society based on sustainable Development, Democracy and Peace!
Thank you!

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