A Look at Brazilian Science and its International Presence

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I felt very honored with the recent invitation by the Minister of Science and Technology, Sergio Rezende, and the Executive Secretary Luiz Antonio Elias, to write this article for the 4th National Conference on Science, Technology and Innovation. I accepted immediately, with great satisfaction and at the same time, with the perception that this would undoubtedly be a great challenge, yet it was still a smaller challenge than that of my colleague Luiz Davidovich who was invited to coordinate the Conference: with a minimum time to get it done and a minimum space for the size of my article. I hope this article contributes to the discussion on where we stand with regards to our science, which I believe is currently undergoing a virtuous moment according to international indicators and to the international prestige we currently hold. I also hope it contributes towards indicating where we might be in 2020 with the proposals contained here, among so many others which will be presented at this important Conference.

Preamble

Although we have had our heroes in the past, like Carlos Chagas, our science is still very young if compared to that of the United States and of a great number of European nations, In fact, our institutional contours only started to become clear with the creation of, for example, the Brazilian Academy of Sciences (initially called Brazilian Society of Sciences) and the Universities of Brazil and São Paulo, all of which occurred within the last one hundred years.

The institutionalization of governmental support to Science and Technology is also something relatively recent. The National Research Council, later called National Council of Scientific and Technological Development – CNPq, and the Coordination for Improvement of Higher Education – CAPES, were created in 1951 and clearly became a milestone in the advancement of S&T. In the following decade, there was the addition of the extraordinary participation of the National Bank of Economic Development BNDE (currently called BNDES), via FUNTEC to support Science and basic technology, and later with the creation of the Financier of Studies and Projects – FINEP. Another very important event was the organization of our post-graduation by the Federal Council of Education in the late 60's, made official by the Sucupira Normative Opinion, which designated CAPES, from the Ministry of Education, as the national institution which qualifies the masters and Ph.Ds programs, based on the scientific excellence of the research groups responsible for their execution. At this time, they also introduced full time programs and exclusive dedication programs at the universities, which later also became standard in our research institutes. With the creation of the Ministry of Science and Technology in 1985, CNPq and FINEP became a part of that as well as the all the main agencies which promote S, T & I.

The institutional picture of Brazilian Science is currently a lot more ample and solid. The scientific-technological research centers in universities, institutes and businesses, in greater or smaller scale, are spreading around the country and involve a number of human resources unthinkable of four or five decades ago, yet these numbers are still not sufficient to allow us to climb to the level of advanced countries and not drift away

from the BRIC countries. It is true that the scientific-technological, creative and refreshing knowledge, is acknowledged by the Federal Government as a whole,

and is increasingly acknowledged by the media and society in general, as an essential instrument for a harmonious and sustainable socio-economic development. This is how the MCT managed to recently install a fantastic network of National Institutes of Science and Technology – INCTs which substitute the Millennium Institutes, with the support of the Health and Education Ministries, BNDES and Petrobrás, and in addition approve several laws to encourage Academies-Companies integrations and develop a National S&T plan as a guiding Pillar of a State policy.

The greatest news in this scenario is the vitality of the Research Support Foundations (FAPs), present in almost all Brazilian states, and the Science and Technology agencies found in all of them. Within the FAPs, it is worth highlighting FAPESP, the Pioneer foundation, and more recently FAPERJ and FAPEMIG who have considerably contributed to the advancement of science in its states, in particular towards Academy-Companies integrations and international cooperation. It is also worth mentioning the performances of FAPEAM, FAPESPA, FAPESC, FACEP and FAPESB, among others. Aside from being very active in their states, and several of them participating in a decisive way of the INCTs programs, the FAPS today are a source of national public policies and are even developing research networks among themselves in partnership with federal institutions, as was the recent case of a malaria network in partnership with CNPq and CAPES. And the latest now are the FAPS in municipalities, adding a new dimension to the promising institutional framework of S&T in our country.

It is within this more ample and solid promising scenario, that we shall deal with relevant recent advances of our S & T and create proposals to increase these advances by 2020.

Recent Advances in scientific production

The advance of Brazilian science in terms of quality has been remarkable in the last decades, as indicated by the three tables: Relative Impact – Brazil all fields from 1981-1985 to 2004-2008; Science in Brazil 1998-2002 and Science in Brazil 2003-2007, in terms of an average of citations of scientific articles attributed to Brazil published in indexed journals in comparison to world averages, in intervals of 5 year.

The first one shows that the average impact regarding all the knowledge areas *together* in regards to the corresponding world average in the period of 1997-2001, evolved from 0.53 to 0.63 in the period of 2004-2008, which corresponds to and advance of 19%.

Table 1. **Relative Impact – Brazil, all fields**

	BRAZIL		
Years	Impact (A)	Imp Base (B)	(A)/(B)
1981-1985	1.30	2.72	0.48
1982-1986	1.28	2.75	0.47
1983-1987	1.35	2.78	0.49
1984-1988	1.28	2.82	0.45
1985-1989	1.26	2.87	0.44
1986-1990	1.26	2.93	0.43
1987-1991	1.24	3.01	0.41
1988-1992	1.35	3.09	0.44
1989-1993	1.45	3.17	0.46
1990-1994	1.53	3.23	0.47
1991-1995	1.64	3.30	0.50
1992-1996	1.77	3.44	0.51
1993-1997	1.85	3.54	0.52
1994-1998	1.91	3.62	0.53
1995-1999	1.98	3.74	0.53
1996-2000	2.00	3.81	0.52
1997-2001	2.10	3.96	0.53
1998-2002	2.25	4.05	0.56
1999-2003	2.37	4.18	0.57
2000-2004	2.47	4.22	0.59
2001-2005	2.63	4.38	0.60
2002-2006	2.76	4.47	0.62
2003-2007	2.88	4.58	0.63
2004-2008	2.94	4.70	0.63

Source: Thomson Reuters. National Science Indicators. Database - Standard ESI. CD-ROM 2008.

There is another indicator which I consider relevant, in which one equally measures the relative impact of our publications in each knowledge area, and this also indicates a significant advancement of Brazilian science in the last years. In order to do the calculation we take the averages of relative impact of the publications in Brazil in comparison to the corresponding world averages – separately for each of the 21 knowledge areas listed in tables 2 and 3 for the period of 1998-2002 and 2003-2007. The averages of these relative impact averages in regards to the world, per area of

knowledge, advanced from 0.61 to 0.66 which indicates an increase of 8.2% of the relative impact of our publications in the two periods.

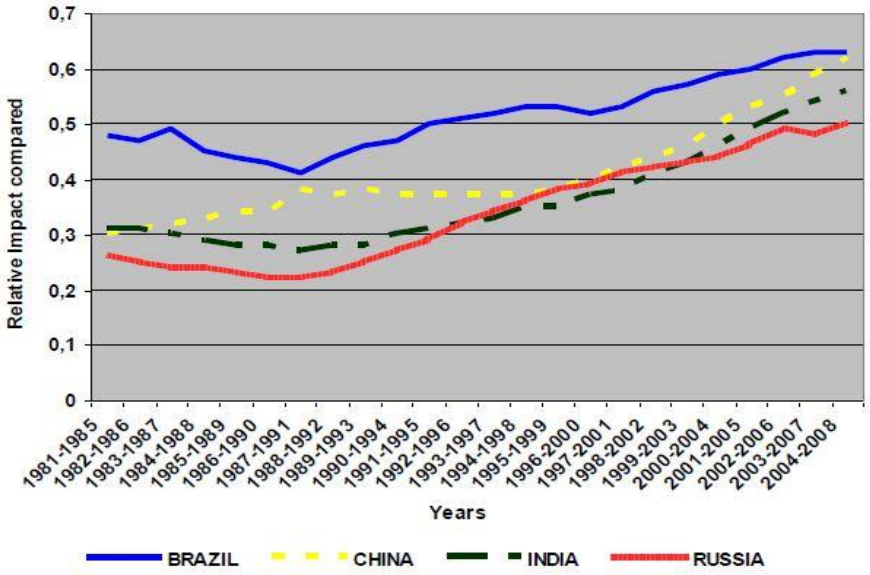
Table 3. Science in Brazil 1998-2002 / 2003-2007

Fields	Percentage of Papers from Brazil 1998-2002	Relative impact compared to world 1998-2007	Percentage of Papers from Brazil 2003-2007	Relative impact compared to world 2003-2007
Agricultural Sciences	2.96	-60	4.05	-45
Physics	2.12	-25	2.13	-14
Space Science	1.92	-27	2.05	-31
Microbiology	1.91	-47	2.53	-40
Plant & Animal Science	1.87	-44	3.02	-42
Pharmacology	1.57	-41	2.48	-35
Mathematics	1.51	-20	1.82	-11
Biology & Biochemistry	1.47	-62	2.12	-56
Ecology/Environmental	1.43	-18	1.96	-12
Chemistry	1.37	-36	1.69	-29
Materials Science	1.26	-24	1.54	-34
Molecular Biology	1.26	-73	-	-
Molecular Biology and Genetics	-	-	1.65	-66
Immunology	1.24	-54	2.04	-51
Geosciences	1.18	-25	1.45	-12
Engineering	1.01	-22	1.30	-18
Neurosciences	0.96	-47	-	-
Neurosciences and Behavior	-	-	1.61	-42
Clinical Medicine	0.95	-35	1.52	-31
Social Sciences	0.76	-57	1.00	-38
Computer Science	0.72	-22	1.05	-31
Psychology/Psychiatry	0.36	-16	0.62	-27
Economics & Business	0.34	-54	0.48	-41
Average 1998-2002				-39 or 61%
Average 2003-2007				-34 or 66%

SOURCE: *National Science Indicators*, 1981-2007 (containing listings of output and citation statistics for more than 170 countries; available in standard and deluxe versions from the Research Services Group).

Regarding the relative impact, in terms of averages of citation of scientific articles for all the knowledge areas together, Brazil was ahead of all other BRIC countries (China, India and Russia), as can be seen on the graph below. But our position is threatened by China and India.

Gráfico 1.



Source: Thomson Reuters National Science Indicators

The situation described above should serve as an encouragement for Brazil to continuously put effort into S&T, in fact, into S, T & I, in order for us to remain in a position of isolated leadership in Latin America, and to remain competitive with the other countries, even with regards to the values associated to our exports, and thus continue to firmly walk towards reaching the similar standards of the most advanced countries in a relatively short period of time.

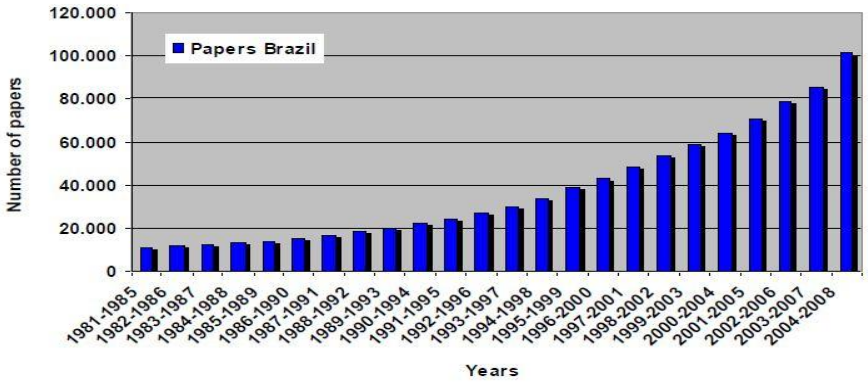
Also with regards to the number of scientific articles published in indexed magazines, our growth has been extraordinary, way above the average for the world, as can be seen in table 4 and graphs 2 and 3 below, which indicate an increase in the number of our works throughout the years and its percentage in regards to the scientific works of the world.

Table 4 **Number of papers and percent share in the world**

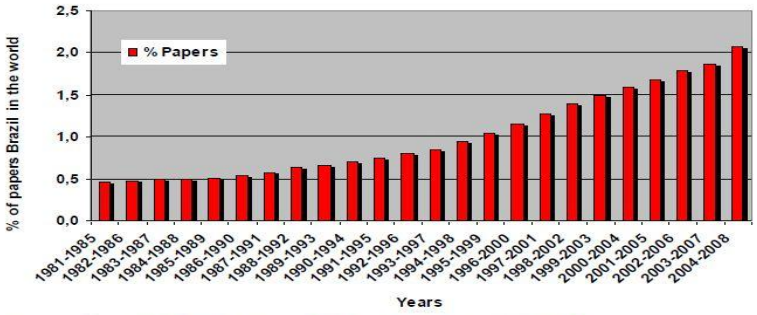
Year	BRAZIL		
	Papers Brazil (A)	Papers World (B)	% Papers (A)/(B)
1981-1985	11.560	2.442.133	0,47
1982-1986	12.199	2.517.331	0,48
1983-1987	12.584	2.569.103	0,49
1984-1988	13.091	2.627.219	0,50
1985-1989	13.798	2.705.569	0,51
1986-1990	15.028	2.768.437	0,54
1987-1991	16.391	2.830.785	0,58
1988-1992	18.417	2.931.764	0,63
1989-1993	20.193	3.015.294	0,67
1990-1994	22.253	3.135.917	0,71
1991-1995	24.640	3.271.659	0,75
1992-1996	27.290	3.413.565	0,80
1993-1997	29.958	3.517.849	0,85
1994-1998	34.113	3.632.560	0,94
1995-1999	38.919	3.704.376	1,05
1996-2000	43.332	3.744.359	1,16
1997-2001	48.203	3.787.141	1,27
1998-2002	53.722	3.834.492	1,40
1999-2003	59.132	3.950.613	1,50
2000-2004	64.030	4.025.939	1,59
2001-2005	71.205	4.227.462	1,68
2002-2006	78.898	4.412.101	1,79
2003-2007	85.453	4.592.036	1,86
2004-2008	101.263	4.865.868	2,08

Fonte: Thomson Reuters. National Science Indicators. Database - Standard ESI. CD-ROM 2008.

Graph 2



Graph 3



Fonte: Thomson Reuters. National Science Indicators. Database - Standard ESI

As a result of such favorable numbers, in 2008 we already occupied the 13th position as seen on table 5 of the *Information Sciences Institute- ISI* or 14th as per SCOPUS.

Table 5

Countries	ISI		SCORPUS	
	Rank	N. Articles	Rank	N. Articles
USA	1	340,638	1	344,167
CHINA	2	112,804	2	230,780
UNITED KINGDOM	3	87,424	3	113,940
GERMANY	4	79,541	4	101,504
JAPAN	5	78,444	5	98,865
FRANCE	6	64,493	6	77,092
CANADA	7	53,299	7	65,515
ITALY	8	50,367	8	61,926
SPAIN	9	41,988	9	49,642
INDIA	10	38,700	10	47,905
AUSTRALIA	11	36,787	11	45,003
SOUTH KOREA	12	35,569	12	42,403
BRAZIL	13	30,415	14	32,929
HOLLAND	14	17,443	13	34,266
RUSSIA	15	27,909	15	31,281
TAIWAN	16	22,608	16	30,815
SWITZERLAND	17	21,065	17	25,028
TURKEY	18	20,794	18	22,831
POLAND	19	19,533	20	20,893
SWEDEN	20	19,127	19	22,488
BELGIUM	21	16,194	21	19,501
ISRAEL	22	12,331	23	15,980
IRAN	23	12,327	22	16,365
AUSTRIA	24	11,607	25	13,818
DENMARK	25	11,089	27	12,587
GREECE	26	10,875	26	13,762
FINLAND	27	10,562	28	12,238
MEXICO	28	9,787	24	14,335
NORWAY	29	9,407	32	10,369
CZECH REPUBLIC	30	8,762	30	10,628
PORTUGAL	31	8,629	31	10,509
SINGAPORE	32	7,811	29	10,927
WORLD	**1,339,329**		**1,660,292**	

Table 6 gives us a picture of our scientific production in the scenario of the world during the period of 2004-2008, both with regards to the quantity indicator, shown by the percentage of articles in each knowledge area in Brazil and in the world, as well as with regards to the aspect of the quality, measuring the global average of the relative impact of our scientific articles in all the knowledge areas together, compared to the corresponding world average. Our best results are found in the areas of Engineering, Mathematics and Physics which are very near the corresponding world averages of the most scientifically advanced countries. It is important to observe that the areas of Engineering and Mathematics, as well as Marine biology and Oceanography are among those which shall grow the most in the next few years.

Table 6 **Scientific Production: 22 Standard Fields - Brazil X World 2004 - 2008***

STANDARD FIELDS	WORLD			BRAZIL			
	Papers Number	Citations	Impact	Papers Number	% World	Citations	Impact
1 Agricultural Sciences	99,744	285,478	2,9	5,376	5,4	7,368	1,4
2 Biology & Biochemistry	272,33	2.009.527	7,4	5,867	2,2	20,019	3,4
3 Chemistry	587,028	2.977.516	5,1	10,478	1,8	34,829	3,3
4 Clinical Medicine	1.008.201	5.807.706	5,8	18,408	1,8	71,648	3,9
5 Computer Science	150,142	226,897	1,5	2,034	1,4	1,922	0,9
6 Economics & Business	73,287	155,873	2,1	377	0,5	429	1,1
7 Engineering	395,352	780,988	2,0	5,753	1,5	10,844	1,9
8 Environment/Ecology	131,825	583,609	4,4	3,578	2,7	12,240	3,4
9 Geosciences	136,314	536,513	3,9	1,971	1,5	6,346	3,2
10 Immunology	60,152	596,174	9,9	1,352	2,3	7,439	5,5
11 Materials Science	231,418	698,366	3,0	3,507	1,5	7,492	2,1
12 Mathematics	125,072	170,677	1,4	2,230	1,8	2,742	1,2
13 Microbiology	81,508	573,185	7,0	2,475	3,0	9,846	4,0
14 Molecular Biology & Genetics	138,303	1.566.285	11,3	2,506	1,8	9,133	3,6
15 Multidisciplinary	22,264	90,096	4,1	444	2,0	830	1,9
16 Neuroscience & Behavior	146,224	1.173.716	8,0	3,600	2,5	13,527	3,8
17 Pharmacology & Toxicology	90,877	492,839	5,4	2,578	2,8	8,660	3,4
18 Physics	467,316	1.943.951	4,2	10,860	2,3	40,319	3,7
19 Plant & Animal Science	270,294	857,683	3,2	12,561	4,7	19,434	1,6
20 Psychiatry/Psychology	119,744	509,368	4,3	1,034	0,9	2,656	2,6
21 Social Sciences, general	198,774	394,491	2,0	2,993	1,5	2,971	1,0
22 Space Science	59,699	426,221	7,1	1,281	2,2	7,174	5,6
TOTAL DATA	4,865,868	22,857,159	4.7	101,263	2.2	297,87	2.9

* Source: National Swcience Indicators - Standard Data Base - ISI Thomson Reuters 2008

Advances in Post-Graduation

As of 1995, approximately three and a half decades after its national organization, post graduation courses start to expand vigorously. The people obtaining PhDs in CAPES accredited programs increases from about 2,000 that year, to about 11,500 in 2009, with an average annual rate of 12%. The number of people obtaining masters degrees grows from about 8,000 to about 35,700 with an average annual rate of about 10,5%.

At the end of 2009, according to CAPES, the national post graduation system was composed of about 2,750 programs and 4,122 courses, with approximately 60% of them being master programs, 35% PhDs and the rest being Professional Master's degrees, with 52,750 students in PhDs and 97,400 in masters. Approximately one third of the students, more or less, have scholarships, of which 17,500 are for PhDs and the number of teachers is of about 44,000.

Table 7. Percentage of the number of programs and graduated students per great areas of knowledge - 2009

Area	Programs	Ph.D.	Masters
Biological Sciences	8%	11%	7%
Health Sciences	17%	20%	15%
Exact sciences and Earth Science	10%	10%	8%
Engineering	11%	11%	12%
Agricultural Sciences	11%	13%	11%
Applied Social Sciences	13%	8%	14%
Humanities	14%	17%	19%
Linguistic, Literature and Arts	5%	6%	7%
Multidiscipline	11%	4%	7%

If the above annual average rates continue, we will have graduated 40,000 with PhDs and 107,000 with masters degree by 2020. We would have a considerable increase in S&T activities in the country, and that is where it is extremely necessary to include the business sector, who would have contributed a large sum of its investments in research and development and in the use of our human resources. The acronym S, T & I would be fully justified. It is indeed a great challenge to substantially increase our efforts towards finding talents, for example, in science Olympics, similar to the ones which already occur in mathematics, and the training of science teachers for the elementary school.

With regards to the human resources available for S&T in Brazil, a total of about 211,000 people with PhDs, masters and Technicians degrees was estimated in 2008, of which about 69,000 hold a PhD and 86,000 a masters degree (as per what was indicated in slides shown by CGEE). On the other hand, according to the data supplied by Pnad 2008 of IBGE, in 2008 we had 96,378,972 people employed in Brazil (of which 34.018.537 were officially employed), which would result in 2.19 researchers/technicians per each 1000 people employed.

If we estimate, with a good dosage of optimism, a annual growth rate average of 8% in the number of researchers/technicians working in S&T in Brazil, we would reach a total contingency of 492,000 in 2020. Meanwhile, the population in Brazil would grow from 190 million, in 2008, to 207 million in 2020 (Source:IBGE). Thus, in 2020 we would have 4 researchers/technicians for each 1000 employed people if the total number of employed people grew to 60% of the population, a number considerably closer to that of the most advanced countries. We have noticed that the average growth rate which we used of 8% of human resources for S&T is considerable, yet it is expressively inferior to the annual growth rate of the most recent numbers of PhD and Master graduates each year.

Investments in S, T&I in terms of GDP – Proposals 2010-2020

As seem previously, Brazilian science shows an auspicious picture of lush growth in a decade and a half, and great enthusiasm within its current community of researchers with regards to future, short and long term perspectives.

The enthusiasm comes from the feeling of having contributed to an expressive network of environments in all the regions of the country in which the desire for scientific, here meaning scientific-technological, discoveries prevails, and from the encouragement of talented young people to share this same feeling and determination.

Today, our resources for activities related to S, T & I have surpassed 1% of the Gross Domestic Product – GDP, estimated for 2010 to reach about 1.2% to 1.3%, with the business sector participating with about 50% of these efforts, in research and development activities.

Yet, it is necessary to double these efforts in a sustainable way in the next 10 years in order for us to reach 2020 with our activities in S, T & I decisively contributing towards the scientific-economic advancement of the country and the harmonious well-being of our society, at a level equivalent to the most advanced countries. It is also important that we maintain our strong presence in the international scenario, briefly described in the last part of this article. Such a presence is based on our scientific competency, and if we cool our efforts, this presence will undoubtedly decrease, including our scientific-technological cooperation with other countries.

Our proposal is for this to be done in a planned and consistent way in the next 10 years to enable us to illustrate Brazilian science in even more vivid colors, and place Brazil

within the group of countries which have contributed the most towards the advancement of S, T & I.

Therefore, the projection for Brazil 2020, requires an increase in comparison to 2009 of two and half to three times:
- of the annual graduation of people with masters and PhDs, with a priority in the concession of scholarship given to the areas considered the most strategic and/or in need in the country;
- in the contingency of researchers/technicians in the area of S, T & I in the country, including investments in the training of lab technicians;
- in the production of scientific works in qualified magazines;
- in investments in the activities of search and stimulation of talents such as scientific Olympics, and the teaching of science , with the corresponding qualification of teachers;
- in the investments in international scientific cooperation activities;
- in investments in infra-structure, with the expansion of the University system, research institutes and laboratories, including large-scale ones; and
- of the business sector expenditure in research and development doubled in terms of GDP of 0.56% in 2008 to 1.12% in 2020;
- improvement of the graduation mechanisms and the establishment of scientists in the regions of the country most in need of solid competency in science and technology, providing the necessary infrastructure;
- improvement of the mechanisms to attract foreign scientists, mainly young talents, keeping in mind our vigorous advancement of S & T and the quite competitive salaries in comparison for example to the European countries, we propose that Brazil reaches 2% of its GDP in investments in S& T in 2020, with an annual growth of about 5.5% of our investments in S, T & I in the next 10 years.

This is of great importance to the country, for S & T is one of the most important symbols of progress of a nation. It is also classified as a diplomacy towards the good. Hard? It is not impossible, but it requires a great deal of effort and enthusiasm. The 4th CNCTI showed that we are willing to lead this noble mission ahead.

We noticed that at a recent meeting of the BRIC countries in April of this year in Brasília, one of the representatives from China declared that the goal of his country was to invest 2.5% of its GDP in Research and Development in 2020.

The International Presence of Brazilian Science

We have today, a very strong presence o four science in the international scenario. In fact, our scientists participate in the activities of the main international science institutions, frequently in a position of privileged importance. At the same time, the federal and state funding agencies are promoting remarkable actions of international scientific cooperation. And also remarkable is the prestige several o four institutions and companies are enjoying throughout the world, due to their scientific-technological competency.

Listed below, in a summarized way, are some examples which substantiate the international recognition of our scientific-technological advances and progress. Of unique importance, we highlight the actions of the Brazilian Academy of Sciences – ABC, with the support of the Ministry of Foreign Relations.

G8+5

Presidents and other scientists of the Academies of Sciences of the G8+5 – South Africa, Germany, Brazil, Canada, China, United States, France, India, Italy, Japan, Mexico, United Kingdom and Russia, have been meeting to draft important proposals in S&T to the political leaders of these countries, in the meetings of the G8+5. It is worth mentioning that in March 2009, for example, ABC successfully presented scientific data proving that the Brazilian ethanol from sugar cane is an excellent biofuel: very efficient, and with low pollution and its production is far from affecting the food industry.

International Forum of Science and Technology for Society (STS Forum)

Forum congregates scientists, businessmen and *policy makers* at an international level. ABC has had a prominent role at the meetings of presidents of the Academies which happens annually in Japan. The last meeting, held in 2009, had the presence of 21 ministers of S&T, including the Minister Sergio Rezende who delivered the inaugural keynote speech, in addition to representatives from 87 countries, 11 Nobel Prize winners, more than 800 scientists and hundreds of businessmen from companies and social organizations. The President of ABC delivered a plenary lecture at the end of the meeting.

World Science Forums

The *World Science Forum,* is held every two years in Budapest in Hungary, since 1999. In 2009, the president of Hungary and the president of the local Academy, the general director of Unesco, the president of ICSU, the presidents of CNPq and of ABC were present at the event, among many other representatives of governments and international scientific communities. Note that Brazil might be the first country, following Hungary, to host the World Science Forum which would occur in 2013.

Academy of Sciences for a World under Development – TWAS

TWAS is an institution linked to UNESCO. It is located in Trieste, in Italy and promotes qualification and scientific excellence as the basis of socioeconomic growth of countries under development. As of 2007, the presidency of TWAS is occupied by a Brazilian scientist. Since then, the offices of the President and the Regional Office of TWAS (TWASROLAC) are located at the headquarters of ABC and they promote annual meetings of a scientific nature with the participation of Members of the Region, including young Affiliate scientists.

International Council for Sciences – ICSU

ABC comprises the Executive Committee of ICSU, which congregate the International Unions of Science, the Academies and the National Science Councils, with representations from more than a hundred countries. Recently, several Brazilian scientists held the vice-presidency of ICSU. ICSU has been responsible for the implementation of important global interdisciplinary programs, essential to a sustainable development. Among them we highlight the International Geosphere-Biosphere Programme (IGBP), which currently has a Brazilian scientist as its president. Located at the headquarters of ABC, the Regional Office for Latin America has promoted innumerous activities of a scientific and educational nature and for the diffusion of science.

Inter-Academy Panel – IAP: the global network of science academies

ABC actively participated in the creation of IAP which today brings together 92 Science Academies of different countries, and it also presided, together with France, the first mandate of the entity. Several international programs are being conducted, among them the Education for Science and the Water Program – this one having ABC as the main responsible entity.

Inter-Academy Council – IAC

ABC is also a part of the Board of Directors of IAC, which is the executive sector of IAP, composed of 15 Academies. As a highlight of its studies, IAC published, in several languages, the books: *Inventing a Better Future - a strategy for building worldwide capacities in science and technology*, who had as one of its coordinator a Brazilian scientist, and *Lightining the Way*, about Energy, also with another Brazilian scientist as its coordinator. Recently, the United Nations requested IAC to form a group of scientist to analyze and possibly revise the famous report on climatic changes, known as IPCC. One of ABC's members was designated by IAC to become part of this group.

Interamerican Network of Academies of Science (IANAS)

IANAS is a regional branch of the InterAcademy Panel (IAP) in the Americas. IANAS has the objective of strengthening the Science Academies existent in the region, aside from supporting the creation of new Academies. The IANAS Agency works at ABC, and the network, which has been co-managed by a Brazilian scientist, has been developing two programs in the Americas – Waters and Education - , both headed by national scientists.

International Cooperation and our main Federal Funding Agencies

International collaboration is of vital importance for scientific progress in any nation. Our scientists, institutions, Ministries and their funding agencies, and the FAPs, all enthusiastically share this principle, and Brazil's scientific collaboration has grown side by side with the progress which science has experienced recently.

The chart below indicates brazil's main partners, and includes traditional countries of renown scientific level, among them the Unites States, England, France and Germany, and several of our close neighbors, like particularly Argentina.

Taking into consideration only the countries mentioned on the chart, our international collaboration involves 34.1% of our published scientific work during the period of 2003-2007. This alone already indicates a considerable percentage.

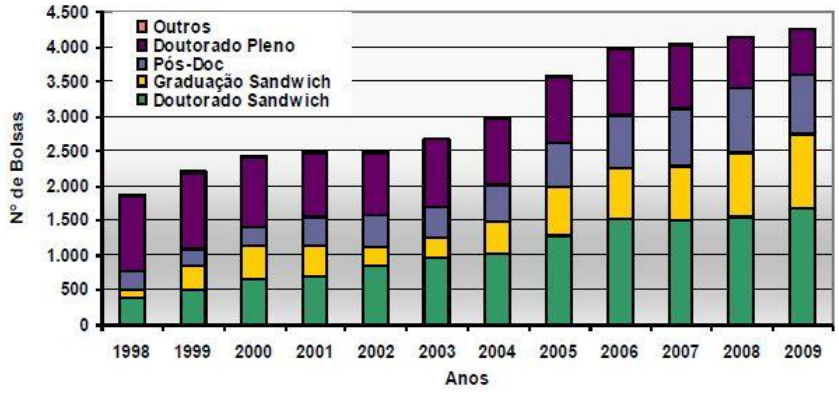
Table 8 : Brazil´s leading international research partners in the period 2003-2007

2003 - 2007		Share (%) of Brazil Total
13,349	USA	11.1
4,162	UK	3.5
4,131	France	3.4
3,727	Germany	3.1
2,358	Italy	2.0
2,382	Canada	2.0
2,313	Spain	1.9
2,092	Argentina	1.7
1,381	Portugal	1.1
1,226	Netherlands	1.0
1,165	Japan	1.0
953	Russia	0.8
913	Mexico	0.8
795	Chille	0.7

Thomson Reuters: Global Research Report – The new geography of science

CAPES and International Cooperation

The Department of International Relations – DRI, was instituted at the end of 2007, responsible for the scholarship programs abroad (CGBE) and for international cooperation. A few associations with other similar agencies from other countries were made, with the objective of granting scholarships in partnership and in na induced way, to not only individual requests, but also to meet the demands of research groups and higher education institutions, and even governmental requests, these in particular through the interaction of the Ministry of Foreign Relations. In 2009, the investment in this sector was of about R$1.1 million.

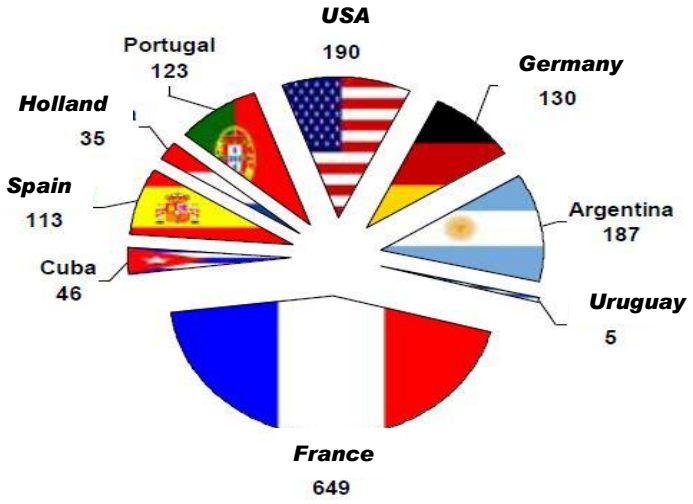


Graph 4: Evolution of the concession of Scholarships Abroad – all types

CGCI works on three fronts: South-North programs, South-South programs and Special Programs. In this last category, there are, for example, the School for Advanced Studies and programs with African and Latin-American Countries. In fact there are seven main international actions by CAPES: individual scholarships abroad, doctoral colleges, joint research projects and university partnerships, professors visiting abroad, schools for advanced studies and the program of general cooperation.

Graph 5 shows the number of scholarship holders awarded scholarships from the CGCI programs in 2009, from each country. Tables 9 and 10 show the number of projects currently being worked on, supported in 2009 through the Joint Research Projects and University Partnerships. The presence of France can be seen in several of the partnerships:: COFECUB, BRAFITEC, BRAFAGRI, Stic-AmSude and Math-AmSud.

Graph 5:



COUNTRY	PROGRAM	NUMBER OF PROJECTS
Germany	PROBAL	71
	BRAGECRIM	16
Argentina	MINCYT	35
Cuba	MES/CUBA	51
Spain	DGU	78
USA	CAPES/UT	20
France	COFECUB	132
Portugal	GRICES/FCT	78
Holland	UNIV. WAGENINGEN	35
Uruguay	UNIV DE LA REPUBLICA	10
TOTAL		**526**

Table 9: Joint Research Project- 2009

COUNTRY	PROGRAM	NUMBER OF PROJECTS
USA	FIPSE	45
Germany	UNIBRAL	26
Argentina	CAPG/BA	23
	CAFP	20
France	BRAFITEC	51
	BRAFAGRI	11
	STIC-Amsud	10
	MATH-Amsud	4
TOTAL		190

Table 10: University Partnerships 2009

CNPq and International Cooperation

This is a traditional activity within CNPq since its creation in 1951. It is coordinated and implemented at the international cooperation advisory ASCIN, which is directly linked to the presidency of CNPq.

PROGRAM COUNTRY

ASCIN possesses different international cooperation financing mechanism to support joint research projects of high quality, mobility of researchers, and training of researchers and qualification of human resources, aiming to promote Brazilian scientific and technological development, in accordance to the orientations of the National Policy on Scientific and Technological Development.

Brazilian researchers are offered a series of opportunity to: 1) initiate a new collaboration through the mobility of researchers involved in joint research projects; 2) consolidate effective international partnerships; 3) coordinate collaborations by means of international networks; or 4) develop partnerships with virtual laboratories such as the International Associated Laboratories (LIA's).

In accordance to the 2007/2010 Action Plan – Science, Technology and Innovation for National Development, CNPq's international cooperation seeks to enhance and streamline the management of thee cooperation instruments, diversify and expand the strategic partnerships with developed countries and countries under development.

Thus, emphasis is given to the increase of research interaction with countries of South America (PROSUL) and Africa (PRO-ÁFRICA), aside from the qualification of foreign human resources in Brazil (PEC-PG, Partnership CNPq/TWAS and CNPq Scholarship Program – Mozambique). The cooperation with developing countries and with those in interaction with third countries is promoted through joint R,D&I programs (IBAS, Brazil-India-South Africa).

Following are the current programs which are in place:

- South American Program for the Support of Cooperation Activities in Science and Technology – PROSUL;
- Iberoamerica: the Iberoamerican Program of Science and technology for Development – CYTED;
- Latin America, Caribbean, Africa and Asia: Student Program Agreement/PECPG;
- Africa: Thematic Cooperation Program on Science and Technology – PROÁFRICA;
- Developing countries: Academy of Sciences for Countries under Development – TWAS ;

In addition, CNPq implements thematic programs with the following countries:

- Germany: Atlantic Rainforest Program and Marine sciences.
- Argentina, Canada, Chile, Colombia, United States, Trinidad and Tobago, Jamaica, Mexico and Peru: Inter-American Materials Collaboration – CIAM
- Portuguese Speaking Countries (Africa) Social Sciences Program – CPLP European Union: EULARINET, EULANEST, APORTA projects.

CNPq maintains agreements with over 35 countries through foreign S & T institutions, such as the ones listed below:
Germany (DLR, DAAD and DFG), France (CNRS and INRIA, IRD, INSERM), Spain (CSIC), Belgium (FNRS), EUA (NSF) Argentina (CONICET), Chile (CONICYT), Colombia (COLCIENCIAS), Costa Rica (CONICIT), Cuba (MÊS e CITMA), Mexico (CONACYT), Slovenia (MHEST), Korea (KOSEF), Finland (AKA).

FINEP and International Cooperation

The international actions of the Financer of Studies and Projects – FINEP, a public company linked to the Ministry of Science and Technology – MCT, is focused on the priorities of Brazilian Foreign Policies, prioritizing the diversification of partnerships, by establishing cooperative programs and projects in all continents,

Their main focus lies in promoting cooperation actions with countries in Latin America, African countries, China and India. With Europe, the United States and other "central" countries, their focus is on cooperation on themes of national interest, based on a reciprocity principle.

Among a series of actions developed in all the continents, we would like to highlight the following:

- Technological Cooperation Agreement with Spain – Center for Industrial Technological Development – CDTI
- Cooperation Agreements with France - OSEO, French Financing Agency for Innovation, and ANR - Agence Nationale de la Recherche.
- Program: INOVAR América Latina.
- Actions for Financing Strategic Projects

CDTI (Center for Industrial Technological Development), as well as FINEP, since 1991, are Office Managers of IBEROEKA. The development of Cooperative Business Projects in S, T & I with the participation of Brazilian Organizations reached an investment of US$ 60 million, and attained the accreditation of 135 projects with FINEP within the CYTED Program (Science and Technology for Development).

We would also like to highlight SEGIB's Program of S & T, which has the participation of 19 countries of Latin America, plus Spain and Portugal. FINEP participates in the definition and the formatting of a new Iberoamerican Program of Innovation, and was indicated by the MCT, to become the headquarter of the first Technical Agency of this new Program. The FINEP / OSEO Program is focused on small and medium French and Brazilian businesses, who work together for the development of joint projects of technological innovation, with the support instrument at FINEP of the Inova Brasil Program. In its first phase, inaugurated in 11/2009, 15 projects were presented, of a total value of US$15 million, of which four were considered eligible, totaling US$3.2 million to be presented to request financing.

The Latin America INOVAR Program, from an Agreement with BID – FUMIN, totaling US$0.5 million, has the objective of identifying Latin American Institutions interested in developing specific activities on Venture Capital, promoting the dissemination of good practices and the implementation of programs similar to the Inovar Project in other countries, as well as expanding and consolidating the venture capital industry in the region. To achieve this, missions have already been performed in Colombia, Peru and Chile.

Of the actions financed with countries from the African Continent, we would like to highlight the financing of the Hydrologic and Environmental Monitoring System of Mozambique, utilizing Brazilian satellites, and the A-Darter Project – Agile Darter, short range air missile developed in partnership with South Africa, with a total investment of about US$50 million.

With China, we can highlight the financing of the CBERS Program – a Sino Satellite – Brazil Earth Resources, and the support to the implementation of the Brazil – China Center of Climatic Changes and Innovative Technologies in Energy, of a total of US$ 19 million.

Institutions and Businesses

The Butantan Institute and International Cooperation

The mission of the Butantan Institute (IB) created in 1901 to combat the Bubonic Plague, and to contribute to public health. In order to take on this responsibility, IB performs essential researches, does technological development and produces vaccines, serums and biopharmaceuticals. The Butantan Foundation (FB), a support entity of the activities of the IB, enables technological development and allows for the production, distribution and the marketing of essential products for public health. These institutions, the IB/FB, from the State of São Paulo, are important partners of the Ministry of Health, who offer free immunobiologicals to the entire Brazilian population.

The IB/FB, where basic research, technological development, and production coexist in a same environment, enables Brazil to supply frontier knowledge immunobiologicals. To maintain this level of excellence requires international insertion, both of the scientific literature as well as in production. All of the products made by IB/FB were the object of publications and/or patented.

In 2008 the IB/FB supplied about 200 million doses of vaccines (expressed in antigen produced by IB/FB) and formulated seventy million vaccines for the Ministry of Health. Among the vaccines produced at the IB/FB we can highlight the DPT (diphtheria, Pertussis, tetanus) and the HEPB (Hepatitis B), and among those which are formulated, the seasonal influenza. The next vaccines to be made at the IB/FB include a rabies vaccine produced from purified Vero Cells, a rotavirus vaccine, and a Dengue vaccine. The production of the rabies vaccine

should start in 2010 and the Rotavirus and dengue vaccine factories are currently in the bidding process.

The serum anti, diphtheria, botulinum toxin, snake poison, scorpion toxin, tetanus and rabies produced with contemporary technologies, meet the needs of the Brazilian market and are exported to almost thirty countries. Other serums are under development. An important biopharmaceutical, whose production was developed at the IB/FB with their own technology, is the Pulmonary Surfactant (SF). The SF allows us to avoid the deaths of premature children who are born with the respiratory distress syndrome of the new-born (RDS). Starting at the end of 2010, the IB/FB should be producing enough SF to meet national needs. Other factories which are due to start their production in 2010-2012 are those who will produce a vaccine against influenza, and create the most modern plant of blood products of the world.

Given their vocation to studying poisons of venomous animals; the need to decentralize research in Brazil and with the support of FAPESP and the Ministry of Science and technology, IB/FB installed and advanced campus in Santarém, Pará. At this campus, researchers, students and health professionals, from IB/FB and from the region, offer courses, collect specimens and stimulate research and improve their assistance to victims of accidents with venomous animals.

IB/FB's international presence becomes evident in many ways. The increase of IB/FB's international insertion is due to a course of action which allowed for, based on research and development of immunobiologicals and biopharmaceuticals, the production of products which have been used by millions in the last decade. IB/FB maintains collaboration agreements with prestigious international organizations as for example the NIH (www.nih.gov) and the PATH Foundation (www. path.org). The objective of these international agreements with governmental entities or foundations is to maintain the internationalization of IB/FB, through collaborative research as well as for incorporating new products and technologies. IB/FB has also maintained agreements of technology transfer with large multinational companies. The agreement with SANOFI enabled the construction of a factory for the production of the Influenza vaccine which, by utilizing state of the art technology, will begin their production in 2010. The blood products factory is due to start their production in 2012, the process belongs to IB/FB in partnership with G&E. Additionally, IB/FB, via their researchers, maintains a regular presence at the International Congresses on Vaccines and Public Health, where, on several occasions there are invited as Main Presenters. IB/FB's presence in multilateral agencies of Health, such as WHO and PAHO is permanent

Oswaldo Cruz – Fio Cruz Foundation and International Cooperation

Created in 1900, this foundation is linked to the Ministry of Health, with its headquarters in Rio de Janeiro and institutes and offices in several regions of the country. It performs research activities, renders high quality hospital services, produces vaccines, drugs, reagents and diagnostic kits, offers education and human resource qualification (technical, Masters and Ph.D.), information and communication on health, science and technology, product and services quality control, and implementation of Social

programs. It produces new drugs, biopharmaceuticals, immunologicals and other strategic inputs.

The institution has an ample international performance. It offers master courses in Argentina, Mozambique and Angola. It implemented a factory for the production of essential drugs for the African continent, such as antiretrovirals to combat AIDS.

In the area of production of inputs, Fiocruz fulfills an important role, meeting the needs of immunization programs and emergency situations in several countries. Vaccines against yellow fever were sent to countries in South America, Central America, Africa and Asia. Vaccines against Meningococcal meningitis type A and C were sent to Asia and Africa.

It participates in several international collaborative networks of the Southern Cone, South and Latin America and Ibero America, such as AMSUD-Pasteur, ACTG – Adults AIDS Clinical Trials Network; HPTN – The HIV Prevention Trials Network; Intreragency Network Information for Health and the International Network on Geography of Health, among others. Among the several major institutions in the European and North American Continent who develop projects of research, of teaching, of communication and information with the several units of Fiocruz, we have: National Institute of Health, Center for Disease Control, Fogarty International Centre, Johns Hopkins, University of Massachusetts, Cornell and California University, in the USA; Pasteur Institute, INSERM, CNRS and IRD in France; Health Institute Carlos III, University of Barcelona and of Valencia, in Spain; and the Institute of Tropical Medicine in Antwerp, in Belgium.
Fiocruz also develops joint ventures in the areas of health with international agencies such as OPAS, OMS, UNAIDS, UNICEF, UNESCO, and also with international associations in the area of public health.

Embrapa in the World

The Brazilian Company of Agricultural Research (Embrapa), linked to the Ministry of Agriculture, Livestock and Supply, was created on the 26th of April of 1973. Its mission is to enable research solutions, development and innovation for the sustainability of agriculture, to benefit the Brazilian Society.

Embrapa works through 45 Units of Research and of Service and through 14 Administrative Units, being present in almost all the States of the Federation, in the most diverse Brazilian biomes.

In order to assist in the construction of Brazil´s leadership position in tropical agriculture, the Company invested, above all, in the training of human resources: it has today 8,692 employees, of which 2,014 are researchers – 21% holding Masters degrees and 71% with Ph.Ds. The Company´s budget in 2009 was of about US$800 million.

The National System of Agricultural Research (SNPA) is under Emprapa´s coordination, and is composed by federal and state public institutions that, in a cooperative way,

execute research in different geographic areas and different areas of scientific knowledge.

Technologies generated by SNPA have changed Brazilian Agriculture. A set of technologies for the incorporation of the Cerrados into the production system has made the region responsible for 67.8 million tons, in other words, 48.5% of the Brazilian production (2008). Soy beans were adapted to Brazilian conditions and today the Country is the second producer in the world.

The offer of beef – of which Brazil is the second largest producer in the world – and of pork, was multiplied by 5, while the offer of chicken – in which the country occupies 3rd place in the production of the world, increased 21 times (in the period between 1975/3008). The production of milk increased from 7.9 billion in 1975 to 27 billion of liters in 2008 and the Brazilian production of vegetables, increase from 9 million tons, in an area of 771.36 thousand hectares to 17.5 million tons in 806.8 thousand hectares in 2006. It is also worth mentioning Brazil´s leadership in the world´s production of coffee, being the main producer of Arabica coffee and holding second place in the production of Conilon coffee. Aside from coffee, Brazil is also the world´s main exporter of orange juice, sugar, ethanol, beef and chicken. It holds in general, the position of third main agricultural exporter of the world, behind the USA and the European Union only.

In addition, specific research programs managed to organize technologies and production systems to increase the efficiency of family agriculture and incorporate small producers into the market, improving their income and their well-being.

In the area of International cooperation, the company maintains 68 technical cooperation agreements with more than 46 countries, 89 foreign institutions, mainly dedicated to agricultural research, aside from multilateral agreements with 20 international organizations, mainly involved in partnership researches and transference of technologies.

To assist in these efforts, Embrapa established partnerships with labs in the United States and in Europe (France, Holland and England) to develop researches in state of the art technologies. These “Foreign Virtual Labs” (Labex´s) have the physical basis of Agricultural Research Service (ARS) of the United States, in Beltsville (Maryland), of Agropolis, in Montpellier in France, of the University of Wageningen, in Holland, and of the Research Institute in Rothamsted, in England. More recently the Labex-Korea was created, in Seul in South Korea.

With these initiatives, researchers from Embrapa and from these other countries have been granted access to the highest technologies in the areas of natural resources, biotechnologies, computer science, precision agriculture, bioenergy, among others.

With regards to the transference of technologies to the countries under development (South – South Cooperation) we can highlight Embrapa´s transference of technology projects in the African Continent (Embrapa Africa, in Ghana), in the South American Continent (Embrapa Venezuela), and in Central America and the Caribbean (Embrapa Americas, in Panama).

This initiative has allowed for a greater dissemination of the technologies and innovations of tropical agriculture developed by Embrapa and SNPA, and to better meet the requests and demands of the countries of these continents by means of Embrapa´s collaboration towards their agricultural development.

Petrobras in the World

Petrobras is today one of the great petroleum companies of the world, and in January of 2010, became the fourth energy company of the world, in terms of market value, according to data from the PFC Energy Consultancy. It also became one of the, if not the most important, petroleum companies operating in deep waters. Its proven reserve is of more than 14 billion boe and it's possible that it doubles this amount in the next three years.

The history of Petrobras is a successful one, build on good management, with the enhancement of its human resources, and due to investing in research and development during decades before reaching its current peak. In this process, it involved dozens of academic institutions in the country, universities and research institutions, stimulating high quality scientific-technological research and promoted, in several cases, the necessary infra-structure. Petrobras´ participation in the advancement of S, T & I in the institutions which are not part of their company, in Brazil, has been extraordinary, of which R$400 million from the contractual obligations of investments in P & D were used in 2009. It is also important to mention that in this same year, the sum of resources from the Sectorial Fund for Petroleum and Gas was of about R$800 million.

Activies Abroad – Companies/representative offices / operational contracts in 26 countries (aside from Brazil):

Exploration and Production; refining; pipeline transportation; marketing and distribution; gas and energy; petrochemical; electricity: Argentina
Exploration: Australia, Cuba, India, Libya, Namibia, Portugal, Tanzania, Turkey
Exploration and Production: Angola, Ecuador, Nigeria, Peru, Venezuela

Representative office: China, Singapore, Iran, United Kingdom
Exploration and Production; pipeline transportation; gas compression: Bolivia
Marketing and distribution of fuel: Chile
Exploration and Production, distribution: Colombia
Exploration and Production, refining: United States
Headquarters of Petrobras International Braspetro B.V.; Representative office: Holland
Refining: Japan
Participation in E&P service contract: Mexico
Marketing and distribution of fuel: Paraguay
Exploration, natural gas distribution, markieting and distribution of fuel: Uruguay

Oil Fields in deep waters: Petrobras´ passport for success in the USA

Petrobras is present in the North-American portion of the Gulf of Mexico since 1988 and operates in the exploration of 211 blocks in the region, being one of the leading companies in the exploration of the Lower Tertiary, in the deep waters of the Gulf of Mexico, with participation in the discovery of Tiber, Stones, St. Malo, Cascade and Chinook.

The Tiber field, discovered in 2009, is currently in the assessment and delineation phase. Petrobras has 20% participation in this field, which is operated by British Petroleum (62%), in partnership with ConocoPhilips (18%).

The Stones field, in which two wells have already been drilled, is in the process of selection of the several development systems of production. Petrobras has 25% participation in this field, which is operated by Shell (35%), in partnership with Marathon an ENI, with 25% and 15% respectively.

The St. Malo field, in which four wells have already been drilled, is in the advanced process of detailing and contracting of the several development systems of production. Petrobras has 35% participation in this field, which is operated by Chevron (51%), in partnership with Statoil, Exxon and ENI, with 21.5%, 1.25% and 1.25% respectively.

Petrobras is the operator of the Cascade and Chinook fields, located on the Walker Ridge quadrant on the Gulf of Mexico, about 250 kilometers from the coast of the State of Louisiana, at a water depth of approximately 2600 meters. The reservoirs are located at an approximate depth of 8000 meters from sea level. Petrobras holds 100% participation in Cascade and 66.7% in Chinook, which is being developed in partnership with TOTAL E&P USA (33.3%). Cascade and Chinook are currently in the advanced phase of development, with production anticipated for 2010.

The development of the Cascade and Chinook fields is stamping Petrobras´ passport as a success story in the United States. With this project, the company will totally change its way of operating in the waters of the region, where successful technologies used in Brazil are being used. Both fields are being developed simultaneously, are will serve as a stage for the implementation of the first platform ship FPSO (floating production, storage and offloading) of the American Gulf of Mexico.

Production of Petrolium in 2009 (Brazil and abroad)

Petrobras' average production of petroleum and natural gas in Brazil in 2009 was of 2,287,457 barrels of oil equivalent (boe), indicating a growth of 5.1% of the volume produced in 2008 of 2,175,896 barrels per day. The volume of natural gas produced by the company in the country was of 50 million 343 thousand cubic meters/day, maintaining the same levels of production of 2008, as a consequence of the decrease of demand in country.

Adding the volume of the fields located in the countries where Petrobras works abroad, the total daily average of the company increased to 2,525,260 barrels of oil equivalent (boe), 5.2% more than the 2,399,958 boe/ per day produced in 2008.

The average production of petroleum abroad in 2009 was of 140,576 barrels/day, which represents an increase of 13.7% compared to 2008. Whereas the average volume of natural gas produced in 2009 was of 16,519 cubic meters per day, representing a reduction of 3.2% compared to 2008. The total production of barrels of oil equivalent abroad reached 237,803 boe/day, 6.1% higher than the previous year.

The increase was due to the company's entrance in the Akpo field, and in new wells in the field of Agbami, both in Nigeria. Whereas the variation in the volume of natural gas is a result of the decrease and demand for gas in Bolivia.

In the month of December of 2009 Petrobras' daily average of production was registered as follows:
- 1,987,098 barrels/day of petroleum with an increase of 6% compared to the same month in 2008, where 1,875,514 barrels/day of petroleum were produced, and maintained itself at the same level of volume produced in 2009;
- 50,981 million cubic meters of natural gas with a small decrease in comparison to the 52,257 million cubic meters of natural gas produced in 2008 and at the same levels of production of November 2009;

- 2,307,758 barrels of oil equivalent (petroleum and gas), with an increase of 4.7% compared to the 2,204,203 boe/day, produced in December of 2008 maintaining itself stable with regards to previous months.

Amazonia in a Regional Context
Organization of the Amazon Cooperation Treaty (OTCA)

Upon realizing that in order to supply responses to environmental problems and attain sustainable development, a work of cooperation which surpasses national frontiers is needed, therefore the eight countries which share the Amazonian ecosystems signed the Amazon Cooperation Treaty (TCA) in 1978. Aware of the needs for strengthening this valuable tool which enables then to search and adopt common views with regards to the complex and diverse regional problem, Bolivia, Brazil, Colombia, Ecuador, Guiana, Peru, Venezuela and Suriname created, a bit over two years ago, the organization of the Amazon Cooperation Treaty (OTCA), whose Permanent Agency is located in Brasilia.

Regional cooperation is essential to further develop the knowledge about the potentials of the Amazon and ensure that, together with science and technology, solidarity becomes the base for regional development. To increase communication among the countries, intensify the intra-regional exchange and develop common lines of research which take advantage of the capacity installed in the Amazon are ways of enhancing the works developed nationally and support public policies which meet the needs of the population. In this regards, we can highlight two joint work experiences: those of the Association of Amazonian Universities (UNAMAZ) and the Cooperative Program of Research and Technology Transference for the South American Tropics (Procitropicos).

OTCA also fosters the development and implementation of a policy of science and technology for the Amazon countries, which increases the national and regional capacity of developing an ample evaluation program on sustainable use of the biodiversity of the Amazon.

The countries signatories of the Treaty of Amazonian Cooperation articulate among themselves, with the ambition of performing joint efforts and actions which promote a harmonious development of their respective territories, in such a way that these joint actions produce equal and mutually beneficial results. Moreover, for the preservation of the environment and the conservation and rational use of the natural resources of these territories, considering that the Amazon possesses unique biological and cultural treasures: being the biggest hydrographic basin in the world, in terms of volume, and contains approximately 20 percent of the planet´s freshwater; is the home to approximately 30 million inhabitants; possesses enormous energy and mineral resources; gathers species of mammals, birds, insects and fish in an incomparable way; possesses hundreds of species of fruits and marketed forest products and more than 2 thousand identified and classified plants used for medicine, as food and for industrial purposes.

This is only one idea of the potential of the Amazon; but this fabulous biodiversity needs to be associated to scientific and technological transformation, which could multiply the economic and social dimension of the region. A great part of the riches of the Amazon are still unknown and unexplored. Based on this, the future of the countries will be determined by their capacity of utilizing knowledge and the information they possess, although still fragmented, added to the technological advances and the traditional knowledge of the people of the Amazon. Information, science and technology, and traditional knowledge: these four joint and harmonious pillars can transform the reality of the region.

This is one of the alternatives which we believe has a good chance of being successful in reversing the destruction cycle, which unfortunately, has accelerated in the last 50 years. At the same time, it is essential to create new alternative mechanisms to improve the quality of life of local populations. For, notwithstanding the extraordinary richness of their surroundings , the Amazonian people are among the most disadvantaged inhabitants of the countries signatories of the OTCA. The increase of the agricultural and livestock frontier, based on unsustainable ways of use of the land, the prescribed burning, the illegal commerce of fauna and flora species, the increasing urbanization of the region and the consequent consumption of natural resources, aside from the indiscriminate use of the environment as a deposit of waste, has forced local communities and our nations to pay a high share of debt to the environment, which we all have, contributed to create in the Amazon.
Source: Treaty of Amazon Cooperation, Article I; The central role of science and technology in the search for alternative mechanisms for the future of Continental Amazonia, OTCA.

Acknowledgements

It is impossible to tell such stories of success of the advances of Brazilian science and of our international presence, aside from projecting perspectives for the future, without the collaboration of colleague scientists and technicians from investment agencies, institutions and companies here mentioned. I therefore would like to express my most profound thank you.

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