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# Trade, Environment and Development: The Brazilian Experience

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**The Working Group on Development and Environment in the Americas**, founded in 2004, brings together economic researchers from several countries in the Americas who have carried out empirical studies of the social and environmental impacts of economic liberalization. The Working Group's goal is to contribute empirical research and policy analysis to the ongoing policy debates on national economic development strategies and international trade. The Working Group held its inaugural meeting in Brasilia, March 29-30, 2004. This paper is one of eight written for the Brasilia meetings. They are the basis for "**Globalization and the Environment: Lessons from the Americas,"** a policy report published by the Heinrich Böll Foundation in July 2004.

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# Trade, Environment and Development:

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## Introduction

The outlook of Brazilian economy, as it emerges from the neoliberal reforms implemented in the last decade, poses a difficult challenge to the sustainable development of the country. This paper argues that there is a need for reconsideration of the conventional methodologies applied to the study of the relationships of mutual causality involving trade, environment and development, giving priority to historical-inductive approaches. Developing this line of thought, the paper begins by reviewing studies that address the linkages between trade, environment and development in Brazil, focusing on two topics: (a) the sustainability assessment of foreign trade and its relation to trade reforms; and (b) environmental requirements and technical barriers faced by Brazilian exports. The analysis of such studies and of the recent performance of Brazilian economy makes it possible, first, to identify which areas are still in need of further research, and then to develop recommendations for policies destined to foster a positive interaction of trade, environment and development. Internally, we recommend fostering stronger linkages between trade and environmental policies, which can be promoted by inserting the commitment to sustainability in two topics that receive the foremost attention from official trade policies: building up competitive productive chains and overcoming technical barriers to trade. Regarding multilateral trade negotiations, we emphasize the importance of solving the implementation issues of the SPS (Sanitary and Phytosanitary Measures) and the TBT (Technical Barriers to Trade) Agreements promoted by the World Trade Organization (WTO), especially making operational the rights to technical assistance and cooperation that are established by these agreements.

## Economic Liberalization: Challenging the "Scale" Effect

Since the early 1990s, economic reforms aiming at promoting a closer integration of the Brazilian economy into the world economy were implemented during the Fernando Collor de Mello administration (1990-1992) and continued with renewed impulse over the two terms of office of Fernando Henrique Cardoso (1995-2002), especially during the first one (1995-1998).

Over the last twelve years, the performance of Brazilian economy very clearly contradicts the dynamic effects predicted by the proponents of economic neo-liberalism. *Per capita* GDP, after a marked downfall at the beginning of the 1990s, has, in the last few years, shown a meager recovery, returning to values comparable with those of the 1980s (below US$ 3,000). In other

words, the *per capita* income in the country has stagnated at values equivalent to those of the so-called "lost decade" (see figure 1).

The stagnation of the economy in this period is further confirmed by the rise and persistence of high unemployment rates – around 8% in the main metropolitan regions in the last five years (see figure 2).[1]

The social consequences of such a low economic growth in Brazil are still more perverse as a result of the persistence of high rates of concentration of income in the period subsequent to the economic liberalization, as shown in figure 3. In 2003, the Gini Index showed an acutely unequal distribution of income, well above the Latin Amercan average.[2]

Concerning the trade impacts of the economic liberalization, the Brazilian case confirms the general trend observed for many developing countries, i.e., that economic liberalization has been unable to promote a more dynamic integration of these countries into the world economy (UNCTAD, 2002).[3]

Brazilian imports outstripped exports between 1992 and 1998, reversing the positive trade balance inherited from the external adjustment carried out in response to the debt crisis in the 1980s (see figure 4). This trade imbalance was only overcome by the strong depreciation of the exchange rate after the foreign exchange crisis of early 1999 and, especially, by the upsurge in demand for products of the agribusiness sector by the foreign markets in 2001-2003: in this period, the growth rate of Brazilian commodity exports was higher than that of semi-manufactured and manufactured goods (see figure 5).

The low dynamism achieved from the integration of many developing countries into international markets is confirmed by their meager shares in the world manufacturing value added. Brazil's share in world exports of manufactures in 1997 was similar to that of 1980 (0.7%); however, its share in world manufacturing value added dropped from 2.9% to 2.7% over the same period (UNCTAD, 2002, p. 81). Throughout the 1990s, there was a strong attraction of foreign direct investment, thus increasing the rate of internationalization of domestic production, which became increasingly subordinated to the competitive strategies of the global productive chains of transnational companies. In the Brazilian case, such strategies aimed mainly at the domestic and regional markets and resulted in a major increase in the imported content of domestic output. As an aggravating circumstance for the country's export performance, foreign direct investment was directed mostly to non-tradable goods (including the services sector).[4]

The trade pattern of Brazilian economy underwent no perceptible change after the economic liberalization. Much to the contrary, the pattern has actually been strengthened: exports are still concentrated in manufactured goods and commodities with a low dynamism in the world market. Low dynamism characterizes both the supply side of exports – standardized products intensive in unskilled labor and natural resources – and the demand side – low income and price elasticities for these exports in the world markets.

In short, economic liberalization has not promoted a more dynamic integration of the Brazilian economy into the world economy. The trade performance after the liberalization: (a) has not developed internal dynamic linkages that could contribute to a virtuous circle leading to

convergence of domestic *per capita* income with that of developed countries; and (b) has not led to structural changes in the country's specialization.

The preceding evidence shows that serious concerns with the environmental impacts of trade liberalization associated with the "scale effect" are misplaced.[5] On the other hand, the persistence of the trade pattern explains the negative results obtained from the empirical studies regarding the environmental impacts of the economic liberalization in Brazil, pointing to the evidence of environmental vulnerability of the Brazilian exports. In fact, what emerges is a very adverse scenario for the outlook of sustainable development in Brazil. From a political economy point of view, the current extreme external vulnerability of the Brazilian economy curtails the policy space for addressing environmental vulnerability, which must give way to the strategic interests of the traditional exporting sectors responsible for balancing Brazilian foreign trade.

## Sustainability Assessment of Trade

In this section, we present a synthesis of the main conclusions reached by empirical studies conducting sustainability assessments of Brazilian foreign trade.[6] Based on these reviews, some lessons are drawn for guiding new studies and policy recommendations.

First, one must underline the fact that there are not many studies available and that most relate to the manufacturing sector.[7] Very few of them focus on assessing the sustainability of agricultural exports in Brazil. One finds case studies that examine the environmental issues associated with specific sectors but that do not relate to trade or to trade reforms, while other studies of aggregate and sectoral economic impacts of trade agreements do not address environmental issues.

### The Manufacturing Sector

The environmental vulnerability of Brazilian exports is a common conclusion drawn by studies focused on the manufacturing sector. Veiga et al (1995), analyzing data from the 1975-1993 period, was the first to point out the environmental vulnerability of the Brazilian exports. The reason for this vulnerability is that the comparative advantages of the Brazilian economy lie in the intensive use of natural resources and of energy, and that the more dynamic export sectors are potential large-scale polluters.[8]

Similarly, Schaper (1999) remarks on the increasingly important role played by "environmentally sensitive industries" (with a high pollution potential as well as making intensive use of natural resources) in the total Brazilian exports between 1980 and 1995.[9] Young *et al* (2002), analyzing data from the 1990-1996 period, came to the conclusion that the Brazilian industrial output oriented towards exports shows a higher polluting potential than that of the industrial output oriented towards the domestic market.[10]

Given that economic liberalization has reinforced the traditional trade pattern of Brazilian economy, the leading manufacturing sectors of which are precisely those identified as "environmentally sensitive" (steel-milling, mining, pulp and paper, chemical, petrochemical, etc.), the environmental vulnerability of Brazilian exports stressed by such studies becomes much more understandable.

Thus, although economic liberalization might not have entailed environmental problems related to the scale effect, problems related to the composition effect can be noticed in Brazilian manufacturing exports.

Concerning the positive environmental impacts associated with the technology effect, the evidence that has been assembled by empirical studies is somewhat contradictory. Young *et al* (2002) and Ferraz and Seroa da Motta (2002) support the view that the major domestic exporters and transnational corporations adopt proactive environmental behavior and thus tend to display better environmental performance than domestic companies producing for the domestic market. They thus come to the conclusion that economic liberalization might entail a positive contribution to the environment, insofar as it fosters corporate behavior in tune with environmental protection.[11]

Almeida (2001) qualifies this thesis, based on research on the environmental situation of the Brazilian petrochemical industry, with data referring to the year 2000. When testing hypotheses about the profile of corporations with a proactive environmental management, this research has arrived at the following findings:[12]

Large companies are the leaders;

Quality management is a necessary condition, though not by itself sufficient, to further promote environmental management;

A larger share of exports in total output is not by itself a guarantee of proactive environmental management. There are companies that have a leading position regarding environmental management but export very little or relatively little, whereas companies very strongly directed towards exports are still in the first stages of environmental management;

The foreign origin of the capital does not by itself determine the stage of environmental management, as the collected evidence is very heterogeneous.

Even if we admit that more advanced environmental management can be an indicator of better environmental performance, the thesis that corporations with a greater insertion into world markets are those that present a better environmental performance requires empirical evidence to be sought for each branch of the manufacturing sector. Furthermore, empirical studies should preferably be based on data regarding levels of actual and not potential pollution in order to assess the environmental performance of the industry, no doubt a major difficulty in the Brazilian case where an emissions database is not available.

Seroa da Motta (2003) also focuses on the manufacturing sector in his *ex-ante* analysis of the likely environmental impacts of the FTAA (Free Trade Area of the Americas).[13] He draws the conclusion that the aggregated environmental impacts of the FTAA on the Brazilian economy tend to be fairly modest and more likely to translate into lower air pollution caused by particulates and $SO_2$ and reduced use of energy, on one hand, and into higher water pollution and increased emission of $CO_2$, on the other.

Within the framework of the wide-ranging trade liberalization that is assumed to be promoted by signing the FTAA, the sugar, iron and steel, footwear and leather, and vegetal products processing industries dominate the potential increases in the levels of emissions and the use of

natural resources. Since these sectors are primarily oriented towards export, it is supposed that they already show better environmental performance, compared to sectors producing for the domestic market. According to Seroa da Motta (2003), it follows that there is no significant reason to worry about the environmental impacts of the FTAA related to the manufacturing sector in Brazil, since they tend to be very small, and might, in fact, entail positive effects.[14]

### The Agribusiness Sector

Brazil's position as a very competitive exporter of agricultural products represents a high potential for negative environmental impacts associated with the increasing production of export commodities (especially soy, meat, coffee and sugar – see figure 6). The growth rate of these exports has been outstripping the rate for manufactured goods over the past three years (see figure 5). This trend is reflected, for example, in the domestic consumption of pesticides and fertilizers. According to data from the IBGE (2002), the quantity of fertilizers sold per unit of cultivated land grew 85.5% during 1992-2000 and the use of pesticides increased 21.6% during 1997-2000.[15]

An especially relevant study was prepared by the World Wide Fund for Nature (WWF) focusing on the environmental impacts of the growing Brazilian exports of soy (Muller *et al* 2003). It provides a thorough survey of the economic, social and environmental dimensions of the soy production chain in Brazil, seeking to propose alternative international and national policies. The environmental concerns are motivated by the reasons summarized below, which are analyzed in greater detail in Muller *et al* (2003).

First, the consequences of the growing scale and the increasing productivity in the production of soy are shown. Between 1995/96 and 2001/02, Brazilian soy output increased from about 23 million tons to 40 million tons, and the cultivated land expanded at a slower pace from 11 to 16 million hectares. On one hand, the growing production entails a positive economic impact: it generates and aggregates value in the productive chain and asserts itself as the main export crop of Brazilian agribusiness (see figure 6), although facing falling per unit export prices (see figure 7). On the other hand, the nature of such increased production must be examined to accurately determine any potential negative environmental and social impacts.

The expansion of the soy production frontier towards an ecologically sensitive area, with risks for the fauna and the flora – the *Cerrado*, in the Mid-Western Region – is another reason for concern. The soy production in the *Cerrado* has to a large extent been conducted in high-risk areas. Furthermore, the environmental concern is not only related to the problem of deforestation: the soy production entails intensive use of machinery and additives (fertilizers and pesticides), with potentially negative consequences for the soil and the water, even in areas that were already deforested.

Similarly, the so-called "soy export corridors," large projects of physical infrastructure for grain transport being implemented to connect the crop areas in the Mid-Western region to the processing regions, located closer to the large urban centers, and to the ports, are also a matter of concern. As the transportation infrastructure is set up in such regions, it fosters the expansion of soy production towards the North, penetrating the areas of even higher environmental sensitivity in the Amazonian region.

Especially relevant today is the debate over the liberalization, however provisional, of the cultivation of transgenic soy in Brazil.[16] Over and above the controversial risk assessments for the environment and human health, the major argument against the production of transgenic soy in Brazil is the risk of losing international market share in soy exports as a result of an increased consumer sensitivity regarding food safety, especially if one takes into consideration that the leading market for the Brazilian exports is the European Union, where such higher sensitivity is especially evident.

An important aspect stressed by Muller *et al* (2003) is the need to strike an adequate balance between the liberalization of the market and the implementation of appropriate regulations and domestic institutions. Market access negotiations must be matched with the design of environmental policies and the bolstering of institutional capacities that will ensure conditions of sustainability for the expansion of soy production, such as the agro-ecological zoning of the production and the environmental control of the process of production. The growing soy production so far has taken place without the benefit of any strengthening of domestic environmental policies and institutions. Concerning market access, policies of tariff escalation on processed products in importing countries favor the export of Brazilian raw materials, rather than soy meal and oil, resulting in lower value added and higher potential environmental impacts. Thus, fighting against policies that establish higher levels of protection for products of higher value added (tariff escalation) in the Doha Round could result in economic and environmental gains.

The productive chain approach taken by Muller *et al* (2003) favors a more precise sector diagnosis, closely identifying problems and actors involved, exploring environmental issues related to trade dynamics and to the strategic decisions of corporations, including foreign firms, in the relevant sector. This approach is very close to the one advocated by FAO to ensure that the food we eat is free from food-borne hazards – everything from pesticides and industrial chemicals to unwanted bacteria and contaminants – the "Food Chain Approach."[17] Both contributions can be taken as an analytical reference for further sustainability assessment studies of the agribusiness sector, integrating the production of agricultural commodities and their processing by the manufacturing sector with the advantage of adopting an approach (productive chain) which is also privileged by trade policymakers at both the Ministry of Agriculture (MAPA) and the Ministry of Development, Industry and Trade (MDIC). In principle, studies adopting this approach can promote a renewed dialogue between the interests defended and issues addressed by the Ministry of Environment and those supported by the MAPA and the MDIC. Such an approach can facilitate this dialogue more effectively than balancing the results of aggregated studies, especially those based on computable general equilibrium (CGE) models.

Moreover, if the aim is to integrate environmental and trade policies and consequently to influence the positions defended by Brazilian diplomacy in trade negotiations, the theme of technical barriers to trade and their interfaces with environmental issues requires special attention, as shown in the following section.

## Environmental Requirements and Technical Barriers to Brazilian Exports

Technical standards and regulations (including sanitary and phytosanitary measures) are becoming one of the most controversial issues in international trade, an issue that is being dealt with under the label "implementation" of the SPS and TBT Agreements in the Doha Round. In this Round, the developed countries aim to achieve a "balance" between affording developing countries with better access to their markets and setting up new rules that will regulate such access and that include stricter disciplines under the SPS and the TBT agreements. The debate on this matter is more heated in the negotiations on the liberalization of agriculture, in which the European Union defends the establishment of rules that reflect national preferences in issues such as environmental protection and food safety.[18] The United States tends to associate environmental issues with "fair trade," a principle normally evoked when highly competitive products from developing countries penetrate the US market.

The growing importance of environmental requirements and technical barriers to international trade stands in contrast to the sparse treatment this subject has received in studies of Brazilian trade. In this sense, based on a review of the main domestic and of certain international studies, this section seeks to identify the major technical barriers to international trade that arise from environmental requirements, in order to make a diagnosis and to consider the possible alternatives for overcoming such obstacles in an environmentally sustainable fashion in Brazil. It is our intent to bring the discussions on technical barriers into the environmental policymaking areas in Brazil, so as to provoke a reaction in the opposite direction, i.e., to bring environmental concerns into foreign trade policy and commercial diplomacy areas, within which the theme of technical barriers has hitherto been confined.[19]

### The Growing Importance of Environmental Requirements in International Trade

As a consequence of the significant trade liberalization achieved under the Uruguay Round, especially in tariff barriers, the trade policies of developed countries have increasingly resorted to the use of non-tariff barriers. Among these, a prominent position is held by technical requirements – including sanitary and phytosanitary measures – that have been increasingly employed, sometimes in a discretionary fashion, against developing countries.

Technical requirements almost always reflect legitimate purposes, but, in certain instances, they may be used to favor domestic producers. Generally speaking, protectionist intents manifest themselves in requirements for adopting innovations, in the widest sense of the term, which developing countries find difficult to internalize and which generally result in higher production costs. The growing importance of these requirements as a protectionist tool had already led to a plurilateral agreement, the 1979 "Standards Code" negotiated in the Tokyo Round, though the Code was limited to those countries that ratified it. The issue was more thoroughly addressed in the two multilateral agreements (the TBT and the SPS agreements) negotiated in the Uruguay Round, aiming to avert the use of such requirements for protectionist purposes, as a substitute for tariff barriers.[20]

Technical requirements include standards, technical regulations and procedures for conformity assessment, which, according to INMETRO,[21] are defined as:

Technical standard: a document approved by an accredited institution, which provides, for common and repetitive use, rules, guidelines or features to be adhered to by products or related processes and production methods, conformity to which is voluntary. It may also contain recommendations for the use of terminology, symbols, packaging, marking or labeling applied to a given product, process or production method, or deal solely with such matters.

Technical regulation: a document approved by government bodies, which define the features of a product or related processes and production methods, including relevant administrative provisions, conformity to which is mandatory. It may also contain instructions for the use of terminology, symbols, packaging, marking or labeling applied to a given product, process or production method, or deal solely with such matters.

Conformity assessment: any procedure directly or indirectly used to determine that the relevant instructions of a technical standard or a technical regulation are applied. The procedures for conformity assessment include but are not limited to sampling, testing and inspection; evaluation, certification and conformity assurance; registration, accreditation[22] and approval, either separately or in various combinations.

Each of these requirements implies different consequences for foreign trade: if a product does not comply with a specific technical regulation established by the importing country, its commercialization is forbidden in the country; if a product does not comply with a technical standard determined by the importing market, this fact does not prevent the product from being commercialized in the country, but it may be detrimental to its local market share. These situations characterize, respectively, the market access and market entry conditions. Market access conditions are determined by "the legal and administrative conditions imposed by the importing countries under internationally agreed trade rules," whereas the ability to enter a market is "a function both of the competitiveness of the exporter (determined by the relative cost and quality of the product, including environmental/health aspects), and of the characteristics of supply chains and the structure of markets." Market access conditions are under the WTO rules, whereas the market entry conditions are not; both, however, are decisive for a better export performance (UNCTAD, 2003, p. 2).

According to the stricter WTO definition, technical barriers are either technical requirements used in a non-transparent way or that do not abide by internationally accepted standards; procedures for conformity assessment that are not transparent or too expensive; or exceedingly rigorous inspections. In short, the WTO defines as technical barriers requirements that determine market access conditions. The INMETRO adopts a broader definition of technical barriers: these are all requirements related to the technical characteristics of goods and services or to their process of production that are established by the importing country, and that affect market access and market entry by rendering such access and entry difficult, onerous or outright impossible.

As for the actual use made of the SPS and TBT Agreements, the consumers' concerns in developed countries with food safety and the environment have increased considerably in recent years,[23] a fact evidenced by the frequent updates of food safety and quality standards, codes of rules and practices of the *Codex Alimentarius* (Prasidh, 1999). In this context, two positions have appeared in international negotiations, frequently mixed up in the debates concerning market access: the first one, upheld especially by the European Union and other developed countries, is

that increasing market access must be dependent upon rules that establish minimum standards for products and production processes; the second, upheld by non-governmental organizations (NGOs), is that the process of international harmonization of these requirements has a huge potential for promoting exports from developing countries and sustainable development in the context of globalization.

A recent study by the International Trade Center (ITC) proves that the majority of foreign trade involves goods that may potentially be affected by environment-related trade barriers, based on the number of measures notified to the WTO for the protection of the environment, wildlife, human, animal and vegetal health, as well as human safety (Fontagé, Von Kirchbach and Minoumi, 2001). Out of the 5,000 different products traded in 1999, over ¾ have had at least one environment-related barrier notified to the WTO by at least one importing country. For around 2,000 products, such barriers are fairly widespread, having been notified by at least five different countries. However, only 14% of the value of foreign trade in 1999 overcame these barriers. This fact – the high number of measures directed to certain products, the impact of which seems to be somewhat limited in the global trade flows – allows the authors to put forward the hypothesis that, in practice, these barriers restrict international trade in the products that they call "sensitive" to environment-related barriers, mainly those of the agricultural and food chains. Denouncing such a barrier and starting a trade dispute with the country that established it is a process involving considerable time and resources, whence the typical attitude of exporters in developing countries, who try to avoid these barriers by abandoning the markets that impose them and going after other importing markets with more favorable access conditions.

In the case of developing countries, the situation brought about by the existence of a growing number of environment-related barriers is more complex and demands more attention, since, in the absence of a certain degree of institutional infrastructure, such countries cannot benefit from the rules established by the SPS and TBT Agreements. This fact is once more confirmed by Rotherham (2003) in his comprehensive analysis of the experience of developing countries in implementing technical regulations and standards intended to protect the environment, wildlife, human, animal and vegetal health and human safety, with emphasis on the TBT. According to Rotherham, without some basic institutional structures in the fields of standardization, conformity assessment and accreditation, developing countries cannot benefit from the provisions of agreements, and technical standards and regulations can restrict the exports of developing countries. The author draws the conclusion that the growing number of technical standards and regulations for the protection of the environment, health and safety raises barriers to trade in the three areas that concern the "institutions of quality" (standardization, conformity assessment and accreditation), and the very real problems faced by developing countries in these areas actually restrict their access to the markets of developed countries, irrespective of their being used for legitimate or protectionist purposes.

Rotherham (2003) holds the opinion that developing countries should make a more intensive use of the provisions of technical assistance in their favor that are contained in the TBT and SPS Agreements, in order to realize the necessary investments in "institutions of quality." International agencies responsible for technical assistance, and which compose the Integrated Framework for Trade-Related Technical Assistance, also admit that the expanding use of technical barriers has become one of the critical matters that regulate access of exports from developing countries to the markets of developed countries.[24]

### The Incidence of Environmental Requirements on Brazilian Exports

The environmental requirements (taken in their broader meaning, according to the ITC methodology) that apply to Brazilian exports under certain circumstances constitute technical barriers (also in their broader sense, as defined by the INMETRO), e.g.: the complexity of the regulatory system of the main destination markets; the excessive strictness of standards and regulations in these markets in relation to international standards; the delay in the processes of certification; and the specific labeling requirements.

Brazil, as a major exporter of commodities, especially those of agribusiness, is particularly affected by the incidence of technical barriers based on environmental requirements affecting the exportation of primary products (mainly fruits, vegetables, livestock and meat, fish, tropical woods, and organic products).

Such technical barriers can be observed in the main destination markets of Brazilian exports. Table 1 presents a compilation of some environment-related technical barriers imposed by the United States, the European Union and Japan on Brazilian exports of specific products.

The United States has a complex regulatory system, with many standards and regulations at the three levels of government (federal, state and local). Lack of transparency in establishing the appropriate requirements, delays in the process of conformity assessment, and the limited use of international standards and regulations are frequent complaints made by Brazilian exporters. The main food safety requirement for certain products consumed in the United States (tinned food of low acidity, fish products, juices and miscellaneous meat products) is the implementation of Hazard Analysis and Critical Control Point System – HACCP, which can be quite onerous. The requirements of the HACCP (hazard analysis, identification of critical control points in the productive chain, establishment of measures, corrective actions, and certification and maintenance of records) are imposed on the exports of meat and fish from Brazil (verified by the importer or by the exporter). Other barriers include a certain inconsistency between US and international labeling requisites, as well as the new Bioterrorism Act, which tends to become an important potential barrier to Brazilian exports, as a result of restrictive standards applied to the exportation of products related to agribusiness, especially food.[25]

Under the Doha Round negotiations, the European Union is attempting to extend the right to establish rules that reflect national and regional preferences in matters such as the environment and food safety. There is a wide range of regional and national environmental legislation, a circumstance that explains the EU's insistence that the WTO should provide ample legal coverage for the precautionary principle and for the product lifecycle approach, privileged by the regional regulations in this matter. Its sanitary and phytosanitary requirements are also considered to be very strict, controlling or forbidding the importation of certain livestock, meats and vegetables, and entailing a greater delay in the processes of certification and testing for approval of exports, a consequence of the lack of uniformity among members. A relevant issue is the Common Program for Environmental Labeling, which establishes trade barriers by influencing the behavior of the consumer and by defining requirements for labeling and for the collection of recyclables according to specific standards.[26]

In Japan, besides the more general tendencies identified in the United States and the European Union, there is strict sanitary and phytosanitary legislation (especially for fruit imports) and an onerous system for the certification of organic products.

### Lessons and Recommendations from the Studies on Technical Barriers to Brazilian Exports

The available studies on technical barriers to Brazilian exports usually focus on market access and market entry concerns and bypass concerns about the environmental sustainability of exports. This is due to the fact that they have for the most been conducted by institutions related to trade promotion.[27]

These studies point to internal and external causes for the problems posed by technical barriers to Brazilian exports. Among the internal causes, the following should be particularly noted:

- Lack of information on the part of the Brazilian firms concerning technical barriers and international legislation (especially by small and medium-size enterprises);
- Lack of capacity (poor internal development of the standards system, lack of homologation of Brazilian laboratories, poor internal conformity assessment systems, and reduced interaction with international standardization bodies) to win the confidence of trade partners in developed countries;
- Lack of technical support by government institutions;
- Low level of domestic demand for international standards and regulations, causing a general lack of conformity with international requirements;
- The Brazilian Focal Points of the TBT (INMETRO) and SPS (SDA – Secretary for Agriculture and Livestock of the MAPA) lack a more integrated approach: the INMETRO is more proactive, but is still lacking in technical capacity (e.g., absence of chemistry and materials laboratories that could ensure progress in new areas of metrology, such as chemistry and biology), and only recently has begun to take a more active part in international negotiations; the SDA, in turn, adopts a more reactive approach, and faces technical, material and institutional insufficiencies in relation to the vast number of private and public actors involved, given the importance of agricultural exports for Brazil. A major source of concern is the lack of integration among official institutions in different levels of the government, since their actions are to a large extent decentralized.

Since 2002, the INMETRO has made many additional services available to exporters. The INMETRO holds technical and institutional capacity in the field of technical standards and regulations that is beginning to gain international recognition. It supervises the Brazilian Program for Conformity Assessment, which covers 55 products, processes or services liable to certification. These were defined after ample discussion with many stakeholders, based on three criteria: impact on health, safety and the environment, impact on the trade balance, and strengthening of the domestic market. The aim of this certification is to improve the competitiveness of Brazilian products, enabling them to gain access to new markets. Within the scope of the TBT, Brazil has forwarded a number of notifications to the WTO – 349 in the period 1995-2001. This number is fairly significant for a developing country, a clear indication of the country's intention to play a more active role in the process of international standardization.

According to the SDA, the institution already has the capacity to respond immediately to the demands of exporters when they face technical barriers.[28] In fact, Brazil is considered to be very active in forwarding specific trade concerns to the SPS Committee (Barros *et al*, 2002). Like all major agricultural exporters, Brazil also participates in the process of international sanitary standardization through notifications forwarded to the SPS Committee of the WTO. However, of the 1,248 notifications forwarded by members of the Western Hemisphere between 1995 and 2001, Brazil was responsible for no more than 43, a relatively small number that puts the country in the seventh position in the process of international standardization in the Western Hemisphere (Barros *et al*, 2002).

Regarding internal capabilities for international sanitary standardization, hazard analyses are performed on imports, and exporters have to strive for conformity. The international standards of the *Codex Alimentarius* are rarely internalized in domestic food production, hampering the increase of food exports. It is recognized that the absence of certain best practices on the part of the producers – the registration of pesticides used in agricultural production, for example – hampers exports. To overcome the lack of best practices in production and commercialization methods, the SDA has been also adopting a more proactive and systemic productive focus within its field of action, organizing markets according to productive chains, as much to prevent risks as to promote corrective actions and more intensive inspection. For example, the integrated system of fruit production (PIF) is being implemented in the production of apples and other fruits in certain areas of the Northeastern region (Petrolina and Juazeiro). However, the pioneering PIF experience with strawberries in São Paulo failed to reach the desired certification, showing the difficulties in implementing this approach even in the areas with a higher average income in the country.

Abroad, the main difficulties identified for overcoming technical barriers to Brazilian exports include:

- Escalation of standards (as soon as the Brazilian exporters comply with certain requirements, others are posed);
- Virtual market reserve for domestic services of conformity assessment in the importing developed countries;
- High costs of the national participation in the international process of standardization and of the capabilities with regard to foreign certification and testing procedures;
- Technical requirements that are not always scientifically justified by the importing countries (firms in developing countries are almost always standards-takers);
- Slow adoption of "technical equivalence" by importers when there is no international standardization;[29]
- Lack of significant progress, up to this moment, in the WTO, in solving problems regarding the implementation of the TBT and SPS agreements;
- Potential threats posed by new restrictions associated with negotiations conducted in related fields, such as Agriculture, Services, and TRIPS, and concerning the relationship between the rules of the WTO and of Multilateral Environmental Agreements in the context of the Doha Round.

According to an informal inquiry addressed to SECEX,[30] very rarely do importers complain about environmental barriers in their sales to foreign countries. The timber sector is recognized as one of the leading complainers, because of the growing demand for certifications of tropical timber. The general appraisal made by SECEX is that major Brazilian exporters have enough capacity to comply with international standards and benefit from such compliance (more demanding standards entail higher competitiveness, a typical win-win solution). Nevertheless, a few issues are still far from achieving consensus: how to conduct the harmonization of environmental issues between developing and developed countries and how to harmonize the WTO regulations and multilateral environmental agreements. Lack of consensus in these matters generates insecurity regarding potential new environmental restrictions on Brazilian exports.

The occurrence of serious sanitary crises in important meat and poultry producer markets ("mad cow" in the US and "bird flu" in Asia) has generated increased concern on the formulation and speedy implementation of an adequate sanitary policy in Brazil. In the case of meat exports, the small market share held by Brazilian meat in the Japanese, US, and Mexican markets has become an obstacle to a faster increase of exports. It results from the existence of sanitary barriers that, for many years, have obstructed the entry of Brazilian meat into such markets, which adopt a common external policy for importing meat.[31] Domestic specialists often remark that Brazil has yet to invest much in sanitary defense so as to ensure adequate prevention of other dangers and diseases and suggest the creation of extensive domestic regulation capable of averting the mistrust of the international consumer.

In these studies it is therefore possible to identify Brazil's shortcomings in avoiding technical capacities and its delay in adopting wide-ranging international standards and regulations, as well as the lack of external support. Particular emphasis is placed on the fact that substantial improvements require strong governmental support, as well as the *bona fide* cooperation of developed countries, while, at the same time, identifying major obstacles to the realization of both aims. The severe fiscal constraint prevailing in the country in recent years is an obstacle to public investments needed for implementing an adequate quality assurance policy. As for international cooperation,[32] it should be noted that greater technical assistance to developing countries is provided for under sections 3.6 and 5.4 of the Decision on Implementation approved in Doha, but is restricted to the least developed countries. Another important matter is the demand made by certain developing countries with the support of UNCTAD to obtain international cooperation for the removal of "restrictions on the supply side" that inhibit export diversification and the retention of an increased value added of their exports. An argument in favor of this modality of international cooperation is the evidence that any market rewards (better prices) obtained by products conforming to voluntary quality requirements are usually appropriated by wholesalers in the importing country and exporters rarely benefit from them (Jha, 2002).

Finally, with respect to environmental issues and their relation to trade policies, very little is actually suggested in the existing studies. The need to work on this interface is stressed by Rotherham (2003), who emphasizes that developing countries face serious problems arising from the environmentally-related barriers erected by developed countries. To overcome them, the institutional structure for establishing technical standards and regulations (such as environmental measures or standards for organic agriculture) cannot remain disconnected from the public and private institutions charged with promoting foreign trade. The solutions that, at the same time,

raise international competitiveness and yield benefits to the environment in sectors sensitive to environment-related barriers depend on national efforts to increase coordination and coherence among the many domestic actors affected by the regulations contained in the SPS and TBT Agreements.

## Final Remarks and Policy Recommendations

There still is much to be done with respect to empirical studies dealing with the relationship between trade, environment, and development in Brazil. Studies focused on the manufacturing sector, even though more numerous, have the disadvantage of being based on potential and not actual emissions levels, since emissions databases are not available in Brazil.

The small number of studies concerning the agricultural sector contrasts with the high potential environmental impact of agribusiness, particularly in the context of the clear reinforcement of the export pattern of the Brazilian economy, which is highly dependent on agribusiness exports, deemed crucial for attaining the equilibrium of the current account since 1999.

This paper suggests the encouragement of sectoral studies that allow, by means of field research, the identification of the environmental performance of firms as well as their strategic behavior regarding environmental matters. In particular, studies that employ the productive chain approach allow a better specification of environmental questions and the identification of the relevant actors involved in each stage of the chain. Since this approach is also preferred by trade policymakers, studies based on such an approach may foster a positive dialogue at the intra-governmental level, i.e., between trade policymakers and environmental policymakers. Given the regulatory intensity of environmental matters and the range of sectors involved, proper coordination of information across agencies and government levels is critical to attaining national objectives.

The problems identified in studies on environmental technical barriers to Brazilian exports render explicit the difficulties faced by developing countries that are posed by the trend of escalation of standards, regulations and other requirements that are demanded by the final consumer markets and are actually better suited to developed countries and their firms. The ecological efficacy and, especially, the economic efficiency of environmental standards or regulations tend to be different in developed and developing countries. In the latter, knowledge, infrastructure, and financing are lacking to meet the requirements of developed countries, a problem that particularly affects small and medium-size companies.

The Brazilian experience shows that the issue of technical barriers further supports the thesis of the environmental vulnerability of Brazilian exports, especially those of agribusiness. In spite of strong evidence in favor of the growing importance of environment-related technical barriers, this still is an issue restricted to discussions on trade promotion policies in Brazil, including trade diplomacy. The participation of the environmental stakeholders in these discussions may result in economic and environmental gains: to argue, when this is the case, against illegitimate and unjustified technical barriers; to contribute to building domestic capacity to comply with legitimate environmental requirements, making use, among others, of the rights to technical assistance and cooperation that are established by the SPS and TBT Agreements; finally, to refuse political support to the efforts of exporters that conflict with sustainability commitments.

An important point that should be emphasized is the need for sufficient coordination and implementation of appropriate domestic environmental regulations and institutions in the context of market liberalization. Negotiations on market access must be balanced with the enactment of domestic environmental policies and the strengthening of institutional capacities that ensure sustainability conditions for the expansion of domestic production.

**Table 1: Environmental Technical Barriers to Brazilian Exports by Destination Market and Product**

| *Destination Market* | *Product* | *Nature of the barrier* |
|---|---|---|
| USA | Shrimp | Losses imposed on shrimp exports arising from the demand for domestic legislation consistent with US regulations; requirement of turtle escape devices (TED) to be used by shrimp fishing vessels and specification thereof in the Brazilian certification. |
| | Gasoline | Losses imposed on gasoline exports by discrimination on the basis of calculation for foreign producers, with arguments claiming control of pollutant emissions. |
| | Tropical Woods | Restrictions on exports of tropical woods posed by sub-federal legislation demanding certification for governmental procurement. |
| | Fruit | Prohibition of imports for phytosanitary reasons (papaya and melon, citric fruits, figs, avocado, persimmon, passionflower and *carambola*); prior license and specific treatment for entry (pineapple, watercress, garlic, apple, yam, grape, mango, etc.); delay in the processes of certification (five years for approving the importation of papaya); inconsistency with international regulations. |
| | Meat | Problems with certification and strict sanitary controls, as well as demanding from exporters practices equivalent to US practices (bovine); prohibition of imports and demand that the Brazilian inspection system issue certifications in a form equivalent to the US system before submission to the regulatory procedures (chicken). |
| | Organic Products | Expenses and delays in label certification procedures conforming to US legislation. |
| European Union | Livestock and Meats | Prohibition of imports, stringent requirements that differ from the internationally accepted requirements, and sluggish procedures of certification due to foot-and-mouth disease, “mad cow,” and biological residues. |

| | | |
|---|---|---|
| | Fruits and Vegetables | Requirements related to residue levels and disease control stricter than international practice, and stringent certification requirements. |
| | Organic and Biological Products | Product certification and acknowledgment of certification agencies according to the strict requirements defined by the EU. |
| | Processed Foodstuffs | Requirement of labels for identifying biotechnological ingredients. |
| | Chemical Products | Potential barriers stemming from the implementation of the White Book, which resorts to the Precautionary Principle for substances that might cause damage to health and to the environment, even in the absence of scientific evidence of such hazards. |
| Japan | Vehicles | Specific requirements for noise tests, inconsistent with international practice. |
| | Biotechnology | Labeling of products processed or semi-processed with biotechnology. |
| | Food Supplements | Requirements concerning the enforcement of rules and regulations on food supplements treated as drugs. |
| | Processed Foodstuffs | Greater restrictions than common international practice. |
| | Fruits and Vegetables | Strict requirements: problems with the quarantine system; poor transparency in the required treatments; delays in conformity evaluation processes, detrimental to the quality of the products; prohibition on imports of items that introduce pests in the country. |
| | Organic Products | Requirement of certification of already certified products. |
| | Meats | Importation of ox-meat prohibited, even from areas certified as free from foot-and-mouth disease. |

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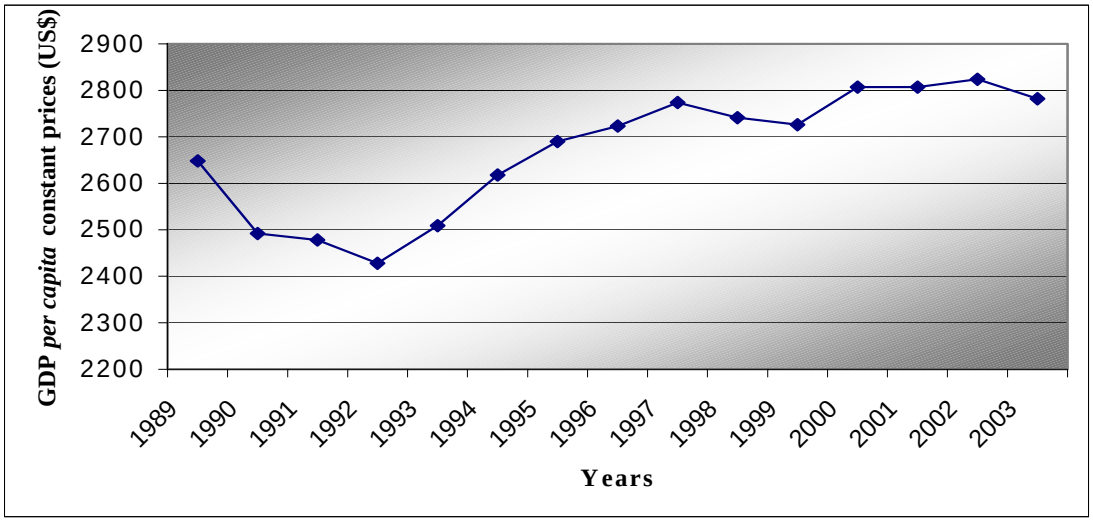
## Statistical Annex

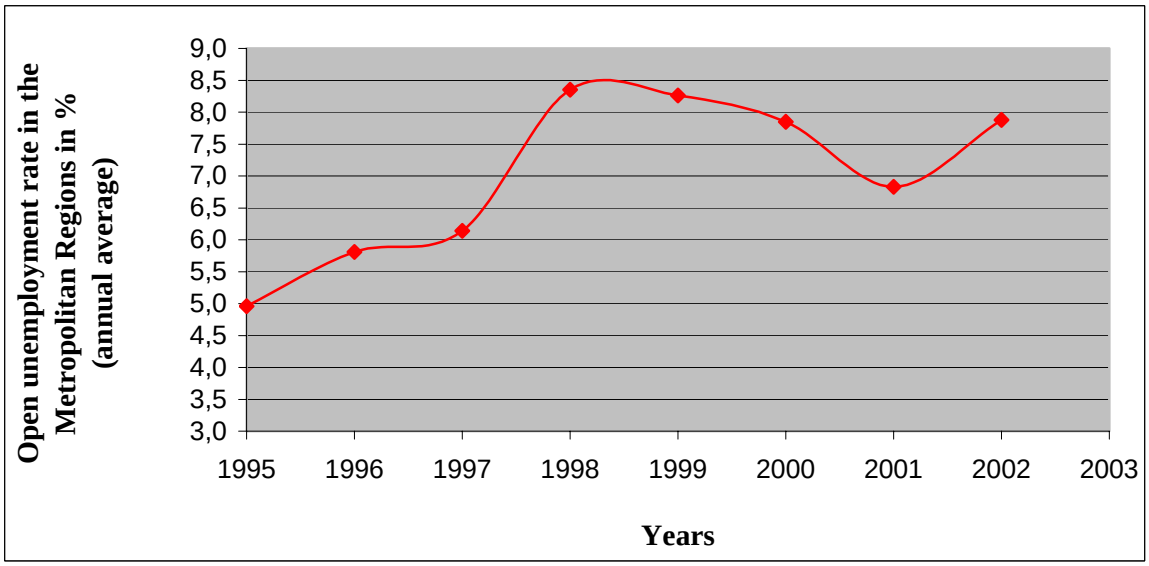
**Figure 1: Brazil: GDP per Capita in Constant Prices (US$), 1989-2003**




*Source: IPEA*

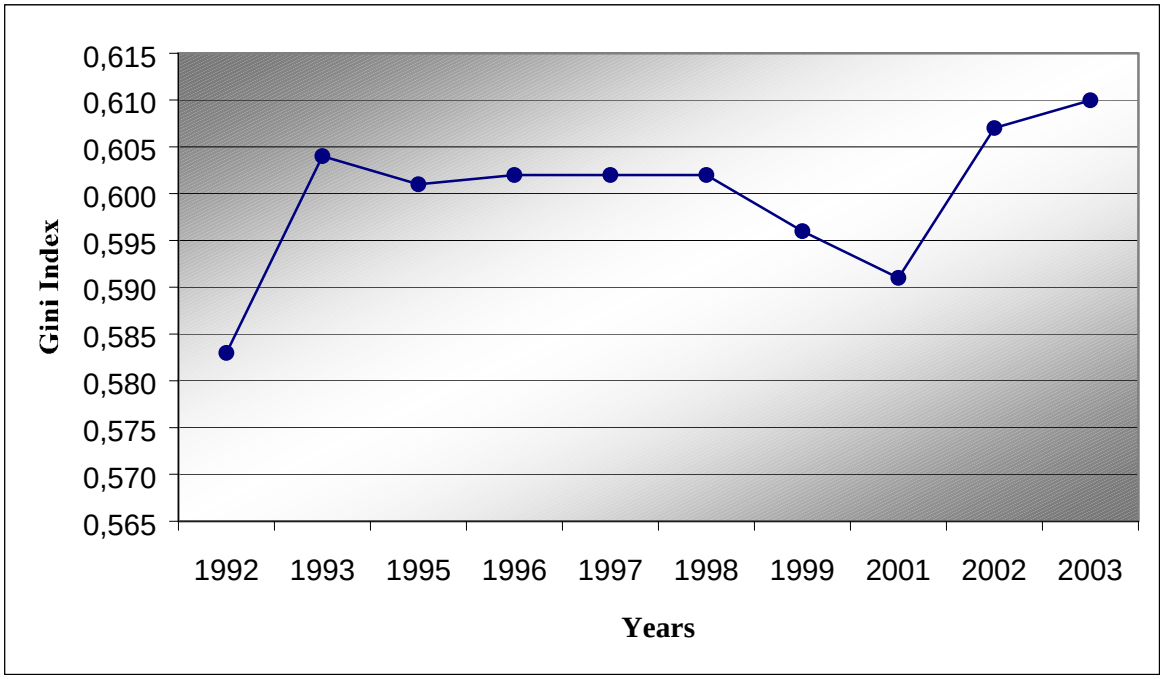
** Estimated series using nominal GDP implicit price deflator, the real exchange rate (R$)/US$ average 2003 and the resident population on July 1st.*

**Figure 2: Brazil: Open Unemployment Rate in the Metropolitan Regions of São Paulo, Rio de Janeiro, Porto Alegre, Salvador, Recife and Belo Horizonte, Annual Average (% of the Economically Active Population-EAP), 1995-2002**




Source: *IBGE/PME several months/years*

**Figure 3: Brazil: Measure of Income Inequality, the Gini Index, 1992-2003**

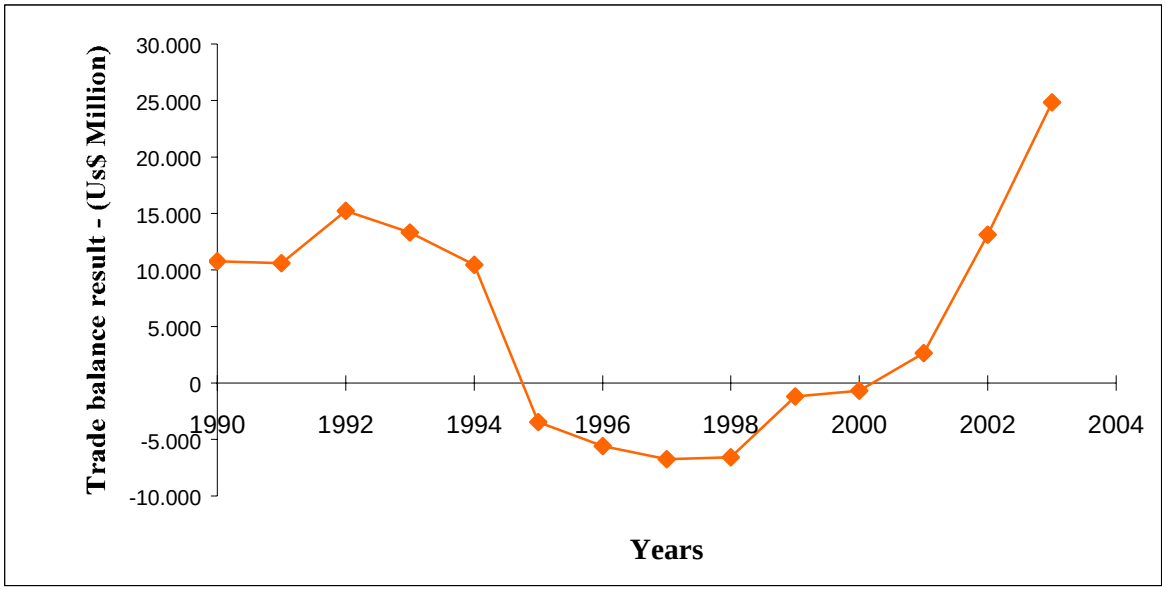



*Source: Produced from PNAD/IBGE and IPEA for 1992-1999 period (no data for 1994) and Human Development Report – PNUD for 2001-2003 (years of report).*

**There are methodological differences in the 1992-99 and 2001-03 series regarding the sources used, however there is no significant difference of indicator.*

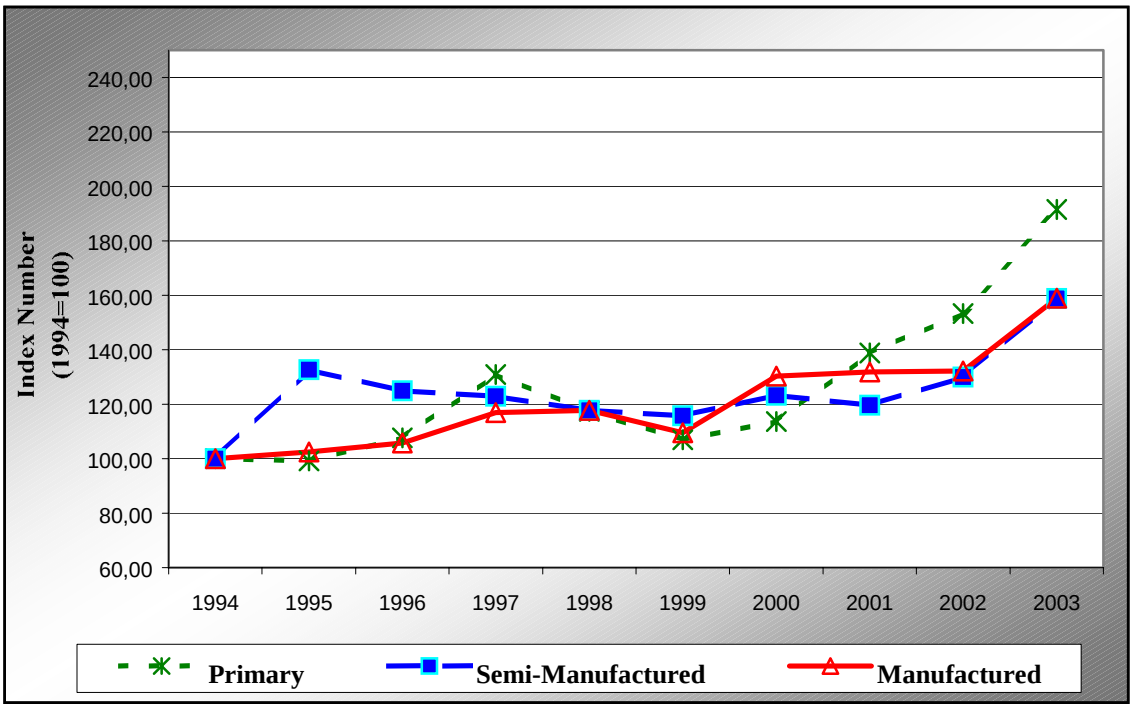
*** The Gini Index summarizes the degree of inequality with values closer to 0 representing a lesser degree of inequality, and values closer to 1 representing greater inequality.*

**Figure 4: Brazil: Trade Balance (US$ millions, FOB), 1990-2003**



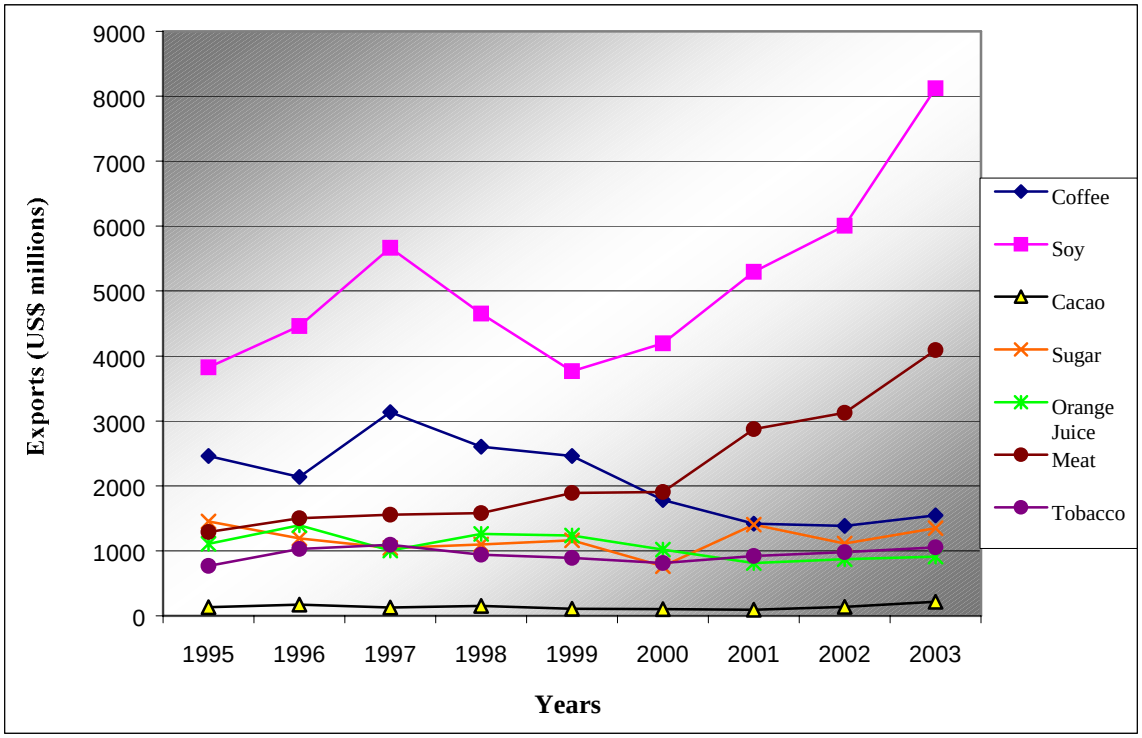

*Source: The Brazilian Central Banking, Bulletin, Payment Balance Section and IPEA.*

**Figure 5: Brazil: Exports Growth Rate of Primary, Semi-Manufactured and Manufactured Products, 1994-2003 (1994 base year)**



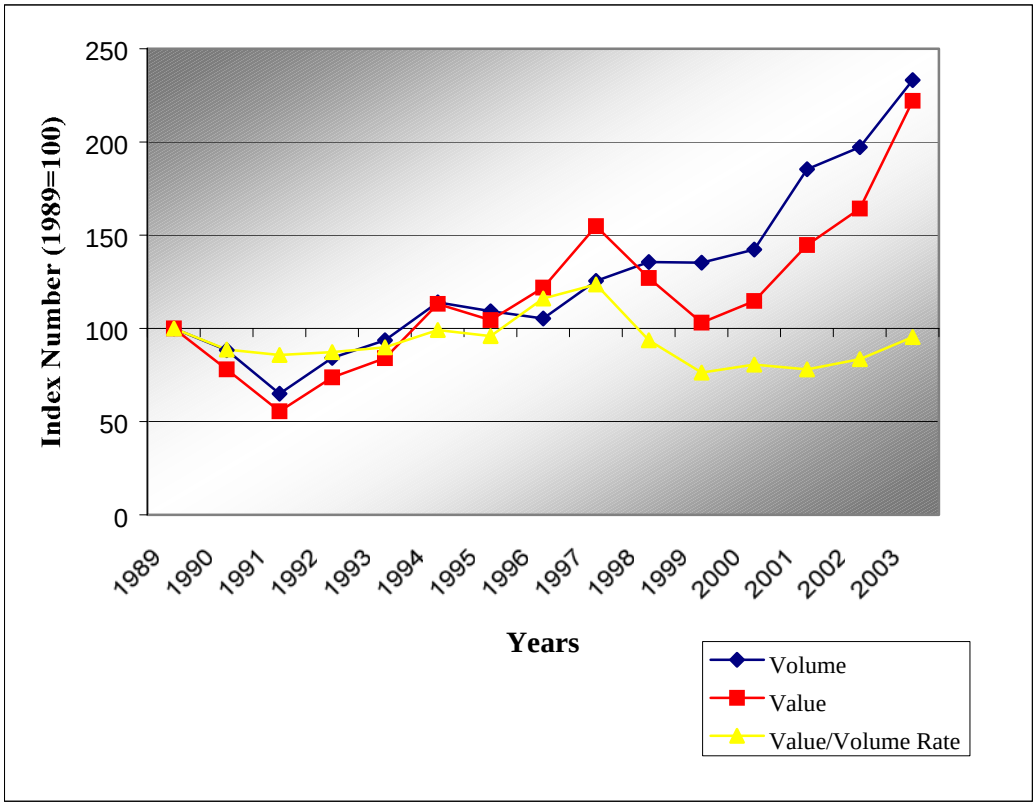

*Source: Brazil–Ministry of the Industry, Development and Trade/Secretariat of the Foreign Trade (MDIC/SECEX)*

**Figure 6: Brazil: Exports of Primary Commodities,1995-2003 (US$ millions)**




*Source: Brazil - Secretariat of the Foreign Trade (SECEX)/AliceWeb (www.mdic.gov.br) apud Ministry of Agriculture, Cattle Raising and Supplying (MAPA)*

**Figure 7: Brazil: Exports of Soy in Volume and Value (mil ton and millions), 1989-2003 and value/volume rate (US$/ton) In Index Numbers (1989 base year)**




*Source: Brazil - Secretariat of the Foreign Trade (SECEX)/AliceWeb (www.mdic.gov.br) and Ministry of Agriculture, Cattle Raising and Supplying (MAPA)*

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[1] These data are based on the methodology employed by IBGE for the calculation of the open unemployment rate through 2002. Employing a new methodology, the open unemployment rate in the major metropolitan regions averages 12% since 2003.

[2] The Gini Index measures income inequality: the closer to zero, the lower the inequality of income distribution, and the closer it is to one, the higher the concentration of income. In 2003, the Gini Index reached 0.61, well above the average of 0.52 for Latin America in the 1990s. In the same period, the averages for the Organization for European Economic Cooperation, the Eastern Europe and Asia were much lower: 0.34, 0.33 and 0.41, respectively (Ferranti, 2003).

[3] Exceptions to this general trend were observed especially in the economies of East Asia (UNCTAD, 2002).

[4] For the impact of recent foreign direct investment in the Brazilian economy, see Lacerda (2004).

[5] The usual methodology for analyzing the environmental impacts of trade liberalization divides them into scale, composition and technology effects. According to the scale effect, trade liberalization promotes economic growth, entailing stronger environmental pressures. The composition effect – sometimes called sectoral effect – depends on the relative changes of each sector in the total domestic value added. The technology effect refers to the aggregated changes in the intensity of pollution as a result of the introduction of innovations in each sector. For further details, see Grossman and Krueger (1992).

[6] One should note that each empirical study briefly reported here follows a particular methodology, on which its results and conclusions are strictly dependent.

[7] Among these, special reference should be made to the studies conducted by the Group for Research in Economics, Environment and Sustainable Development (GEMA), Institute of Economics of the Federal University of Rio de Janeiro, under the coordination of Carlos E. F. Young.

[8] It should be noted that the period envisaged by this study allows the effects of Brazilian trade liberalization to be observed only in its preliminary stages.

[9] Schaper's study (1999) takes into consideration nine countries of Latin America and the Caribbean and draws the conclusion that the export structure that emerges in the region in the decade of the 1990s is more environmentally vulnerable than that of the 1980s, since the exported volume coming from sectors of acknowledged environmental impact, such as basic goods and manufactured goods coming from industries with high pollution potential, grew three times in the period between 1980 and 1995.

[10] Estimates of manufacturing emissions were based on the database of the World Bank (Industrial Pollution Projection System – IPPS, 1985 as a base year) and of the CETESB (1996 as a base year) .

[11] Young *et al* (2002) and Ferraz and Seroa da Motta (2002) refer to the same database: the Survey of Economic Activity, prepared by the SEADE Foundation for the Great São Paulo, with information referring to the year 1996.

[12] Almeida (2001) conducted the research through interviews with representatives of a sample of companies of the Brazilian petrochemical industry.

[13] Seroa da Motta's estimates of industrial environmental impacts of the FTAA are based on a study that makes use of a stationary model of computable general equilibrium – CGE – to simulate the impacts of the FTAA both on the macroeconomic level and on each sector of the Brazilian economy, considering 1998 as the base year. The limitations of such a model are well known, including the extensive use of unrealistic assumptions (perfect competition, given prices and exchange rates, perfect knowledge of market access conditions being negotiated etc.). Since the acknowledgement of such limitations requires specific training in economic theory, the results of CGE models are usually misinterpreted by policymakers and by the general public, being regarded as forecasts for changes in the economy after the implementation of a trade agreement. For a critical analysis of the CGE models applied for environmental impacts assessment of trade agreements, see Gallagher (2003).

[14] According to Seroa da Motta (2003), regarding the industrial environmental impacts of the FTAA, Brazilian environmental policymakers should pay more attention to: (a) water pollution, recommending the application of taxes levied on the use of water resources; (b) the sectors which process vegetal products (cocoa, rice, tobacco, fruits, etc.), since these are less concentrated sectors, very diversified in terms of production and location, and for which no common R&D efforts can be found among producers, factors which render difficult any significant improvement in their environmental performance.

[15] The intensive use of pesticides and fertilizers may entail wide-ranging and varied environmental impacts, e.g. erosion and acidification of the soil, eutrophication of rivers and lakes (excess of nutrients in water bodies, especially nitrogen and phosphorus, occasioning an excessive growth of aquatic plants such as algae), contamination of water reservoirs, deforestation, threats to biodiversity, risks to the health of the population (consumers and rural workers)

etc. IBGE (2002) contains data on the quantity of fertilizers and pesticides sold per unit of cultivated area, as well as indicators of arable land and deforestation.

[16] At the very beginning of his term of office, in March 2003, the Luis Inacio Lula da Silva administration issued a provisional measure to provide legal coverage for harvesting transgenic soy. It claimed it had inherited a *de facto* situation from the preceding administration and that this course of action was adopted to avoid imposing harsh losses on rural producers. In September 2003, a new provisional measure was approved, regulating the cultivation and marketing of transgenic soybeans for the 2003-2004 harvest, restricting it to the use of seeds retained from the preceding crop by the farmers. This measure compels producers cultivating transgenic soy to sign a statement of commitment, liability and course of action.

[17] The key is to strengthen each and every link in the complex process of food reaching the consumer – from the way it is grown or raised, to how it is collected, processed, packaged, sold and consumed. The system was discussed during a week-long high-level Committee on Agriculture meeting (31 March – 4 April 2003). See COAG/2003/5 in www.fao.org.

[18] For the position of the European Union, see the testimony of its Trade Commissioner, Pascal Lamy, in the European Parliament, on September 24, 2003, *Résultat de la Réunion de l'Organisation Mondiale du Commerce (Cancun, 10/14 septembre 2003)*, in http://europa.eu.int/comm/commissioners/lamy/speeches_articles/spla192_en.htm.

[19] This was the approach also privileged by the "Technical Standards and Regulations for Sustainable Development" Project, under the overall coordination of Tom Rotherham (International Institute for Sustainable Development – IISD, Canada). Local coordination in South America was conducted by *Recursos e Investigación para el Desarrollo Sustentable* (RIDES, Chile) and Luciana Togeiro de Almeida was the Brazilian adviser.

[20] According to the SPS and TBT Agreements, legitimate goals can be used as justification for implementing trade protection mechanisms in the face of threats to national and human security, to human, animal and vegetal health, and to the environment. For a definition of legitimate goals under these agreements, see section 2.2 of the TBT and section 2.1 of the SPS.

[21] INMETRO - the Brazilian Institute of Metrology, Standardization and Industrial Quality - is the Focal Point of technical barriers in Brazil, being a federal agency linked to the Ministry of Development, Industry and Trade. See www.inmetro.gov.br.

[22] Accreditation is the procedure whereby an authorized entity formally acknowledges that a given institution or natural person is entitled to certify conformity assessment procedures.

[23] This concern with healthier and safer food is reflected in the international meetings of the *Codex Alimentarius* Committee, which is charged with defining scientifically-based standards to regulate the production and international trade of foodstuffs, ensuring, at the same time consumer safety and fair trade practices on the international food market. The strategic vision of the CAC is to attain the greatest possible protection for consumers, including food safety and quality. The standards approved by the CAC are not necessarily adopted by the member countries. This circumstance results in international standards that are stricter than domestic regulations adopted in many developing countries. Several analysts point out that the adoption of new measures generally contains a bias favorable to the interest of the industry of developed countries (Charnovitz, 2002).

[24] See www.integratedframework.org/

[25] The Bioterrorism Act contains five articles, which, in turn, are made up of sections. Article III, Protecting Safety and Security of Food and Drug Supplies, deals with the rules for controlling imports of food and beverages to the United States, the implementation of which is conducted by the Food and Drug Administration (FDA). The provisions are further discussed in ITAL: www.ital.org.br/CETEA/web_bioterrorismo/lei_bioterrorismo.html).

[26] Out of the 44 environmental barriers detected over the last decade in a study conducted for APEC, 34 were set up by the European Union (OXLEY et al, 2003).

[27] MDIC/AEB (2003); Ferraz et al (1997 a, b, c); Brazilian Embassy in the United States (2003); MDIC/SECEX (2001); Brazilian Mission to the European Community (2000), MAPA (1999). For a recent study dealing with environmental matters, see Almeida and Presser (2003).

[28] As an example of the SDA´s response efficiency, it is asserted that the Chinese and Russian markets were opened thanks to successful negotiations conducted by the Brazilian sanitary authorities.

[29] "Technical equivalence" should be acknowledged when the measures adopted endure a degree of safety deemed to be adequate, even if they differ in methods and procedures. This enables countries to adopt different procedures, provided the equivalence in results is ensured.

[30] The Secretary of Foreign Trade (SECEX) of the Ministry of Development, Industry and Foreign Trade (MDIC) is the body charged with providing support to Brazilian exporters subjected to trade defense investigations abroad. The replies sent by SECEX on issues concerning technical barriers and environmental matters have, as a rule, been provided by Júlio Cesar Baena (foreign trade analyst of the International Negotiations Division).

[31] Brazil faces obstacles in its meat exports to these countries since it is still considered a producer that has not controlled the foot-and-mouth disease; despite the fact that Brazilian cattle is vaccinated against the disease, foreign regulators demand a strict evaluation of the disease risk.

[32] The technical assistance provided for the implementation of the TBT and SPS Agreements has been exceedingly limited thus far, around US$ 185 million in 2001-2002 (WTO/OECD, 2003).