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Trade Liberalization in Chile: What is the Evidence of Its Effects and How Can Sustainable Development Be Safeguarded?

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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.

The Policy Report and Discussion Papers produced by the Working Group can be found on the Web at:

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Trade Liberalization in Chile: What is the Evidence of Its Effects and How Can Sustainable Development Be Safeguarded?

Paper prepared for the Regional Workshop “Environmental Impacts of Trade Reform in the Americas: Lessons for future trade agreements”

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I. Introduction – the Context

The economic success of the Chilean development model, based on free-market policies and active integration into the world markets, is frequently emphasized by economists and politicians around the world.¹ In the second half of the 1970s and throughout the 1980s, the military regime implemented a neo-liberal economic transformation with export promotion and diversification, favorable conditions for foreign direct investment, and a gradual reduction of tariffs from 35% (1984) to 11% (1991) at its core. In the 1990s the democratically elected government complemented these elements aimed at global insertion with an extensive program of bilateral and regional trade agreements. At present Chile has signed trade pacts with most of the Latin American Countries, Canada, and just recently with the European Union, as well as with the United States. Trade negotiations are underway in the context of the FTAA and with China. Moreover, Chile is member of the Asia Pacific Economic Cooperation (APEC) since 1994 and an associated member of MERCOSUR since 1996.

Average growth in real terms in the 1990s amounted to 6%. Due to the unfavorable world economic situation, in 1999 Chile experienced negative economic growth for the first time in more than 15 years. By the end of 1999, exports and economic activity had begun to recover, and growth rebounded to 5.4% in 2000. Even in the context of further deterioration of the external scenario, including events such as the Argentine financial meltdown, GDP grew by 2.1% in 2002. Foreign Direct Investment (FDI) flows increased continuously until 1999, when they had their peak at US\$10 billion. The growth of the export sectors in the period between 1973 and 2000 is remarkable. Earnings from exports rose by about 14 times between 1973 and 2000. (Banco Central, 2001). In the same time period, a diversification of exports was achieved. The relative dependence on copper (80% in 1973) was reduced by one half in 2000.

At the same time the importance of natural resource based exports has not diminished, but has probably even increased. In 1997, 89% of all exports were based on natural resources (Consejo de Desarrollo Sustentable, 2001).

Giljium (2003) states:

The 15 most important export product groups in 2000, totaling more than 60% of export revenues, contained not a single product group of more than a basic manufacturing level (DIRECON, 2000).

Apart from the mining sector, major revenues are obtained from exports of fresh fruits (especially wine grapes and apples), fresh fish (especially salmon) and fish meal, wine, and wood, cellulose and paper products. The specialization on resource-intensive production in the export sector also led to a relative “deindustrialization” of the Chilean economy as a whole, with the share of the industrial sector in GDP falling from 30% in 1974 to 17% in 1994 (Van Hauwermeiren and De Wel, 1997).

Other environmental and social effects of the export-driven global insertion and growth process have also been perceived as considerable. Thus, the Chilean government acknowledged in the Earth Summit that although some national macroeconomic indicators showed positive signs as a result of the development model imposed by the military government, the transformations that took place in this period (1973-1989) were not free from undesired social and environmental consequences. In this context, the government identified the main national challenge as the need to attack the country’s environmental and social problems decisively, maintaining the same economic model but correcting those aspects that acted against social equality (CONAMA, 1992).

In the 1990s, whereas one group still hailed the economic success of the neoliberal reform policies, in other sectors voices became louder denouncing the environmental and social unsustainability of the economic model that was implemented under the military regime and basically not changed by the democratically elected government.

There is a vast number of studies that criticize the Chilean economic model and that specifically refer to the relationship between trade liberalization and different aspects of sustainability (e.g. Quiroga and Van Hauwermeiren, 1996; Nazarali-Stranieri, 1999.) The conclusions by Nazarali-Stranieri (1999) reflect the general tenor of these studies:

The case of Chile exemplifies the inadequacy of traditional economic models that fail to account for human development and environmental degradation. While Chile’s has seen spectacular economic growth in recent years, it has been at the expense of rural and indigenous populations and the natural environment.

Thus, these studies and their arguments, backed up by some data and researched information, have emphasized the importance of looking at sustainable development and not exclusively at economic growth indicators. They rest basically upon a qualitative analysis, and do not include indicators against which the performance over time is measured. In addition, cause and effect relations are not examined in great detail. In their policy recommendations some of these studies call for environmental impact assessments or reports to be undertaken in the context of economic and trade policies (Nazarali-Stranieri, 1999).

At the same time, at the international level, theory and practice on strategic environmental assessments, integrated environmental assessments or sustainability impact assessments of policies have evolved substantially. Nurtured by this international context, subsequent studies in Chile have become more and more elaborate, starting to follow clearer methodological frameworks, mostly involving indicators attempting some sort of structuring around the analysis of the cause and effect relationships between liberalization and sustainability. Special emphasis was given to environmental aspects. However, as of today there have not been comprehensive studies. One recent attempt to a more comprehensive quantitative study has been Giljium (2003) in which the author applied a material flow analysis in order to analyze effects from trade

liberalization over the past two decades. However, the author himself recognizes the limitations of the approach applied and the lack of data availability, which has so far not permitted an adequate inclusion of environmental and social considerations into the material flow analysis.

This paper pulls together the evidence from the various specific studies and thus attempts to provide a more comprehensive overview of the trade liberalization-sustainability interrelations, including an idea about the overall structural effects (including scale, technological, regulatory and other considerations) of liberalization, as well as about the most important specific effects of liberalization measures. By summarizing and analyzing the evidence provided by key documents published on the issue over the past ten years, 1994-2004, an attempt is made to provide a more complete picture of the effects of trade liberalization in Chile. In the analysis the following questions are addressed:

- How has trade liberalization (in its widest sense) affected environment and development in Chile? What might be the effects of further liberalization?
- What is the evidence so far?
- What policy recommendations have been suggested in the studies?
- What other policies could be put in place to mitigate any of the negative effects or enhance the positive ones?

The next section will provide a survey and characterization of fifteen of the most important studies carried out over the last decade. A brief characterization of the studies with regard to the objectives, the content and the methodology applied precedes the short summaries of the main results of the studies. The section concludes with a synoptic table of the studies.

In section 3 an integral analysis of the effects and policy recommendations of the studies is carried out and some additional or cumulative effects are identified and policy recommendations formulated.

Before starting the description and analysis of the studies, some brief comments about the concept of liberalization applied in this paper are appropriate. The meaning of liberalization is by no means uniform across the studies. Whereas in some, such as in Blanco *et al.* (1999) or Borregaard *et al.* (2003), liberalization is understood as an inextricable part of a wider process of an economic model that relies to a large extent on export promotion and diversification, other studies look strictly at one liberalization measure, such as the accession to MERCOSUR or the accession to NAFTA. In this paper, liberalization is certainly understood as a wider process, embracing also privatization processes as well as the creation of favorable conditions for foreign direct investment. Globalization and global insertion, on the other hand, are terms that go far beyond liberalization. As WWF (2004) puts it:

The term Globalization is used to describe the major changes our society is going through. These changes include the revolution in transport, communications and information technology which have contributed towards the expansion of the world economy, caused major shifts in the composition and location of production and consumption activities and reduce the ability of national and local governments to act independently.

Some trade policies, such as, for example, forest plantation subsidies paid during the 1980s and 1990s, responsible for much of the growth in forestry plantations and exports, are certainly not trade liberalization measures; on the contrary, they distort trade. On the other hand, they have without doubt led to a greater insertion of the Chilean forestry sector in the global economy and greater investment, including by foreign companies.

A second element that should be emphasized in the context of the discussion of the concept of liberalization refers to the fact that liberalization has mostly not been outright deregulation but it has rather implied or gone along with processes of re-regulation. An improved understanding of these re-regulatory processes will put us into a position to better understand the changing role of the state and the private sector and will shed light upon the requirements and upcoming gaps in regulatory activity.

Finally, before starting with the analysis, it is important to keep in mind the character of the studies: they are by no means purely academic exercises or direct policy inputs, but rather they are aimed at contributing to social processes of conflict prevention or resolution, to the construction of trust among the different actors of society. Thus, even though as WWF (2004) put it – “SAs are not yet directly contributing to the design of trade policies and regulations that allow the various dimensions of sustainable development to be mutually reinforcing” – for many of the studies over the last decade the objective was not so much the immediate objective of changing trade policies or other domestic policies and legislation, but, through providing solidly researched arguments, documents and material, it lay in the creation of trust and credibility among the social players. In this sense, these studies are difficult to summarize by looking exclusively at the analytical part of them and not at the process part around them. However, the analysis and summary of the process issues is a task that certainly goes beyond the scope of this paper but that should be kept in mind for the conclusions and policy recommendations.

II. Sustainability Impacts of Trade Liberalization in Chile – the Evidence²

In this section, fifteen studies on the impacts of trade liberalization on sustainability in Chile are presented and their main results and policy recommendations are summarized. The section is ordered along three categories of studies: specific trade liberalization studies – studies that examine one specific trade liberalization measure; sectoral trade liberalization studies – studies that concentrate on the analysis of one (or more) specific sectors; and general trade liberalization studies – studies that consider liberalization measures over a longer period of time, and look at the overall macroeconomic effects of these liberalization measures.

While there is certainly some overlap among these three categories, this categorization aims to facilitate the reader’s orientation.

II.1. Specific Trade Liberalization Studies

II.1.1. MERCOSUR and Environment

Country, year	Chile, Brazil, Paraguay, Argentina, 2000
Objective	To examine the potential environmental effects of Chile’s associate membership in the MERCOSUR upon the country, and to explore alternatives of

	environmental cooperation and coordination among member countries, particularly regarding environmental impact assessment systems and ISO 14000 certification.
Sector	Agriculture (traditional crops in the Región de la Araucanía, Chile) and infrastructure (Chile).
Contents	Part I, environmental impacts of the MERCOSUR: environmental impacts of changes in land use and sanitary and phytosanitary risk analysis (Chile); demand for infrastructure and its environmental effects (Chile); main environmental impacts in Brazil, Uruguay and Paraguay. Part II, issues of cooperation: environmental impact assessment systems in the MERCOSUR countries; ISO 14000 standards in Chile; and ISO 14000 standards in Brazil, Uruguay and Paraguay. Conclusions and recommendations.
Methodology	For changes in land use: first the economic impacts were identified from existing studies using partial equilibrium models. Then a similar scheme was followed in the environmental impact assessment, centered on five relevant issues: water consumption, use of pesticides and fertilizers, erosion, and biodiversity. For sanitary and phytosanitary risk and infrastructure, a mainly qualitative analysis was carried out, backed up by interviews with representatives from relevant sectors.
<i>Ex ante</i> or <i>ex post</i>	<i>Ex ante</i> (negotiations completed)
Authors	Hernán Blanco and Nicola Borregaard (editors), CIPMA

Main results

- This was the first predictive assessment – *ex ante* – of the environmental consequences of a trade agreement in Chile. Traditional methodology was used, which first identified and assessed economic effects and then attempted to translate these into environmental effects.
- The environmental impacts identified as resulting from Chile’s associate membership in the MERCOSUR did not turn out to be very significant; instead the main concern related to the increased pressure on the environment and its resources.
- In the cases of Brazil, Paraguay and Uruguay general environmental impacts were identified relating to the trade liberalization in the MERCOSUR. In these countries environmental concerns were focused on land and energy integration projects.
- In the mid and long term, trade liberalization in the region and the consequent increase in levels of trade are expected to have significant impacts upon enforcement bodies. Governments must identify and assess these requirements in order to tackle them appropriately.
- Although environmental impact assessment systems are similar in the MERCOSUR countries and Chile, practices and experiences are very diverse. The differences could: i) influence product competitiveness leading to implicit trade barriers; and ii) create

significant negative impact in countries with poor regulations, due to potential migration of contaminating industries.

- The ISO 14000 standards are mainly being implemented by companies trading with industrialized countries. Therefore, these standards will probably not play a preponderant role in regional trade, at least in the short term.
- The document offers a series of recommendations; including: the need i) to have base studies on the environmental impact of pesticides and fertilizers; ii) to implement road tax mechanisms that internalize the environmental costs of increased international traffic; and iii) to tackle the environmental issue explicitly and proactively in international negotiations.

II.1.2. Sustainable Impact Assessment (SIA) of the Trade Aspects of Negotiations for an Association Agreement between the European Communities and Chile

Country, year	Chile, 2002
Objective	<p>The study aims to produce a comprehensive, methodical and targeted analysis of the impacts of the major potential trade measures under discussion between the EU and Chile on economic, social, and environmental sustainability.</p> <p>Specifically, it aims to</p> <ul style="list-style-type: none"> • provide a better basis than has existed to date for EC institutions to ensure that ongoing negotiations take the sustainable development dimension fully into account; • provide inputs to the definition of a full package of policies at EU level and in the domestic context of trade partners; and • create a basis for the discussion with European stakeholders about sustainability implications of the negotiations.
Sector	All sectors, specifically fisheries, agriculture, forestry, transport, mining, electricity, specific manufacturing
Contents	<p>1. A description of the methodology used, including a presentation of the conceptual framework of the sustainability assessment analysis and developments or changes from past studies. This methodological study includes a discussion of evaluation themes and indicators and the representation of results.</p> <p>2. An analysis of the trade-related measures incorporated in the EU-Chile Economic Partnership Agreement and a macroeconomic analysis of its long-term economic impacts. The macroeconomic analysis is performed using a computable general equilibrium economic model, the use of which is described. These two exercises are aimed at providing information to be used as inputs into the screening exercise for the key sustainability issues and the impacts associated with the trade agreement.</p> <p>3. A screening / scoping exercise based on the results of the previous exercises</p>

	<p>and on other information, which results in the selection of sectors and areas for more detailed study. This analysis includes the first use of macro and sector specific indicators.</p> <p>4. More detailed studies which analyze potential social and environmental sustainability impacts in the areas and sectors identified by the screening / scoping exercise. The outcome of these studies is an initial assessment of the sustainability impacts in their areas.</p> <p>5. An assessment of the social, environmental and economic sustainability impacts at macro and sector levels. This assessment includes an analysis of missing and conflicting information and concludes with an analysis of potential ameliorating (flanking) measures.</p> <p>6. A description of contacts with identified civil society representatives and information on progress in developing the study website.</p> <p>7. A record of the comments made by the Commission on the Inception and Midterm Reports and discussion as to how these comments have been responded to in the present report.</p> <p>8. A review of the literature and a list of tools and references.</p>
Methodology	<p>The main stages in the Sustainability Impact Analysis are the following:</p> <ol style="list-style-type: none"> 1. Description of scenarios 2. Identification of effects to be studied and methods of analysis – screening and scoping 3. Identification of methods of assessment and main sustainability impacts – assessment and comparison of uncertain information 4. Response to identified sustainability impacts – mitigation and enhancement
<i>Ex ante</i> or <i>ex post</i>	<i>Ex ante</i>
Authors	Planistat, prepared for the Directorate General for Trade, European Commission

Main results³

- **Economic:** Overall, the impact of the EU-Chile Economic Partnership Agreement is to reinforce existing trends in Chile. The Agreement results in additional economic growth for Chile, equivalent to not more than a year's normal economic growth. This is the result of some economic restructuring in favor of sectors in which Chile has a comparative advantage, such as processed foods, agriculture, wood, pulp and paper, and chemicals. Sectors in which Chile has a comparative disadvantage are steel, motor vehicles and other machinery. These sectors lose employment, as does mining due to increased labor-saving investment. None of these employment losses are large. In both Chile and the EU, the

Agreement will bring about a combination of increases in employment and a reduction in prices relative to wages.

- **Social:** In Chile, the combination of increases in employment and a reduction in prices relative to wages will help to increase the standard of living and reduce poverty among the majority of the people living in urban areas. On the other hand, there are a number of pre-existing socially unstable and perhaps unsustainable issues that will be affected by the EU-Chile trade agreement, although the trade agreement cannot be said to be the root cause of these situations. In each of these situations, the issues are related to the existence of a dual economy and to difficulties with consistent and fair regulation or with title to land. The overall impact on employment means that urban opportunities for self-employment, including in the informal sector, must be created. On the other hand, many small farmers face an existing sustainability crisis reinforced by increased investment and competition from large commercial farmers. In terms of overall equity, existing inequalities in terms of practical rights and access to social and economic opportunities will not be challenged by the impact of the agreement. In some situations, such as small farming, artisanal fishing and forest-based Mapuches, there is a risk that their already precarious situation will be worsened. Women's access to employment, to capital, to land rights on equal terms is not yet universally achieved. While employment in some sectors where women are employed, such as food processing, will increase, no necessary change is created by the agreement to the pre-existing inequalities. Indigenous peoples suffer from the same existing small farming problems as other people. Forest-using indigenous peoples consider that their lands are being encroached upon by increased commercial forestry, although the increase in forestry is expected to be modest. Depending on the electricity generating strategy chosen by Chile, they may or may not be negatively affected, although such a negative impact is not a necessary consequence of the EU-Chile agreement. Without the EU-Chile trade agreement, the existing social problems will continue. While the agreement will not solve all of these problems, it will bring considerable social benefits to a large part of the population. The agreement will also bring opportunities to address some of the pre-existing social problems.
- **Environmental:** The consequences of the trade agreement clearly interact with existing trends to cause possible sustainability impacts. Increased industrialization implies negative scale effects that despite voluntary engagements and new regulations generally outweigh benefits from technique effects. Land and water quality are affected negatively by agricultural intensification – a trend not fundamentally caused by the EU-Chile trade agreement but reinforced by it. For these indicators, some localized environmental improvements could occur from technique effects, but we also note the potential local seriousness of mine-induced pollution. Biodiversity impacts are largely a function of the electricity strategy chosen – a strategy that is not a necessary consequence of the EU-Chile trade agreement. Natural resource stocks, notably fishing stocks, depend on the effective implementation of appropriate management techniques rather than on the Agreement. Chemical and non-ferrous metals industries are heavily involved in the pressure exerted on the environment, but companies are increasingly aware of the problem. Past mechanization led to increased pressure on fish stocks. In recent years, policing of quotas has improved and current market based proposals aim at doing this further. If the measures being taken to protect fish stocks are effective, then the EU-Chile

trade agreement will indeed have no impact on fish stocks. If, on the other hand, there is continued inconsistency in policing, then the increased demand brought about by the tariff reductions would increase the incentive to fishermen to evade the quotas. The competitive pressures brought about by increased investment in the industry might have a similar effect.

- **Mitigation:** Most if not all of the sustainability issues have been experienced in Chile for quite some time. Great efforts have been made to improve environmental quality. Because of this, especially concerning environmental sustainability, many of the structures for the mitigating (flanking) measures required already exist. In the cases where a consensus exists, there is usually a fully effective regulatory body. The role of the EU in acting to mitigate the negative sustainability consequences of the EU-Chile agreement could therefore generally be seen as a participant and supporter of efforts already under way; as a source of support where new resources are required for research; and as a partner in a two-way EU-Chile mutual education dialogue in those situations where a consensus is still to be built within Chile. It is perhaps not surprising that the sectors where the sustainability impacts have been most noted are those where there is competition for non-marketed resources: fishing and agriculture.

II.1.3. Sustainability Assessment of the Free Trade Agreement between Chile and the United States in Chile’s Agroindustrial Sector (Evaluación de la sustentabilidad de un acuerdo de libre comercio entre Chile y Estados Unidos en el sector agroindustrial chileno)

Country, year	Chile, 2002
Objective	Analysis of the sustainability effects of the trade agreement between the US and Chile
Sector	Agroindustrial sector
Content	Description of overall economic context of the agroindustrial sector. Description of environmental and social issues relevant to the agroindustrial sector. Analysis of potential economic, environmental and social effects in the Región del Libertador Bernardo O’Higgins.
Methodology	Effects are examined in greater detail in the Región del Libertador Bernardo O’Higgins, the region that concentrates the greatest part of agroindustrial production in Chile. Given data scarcity, indicators could not be constructed. However, in a participative process that involved interviews and the implementation of a workshop, sensitive topics were identified and subsequently researched through a literature review as well as a qualitative analysis of existing regulation.
<i>Ex ante</i> or <i>ex post</i>	<i>Ex ante</i>
Author	Annie Dufey, CIPMA

Main results

- The information at the level of the region was too scarce to be able to establish a baseline with solid indicators and carry out a more detailed and quantitative evaluation of the effects of the FTA.
- It is expected that in the case of pesticides and fertilizers, water contamination, and water use, environmental pressures will increase, whereas soil conservation will be improved.
- A positive effect of the FTA is expected if the FTA effectively contributes to a strengthening of the environmental and social legislation and especially of its enforcement.
- Given the environmental chapter, it can be expected that the FTA will certainly signify an improvement with regard to enforcement.
- More domestic regulation and policymaking is required, especially with regard to soil contamination, water contamination from diffuse sources, solid waste treatment and disposal, and with regard to land use planning at the provincial level (expansion of the cities, loss of agricultural land).
- Clean production agreements could be useful to promote the use of clean technologies in the agroindustrial sector, a sector that is characterized by a strong presence of small- and medium-sized enterprises (SMEs), which currently display significant differences among themselves with regard to technological standards.
- The agreement or chapter on environmental cooperation should be used for the promotion and transfer of clean technologies in the agricultural sector.
- The chapter on labor cooperation could help to elaborate a capacity building program on the handling and disposal of waste from of chemical inputs in the agricultural sector.

II.1.4. Environmental Assessment of the U.S.-Chile Trade Agreement

The Government of Chile conducted a review of certain environmental impacts from the U.S.-Chile FTA in Chile, its first for an agreement of this nature. In order to determine and measure possible environmental impacts of the FTA, the Chilean Office of International Economic Relations (DIRECON) of the Ministry of Foreign Relations developed, with the assistance of the School of Engineering of the University of Chile, a preliminary environmental impact assessment employing a computable general equilibrium model that complements their economic and commercial assessments. The exercise, which suggested that additional economic activity could produce a slight increase of less than 1% in certain emissions, provided data relevant to the Government of Chile's policy on pollution mitigation.

II.2. Sectoral Trade Liberalization Studies

II.2.1. Identifying Economic and Environmental Impacts of Trade Liberalization: Application to the Mining Sector

Country, year	Chile, Bolivia, Peru, 2000
Objective	To identify and measure the social benefits (including the environmental costs) versus the private benefits for production and exportation in the mining sector in

	Chile, Bolivia and Peru. Basically, the investigation aims to put a value on the environmental impacts of mining production, and thus questions in general terms the benefits / social costs of exports, integrating environmental aspects.
Sector	Mining sector
Contents	Integration of an environmental and economic analysis of the environmental problems in the mining sector; environmental and economic analysis and valuation of selected environmental effects of mining production: <ul style="list-style-type: none"> • Water use, SO² emissions, implied risks of tailing dams, implied risks of sulfuric acid transportation, water pollution from tailings; conclusions and policy recommendations
Methodology	A methodological focus was applied based on the Domestic Resource Cost Approach (which compares production costs with gains obtained from the international market), placing emphasis on the analysis and economic valuation of the environmental impacts of mining production. In most cases the method used was mitigation cost valuation.
<i>Ex ante</i> or <i>ex post</i>	This study and its methodology is either a general <i>ex post</i> study of the effects of trade liberalization, or it can be used to complement studies carrying out <i>ex ante</i> or <i>ex post</i> assessments of the effects of trade liberalization within the context of specific agreements
Authors	Nicola Borregaard, Centro de Investigación y Planificación del Medio Ambiente, CIPMA; Gustavo Lagos, Pontificia Universidad Católica; Robert Moran, Consultant; Raúl Tolmos, Consultant; Maria del Socorro Peñaloza, MEDMIN; Evelyn Taucer, MEDMIN; Igor Reinhard, MEDMIN; Jorge Falla, Consultant

Main results

- In terms of international competitiveness, the study indicates that environmental effects absorb a significant part of the economic benefits of mining exports. However, adding together all the environmental effects, the negative effects do not yet totally cancel out the positive economic effects.
- The study helped to identify and rank the environmental problems in the mining sector. While the main problems are SO² emissions, followed by the implied risks of tailing dams and water pollution from tailings, water use and sulfuric acid transportation are problems with relatively small environmental, and hence economic, impact.
- In terms of policy implications numerous specific indications are made, based on concrete results from the study. These include the need to start up a debate on the environmental liability posed by abandoned tailing dams in Chile, the urgent need to review company practice for sulfuric acid transportation and the possibility of introducing environmental insurance on the transportation of dangerous substances based on calculations made in the study, as with the indication in the case of the Región de Potosí in Bolivia with pollution caused by tailings seeping into neighboring rivers, to build a tailing dam funded by a tax applied to each tailing unit.

- The proposed internalization of environmental costs is a policy tool expected to prevent the environmental effects of economic and trade policies.

II.2.2. Environmental Impact of Trade Liberalization and Policies for the Sustainable Management of Natural Resources: Case Study of the Mining Sector in Chile

Country, year	Chile, 1999
Objective	Two central objectives are identified: to assess the environmental impacts derived from mining activity in Chile after the trade liberalization process; and to contribute to the practice of environmental assessment from a methodological perspective
Sector	Mining sector
Contents	Relationship between international trade and the environment: methodological considerations; structure of the Chilean mining sector; economic effects of trade liberalization in the Chilean mining sector; environmental impacts of trade liberalization in the Chilean mining sector; lessons learned and reflections.
Methodology	Basically qualitative analysis of the environmental impacts of the mining sector after the trade reform process. First, an exhaustive global review of the economic and regulatory context was carried out; then economic changes resulting from the trade reform were established from scale, structural and product effects; these effects were related to their respective environmental impacts with technological and regulatory elements added to the analysis; last, the implications of the study's findings were assessed from a methodology and policy perspective, from which correspondent recommendations were drawn.
<i>Ex ante</i> or <i>ex post</i>	<i>Ex post</i>
Authors	Nicola Borregaard, Giulio Volpi, Hernán Blanco, Françoise Wautiez and Andrea Matte-Baker

Main results

The main results of the study, in terms of the trade-environment relationship for Chile's mining sector, and its consequent recommendations, are summarized in the final chapter of the study "Aprendiendo de la Experiencia" ("Learning from the Experience"). The study's main conclusions point clearly to the fact that the process of trade liberalization has had negative environmental effects, despite the fact that some efforts, also connected with the liberalization of trade, have contributed to their mitigation. The main conclusions are:

- The neo-liberal policies adopted by Chile in the early seventies encouraged significant economic growth, leading to greater natural resource exploitation at a rate that continues to increase. This has affected the quality of the environment and raised questions regarding the long-term sustainability of this pattern of economic development. The study establishes a chain of causalities that have had an impact on the environment:

- The Chilean trade liberalization process led to a significant increase in mining exports.
 - The increase in trade led in turn to changes the structure of the mining sector, changes in production patterns, and changes in the kind of products exported.
 - The scale effect that (fundamentally) derives from the trade contributed to increased pressure on the environment, particularly in terms of residue deposits, abandoned mines, communities' economic and social sustainability, and water scarcity.
 - Outside factors, such as the copper producers' lobby in the United States and the pressure exerted by multinationals on the Chilean authorities to obtain clear environmental regulations, played an important role in the environmental management of Chilean mining and in the way these impacts were perceived.
 - Trade liberalization also encouraged technology transfer and more effective environmental management.
 - Improvements in the regulatory framework, management, and technology have led to a reduction in negative environmental impacts of mining activity per unit produced (and this reduction will continue into the future).
 - Since the mining sector is based on the extraction of non-renewable resources, its activity will be significantly reduced to the point of ceasing altogether. Mine abandonment could leave an important legacy of environmental problems.
- The Chilean experience demonstrates that the most efficient way to manage the environmental impacts of mining activity is through regulation and technological improvements. Although both elements function relatively well, there are still significant improvements to be made and specific actions to be carried out, among which the study recommends the following:
 - In the framework of environmental policy, the development of an environmental policy with a long-term perspective that integrates economic, social, and environmental elements is desirable.
 - In the field of environmental planning and management, the introduction of an integral management and planning system that encompasses all the river basin ecosystems is recommended, thus allowing the interplay of interactions among the differing environmental pressures and the demands of the productive sectors.
 - In the framework of environmental regulation, organization of both the regulatory system and the associated institutional structures is desirable.
 - In the field of development and technology transfer, establishing incentives for their adoption on a large scale is recommended, both for the mining sector and the economy in general, in order to help strengthen environmental protection.
 - Design of specific action programs is required, since the development of a strategy to ensure a more sustainable pattern of development in mining areas is identified as a priority issue.

- The creation of a special fund for environmental protection is recommended.

II.2.3. Environmental Impacts of Trade: Analysis of Three Chilean Export Sectors

Country, year	Chile, 1998
Objective	To identify and measure the social benefits (including the environmental costs) versus the private benefits for production and exportation in the mining sector in Chile, Bolivia and Peru. The investigation focuses on the general question of the benefits / social costs of exports, and the question of how the economic and environmental costs and benefits can become comparable
Sector	Fish meal, copper cathodes, timber board
Contents	General analysis of the environmental effects of trade; proposal for a new method to measure the social benefits / costs of exportation; introduction to the EDRC (Extended Domestic Resource Costs) approach; application of the method to the fishery, forestry and mining sectors in Chile; conclusions and policy recommendations
Methodology	A methodological focus was created based Domestic Resource Costs approach (which compares production costs with gains obtained from the international market), integrating environmental costs and benefits into the economic valuation
<i>Ex ante</i> or <i>ex post</i>	This study and its methodology is either a general <i>ex post</i> study of the effects of trade liberalization, or it can be used to complement studies carrying out <i>ex ante</i> or <i>ex post</i> assessments of the effects of trade liberalization
Authors	Nicola Borregaard, Centro de Investigación y Planificación del Medio Ambiente, CIPMA; Theresa Bradley, World Resources Institute, WRI; Gustavo Lagos, Pontificia Universidad Católica; Arcadio Cerda, Universidad de Talca; Alexandra Roettger, FAO; Bernardo Aliaga, CONAMA

Main results

- The quantitative results show the negative environmental costs of production of the three leading Chilean export sectors absorb a significant proportion of the gains in wellbeing generated by these exports.
- Although in all the cases the EDRC quotients remained below one (indicating there to be no net loss of social well being through export of the respective products), a more complex analysis – only three environmental impacts have been studied in each productive sector to date – would be expected to reveal figures higher than one in some cases.
- Trade liberalization does not ensure that all companies raise their activity’s efficiency and so reduce their environmental impacts. It is possible that significant differences continue to exist between different companies, in terms of the reach of environmental damage,

which depends on the kinds of technology used, a long time after trade has been opened up.

- Above and beyond providing specific figures, this methodology helps identify priority environmental problems and their systematization. Rigorous systematization of effluent emission quantities and their respective impact on health and the environment, as well as potential solutions and respective costs – all aspects required for economic valuation of the environmental problems under analysis – helped identify how much we really know about the environmental problems.
- Moreover, the methodology helped identify those to benefit and those to lose out, as well as delivering a quantitative estimate to direct policies to specific problem areas.
- As one example of the point above, the study offered estimates of potential values applicable for sale of water rights as opposed to the current practice of handing over rights free of charge to those requesting them.
- Lastly, the methodology helps show that we are still a long way from understanding which sectors are sustainable and how we must progress with concrete identification of requirements in terms of environmental management, information transparency and management and definition of environmental investments and potentially applicable policy tools.
- One evident lesson to be learned from the Chilean experience of trade liberalization is that dissemination of scientific and economic information to the public on the environmental impacts generated by the economy's main export sectors should become an important function of government if it is to promote liberalization of its trade regime. Three aspects of this point acquire importance:
 - Cooperation between the industrial sector and the government is vital. Industrial groups must be given incentives to provide the government with information regarding environmental damage. This should not be limited to voluntary schemes, but form part of a legal framework.
 - Secondly, it is essential to form and capacitate a “critical mass” of informed participants, including representatives from private companies, government, NGOs, and academic institutions, to take part in the debate on policy formulation, in order to raise the level of political debate and create environmental standards and tools that guarantee balance between economic, social, and environmental objectives.
 - Lastly, in the preparatory stages of any debate on changes to trade regulations, the International Monetary Fund (IMF) and other donors backing the trade reforms must offer incentives and technical support to the developing nations' actions, examining and reviewing the possible environmental effects of such reforms, and outlining an agenda and calendar of reforms to tackle such matters.
- The study makes no attempt to analyze any specific liberalization agreement, but rather tries to help the private sector, NGOs, and civil servants to a better understanding of the interrelation between trade and environmental effects.

II.2.4. Sustainability Impact Assessment of Transport Services Liberalization – Case Studies from Chile and Germany

Country, year	Chile, Germany, 2003
Objective	<p>The study is directed at provide answers to the following questions:</p> <ul style="list-style-type: none"> • What is the status of SIA in the context of trade policy, and specifically in the context of services? • How can SIA be applied to liberalization in the transport sector? • What form does trade liberalization in the transport sector take? • What sustainability effects has transport liberalization had in the two countries? • What effects is further liberalization likely to have in the two countries? • What policy measures would have to be in place to mitigate negative and expand positive effects of transport liberalization in the two countries? • What lessons can be drawn from the experiences in the two countries?
Sector	Freight transport sector, especially maritime
Content	The study begins with a discussion of the current SIA methodologies in the context of trade liberalization and develops an approach to analyze the impacts of the liberalization of transport services. Sustainability indicators are then identified and performance of these indicators over the past two decades is presented. Then, past liberalization measures and the current status of liberalization in the transport sector in each country are described and the interrelation between liberalization measures and sustainability in the freight transport sector analyzed. Finally, in each country a case study of a future liberalization measure is undertaken.
Methodology	Once indicators have been selected and validated through a participative method, the OECD methodology is applied, contemplating scale, structural, regulatory, and technological effects. The indicators are applied <i>ex post</i> to all four transport modes, and indicator performance and trade liberalization measures are then crossed to establish cause and effect relationships. Subsequently the indicators are applied <i>ex ante</i> to one specific case of liberalization, the case of Chile maritime cabotage liberalization.
<i>Ex ante</i> or <i>ex post</i>	<i>Ex post</i> and <i>ex ante</i>
Author	Nicola Borregaard, RIDES, Gordon Wilmsmeier, RIDES, Stephanie Pfahl, ADELHPI

Main results

- Overall, given the lack of a clear transport policy that takes into account the challenge of a multimodal transport system, there has also not been a clear strategy behind liberalization in the transport sector. The bias towards road transport has translated into a

weak “unimodal” transport system at the national level, which eventually fails to fulfill the expectations and needs in freight transport. Overall, a decoupling of transport growth from economic growth, indicating greater transport productivity in terms of GDP, has not occurred. There has not been a more coherent effort with regard to the internalization of external costs of the different modes of transport, this being the principal reason for the lack of more positive effects on sustainability from liberalization in the transport sector.

- Private concessions have led to a significant increase in investment in the transport sector, basically in road infrastructure, but also in ports. In ports this has led to a noteworthy growth in productivity and efficiency.
- Liberalization has led to an increased concentration in some sectors, especially in the air transport sector and the port sector. However, the road transport sector is still highly atomized, with 78% of enterprises owning just one truck in 2002.
- Effects on employment have been considerable. Even though today unemployment is relatively lower in the transport sector than the national average, in the last two decades there have been substantial reductions in employment in some transport modes.
- Especially before the background of the significant privatization initiatives in Chile, “getting the market signals right,” also involving the stronger use of market based instruments for the integration of external effects seems adequate and necessary. Beyond road charges there are several other economic incentives that might be considered in the context of freight transport policy, including tradable development rights, the creation of insurance funds for environmental damage from accidents, compensation schemes in the framework of the Environmental Impact Assessment, and the promotion of carbon credits.
- Environmental data are not only scarce but also poor, and it is difficult to deduce the effects of liberalization. Yet current figures show that potential technological improvements could not outweigh significant increases in energy consumption in the sector. With regard to environmental management in the transport sector, it has to be emphasized that there is not only a lack of policy and sufficient environmental regulation, but the performance of the private sector with regard to environmental and social management has also been relatively poor compared to other sectors.
- From a sustainability point of view it seems crucial that liberalization measures take into account the establishment and/or maintenance of a level playing field among the various transport modes as well as among countries of one region.
- Both case studies confirm that as countries become economically interdependent through economic integration there seems to be a need for a harmonization of regulations and technical standards in transport policy.
- Another more complicated aspect faced in the context of transport services liberalization and the GATS are the indirect linkages between specific liberalization measures and integrated transport systems.
- Indirect linkages with other sectors are also important and have to be taken into account in any decisions of transport liberalization.

II.2.5. Environmental Effects of Foreign Investment Versus Domestic Investment in the Mining Sector in Latin America

Country, year	Chile, Peru 2002
Objective	This document intends to determine the environmental impact of Foreign Direct Investment (FDI) in the mining sector in Latin America, especially in Peru and Chile.
Sector	Mining sector
Content	Description of the sector in general in Latin America and in the two countries under analysis; economic situation, environmental policy and economic and environmental regulatory measures affecting the sector in the two countries. Description of evolution of FDI in the sector. Analysis of environmental effects of FDI. Conclusions and policy recommendations.
Methodology	The OECD methodology of analyzing scale, structural, technological and regulatory effects was applied in a qualitative assessment, without the use of indicators. The methodology was backed up by a literature review, interviews of selected experts in the respective countries, and a survey that involved the major mining companies in Chile.
<i>Ex ante</i> or <i>ex post</i>	<i>Ex post</i>
Author	Nicola Borregaard, Annie Dufey, CIPMA

Main results

- The principal inflow of FDI in the mining sector was materialized through the Decree 600 of 1974.
- FDI in the mining sector between 1974 and 1999 amounted to US\$ 14.7 billion equivalent to 36.2% of total FDI in this period (US\$ 40.6 billion). While between 1974 and 1989 FDI mining amounted to US\$ 2.4 billion between 1990 and 1999 this sum rose to US\$ 12.3 billion.
- Between 1974 and 1999, 36% of the materialized FDI in mining was in Region II, 20% in Region I, and 18% in the Metropolitan Region
- The differentiation between foreign and domestic investment has become increasingly difficult. Different companies have various owners, and different operations are run, in turn, by different companies. Joint ventures are common and, given the large amount of capital required in mining operations, are a necessity in the sector. As the economy becomes more open, differences between large domestic and foreign investment become increasingly subtle.
- The important contribution of foreign companies toward introducing the most modern environmental technology – in terms of equipment, processes, and management in Chile – has been instrumental for the domestic companies of the sector, as it has enabled the transfer of those technologies within the country, to the benefit of the national mining

sector. Even though foreign investment operations and domestic operations have converged in their environmental management practices over the last decade, some differences remain, reflected for example in the fact that foreign owned companies have been the first to become certified in ISO 14001.

- In some cases, the introduction and use of environmentally friendly technology cannot be attributed directly to FDI. Many of the new technologies have been developed by Chilean companies – such as the Teniente Furnace – and others, such as hydrometallurgic processes, have been adopted and adapted quickly by foreign and domestic companies alike.
- There has been a relative increase in the production and export of copper concentrate versus refined copper.
- Regarding environmental effects such as air contamination, effluents, and water use, there has been more progress than for sustainability issues such as local community development.
- Scale effects are important regarding the scale of individual operations as well as the scale of overall production. Increasing scale puts increasing pressure on natural resources and imposes new regulatory challenges.
- Chile is badly prepared to confront the issue of exhaustibility of the resource. There is a lack of policies aimed at ensuring local and regional sustainability post-extraction. Currently there is no scheme of royalties. FDI, due to its volatility and very often, its large scale will have to assume a special responsibility with regard to ensuring local sustainability that can last beyond the time of its operation. Foreign mining companies have to develop clear strategies regarding the interaction with the local community, the identification of the local community's priorities, and the creation of long term partnerships with the local community.
- The use of scarce water is causing problems with regard to biodiversity and water use for human settlements.
- Positive effects from FDI in the mining sector lie especially in the upward pressure on domestic regulation, as illustrated in the Chilean case regarding the Environmental Impact Assessment system as well as decontamination plans.
- A final challenge concerns the generation of environmental information.

II.2.6. Effects of Foreign Investment Versus Domestic Investment in the Forestry Sector in Latin America

Country, year	Chile, Brazil, 2002
Objective	This document intends to determine the environmental impact of Foreign Direct Investment (FDI) in the forestry sector in Latin America, especially in Brazil and Chile.
Sector	Forestry sector

Content	Description of the sector in general in Latin America and in the two countries under analysis; economic situation, environmental policy and economic and environmental regulatory measures affecting the sector in the two countries. Description of evolution of FDI in the sector. Analysis of environmental effects of FDI. Conclusions and policy recommendations.
Methodology	The OECD methodology of analyzing scale, structural, technological and regulatory effects was applied in a qualitative assessment, without the use of indicators. The methodology was backed up by a literature review, interviews of selected experts in the respective countries, and a survey that involved the major mining companies in Chile
<i>Ex ante</i> or <i>ex post</i>	<i>Ex post</i>
Author	Nicola Borregaard, Annie Dufey, CIPMA

Main results

- Among the factors sustaining the important growth of the forestry sector are the state's adoption of instruments to give incentives to the private sector to invest in the sector; the opening up of the economy to the external sector; privatization processes; and processes to encourage foreign investment.
- The DL 701 of 1974 is considered the most important instrument for the construction of the country's forestry richness. The decree establishes total protection from expropriation for forestry land, contemplates up to 75% rebate of reforestation costs and plantation management, and introduces exemptions and reductions of land taxes and utilities derived from the exploitation of native and planted forests.
- Investments from foreign companies have been relatively limited (between 1974 and 1999 they were to 2.6% of total FDI introduced through the DL 600 in that period).
- Apart from the DL 600, the impact of Chapter XIX of the Compendium of Regulations for International Exchanges of the Chilean Central Bank has been far more relevant for the FDI flow into the forestry sector. This measure was introduced in 1985 in order to stimulate FDI and diminish foreign debt. Between 1985 and 1989 the total FDI into the forestry sector due to this instrument was US\$ 1.02 billion equivalent to 22.7% of the total FDI that came into the national economy through this instrument.
- Differences in environmental management between foreign and domestic companies have been rather small and can hardly be called systematic
- One of these aspects relates to the certification of foreign companies within the Forest Stewardship Council (FSC)⁴. In the Chilean case the first company that was certified under ISO 14001 was Santa Fé, at that time foreign owned (by Shell). Some years later, the first two companies to be certified or are about to be certified under FSC are also foreign owned.⁵

- With regard to the introduction of the Clean Development Mechanism in the framework of the climate change programs it was again a foreign company that was the first to inscribe a project in the Register of AIJ of the IPCC.⁶
- Another aspect relates to the use of transgenic species, where again it was a foreign company that was one of the first to get involved in field tests.
- Beyond these differences in terms of technology and management, in the Chilean context specifically, two foreign investment projects have left their mark on the environmental contingencies: Trillium and Forestal Cascada. Due to the strict rejection by environmentalists, these two projects have not materialized. The reaction of environmentalists referred, basically, to the magnitude of the operations, their effect on the native forest, and the lack of policies and enforcement capacity related to management plans for the native forest.
- All in all, global insertion seems more relevant than foreign investment. Export orientation and world-wide businesses create the need for certification. The globalization not only of companies but also of other organizations and institutions plays an increasingly significant role. International NGOs have become important players, especially in countries in which environmental consciousness is incipient. Foreign investors have a more fluent relation and access to international NGOs, at the same time as they are more exposed to their scrutiny.

II.3. General Trade Liberalization Studies

II.3.1. Environmental Impacts of Changes in the Export Structure in Nine Countries of Latin America and the Caribbean: 1980-1995

Country, year	Argentina, Bolivia, Brazil, Chile, Colombia, Costa Rica, Jamaica, Mexico and Peru, 1999
Objective	To assess the environmental impacts of the trade reforms implemented in Latin American countries by analyzing the transformation of the countries' export structures
Sector	Export sector, diverse production sectors
Contents	Analysis of international trade by product type: classification based on intensity of use of natural resources, technology and production factors and classification according to environmentally sensitive industries; indicators to measure the environmental impact of the evolution in export structure by means of three effects: scale, composition and technology; analysis of the environmental effects of trade reforms in each selected country; analysis of some selected environmental indicators to illustrate differences in the rhythm of environmental deterioration between the selected countries; conclusions and recommendations
<i>Ex ante</i> or <i>ex post</i>	<i>Ex post</i>
Methodology	Mainly quantitative selection and assessment of economic and environmental indicators, the changes in which are related to trade policies adopted by the

	countries of the region
Authors	Marianne Schaper, Economic Commission for Latin America and the Caribbean, ECLAC, United Nations

Main results

- The document’s main results are presented in the section, “diagnosis by country,” which analyzes the economic effect of the change in export structure on each of the selected countries and its potential environmental impact. To achieve this, it first classifies the export structure on the basis of two trade classifications: according to intensity of use of natural resources, technological content and incorporation of different production factors in product manufacture (primary products, manufactured products, and others); and according to the classification of environmentally sensitive industries. It then uses economic variables to measure the scale effect (export volumes of primary products and environmentally sensitive products), composition effect (sectors’ contributions to total exports according to intensity of use of natural resources, technological content, and production factors; contribution of environmentally sensitive industries to total exports; specialization index or revealed comparative advantage index; and competitiveness matrix and technology effect (capital goods imports; technological specialization index) comparing these variables in pre and post reform periods. Then, in the section “evolution of some selected environmental indicators” environmental indicators are supplied (companies with ISO 14000 certification; the environmental market value and GDP relationship; energy consumption per capita; industrial CO² emissions; GDP per unit of energy consumption; environmentally sensitive industries, deforestation rate; fishing volumes; cultivable land per capita; and fertilizer consumption) to illustrate the differences in the rhythm of environmental deterioration among the countries chosen.
- Another important result corresponds to the document’s final reflections, among which the following stand out:
 - The export structure of the 1990s (post-reform) is more environmentally vulnerable than that of the 1980s (pre-reform or during reform) for all the countries analyzed, since the export volume coming from sectors with recognized environmental impact, such as primary products and products from ‘dirty’ industries, has increased three-fold or more in most of the countries studied.
 - There is no simple mechanical relationship between policies of trade liberalization and increased environmental protection.
 - The above relationship depends more on each country’s institutional structure, trade structure, income distribution and implemented environmental policies, interest groups, geographical density of economic activity, education of the population, and elasticity of demand for environmental quality.
 - The convenience of and need to complement the liberalization process with an adequate environmental policy backed up by a solid institutional structure.

- The need to formulate and undertake articulate economic, technological and environmental policies that help improve the systemic competitiveness of production and export mechanisms.

II.3.2. Evolution of Trade and Foreign Investment in Environmentally Sensitive Industries: Andean Community, MERCOSUR, and Chile (1990-1999) (*Evolución del comercio y de las inversiones extranjeras en industrias ambientalmente sensibles: Comunidad Andina, MERCOSUR y Chile (1990-1999)*)

Country, year	MERCOSUR, Andean Community, Chile, 2001
Objective	To assess the environmental impacts of the trade reforms implemented in Latin American countries by analyzing the transformation of the countries' export structures
Sector	Export sector, diverse production sectors
Contents	Analysis of international trade by product type: classification based on intensity of use of natural resources, technology and production factors and classification according to environmentally sensitive industries; indicators to measure the environmental impact of the evolution in export structure by means of three effects: scale, composition and technology; analysis of the environmental effects of trade reforms in each selected country; analysis of some selected environmental indicators to illustrate differences in the rhythm of environmental deterioration between the selected countries; analysis of competitiveness indicators; conclusions and recommendations
<i>Ex ante</i> or <i>ex post</i>	<i>Ex post</i>
Methodology	Mainly quantitative selection and assessment of economic and environmental indicators, whose changes are related to trade policies adopted by the countries of the region
Authors	Marianne Schaper, Valérie Onffroy de Vérèz, Economic Commission for Latin America and the Caribbean, ECLAC, United Nations, Serie Medio Ambiente y Desarrollo Nr. 46

Main results

- Chile is the country in the group of countries analyzed with the highest percentage of exports from environmentally sensitive industries. This percentage has, however, decreased over the time period analyzed, from 54% of all exports to 43% of all exports.
- Chile is the country in the group of countries analyzed with the lowest percentage of exports from clean industries.
- For Chile the principal market for environmentally sensitive exports has been and still is Japan. However, the participation in these exports has diminished from 50% in 1991 to 28% in 1999.

- NAFTA countries increased their participation in environmentally sensitive exports from 8.4% in 1990 to 13.6% in 1999.
- Chile has lost market share in exports from environmentally sensitive industries and has slightly increased its market share in exports from clean industries.
- The process of opening up the economy has to be accompanied by an adequate environmental policy and an appropriate and solid institutional structure. It is also necessary to implement a complementary strategy or policy in the economic and technological area so that the systemic competitiveness of the productive sector is enhanced.
- The role of FDI should be clearly understood and identified and FDI should be channeled towards the countries' priority sectors in the aforementioned strategy.
- There is not much space for countries like Chile to adjust their productive sectors to environmental requirements. These latter are formulated mostly in industrialized countries with the prevailing production, technological and environmental patterns and structures of these industrialized countries.

II.3.3. Sustainable Trade Expansion in Latin America and the Caribbean: Analysis and Assessment

Country, year	Latin America and the Caribbean, 1998
Objective	To review crucial issues for the region regarding the relationship between trade and the environment, in order to offer an empirical assessment that takes into consideration export sectors, geographical location, and existing government policy
Sector	Exporters, different areas
Contents	Recent changes in trade policy of the Latin American countries with regard to the different regional and inter-regional agreements; the sectoral and environmental impacts of liberalization and opportunities to promote more sustainable trade strategies and policies
Methodology	A set of indicators was selected to assess the impacts of trade on the environment, covering multiple pollution categories from the main export sectors. The assessment shows up a variety of factors, including geographical location, resource allocation efficiency, scale of production, technology, and government policy
<i>Ex ante</i> or <i>ex post</i>	<i>Ex post</i>
Authors	World Resource Institute: C. Ford Runge, Eugenio J. Cap, Paul Faeth, Patricia McGinnis, Demetri Papageorgiou, James Tobey and Robert Housman

Main results

- Based on empirical analysis, the study concentrates on the way trade expansion can facilitate and complement sustainability in the region. This premise is founded upon two observations: (1) that trade is expanding rapidly, generating increases in income levels per capita, and (2) that this growth will create challenges and opportunities for the quality of the environment and conservation of natural resources.
- The central hypothesis is visualized in the chain of events that causes trade to affect the environment: Trade → creates greater efficiency in resource assignment (-) → greater GDP growth per capita → negative scale effects (-) → more demands for environmental protection and policies → changes in product composition (+) → changes in technology (+).
- The document reviews the changes brought about by market liberalization in 16 countries with micro-economic data (including GDP, trade performance, percentage participation of exports in production and their sector trends). The results deliver the empirical base of the comparative analysis by country, taking the geographical location and the sector and reviewing the negative and positive impacts of the trade insertion.
- Identification and validation of the environmental impacts are oriented according to Lucas' methodology (1996), using a variety of environmental indicators. In addition, the study tests the proposal that environmental degradation accompanies an increase in income, measured by GDP per capita (Kuznets curve).
- The real merit of this study is manifested in the search for contending data and interrelations able to describe the specific situation of the countries analyzed. The authors avoid arbitrary conclusions. The complexity of interrelations and the multiple factors (external and internal) that influence the assessment of each sector, country, and period do not permit generalizations. In this way, international trade is neither the main cause nor the predominant factor of the environmental impacts, although trade policies and practices do have consequences on the environment. These can be found at every stage from the production process right up to the final consumer.
- This perception and analytical base leads to the question about what the potential effects of environmental regulation might be on the expansion of trade. The interrelation of these issues is reflected in the increase in environmental measures and requirements in the international arena, such as ISO, HACCP, certification, or eco-labeling. It is concluded that the internationalization of such instruments by international trade does have positive environmental effects.
- The study's main findings lead to the definition of organizational principles and recommendations for sustainable trade policies. These refer to a set of policy strategies to "maximise the complementarity of the trade reform and environmental sustainability" by harmonizing environmental standards, internalizing costs, implementing institutional innovations to increase research, control and monitoring, etc.
- The conclusions and recommendations give priority to reinforcing government policies. Within this context, the authors highlight the role of leadership in developing the environmental institutional capability held by those countries with a greater probability of influencing and shaping future links between trade and the environment. The authors identify Chile, Brazil, Mexico and Argentina as the main players in this task.

- The study cannot and does not give solutions to be applied in each country. However, the recommendations emphasize the change in government policy and the growing role played by civil society, the scientific community, and the private sector in order to achieve a better strategy to tackle the trade-environment interface.
- The conclusions confirm the need to consolidate an interregional trade-environment policy to ease cross-border problems.
- Additionally, the definition of a common policy is indispensable in order to be able to participate and influence decision-making in the field of international commerce.
- The study does not give answers about the stakeholders and main players in the change towards sustainable policy in the countries. Since these transformations always have “winners and losers,” it would be interesting to discover to whom the specific benefits are accrued and who bears the burden of the costs.
- Imposition of environmental standards, generalization of management systems (ISO, HACCP), “green protectionism,” a growing use of voluntary tools regarding environmental performance, etc., are brought in by the same countries that produce the environmental technology and whose regulatory demands are aimed at their own situations and economic interests. In order to draw up trade strategies for Latin American countries it would be interesting to have more transparency in and influence on the decision-making of their trade “counterparts.”

II.3.4. Trade, Material Flows and Economic Development in the South: the Example of Chile

Country, year	Chile, 2003
Objective	<p>By applying the material flows analysis, attempt to provide some answers to the following questions:</p> <ul style="list-style-type: none"> • What are the implications of the export-oriented development model for the use of natural resources in Chile? • How can environmental pressures stemming from international trade activities be consistently quantified and analyzed? • What are strengths and deficits of a MFA study of an export-based economy such as Chile?
Sector	Overall economy, with special emphasis on the natural resource sectors, and more specifically the mining sector
Content	The author applies material flow accounting and analysis (MFA), internationally recognized as a key tool to assess the biophysical metabolism of societies and to provide aggregated indicators for environmental pressures of human activities, to analyze the restructuring of the Chilean economy towards an active integration in the world market from the perspective of natural resource use. Special emphasis is put on the assessment of material flows related to Chile’s international trade relations and further development

	of trade-related material flow-based indicators.
Methodology	Material flow accounting and analysis, resource productivity analysis
<i>Ex ante</i> or <i>Ex post</i>	<i>Ex post</i>
Author	Stephan Giljium, SERI

Main results

- In the last 15 years, the high rates of economic growth in particular stimulated imports of fossil fuels and fossil fuel products, taking Chile out of the group of net exporters of natural resources.
- A first estimation of a comprehensive physical trade balance, including indirect resource requirements for production processes, showed that Chile has a substantial trade deficit with the rest of the world from the perspective of indirect material flows.
- Despite the rapidly rising material input of the economic system, actual domestic consumption increased at a much slower rate, as major parts of material flows are activated by demand of export-related sectors.
- MFA proved to be a valuable framework to clarify rising human pressures on resource use in Chile, especially with regard to economic activities associated with international trade activities.
- The overall resource productivity (or eco-efficiency) of the Chilean economy has halved between 1973 and 2000. Thus, at the end of the 1990s, double the amount of material input was required to produce one unit of GDP.
- An overall sustainability evaluation of Chile's development model would require both an extension of the presented MFA data set and a connection of material flow-based indicators with other environmental as well as socio-economic indicators.

II.3.5. Economic Integration and Environment in Latin America (Integración económica y medio ambiente en América Latina)

Country, year	Latin America, Chile, Argentina, 2000
Objective	Analyze the general interrelation between trade and the environment in the Latin American region, with special emphasis on Chile and Argentina
Sector	Overall economy
Content	International trade and the environment, international regulation, WTO, trade agreements-Chile; Chilean exports, Argentine automobile sector. The first section analyzes how the environmental issue has been tackled in the field of international trade, specifically in the adoption of international agreements, in the WTO arena and in the regulations coming from the private enterprise sector. Then, in the case of Chile, he undertakes a brief analysis of the Chilean economy's evolution face to face with trade liberalization, its effects on the environment and how the

	environmental issue has been tackled in the trade agreements Chile has signed up to with the European Union, Canada, APEC and MERCOSUR. Lastly, two brief studies are presented of environmental conflict case studies, one for the Chilean export sector and the other for the Argentine automobile sector.
Methodology	Qualitative analysis, literature review, two case studies
<i>Ex ante or ex post</i>	<i>Ex post</i>
Author	José A. Ramírez, Universidad de Chile, for the European Commission, (DG I)

II.4. Summary Table

Sectors studied	Methodology	<i>Ex ante / ex post</i>	Concept of liberalization	Main results	Main recommendations
<p>Sectoral studies are predominant. Almost all of the sectoral studies are natural resource sectors, with the exception of one study on transport. The mining sector and the agricultural sector receive the greatest attention, whereas the fisheries sector has been included only in one sectoral study.</p>	<p>There is a wide range of methodologies. The lack of data seems to be a severe limitation in all studies. Most studies identify indicators and establish a qualitative relationship between the indicators and the trade liberalization measure. In some cases general or partial equilibrium models have been applied, but the limitations of this approach have been emphasized.</p>	<p>There is a clear predominance of <i>ex post</i> studies. These studies, in many cases, turn out to be in great part constructions of baselines of sustainability in the different sectors.</p>	<p>In about two thirds of the studies, the concept of liberalization is wide, including trade agreements, tariff reductions, privatization, and foreign direct investment regulations. In the other third, one specific liberalization measure, mostly a trade agreement, is analyzed – the exception is the case of maritime cabotage liberalization in the transport study.</p>	<ul style="list-style-type: none"> • Certainly results differ widely. • In general negative impacts are felt to be more substantive, but there are no numbers for this impression. • The environmental impacts identified from specific trade liberalization measures did not turn out to be very significant; instead, most studies emphasize the fact that existing trends and pressures on the environment and its resources are reinforced through liberalization. • Past impacts are considered more significant, both in positive as well as in negative ways – this might mainly be attributed to an increasing overall assimilation of technologies among large domestic and large foreign producers/investors. • Technological differences, especially among smaller producers, are still felt to be large, even though there is a lack of data to back this argument up. • Studies indicate that environmental effects absorb a significant part of the economic benefits of export. • Liberalization has not contributed to industrialization or more value added production. • Liberalization has contributed to the upgrading of regulation at the same time as it has imposed new regulatory challenges (large scale investments). • Environmental aspects have been progressively more integrated into trade agreements. 	<ol style="list-style-type: none"> 1. The generation of and access to information is an urgent requirement for undertaking impact assessment in an efficient and effective way – the construction of baselines of sustainability in different economic sectors of the country should be carried out independently of trade liberalization assessments. 2. Domestic policy indications: most studies insist on the priority of reinforcing government policies and institutional structures (even though some also insist on the fact that these have improved considerably over the 1990s). Important aspects mentioned in this context reiteratively are: <ul style="list-style-type: none"> • First and foremost, strengthening of the enforcement of existing regulation. • Strengthening of the regulatory framework. • Introduction of market based instruments. • Support to the transfer of hard and soft technology among companies of the same sector. • The need to formulate and undertake articulate economic, technological and environmental policies that help improve the systemic competitiveness of production. <p>Sometimes, especially when there are summaries and attempts of generalizing impacts or evaluating in a global way the impacts, it is difficult to grasp how the authors arrived at some of the assertions in the conclusions.</p> 3. Trade policy indications: the two main elements of trade policy recommendations include the promotion of harmonization / mutual recognition of regulation / voluntary measures, and the integration of cooperation on environmental and social matters into trade agreements.

III. Integral Analysis of Effects

III.1. Overall Effect

The studies show that the relationship between environmental and/or sustainability effects and trade liberalization is highly complex. Especially given the lack of continuous data, pre-established models and the limitations of resources for carrying out the studies, the isolation and quantification of effects is hardly possible.

Given this complexity in the baseline definition and the context of liberalization, in the analysis as well as in the cause and effect chain it is not surprising that there is no study that denounces a single significant effect. However, it is also evident that almost all studies insist on the fact that liberalization measures bring along an increased pressure on the environment and its resources, the foundation of this assertion being the increase in production, exports, and sometimes also the scale of the operations.

Most studies carry out an *ex post* assessment of various liberalization measures. Those that do look at one liberalization measure, such as the Cooperation Agreement with the European Union, the Chilean accession to MERCOSUR, the Chilean accession to NAFTA, or the liberalization of cabotage, do not identify one or more outstanding effects. In almost all cases, changes in the tariff structure are minimal with the introduction of the trade agreement, given previous preferential tariff arrangements or trade agreements. Thus, given that many of the studies rely on linking results from economic – either general or partial equilibrium – modeling, the effects presented in the studies are small. This is why the value of the application of general and partial equilibrium models, especially with regard to the wider discussion of longer term effects of liberalization and globalization, is rather limited. Studies that embark upon a more inclusive analysis of the measures, also referring to changes in foreign direct investment, changes in the regulatory structures, and non-tariff measures, shed more light upon possible effects.⁷ The latter are, however, mostly qualitatively assessed.

Most studies concentrate on the specific effects of the measure(s) under analysis and the mitigation of the effects, certainly without questioning the overall economic model.

III.2. Structural Effects

Notwithstanding the complexity and difficulty in establishing single significant cause and effect relations, the studies have at the same time contributed to making very clear how each liberalization measure contributes a small part to changing consumption and production patterns, trade structure, and the structure of production.

Certainly, these structural effects are not always negative and in fact can be rather ambiguous. When studies have attempted general conclusions about these effects there is no quantitative foundation to back these up and, in fact, sometimes these conclusions are difficult to trace back to the arguments.

One significant structural effect concerns the scale of production. In many cases over the past decades there has been a significant increase in the scale of operation and size of company, in a

context of important economies of scale. This situation has raised preoccupation with regard to the concentration of power, the decay of small- and medium-sized enterprises, the surge of ever larger environmental risks and ever larger affected areas. The studies in the mining sector, in the forestry sector, and in the transport sector have demonstrated this effect, where in the mining and forestry sectors, foreign direct investment has tended to lead to ever increasing operations, and in the transport sector liberalization has led to an increased concentration in the case of air transport.

The role of and change in SMEs has not been analyzed in great detail in the studies under analysis – a fact that can be understood in the context of limited resources and the complexity and scarcity of information in which the SME sector operates. In the future, it would be worth analyzing the effect of trade liberalization on SMEs in a separate study.⁸ The structural changes are still very poorly understood. Evidence is anecdotal and has not been well documented, especially in industries that have experienced extremely dynamic growth in a very short period of time. Thus, the structural changes that are brought about by increased liberalization and globalization, such as the changing patterns of consumption and their environmental implications, have barely been touched upon in the SIATP / EIATP studies and have only been very preliminarily analyzed in other contexts. Patterns of consumption and production change at a much quicker pace than before. In Chile's tourism sector, for example, the rise of so-called ecotourism projects and investments has been significant over the past years. Projects such as the Pumalin Park or the Isla Nalcayec are only the tip of the iceberg of what can be seen as an important trend about which, however, there are still no official numbers available.⁹ Part of this evolution is due to foreign investment in the sector, facilitated by current foreign investment regulations combined with incentives to tourism investments applicable to domestic as well as to foreign investment.¹⁰ The generation of waste, especially hazardous waste, is another example of a very dynamic evolution. Whereas domestic solid waste confronts problems of strategic planning of waste dumps, for hazardous waste there still is no specific regulation, and numbers on hazardous waste production date from 1994 and consist merely of estimates.¹¹ The salmon industry is another good example for an industry that has expanded rapidly. Two decades of approximately 15% annual growth have led to a situation in which in 2002 the industry exported about 300,000 tons of salmon and generated more than US\$ 1 billion in exports. The accusations of dumping in the United States and in Europe are a reflection not only of the competitors' concerns about cheaper production due to less strict regulations, but also of an industry that has to adapt quickly to the challenges that are implied in terms of environmental and labor considerations, as well as in terms of structural changes due to mergers and acquisitions and new types of associations and supply chain contracts.

Information and indicators in all aspects of sustainability are necessary to better understand these structural changes. These indicators will have to be carefully constructed with the consultation of experts in each sector.

A preoccupying trend is the lack of a relative increase in value added production. This continuing and even rising dependence on primary material exports is a phenomenon that will have to be analyzed in greater detail.

IV. Conclusion and Some Policy Recommendations

The first question, related to the last aspect mentioned above, points to finding out the reasons for the continuing dependence on primary material exports and to finding out what the overall implications of this phenomenon are. Clarity is required with regard to an answer to the question of whether or not Chile needs and wants a structural change in this sense. In past years and especially recently there has been a lot of discussion around the need for a technological revolution or a technological strategy for the country, though without a convincing argument of the background on the reasons for the need for such a technological strategy.¹²

At the other end of the spectrum the question that emerges is whether Chile is institutionally – in the widest sense of institution – prepared to confront the above-mentioned structural changes. Even though the model of environmental policy management is changing, with voluntary agreements and a very limited number of economic instruments integrated in Chile's environmental policy, there is still a long way to go to speak of a real policy mix and an efficient way of policy management in this area. The integration of economic, social, and environmental aspects into policies and efforts to develop strategies is essential. So far, there is no government institution that guarantees this type of integration – an integration that is essential for such issues as biotechnology, patents, or the integration of small and medium sized enterprises (SMEs) into quality control and certification along the supply chain.

The current debate on whether the institutional set-up of the CONAMA lives up to the new requirements can also be seen as a reflection of this situation. Today, most sectors believe that an institutional change is urgently needed. The debate has concentrated on the inadequacy of having a commission instead of a ministry. However, if there is an interest in growing sustainably, all ministries have to participate actively in the debate, a debate that is not only about environmental protection but, among many others, about economic growth, stability, social equality, and cultural diversity and integration. Thus, what seems clear is that the debate should probably not focus so much on whether environment should be given the status of a ministry, but on how to develop a “Sustainability Vision, or Policy, or Strategy” that emanates from all relevant ministries together – that is, a government policy. One of the first pillars of this policy will have to be the identification of important strategic issues for an environmentally, socially and economically sustainable global insertion. Several of these strategic issues arise from the foregoing analysis:

1. Need for improved land use management

As pointed out before, there is currently no land use policy or clear management structure with regard to land use. This poses environmental and social problems, and problems relating to the efficiency in dealing with large investment projects' authorizations. Closely linked to this issue is the lack of a strong policy on indigenous people.¹³

2. Creation of trust and cooperation among the different actors

The creation of trust and cooperation is also essential given the dynamic changes that on the one hand are potential sources of conflict and on the other hand do not permit the public sector to have the necessary information for the elaboration of efficient policy strategies. In this area the

government, through the elaboration of a comprehensive strategy on clean production agreements, has made some headway.¹⁴ However, these agreements lack the integration of social issues such as labor concerns,¹⁵ and have not involved important actors in civil society, such as academicians or NGOs. It will be a challenge to remedy these limitations in future agreements.

3. Need for a better understanding of new political and economic forces.

There is also a need to better understand the rise of and dependence on new economic and political forces. Large multinationals, international NGOs, trade agreements, and third country importers and consumers have become important determinants in international trade and thus in the Chilean economy. The participation by the private sector in the assessment activities has so far been minimal; given the increased role of it, the process of re-regulation and privatization and the increasing economic importance of private business, this is a deplorable situation.

4. Institutional adaptations to new markets

The institutional requirements in terms of necessary adaptations in ministries that oversee different economic sectors are significant. The national service on tourism and the national services of consumers, dependent on the Ministry of Economy, are two examples of services that lack the resources and capacity to confront the challenges in the area of new market opportunities for more sustainable business. The energy sector is an example of a sector that has been privatized and that requires new regulatory structures, especially for long term planning and the management of crises.

5. Requirements in terms of generation of data and accessibility of data

As mentioned before, data availability, modeling and quantification – economic as well as environmental – are rather weak and highly limit the meaningfulness of the studies. All ministries and public services will have to endeavor to cooperate on this issue and systematically attack it. Concerted action and a clear strategy will be required in this area.¹⁶

Beyond these more general policy recommendations, looking at the overall impacts identified in the studies, several additional specific policy recommendations can be formulated:

- Confronting environmental liabilities is already a challenge and will become an ever greater challenge, especially in a scenario of increasing scale of operations and lack of regulation in some areas.
- Links among sectors have to be better understood (for example transport infrastructure and other sectors' production, or energy and other sectors).
- The integration of social aspects into the Impact Assessment Studies and into strategy discussions on policy recommendations is urgently needed.
- There is a need for better understanding the drivers of innovation and value added production and the sustainability impacts of primary resource based production and exports.

- The integration of SMEs into sustainable supply chains will be key to ensuring sustainability in different ways.
- Some of the conclusions and recommendations expressed in the studies have to be analyzed in greater detail and their implications seriously evaluated.
- Applied policy research can play a crucial role in making the link between solidly researched studies and results and the implementation of policy recommendations.

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(in addition to the fifteen studies presented in Section 2)

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¹ See for example World Bank (2001).

² Seven of the fifteen studies presented in this section are based on direct translations and slight modifications of original versions of analyzes in Blanco et al. (2002).

³ This summary of the main results is, in great part, a citation from Planistat (2003)

⁴ This certification scheme was created by the World Wildlife Fund and Unilever at the beginning of the 1990s . By August 1994, a definitive set of Principles and Criteria was approved, which includes issues like compliance with the country's regulations, indigenous peoples' rights, community relations and workers' rights, environmental impact, management plan, assessment, and maintenance of high conservation value forests.

⁵ Forestal Monte Aguila, owned by Shell, is already certified, and Millalemu (owned by the Swiss Schmidheiny Group) is on its way to certification.

⁶ See Gayoso and Schlegel (2001).

⁷ See, for example, the effects in the context of sanitary and phytosanitary measures in Chile-MERCOSUR, or the compliance of environmental and labor regulation in United States-Chile.

⁸ In this context it is worth mentioning that recent work by the Economic Commission for Latin America and the Caribbean (ECLAC) of the United Nations (2003) has explicitly focused on SMEs in the context of trade. However, so far it has limited its analysis to the evolution of SMEs in the environmental goods and services sector.

⁹ Numbers about the rise in visitors in parks can serve as an orientation of the dynamism of the sector: according to ProChile, the government export promotion agency, between 1990 and 1998 these numbers rose by 34% (www.prochile.cl/documentos/ecoturismo01.php).

¹⁰ For these schemes see Sernatur (2002).

¹¹ CEPAL (1994). Other documents such as Centro Uruguay Independiente (2003) are brief general characterizations of the evolution of the problem without providing numbers (www.erres.org/uy).

¹² See for example El Mercurio 29 de Marzo 2004, Cuerpo A.

¹³ The most recent example to illustrate this situation is the flooding of an indigenous cemetery by one of the most conflictive hydroelectric power projects (Ralco) in April 2004. Even though the company (Endesa) had insisted to the government on the need for a decision with regard to the handling of this issue, the government was institutionally not prepared to provide a clear answer regarding the required action.

¹⁴ For these, see www.apl.cl.

¹⁵ See, for example, concerns expressed regarding the labor conditions in the salmon industry, Ecoceanos News (2001) (www.parlamentodelmar.cl/noticias/rabobank_explotacion.htm).

¹⁶ A promising step has been the commitments Chile has entered into for joining the OECD. In the environmental evaluation, the statistical part fell far short of the rest of the analysis, a situation that possibly triggers some change towards establishing a more systematic approach in this area.