

A view on the brazilian support schemes for research and development

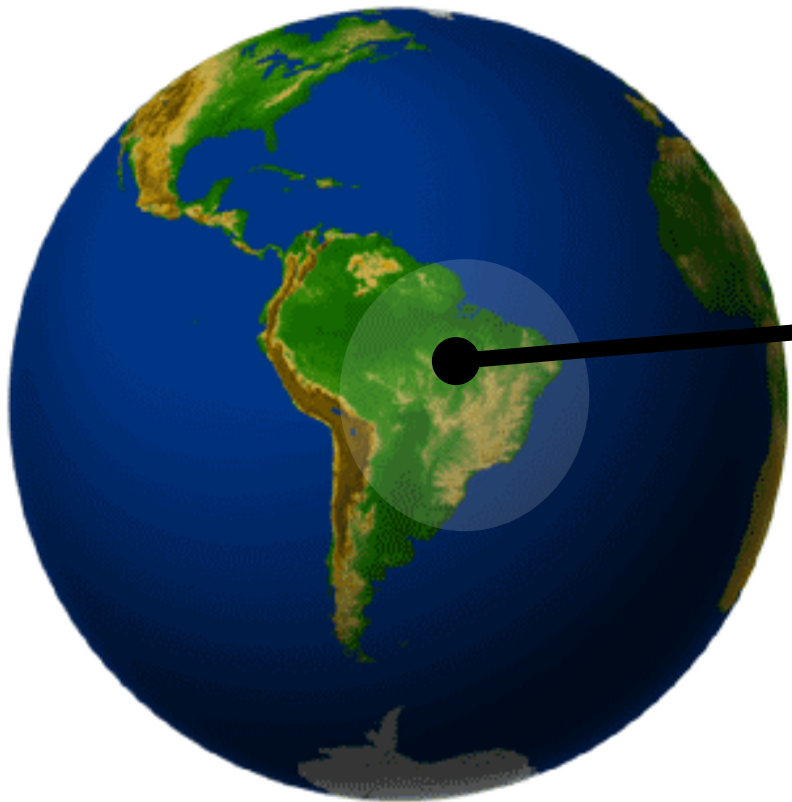


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ACOFI meeting, September, 2009

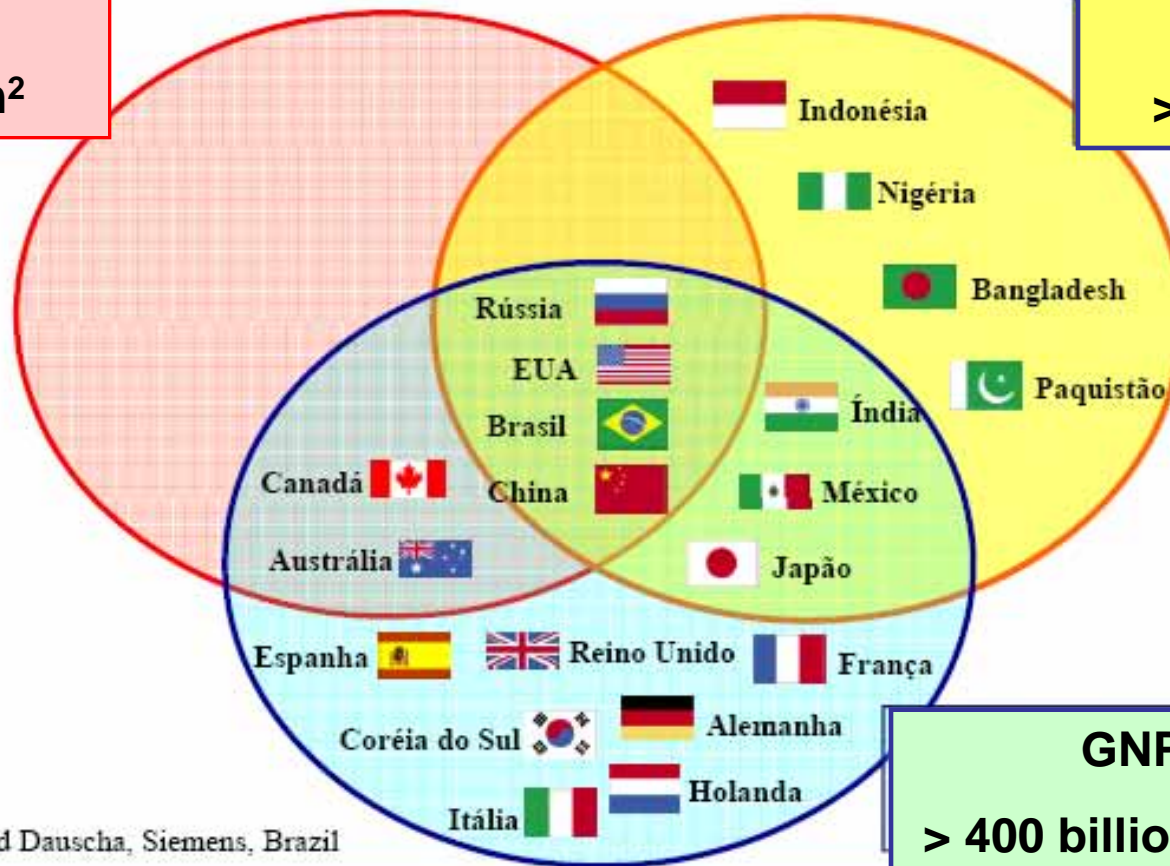
BRAZIL: population 192 million, 10th GNP, surface: 8,514,876 km²



Land, population, GNP strategic combination

Surface
> 4 million km²

Population
> 100 million



GNP
> 400 billion USD

Borrowed from Ronald Dauscha, Siemens, Brazil

BRAZIL: facts and figures (1)

	Year	
GDP 1X10 ⁹ USD PPP	2008	1.994
GDP growth	2008	5.1%
Agriculture GDP	2008	5.5%
Industrial GDP	2008	28.7%
Services GDP	2007	65.8%
Population	2008	~192x10 ⁶
Population growth	2008	1.2%
GDP per capita (USD PPP)	2008	10,551

BRAZIL: Facts and figures (2)

	Year	
School enrollment, fundamental, ages 7-14	2006	97.6%
School enrollment, high school, ages 15-18	2006	40.0%
Higher education enrollment, ages 18-24	2007	15.0%
Scientific papers published	2008	30,145 ¹
Doctoral degrees (graduate)/year	2008	9,919 ²
Patents	2007	384 ³

(1) 2.12% of the world production – 13th in the ranking

(2) 1.2% employed in industries

(3) 24th in the world patents ranking

Brazilian graduate system (2009)

Ø 44,055 teaching staff**

Ø 150,121 students (end of 2008**)

- 97,371 M.Sc. e M.Prof. students

- 52,750 doctoral students

Ø 49,081 scholarships***

- 31,528 M.Sc. students

- 17,553 doctoral students

*Source: Programas Recomendados e Reconhecidos. Available at: <http://www.capes.gov.br/cursos-recomendados>. (04/05/2009).

**Source: Coleta 2008.

***Source: Student inventory. at 11 , May 2009.

Challenges in fostering the innovation system

- Increase the number of scientists in industries
 - ~23% of Brazilian scientists in industry (<20,000) as compared to:
 - USA: 790,000 = 80% of the total scientists
 - South Korea: 94,000 = 54% of total scientists
- R&D in companies has to be increased
 - Petrobras: 11th in oil sector R&D
 - Embraer: 17th in aerospace R&D
 - Embrapa: agrobusiness driver (led Brazil to be 1st in soy productivity, 1st in meat exports, 1st ethanol production)
- Learn how to transform knowledge in richness
30,145 papers x 384 patents (2007)

Brazilian innovation system

- Federal government (Ministries)
 - Science and technology (FINEP)
 - Education (CAPES, CNPq)
 - Industry and commerce (ABDI)
 - Agriculture (EMBRAPA)
- State governments:
 - R&D supporting agencies (FAPESP, FAPERJ,...) - R&D institutes; Science & Technology Parks; Technical Schools
- Universities
 - Graduate education (M.Sc. and Dr.Sc.) and research
- Private sector
 - National Confederation of Industries (CNI) + State Federations (FIESP)
 - Industry and services: R&D + Innovation
 - Agribusiness; energy related companies; aircraft industry
- Non Governmental Organizations
 - Academy of Sciences, SEBRAE (small business)

Public Policies - Innovation System

- Education – Technical high schools and faculties (FATEC)
- Research at universities and government supported institutes
 - Mission oriented R&D institutes: Agriculture (EMBRAPA), Amazon, Health (FIOCRUZ, INST. BUTANTAN), Space (AEB, INPE)
 - Academic research and graduate education
- R&D at the private sector
 - Subvention program
 - Tax incentives
 - National programs and government purchases
 - Research structure
 - Technological parks, enterprise incubators, technical support

***Federal actions - R&D supporting
laws***

Continuing policies – Incentive laws for the innovation system

- Innovation Law (10,937/2004)
 - R&D as a joint University-Industry activity
 - Academic intellectual property
 - Fostering of R&D at industry
- “Lei do Bem” (5,798/2006)
 - Employment of Ph.D.(Dr. Eng) and M. Sc.(M.Eng) at the industry
- Sectoral Funds for Science and Technology
 - 16+2 Funds to finance research, development and innovation projects
- PITCE – Industrial and Technological Policy - Three axes
 - Innovation and technological development of exports/internal insertion, industrial modernization, institutional environment
 - Strategic sectors (software, semiconductors, medical drugs, capital goods)
 - Activities “bearing” future (biotechnology, nanotechnology and renewable energy)

Innovation law (10,937/2004)

- Public-Private Relationship (ICTs – companies)
 - University-Industry joint reasearch and development
 - sharing equipment, laboratories and installations
 - Government as minor shareholder of R&D based enterprises
- Economical subsidies
 - Scholarships to researchers to stimulate innovation
 - Researchers on leave to start-up companies (3+3 years, with government replacing the researcher to the University)
 - Simplified rules to start up small and medium enterprises
 - Low interest loans to the R&D based enterprises
 - Public funding (no return) to develop innovative processes and products
- Technological government purchases
- Fostering of academic *start-ups*

Innovation law subsidized project examples (aerospace technological densing)

144	3880/06	CENIC ENGENHARIA INDÚSTRIA E COMÉRCIO LTDA	DESENVOLVIMENTO DE ELEMENTOS MECÂNICOS E ESTRUTURAIS BÁSICOS PARA MODELO DE ENGENHARIA DE SISTEMAS DE CONTROLE DE ATITUDE DE SATÉLITE
382	4111/06	COMPSIS COMPUTADORES E SISTEMAS INDÚSTRIA E COMÉRCIO LTDA	SOFTWARE DE SUPERVISÃO E CONTROLE PARA COMPUTADOR DE BORDO DE ACDH
56	3792/06	EMPRESA BRASILEIRA DE AERONÁUTICA	PLATAFORMA DE C412SR - COMANDO, CONTROLE, COMUNICAÇÃO, COMPUTAÇÃO, INTEGRAÇÃO, INTELIGÊNCIA, SUPERVISÃO E RECONHECIMENTO
199	3933/06	EQUATORIAL SISTEMAS LTDA	IMAGEADOR AVANÇADO PARA A AMAZÔNIA
793	4516/06	ESYTECH INDÚSTRIA E COMÉRCIO LTDA	SISTEMA AVIÔNICO DE COMUNICAÇÃO DE DADOS
717	4442/06	FRACTAL TECNOLÓGICA INDÚSTRIA E COMÉRCIO LTDA	FIBRA DE CARBONO E FIBRA DE PAN OXIDADA A PARTIR DE FIBRA PAN NACIONAL
117	3853/06	GEOMETRA BTE - BUREAU DE TECNOLOGIA E ENGENHARIA LTDA	DESENVOLVIMENTO DE RODA DE AERONAVE EM MATERIAL COMPOSTO
167	3902/06	MECTRON - ENGENHARIA INDÚSTRIA E COMÉRCIO LTDA	DESENVOLVIMENTO DE COMPUTADOR DE BORDO PARA USO EM SATÉLITES
294	4027/06	OMNISYS ENGENHARIA LTDA	TRANSMISSOR EM ESTADO-SÓLIDO PARA RADAR DE ROTA DE CONTROLE DE TRÁFEGO AÉREO EM BANDA L
541	4265/06	ORBITAL ENGENHARIA LTDA	DESENVOLVIMENTO DE MOTOR-FOGUETE A PROPULSÃO LÍQUIDA

“Lei do bem” (No. 5,798 June, 7, 2006)

- Tax reduction for research equipment, accelerated economical depreciation
- Credit on the Income Tax for royalties, technical assistance and specialized services used for the R&D process and product development
- Tax deduction
 - 60% extra exclusion on the liquid revenue of expenses with technological innovation R&D
 - 80% (up to) exclusion as a function of the number of hired researchers.
 - Additional up to 20% exclusion of the amount of expenditures or payments related to the R&D of a registered patent or cultivar
- Government subsidizing salaries of Doctors/Masters hired at the industry
 - Up to three years (40% to 60%, depending on the region).

Sectoral funds for science and technology

- CT- Aero
- CT- Agro
- CT- Amazon
- CT- Aquaviario
- CT- Biotec
- CT- Energ
- CT- Espacial
- CT- Hidro
- CT- Info
- CT- Infra
- CT- Mineral
- CT- Petro
- CT- Saúde
- CT- Transporte
- FUNTTEL
- Audiovisual
- Verde-amarelo
- Ações transversais

Sectoral funds for science and technology

- Financial resources for the Funds come from the contributions related to the results of exploitation of natural resources belonging to the Brazilian Federation. Sectoral funds are primarily financed by levies on enterprise turnover in the network industries that were privatised in the 1990s, including energy and telecommunications. Other sources of finance for the sectoral funds are the earmarking of revenue and a 10% levy on payments to non-residents for technical assistance and royalties. Due to the introduction of the sector-specific levies, financing for innovation rose in tandem with the increase in utility prices after privatisation. The composition of revenue sources varies across the sectoral funds.
- FINEP(MCT) is the managing actor for the Sectoral Funds (exception is FUNTTEL, by the Ministry of Communications)

PITCE – Industrial, Technological and Trade Policy (2004)

- PITCE focuses on the promotion of R&D activities in the business sector, aiming at better integrating innovation into the government's industrial and foreign trade policies.
- In 2005 new tax incentives for innovation, as part of a broader package, were introduced to reduce the tax burden on the business sector and facilitate the sharing of intellectual property rights (IPR) proceeds between business and public universities and research institutions.

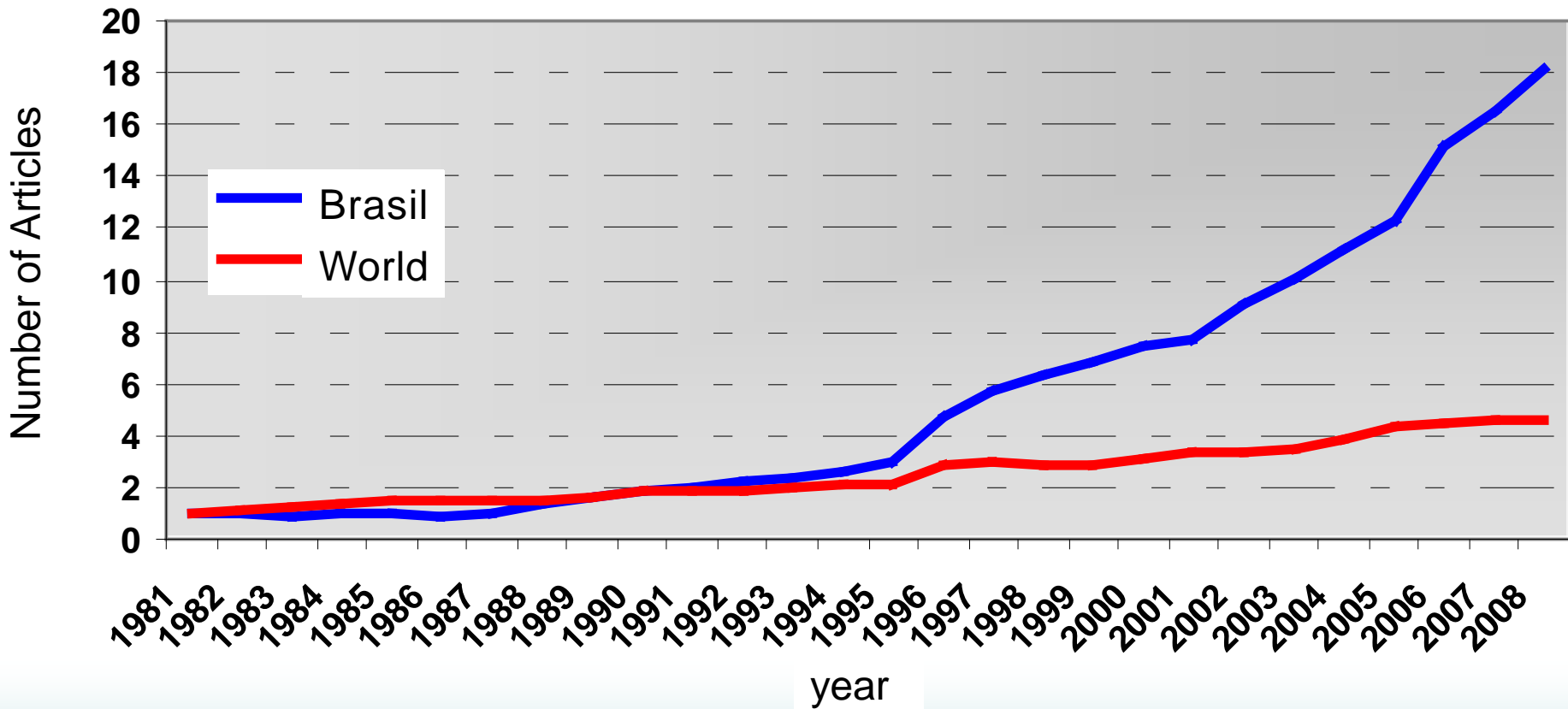
CAPEX “Pro-Engenharia” Program started 2008

- Strengthening and the enlargement of the *stricto sensu* Graduate Programs in Engineering in the thematic areas;
 - Sustainable engineering;
 - Renewable energy and its efficient use;
 - Biomechanics and biotechnical processes;
 - Materials development;
 - Micro and nano systems;
 - Manufacture and operations management;
 - Control and automation;
 - Information technology and processing;
 - Biofuels

- Contents
 - 12,700 periodical collections
 - 150 data bases
- Public:
 - 260 Institutions
- Utilization:
 - 13.1 million downloaded texts/year
 - 13.8 million consultations to databases/year
 - More than 120,000 accesses/day

Scientific papers production: *Brasil and the world*

1981 to 2008 – Scopus Base



State R&D Agencies

FAPESP – FUNDAÇÃO DE AMPARO
À PESQUISA DO ESTADO DE SÃO
PAULO

as an example of the “FAPs”

FAPESP – Research in São Paulo State

- 1962 – Instituted by decree No. 40,132 with 1% of the tributary collection on all goods sales in São Paulo State (in 2008~US\$320 millions) to be applied in the development of Science and Technology.

REGULAR PROGRAMS

- Scholarships (Brazil and abroad)
 - IC (Scientific initiation)
 - Master and Doctoral Programs
 - Post- Doctoral Programs.
- Research Grants
 - Capital goods (equipment) and expenditures, visiting researchers, congress and symposia organization, publications

FAPESP – Programs

- Infrastructure
- Young researchers
- Research applied to teaching
- Partnership for technological development
- Small enterprise – PIPE
- Genoma: Xylella, Cancer, Sugar Cane
- Public policies
- FAPbooks
- Other ...

Small Business Innovative Research (FAPESP PIPE PROGRAM)

- Innovative content
- Commercial potential of associated R&D
- Increase company competitiveness
- Foster innovation culture in small business enterprises

Conditions

- Non refundable funding
- Up to US\$350,000 per project
- Principal researcher must be employee of SBE

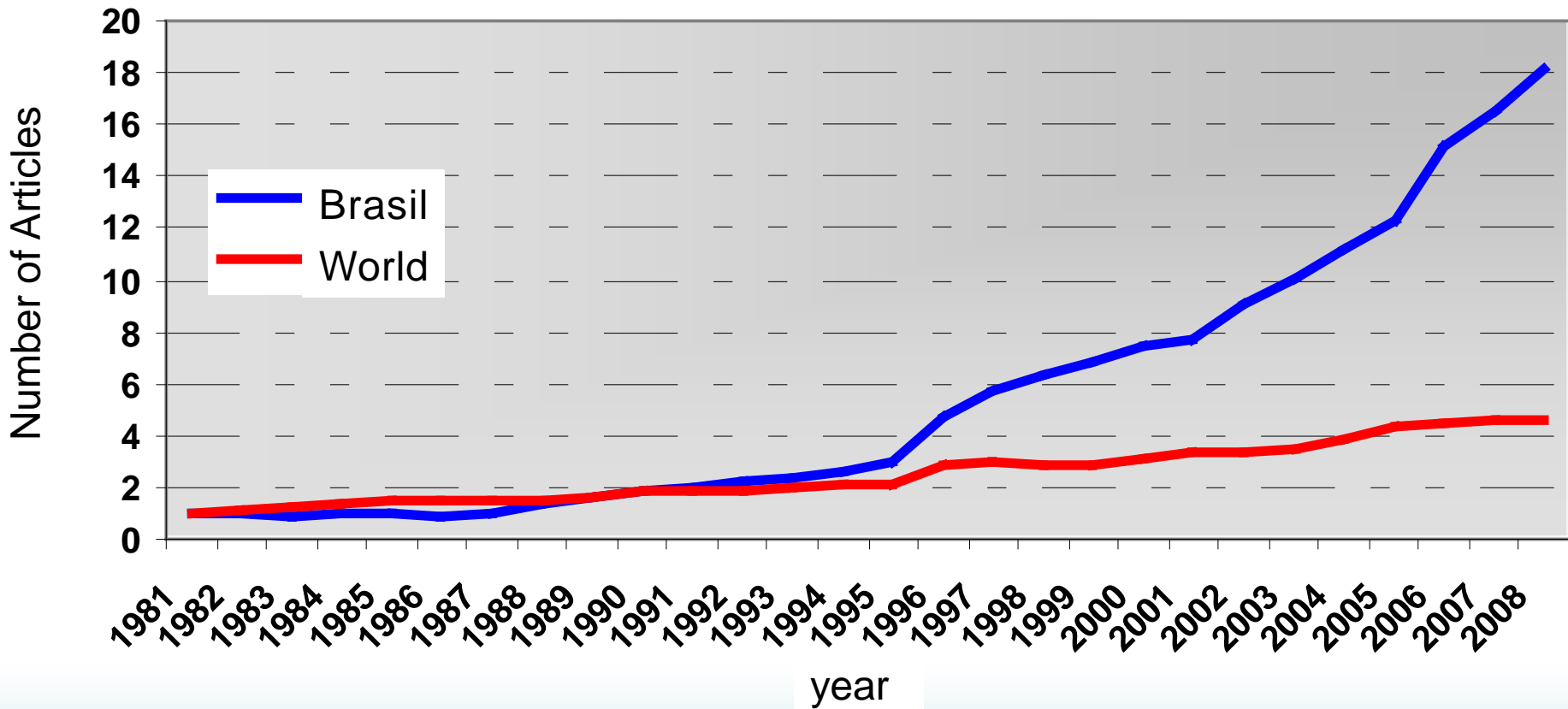
FAPESP 2008 – Revenues and expenditures

- Revenues : R\$769,336,406
 - Budget (% sales tax) 623,367,940
 - Others 145,968,466
- Expenditures
 - Scholarships 223,966,926
 - Research grants 248,169,041
 - Special Programs 91,097,830
 - Prog. Tech. Innovation 74,623,001
 - Current expenses 33,559,797 (4.9%)
 - Investments 2,878,582

Some recent R&D results

Scientific papers production: *Brasil and the world*

1981 to 2008 – Scopus Base

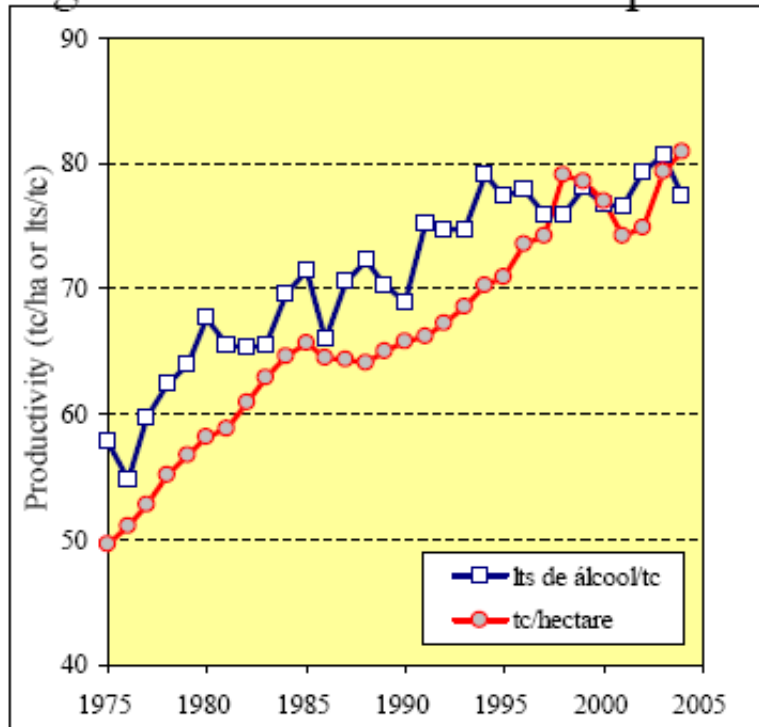


Some R&D results

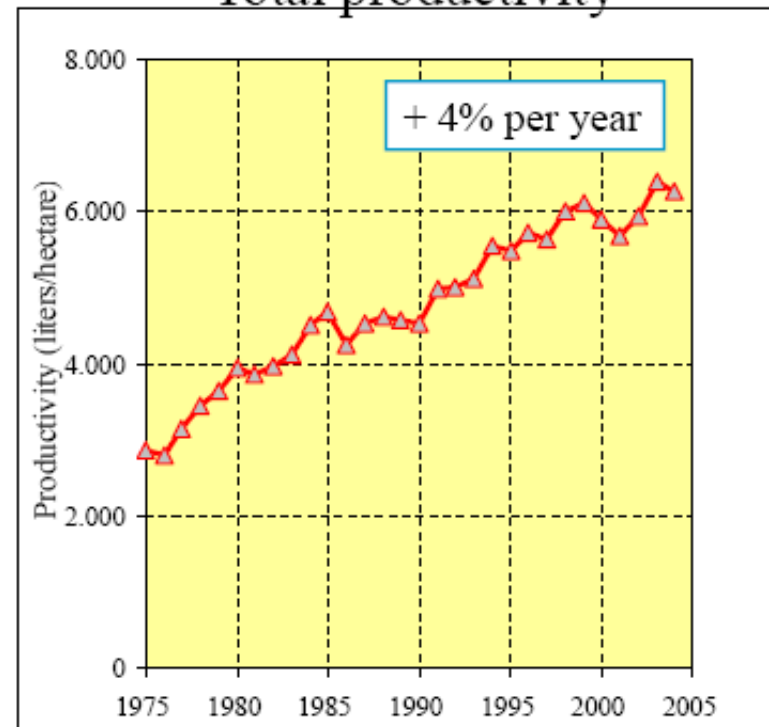
- Electronic elections
 - 125 millions voters ► results known same day
- Exploiting oil at 3,000 meters under the sea level
- 50 and 100 seats jets – Embraer
- Most productive soybean in the world (as well as with meat, oranges,...)
- Second and most efficient ethanol producer
 - 35% of world production
 - Over 1 million flex-fuel vehicles, 90% of total sales
 - Ethanol cost reduction - next

R&D fostering productivity – The case of sugarcane ethanol

Agricultural and Industrial product.

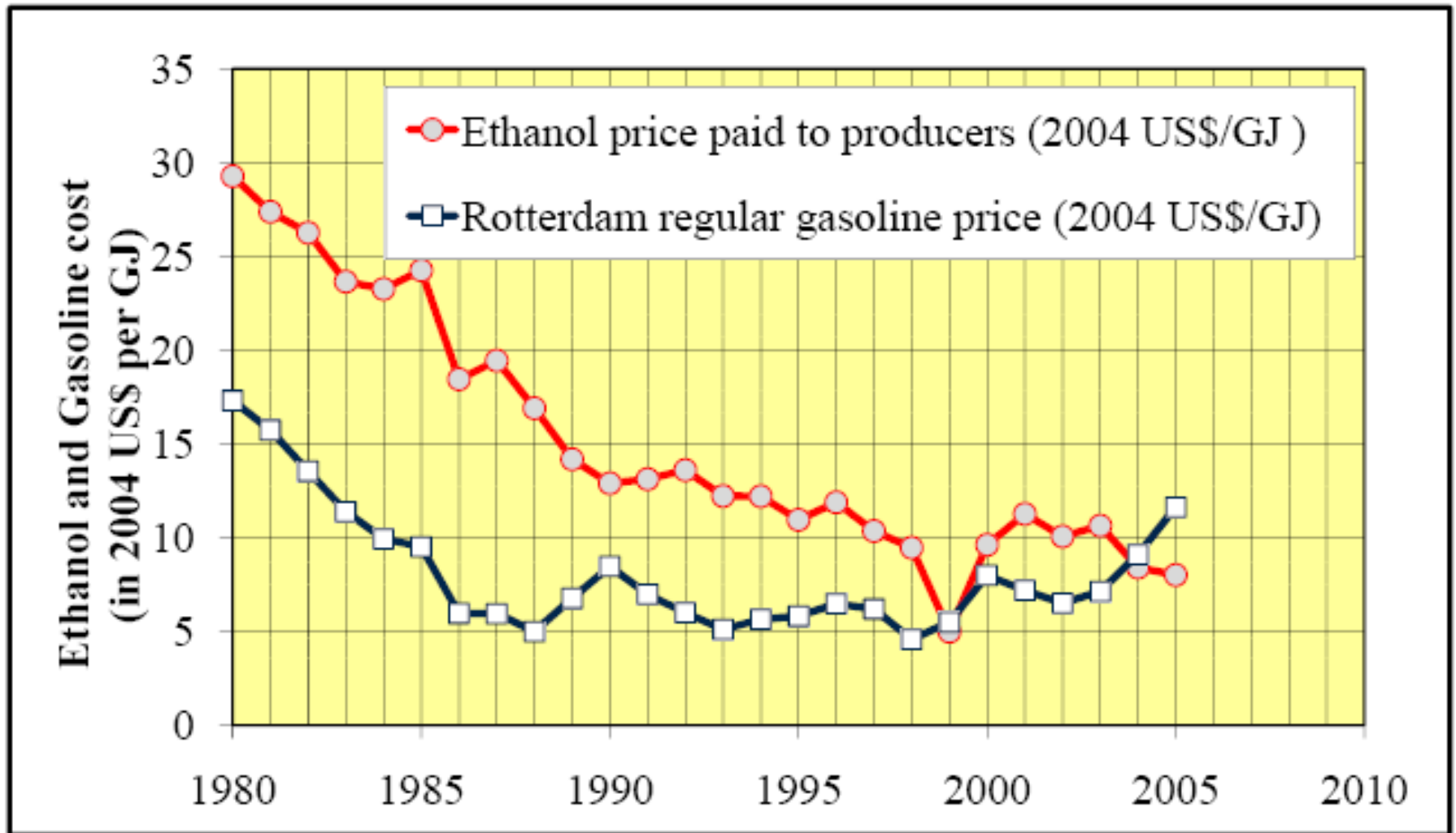


Total productivity



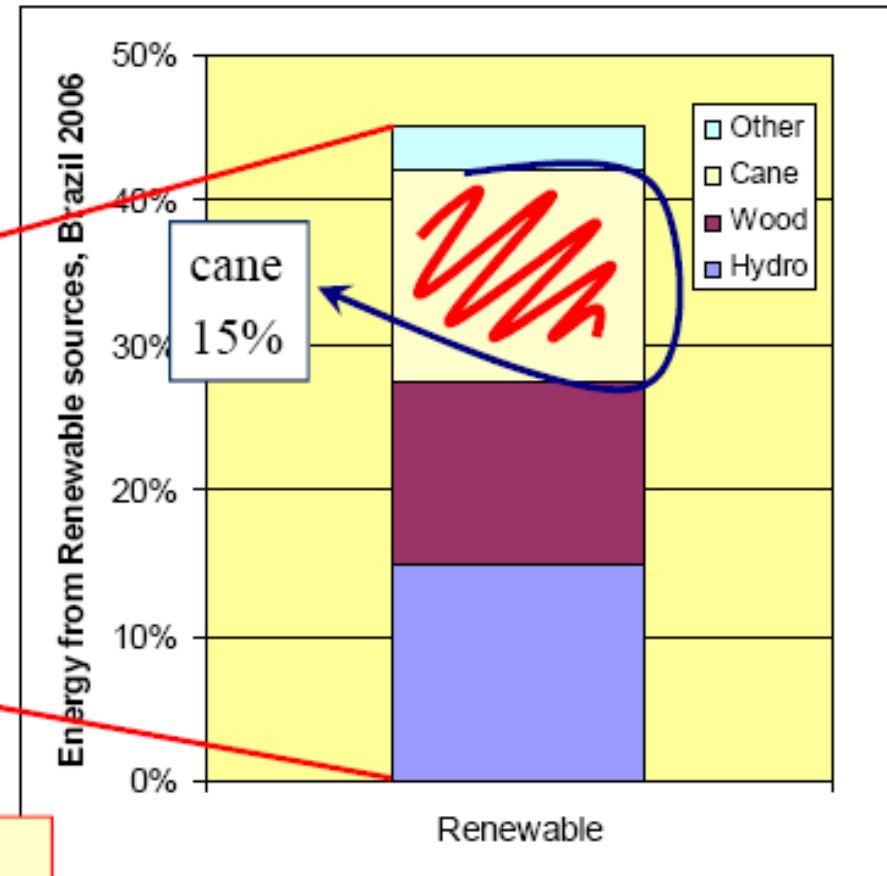
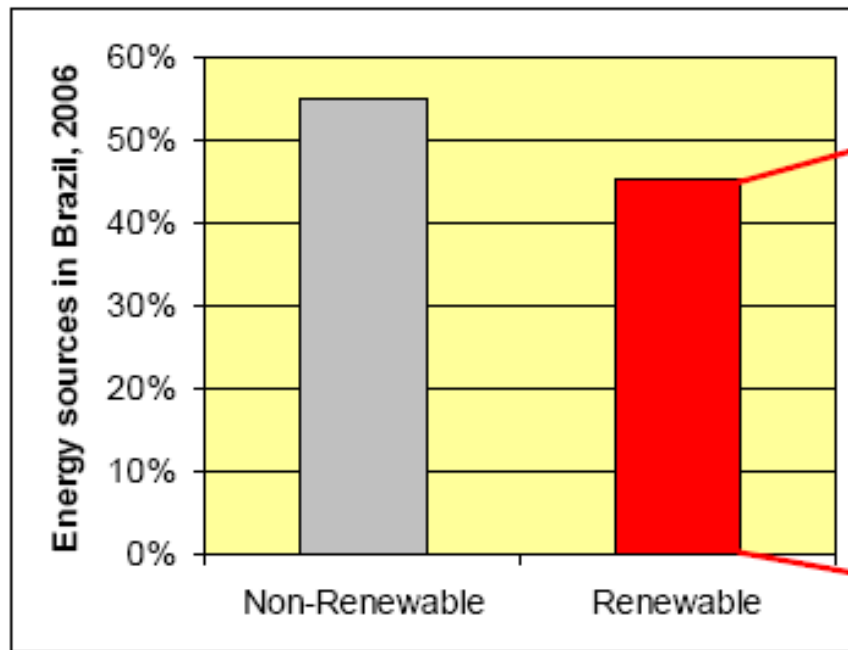
29/06/2009, 20090709-innovation-in-Brazil.pptx; © C.H. Brito Cruz e Fapesp

Ethanol x gasoline costs



29/06/2009, 20090709-innovation-in-Brazil.pptx; © C.H. Brito Cruz e Fapesp Source: Goldemberg, 2005

R&D results – Energy in Brasil



Renewables in Brazil: 46%; World: 13%; OECD: 6%

Acknowledgements

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muchas gracias !

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