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RESEARCH IN ECONOMICS AND RURAL SOCIOLOGY

THE BRAZILIAN SOYBEAN IS COMPETITIVE, BUT AT WHAT COST TO THE ENVIRONMENT?

Brazil is at the centre of the debates on the world analysis of agricultural and agro-food dynamics thanks to its performance in terms of competitiveness on the international markets, but also because of the risks run by the environment as a result of the development of its intensive model of agricultural production. Its weight considerably intensified in the commercial talks held in the World Trade Organization (WTO) context as its share in the world production and trade increased. The continuing expansion of its agricultural frontiers and the modernization of its agriculture helped Brazil to increase its agricultural and agro-food exports rapidly, especially soybean, poultry and pork meat exports on top of more traditional ones like sugar or coffee. At the same time, it became a major actor in all the talks regarding environmental protection, especially as far as Amazonia is concerned. The case of the accelerated development of soybean crops illustrates quite well the challenges Brazil has to face. Is the expansion of the “soybean complex” in the Northern parts of the country a chance or a threat?

The performance of Brazilian agriculture and agro-food

Brazil has become a major actor in the WTO international negotiations, especially on the agricultural issues. It has demonstrated its ability to unite a sufficient number of countries to support its position in order to foil the compromises elaborated by the usual actors (United States, European Union) who, from now on, must take Brazil into account. The power of its agriculture and related sectors has something to do with this major change.

An imposing agricultural and agro-food potential

With its 185 million inhabitants (but less than 9% of farming workers) and its 8.5 million square kilometers, Brazil is one of the leading agricultural and agro-food producers in the world. Its vastness, 4000 km from North to South and as much from East to West, raises serious infrastructure problems even if the quasi-absence of mountainous regions makes transports, farming and livestock activities easier. Paradoxically, Brazil does not cultivate much more than 50 million hectares, a third of which is used for soybean and the rest for maize, rice, wheat, sugar cane and cotton. Permanent crops (coffee, citrus fruit, other fruit) occupy about 8 million hectares and remain a basis for Brazilian traditional exports (coffee) and new ones (orange juice, mangos). Cattle breeding, practiced in an extensive way, uses about 180 million hectares of pasture, half of which is natural pasture, for more than 180 million heads of cattle. Poultry farming, dairy and pig products have also seen major growth by using intensive breeding techniques that are made competitive by the availability of raw materials such as maize and soybean-cakes, among others.

Upstream and downstream, agriculture is controlled by powerful industrial sectors, services and distribution, what Anglo-Saxon people refer to as “*Agribusiness*”, or “*Agro-negocio*” in Portuguese. In 2003, this complex sector represented 33.4% of the Brazilian GDP. It is the leading economic sector in the country (like in the United States). Agriculture and livestock represented 30.3%, upstream industries 6.4%, agro-food industries 30.8% and food distribution 32.4% of the total amount. In 2004, this represented 41% of the country’s exports with a trade balance of 34 billion dollars.¹ In this way, its largely contributed to the restoration of the Brazilian trade balance. We may add that with the “Proalcool” project (1972) aiming at using sugar cane to produce biofuels, Brazil took the lead in the use of renewable agricultural resources to produce energy.

The weight of Brazil on the world markets increases

The weight of Brazil on the agricultural and agro-food world markets remained steady as regards traditional exports (chiefly sugar and coffee) and large gains were made with “new” products competing with similar products from industrialized countries, such as soybean and its by-products (oils and soybean cakes), poultry meat, and orange juice (graph 1).

For wheat, Brazil remains an importer structurally. Imports chiefly come from Argentina, the integration agreements between both countries for this product being consolidated within the framework of MERCOSUR.

¹ See Gasques J.G. and al. (2004) *Desempenho e Crescimento do Agronegocio no Brasil*. Brasilia: IPEA, Texto para discussao n° 1009, fevereiro, 39p.

The positions of Brazil in the international negotiations at the WTO

Brazil is a member of the CAIRNS² group which was created during the GATT trade talks, then the WTO talks, by its ultra-liberal positions on agriculture, recommending the removal of all kinds of subsidies to this sector. In September 2003 at the Cancun conference, it led the way among the “Group of 20”³ which opposed the Euro-American proposition of compromise on the agricultural issue, leading to the failure of this summit.

In July 2004, the difficult re-opening of the negotiations at the WTO, after the positive results obtained, from the Brazilian point of view, in the panels on cotton against the United States and on sugar against the European Union strengthened further the interest in understanding how public policies operate concerning the agricultural sector and more generally the food system in Brazil.

From 1992 on, Brazil started to liberalize its agricultural and agro-food exchanges, reduced the level of subsidies to certain sectors (wheat, sugar, dairy products) and gave up its policy of export subsidies; but, not all interventions were suppressed because of the strategic role of this agricultural sector, as much for the domestic food supply as for its positive contribution to the trade balance.

Although it is true that protection of the agricultural sector in Brazil has decreased since the beginning of the 1990s, the country has kept and improved its tools of regulation (policy of storage) and of public intervention (subsidized loans, development of infrastructures, research) which remain essential to correct the imperfections of the market and help it stay competitive on the domestic or international markets.

The trade talks in process at the WTO – in spite of the failure of September 2003 in Cancun – focus on three fields: access to markets, domestic support to agriculture, and export subsidies.

The positions defended by Brazil, such as they were presented by the Brazilian Ministry of Agriculture as early as 1999, were the following:

- Like each member of the Cairns group, it asks for **the suppression of agricultural export subsidies**, an essential condition for these countries to achieve the liberalisation of trade. We shall note that the European Union took a step in this direction by calling into question its own system of export refunds.
- On the **access to the market**, the basic idea is to cut the present tariffs by taking as a basis the rights consolidated in Brazil at the end of the starting period of the agricultural agreements of the Uruguay Round (1995), and by taking into account the fact that farm products have higher tariffs than

industrial ones. In fact, it is a matter of proposing a substantial reduction of pricing peaks.

- On the **domestic support measures**, the aim of the Brazilian propositions is to reduce as much as possible the distortions originating from the use of domestic support measures.

We may point out that, with the creation of the MERCOSUR in 1995, Brazil committed itself to a process of suppression of custom duties with its partners (with some delay for certain sensitive products like sugar), with the fixing of a common external tariff (at the beginning, 15% on average) which protects its domestic market. In this way, Brazil is true to its liberal credo and does not hesitate to act at the WTO level to institute proceedings against the protectionist measures of industrialized countries, with some success (cotton, sugar). However, it seems more ready to accept compromises and take into account the results already obtained during previous negotiations.

The factors of Brazilian competitiveness in agriculture and agro-food

In our opinion, the recent strengthening of the weight of Brazil in the WTO negotiations can be explained by the increase in importance of its agricultural and agro-food networks, especially the ones built around products like sugar, orange juice, poultry and pork meat and, above all, soybean. This last example helps us illustrate the competitiveness issue.

The command of technology and the role of public policies

Through their innovation activity and their search for outlets and the lowest costs and prices, firms play a key role in creating a competitive national system associating national and multinational firms. In the case of the Brazilian “soybean complex”, and as early as the beginning of the 1970s, most of the big foreign groups invested massively in the sectors of soybean crushing, international trading, mechanization and industry of fertilizers and plant-care products. This inflow of foreign capital produced the formation of powerful national, private and cooperative groups.

Among the key factors in the competitiveness of Brazilian soybean and as well as the know-how and mobility of the Brazilian producers in so vast a space, we must mention **the part played by the subsidized credit**, particularly in the starting period of the 1970s, and **the public research effort** carried out by EMBRAPA (Public Brazilian Institute for Agronomical Research) since 1972. The work on the varietal improvement and adaptation of the soybean varieties to the different agro-ecological conditions of the country, and the implementation of new agricultural practices (direct sowing) diffused by a spreading device set up by cooperatives and private firms, led to a significant rise in soybean yields and allowed Brazil to catch up with the United States (graph 2).

The second key factor is the credit policy, closely linked, like in the United States, to agricultural support via minimum prices and a policy of market regulation by storage. In the 1970s and 1980s, credit and minimum prices were closely linked through a calculation of the cost of

² Created in 1986, it includes 18 countries among which South Africa, Australia, Argentina, Bolivia, Brazil, Canada, Chile, Colombia, Costa Rica, Guatemala, Indonesia, Malaysia, New Zealand, Paraguay, Philippines, Thailand, Uruguay, Fiji islands.

³ Which includes Nigeria, Tanzania, Zimbabwe, South Africa, Argentina, Bolivia, Brazil, Chile, China, Cuba, Egypt, India, Indonesia, Mexico, Paraguay, Philippines and Pakistan.

“productive advances” or *custeio* (amount of operational production costs). In those years of sometimes galloping inflation (the 1980s), complex systems of indexation maintained a level of agricultural subsidy by the public credit administered by the Bank of Brazil (Bertrand J.P., Hillcoat G., 1996). We shall note that in the context of the macro-economic policy of stabilization implemented since the beginning of the 1990s, the basic tools of agricultural policy have been modified within the framework of liberalization and privatization: public funds to agriculture have increased (graph 3) but the State has offloaded the attribution operations onto the private banking sector. For instance, the government-subsidized loans – in 2003, 8.75%, for the agricultural rate against 19% for commercial rates – remains an essential tool for the development of production and the industrial equipment which goes with it. However, agricultural protection especially that linked to tariffs and high minimum prices has decreased. For a great number of products, producers are now faced with international prices.

An idea of the farm-gate **cost competitiveness** of the Brazilian soybean may be given by a comparative analysis of soybean production costs carried out by a team from USDA (table 1). It shows that, in 1998-1999, the variable costs of soybean production were lower in the United States than in Brazil or Argentina, but that the fixed costs, especially land costs, were three times lower in Brazil than in the United States. We should note that the Mato Grosso producer seems more competitive, at farm-gate, than the American or Argentinean one. But this advantage disappears when account is taken of the transport costs from the export harbours of Paranaguá or Santos located more than 2000 km from Cuiba, the capital of the State of Mato Grosso (figure 2).

The effects of the devaluation of the Real on agricultural competitiveness

At the end of the 1990s, several exporting sectors complained about the decline in their competitiveness and in January 1999 looked favourably on the government decision to devalue the *real*. However, not all of them benefited from it in an immediate or equivalent way.

For products like soybean cakes, poultry meat (graph 4), sugar and coffee, devaluation had important and positive effects. However, for orange juice, for which entry barriers exist on the American market, devaluation did not impede the erosion of Brazilian positions.

For the vast majority of Brazilian agricultural and agro-food products, the effects of the devaluation of the *real* were only fully felt from 2001 on: the agricultural and agro-food trade balance was restored and showed surpluses of 19 billion dollars in 2001 and more than 20 billion dollars in 2002, contributing to the readjustment of the Brazilian global balance trade: respectively 2.6 and 13.1 billion dollars.

From 2004 on, the *real* started to rise against the dollar thanks to the relative good health of the Brazilian economy (control over inflation, advance repayment of external debt). Consequently, the competitiveness of most farm products instantly suffered, except the exports of soybean grains, the demand of which did not weaken.

The territorial boom of the Brazilian soybean complex and the conquest of the international market

The soybean boom has been continuous since the beginning of the 1970s. Cultivated on less than 250,000 hectares at the beginning of the 1960s, soybean is now the main Brazilian crop with 22.9 million hectares cultivated in 2005 and a production of 50.2 million tons. After starting in the Rio Grande do Sul and in Paraná in the 1970s and 1980s, soybean crops spread to the Centre-West (Minas Gerais, Goiás, Mato Grosso do Sul) before reaching the States located further to the North in the 1990s, carrying on the development of the *cerrado* and settling on the plateaus better adapted to mechanized farming (figure 2). Although some macro-economic crises, especially in the 1980s – strong inflation, debt crises – momentarily halted its progress, today this crop has reached the States bordering Amazonia, particularly Mato Grosso.

For the first time during the 2005/2006 campaign, transgenic soybean will be legally cultivated, which poses the question of the future of the traditional sector supported by quite a number of European actors, cooperatives and distribution groups.

Soybean spreads to the tropical zones

The proportion occupied by soybean in the Brazilian cropping area (today more than one third) has increased constantly and has reached the North of the country. This soybean front is not only agricultural but also contributes to the agro-industrialization of agriculture and local cattle-breeding. In world production and, particularly, in the agro-industrial processing and world trading of grain, oils and soybean cakes, the place of Brazil rapidly increased before being challenged by Argentina. In this country, soybean settled in the humid Pampa, substituting pastureland and/or maize. Since 1997, most soybean sown has been transgenic. The storage and industrial processing plants are very much concentrated around Rosario, along the river Paraná.

In Brazil from the middle of the 1970s, and ten years later in Argentina, the decision to process soybean on-site and build crushing plants were taken by the firms and States, allowing both countries to rapidly beat the United States on the international soya cakes and oils markets. The importing countries, Europe and Japan, which were looking for a diversification of their supply, strongly encouraged this evolution (graph 5).

At the end of the 1990s, India and China, anxious to develop their own crushing capacities raised their tariffs on soybean cakes and oils. These two countries, which had become the main importers of semi-processed products, switched to grain purchases, thereby favouring the Northern States of Brazil.

The consequences for the environment: the case of Mato Grosso

As soon as the complex Amazonian eco-systems are concerned, a singular feature of the dynamics of the soybean front is that a process gets under way resulting in implementation of a simpler system of production – the soybean-maize model – which is fast expanding and has

numerous effects on agriculture, cattle ranching and more generally the environment. Must we keep on reasoning in terms of economic competitiveness? How can the potential deteriorations of the renewable resources and, more generally, the effects of the soybean boom on the environment be taken into account?

In 1996, the Mato Grosso had the largest reserve of wooded savannah in Brazil with almost 42 million hectares in the category listed “*cerrados*”. But, since 1999, it has also become the leading soybean producing State in the country, and has thus started to draw from this reserve in a significant way.

The main economic factors explaining the advance of the soybean area in the Northern areas of Brazil are the following:

- The existence of “free” lands is the fundamental factor in the advance of the soybean area, along with low land prices which are attractive to migrants. Most of them come from the Southern States (Rio Grande do Sul, Santa Catarina) and more recently from the West-Centre, often after several migration stages. In these “virgin” areas, producers may either buy land from producers already in place, most of the time cattle- breeders, or take over public lands, ownership being conditional upon the cultivation of these lands. This second method is much longer and uncertain. Once the land has been cultivated, it obviously gains in value and prices rise. The price differential between the lands from the South and the ones from the border is sufficient to maintain a large flow of migrants. On these pioneering fronts, although the lower price attracts producers of all sizes, the disparity which characterizes the Brazilian agrarian structure reappears with the constitution of a group of family “farmers” of an appreciable size, around 800-1000 hectares in the Mato Grosso, the heart of intensive grain production and target of the agro-industrial complex.
- This land improvement cannot be done **without developing infrastructures** (roads, railways, waterways), **without means of production** (seeds and other inputs, machines), without **operating labour markets**, without trader and industrialists to provide **the production outlets** and, in particular, without public policies, which as a general rule have allowed the development of soybean in Brazil (price support policy, credit policy).
- One of the visible results of this soybean boom in the tropical lands is **the high yields of soybean**: 29.5 q/ha on average over the past five campaigns in the Mato Grosso (graph 6), that is to say 4 q/ha more than the Brazilian national average (25.3 q/ha) with equivalent technical practices and above all, nearly 12 q/ha more than the average of the Rio Grande do Sul, a factor which also explains the increase in the flow of migrants coming from the Southern States and going northwards.

All factors considered, until a short time ago, the public incentive policies, the removal of technological barriers as regards the adaptation of soybean varieties, the mobility of producers and different stakeholders, industrialists and traders, added further to favourable external determinants. Strong international demand for soybean, leading to relatively high international prices and a contribution of foreign capital ready to be invested in industrial and trading activities, explain the soybean boom in the Mato Grosso and in the Northern States of Brazil. However, we may wonder whether they are not partly reversible in the short or medium term. Since 2005, international soybean prices have decreased and Asiatic rust attacks have affected crops and have not encouraged producers. For the first time in a long time, the cultivated area and production of soybean have dropped.

Indeed, everything seems excessive in the Mato Grosso case: the quick exploitation of “new lands” after deforestation and/or instead of “degraded” pastures, the very high growth rate of grain production, especially soybean, the level of capital-intensiveness of agricultural practices and the accelerated growth of industrial activities and related services. A real “creation” of soil fertility was achieved with massive inputs of calcareous enrichments and fertilizers, barely tempered by the use of techniques like direct sowing, aiming at preserving the fertility and soil structure.

As far as health and agronomics are concerned, the attacks of Asian rust show the fragility of the “soybean” system accentuated by the simplification of cultural practices. Of course there are solutions, but they intensify the recourse to treatment products and increase production costs. Lastly, the GM issue still remains unresolved in this State, which, for the moment, has decided on non-GM soybeans. But in this field, the reactions from public (EMBRAPA) and private (Foundations) research will have to be taken into account; they will try to preserve the benefits of the effort accomplished over the last few years in the face of new industries like Monsanto, the leader in GM soybean seed.

On the social and environmental level, the boom of crops like soybean or maize in the tropical areas of Northern Brazil is a source of conflict because the soybean front and, more generally, the cultivation of rice or maize are coming in more and more direct contact with environmentally protected areas or Indian reservations. This agricultural development also raises difficult problems in terms of **infrastructure, especially transport and storage**. In this context, at the same time the **Amazonian area** is becoming a new agricultural frontier for soybean and an export platform mobilizing rivers and river ports (Porto Velho, Santarem, for example, where Cargill and Amaggi have set up large capacities of storage and river transport mobilizing the Amazonian basin).

The potential risks of damage to the environment are therefore real but diversified. We must point out that, even though it is a tropical region, the eco-systems affected by the soybean boom are not the same: the wooded savannah does not react in the same way as the dense forest to deforestation and cultivation. Though the direct sowing technique is developing widely, several studies have pinpointed erosion problems in the South-West of the Mato

Grosso where planting in contour lines is lacking. The quality of water may also be affected by the excess of fertilizers or treatment products. They could pollute certain parts of the Pantanal reserve. Lastly, the development of transport infrastructures along the Amazon River and its tributaries will obviously have effects on the environment.

What will be the **agronomical and sanitary risks brought about by the intensification of agriculture in the relatively fragile zones** of the *cerrados* and in the Amazonian forest? These questions refer to the sustainable or unsustainable character of the production model developed on the soybean in tropical zones. Various EMBRAPA and CIRAD teams are working on it.

Conclusion

Being competitive will doubtless remain necessary for Brazil in the context of accelerating globalization, but at what price? Brazil has increased its importance in the international talks, especially at the WTO, and has had major successes in the fight against sugar or cotton subsidies. It is deploying its export system towards Asia, especially China and India. Can soybean production follow the dramatic rhythm of recent years?

And yet, at the same time as these export successes, more than 40 million Brazilians do not get enough to eat, leading the Brazilian government to take measures (food aid, allowances to the poorest families) to try to reduce the gap which lies between the rich and the poor in this country, among the world's most unequal in terms of income and access to land.

Another paradox is the existence of an active agricultural frontier – almost a million hectares a year were added to the cultivated area during the period 1975-2000 – which is an essential characteristic of the running of the Brazilian agricultural and agro-food system. Brazil has the **biggest reserve of land** in the world. For instance, USDA forecasts that Brazil could put into cultivation 1.2 million hectares per year between 2004 and 2013. This is probably exaggerated but it does represent an asset that is little or not available elsewhere. On the other hand, the Brazilian agrarian reform, which started more than 15 years ago, has not yet managed to fully provide land to millions of small landless farmers.

It is necessary to broaden the notion of economic competitiveness in order to take into account the social and environmental effects of the boom of big crops like soybean in the tropical milieu. What is going to happen with the expected drop in international soybean prices? How will producers resolve the complex equation linked to their relative distance from the centres of consumption: an increase in production costs linked to the cultivation of even farther-off lands, adding to the rise in transport costs due to insufficient infrastructures? The opening-up of the region will remain its major problem.

Brazil has great agricultural potential, lands in reserve and stakeholders ready to develop them. However, the model chosen to increase soybean production has concentrated wealth, providing little employment on the agricultural level, and Brazil will face difficult challenges to save its environment and reduce its inequalities. But for this country, agro-exportation remains an agricultural, but also industrial, trump card and it is not ready to give up the fight for less-subsidized international agricultural trade.

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For further information

Bertrand, J.P. (coord.); Pasquis, R. (coord.); Aparecida de Mello, N.; Bolzon, A.; Cadier, C.; Gasques, J.G.; Le Tourneau, F.M.; Mendez del Villar, P.; Piketty, M.G.; Théry, H.; Werhmann, M. (2004). *L'analyse des déterminants de l'avancée du front du soja en Amazonie Brésilienne: le cas du Mato Grosso*. Rapport final d'une recherche financée par le fonds commun INRA-Cirad and CREDAL. INRA, Paris, 236 p.

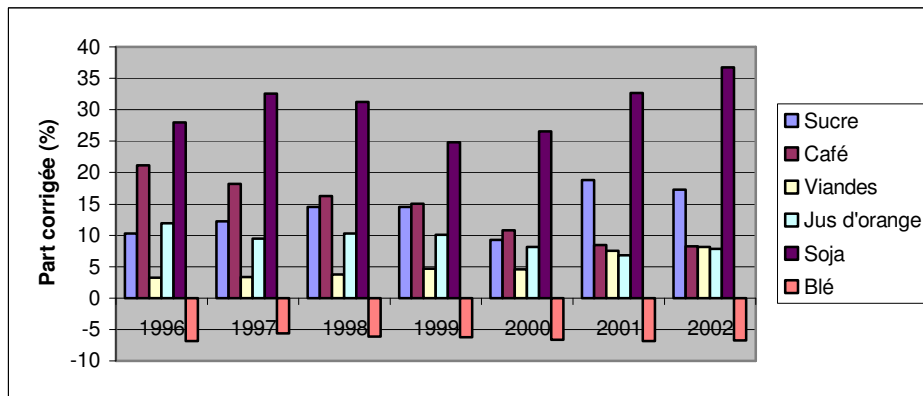
Bertrand, J.P. (2004). L'avancée fulgurante du complexe soja dans le Mato Grosso: facteurs-clés et limites prévisibles. *Revue Tiers Monde*, pp 567-594.

Bertrand, J.P.; Cadier, C.; Gasques, J.G. (2005). Le crédit: un des facteurs clés de l'expansion de la filière soja dans le Mato Grosso. *Cahiers d'études et de Recherches Francophones. Agricultures*, vol.14, n°1, pp 45-51.

Bertrand, J.P. (2005). *Politique agricole, stabilisation macro-économique et politique commerciale au Brésil (1994-2004)*, in: Rainelli, P. (éd.), Les politiques agricoles sont-elles condamnées par la libéralisation? Academia Bruylant/IFRI, Bruxelles, pp 55-91.

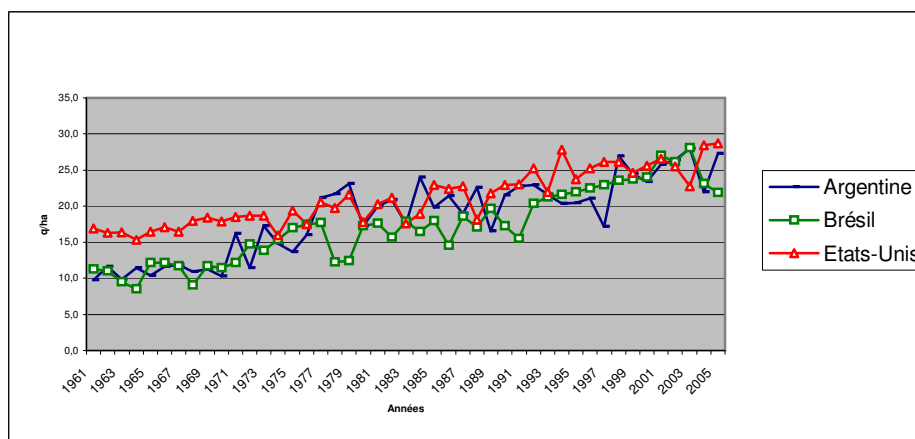
Bertrand, J.P. (coord.); Hillcoat, G.; Théry, H.; Waniez, P.; Guibert, M.; Aparecida de Mello, N.; Souchaud, S.; Burstein, V. (collab.); Mawete, J. (collab.) (2002). *Les principaux facteurs de la compétitivité des filières céréales et oléoprotéagineux au Brésil et en Argentine: politiques des Etats et stratégies des acteurs*. Rapport final d'une recherche financée par l' INRA et la FOP. INRA, Paris, 405p.

Graph 1: Position of Brazil on a few agricultural and agro-food markets of the world (1996-2002)



Source GASQUES J.G. and alii. (2004) Desempenho e Crescimento do Agronegócio no Brasil. IPEA, Brasília, *Texto para Discussão*, n°1009, February
 The position of a country on international markets is a function of the export market share ($X/D*100$) decreased by the import share ($M/D*100$) where D is the world demand for the same product. (See Gasquès and alii., 2004)

Graph 2: Soybean yields in Brazil, Argentina and the United States (1961-2005)

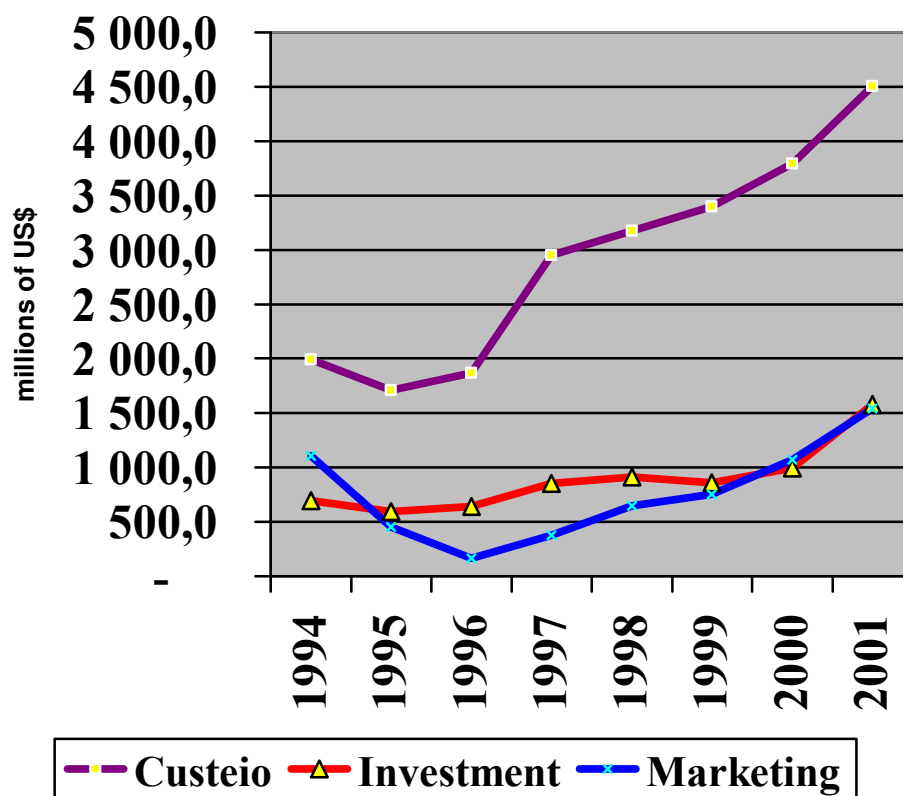


Source: drawn up from FAOSTAT

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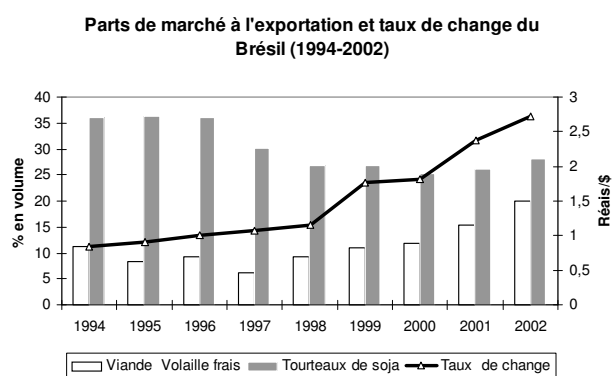
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Graph 3: Evolution of the volume of public funds to agriculture (1994-2001)



Data source: Central bank of Brazil

Graph 4: Export market shares and exchange rates in Brazil



Source: drawn up from FAOSTAT and FGV-PA

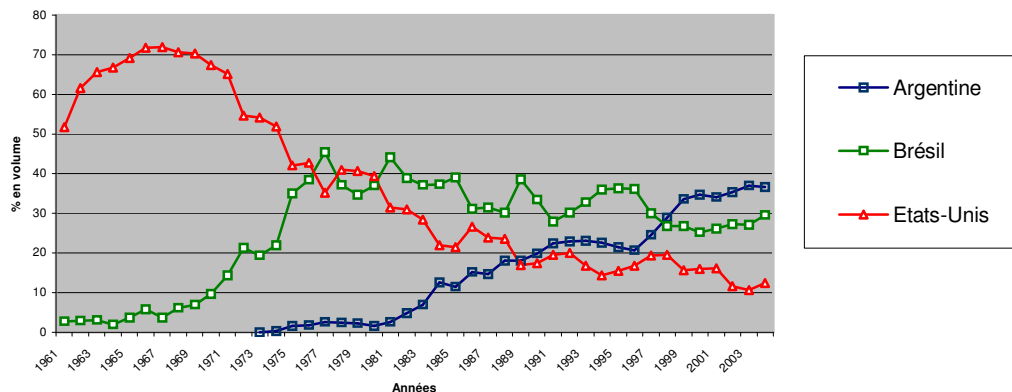
Market share in volume: $X/D \cdot 100$ where X= Brazil export and D the world demand

Right scale = exchange rate of the *real* against the American dollar

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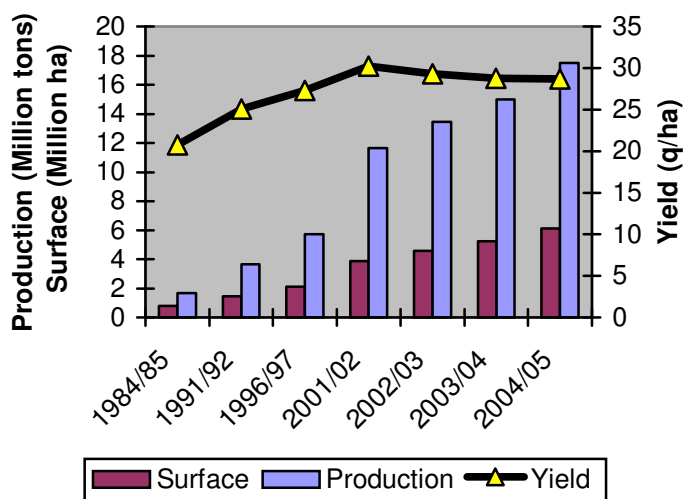
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Graph 5. Evolution of the shares of Brazil, Argentina, and the United States in worldwide export of soybean cakes (1961-2005)



Source: drawn up from FAOSTAT

Graph 6. Evolution of the production, cultivated areas and soybean yields in the Mato Grosso (from 1984-85 to 2004/05)



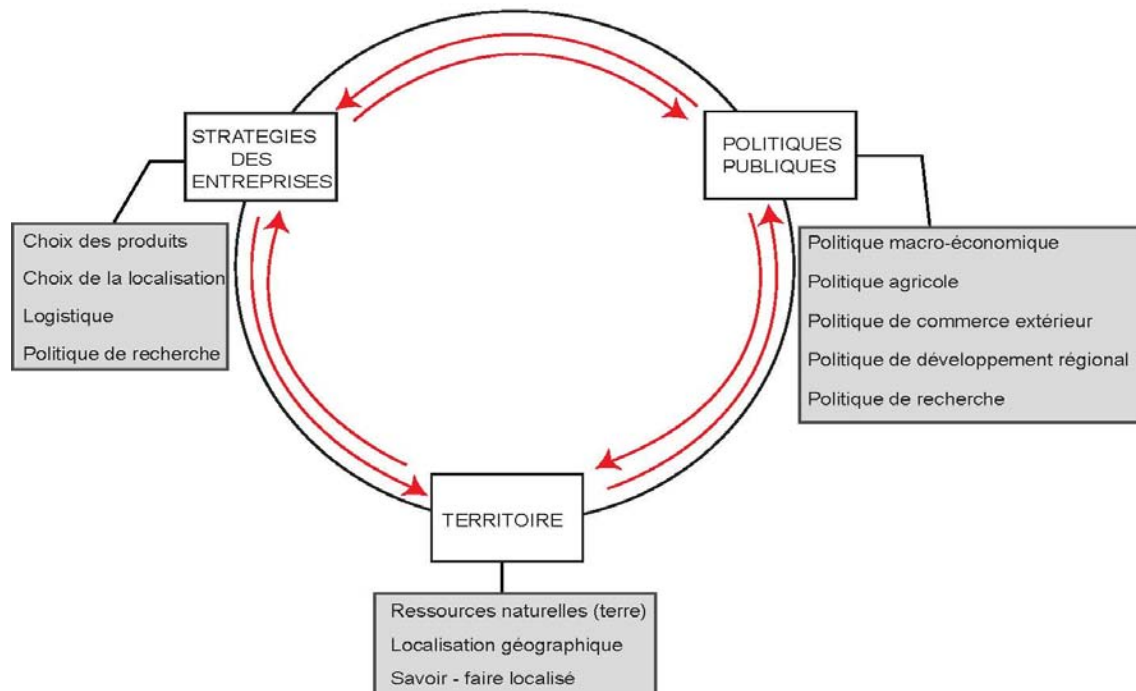
Source: CONAB/Brazilian Ministry of Agriculture

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Fig 1: Main factors in total and territorial competitiveness

Figure 1.1. Les principaux facteurs de la compétitivité globale et territoriale



A systemic approach of competitiveness

There are five types of competitiveness: cost, price, technological, structural and “non-price” (Nezeys B., 1993). Furthermore and transversely, a macro-actor may sustain or handicap the competitiveness of a product-industry: Federal and States policies according to the size of the main States and the political system. There are several sections in public policies: first, macro-economic policy (exchange rate, budget, tax system) and regional development (building of infrastructures), international trade policy, food and agricultural policy and research policy, among others (figure 1).

Competitiveness refers to numerous agents’ decisions linked together by market and “non-market” connections. For each of the components of competitiveness, there is a series of factors which, combined with the measures of economic policy, form the framework for an overall or “systemic” competitiveness specific to each national space.

Furthermore, it is necessary to take the territorial aspects of the competitiveness into account. In a given country, especially one the size of Brazil, regions have their own geographical and cultural characteristics, and specific policies which may make them attractive (quality of infrastructures, natural resources, particular know-how).

The aim of the analysis, in terms of competitiveness, is to discover the original features of this combination of factors and their evolution over time.

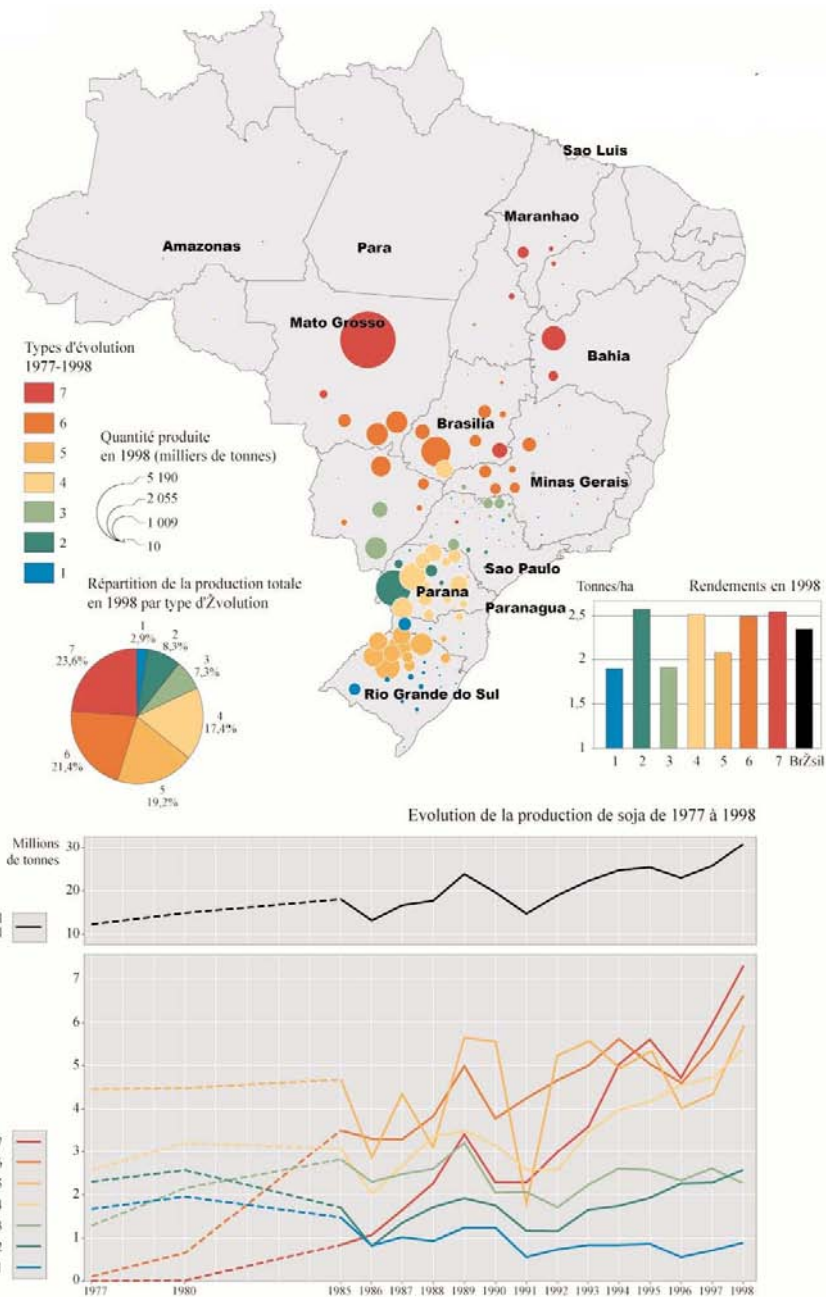
The measurement of competitiveness on international markets may be done in terms of market shares in volume and value. On the domestic market, competitiveness is assessed by the rise in the auto-supply rate or the decrease in the degree of penetration of foreign products.

When appraised in an excessively narrow economic way, competitiveness does not take into account the social effects (increased inequality, exclusions) and environmental effects: deterioration of natural resources, soil fertility and water quality. We present here some examples of the effects of intensive production on the environment.

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Figure 2 - Production of soybean in Brazil (homogeneous micro-regions)



The seven forms or paths of evolution—represented by seven different colours on the map—are fixed by taking into account the quantities produced and their evolution in the past, in each of the 368 homogeneous microregions. These types of paths result from a hierarchical ascendant classification, every year, on the table of contingencies « microregions X quantity produced ». Group 1 (in blue) represents a decreasing development. Groups 2 and 3 represent relatively stabilized paths and groups 4 to 7 quick but sometimes very unstable forms of evolution. Data source: IBGE, Production Agricole Municipale, 1977-1998. Map by Philippe Waniez and Violette Brustlein in Bertrand J.P. and al., 2002

THE BRAZILIAN SOYBEAN IS COMPETITIVE, BUT AT WHAT COST TO THE ENVIRONMENT?

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