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RESOURCE EFFICIENCY IN LATIN AMERICA:

ECONOMICS AND OUTLOOK

CASE STUDIES: MERCOSUR, CHILE AND MEXICO

Executive Summary



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RESOURCE EFFICIENCY IN LATIN AMERICA: ECONOMICS AND OUTLOOK

CASE STUDIES: MERCOSUR, CHILE AND MEXICO

1.

EXECUTIVE SUMMARY



ABOUT THIS REPORT

The issues of environmental protection and productive development are often presented as almost mutually-exclusive objectives. Conventional economic analyses undertaken in Latin American countries tend to overlook the consequences associated with the depletion of natural resources. However, a more efficient use of natural resources and policies oriented towards sustainable development can contribute, to a large extent, to overcoming social debts, while ensuring a development process with better quality of life for future generations.

In order to assess the region's progress towards greater resource efficiency and sustainable development, the United Nations Environment Programme (UNEP), with the technical support of the Mercosur Economic Research Network, in 2009-2010 prepared a report entitled **“Resource Efficiency in Latin America: Economics and Outlook”**.

From an economic point of view, the report addresses the importance of an efficient use of resources to achieve sustainable development, and to promote a better international insertion of Latin America. It acknowledges sustainable development as a process, rather than a goal. For these reasons, the report focuses on providing a better understanding of the existing trends and challenges in terms of resource efficiency, rather than capturing a high definition “picture” of the current situation of the countries analysed.

The study focused on three thematic areas, based on their importance in Latin America: land use changes, energy and climate change, and water use. Six countries (Argentina, Brazil, Chile, Mexico, Paraguay and Uruguay) were subject to an in-depth analysis.

Based on the evaluation of economic and environmental trends, and on case studies undertaken in the six countries, possible future scenarios were defined. Lessons, findings and recommendations were also identified in relation to the design of policies oriented towards efficient and sustainable use of the region's resources.

From the trends observed, four regional scenarios were built for 2010-2030 in order to identify viable alternatives to eventually make the best use of the region's potential. This forecast provides elements that are intended to help identify strategies and paths to move from the current Scenario 2 (“Status quo: Neither sustainability nor efficiency”) to the most desirable Scenario 4 (“Efficiency, sustainability and governance for inclusion”).

Economic and productive priorities need to be defined together with environmental and social goals.

One of the main findings of this report is that core sustainability and efficiency problems are strongly linked with the need to adapt and improve existing institutions in order to broaden the scale of successful local experiences of resource efficiency promotion (going from local cases or practices to a policy approach). Ultimately, the way a state is organized, and how its leadership articulates decisions, regulates and manages its capacities, is key to promoting an efficient, sustainable and inclusive use of resources.

Existing institutions should be adapted and improved in order to broaden the scale of successful local experiences of resource efficiency promotion.

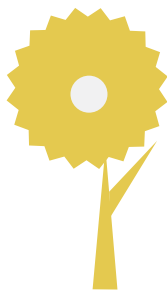
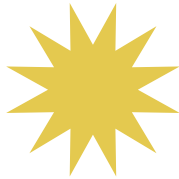


The report suggests that focusing on policies aimed at resource efficiency may play a key role in reaching a higher degree of sustainability and competitiveness, while at the same time being a powerful tool for the reduction poverty and inequality. Therefore, the results of this report are relevant for different decision making areas - and they call for an interdisciplinary approach to look for development solutions or alternatives.

This Executive Summary captures the main results of the report by highlighting policy recommendations that might be relevant for different public stakeholders, be they environmental agencies or social, economic-commercial and productive agencies at national, sub-national and regional levels.

COUNTRIES ANALYZED :

- MEXICO
- BRAZIL
- PARAGUAY
- ARGENTINA
- CHILE
- URUGUAY



The report's results can be summarized into 12 general findings related to the use of resources in the region, and to results specifically associated with the thematic areas analysed (e.g. water use, land use and energy, and climate change, including biofuels).

FINDINGS

A. MAIN FINDINGS

- 1.* The primarisation of the economies of Mercosur countries, as well as Chile and Mexico, has caused increasing pressure on water, land and other natural resources.
- 2.* Even though resource efficiency has improved in specific sectors of Latin American countries, there is a still great potential for improvement.
- 3.* In some cases, the environmental impact of economic activities is so great that tremendous improvements in resource efficiency would be necessary to achieve sustainability.
- 4.* Latin American environmental policies are slow in adapting to the Region's new production practices, as well as to their integration with the world. This is characterized by an intensive use of natural resources.

5. The lack of initiatives, policies and programs that should be aimed at preventing the negative environmental impact of productive development might end up discouraging environmental improvement and having serious economic consequences for those countries that were analysed.

6. Saving and physical investment and the investment in human resources in Mercosur countries, Chile and Mexico are not enough to compensate for the depreciation of physical and natural resources.

7. Resource efficiency and sustainability can and will increasingly contribute to business competitiveness.

8. Environmental regulations in developed countries represent a challenge for the public policies of Latin American countries.

FINDINGS RELATED TO WATER, LAND USE, ENERGY AND CLIMATE CHANGE

9. The main problem related to water in the region is the pressure exerted on the resource, both in terms of quantity (extraction) and quality (pollution).

10. Emissions in the energy sector are closely related to GDP and population growth.

11. Latin American countries are increasingly, albeit slowly, adhering to the global trends in the promotion of energy efficiency and modern renewable energies.

12. Land use and environmental impact caused by agricultural and livestock production are key issues in the MERCOSUR countries, Chile and Mexico.

Focusing on policies aimed at resource efficiency might play a key role in achieving greater sustainability with competitiveness, while at the same time acting as a powerful tool in contributing to the reduction of poverty and inequality.

RECOMMENDATIONS OF THE REPORT

I. IN REGARD TO POLICIES AND STRENGTHENING OF INSTITUTIONS

1. The greatest policy challenge is to adapt and improve the current institutionality to broaden the scale of successful local experiences of resource efficiency (going from actual cases or local practices to a policy approach).

2. More efficient, sustainable and inclusive use of resources requires a role of leadership, articulation, regulation and control by the State.

3. Public policies alone are not enough unless their implementation promotes public-private partnerships and agreements with different stakeholders.

4. In order to include the resource efficiency approach in the design of public policies, it is essential to strengthen research capacities and improve the availability of environmental statistics.

5. National regulatory systems and productive strategies must consider the efficient and sustainable use of land, and the social and environmental impact of agricultural and livestock production.

6. Improvements in institutional and regulatory engineering, along with the introduction of incentives for the rational use of water, have proven to be successful tools for resource efficiency.

7. The inclusion of energy efficiency and the rational use of energy from bio-mass require specific additional efforts.

8. It is necessary to review existing national development strategies, including climate change response initiatives, as an integral part of future scenarios.

II. IN REGARD TO REGIONAL COOPERATION

9. Biofuels imply different challenges, depending on the country's characteristics and on the technology and type of biofuel involved. However, it is possible to promote coordinated regional strategies to face up to such challenges in a proactive manner.

10. In order to limit the environmental impacts of primary activities, it is necessary to promote sustainability and efficiency initiatives at both the national and regional levels.

11. Economic implications of environmental impact caused by production, which are already being reflected in the requirements of a growing number of export markets', have to be considered in terms of competitiveness and sustainability.

12. The promotion and implementation of sustainable consumption and production practices should be seen as a key issue in regional cooperation (both for the development of common policies and objectives in regional blocs, and for the coordination of national and sub-national policies).

13. Regional cooperation is a key aspect to coordinate actions related to innovation; applied scientific research; generation and dissemination of basic information on sustainability and resource efficiency indicators.

14. National, regional and international financing mechanisms for development should ensure the availability of financial resources to promote investments that will lead to resource efficiency.

1.

PURPOSE, REPORT STRUCTURE AND METHODOLOGY

PURPOSE

Conventional economic analyses often pay little attention to the key role played by natural resources (which provide raw materials and ecosystem services, for example) in socio-economic development, human well being, and international integration (international trade patterns). This also implies the risk of dismissing the potentially negative environmental and socio-economic effects that could result from resource over-exploitation; as well as the risk of overlooking the benefits that improved resource efficiency in the use of natural resources would bring about.

The urgent need to encourage private and public efforts to implement initiatives and design specific policies that contribute to achieving development based on sustainable consumption and production patterns is often underestimated. This is a main concern because the use of resources cuts across different areas - including environment, industry, trade, competitiveness and technology, and local development. But, in practice, any specific policy or procedure focuses on the use of resources.

Based upon these facts, this report provides more information about ways of using resources, which are the basis of development, and their relationship with the international integration profile of the countries

analysed. The aim is also to improve the understanding of how the efficient use of resources may contribute to moving towards both a more sustainable development path and international integration pattern in environmental, economic and social arenas.

REPORT STRUCTURE

The report's recommendations are based on the analysis of a series of indicators and their trends; on the lessons learned from a number of case studies carried out in the countries selected; and on a series of 2010-2030 scenarios focused on the institutional dimension.

The report is made up of seven chapters: the first presents a review of relevant concepts and approaches, which are key to assessing resource efficiency. *Chapter 2* reviews and analyses regional applications of methods, tools and relevant indicators related to resource efficiency, including the results of a regional study undertaken to provide evidence of production specialization, trade integration and emission intensities.

Chapter 3 presents an analysis of regional trends and perspectives, based on a series of indicators that reflect the region's socio-economic and environmental development, and in relation to resource efficiency

and emissions intensity for each of the thematic areas selected (energy and climate change, water resources and land use changes).

Chapter 4 provides a brief review of some policy tools and initiatives on resource efficiency, and the thematic areas selected in this study. There are also lessons and results of twelve national case studies of public-private initiatives in Argentina, Brazil, Chile, Mexico, Paraguay and Uruguay.

Chapter 5 proposes a series of regional scenarios (2010-2030) that analyse institutional trends and policies for sustainability and resource efficiency. This exercise integrated governance and policies dimensions, and thus each scenario portrays a different policy implication.

Chapters 6 and 7 present – respectively - the findings from including resource efficiency in policies, as described in the report; and the recommendations identified from the results of the trends analysed, the lessons learned from the case studies, and the scenarios.

The main results of the report are presented in this Executive Summary, and in three Policy Briefs specially prepared for the following target groups: decision makers in the public sector, civil society and business.

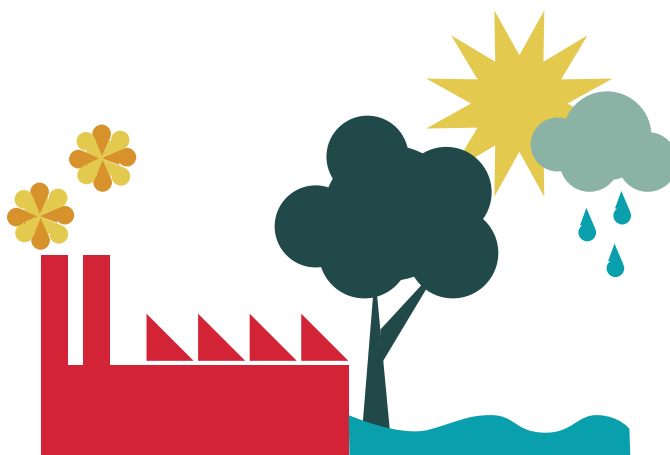


METHODOLOGY

The methodological approach adopted aims to provide elements to understand the contribution of resource efficiency to sustainable development. It does so bearing in mind all its environmental, social and economic dimensions, in addition to competitiveness and the international integration of Latin American countries. The objective is to identify lessons to contribute to better design and implementation of public policies, private and public-private initiatives aimed at greater resource efficiency and at reducing emission intensities. Upon analysing the ways to promote a change in production and consumption patterns, research was then conducted into the potential contribution of a number of economic tools - valuation, incentives, cost-benefit analyses, etc.- in order to improve resource efficiency and reduce emission intensities in the region.

The report presents and analyses a wide range of resource efficiency and sustainability indicators, in order to reflect the regional situation and its evolution, and to compare it with the situation in other regions. The analysis of those trends observed for resource efficiency, development and trade specialization in the countries studied provides an understanding of the extent to which an improvement in efficiency may contribute to increasing sustainable development in Latin America in the near future.

The cases selected focus on experiences related to sectors and resources that are key from the point of view of trade specialization and development; and where resource efficiency may play a key role to promote more sustainable development and improve competitiveness. Some cases include win-win situations, since greater efficiency leads to the sector's lower environmental impact, as well as lower production costs and higher competitiveness. Cases have also been found where improving efficiencies or reducing environmental impacts are vital to overcoming trade barriers, due to the existing environmental requirements to achieve export market access.



KEY RESEARCH QUESTIONS OF THE REPORT:

The analysis developed in the report is broadly based on four key questions to reflect upon resource efficiency in the region:

1.

> To what extent does greater resource efficiency and less emission intensity contribute to solving the existing challenges of sustainable development in the region?

2.

> From a policy design and implementation perspective, what is the role of economic analysis tools and fiscal incentives in the improvement of resource efficiency and the reduction of emission intensities in the region?

3.

> Will resource efficiency contribute to improving opportunities for sustainable growth, as well as increased human well being and quality of life for the population?

4.

> Will resource efficiency contribute to improving the international integration of Latin American countries and accessing markets - in the context of growing trade barriers and the emergence of higher-value niches or specialist products differentiated by their environmental impact?

In this report, resource efficiency was approached from an economic perspective. Its main features are as follows:

- Application of an economic vision to resource efficiency and its relationship with sustainability: examining how the application of analysis tools and policy recommendations made from an economic point of view may contribute to improving resource efficiency. Considerations included cost-benefit analyses, economic assessment of resources and environmental impact, use of incentives and prices to reflect actual shortage, and the promotion of changes in the agents' behaviours.

- A broad vision that goes beyond conventional economic analysis- and considers the central role played by resources in socio-economic development, human well being, and international integration of Latin American countries. This vision includes elements and tools from two supplementary approaches regarding the interaction of economy and environment: environmental economics and ecological economics. Environmental economics provides the idea of a possible replacement of some forms of natural capital in certain productive functions, which could improve efficiency. It highlights the importance of estimating the economic costs associated with the loss of resources as a result of the continuity of development patterns that cause environmental degradation. Ecological economics stresses the impossibility of replacing natural functions of some key ecosystems, species and resources. It examines the need to consider the eventual irreversibility of certain decisions that might put them at risk, and the critical costs of their loss or deterioration.

- Consequently, the sustainability vision contained in this report acknowledges that certain types and minimum amounts of natural capital are irreplaceable, although this might not be the case for all forms of natural capital.

- The approach adopted considers resource efficiency as an important factor, both in terms of contributing to sustainable development, as well as to promoting it as a process. The idea here is to improve Latin American productive specialization and international integration.

- Sustainable development is understood as a process rather than being a goal. For this reason, and instead of obtaining a high-definition "picture" of the current situation of the countries analysed, the purpose has been to improve understanding of past and future resource efficiency trends. From this it can be assessed whether or not the countries under review are moving towards a pattern of resource utilization that can promote greater sustainable development.

The main conceptual themes that have driven the analysis of this report are:

- From an economic perspective, environmental problems make up negative externalities, including external costs. For example, the emissions of toxic substances into water resources engender socially undesired externalities caused by one agent into another, without there being consent or compensation. Externalities exist when those companies or authorities responsible do not take into account all the effects implied by their actions - but only the impact reflected on the market (for instance, a lower production cost in the short term, due to the lack of treatment of effluents). The final consequence is the inefficient allocation of

resources, since a “market” solution leads to excessive emissions as compared to a socially optimal one. Consequently, there is also reduction of human well being compared to that which would be achieved if maximizing social outcomes were the aim. Optimal results occur when a level of activity or production balances the marginal costs and benefits of productive activities, including its externalities.

- Natural resources and the environment are public assets, since they provide society with environmental and ecosystem services that may benefit an individual regardless of benefiting industry. So it becomes difficult to exclude individuals from enjoying such benefits (non-exclusion principle). It is therefore also difficult to finance the provision of these benefits, and this poses great challenges in the design of public policies.

- A better quantification of the externalities (or external costs) facilitates understanding of resource efficiency. External costs borne by the society are often unclear. The lack of quantification of externalities linked to different forms of environmental degradation (ranging from the extraction of resources, emissions into water and atmosphere, waste generation and disposal, to the loss of biodiversity), undermines a general understanding of the economic importance of sustainable practices. The same may be said of the analysis of those benefits that would result from the adoption of efficient and sustainable consumption and production practices – or the opportunity cost of failing to adopt them.

- Despite the growth of information on indicators that reflect the situation and progress with different environmental aspects, there is still a long way to go before having sufficient economic assessments of environmental problems and their associated costs.

Such assessments are fundamental from the economic perspective to design adequate actions or appropriate forward-looking measures. For example, these assessments are necessary to design and implement a tax-per-unit assessment of emissions that will reflect their actual externalities and encourage agents’ behavioural correction.

- There are different approaches that contribute to the design of policies to provide both a vision of the problem and the possible solutions. Given their importance in terms of contribution to efficiency and development policies in the region, the following approaches should be highlighted:

- > Sustainable Consumption and Production (SCP): this is the paradigm currently promoted by agencies like UNEP to guide the definition of policies and the identification of practices to promote sustainability. The concept incorporates that of life-cycles of products and services in environmental policy decisions that are made by the public and private sectors. It does so by integrating production and consumption processes, and then relating the problems and solutions to different stages of the process. Resource efficiency appears to be a key tool towards achieving this objective.

- > Cleaner production (CP): this is the starting point of the SCP concept. CP is a “micro” vision aimed at solving specific environmental problems at the business level, with the purpose of reducing the environmental impacts of processes and products throughout the whole chain. Chapter 4 of the report reviews a number of Latin American initiatives in this regard.

- > Circular Economy: a circular economy approach promotes a political vision that seeks a balance between economic development and environmental and resources protection. It proposes the consideration of economic, production and consumption activities as part of a closed circular scheme of flows of natural

resources, goods, environmental and other services and waste. This implies the implementation of cleaner production practices by the companies; the development of eco-industrial parks and an integrated resources use planning for industrial, agricultural and urban development. This approach is useful to conceive integral policies, although the countries analysed herein have not to date shown significant progress in this regard.

> **Green economy:** this concept became popular after the world financial and economic crisis of late 2008. It proposes initiatives to review national policies and tools in order to analyse their potential for supporting “the greening of the economies”. The approach is based on four strong thematic areas: employment generation; economic growth; innovation promotion and improved management of ‘natural capital’. It is inspired by national experiences in various sectors that have already demonstrated tangible results for advancing sustainable development. A Green Economy, in the context of sustainable development and poverty eradication, is one of the two themes for the UN Conference on Sustainable Development 2012, or Rio+20.

Lastly, the methodology adopted for the scenarios is based on one developed by UNEP, which was adapted to the report’s needs to define the 2010-2030 scenarios in the five stages detailed below:

STAGES TOWARDS THE CREATION OF REEO SCENARIOS

LATIN AMERICA 2010- 2030

- 1.** Review of (a) scenarios defined by UNEP for the region and (b) other key reports.
 - > Definition of the purpose and scope of these scenarios (focused on the institutional aspect).
 - > Definition of a time period (2010-2030) and a geographical area (Latin America).
- 2.** Driving forces and variables’ list.
- 3.** Selection of key variables, according to their importance and uncertainty - and based on case studies in the report.
- 4.** Definition of thematic areas for the analysis of scenarios based on such key variables.
 - > Scenarios matrix design.
 - > Presentation and discussion of scenarios of workshop validation on the report’s results (carried out in Buenos Aires, Argentina in December 2009).
- 5.** Narrative descriptions of the scenarios in order to highlight the key issues of the analysis, and for identifying implications in terms of the policies to be defined.

2.

TOOLS USED TO ASSESS RESOURCE EFFICIENCY AND ITS ECONOMIC IMPLICATIONS

The presentation of the tools used has been organised according to the level of analysis (macro, meso and micro), and also by taking into account the type of approach: economic analysis (mainly based on a vision of environmental economy); sustainability analysis (mostly from a vision of ecological economy) or a combined approach that includes development and environment.

MACRO TOOLS

The economic approach for environmental accounts aims to include the value of goods and services provided by nature into the national accounting systems, in order to consider the economic value of their use or exploitation. Basically, this implies estimating the level of “depreciation of natural capital”. Over recent decades a variety of tools have been proposed for this purpose, each using different indicators and varying levels of in-depth analysis.

Environmental statistics describe the status of and the changes observed in the natural environment (air and climate, water, soil and subsoil), the biota in the environment and human settlements. Environmental statistics are inclusive and measure human activity and natural events affecting the environment; the impact of such activities and events, and the social response to the impact and the quality and availability of natural resources.

MACRO TOOLS TO ASSESS RESOURCE EFFICIENCY AND ITS ECONOMIC IMPLICATIONS:

They provide aggregated data to measure resource impact or resource use at the national or regional level.

Economic approach:

1. Adjusted net savings.
2. Environmental Economic Accounts.

Environmental sustainability approach:

3. Ecological Footprint.

Development and Environment Approach:

4. Environmental Kuznets Curves.
5. Decoupling Analysis.

MACRO TOOLS CONSIDERED IN AN ECONOMIC APPROACH:

ENVIRONMENTAL ECONOMY ACCOUNTS SYSTEM

This provides a conceptual and methodological framework to develop economic and environmental information necessary for the creation of an integrated, internationally acknowledged and comparable accounting system. The System of Integrated Environmental and Economic Accounting (SEEA) is created as a satellite account that links environmental data directly to the National Accounting System through common structures, definitions and classifications. The creation of this system is aimed at facilitating the analysis, description and explicit quantification of the interrelations between environment and economy, while maintaining methodological consistency throughout time.

Mexico is the only Latin American country that has kept and updated a System of Integrated Environmental and Economic Accounting of Mexico (SCEM for its Spanish acronym) since 1993. The topics covered by the SCEM are: oil; forestry resources for wood and changes in land use; water resources; soil erosion; water, soil and air pollution; and expenses related to environmental protection. In 1993, Chile began the implementation of an Environmental Accounting Project. The initiative, carried out by the Central Bank, started by addressing the forestry sector, followed by the mining sector. However the project did not last over time. There are some countries in the region that

are currently considering formal plans to implement an environmental accounting system - though progress to date has been slow. None of the other countries analysed in this report have shown any movement in this respect.

ADJUSTED NET SAVINGS

Estimates the total value and the actual savings (net savings adjusted to consumption of resources, due to costs associated to carbon dioxide emissions and human capital training).

Saving rates are very low in the countries analysed in this report. Some countries have even registered negative values, which mean that savings do not cover capital depreciation. The adjusted net savings are also negative for certain countries and periods: this means that savings and investments in human capital are insufficient to compensate for the depreciation of physical and natural capital. Despite significant fluctuations, these indicators suggest that, in most of the countries analysed, sustainability has worsened in the second half of the 1990s (except in Mexico), while it improved at the beginning of the current decade (except in Chile). By comparing the initial situation (early 90s) with the end of the period analysed, it is possible to claim that, except for Mexico and Chile, the remaining countries have seen an improvement in their sustainability according to the adjusted net national savings indicators.

MACRO TOOLS CONSIDERED IN THE ENVIRONMENTAL SUSTAINABILITY ANALYSIS:

ECOLOGICAL FOOTPRINT

This tool analyses the use of resources and is aimed at providing a simple measure of sustainability. It measures the amount of land and water required by a population in order to produce what it needs for its consumption and to absorb the waste generated with current technologies (Wackernagel et al, 1996). So, it is an instant picture of the situation. The measurement is then related to a surface area and absorption capacity. Because the productive area and the land's absorption capacity (biocapacity) are limited, the ecological footprint allows to measure whether the needs outstrip or fall behind availability. The current ecological footprint of humankind is 23% higher than the planet's capacity to regenerate itself. This implies that it takes the Earth one year and two months to absorb what its population generates in one year. Latin America consumes less than its biocapacity, while Europe and North America consume more than their biocapacity. This implies an exportable surplus for the former, and a net import of resources for the latter.

The ecological footprint can be measured at the individual level, at the city level, or at a national or global level, but it is generally used in its "macro" dimension (at the country or regional levels). One difficulty of this measurement is that it fails to account for technological differences between the different

regions. The need for land to produce goods or to absorb waste is calculated on the basis of average factors. However, it provides a useful measure to compare the situation of sustainability with the transfer of resources implied in international trade.



MACRO TOOLS FOR THE DEVELOPMENT AND SUSTAINABILITY APPROACH:

ENVIRONMENTAL KUZNETS CURVES

They are based on a hypothesis that infers pollution increases with economic growth up to a certain level of income, after which it begins to be reduced. In the countries studied, several factors are responsible for postponing the (possible) positive incidence of growth on environmental quality. These factors include the persistent unfair income distribution, inefficient institutions, political and social instability, and elements of environmental impact intensity associated to international trade.

ANALYSIS OF DECOUPLING

It refers to breaking the link between “environmental bads” (emissions) and “economic goods” (economic growth or development). This is the way to analyse sustainability, by studying if there is a trend towards “dematerialization” or decoupling of environmental pressures from economic growth. This was largely studied, in industrialized countries.

Decoupling occurs when the growth rate of environmental pressure is less than that of its economic driving force in a given period of time. Decoupling can be either absolute or relative. Absolute decoupling takes place when the relevant environmental variable is stable or decreasing while the economic driving force grows. Relative decoupling

occurs when the growth rate of the corresponding environmental variable is positive, but lower than that of the economic variable.

Decoupling indicators measure changes over time. Their reading must consider absolute levels of environmental pressures and driving economic forces. The initial level of the environmental pressure and the selection of the time period considered may affect the interpretation of the results. It is important to take into account the circumstances that are particular to each country (size, population density, natural resources, energy matrix, changes in the economic structure, and degree of economic development) when these indicators are used to compare the environmental performance between countries.

Decoupling analyses available for Latin America indicate that emissions from the energy sector are closely related to the increase of the population and the level of economic activities. This could be explained by the regulatory design of the national energy systems (which prioritize returns in the short term and guaranteed supply, as they promote large-scale investments in carbon-intensive technologies).

(F-1, 2 and 3)

FIGURE 1 > LATIN AMERICA AND THE CARIBBEAN: TRENDS OF CO₂ EMISSIONS BY SECTOR, GDP, POPULATION, 1990 - 2005. INDEX 1990 = 100

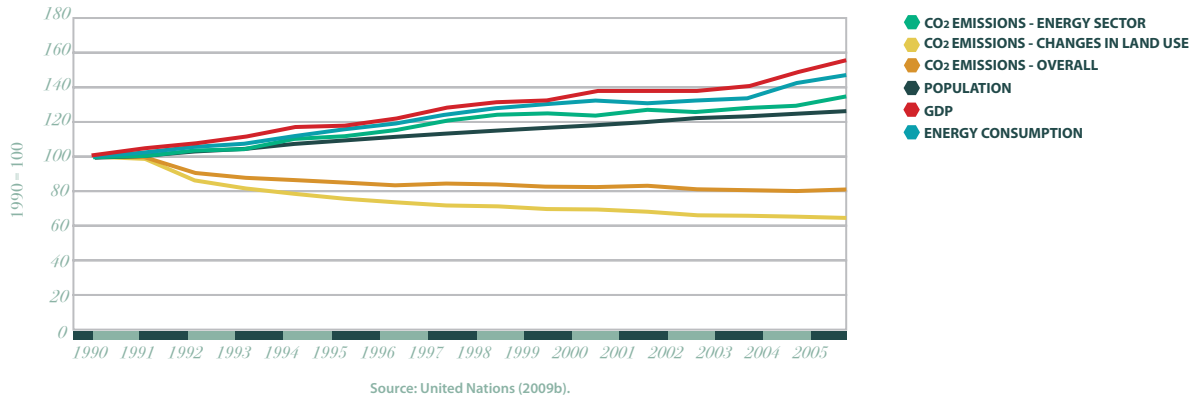


FIGURE 2 > TOTAL CONSUMPTION OF ENERGY AS A PORTION OF THE GDP

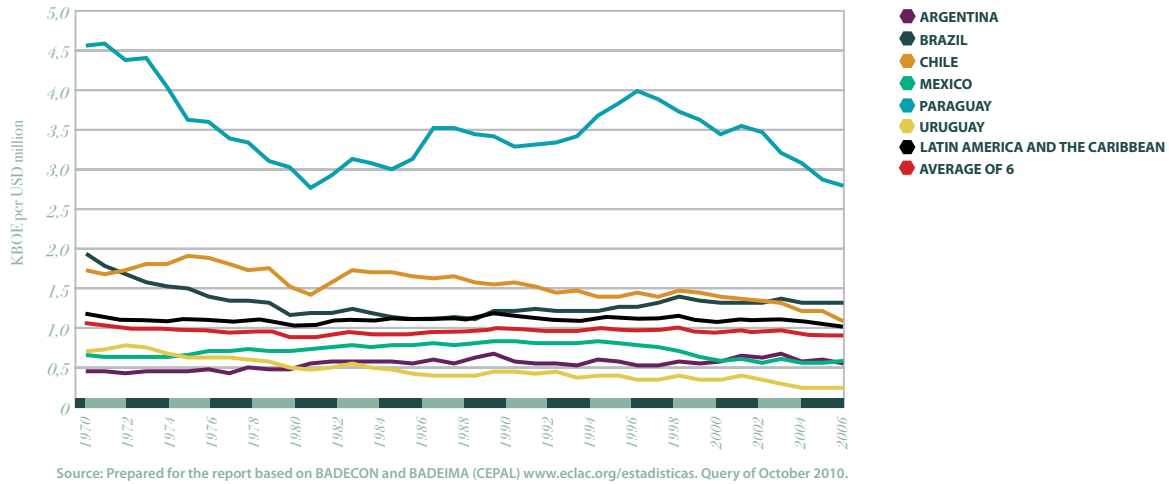
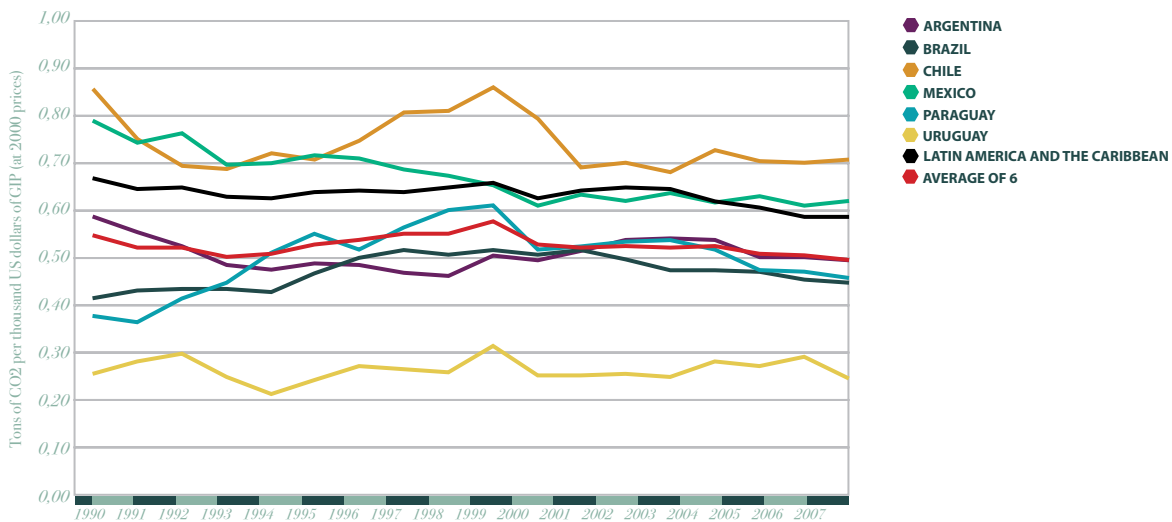


FIGURE 3 > CARBON DIOXIDE EMISSIONS AS A PORTION OF THE GDP



MESO TOOLS

An important consideration when examining emissions intensities and the use of resources from the sectoral aspect of development patterns is the one related to trade and the environment. From this perspective, the report includes a regional analysis, which considers the emission intensity implications of the region's productive specialization and trade inclusion patterns. Here, only four countries are reviewed: Argentina, Brazil, Chile and Mexico. For this purpose, among the products considered with a high pollution potential, those with a greater participation were studied for each country. **In general terms, it was found that a relatively small number of products are responsible for most of the pollution potential.** The analysis showed that these countries are increasingly concentrating their production and exports on natural resources and on industrial goods characterized by polluting production processes. (F-4 and 5)

MESO TOOLS TO ASSESS RESOURCE EFFICIENCY AND ITS ECONOMIC IMPLICATIONS:

Economic approach:

1. Trade and Environment

Environmental sustainability approach:

2. Carbon footprint
3. Water footprint and Virtual water
4. Analysis of use of materials
or materials balance

FIGURE 4 > PROGRESS OF EXPORTS ACCORDING TO CONTAMINATION POTENTIAL GROUP. LATIN AMERICA 1998 - 2007 (1998 = 100)

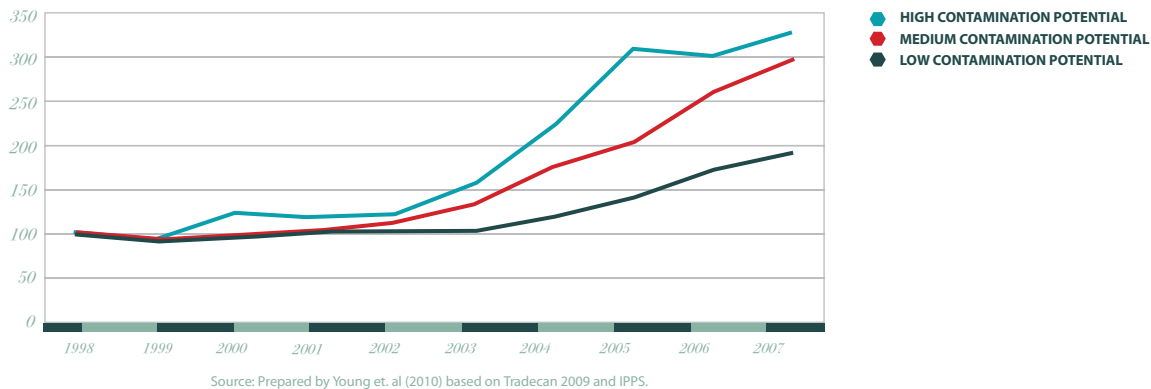
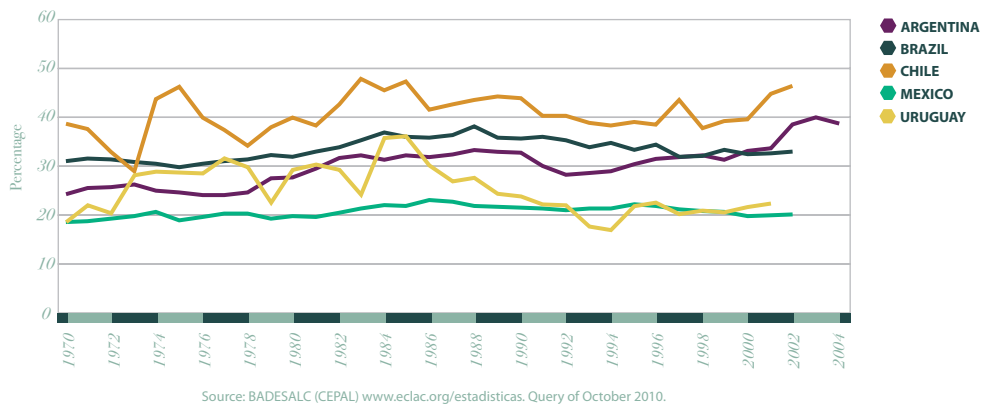


FIGURE 5 > PARTICIPATION OF SECTORS WITH HIGHER CONTAMINATION POTENTIAL IN THE TOTAL VALUE OF INDUSTRIAL PRODUCTION



Other recent approaches on sustainability seek to reflect the impact of certain sectors on international trade and particular environmental aspects. This analysis was extended to include the effects of water included in traded products (“water footprint”), as well as the related carbon dioxide emissions (“carbon footprint”).

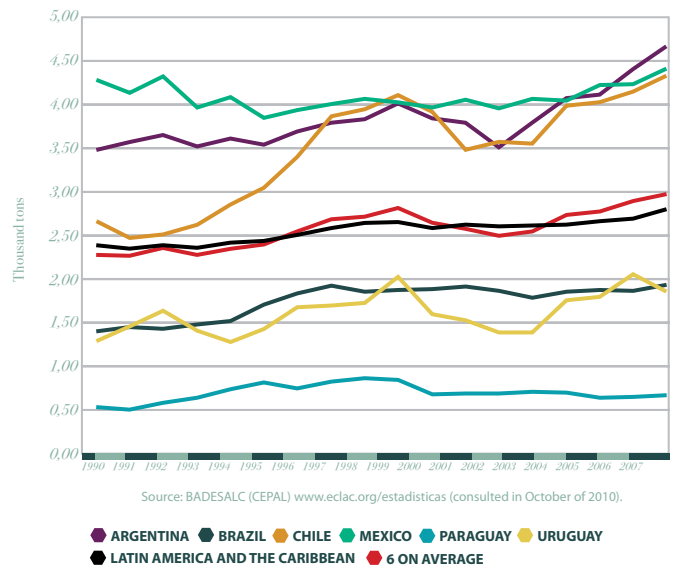
MESO TOOLS FOR AN ENVIRONMENTAL SUSTAINABILITY APPROACH:

CARBON FOOTPRINT

It measures greenhouse gas emissions associated to the life-cycle of a product, service, company, individual or country. A multi-regional global model is used to analyse a nation's carbon footprint. It defines the carbon footprint as the emissions of CO₂, methane, nitrous oxide and HCFCs emitted in the production of goods and services for final consumption, and CO₂ emissions that take place during consumption activities. Carbon emissions intensity varies from one country to another, but, given the lack of internationally comparable data, most studies apply the “imports hypothesis”, that is: they take the same value of carbon intensity for both imported and domestic products.

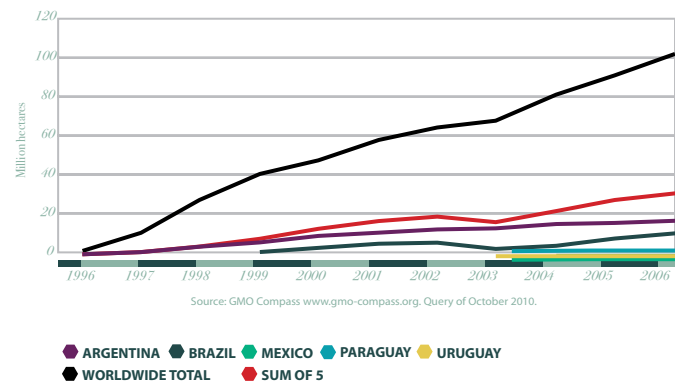
The six countries analysed in the report consume less than their own capacity to provide resources and assimilate waste. This means that they generate an “exportable surplus” that favours regions like Europe and North America. The sectors with a greater negative impact in Latin America are the primary (food production) and transportation sectors. At the national level, those countries with greater per capita impact are Argentina and Uruguay. (F-6 and 7)

FIGURE 6 > CARBON DIOXIDE EMISSIONS (CO₂)



Source: BADESALC (CEPAL) www.eclac.org/estadisticas (consulted in October of 2010).

FIGURE 7 > AREA OF GENETICALLY MODIFIED CROPS



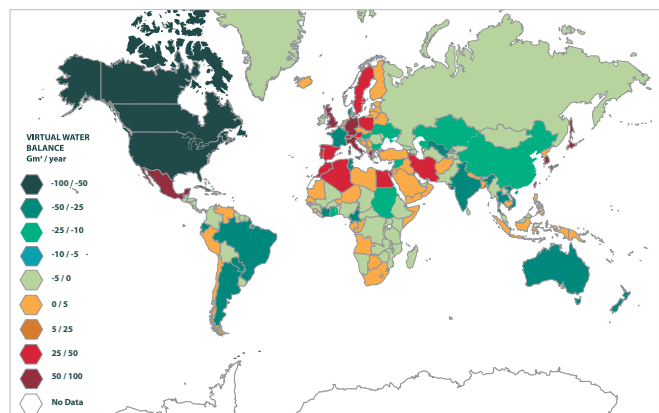
Source: GMO Compass www.gmo-compass.org. Query of October 2010.

WATER FOOTPRINT AND VIRTUAL WATER

Water footprint and virtual water respectively measure the amount of water required to obtain certain goods or services and the volume of water needed to produce the amount consumed by the residents of a certain place. The concept of “virtual water” was defined as the water needed to obtain certain goods or services. Based on this concept, the international flow was calculated taking into account the virtual water content of exported products. Existing assessments show that the “virtual water” content of some export products is quite high, for example, when soybean is exported part of the water needed to harvest the crop is also being exported.

According to these indicators, Latin America is specialising in the production and export of goods with high water content. While Argentina, Brazil and Paraguay are net exporters of virtual water, Chile and Mexico would classify as net importers. (F-8 and 9)

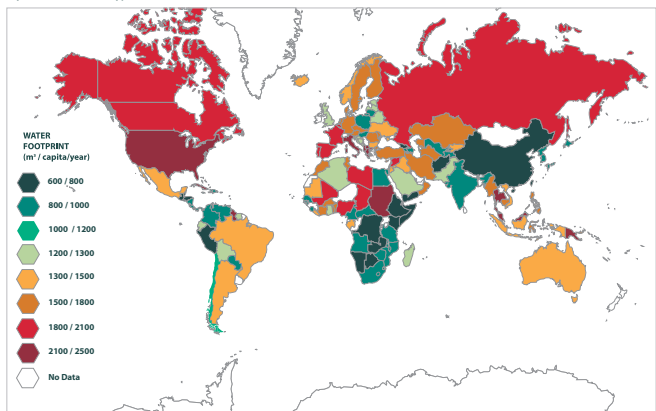
FIGURE 8 > VIRTUAL WATER BALANCE (1997-2001), GM³/YEAR



Note: The countries coloured green on the map are net virtual water exporters, while the ones coloured red are virtual water net importers. Argentina and Brazil are among the top 10 exporters of net virtual water (45Gm³/year, between 1997 and 2001).

Source: Chapagain A.K. y Hoekstra A.Y. (2004) "Water Footprints of Nations" Volume 1: Main Report. UNESCO-IHE.

FIGURE 9 > PER CAPITA WATER FOOTPRINT BY COUNTRY (1997 - 2001), in m³ / CAPITA / YEAR



Note: The green color means that the water footprint is equal to or smaller than the global average. The countries in red have a water footprint above the global average.

Source: Chapagain A.K. and Hoekstra A.Y. (2004) "Water Footprints of Nations" Volume 1: Main Report. UNESCO-IHE

MATERIAL FLOW ACCOUNTS

Material Flow Accounts (MFA) imply a set of descriptive and analytical tools that enable to understand how the physical basis of a society functions, and the interrelations between production processes and chains, as well as the exchange of materials and energy with the environment, in order to clarify the interaction between human activities and the environment. The different types of accounts will depend on whether the analysis focuses on specific substances or on materials flow, or whether the geographical scale considered is local, regional or global.

There are aggregated indicators resulting from Material Flow Accounts to indicate the metabolic transformation of economies. In an economy, Material Flow Accounts are a physical supplement of national account systems. They are based on the concept of mass balance and count all material flows (input/output) that go through the functional boundary between economy (technosphere, anthroposphere) and the environment. They also take into account the materials' flow that goes through national boundaries (imports and exports). Indicators of input, output, consumption and balance are applied.

Consequently, Material Flow Accounts enable analysis of the materials flow to consider the "material wellbeing" of a country to enable international comparisons. Relating the material flow indicators with economic performance indicators, such as GDP, enables assessment of the efficient use of material resources in an economy.

Although this method is not yet fully developed, work has been done for certain countries in the region. At a smaller scale, Material Flow Accounts have proven to be highly useful to analyse the significance that subsistence activities have in the developing countries' local economies. The inclusion of the analysis of Material Flows in official statistics and in the development of the Environmental Accounting Systems (SEEA)-MFA as a new standard is being considered.

In the case of Mexico, the research shows that domestic extraction of materials grew steadily from 1970 to 2003, mostly due to the extraction of minerals and fossil fuels. Meanwhile, the intensity of materials use is high in Chile, both in absolute terms and in relation to its GDP. This is mainly explained by the expansion of the copper sector. In Brazil, a study conducted in 1995 showed that the intensity in the use of materials was under permanent growth.

Progress in the application of MFA to Latin America has been driven by the academic sector. There are currently material flow accounts in Chile, Colombia, Ecuador, Peru and Mexico; and national MFA are still to be completed for the other Latin American countries. There is a gap in the application of this method to other smaller geographical scales like regions, cities and communities.

MICRO TOOLS

MICRO TOOLS TO ASSESS RESOURCE EFFICIENCY AND ITS ECONOMIC IMPLICATIONS:

Economic approach:

1. Cost-benefit analysis

Environmental sustainability approach:

2. Life cycle analysis (LCA)

COST-BENEFIT ANALYSIS

Cost-benefit analysis is the basic principle of economic analysis to assess policies and projects (Azqueta, 2001). According to this tool, projects and programs would only be justified if their cost is supplemented by the benefits they generate (this can be assessed both on a social and private scale, according to the requirements of the specific project or initiative).

Unlike some other regions, where cost-benefit analyses are required prior to the introduction of any environmental regulation, there are few examples of applications of cost-benefit analyses for public policies in Latin America, especially in the environmental field. In the case of Chile, however, there is a long-standing tradition of applying rules to assess political interventions, based on cost-benefit analysis requirements of the Ministry of Planning (MIDEPLAN).

LIFE CYCLE ANALYSIS (LCA)

The LCA is a tool to compare two products or processes according to the total environmental impact they have throughout their life cycle. That is: from their conception and design, their production and consumption processes, to their final disposal. This contributes to reflecting additional information about the differential environmental impact of several production methods, materials and producing countries.

Given its practical applicability, it has been included in several information instruments such as labelling systems (ecological labels), but it has not been much publicised in the developing world, with the exception of exporters in developing countries who must carry out their analyses in order to reach the demanding markets of developed countries or to obtain certain ecological labels. The LCA is not much developed in the region, despite being another very useful tool to improve the understanding of emission intensity and of resource efficiency of different consumption and production patterns.

APPLICATION OF COST-BENEFIT ANALYSIS TO ASSESS A TECHNOLOGY UPGRADE PROGRAM:

THE CASE OF THE PROGRAM ON WOOD-BURNING DEVICES IN TEMUCO AND PADRE LAS CASAS

Air pollution due to particles of material in urban areas is a widely studied and observed phenomenon worldwide. Chile has extensive documentation of air pollution in the city of Santiago, though this problem has been detected in other cities throughout the country. The problem of air quality deterioration in urban communities in central and southern Chile is mainly due to the use of wood in households for heating and cooking purposes. The communities of Temuco and Padre Las Casas in the Chilean region of Araucanía¹ stand out as chief among those areas with this problem. Nearly 350,000 people live in these communities. The main pollution particles, responsible for over 90% of emissions, originate from wood burning in some 86,000 households. Atmospheric pollution episodes are caused by the so-called “thermal inversion effect”, under which the gases released are caught at a low height- thus generating high levels of trapped particles in the city’s breathable air.

The statement included in Decree-Law No. 35/2005 by the Chilean Ministry General Secretariat of the

Presidency, provides a legal obligation to establish an Atmospheric Decontamination Program – PDA - to define regulations aimed at eliminating air pollution by PM10 from Temuco and Padre Las Casas communities from the overstretched region within a period of 10 years. The PDA stipulated that the National Environmental Commission (CONAMA) would, together with a number of competent bodies, design and implement a replacement program to address at least 12,000 existing wood-burning devices. It has been estimated that, given the program’s nature (the voluntary decision of each household to replace its heating device), the type of economic instruments to be used must include a subsidy for those who choose to cooperate, for them to acquire more efficient and less polluting wood-burning devices.

The social benefits of the replacement program were calculated on the basis of the emissions reduction that could be achieved. Those benefits were associated with improvements in several health aspects and better visibility in cities. In this way, a health benefit amounting to 9,287 US dollars per ton of reduced

PM10 was calculated for the year 2004. The estimated cost of the benefits related with visibility amounted to 450 US dollars per ton of reduced PM10 in 2004.

The **cost-benefit and cost-efficiency analysis** was based on the evolution of emissions that would be generated without a replacement program. This led to estimating that in the whole implementation period of a replacement program, there could be a “natural” improvement of approximately 6 to 10% in overall emissions, corresponding only to the effect of new housing including devices compliant with the emission standards in force.

In all income groups, the replacement program showed a relatively high cost-benefit ratio. In the lower income groups, however, the social profitability was greater - meaning that emissions would be reduced to a greater extent, as compared with the costs implied by the program. But in higher-income groups social profitability also proved to be high. This confirms that the application of the programme is justified for all population groups, regardless of their socio-economic situation.

The **cost-effectiveness analysis** considered a situation where the replacement program was not applied. The programme effectiveness was measured as the amount of PM10 tons that could be reduced in comparison to a situation without replacements undertaken. The analysis showed that using the replacement program as an emission reduction instrument would carry a cost of approximately 330 US dollars for each ton of PM10 reduced. When analysing cost-effectiveness indicators for different income groups, the lower costs for reduction per ton were obtained in the lower-income groups.

¹ Comisión Nacional del Medio Ambiente (CONAMA) – National Environmental Commission: “Preliminary Project of the Programme for Environmental Decontamination of the Counties of Temuco and Padre Las Casas”. Resolution No. 1190, 2007.

3.

RESOURCE USE IN LATIN AMERICA: NEITHER SUSTAINABILITY NOR EFFICIENCY

The economic production strategies of Latin American countries have not fully integrated the concept of sustainability. Despite the significant differences in their productive structures, the countries analysed have shown common trends and a significant structural change in Latin American exports in the late 1990s: from 1988 to 1997, there was a relative reduction of dependence on commodities based on natural resources, and the more dynamic industrial exports were products with lower pollution potential. However, from 1998 to 2007, Latin American countries became more dependent on commodities based on natural resources (primary dependent economies) and on industrial products with greater pollution potential.

Latin American primary goods exports increased in the past decade.

Latin America returned to a specialization pattern marked by industrial products with greater pollution potential.

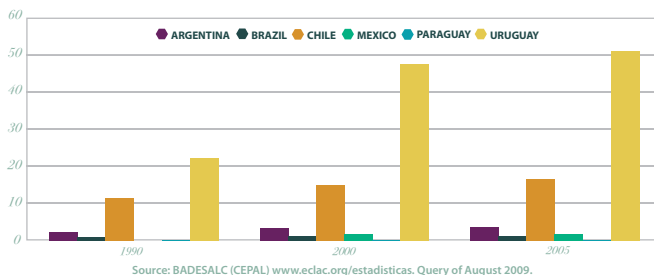
Since 2000, there has been an increasing role and growth of exports of primary goods in overall Latin American exports, and it may be associated with the de-industrialisation hypothesis. This trend was further reinforced in the last decade due to the growth of emerging economies, particularly China, which increased their demand for these products. The liberalization process, which started in the 1990s, together with the commodity price boom around 2005, led to a **structural change in the region, which in turn created a return to a situation where the growth of external markets growth is based on natural resources.**

The economic primarization of the Mercosur countries, as well as Chile and Mexico, has increased the pressure on some natural

resources such as water and land. Land use and the environmental impact derived from agricultural and livestock production are key issues in the aforementioned countries.

Given the above, one of the most important challenges faced by Latin American countries is to adequately measure and minimize environmental impacts of agricultural and cattle farming activities, especially on land use changes and deforestation, as well as fugitive emissions of agrochemicals.

FIGURE 10 > AREA OF FOREST PLANTATIONS
(Percentage over the total forested area)



In recent years, Latin America has returned to a pattern, which favours potentially pollution-intensive industrial goods.

Even though overall industry exports have decreased, the relative impact of potentially pollution-intensive industrial goods has increased.

The growing impact of primary sectors on regional production and exports implies an increase in the natural resources, land, energy, water and agrochemicals needed. It also creates greater pollution and more negative impact upon ecosystems and biodiversity. Land use changes and the pressure exerted by the agricultural sector resulted in a reduction of natural forest cover in most of the countries (especially Brazil and Paraguay) and an increase in forestry plantations—mainly in Chile, Mexico and Uruguay .

Land use and environmental impacts derived from agricultural and livestock production are key issues.

THE GROWTH OF SECTORS WITH HIGH POLLUTING-POTENTIAL

The growth of sectors with the highest polluting potential in the industry is evident in most of the countries analysed (except for Mexico and Uruguay). This trend is even stronger in the exporting sector. (Figures 4 and 5 in page 21)

Most regional exports are concentrated on a relatively small number of products and sectors that have high polluting-emissions potential. These are mainly intermediate goods like chemicals, pulp and paper, wood and metallurgy industry-related products. Other capital goods are among the offenders, including machinery like pump and engine parts, but their role is relatively smaller when compared with intermediate goods.

With specific reference to the exporting profile of the countries analysed, there was no evidence of “dirtier” exports in Argentina over the past two decades, which could be explained by the relative progress in the exports of soya industrial by-products. These are considered to have medium or low pollution potential. In Argentina, oil and its by-products have the highest level of toxicity.

Meanwhile, in Brazil there is an advance in the sectors with the highest pollution potential. It has also been verified that the productive chains associated with exports are more emission-intensive than those for the domestic market. **Brazil has the region’s most diversified exporting structure, but there are only 10 products that account for 60% of the overall toxicity, and they represent over 15% of the total exports.** Mexico’s case is similar, with nine products accounting for almost two thirds of the overall toxicity. **Chile has the most concentrated figures with only 6 products accounting for nearly 70% of the toxicity and representing between 10 and 14% of the overall exports. They are taken mainly from the timber, pulp and paper sectors.**

While these sectors tend to be capital-intensive, they are not labour-intensive. For this reason, the eventual economic costs resulting from adapting to better environmental standards and improvements in resource efficiency would not necessarily extend to the entire economy. Rather they would concentrate on some sectors, and would have little - if any - negative effect on employment.

The above-mentioned results are of particular concern for competitiveness and from the point of view of the production specialization pattern, since consumers from developed countries are increasingly aware of the ecological footprint of the goods they purchase. The Latin American position might be increasingly weak if this awareness becomes reflected in trade barriers or other restrictions to products with a potentially high environmental impact.

The following aspects might explain the recent trend towards a specialization in exports of primary goods and industrial products with higher polluting potential:

- > Higher prices of commodities as a result of the global economic boom, based on the dynamism of emerging economies.

- > Lack of planning in creating local activities with high innovation and low pollution potential, which had fewer competitive advantages and were therefore unable to compete against foreign producers.

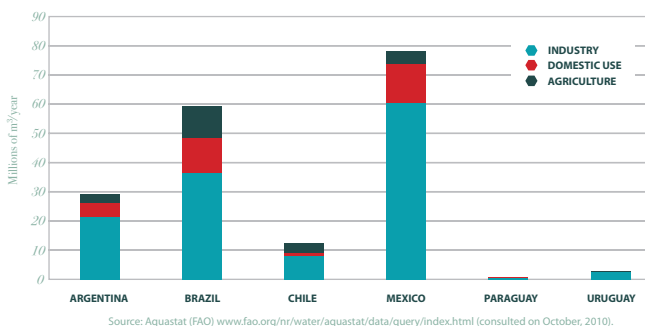
- > Exchange rate over-valuation in many Latin American economies led to the “Dutch disease”², since the recent supply of foreign currency guaranteed by the expansion of natural resource-based sectors rendered the manufacturing industry less competitive.

- > Flaws in public policies, since Latin American governments have largely failed to recognise the consequences of domestic environmental and social degradation associated with economic growth. In fact, many such public policies have strongly supported the expansion of natural resource-based commodities and industrial products with high polluting potential, since they seek to maximize short-term profits.

For the six countries analysed (Argentina, Brazil, Chile, Mexico, Paraguay and Uruguay), the trends indicate an increasing pressure on water resources, with a slight improvement in water quality. Agriculture is the sector for which water demand is the highest. As a result of this, agricultural areas subject to irrigation have increased particularly in Brazil, Chile and Mexico - while they remain stable in Argentina, Paraguay and Uruguay. (F-11)

With the exception of Paraguay, however, all of the countries analysed do show a sharp reduction in the intensity of organic pollutants discharged into water systems per product unit.

FIGURE 11 > TOTAL WATER EXTRACTION BY SECTOR 2000 - 2002
(10⁹ m³ / year)



² This term is used to describe the negative effects that a significant and abrupt increase in the inflow of foreign currency may have on a given economy. This concept was coined after a discovery of big oil deposits in the North Sea in the 1960s led to a great inflow of foreign currency in The Netherlands, causing the appreciation of its currency and the subsequent loss of competitiveness of non-oil exports in the country (Stijns, 2003).

There has been a considerable increase in the use of fertilizers in Argentina, Chile, Paraguay and Uruguay. This percentage increase outstripped that of economic growth: while the use of fertilizers doubled from 1995 to 2005 in the six countries analysed, the region's GDP increased around 20% on average during the same

period. The growing use of fertilizers and pesticides has become a matter of public concern, especially in Brazil, Chile and Uruguay, and to a lesser extent in Argentina and Paraguay. In Mexico, however, the growth rate of fertilizer use is lower than the economic growth.

(F-12 and 13)

FIGURE 12 > EMISSION OF ORGANIC POLLUTANTS IN THE WATER AS A FRACTION OF THE GDP

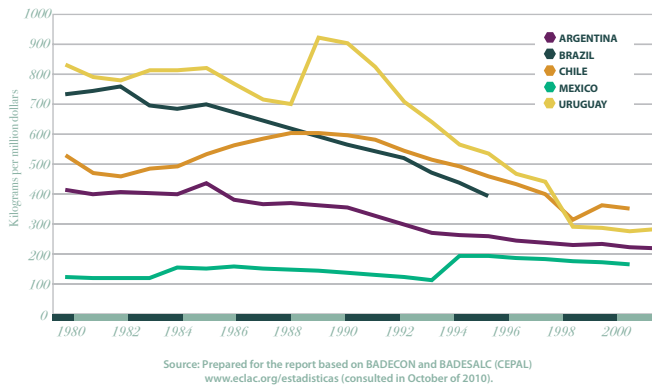
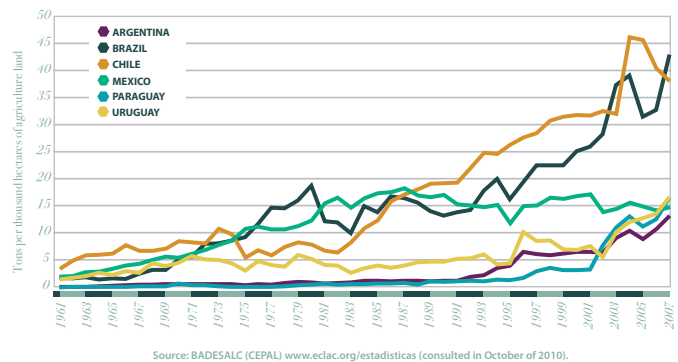


FIGURE 13 > INTENSITY IN THE USE OF FERTILIZERS



In the energy sector, even though the countries considered in the report have a long-standing tradition of using hydroelectric power, there is a trend of a growing inclusion of renewable energy sources, such as bio-fuels and other forms of bio-energy. However, such progress is yet to be translated into a significant role for renewable sources in the energy matrix. (T-1)

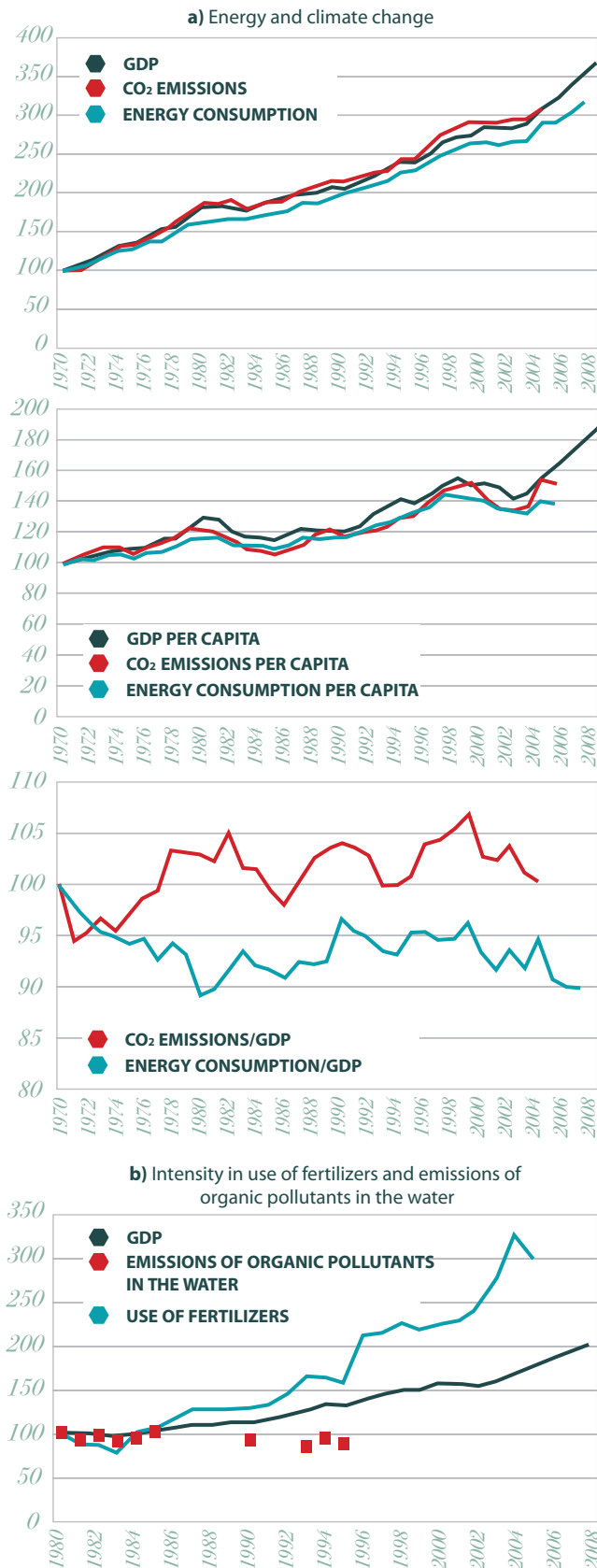
Energy production and consumption and carbon dioxide (CO₂) emissions are growing in the region. For the past fifty years, this group of countries recorded average emissions above the Latin American average, and their growth is also higher than the rest of the region. Brazil and Mexico are the biggest CO₂ emitters in this group of countries. Energy-derived CO₂ per capita emissions are especially rising in Argentina, Brazil, Chile and Mexico, and remain relatively stable - with some fluctuations - in Paraguay and Uruguay.

TABLE 1 > ENERGY MATRIX OF COUNTRIES ANALYSED
(percentage contribution of different sources to the total primary energy)

SOURCE	ARGENTINA (2007)	BRAZIL (2007)	CHILE (2005)	MEXICO (2007)	PARAGUAY (2006)	URUGUAY (pr. 2001-07)
Non renewable energies	92	54	69	90	14	57
Oil	38	37	36	65	14	55
Natural Gas	50	9	24	22	Nd	2
Coal	1	6	9	2	-	-
Uranium-based	3	2	-	1	-	-
Renewable energies	8	46	31	10	86	43
Hydroelectric energy	5	15	17	3	60	28
Charcoal and vegetal charcoal	1	12	14	2	26	12
Sugar cane by-products	1	16	-	1	Nd	Nd
Others	1	3	Nd	4	0,4	3

Source: Prepared based on information from López and Starobinsky (2009), Comisión Nacional de Energía de Chile (National Energy Commission of Chile) and Sistema de Información Energética de México (Energy Information System of Mexico), available at www.sie.energia.gob.mx

FIGURE 14 > REGIONAL TRENDS (THE 6 COUNTRIES)



Source: Prepared for the report based on data from Cepalstat, www.eclac.or/estadisticas (Consulted in October of 2010).

Taken together, the six countries show a very similar evolution in energy consumption, CO₂ emissions and economic growth, whereas the use of fertilizers is increasing at a higher rate than economic growth. There has nevertheless been a relative reduction of organic pollutant emissions into fresh and coastal waters. (F-14)

Even though resource efficiency has improved in some Latin American countries and sectors, there is still great potential for improvement.

Three factors that could explain this underexploited potential for efficiency improvements are:

- i) A lack of objective assessments of the potential economic, social and environmental benefits of improving resource efficiency, both from the public and private sectors.
- ii) Initiatives towards greater resource efficiency in each country fall under the jurisdiction of several separate public agencies, which usually work in an uncoordinated way. There are also different guidelines and regulations that impact on efficiency-related private decisions.
- iii) The fact that more resource-efficient production may lead to better integration into international markets is sometimes overlooked.

The report highlights that in some cases **the environmental impact of economic activities is so high that, even though resource efficiency is improving, sustainability is still only a distant prospect.** The trends observed show that little more than a relative de-coupling has been achieved. This means that an improvement in efficiency is not enough to reduce the overall environmental impact in absolute terms, although a lower impact per product unit has generally been seen. Thus, **improvements in efficiency are not yet enough to ensure sustainability.**

4.

These recommendations aim to contribute to the design of national and regional policy initiatives, as part of the four future scenarios defined around the evolution of key sustainability and resource efficiency variables for the 2010-2030 period:

1.

The “**Efficiency without sustainability**” scenario implies an advance in efficiency without improvement in environmental policies. The initial configuration of this scenario would imply limited State involvement: it would in effect be a development agent that promotes resource efficiency to encourage a system of regulations and penalties, rather than a more sustainable or more inclusive development model. This scenario does not allow for significant advances in terms of poverty reduction or inclusion, since the aim is not to achieve inclusive development.

A second configuration of this scenario could stem from a greater use of international financing mechanisms to tackle climate change and overall resource efficiency issues. It could also deal with issues related to the promotion of more sustainable production by the business sector, without State support and without an improvement of public policies’ management. This scenario carries with it the risk that those sectors or territories not directly related to the leading resource efficient business sectors will hardly be able to enjoy the benefits of social overflow. This could generate a new stripping of territories or sectors, due to the lack of opportunities or comparative advantages.

2010-2030 SCENARIOS AND POLICY RECOMMENDATIONS

2.

A “**Status quo: Neither sustainability nor efficiency**” scenario implies the worsening of the current situation, where neither efficiency nor sustainability show any progress. Despite ongoing international initiatives and some isolated instances of positive achievements, neither the Latin American region nor its individual countries have been able to overcome the current Scenario 2. The growth model that reproduces inequality and the concentration of resources generally still obtains.

In an extension of the status quo scenario, an increase in inequality could be expected, as well as further exclusion of groups that are already excluded. In this scenario, social or environmental conflicts and environmental migration caused by climate change are expected to affect the region in different ways. A drastic worsening of the situations of the rural populations and the wide sectors of the economy that were defined as small and medium producers in 2010 could also be expected in this scenario, due to their increased vulnerability and the lack of consistent policies. Depending on each country, these conflicts may be in addition to others: to existing rivalries between different regions; to movements that advocate for separatism; or they could even increase existing discrimination based on ethnic origin, class, age or gender. In this scenario, regional cooperation mechanisms would continue to be weak, and would lack substantial resources and the capacity to be implemented.

3.

A “**Sustainability without efficiency**” scenario includes improved sustainability without significant improvement in resource efficiency: here the different stakeholders would fail to assume responsibilities to promote advances, in order to achieve the commitments made by governments. This implies keeping a regulatory framework that does not make use of the economic or market incentives that allow achieving environmental objectives at lower costs. This lack of efficiency in policies represents a trade-off between competitiveness and sustainability.

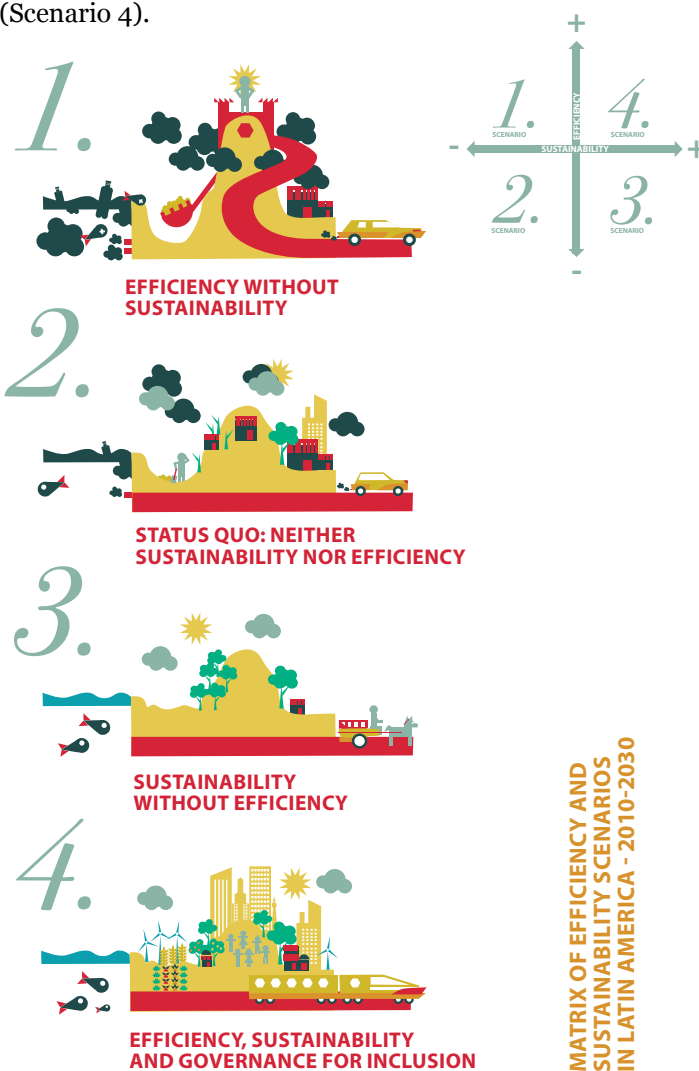
This stalemate between an efficient State to define policy instruments and a private sector that does not change its production and market access strategies could, in the long run, turn into a scenario where the State’s regulation role in the use of resources would prove ineffective, or where the capacity to apply public resources for this change in models would reach its limit and become stagnant. This could then be easily turned into a Scenario 2, where institutional advances stop due to the lack of actual implementation, or the lack of capacity to generate incentives that are attractive enough for the private sector.

4.

An “**Efficiency, sustainability and governance for inclusion**” scenario represents the most desirable situation, where efficiency improves along with sustainability. In summary, this scenario implies a virtuous circle where the use of resources improves along with the quality of public management, thus increasing sustainability and the participation of all concerned. This generates incentives so that investments in science, technology and infrastructure are aimed at public and private efficiencies in the use of resources. This scenario promotes a development model that is more inclusive and it reverses the trend of previous years regarding income concentration. All of this is possible due to greater efficiency and competitiveness. It is also a result of policies promoted to at least reduce - if not eliminate-

the inequalities affecting social groups and territories that have been historically marginalized and excluded. Under this scenario, efficiency is fully included within the objectives of equity and inclusion.

A 20-year status-quo or “business as usual” scenario (from 2010 to 2030) could hardly be a stability scenario, and this might pose a serious risk to governance in the region’s territories. It could also jeopardise the capacity of individual governments not only to manage resources, but also to ensure democracy and institutional stability. The analytical and practical challenge is based on the transition from a “status quo” scenario where the sustainability and efficient resource use dimensions have not been included as a target of central development in Latin American countries, to a situation of innovative policies and approaches that promote improved efficiency and sustainability (Scenario 4).



1) RECOMMENDATIONS CONCERNING POLICIES AND INSTITUTIONAL STRENGTHENING

R1.

The greatest policy challenge is to adapt and improve the current institutionality to broaden the scale of successful local experiences of resource efficiency (going from actual cases or local practices to a policy approach).

It is necessary to increase the current limited scope of successful initiatives that exist in demonstration or pilot programs (which have international or private support) into integrated sectorial policies. The challenge lies in acknowledging and overcoming the fact that this movement (going from cases to policies) depends on difficult political decisions, and is subject to restrictions in the allocation of funds and human resources within the public sector. The evaluation of sustainable consumption and production experiences made by UNEP shows that although projects and policies successfully reach the formulation stage, they face difficulties in their subsequent implementation at broader scales.

There is a need for systematic efforts to strengthen policy assessment processes and programs, and to generate and disseminate information about the outcomes of pilot programs.

Promoting cooperation between different government areas is crucial in order to benefit from the existing synergies between resource efficiency,

sustainability and competitiveness, something quite unusual, at least in the countries studied. This implies overcoming the conceptual and administrative (ministerial) divisions between environmental, trade and economic and social development. Programs developed in the region are usually inter-ministerial initiatives aimed at achieving greater impact on production and consumption of a large number of individuals and entities from the public and private sectors. The objective needs to be one of obtaining more human and financial resources to broaden the scale of these programs from pilot experiences to a policy approach.

The role played by cost-benefit and cost-effectiveness analyses is important in the design of environmental policies. These are useful tools to demonstrate potential positive social effects and to promote resource efficiency, while clearly showing the potential savings that can be achieved with certain initiatives. It is possible, for instance, to estimate potential health benefits from reducing the emissions intensity of specific activities.

THE CHILEAN PROGRAM FOR REPLACEMENT OF WOOD BURNING DEVICES

PEOPLE SAVE, AND THE ENVIRONMENT BENEFITS

Air quality in cities of Southern and Central Chile has worsened as a consequence of household emissions caused by the massive use of wood as a source of energy for heating purposes. In response to this problem, the government has implemented a replacement program of wood-burning devices for the Communities of Temuco and Padre Las Casas with more environmentally friendly technology, as part of the Atmospheric Decontamination Plan approved in 1995. The program aims to replace at least 12 thousand devices throughout the implementation period (2008-2018), in order to reduce emissions by 30%.

The program's success depends on several factors, namely: the population's need to save on fuels; the fact that devices should be manufactured by local producers in order to allow for reasonable prices for the population; and they should represent a significant change in regards to technology available for environmental care, besides being easy to operate.

At the international level, these programs have proven to be a useful and profitable tool in decreasing emissions that cause atmospheric pollution. All the experience gathered in implementing this replacement program will be important for the application of similar programs in other places in the region.

CERTIFICATION OF RICE PRODUCTION IN URUGUAY

Rice harvested in Uruguay is irrigated with agrochemicals and subject to large-scale production. This has an impact on the environment. The private sector (rice producers and mills) and the public sector (research and regulation) work as a network to strengthen the environmentally-friendly profile of their production, and they promote technologies to minimize such impact. The purpose is to ensure the technical and organizational conditions are such that rice production is internationally certified as an environmentally sustainable activity. The rice network generates information to reduce losses caused by plagues through crop management practices that enable it to reduce pesticide use. These practices include the use of varieties that are more resistant to disease (all non-genetically modified by decision of the private sector which participated in the design of public biosafety policies); avoiding excessive nitrogen fertilization; and the use of effective systematization and levelling of farms.

Innovations developed in the rice network, including those involved with production and commercialisation, contributed to increased income and reduced production costs. The network has implemented the environmental monitoring of its rice production processes, and has recently put in place a specific project following the latest environmental standards in order to obtain environmental certification. The resulting international recognition now gives Uruguayan rice access to higher-value markets.

The extraordinary dynamism of the private sector was a key element in developing long-term articulation and synergy capacities among the rice network industry. There are still many environmental challenges. **The design of institutional articulation is critical to the successful application of policies and actions to achieve environmentally sustainable competitiveness.**

R2.

More efficient, sustainable and inclusive use of resources requires a role of leadership, articulation, regulation and control by the State.

The definition of efficiency-oriented policies is a key element in defining the relationship between competitiveness and sustainability. An increased use of economic incentive instruments for a more rational use of resources, along with the promotion of clean technologies and the availability of funding for innovation, are tools that require public initiatives.

The role of public regulator is important and it should not be delegated to the private sector. The State should have the capability to ensure efficiency, competitiveness and sustainability in a broad sense - with a long term, integral vision that includes not only the economic dimensions of productive activities, but also their social and environmental aspects.

A possible response that seems to be effective may come from a combination of regulatory instruments; incentives and public and private initiatives; technological cooperation; land use regulations and zoning, and definition of standards and regulations for best practices.

The use of economic incentives becomes necessary to promote a more efficient and rational use of resources. The promotion of clean technologies and the availability of funds for innovation are also key. The State's role as a promoter should make a meaningful difference in all of these areas.

In addition to using incentive-based policies, the public sector should contribute to the promotion of the best productive practices through regulatory and control mechanisms to avoid negative socio-economic and environmental impacts.

The inclusion of good productive practices to promote productive efficiency, and the application of sustainable practices, along with the certification of sustainable production, provides a "win-win" opportunity for everyone involved. It offers a chance for parallel improvement of business competitiveness and the environmental situation.

A more efficient and sustainable use of resources in itself does not guarantee redistribution or an improvement in the use of such benefits by society, and particularly by the least privileged. The State should ensure that the capacity to become more competitive or efficient does not turn into a greater concentration of these capacities among the producers who have easier access to resources or markets. In sum, efficiency and sustainability incentives should not be discriminatory. To achieve this, specific strategies or approaches are required for the less privileged sectors. In this regard, policies and incentives that particularly take into consideration small and medium producers - and family farming should be introduced and promoted.

CHILEAN SALMON

IMPACTS OF THE LACK OF A REGULATORY FRAMEWORK AND ADEQUATE CONTROLS

Aquaculture, and salmon aquaculture in particular, has experienced extraordinary growth in Chile over the last two decades. This led to an expansion of its production, both in production centres and processing plants, as well as in the level of exports and the positive impact on employment in the geographical areas where the activity was developed.

The development of salmon aquaculture in Chile generated, in a short period of time, significant changes in geographical areas that were poorly populated two decades ago, and where the basic activity had been small-scale agriculture and traditional fishing.

Industry estimates indicate that salmon aquaculture generated 53,000 jobs in 2006, 35,000 of which were direct jobs involved in fish farming, production and processing plants.

The industry's strong productive development has been subject to criticism because of the potential environmental impacts - mainly derived from the

use of chemical products and antibiotics, and its potential impacts on water quality. A weak regulatory framework for the activity did little to counter the negative effects.

Salmon aquaculture was expanded fast and wide and, as already stated, without a regulatory framework and required controls to avoid and anticipate environmental problems or the development of transmissible diseases. This reflects an excessive confidence on self-regulation of the productive sector involved.

By mid 2007, the Infectious Salmon Anaemia Virus (ISAV) was detected in the Chilean salmon aquaculture industry. The outbreak spread rapidly through a large geographical area. Despite quarantine areas being established in several aquaculture centres, the disease continued to spread, thus seriously affecting the industry. The fast spread of the disease through the infection of different centres may have been fostered by the activity's high geographical concentration, a high

population density of the species and possibly by other inadequate management practices associated with bio-safety measures. As a result of the disease, the Atlantic Salmon yield was reduced in 33% by mid 2009, compared with the same period of the previous year. According to recent information, the further reduction in the Atlantic Salmon yield could be even higher, reaching nearly 40%.

As a direct consequence of the ISA virus, there have been changes in the industry's productive processes, thus affecting the different links of the production chain.

The changes have also affected public authorities responsible for regulating and controlling the sector's activities. This led to the development of regulatory changes, including some specifically aimed at mitigating and controlling the disease's development. Legal initiatives were also started in order to create a new framework to develop this activity in Chile.

The transmission of the disease created the opportunity for public political discussions, and evidenced the need for greater and better regulations to overcome the sector's vulnerability. It also allowed for the allocation of increased public funds to the State's regulation and control activities on aquaculture, as well as to scientific research and technical studies. These were all deemed necessary to improve the existing knowledge of the impacts of salmon aquaculture.

R3.

Public policies alone are not enough, unless their implementation promotes public-private partnerships and agreements with different stakeholders.

Public and private cooperation is crucial to effectively incorporate innovative issues and initiatives in the development agenda, particularly those related to the links between competitiveness and environmental protection.

Involvement of multi-stakeholders has proven to be a positive mechanism to identify needs and to offer proper solutions to sustainability challenges that may be tackled to a great extent with improved resource efficiency. For this purpose it is fundamental for public entities to act as promoters and to offer initial opportunities for dialogue with those from the private sector and civil society. Such dialogue is essential in identifying and validating demands, interests and potential of cooperation agreements and arrangements. The creation of consultative and participative processes with the population and civil society organisations that would benefit from or suffer the effects of such initiatives is another practice that has been identified as successful. Even though these processes have their costs and take time, they reduce the chances of potential misunderstandings or problems of implementation as a result of dissatisfaction or conflicts of interest.

The participation of multi-stakeholders (governmental officials, civil society and business representatives) at different jurisdictional levels - small municipalities, cities, provinces or states and even regions including provinces, states or several countries - should be ensured. This implies the double challenge of involving private enterprise and civil society on one hand, and the different levels of governmental administration on the other. Such articulation may also have a preventive impact for social conflict situations due to environmental reasons, or for conflicts or paralysis of initiatives underway due to competition for public resources between local, sub-national or national public agencies.

This requires strengthening capacities, ensuring information disclosure to all involved and having clearer mandates for the resolution of conflicts that might otherwise end up inhibiting civil society and business participation.

The lessons learned from participatory experiences in the region show that the clearer the rules and procedures to make contributions effective - including recommendations by private sector participants and civil society - the more successful these processes are likely to be.

INITIATIVE FOR CLEANER PRODUCTION IN PARAGUAY'S POULTRY INDUSTRY

Paraguay's National Environmental Policy is relatively new (2006), and it is currently undergoing an adaptation and implementation process. Several participants began to include practices to increase the sustainability levels. **The strategy of alliance between the public and private sector to implement said policy resulted in coordinated collaboration with the Industrial Union of Paraguay (UIP).** The poultry industry is very dynamic, due to both domestic consumption and to exports. This case study analyses the actions taken by the company Corporación Avícola Sociedad Anónima (CORPASA), related to the Poultry Farm La Blanca from Paraguay (which constitutes 75% of the market). This company carried out a thorough analysis of the production system, aimed at detecting diseconomies and resource inefficiency.

The main practices that were implemented to increase resource efficiency were:

> Changes in plastic packing: the poultry is packed in cut-out plastic trays which reduced plastic waste emissions and improved efficiency in the packing process.

> Reduction of the water used in chicken delivery, allowing for 80% savings in water.

> Reduction of electrical power through the use of photocells, and the replacement of ceiling materials to let sunlight in. This yielded an overall saving of more than 10,000 US dollars over a one-year period.

> Reduction of the water used at the odour control plant. Water consumption went down from 20 cubic meters to 15 cubic meters per ton per treated feather.

> Reduction of noise levels in the working areas.

The results of the internal analyses conducted by CORPASA's managers and employees showed that every \$1,000 invested in innovation and improvement of the productive system to minimize environmental impact produced savings of nearly \$10,000 that would have been previously spent on environmental compensation.

Changes made in some productive processes enabled CORPASA to make the most of its resources in the poultry industry. This improved the company's management, led to cost reduction and showed the other industries how easy and practical it is to make such improvements.

FRUIT AND VEGETABLE PRODUCTION IN URUGUAY

THE IMPORTANCE OF A PRIVATE SECTOR WITH TECHNICAL AND ECONOMIC CAPACITIES

Since the 90s, this sector has focused on the local market and is known for its competitive weakness. There are historical shortcomings in environmental protection due to the intensive use of natural resources and agrochemicals, and also due to a lack of regulations. In response to this, an Integrated Production System has been implemented to permanently control production and packing techniques, thereby allowing for the follow-up, certification and traceability of products.

In relation to pesticides, the IP system was found to use approximately 50% fewer applications than the conventional production system. However, the IP network discontinued its activities in 2004, and the enterprise was reduced to the domestic market with no commercial impact, which determined its interruption. Another factor that led to this was the **very limited involvement of the private business sector, mainly made up by producers with low levels of economic resources and technical training.**

R4.

In order to include the resource efficiency approach in the design of public policies, it is essential to strengthen research capacities and improve the availability of environmental statistics.

Well designed regulations, assessments and environmental monitoring are predicated on sound science. It is necessary to strengthen these capacities, both at the national and regional levels, in order to improve understanding of the situation and the regional

trends on sustainability and resource efficiency. To achieve this, it is essential to strengthen the public institutions' knowledge generation and public-private cooperation when undertaking research.

R5.

National regulatory systems and productive strategies must consider the efficient and sustainable use of land, and the social and environmental impact of agricultural and livestock production.

There is an increasing need to include the different environmental aspects and the use of related natural resources as part of development policies, though this is still a matter to be resolved. Land use and the environmental impact resulting from agricultural and livestock production are critical issues in all of the countries analysed. This is not only due to the importance of this activity in the countries' national production and exports, but also and fundamentally because of the great social, production efficiency and environmental implications that are involved. An outstanding and urgent issue for all countries in the region is the regulation of diffuse pollution caused by agricultural activities.

An urgent and pending issue for all countries in the region is the regulation of diffuse pollution caused by agricultural activities.

One of the most relevant approaches for agriculture and livestock regulations is that of introducing territorial development and planning policies (along with proper enforcement of land use regulations) in order to define high priority areas for conservation, and to limit deforestation along the agricultural boundaries.

Both productive efficiency and the analysis of environmental impact must be considered from the perspective of international and local competitiveness.

From the standpoint of productive strategies and specialization and exports patterns in the region, it would seem that many of the public and private decision makers leading these processes do not yet fully appreciate the concerns regarding land use and the environmental impact of agricultural and livestock activities. The regulatory role of the State could be a way to move forward, though it is also necessary for the State to explicitly articulate the institutional strategies, policies and bodies related with production, trade, environment and social development.

Competitive, attractively profitable and sustainable family farming for self-consumption and selling of surplus production may be a way of improving quality of life for poor small farmers. However, the implementation of new approaches and productive schemes in peasant family farming, with sustainability and social inclusion, is neither easy nor fast. It is nonetheless a sure, proven and attractive opportunity for socio-economic development, and more specifically for the mitigation of rural poverty. Therefore, the role of the State as promoter of such initiatives, implemented through programs or incentives for micro and small farmers, could be a tool that promotes productivity, competitiveness, efficiency and sustainability while it strengthens the capacities and strategies for the survival of large sectors of the rural population.

The region presents several successful cases whereby international cooperation and local governments have played a significant role in promoting family farming, but it is essential for these strategies to also have the support of the public sector. Just as there are different initiatives to support SMEs, said support could be provided through various family farming support tools - including incentives, access to credit, capacity building, advice for international inclusion, and facilitating the creation of consortia and cooperatives.

R6.

Improvements in institutional and regulatory engineering, along with the inclusion of incentives for the rational use of water, have proven to be successful tools for resource efficiency.

The introduction and expansion of market-based instruments, such as charges applied for the use of resources, are all effective incentives for greater resource efficiency. They also generate resources to implement policies and incentives for behavioural changes. This was the case of several examples analysed in the report, which came to prove that price signals are effective to the extent that they are implemented through multi-stakeholders mechanisms such as watershed committees.

These involve all public and private users, along with corresponding authorities at the different jurisdictional levels.

The introduction of incentives often also promotes advances in savings by large sectors and users, thus guaranteeing funding of investments needed for infrastructural development and maintenance.

It is necessary to strengthen the follow-up of performance indicators in reference to the provision of infrastructure and resource availability, use and quality.

With regards to the efficient use of energy and water, an important factor to consider is the gender variable in technical projects: it has been largely documented that women play a fundamental role in the selection of techniques for the efficient use of water and energy at the household level. Their quality of life and that of their families or direct surroundings could be considerably improved with access to modern energy sources, and with proper provision of infrastructure and public support for environmental protection.

CHARGE FOR WATER USE IN BRAZIL

WHEN PRICES RAISE THE VALUE OF RESOURCES

Improvements in resource use are often the result of innovative private or public initiatives. Such is the case of the Paraíba do Sul river Basin, in the South-East of Brazil, where there are nearly 8,500 industrial plants. Water pollution is the main problem of the Basin, due to industrial and household effluents.

As a result of this, a Watershed Committee was created in 1996 - with the participation of local authorities and public and private users.

The Committee decided to charge gradual prices on water use as from March 2003, which led to a progressive increase of income that was later invested in the Basin. At the same time, the charges became an effective instrument for water conservation: water extraction was reduced by 16% between 2006 and 2008, and consumption was reduced by 29% during the same period.

Water charges also became an incentive for companies to invest in water re-use. These outcomes suggest that the water charges may counteract the growing demand for water resulting from economic development, thus improving resource efficiency.

R7.

The inclusion of energy efficiency and the rational use of energy from biomass require specific additional efforts.

Promoting strategic planning is essential because resource availability trends and concerns over the local and global environmental impact (climate change) of energy development confirm the need to rethink ways to assess energy matrices and regional cooperation in the long term.

There is an urgent need to overcome “energy poverty” and the regressive pattern of energy rates in most countries. This calls for greater planning and assessment of public efforts.

Demonstration and learning impacts are definitely required. It is also important to systematize this kind of beneficial effort, and improve cooperation at the sub-national and national levels, as well as between the public and private sectors.

Governments must be capable of financing promotion programs by aligning economic incentives with tax policies since, given its nature, the energy context is an area that requires large-scale investments.

It is important to generate information for a correct ex-ante assessment of policies and initiatives (in their potential impact) as well as ex-post (to correct

errors) in regard to improved energy resources efficiency. A greater dissemination of successful cases will only be achieved with clear evidence.

To achieve the decoupling of economic growth of carbon emissions it is necessary to integrate energy generation policies with those of transportation, public finance, environmental, poverty fighting, economic promotion, and urban planning.

Governments should improve their capacity to carry out forecasting studies. They must also promote renewable energies, diversify energy matrices and stimulate energy efficiency and security policies, all with an integrated regional approach. This requires a permanent follow-up of energy issues in the regional context, as well as identifying obstacles in the development of various sources of energy in each country. It also implies promoting studies on the potential of different renewable sources, and the coordination of the diverse agencies involved (both public and private), in order to design incentives to modify their actions in accordance with commonly agreed objectives.

IMPORTANCE OF THE STATE'S REGULATING ROLE IN THE PROMOTION OF RENEWABLE ENERGIES

The obstacles to developing renewable energies call for the State's additional efforts to overcome them. They include:

- i) Economic barriers, such as the higher cost of renewable sources as compared to conventional ones;
- ii) Reduced degree of institutionalization of renewable energies;
- iii) Limited technical capacity to design and develop projects;
- iv) Financial barriers that include the scarce availability of promotional credits and high transactions costs, and
- v) Social barriers, such as the reduced payment capacity of lower-income sectors.

BIOFUELS IN ARGENTINA

IMPORTANCE OF AN ADEQUATE REGULATORY FRAMEWORK TO PROTECT EXPORTS AND THE ENVIRONMENT

90% of all available energy in Argentina is based on fossil fuels. In order to reverse this trend, the government defined a regulatory framework to promote biofuel use and production in the national territory. After two years since the law entered into force, **Argentina shows great development in the production of biodiesel from soya (and to a lesser extent, a certain advance in ethanol production) mostly destined to external markets. Argentina has become the world's leading biodiesel exporter based on its great competitiveness in the soya complex** (thanks to which it's among the top three soy and soy-oil exporters worldwide).

However, the national and provincial authorities have explicitly and implicitly supported the sector's expansion as a short-term business, without accounting for environmental or social impacts, or even technological aspects, in the medium term. **The authorities are yet to react to the evident impact of soya expansion on the deforestation process in some endangered ecosystems** (particularly in the Chaco region).

The current regulatory framework does not adopt special provisions with regards to the sector's impacts on land use. Also, **said regulatory framework and the authorities do not take into account the requirements of external markets that often demand certifications related to environmental impact and the use of "second generation" technologies that are not compatible with food crops. Based on all of this, Argentina could find itself being rapidly excluded from these markets.**

ENERGY USE IN MEXICO

IMPACT OF RESOURCE EFFICIENCY ON PUBLIC FINANCING

In an oil producing country like Mexico, its energy sector performance affects not only the growth of the overall productive sector, but also public financing stability, and consequently the government's ability to address social demands.

The achievement of energy efficiency that is a part of the recent progress of the Mexican economy is basically the result of a reduction in energy consumption in the industrial and residential sectors. This was due to a combination of the application of technological programs of energy consumption reduction; changes in legislation and the creation of technical standards.

This case suggests that governments should be able to finance specific promotion and incentive programs, which first requires the development of institutional capacities and specific information on energy generation and management.

Mexico's economic transition in recent decades has shown that energy is a matter of national security and economic stability. However, Mexican inequalities show that economic growth is not enough to correct the social welfare gaps. Greater energy availability with fewer emissions does not necessarily mean less poverty.

R8.

It is necessary to review existing national development strategies, including climate change response initiatives, as an integral part of future scenarios.

Since climate change will have an impact on the development and international integration possibilities for Latin America, it is necessary to anticipate and act on these trends.

A crucial factor will be the review of institutional and technical capabilities in each country. This must include analysis of vulnerabilities and needs for adjustment and opportunities in the event exports are restricted in the near future, due to trade barriers and performance requirements related with greenhouse gas emissions associated with products and services obtained in the region.

There is also an increasingly evident need to prepare negotiation strategies at the regional level, and make better use of the opportunities created by the new international mechanisms in place or to be created in the future. Examples of such mechanisms are REDD+, NAMAs and programmatic CDM.

The academic sector should be encouraged to expand its research on regional climate models; cross-border issues on land use; measurement of changes to land use; deforestation and other related issues.

2) RECOMMENDATIONS ON REGIONAL COOPERATION

Progress made in dealing with several of the problems identified throughout this report, requires regional cooperation in standardization (of measurement, and testing mechanisms, for instance), in projects related with technological demonstration and cooperation and in the regulation of cross-border issues and conflict resolution. There are several reasons for this: some are related to the necessary scale to make effective demonstrations that go beyond local or national experiences. Others may have to do with the need for effective mechanisms to address problems that cannot be resolved by just national action, or where a national efficiency initiative could be undermined by a neighbour.

Advances at the regional level not only depend on achieving regulatory agreements and on the degree of internationalization of such agreements, but they also respond to a great extent to the existing political goodwill and mutual trust between the countries involved. Regional coordination produces benefits, but can also entail costs and risks that will hardly be undertaken by private sector investors in the absence of certain leaderships, incentives or coercion by national governments. This also refers to Recommendation 2 on the role of the State, and to Recommendation 3 on the need to generate multi-stakeholders' involvement and public-private partnerships that will provide guarantees to all parties (particularly concerning common agreements, transparency and accountability).

R9.

Biofuels imply different challenges, depending on the country's characteristics and on the technology and type of biofuel involved. However, it is possible to promote coordinated regional strategies to face up to such challenges in a proactive manner.

In the case of biofuels, some pro-activity was observed in Brazil (INMETRO seal, government negotiation to certify local standards abroad). In Argentina, the private sector is more active than the public sector – although the latter has become successfully involved in several important activities. Nevertheless, for the time being, multiple standards and requirements coexist. This makes public sector intervention necessary in order to define and have common standards and consistent coordinated efforts.

There is regional relevance to studying local production conditions, potential environmental impacts and technological options to overcome the dilemmas between biofuels, and environmental sustainability or between biofuels and food.

Several destination markets for the region's exports - particularly the U.S. and the European Union - are implementing performance and certification requirements on biofuels related to net greenhouse gas emissions throughout their entire production cycle (particularly in the first stage of obtaining crops or energy raw materials) and their effects on deforestation. Because of a lack of information about the environmental impact of the production of agricultural raw materials

in the region, it is possible that unjustified trade barriers are and will be created when importers apply “default” values to such indicators.

Current market trends, and the overall perception that in the next two decades there will be an increasing involvement of developing countries in global actions to tackle climate change, suggests that the external concerns and pressures on the sustainability of bioenergy are here to stay. This implies the need to include the impact of biofuels in decisions related to land use, not only because of their potential negative impact on society and the environment, but also due to their competitive effects and future implications for climate change. There is also the consideration of international support and financing mechanisms to be established in the near future.

There are several ways to face up to these increasing requirements:

> A proactive position in international negotiations and debate fora. This is important given the ongoing international deliberations about creating a “single” standard in regard to environmental requirements for biofuels).

- > Generating capabilities and information to measure the environmental impact of local production.
- > Including more sustainable technologies for a better use of bioenergy with lower environmental impact.
- > Including the impacts of biofuels in decisions on land use - not only due to their potential negative social and environmental impacts at the local and global levels, but also because of their competitive effects.
- > Promote a better use of existing and future international support and financing mechanisms.

R10.

In order to limit the environmental impacts of primary activities, it is necessary to promote sustainability and efficiency initiatives both at the national and regional levels.

Regional cooperation is urgently needed in areas such as climate change, environmental impact of the primary sector, and water regulation (specifically in shared basins and underground resources).

The certification of sustainable production and the inclusion of good practices is an interesting “incremental” element towards reducing the negative external impacts of agriculture and livestock production. The problem is that the public sector is sometimes in a difficult position in terms of addressing regulation of this sector because the impacts are unclear and it may take years to recognise them. Also, the impacts on ecosystems also occur on private land. Thus, a significant challenge is placed on local, national and regional policies to promote agricultural sustainability, and to minimize the impact of production and agrochemicals in land use and biodiversity. The best potential response may

arise from a combination of regulatory instruments, incentives and public-private initiatives: technological cooperation, regulation of land use, zoning and the definition of best practice standards and rules.

It is necessary to gather more information in order to identify good practices at the level of local governments, micro-regions, countries and macro-regions in regard to land use.

Latin American countries should invest in monitoring activities of land use in order to provide transparent and consistent information to the international community. This measure is extremely important to guarantee access to external markets.

Latin American countries should also develop their own analytical models for land use, since the technical debate regarding the change in land use is a central issue in international trading negotiations. Most

of the models discussed in those contexts do not take into account the specific aspects of land use patterns in Latin America.

Potential border conflicts related to the use of aquifers (related with productive projects, for example) should be considered, and regional cooperation must

be promoted in this regard. Regional integration mechanisms should be useful tools for the resolution of environmental disputes or disputes over the use of resources. This will be the way of strengthening regional integration, rather than making it weaker.

R11.

Economic implications of environmental impact caused by production, which are already being reflected in the requirements of a growing number of export markets, have to be considered in terms of competitiveness and sustainability.

External pressure serves as an incentive for producers to start paying attention to the environmental impacts of production. But this reactive approach could be costly, because dynamic competitiveness calls for the creation of institutions, knowledge and a proactive attitude and long-term vision. None of this is achieved overnight, with a view of satisfying the requirements of a destination market.

Therefore, from the local perspective, it is important for the public and private sectors to include these concerns in a proactive manner as soon as possible. Otherwise, they could have serious implications on competitiveness and employment, or an environmental and social impact, in the medium term.

However, the transition to a “cleaner” economy should not be expected to happen naturally only through the exposure of companies to the destination

market. The existing technological gap is quite broad. The role of policy makers must be oriented towards promoting and facilitating technology transfer by differentiating opportunities where everyone “wins” by effectively dealing with situations of potential threats to competitiveness.

Instead of losing markets, and in order to obtain proactive responses from companies, governance mechanisms are necessary. So too are accompanying mechanisms and disseminating information to avoid hindering the competitiveness of regional producers. Once again, in most of the successful cases analysed, the public sector has played an important role - with effective interaction and synergy between public and private entities.

External (destination) markets’ environmental requirements also pose the challenge of developing local

capacities to ensure compliance with the regulations required by buyers, and to adequately measure the environmental impact of regional production. The example of biofuels has shown that importing (developed) countries tend to ignore technical characteristics of production in specific developing countries, and the producing (developing) countries ignore its local environmental impact. In this context, it is quite possible that unjustified trade barriers posed by technical indicators would be established.

At the regional level, international trade is at the foundation of many international negotiations. It has become one of the main fora for discussing

aspects related to sustainability, competitiveness and efficiency - as well as the complex challenges imposed by unilateral measures that might undermine trade and development. Consequently, the natural arenas to coordinate environmental and productive policies should be the regional integration processes, since trade and economic integration also extends to political integration. As a result, there is the need to ensure homogeneous environmental standards in agreements with unequal partners (as has happened in the framework of the North American Free Trade Agreement - NAFTA).

R12.

The promotion and implementation of sustainable consumption and production practices should be seen as a key issue in regional cooperation (both for the development of common policies and objectives in regional blocs, and for the coordination of national and sub-national policies).

It is essential to recognise and benefit from the potential synergies between several policy areas; and environmental and productive challenges are often related. In particular, synergies between climate change objectives and those related to the conservation of watersheds and biodiversity should be acknowledged and included in the design of land use planning policies and standards. This could lead to the efficient use of innovative mechanisms, such as REDD and REDD plus.

It is also necessary to urgently move forward with regional cooperation in respect of standardization, measurement and testing mechanisms to address new issues. These include the environmental requirements of export markets, and regional technology cooperation

in order to identify meaningful demonstration projects. This particularly refers to the definition of the scale needed to have a stronger demonstration affect.

It is therefore recommended to promote effective regional regulation. It should include the addressing of different environmental issues linked with cross-border impacts, and the resolution of any conflicts that arise over the use of shared resources.

Regional cooperation is important in regard to both international integration, and the competitiveness of regional producers that operate in environmentally and socially vulnerable sectors. For instance, sustainability requirements in the case of biofuels may become a defining factor for the competitiveness of companies and of the countries in the region.

Sustainable energy and climate change fields also urgently need regional cooperation. These are areas with a strong link to energy integration - as well as with technological development in the agriculture, forestry and energy areas and the primary sector's environmental impact.

In the case of water resources, there is a need to move forward in the exchange of information and in cooperation to create mechanisms aimed at regulating water use. This particularly applies in the case of shared basins and underground resources.

Since there are external pressures to comply with environmental requirements in export markets, as well as requirements to access multi-lateral credit and

international commitments on climate change, regional cooperation in these areas may prove vital in order to strengthen joint negotiating positions, to improve the follow-up of rapidly evolving technical aspects, and to adequately respond to potential trade restrictions (as seen in the case of biofuels).

Regional actions to adapt the existing regulations and to face the challenges of environmental policies appear to be another desirable strategy.

Financial institutions and agencies related to regional inclusion may contribute to facilitate cooperation, mainly in the establishment of funds to finance environmentally friendly initiatives and the promotion of insurance markets.

R13.

Regional cooperation is a key aspect to coordinate actions related to innovation; applied scientific research; generation and dissemination of basic information on sustainability and resource efficiency indicators.

The importance of a regional approach in regard to technology lies in the need to benefit from synergies, and to achieve an efficient use of the scarce resources available for that purpose in the region.

Cooperation turns out to be particularly necessary to defend the regional position in international fora, regarding the protection of intellectual property, to make sure that access to less emissions-intensive technologies is not subject to excessive barriers that limit the implementation of actions to tackle climate change in the region.

A greater institutional development is necessary to allow not only the flow of information and technical means, but also to achieve the effective management of certain cross-border environmental issues. These can have clear and harmful impacts on sustainability, trade and regional inclusion if not properly resolved.

To achieve a greater inter-governmental articulation on these issues at the regional level, it is also necessary to move forward in Recommendation 1 of this report, that is: improving the countries' state planning capacity of environmental and sustainable development policies.

R14.

National, regional and international financing mechanisms for development should ensure the availability of financial resources to promote investments that will lead to resource efficiency.

Latin American countries analysed in this report have shown very slow progress; and have even fallen behind in areas such as the financing or the definition of priorities in the use of budget funds for environmental issues. It is true to say that Latin America is not devoting sufficient resources to environmental policies at the various government levels. Environmental policy-making is thus at a clear disadvantage when compared to the resources extended to other areas, particularly the economic sector.

The existing financing mechanisms for national development (national development banks) and at the regional level (Inter-American Development Bank, Andean Corporation for Promotion, and the Structural Convergence Fund for MERCOSUR – FOCEM - among others) have slowly incorporated environmental sustainability into their analyses, investments and loans. Although there is still a long way to go in this regard, it will be essential to include the resource efficiency perspective in their policies and practices to ensure that financial resources achieve greater sustainability goals. Otherwise, even with the efforts of public and private sector involvement towards greater sustainability and improved resource efficiencies at the local or national levels, these will continue to be isolated cases of improved policies that will not find the necessary funding to become effective.

If productive, trade, energy and regional infrastructure initiatives financed by regional or international agencies are not part of the environmental sustainability and resource efficiency perspective, all national or sectorial efforts in this direction will be severely hampered. Therefore, their externalities will not only affect the environment or sector where investments are made on a regional scale, but will also adversely impact the actual investments made and progress achieved at national, local or sectorial levels within the region.

Financing associated with the generation of information and to provide follow up of pollution and environmental degradation levels is as important as is the use of natural resources. This information must be generated before the development of projects that would significantly affect environmental and natural resources. This implies that, apart from specific financing, the monitoring and assessment systems of regional or other mega-projects should be improved, by including not just environmental and social impact indicators, but also any other indicators regarding the efficient or non-efficient use of resources involved or affected by the projects or activities in question.





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