



Globalization and the Environment

Lessons from
the Americas



Working Group on Development
and Environment in the Americas



HEINRICH BÖLL FOUNDATION

Globalization and the Environment: Lessons from the Americas

**Working Group on Development and
Environment in the Americas**

The Heinrich Böll Foundation North America

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The report is based on a series of detailed studies presented at the Brasilia meetings. Those longer studies are available on the Working Group's web page: <http://ase.tufts.edu/gdae/WorkingGroup.htm>.

The report benefited greatly from detailed commentary on the group's presentations by members of the Brazilian government and academic and non-governmental observers who attended the meetings. This report is an attempt to summarize the individual studies and synthesize the Working Group's main conclusions. As such, it is less a consensus document than a summary of a rich discussion among a diverse group of experienced researchers from the U.S. and Latin America.

FOREWORD

Ever since the Earth Summit in Rio de Janeiro in 1992, the concept of sustainable development, the idea that economic development should at the same time ensure environmental protection and social advancement, has gained popularity and credence among scientific and civic groups worldwide. Indeed, in the past decade, many politicians, international organizations and regimes have used explicit reference to sustainable development when negotiating and prescribing political action plans for economic growth and poverty reduction.

However, as a look at globalization processes in the Western Hemisphere in the past 20 years reveals, these references have proved to be mostly rhetorical. Today, the Americas are plagued by growing social injustice and environmental degradation amid sluggish economic growth as a result of a policy strategy for the region that focused predominantly on trade liberalization and open markets.

Far from looking at lessons learned from the past and not even considering alternative economic development models, most national governments in the region, the International Monetary Fund, the World Bank and the Inter-American Development Bank continue to seek the political remedy for the policy shortcomings of the past in more, not less market liberalization. The efforts for a Free Trade Area of the Americas (FTAA), the recently negotiated Central American Free Trade Agreement (CAFTA) or a host of future planned additional bilateral and regional free trade agreements in the Western Hemisphere offer conclusive evidence for this myopic political strategy.

While the resistance of many civil society organizations against unfettered economic integration in the region – on environmental and social grounds – has been growing in recent years, political decision-makers have been successful in labeling many of these activists as mere globalization-phobics, anti-globalization protesters that base their critique on incidental evidence rather than hard economic facts and academic scrutiny.

This is one of the reasons why academic research efforts, such as those presented in this publication, are so important in making the case that globalization critique is not only justifiable, but routed in facts, not fiction. The Heinrich Böll Foundation (committed to supporting sustainable development through its work with 200 partner organizations in more than 60 countries via 23 offices worldwide) is proud to work with the newly formed Working Group on Development and Environment in the Americas in its effort to add empirical-based lessons to the often polarized debates over trade liberalization in the Americas.

Environmental and development economists from seven countries in the Americas undertook detailed analyses of the environmental impacts of reform policies in their various countries. Their findings, summarized in this policy paper, show that in Latin America the environment has so far not profited from globalization, and the often-held promise that with economic growth regard for environmental protection will inevitably grow, has so far been largely unfulfilled. Rather, the authors show that the burden on the environment in many countries of the Americas continues to increase.

Far from rejecting trade strategies and economic liberalization models outright, these economists warn that governments and policy makers must take on the needs of the environment in the Western Hemisphere directly, as an integral part of regional trade and investment policies and with the flexibility and means for national governments to do so. As such, this policy reports adds a scientific and academic voice to a growing choir of voices that hold out a different vision for the Americas.

Our heartfelt thanks goes to members of the Working Group on Development and Environment in the Americas for their valuable work and their success in condensing eight lengthy country studies into this summary policy paper. It is indeed worth the read – and should be required reading for trade negotiators, not only in the Western Hemisphere.

June 2004

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EXECUTIVE SUMMARY

A comprehensive review of the environmental impacts of trade liberalization and related economic reforms in Latin America suggests that, with some exceptions, free-trade policies have taken a heavy toll on the environment, according to a report by the Working Group on Development and Environment in the Americas. The Working Group, which includes development and environmental economists from the U.S., Mexico, Brazil, Argentina, Chile, Costa Rica, and El Salvador, recommends that far more attention be paid to strengthening environmental institutions, regulations, and enforcement as countries in Latin America negotiate trade agreements.

The report, “Globalization and the Environment: Lessons from the Americas,” is the product of a series of studies presented by Working Group members at its first meeting in Brasilia March 29-30, 2004, hosted by Brazil’s Environment Ministry. The Working Group presented its reviews of the environmental impacts of trade liberalization in the hemisphere, drawing from original research and a growing body of so-called “sustainability assessments” – empirical studies of environmental costs and benefits of the free-market policy reforms that have prevailed in most of the region over the last two decades.

Known in the United States as the Washington Consensus and in Latin America as “neoliberalism,” the reforms include a package of economic policies that promote economic development by opening national economies to global market forces. Over the last twenty years, governments throughout Latin America have reduced tariffs and other protectionist measures, eliminated barriers to foreign investment, restored “fiscal discipline” by reducing government spending, and promoted the export sector of the economy.

These policies, which were advocated by the U.S., World Bank and the International Monetary Fund and enthusiastically endorsed by most governments in the hemisphere, have been advanced by trade agreements. The 1994 North American Free Trade Agreement (NAFTA) between the U.S., Canada and Mexico became the template for a range of subsequent regional and bilateral accords, including agreements on the hemisphere-wide Free Trade Area of the Americas (FTAA), Central America Free Trade Agreement (CAFTA), U.S.-Chile Free Trade Agreement, and negotiations toward a pact between the U.S. and Andean nations.

These agreements have raised concerns, in part because the open-market policies they promote have shown poor results. Economic growth in the region was much slower – less than 2 percent – in Latin America and the Caribbean between 1980 and 2000, the period of the reforms, than in previous periods. Chile and Argentina (before its recent crisis) are the exceptions to the rule.

The Working Group found that the environmental record was not much better. U.N. agencies have documented the region's growing problems with air, soil, and water contamination, the result of urbanization and the modernization of agriculture. Working Group studies documented and analyzed the environmental track record in specific countries and sectors:

- **El Salvador** has shifted from an agro-exporter to a labor exporter, with benefits to the rural environment as land pressures eased but with heavy costs in urban areas.
- **Central America** as a region has seen demand grow for some of the agricultural products – bananas, sugar, melons – that impose the heaviest environmental costs.
- **Mexico** has transformed itself from a resource-dependent, closed economy to an export-driven manufacturer, but weak environmental enforcement has allowed rising levels of air pollution and unsustainable resource use.
- **Brazil** has seen rising demand for agro-exports, such as soy, but the expansion threatens fragile lands and ecosystems.
- **Argentina** has benefited from imported technology through liberalization, but the environmental record has been mixed, with some improved practices in industry and agriculture but little institutional capacity to spread such benefits.
- **Chile** has been the only country in the hemisphere to see faster growth rates, but its dependence on natural resource-based exports has increased.

The Working Group's findings, which are summarized in "Globalization and the Environment: Lessons from the Americas" and documented in full in the Brasilia papers (available online), include:

- **Pollution rates continue to worsen** because governments have not provided the level of oversight needed to limit environmental damages.
- The region has seen a **gradual shift toward cleaner industrial production**, an expected outgrowth of economic development, yet pollution continues to increase because governments lack the institutional capacity to protect the environment.
- With a comparative advantage in resource-based industries – oil, copper, fishing, agriculture, forestry – **Latin America has grown more dependent on resource-based exports**, putting added pressure on the environment.

- Technological improvements are expected to yield environmental benefits, as foreign firms bring new technology and higher environmental standards. Yet the results are quite mixed. In some cases, foreign firms or technology generated environmental improvements, such as in some large export-oriented firms. Yet other **evidence suggests that foreign firms are no more likely to impose strict environmental standards than domestic companies**, and small and medium-sized enterprises are largely left behind.
- In some cases, trade-led technical change has brought a net worsening of environmental conditions, such as when modern, **chemical-intensive agriculture displaces more sustainable, traditional practices**. This can have potentially irreversible impacts on biodiversity, as studies of Mexican maize and Brazilian soy document.
- **Rural displacement has in some cases reduced pressure on the land, but internal migration has compounded environmental problems associated with unregulated urbanization**. International migration, which has grown dramatically despite the unwillingness of the U.S. government to liberalize labor flows, now assumes a crucial economic role as migrants return wage remittances to family members. For many communities and some countries, these payments are an economic lifeline.

Changing Directions

The Working Group found ample reason to question the prevailing assumptions that trade and investment liberalization will automatically lead to growth and that such growth will naturally lead to environmental improvements. Latin American countries, which have implemented sweeping open-market reforms over the last twenty years, have seen limited benefits from such policies. If trade and foreign investment are going to produce development that is strong and sustainable, governments need to address the environment directly. The report's recommendations include:

- **Strengthen environmental institutions** – Strong environmental legislation, regulation, and enforcement must accompany liberalization. While legislation in the region is generally good, the capacity to enforce it is weak.
- **Build environmental capacity** – Often, open-market reforms impose fiscal constraints on governments, limiting their capacity to finance environmental programs. Developed countries must provide training and financial assistance to help developing countries improve

environmental standards and institutions. Such support should include efforts to improve developing countries' ability to meet international environmental standards so that such requirements do not serve as unfair technical barriers to trade.

- **Reduce resource dependence and promote value-added development** – Latin America must either reduce or upgrade its dependence on resource-based industries, which has increased under open-market reforms. Trade agreements can promote higher value-added development by, for example, reducing tariff escalation on processed goods.
- **Leave governments the capacity to promote sustainable development** – Too often trade agreements constrain government's ability to direct development in general, and foreign investment in particular, toward desired national ends. Agreements must not proscribe these essential tools for development – performance requirements, technology agreements, etc.

The studies in “Globalization and the Environment: Lessons from the Americas” highlight the social and environmental costs of the present approach. Hopefully they also point to some of the ways in which national policies and international trade agreements can be transformed to better meet societies' goals.

INTRODUCTION

In the last two decades, there has been a dramatic shift in economic policies in developing countries, and Latin America and the Caribbean have experienced the most sweeping changes. After decades of pursuing policies designed to foment national industrialization through heavy government intervention in the economy, supported by selective protectionist measures, most governments in the Western Hemisphere changed course beginning in the 1980s. In the face of high levels of external debt, fiscal deficits, and inflation, not to mention slow growth and rising inequality, “neoliberalism” became the word of the day in the region.

The reforms include a package of economic policies that have the stated goal of promoting economic development by opening national economies to global market forces. Principal planks of the platform include: reducing tariffs and other protectionist measures; reducing barriers to foreign investment; restoring “fiscal discipline” by reducing government spending; and promoting the export sector of the economy. As countries open up to a dynamic global economy, so the theory goes, external dynamism will begin to drive national economies in the areas in which each country or region has a “comparative advantage” over its trading partners. As governments become less involved in the economy, external forces – markets for exports, investment for modernization, imports to meet consumer demand – will drive development.

Different countries in the hemisphere adopted these policies at different times and to different degrees, but as a region Latin America and the Caribbean for the last twenty years have followed such policies. In recent years, this orientation has been promoted through a growing range of trade agreements that seek more rapid global economic integration and a deeper liberalization process. The North American Free Trade Agreement (NAFTA) between the United States, Canada, and Mexico was the first regional agreement in the hemisphere, and it has been the model for a range of bilateral and multilateral trade negotiations. NAFTA’s “deep integration” – reducing not just tariffs on imports and exports but government activity in the domestic economy in such areas as services, intellectual property, and investment – is the template for hemispheric negotiations on the Free Trade Area of the Americas (FTAA), the Central America Free Trade Agreement (CAFTA), the current negotiations with the Andean nations for a free trade agreement, as well as a bilateral agreement between the United States and Chile. These more ambitious agreements reflect what some developed nations would like to see in the WTO.

Now, after 20 years of free-market reforms, many citizens in the hemisphere – and some governments – are now questioning the wisdom of deep integration. The region has not experienced the promised economic growth.

According to a sweeping assessment of the impacts of the reforms conducted by the Economic Commission for Latin America and the Caribbean (ECLAC), the region's economies grew at an annual rate of less than two percent between 1980 and 2000, compared to a rate of 5.5 percent between 1960 and 1980. Growth was faster during the 1990s than in the 1980s, but it still did not compare to the period previous to the reforms¹. Chile is an exception where growth rates almost doubled over the past twenty years compared to the 1960 to 1980 period. Argentina looked like it was on a similar trajectory, growing faster between 1990 and 1998 than during the earlier periods, but has fallen into crisis. The ECLAC report concludes that the reforms contributed to an increase in inequality in the region. As a result, there has been widespread popular resistance, which is putting added pressure on governments to question both the Washington Consensus and free-trade agreements.

There is also widespread concern about the extent to which these reforms contribute to a worsening of environmental conditions. In recent years, there has been a wave of research examining the environmental impacts of this model. Sometimes referred to as "sustainability impact assessments," such studies examine the concrete impacts on the environment of a given set of trade policy reforms. This approach contrasts with that of the U.S. Trade Representative's Office, which relies on complex and controversial economic modeling to predict the economic and environmental impacts of a trade agreement under discussion. These results are often misleading and estimate impacts only for the United States. With a 20-year history of liberalization in the hemisphere, it is now possible to examine the past as a guide to the future.

The overall picture is not encouraging. According to a comprehensive report by the United Nations Environment Program (UNEP) and ECLAC, environmental trends in the region continue to worsen². Increasing urbanization and the modernization of agriculture are leading to increases in air, soil and water pollution and subsequent adverse human health effects. The report notes that the health problems associated with deteriorating air quality and toxic substances are as serious as the health problems previously caused by underdevelopment. Finally, although on average industrial manufacturing has shifted toward relatively "cleaner" sectors, increasing rates of pollution are occurring because of "serious shortcomings" in environmental management.

¹ Stallings, Barbara and Wilson Peres (2000). *Growth, Employment, and Equity: The Impact of the Economic Reforms in Latin America and the Caribbean*. Washington, ECLAC/Brookings.

² Economic Commission for Latin America and the Caribbean and United Nations Environment Program (2003). *The Sustainability of Development in Latin America and the Caribbean: Challenges and Opportunities*. Santiago, ECLAC/UNEP.

On March 29-30, 2004, the Working Group on Development and Environment in the Americas held its first meetings in Brasilia. A select group of environment and development researchers from different countries in the hemisphere, the Working Group was formed to bring together some of the research on the social and environmental impacts of policy reforms and collectively draw out lessons for economic policy and for ongoing trade negotiations. Members from Mexico, Brazil, Chile, Argentina, El Salvador, Costa Rica, and the United States presented papers on their countries' experiences in a day-long session hosted by Brazil's Environment Ministry. The presentations were commented on by representatives of four different Brazilian government ministries as well as academic researchers and members of prominent non-governmental organizations.

This report summarizes the findings of those papers and presents the Working Group's main policy recommendations. These studies confirm the model's weak economic performance and highlight the environmental costs associated with this development model. The recommendations take on particular importance in the context of current trade negotiations. Legislation giving the U.S. president the authority to negotiate trade agreements mandates that all agreements have an environmental component.

Even though the Bush Administration has shown less interest than previous U.S. administrations in advocating for the environment in trade negotiations, many Latin American governments are resistant to what are perceived as Northern demands for environmental standards that are expensive to implement and can be used as unfair barriers to the U.S. market. Still, with the FTAA process devolving into a series of bilateral and regional agreements, Latin American negotiators must grapple with the ways in which such agreements address the environment. So-called "trade capacity-building" funds have been earmarked to help negotiators think about the relationship between trade and the environment.

This report and the more detailed studies on which it is based can provide some useful guidance. They point out not only the limitations of the current approach but also some of the policy options that can promote broad-based economic development while protecting the environment. There is a growing consensus that the Washington Consensus has delivered neither sustainability nor development. To the extent trade liberalization can be harnessed to promote both, these studies offer useful guides to how that can be achieved. Perhaps most important, they do so from a Southern perspective that recognizes the need to link environmental protection to economic development in a region that continues to suffer from a shortage of both.

CENTRAL AMERICA

Trade and Sustainable Agricultural Development

Carlos Pomareda and Carlos Murillo

The Central American region continues to depend heavily on agro-exports for foreign exchange, income, and employment. With the growing integration of the region into the global economy, and the negotiation of trade agreements to promote that integration, agriculture will continue to figure prominently in Central America's development. It is therefore important to ensure that export-led agricultural development follow sustainable practices. Up to now, this has not been the case, though there are some positive trends.

Since 1990, Central American trade with outside countries has increased significantly. Imports, however, have grown faster than exports, expanding at an annual rate of 10.1 percent compared to 8.6 percent growth in exports. Agriculture helps narrow this structural current account deficit, maintaining a significant trade surplus and accounting for roughly two-thirds of exports. Principal agricultural exports include bananas, coffee, sugar, and melon. These and other agricultural exports are projected to continue to grow in coming years. In addition to these agro-exports, maize, poultry, and hog farming are also important agricultural activities.

A recent study assessed the various environmental impacts of the principal agricultural activities in five Central American countries: Costa Rica, Guatemala, Honduras, El Salvador, and Nicaragua. Using a detailed matrix of social and environmental impacts – including soil, water, air, forest cover, biodiversity, land use, employment, and health – researchers examined all aspects of the production, transport, and processing of the seven agricultural products listed above. These results were then compiled to assess the sustainability of current agricultural practices and the likely impacts of expanding demand for certain products due to trade liberalization. Based on this assessment, we discuss the priorities for future negotiations over trade liberalization.

Social and Environmental Impacts of Agriculture

Though there is great variation among the five countries studied, there are enough similarities in their agricultural production to consider them as a regional group. Overall, there are four broad categories of producers:

1. **Small producers**, who have limited and low-quality land and produce mainly for subsistence and for the local market. Most grow maize and other staple crops, and many have small livestock. Few are part of the agro-export chains.

2. **Medium-sized producers**, who often have contracts with agro-exporters. They produce coffee, milk, poultry, eggs, fruit, and ornamental plants.
3. **Agro-industrial firms**, which are involved in processing: rice mills, sugar refineries, coffee processing plants, some intensive livestock.
4. **Transnational firms** specializing in bananas, pineapple, and more recently cantaloupe. These firms control large extensions of land and hire large numbers of agricultural laborers to produce for export.

Based on our research, we identified the following environmental impacts from the agricultural activities studied:

Bananas – Bananas remain Central America's most important agro-export, accounting for sales of US\$921 million in 2001, 20 percent of the region's export earnings. The crop is grown most notably in Costa Rica, but also in Guatemala and Honduras. Production and exports have fluctuated during the last decade, with overall levels remaining roughly what they were in 1990. Principal environmental impacts of banana production relate to soil and water contamination from the heavy use of agro-chemicals, including pesticides, fungicides, and fertilizers. Processing also contributes to severe water pollution. Groundwater is contaminated from chemical runoff. Chemical spraying and processing contribute to air pollution. High chemical use causes some prey-mediated negative impacts on animals. There are some positive environmental impacts from the sowing of trees and bushes to create buffer zones around plantations, to control the spread of plagues. Due to the large number of jobs created in the industry, bananas make a significant social contribution.

Coffee – Coffee is the second most important cash crop for the region, bringing in US\$835 million in 2001. It is produced in all five countries, with Guatemala, Honduras, and Costa Rica producing the most. Coffee covers the most area of any agro-export crop, and planted area has grown 14 percent since 1990 despite low international prices. There are two distinct cultivation techniques: shade and plantation. Shade coffee predominates in the region, while plantation coffee is most common in Costa Rica. Shade coffee offers many environmental benefits, contributing to soil stability and fertility, helping with water filtration, providing forest cover, and contributing to both plant and animal biodiversity. Plantation coffee, on the other hand, has moderate negative impacts on the environment, due to high chemical use, water pollution, and erosive farming techniques.

Sugar Cane – The third most important agro-export is sugar, and production grew nearly 50 percent in the 1990s. The region exported US\$399 million in sugar in 2001. Production is concentrated in Guatemala, El Salvador, Honduras, and Costa Rica. Sugar cane cultivation is hard on the environment due to intensive water use for irrigation, heavy pesticide use, and the burning

of harvested fields. The latter practice is very hard on the soil, causing high erosion and compaction. It also reduces biodiversity and contributes to localized air pollution and the emission of greenhouse gases. Sugar remains a very labor-intensive industry, so the industry employs significant numbers of workers. Cane-cutting, however, is one of the more dangerous agricultural activities, and the burning of fields is harmful to workers' health as well.

Poultry – Broiler production has been growing throughout the region, increasing 80 percent since 1991. Guatemala has the largest production in the region. While poultry farming itself has some environmental impacts, processing has significant ecological costs. Farms require a lot of water, straining supplies, while the disposal of carcasses causes significant groundwater pollution. Air pollution is caused by cleaning agents used on the farms as well as chemicals used in the slaughter. In terms of employment, processing is a growing source of jobs in the region.

Pork – Hog farming grew about 10 percent during the 1990s, mainly in Costa Rica, Guatemala, and Honduras. Throughout the region, farming techniques vary considerably. The more predominant form is small-scale raising of locally bred varieties in association with other agricultural activities. This has minimal environmental impacts. Intensive hog farming, however, produces most of the commercialized meat and has severe environmental impacts. These include soil and water contamination from wastes, excessive use of groundwater, and heavy air pollution, including extensive emissions of greenhouse gases.

Cantaloupe – Along with watermelon, cantaloupe has emerged as one of the more important specialty agro-exports. By 2001, it was the region's fifth most important agro-export, with US\$118 million in sales. While melons are grown using efficient drip irrigation, production still takes a heavy toll on the environment. Soil, air and water contamination result from heavy use of chemicals, including methyl bromide, a highly toxic, broad-spectrum insecticide that contributes to greenhouse emissions. Some Central American countries are considering banning its use. Melon cultivation also has negative impacts on biodiversity, due to high chemical use, including in the washing of the ripened fruit with untreated chlorine, and the use of plastic sheeting to protect plants. The industry creates many jobs, and risks to workers are lowered by the use of modern technology for chemical applications.

Maize – Maize remains the region's most important domestic crop and the population's most important source of nutrition. Production has not changed significantly in the last decade. Previous expansion contributed to deforestation, as peasant farmers moved onto more marginal lands. Grown on small plots and intercropped with other food plants, the environmental impact is generally positive. Traditional maize is often good for the soil,

prevents erosion, and fosters biodiversity. Burning of fields after harvest can cause some damage.

Worrisome Trends for Sustainable Agriculture

On balance, these findings suggest worrisome trends for sustainable agriculture in Central America. Agro-exports will continue to represent half of the region's export, with strong projected growth. International demand is growing for crops with a high environmental impact – melons, sugar, pork, and poultry – while the region's most important export crop, bananas, imposes high environmental costs. Demand is relatively slack for some of the more traditional crops with positive environmental impacts, such as maize and coffee.

Overall, the main problems identified by this analysis include soil, water, and air pollution from high pesticide use, and air pollution from chemical use and from the burning of fields. There are some signs of improvement, including the possible elimination of methyl bromide in melon production, Costa Rica's recent ban on burning in cane fields, and incentives for the wider use of biological rather than chemical pesticides in coffee and some other fields. There is also some growth in production for specialty markets with organic or other environmental certification.

Governments need to do more, and current international obligations leave ample room for action. While environmental legislation in the region is relatively strong, laws are poorly enforced. There is little training or agricultural extension to promote more sustainable practices, and there are few incentives to adopt such methods. Many of these changes would be either inexpensive or profitable if there were the political will and technical assistance to promote them.

Finally, it is worth noting that environmental standards for agro-exports are contributing to the development of more sustainable agricultural practices. While this is positive, trade negotiators must be careful to ensure that the United States and other developed countries are not allowed to use such environmental standards as technical barriers to trade. This can be productively handled through bilateral cooperation agreements that build on the positive aspects of the relationship between trade, agriculture, and the environment.

The present multilateral trade system contributes to the perpetuation of unsustainable production and is a disincentive for change. The adoption of cleaner methods is left up to market forces. There is no tariff classification for products of cleaner production processes, and many developing countries emphatically reject such a classification and consider certification a technical barrier to trade. Still, such provisions would help contribute to sustainable

agriculture in Central America and they should be pursued with all necessary assurances to developing countries.

This paper summarizes a more comprehensive study, with Randall Arce, Max Valverde, Greivin Hernández, Rolando Zamora and Adriana Campos, and published originally by the Trade Knowledge Network.

The executive summary, in English, is available at:

http://www.tradeknowledgenetwork.net/pdf/tkn_trade_sd_agi_sum.pdf

The full report, in Spanish, is available at:

http://www.tradeknowledgenetwork.net/pdf/tkn_trade_sd_agi_es.pdf

EL SALVADOR

Economic Transformation and the Environment: From Agro-Exports to Labor Exports

Hermán Rosa

El Salvador has experienced a dramatic economic transformation in the last two decades, with strong impacts on the environment. The country has seen tumultuous changes, including a civil war, broad land redistribution, rapid urbanization, large-scale out-migration and an orthodox economic reform. As a result, the country shifted from an agro-exporting economy to a remittance-driven urban-based economy. Traditional agro-exports generated 80 percent of foreign exchange in 1978, but only 6 percent in 2002. Remittances, on the other hand, went up from 8 percent of foreign exchange in 1978 to 67 percent in 2002. The *maquila*, or assembly industry, which grew from 3 percent of foreign exchange in 1978 to 16 percent in 2002, is now more important than the traditional agro-exporting sector.

With an estimated one-fifth of the Salvadoran population having emigrated abroad – 90 percent to the United States – remittances have generated an abundance of foreign exchange that facilitated the application of an orthodox economic reform package since 1989 and the full dollarization of the economy in 2001. This economic reform consolidated a pattern of economic growth that favored the financial sector and import-intensive urban-based economic activities, while at the same time deepening the crisis in the agricultural sector, which saw a major erosion in its purchasing power *vis-a-vis* other sectors in the economy.

These changes have had a mixed impact on the environment. On the one hand, land-use pressures have eased in the countryside, and the agricultural crisis has reduced some of the more environmentally damaging agricultural practices, such as in cotton. On the other hand, urbanization is generating significant environmental damage, from air pollution through expanding automobile use to encroachment on sensitive land outside urban areas. Thus far, El Salvador has failed to manage this rapid economic transformation in a way that can revitalize rural communities while reducing the environmental costs of urbanization.

From Agro-Exports to Remittances

The transformation of the Salvadoran economy has been dramatic. The participation of agriculture in GDP was reduced from 32.6 percent in 1982 to 14.2 percent in 1992 and 8.7 percent in 2002. Macroeconomic conditions since the eighties depressed relative prices in agriculture; during 1980-2000,

agricultural prices lost more than 70 percent of their value relative to overall prices. This affected crops both for export and for the internal market. Cotton production, previously one of the country's main agro-exports, fell to near zero by the early 1990s. Coffee, another important export crop, has been more resilient, though low international coffee prices since 1989 have made such activities more precarious.

Corn production has also declined in recent years after steady expansion through the 1980s. Despite the land distributions associated with the 1992 Peace Accords, the amount of land dedicated to corn production has decreased nearly 30 percent since 1992. This is partly the result of low prices; real producer prices in 1999 were just 30 percent of 1980 prices, and about half the prices in 1990. Labor shortages associated with male out-migration have also contributed to this decline.

While the *maquila* sector has expanded in importance, remittances from migrants to the United States have become the primary driver of the Salvadoran economy. El Salvador now receives more remittances than any other country in Central America. Remittances began to grow during the 1980s – the years of the civil war – when El Salvador experienced a major out-migration. By 1990, remittances had surpassed the value of coffee exports – the single most important export for more than a century. That growth continued unimpeded during the 1990s when the government implemented an aggressive economic reform package.

The vast majority of Salvadoran migrants go directly to the United States or Canada. Only about one-quarter of migrants move to other parts of El Salvador. By 2002, one-fifth of Salvadorans lived in the United States, and their annual remittances totaled nearly US\$2 billion, four times the net income from the *maquilas* and more than ten times the value of the country's traditional agro-exports. Remittances represent 13.5 percent of the country's GDP. These transfers represent an important source of income for nearly one-quarter of Salvadoran households, in both urban and rural areas. For those receiving remittances, the funds represent 40-60 percent of total household income.

Environmental Impacts

The sweeping changes in the patterns of economic activity, sources of income, and settlement of the population have altered environmental dynamics in the country. In the 1970s, rural environmental problems - deforestation, land degradation and contamination from agro-chemicals - were the most pressing issues. Now, urban problems have become more critical.

The shift away from agriculture may have destroyed traditional rural livelihoods, but it has eased pressure on scarce and vulnerable land, reducing

some important sources of environmental damage. Contamination related to the use of chemical inputs has decreased, in large part due to virtual elimination of cotton production. With its extremely high use of agrochemicals, cotton was responsible for contaminating local water bodies and polluting mangroves. Much of former cotton land, which has regained its fertility, was distributed to ex-combatants in the land redistribution of the early 1990s. Some of these new farmers have introduced organic farming techniques and tapped into niche international markets for some products, such as cashews. The declining corn production has been good for the environment as it eases pressures on marginal lands. Corn production expanded in the 1970s onto marginal lands, contributing to erosion and deforestation. It expanded further in the 1980s with the initial land reform programs turned over new lands for small-scale agriculture.

Coffee remains a significant environmental resource under threat. Coffee trees represent one of El Salvador's most important sources of stable forest cover, contributing important ecological services in the area of groundwater recharge. Some coffee lands are being lost to urban sprawl as the urban population increases.

According to satellite images of forest density, about one-third of El Salvador has shown decreases in forestation while about 55 percent has shown increasing forest density. This can be seen as a positive environmental impact of the recent economic changes. However, some of the losses have come in coffee lands on the outskirts of urban areas, where low coffee prices and the high demand for housing and industrial and commercial operations is displacing important sources of forest cover. These may be irreversible losses.

Other urban environmental problems, such as air contamination, are also on the rise. With increased availability of foreign exchange due to remittances and with lower tariffs, many small-scale entrepreneurs are importing scrapped motor vehicles from the United States. These are then repaired and sold in the local market. The number of vehicles in El Salvador almost doubled from 1994 to 1999 – from 242,000 to 468,000 – and the total now may exceed 600,000. Since most of the vehicles circulate in the San Salvador Metropolitan region, where one-third of the population resides, it comes as no surprise that air quality has deteriorated in the Metropolitan region and respiratory diseases are on the increase.

Conclusions

The direct export of labor – through migration – has been the most significant feature of the present form of economic integration, rather than the development of a strong export sector to take over the role, which agro-exports played in the past.

The collapse of the traditional rural economy and the rise of migration and remittances have changed land-use patterns and the way the population and communities relate to the resource base. While further degradation remains a pattern in some areas, particularly in urban and peri-urban areas where environmental degradation has accelerated, in some rural areas the result is environmental regeneration. So far, El Salvador has not been able to take advantage of the new dynamics in rural areas to develop them in ways that revalue the environmental contributions of peasant agriculture.

Given the importance of remittances for the Salvadoran economy, the impact of trade agreements probably is not that significant. Already, the country has several free trade agreements in force: with Mexico (March 2001), the Dominican Republic (October 2001) and Chile (June 2002). While great expectations were created with the end of the negotiations of the free trade agreement with the United States (CAFTA) in 2003, in the years ahead it is likely that continued migration to the United States will be El Salvador's most important form of further economic integration. This may be true as well for most Caribbean and Central American countries.

The export of labor remains one of the few areas in which deregulation and liberalization are not considered. Nonetheless, such labor movements are proving more important to economic development in many countries than expanding trade and investment. As remittances grow in importance, so too will the desire to win more favorable conditions for illegal migrants in the United States.

The original Brasilia Discussion Paper is available at:
<http://ase.tufts.edu/gdae/pubs/rp/DP07RosaJuly04.pdf>

MEXICO – UNITED STATES

The Environmental Costs of Trade-led Growth

Kevin P. Gallagher

The case of Mexico offers many lessons for current discussions regarding trade and sustainable development because Mexico has such a long history of economic integration. Whereas many nations are just now considering a deep level of integration into the world economy through the FTAA or the WTO, Mexico began liberalizing its economy in 1985 and is now one of the more open economies in the world. This study highlights how economic integration can bring adverse environmental effects when the proper institutions are not put in place to manage the environmental impacts of trade-led growth.

During the NAFTA negotiations, proponents of the agreement argued that free trade would lead to seemingly automatic improvements in environmental conditions in countries like Mexico. Opponents of NAFTA said that the environment would automatically worsen in Mexico because Mexico's lower standards would attract highly polluting firms from the United States. In effect, Mexico would serve as a pollution haven for U.S. industry.

The proponents were generalizing from the so-called "environmental Kuznets curve" (EKC) hypothesis. The name derives from an analogy to the original Kuznets curve – the theory that first inequality increases, then later decreases, as per capita income grows over time. Studies in the early 1990s reported a similar relationship between environmental degradation and levels of income: environmental degradation may sharply increase in the early stages of economic development, but the rise in per capita income past a certain "turning point" seemed to gradually reduce environmental damage.

Economists hypothesized that environmental improvement beyond the "turning point" happened for three reasons. First are so-called scale effects: increases in growth correspond with increases in pollution. However, scale effects can be offset by what are called composition and technique effects. Composition effects occur when economies shift toward services and other less pollution-intensive economic activities. Finally, technique effects occur when increasing income eventually leads to higher levels of environmental awareness, which translates into more stringent environmental policies as the growing middle class demands a cleaner environment.

Early EKC studies suggested the "turning point" at which economies would begin to get less pollution-intensive was a per capita income of approximately US\$5,000. This led to the policy prescription now heard in many negotiating rooms that the environment can wait, since economic growth will eventually (and naturally) result in environmental improvement. More recent studies,

however, have called into question both the specific findings and the broad generalizations from these early EKC studies.

Mexico reached US\$5,000 GDP per capita in 1985, precisely the year it began opening its economy. The data suggests, however, that subsequent rises in income have been small and environmental degradation has been large. Statistics from Mexico's National Institute for Statistics, Geography and Information Systems (INEGI) document how environmental degradation has overwhelmed any benefits from trade-led economic growth.

First, since 1985 real incomes have grown at just 2.5 percent per year, and less than one percent per capita. Second, according to INEGI, major environmental problems have worsened since trade liberalization began in Mexico. Despite the fact that Mexico reached levels of income beyond the range of a predicted EKC turning point, national levels of soil erosion, municipal solid waste, and urban air and water pollution all worsened from 1985 to 1999. Rural soil erosion grew by 89 percent, municipal solid waste by 108 percent, water pollution by 29 percent, and urban air pollution by 97 percent.

The results have been costly to Mexico's prospects for development. The INEGI studies estimate the financial costs of this environmental degradation at 10 percent of GDP from 1988 to 1999, an average of US\$36 billion of damage each year (US\$47 billion for 1999). The destruction overwhelms the value of economic growth, which has been just 2.5 percent annually, or US\$14 billion per year.

The Pollution Haven Hypothesis

Is the Mexican environment worsening because Mexico is serving as a pollution haven for highly polluting industries in the United States? This study also performs numerous statistical tests on the pollution haven hypothesis for Mexico. The study analyzes the extent to which economic activity in pollution intensive industries expanded in Mexico before and after NAFTA. One would expect that the amount of pollution intensive industry would decrease in the U.S. and increase in Mexico. What was found however was that the amount of dirty industry decreased more in Mexico than in the U.S.

The reason this analysis and so many others like it fail to find evidence for pollution havens in developing countries is that the economic costs of environmental regulation and compliance are relatively small compared to other factors of production — especially those that determine comparative advantage. Mexico is factor abundant in un-skilled labor that takes the form of manufacturing assembly plants. On average, such production processes are less pollution-intensive than more capital laden manufacturing activities such as cement, pulp and paper, and base metals production. As we saw, the latter sectors have been contracting in the Mexican case. In terms of

costs, even at the margin, the costs of pollution are too small to significantly factor into the average firm's location decisions. In addition, many firms are simply too large and cumbersome to move to another location, and they need to stay close to their product markets. The marginal abatement costs are small relative to the transaction costs of decommissioning and actually moving to another country.

Although this work shows that the majority of firms that move to Mexico do not move there because of low environmental standards, such a finding does not imply that when firms move to Mexico they are model environmental corporations. In fact, the World Bank conducted a survey of over 200 firms in Mexico and found that, contrary to prevailing assumptions, foreign firms were no more likely than domestic firms to comply with Mexican environmental law.

Need for Strong Environmental Institutions

If the Mexican environment is worsening, but not because it is a pollution haven, what is driving environmental degradation? Costly degradation is occurring because the proper mechanisms were not put in place to help Mexico manage its economic growth in an environmentally sustainable manner. In the lead-up to NAFTA, Mexico doubled spending on environmental protection and started a much-needed industrial environmental inspection program. However, shortly after NAFTA was signed and fiscal and financial woes set in, attention to the environment nose-dived. According to INEGI, since 1994 real spending on environmental protection declined by the equivalent of US\$200 million, or 45 percent. Even at their highest levels, allocations for environmental protection were low in comparison to Mexico's counterparts in the OECD; as a percentage of GDP, they were only one-fifth the size of other OECD nations. Tellingly, the number of industrial environmental inspections has also decreased by 45 percent over the same period.

The environmental "side" institutions created by NAFTA set some important precedents, but were not equipped to address these problems. At most, Mexico receives only one-third of the US\$9 million annual budget of the North American Commission for Environmental Cooperation (NACEC). NACEC has been effective in carrying out its limited mandate, enabling citizens groups to monitor environmental progress and convening cross-national information sharing and research efforts in North America. But its US\$3 million budget for Mexico is dwarfed by Mexico's budget shortfalls and buried by the US\$36 billion price tag of environmental degradation.

Conclusions

This study confirms the findings of many others casting doubt on the validity of the Environmental Kuznets Curve hypothesis. There is no evidence that the pollution has begun to decrease now that Mexico has passed the theoretical turning point of US\$5,000 per capita. Nor have other environmental indicators begun to show improvement. This study also suggests that fears that NAFTA would create a pollution haven for dirty industry in Mexico were not justified overall, though the firms that have moved to Mexico have not always followed environmental best practice.

Together, these findings suggest two important conclusions as countries continue to negotiate the terms under which they will integrate into the global economy. First, if growth alone will not bring with it a long-term tendency toward environmental improvement, or if the turning point is so distant as to make the environmental costs of waiting unacceptable, then governments need to put in place the institutional mechanisms that can monitor environmental impacts and prevent unacceptable levels of environmental destruction. Without environmental laws, regulations, and the willingness and capacity to enforce them, trade-led growth will lead to increases in environmental degradation.

Second, since the evidence from Mexico suggests that such regulations and enforcement are not generally decisive in most firms' location decisions, governments should have little fear in strengthening such safeguards. Governments will not be jeopardizing their access to foreign direct investment by enacting strong environmental legislation and enforcing it.

In short, governments need to act to protect their environments. The costs of doing so, in terms of lost investment, are likely to be very low. The costs of inaction are likely to be very high.

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<http://ase.tufts.edu/qdae/pubs/rp/DP06GallagherJuly04.pdf>

MEXICO – UNITED STATES

The Environmental Costs of Agricultural Trade Liberalization: U.S.-Mexico Maize Trade Under NAFTA

Alejandro Nadal and Timothy A. Wise

The North American Free Trade Agreement (NAFTA) had a profound impact on maize trade between the United States and Mexico. Negotiated quota and tariff reductions and the Mexican government's decision not to charge some tariffs to which it was entitled contributed to a tripling of U.S. exports to Mexico. U.S. corn now supplies about one-fifth of Mexican demand, primarily for feed grain, corn sweetener, and processed foods. Though US exports to Mexico account for only about 2 percent of total U.S. production, corn is such a large crop in the US that the marginal impacts of trade cannot be ignored.

The changes in U.S.-Mexico corn trade had significant environmental impacts on both sides of the border. Corn production in the U.S. has heavy negative impacts, while the production of maize in Mexico predominantly involves positive environmental externalities associated with the stewardship of genetic diversity in the world's center of origin for maize. Neither the environmental costs of pollution-intensive U.S. production nor the benefits of Mexico's biodiverse maize production are reflected in international prices. These externalities allow U.S. corn to be priced below its true costs of production, while traditional Mexican maize prices do not reflect their full value. The linking of these two dynamics through deregulated trade results in overall environmental impacts that are worse than the simple sum of its parts, as under-priced U.S. corn threatens to displace undervalued Mexican maize, a process referred to as the globalization of market failure.

U.S. Impacts

Looking first at the environmental impacts in the U.S., corn is one of the country's largest and most chemical-intensive crops. Corn is planted on some 28 million hectares, 20 percent of all U.S. harvested land, and 3.7 percent of the entire land area of the contiguous 48 states. The environmental toll of intensive corn production is well documented. Chemical fertilizers are used on the vast majority of U.S. corn crops. The run-off is a major source of water pollution, affecting drinking water throughout the corn belt in the center of the country. Run-off also pollutes rivers and streams. Run-off into the Mississippi River contributes to a well-documented "dead zone" in the Gulf of Mexico, an area the size of a small U.S. state in which all life has been killed off.

U.S. corn is also intensive in its use of herbicides and insecticides. Due to important technological improvements, the intensity of herbicide use has declined in recent years, though atrazine and other chemical herbicides still pollute drinking water supplies. Pesticide intensity has remained roughly constant, which has been disappointing given the growing use of genetically modified corn. Nearly 30 percent of U.S. corn is now planted in varieties engineered with the Bt endotoxin to fight some common pests. While there are widespread concerns about the risks of such crops to human health and to the environment, their widespread adoption has not yet produced the environmental benefit they promised: reduced pesticide applications. In addition to Bt corn, another 11 percent of U.S. corn is now genetically engineered for herbicide tolerance. With 40 percent of U.S. corn land planted in GM crops, and the share still rising, there are serious concerns about the long-term health and environmental consequences.

Finally, though only about 15 percent of U.S. corn is irrigated, the vast majority of irrigated corn land is found in four states: Nebraska, Texas, Colorado, and Oklahoma. These states rely for their irrigation on water from the vast Ogallala Aquifer, an underground reservoir the size of Lake Huron. The Ogallala is being depleted at unsustainable rates, calling into question the wisdom of expanding corn production in areas lacking adequate rainfall. These warm, dry areas are also feeding the demand for Bt corn, since the variety is engineered to fight a pest that thrives in such climates.

While corn production has not expanded during this period, access to the Mexican market has allowed the U.S. to keep corn land in production when it would otherwise have been turned over to other crops. Increased exports to Mexico due to trade liberalization – the three-fold increase recorded since NAFTA – represent 1.3 percent of total U.S. production and should therefore be considered responsible for 1.3 percent of the environmental impacts of corn production. Given the scale of U.S. production, these are considerable, representing, for example, 100,000 additional tons of nitrogen, phosphorous, and potassium-based loadings to US water each year.

Mexico Impacts

For Mexico, the principal potential environmental impact of the loss of a significant share of its domestic maize market to the U.S. is the threat to agrobiodiversity. Mexico is the center of origin for maize and its wild relative, teosinte. Over 40 distinct native varieties – or landraces – can be found in Mexico, the product of several thousand years of selection by farmers in the region. Despite industrialization and urbanization, some 20 percent of Mexico's economically active population grow maize, most on small to medium-sized plots in difficult environments and using low levels of modern technology, such as tractors, chemical inputs, or improved varieties. The agrobiodiversity they maintain is not only the source of their principal nutrition

and the center of Mexican culture, it is also a global resource, key to crop-breeding to meet evolving demands for corn varieties around the world.

Trade threatens Mexican maize diversity in two ways. First, and most important, the flood of imports from the U.S. has brought producer prices down nearly 50 percent, increasing economic pressure on marginal maize farmers. If they leave the land or leave maize, the traditional knowledge and practices that sustain this resource will go with them. While many – including some in the Mexican government – predicted NAFTA would lead to an exodus from maize, this has largely not occurred. Data suggest that production has remained relatively constant, and even increased in some of the states dominated by traditional production.

While this has caused some researchers to conclude that there is no threat to agro-biodiversity, our research suggests that such data mask long-term dangers. Though production is up in some agricultural areas of high diversity, so is migration to other parts of Mexico, as family members leave to find paying work elsewhere. This may suggest we are seeing only a delay in the threatened loss of maize diversity.

The second threat to maize diversity is the contamination of traditional fields by GM corn from the United States. Mexico has banned the cultivation of GM maize since 1998. Yet studies have verified the presence of Bt and herbicide tolerant transgenic traits in traditional landraces in several states, leading to widespread fears that such gene flow from GM varieties to landraces may be more rapid and widespread than previously thought. It is widely assumed the contamination came from US grain, which enters Mexico unsegregated and with no label and is distributed in rural areas as food by a government anti-poverty program. Unwitting farmers experimented with the grain as seed, and the pollen contaminated traditional varieties.

An exhaustive study by the North American Commission for Environmental Cooperation (NACEC), the agency set up by NAFTA's side agreement, is underway. A preliminary draft of the report suggests that the threat to maize diversity is neither imminent nor negligible, and many are calling for precaution in the regulation of U.S. imports.

Conclusion

The case of Mexican maize clearly calls into the question the wisdom of across-the-board agricultural trade liberalization. Looking at Latin America, there are clearly other crops and countries that share Mexico's status as a center of important genetic diversity for traded food crops. Potatoes in the Andean highlands would be a clear example. Positive environmental externalities are present in many traditional forms of agricultural production, from low chemical use to soil stabilizing farming techniques. Where traditional production continues to be a significant part of Latin American

agriculture, it is important to assess the environmental benefits of such activities before throwing such producers into unmediated competition with their more industrialized, pollution-intensive counterparts.

If agro-biodiversity is a common global good that is worth preserving, and if the market is unlikely to internalize these benefits any time soon, then non-market mechanisms will be needed to shelter such sectors in the economic integration process. In the end, tariffs may prove the best way to protect environmentally valuable farm sectors.

On the positive side, trade creates growing demand for some agricultural products, such as feed grain, corn sweetener, and corn flour in the case of Mexico. This demand has been largely filled by imports from the United States. But a different set of trade arrangements and government policies could allow rising demand to serve as the economic stimulus to improve the livelihoods and long-term economic prospects of traditional farmers.

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<http://ase.tufts.edu/gdae/pubs/rp/DP04NadaWiseJuly04.pdf>

BRAZIL

Environment, Development, and Technical Barriers to Trade

*Luciana Togeiro de Almeida, Mario Ferreira Presser, and
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Since the early 1990s, Brazil has accelerated the pace of economic liberalization. The reforms, however, have failed to promote the dynamic integration of the Brazilian economy into the world economy. Economic growth has been slow and the country's export profile has been reinforced rather than altered by the new policies. This has adverse consequences for sustainability, as many manufacturing and agricultural export industries in Brazil continue to be potentially environmentally damaging. Brazil's comparative advantages are based on the intensive use of natural resources and energy. In agriculture, soy production nearly doubled in the second half of the 1990s, putting added pressure on fragile lands. Brazil's more dynamic export sectors – steel, mining, pulp and paper, chemicals, petrochemicals – are potential large-scale polluters.

As Brazil becomes more dependent on global markets, it becomes vulnerable to the imposition of environment-related technical barriers to trade. Overcoming these barriers is a significant challenge for Brazil, though the potential remains to improve environmental performance and develop needed institutions to ensure more sustainable practices.

Liberalization, Growth, and Exports

Economic liberalization has not had the desired impacts on economic performance in Brazil. Per capita income has stagnated around the same level as during the 1980s – less than US\$3,000 – and the country suffers the hemisphere's highest levels of inequality. Unemployment has remained high, around 8 percent in the main metropolitan areas.

From an environmental standpoint, the Brazilian economy's disappointing response to liberalization suggests that the most important concern is not the increasing scale of economic activity, since there has been so little growth. Still, the weakness of the economy has limited the political space of environmental interests, which have become more marginalized as increasing the country's export-surplus became one of the top economic priorities.

The composition of Brazil's exports has not been transformed by liberalization; instead old patterns have been reinforced. Brazil's share in world exports of manufactured goods remained essentially unchanged (around 7 percent) between 1980 and 1997, while its share in world manufacturing value-added dropped from 2.9 percent to 2.7 percent. This

has important implications for the environment. In manufacturing, export-oriented industries have been shown to be more pollution-intensive than industries producing for the domestic market. While there is some evidence that major Brazilian exporters have a better environmental record than domestic companies producing for the domestic market, some studies suggest otherwise. Though large firms tend to have better environmental management than smaller firms, neither production for export nor the foreign origin of capital have been shown to guarantee strong environmental performance.

While most studies have focused on the manufacturing sector, agribusiness merits greater attention than it has received. It has experienced more dynamic export growth in recent years, particularly soy, meat, coffee, and sugar. While this trend has economic benefits, the potential adverse environmental impacts are also quite significant. For example, the chemical intensity of production has increased dramatically, with fertilizer use per hectare growing 86 percent from 1992-2000. Between 1997 and 2000, pesticide intensity increased 22 percent. This has widespread environmental impacts on soil, water, and biodiversity, among other areas.

One exhaustive study of the environmental impacts of soy expansion highlights some of these problems. Between 1995-6 and 2001-2, soy became Brazil's main export crop, with production increasing from 23 million tons to 40 million tons. Cultivated land in soy expanded from 11 to 16 million hectares. Much of this expansion has been in the Cerrado region, with heavy environmental impacts. Deforestation is a major problem as vital forest land is cut down to make way for intensive soy operations. This is exacerbated by the construction of large-scale transportation infrastructure – soy export corridors – that cause deforestation and encourage further expansion of the agricultural frontier into the Amazon region. Soy farming itself is intensive in its use of chemical inputs with potentially undesirable impacts on soil and water. Additional concerns have been raised by the recent government decision to allow the provisional release of transgenic soy. There is considerable controversy over possible risks of such crops to human health; the adoption of GM soy may also jeopardize part of the country's international market share, particularly in the case of the European Union.

Environment-Related Technical Barriers

Technical standards and regulations – which are regulated by the Sanitary and Phytosanitary (SPS) and Technical Barriers to Trade (TBT) agreements of the WTO – are among the most controversial issues in international trade. For Brazil, as for many developing countries, such standards and regulations can pose a substantial barrier to exports, as they often impose higher technical requirements and production costs than producers in developing countries can meet. Primarily imposed by developed countries, many are

based on legitimate environmental, health, and safety grounds, but developed countries can easily use them to prevent market access and protect domestic producers.

Many of these technical barriers to trade are environmental in nature. Over three-fourths of the 5,000 products traded in 1999 have had at least one environment-related barrier notified to the WTO, while nearly 2,000 products – mostly agricultural and food products – have had environmental barriers notified by at least five different countries. These products accounted for only 14 percent of the value of foreign trade in 1999, suggesting that these standards may be serving as protectionist trade barriers. Some of Brazil's key exports are affected by international environmental standards, particularly agricultural commodity exports, including fruits, vegetables, livestock and meat, fish, tropical woods and organic products.

A number of external and internal factors contribute to the difficulties that Brazil and other developing countries face in overcoming these barriers. External factors include the escalation of standards; the high costs of national participation in the international processes of standardization; the slow adoption of technical equivalency by importers in cases where there is no international standardization; the inability of the WTO to resolve implementation problems of the SPS and TBT agreements thus far; and new restrictions associated with negotiations in other fields, such as agriculture, services, TRIPS and the relationship between the WTO and multilateral environmental agreements.

Internal factors generally revolve around the lack of effective domestic institutions. These include a low level of capacity to implement an effective standards system; a lack of technical support from government institutions; a lack of action and coordination by relevant institutions; low domestic standards and a lack of conformity with international standards; and poor dissemination of information to companies, particularly small and medium-sized enterprises. While some efforts have been made to improve services to exporters, particularly by INMETRO, Brazil's responsible government agency, substantial institutional challenges remain.

Recommendations

The area of technical barriers to trade is one in which greater cooperation between environmental and trade constituencies would be mutually beneficial. The participation of environmental stakeholders in discussions of environmental barriers to exports could facilitate challenges to illegitimate or unjustified barriers. In cases where the requirements are legitimate, such stakeholders could assist in building national capacity to meet environmental requirements. Finally, their participation would benefit efforts to enhance

sustainability by refusing political support for exports that are environmentally unsustainable.

This is only one example in which strong domestic institutions must be nurtured to assist in achieving both economic and environmental ends in a context of economic liberalization. Brazil needs to develop domestic standards and assessment systems that are consistent with international standards and acceptable to importing countries. Brazil also needs to participate more fully in the international standardization bodies, make use of the technical assistance and cooperation clauses of the SPS and TBT agreements, and cooperate within Mercosur in order to harmonize technical and sanitary regulations. Improvements in regulatory and institutional capacity are also needed in promoting more sustainable industrial development.

The growing demand for Brazilian agribusiness products presents its own daunting set of problems. The pressures on the agricultural frontier are likely to continue, but the Brazilian government can do a better job managing agricultural expansion. A comprehensive land-use plan, for example, could identify zones in which expansion is encouraged, such as land already cleared but abandoned, while restricting agricultural development in environmentally sensitive areas.

Brazil also needs to ensure that the expansion of primary exports such as soy lead to higher value-added production in processing industries. This is highly relevant to international negotiations. Tariff escalation by developed countries on processed goods encourages the continued dependence on primary goods. Reducing tariff escalation in negotiations over market access would have both economic and environmental benefits. With Brazil's population suffering from slow economic growth and high inequality, proposals that foster both economic growth and environmental protection stand the greatest chance of winning popular and government support.

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<http://ase.tufts.edu/gdae/pubs/rp/DP01TogeiroyJuly04.pdf>

BRAZIL

Trade, Foreign Investment, and the Environment

Carlos Eduardo Frickmann Young

Like the majority of nations in Latin America and the Caribbean, Brazil has experimented with neoliberal trade policies for almost two decades. Also consistent with the rest of the hemisphere, these policies have been very controversial. Proponents of the policies have argued that trade and investment liberalization have enabled a more efficient allocation of economic resources in Brazil and have subsequently spurred technological improvements and economic growth. Critics of the policies point to mass unemployment in industry and growing current account deficits to argue that neoliberal trade policies are causing a de-industrialization of the Brazilian economy and a return to natural resource dependency.

A topic that has received relatively little discussion has been the impact of Brazil's trade policies on the environment. On a theoretical level, there has been concern that environmental regulations in developed countries would hurt the competitiveness of developed country firms, and thus prompt them to re-locate to developing countries with lax environmental regulations once a trade agreement was signed with such a developing nation. Little attention has been given to these concerns from a developing country perspective, such as Brazil's. This study is one of the first to ask whether trade liberalization has resulted in a specialization of pollution-intensive industry in Brazil. Secondly, the study determines the extent to which pollution control-mitigation efforts in Brazil would affect the competitiveness of Brazilian exports.

This study finds that Brazil's export manufacturing sector has become significantly more pollution-intensive than other parts of the Brazilian manufacturing. Interestingly, however, it is also found that the direct costs of introducing pollution control in Brazil's export sector are relatively small. Indeed, many export-oriented firms in Brazil see environmental improvement as an opportunity to gain more market share in the global economy. Based on these findings, I conclude that unbridled liberalization in Brazil will not lead to automatic environmental improvement. Brazil should construct a viable environmental policy that can enable economic growth and environmental improvement.

Analyzing the Pollution Intensity of Brazilian Exports

In this section, the air and water emissions intensity of the Brazilian economy is measured by combining input-output tables prepared by the Brazilian

Institute of Geography and Statistics with three different sets of pollution coefficients. First, the pollution intensity of Brazilian exports is calculated for the period 1985 to 1996 and compared to the pollution intensity of the rest of the Brazilian economy. Second, the pollution intensity of imports is calculated in order to obtain a measure of the “net” levels of industrial pollution due to trade liberalization in Brazil.

The pollution intensity (measured by kilograms of pollutant divided by economic output) of a variety of water and air pollutants is estimated for Brazil. The water pollutants examined are biochemical oxygen demand (BOD) and heavy metals. The air pollutants examined are particulate matter (PM), sulfur dioxide (SO₂), nitrogen oxides (NO_x), Nitrogen Dioxide (NO₂), hydrocarbons (HC), volatile organic compounds (VOC), carbon monoxide (CO), and carbon dioxide (CO₂). Three different measures of these pollutants are considered in the calculations because the reliability of data on pollution in developing countries is often questioned. Using a variety of measures allows one to be more confident in the results.

Regardless of the measure, Brazilian exports became more pollution intensive for all but two of the air pollutants, VOC and NO₂. Interestingly, the increase in the pollution intensity of exports coincided with an overall decrease in the pollution intensity of the Brazilian economy as a whole. In other words, the export sector has become much more pollution-intensive than the economy as a whole; the composition of Brazilian manufacturing exports has shifted toward industries that are much more polluting. The main export sectors in Brazil that are the source of such heavy pollution are the metallurgy (which serves as an input to Brazil’s important auto industry), pulp and paper, footwear, chemicals, and food processing industries.

The pollution intensity of Brazil’s imports over this period is also calculated (and then subtracted from the pollution intensity of exports) in order to determine the “net” effect of trade liberalization on pollution in Brazil. In the counterfactual sense, although Brazil’s export sector is becoming increasingly pollution-intensive, imports from less-pollution intensive sectors may be “avoiding” (or saving) the possibility of even more pollution. Interestingly however, in the case of every pollutant studied here the pollution intensity of exports outweighs that of imports—implying that the “net” effect of trade has worsened in Brazil over this period.

Environmental Regulation and the Competitiveness of Brazilian Exports

The analysis described above clearly points to the need for increased environmental protection in the Brazilian export manufacturing sector. But will such environmental regulation hurt the competitiveness of Brazilian exports? We estimated the extent to which increased environmental abatement costs

for water pollution would affect the competitiveness of Brazilian industry. We also assess the capacity for environmental innovation in Brazilian industry.

Increasing environmental protection in the Brazilian export sector would not have a major impact on the Brazilian export competitiveness. Using abatement-cost data from the Brazilian government and World Bank, the cost of emissions control was calculated for the fifty, seventy-five, and one hundred percent removal of BOD and heavy metals from Brazilian export industries. We found that the majority of sectors would only experience a cost increase between zero and three percent of value-added production. Even when all the pollution is removed (the 100 percent scenario) the average cost increase is lower than one percent of value added. Only the base metals and footwear sectors would experience cost increases over three percent—implying that those sectors that would see a loss of competitiveness would be limited to a handful of sectors.

Using data on the elasticity of demand for Brazilian exports, the study also calculates the extent to which increased environmental regulation in Brazil would reduce the amount of exports. Given the low costs of environmental control just discussed, the loss of exports due to regulation would not be high—the total loss would remain between one and two percent of total exports.

Whereas the majority of this study examines the composition effect of trade on industrial pollution in Brazil, the final analysis examines the “technique” or “technology” effect by examining the extent to which foreign and export-oriented firms follow different patterns of environmental innovation and compliance than domestic firms. Drawing on a representative sample of 843 firms operating in Brazil, we found that 84.7 percent of them did not see increasing environmental regulation as an obstacle to their operations. Interestingly, national firms were less apt to see environmental regulation as an obstacle than foreign firms.

Regarding environmental innovation, respondents in a much larger survey (over 40,000 firms in Brazil!) were asked whether environmental protection played a part in their firm-level strategies to innovate in general and secondly whether firms made explicit investments to change their production process for environmental protection. Some 40.8 percent of the export-oriented firms responded that environment played a part in their overall innovation strategies, as opposed to only 18.3 percent of domestic firms. Regarding the question of whether firms made explicit research and development efforts for environmental improvements, only 18.7 percent responded positively and close to half of them were export-oriented. These findings imply that although the Brazilian export sector is becoming more pollution-intensive the capacity for innovation is in place to allow improvements.

Conclusions and Policy Recommendations

Trade liberalization in Brazil has resulted in a shift toward more pollution-intensive exports in manufacturing. This poses a grave challenge. Brazil vitally needs growth in exports to support its development goals, but increases in exports are resulting in corresponding levels of pollution that are jeopardizing such development goals. It is essential that Brazil design a series of environmental measures that will increase economic growth and enable environmental protection at the same time. Our analysis of the future costs of environmental protection implies that Brazilian exports will not be significantly affected by environmental mitigation in all but a few sectors. The careful use and design of flexible economic instruments for environmental improvement would be an important first step in the right direction.

The original Brasilia Discussion Paper is available at:
<http://ase.tufts.edu/gdae/pubs/rp/DP02YoungJuly04.pdf>

ARGENTINA

Sustainability in Industry and Agriculture: A Mixed Record

Daniel Chudnovsky

In the early 1990s, Argentina introduced a series of structural reforms liberalizing the economy and promoting foreign direct investment (FDI). Have trade liberalization and FDI contributed to environmental improvements or have these changes come at the expense of the environment?

There are two major theories about trade's effect on the environment. The first, a *win-lose* scenario, posits that trade liberalization leads to economic growth, which, while increasing incomes, also results in an increasing *scale* of economic activity and, therefore, greater environmental degradation. This effect might also be compounded by a *composition* effect, in which countries specialize in more environmentally damaging industries.

The second scenario, on the other hand, is a *win-win* scenario, in which trade strengthens both economic performance and environmental quality. The improvements stem from a more efficient allocation of resources, greater diffusion of environmentally friendly technologies, and rising incomes, which, according to the Environmental Kuznets Curve hypothesis, should actually contribute to progress in environmental quality.

In the case of Argentina, an examination of environmental management practices in manufacturing and the growth of soy production suggest that the results have been mixed. Some progress has been made in the agricultural sector as a result of the adoption of transgenic soy, while in the manufacturing sector environmental improvements have been scattered. These outcomes could be improved by changes in national and regional policies and institutions.

Context

The reforms of the 1990s included the liberalization of trade and investment, as well as a massive privatization program and the Convertibility Plan, in which the peso was pegged to the dollar. These reforms were followed by several years of strong economic growth.

In 1999-2002, the country entered a profound crisis in which GDP declined by more than 20 percent, the country defaulted on its large external debt, the peg to the dollar was abandoned, and unemployment and poverty reached record highs. The country has since resumed economic growth thanks to favorable international commodity prices. However, sustainable growth, employment, and poverty remain key challenges for the country.

In its efforts to address some of these economic challenges, Argentina has been active in the trade negotiations in the FTAA and WTO, with the primary goal of gaining market access for its exports and with concerns over concessions being demanded in the liberalization of services. While Mercosur has foundered in recent years, Argentina finds itself in an emerging alliance with Brazil over several important issues, particularly the issue of subsidies in agricultural trade.

Environmental Management in Manufacturing

One way to assess the environmental impact of liberalization is to examine the importance of highly polluting industries in manufactured exports. In the case of Argentina, trade liberalization does not seem to have generated either a cleaner or a dirtier composition of exports. Both before and after liberalization, Argentina's pattern of exports has been dominated by medium and highly polluting industries, as defined by their toxicity to humans. In 1990, these sectors accounted for 72 percent of the total manufactured exports; in 1997, such industries still represented 69 percent of the manufactured exports.

At the same time, however, fewer of Argentina's exports were subject to international environmental requirements: Mercosur increased in relative and absolute importance as a market for Argentine exports, while developed countries declined in importance until 1999. This reduced pressure to improve environmental standards.

Nevertheless, some firms improved their environmental management practices, in many cases as a result of increased competition. A survey of 32 large firms and 120 small and medium enterprises (SMEs) in 1997 operating in various sectors in Argentina suggests that cost-reducing strategies often included environmental improvements, particularly through better use of resource inputs and waste products.

Easier access to environmental technologies and processes, consumer pressures, and – in the case of transnational affiliates – global corporate policies also contributed to improvements in environmental management. In general, better environmental performance tended to be associated with firms that were larger, export-oriented, affiliated with foreign companies, and that had newer facilities. Despite some improvements in some firms, however, spillovers to other stages in the production chain were weak, and a lack of domestic innovation capacity limited the ability of firms to respond to idiosyncratic environmental challenges.

Overall, environmental performance remained well below the highest international standards. While trade liberalization did not seem to have resulted in declining environmental quality in the manufacturing sector, neither did it appear to have improved it.

Expanding Soy Production

Unlike the manufacturing sector, the agricultural sector saw improved environmental conditions as a result of trade liberalization. This occurred primarily through the widespread adoption of no-till cultivation practices and transgenic glyphosate-tolerant soy. Glyphosate-tolerant soy now constitutes over 90 percent of total soy production, which has itself increased dramatically – from 10.9 million tons in 1990/1991 to 35.0 million tons in 2002/2003. This generated nearly 200,000 jobs during the 1993-1999 period. Soy has become the country's leading export.

Several factors have contributed to this rapid adoption of the transgenic soy, which has not been replicated in the case of other transgenic crops, such as Bt corn and Bt cotton. Costs are lower than for conventional crops, with significant savings in farm management. Unlike in many other countries, there has been broad public support for the adoption of transgenic crops. Likewise, Argentina has not encountered any rejection of the transgenic soy, exported as oil and beans, in its export markets.

In addition, the cost of the seeds to farmers in Argentina has been relatively low. The glyphosate-tolerant gene was first introduced to Argentina when the developer – Monsanto – licensed it to another company. Consequently, when Monsanto sought to patent the gene in Argentina, it was unable to do so, since it had already been released. The company was therefore unable to charge a fee for the technology or restrict the use of the seed, keeping the price low. There is also an active black market for seeds, with 35-50 percent of seeds sold uncertified. In addition, farmers in Argentina have the right to save seeds for their own use. At the same time, the cost of glyphosate has declined as a result of competition among producers. So unlike most transgenic crops, benefits have accrued primarily to farmers rather than to the seed companies. According to one study, GM soy farmers captured over 80 percent of the gains from the technology, compared to less than 20 percent for Bt corn and cotton.

Environmental improvements resulting from these developments have taken two principal forms. The first is a dramatic increase in the use of no-till cultivation practices, which benefit soil fertility and carbon sequestration. The number of hectares under no-till cultivation rose from approximately 300,000 in the 1990/1991 season to over nine million hectares in the 2000/2001 season. Second, while the use of glyphosate has increased significantly, there has been a simultaneous decrease in the use of more toxic herbicides. Consequently, the adoption of transgenic soy has represented a win-win scenario thus far.

There are, however, long-term concerns. First, soil fertility may be unfavorably affected by excessive reliance on a single crop, as has happened since 2001, pushed by high international prices. The Pampas will lose fertility if farmers do not institute regular crop rotations. Second, there are indications

that soy expansion is driving the agricultural frontier into ecologically sensitive areas. Third, research on the long-term impacts of the combination of transgenic soy, glyphosate, and no-till cultivation has been inadequate. Finally, increasing consumer attention to the issue of transgenic products may eventually have adverse impacts on Argentine soy exports.

Conclusion

The experiences of the manufacturing and agricultural sectors in Argentina thus far hold several policy lessons for expanding trade while improving the environment. In particular, while it is critical to keep the economy open to international flows of technology and investment, this must be complemented by the development of endogenous innovation capacity, both for technological development and for the adaptation of environmental indicators and processes to local conditions. To this end, it is important that WTO negotiations extend Article 8 of the WTO Agreement on Subsidies and Countervailing Measures, which permitted certain types of subsidies, including support for research, adaptation to new environmental requirements, and assistance to disadvantaged regions. It is also important to encourage international cooperation and financing for strong institutions and endogenous innovation capacity in developing countries.

International environmental standards and consumer preferences tend to drive environmental management practices. As Argentina's export portfolio includes more trade with Mercosur countries, that trading bloc's environmental policies will play an increasing role in the behavior of Argentine firms. So will consumer preferences abroad, and Argentina's current dependence on GM soy makes the country particularly vulnerable to growing sensitivity around GM products.

Overall, Argentina's experience with trade liberalization shows that, without building adequate institutions and public policies to deal with pervasive market failures such as those related to environment and innovation issues, sustainable development is not possible. While some stringent environmental regulations are in place, enforcement tends to be very lax. Without both regulations and enforcement capacity, there is still the chance that environmental conditions will not worsen, as apparently happened in the cases of GM soy and among large firms improving their environmental management. But these are exceptions that are unlikely to be repeated.

The original Brasilia Discussion Paper is available at:
<http://ase.tufts.edu/gdae/pubs/rp/DP03ChudnovskyJuly04.pdf>

CHILE

Trade-led Growth, Natural Resource Dependence, and Sustainable Development

Nicola Borregaard

Since the Pinochet dictatorship in the 1970s, Chile has carried out neoliberal reforms. Successive governments have promoted exports, reduced tariffs, welcomed foreign investment, and pursued bilateral and regional trade agreements, including the recent U.S.-Chile Free Trade Agreement. Unlike most countries in the region, these reforms have produced rapid growth. Real growth rates in the 1990s averaged 6 percent. Thanks in part to Chile's diverse trade relationships and its maintenance of capital controls – a notable area in which liberalization was limited – the financial crisis in Argentina did not affect Chile to the same extent it spread to Brazil and some other countries in the region.

Foreign direct investment (FDI) grew steadily in the 1990s and reached US\$10 billion in 1999. Over the entire neoliberal period, exports have both increased and diversified. Between 1973 and 2000, export earnings rose 14-fold. At the same time, Chile's historic export dependence on copper declined from 80 percent to half that level. However, the importance of natural resource exports has not declined. In 1997, 89 percent of exports were natural resource based, including apples, wine grapes, salmon and other fish, fish meal, wine, and forest products. From 1974 to 1994, in fact, the Chilean economy de-industrialized, with manufacturing's share of GDP declining from 30 percent to 17 percent. According to one of the studies reviewed here that looked at the environmental "sensitivity" of exports, Chile has among the highest percentages of environmentally sensitive exports (nearly half) and among the lowest percentages of exports from "clean" industries. One calculation indicated that the "eco-efficiency" of the Chilean economy had declined by half from 1973 to 2000; that is, the material input required to produce a unit of GDP doubled.

This raises questions about the environmental sustainability of the reforms. These are compounded by questions about the social impacts of the current economic model, particularly with regard to inequality. These effects have been researched to some extent. This chapter examines and summarizes the main findings in 15 separate studies. The summary and analysis of the existing studies suggest that it would be misleading to draw conclusions with regard to the overall impact of the liberalization process. The studies document both positive and negative impacts in specific sectors. Liberalization has also brought with it structural changes. These are more difficult to identify and they have been studied to only a limited extent.

Effects of Liberalization on Environment and Development

Studies of the impacts of liberalization on environmental sustainability have generally focused on the effects of trade liberalization on specific sectors of the Chilean economy. Detailed studies have been done on mining, forestry and timber board, fish meal, agro-industry, and freight transportation. Some have looked only at Chile, while others have included several countries and some have looked at the region as a whole. Two of the studies reviewed here looked at the effects of foreign versus domestic investment in mining and forestry. Most of these so-called Sustainability Impact Assessments took an *ex post* approach, examining the effects of past policies rather than projecting future effects using economic modeling techniques.

In general, the studies suggest that negative impacts have been related to increased production and thus increased pressure on the environment, whereas positive impacts were derived from regulatory upgrades and soft-technology transfer. Structural changes, on the other hand, have been more ambiguous impacts. These include changes in the scale of individual operations, changes in the industry structure – with a tendency towards an increase in the size of the companies – and changes in the production structure. Two sectors illustrate these different effects.

Mining – Environmental costs absorb most of the benefits of mining exports, but not necessarily all. Trade liberalization led to changes in the structure of the mining sector and increased scale effects on the environment, particularly for residue deposits, abandoned mines, and water scarcity. Yet improvements in the regulation and technology reduced overall pollution-intensity. Both were associated with liberalization and increased foreign investment – more than US\$12 billion in the 1990s – in the sector, which brought technology transfer, improved management practices, and the harmonization upward of environmental standards. Still, long-term environmental costs of this non-renewable resource extraction are likely to be significant, particularly as mine abandonment leaves a heavy environmental legacy.

Forestry – Chile opened the sector for foreign investment and created incentives for private investment in the forest sector, creating significant scale effects on the environment. While significant FDI came into the country, there were not notable differences in environmental management between foreign and domestic firms. Export markets, however, increasingly create new demands for environmental improvements. The Clean Development Mechanism, related to climate change programs, has had some positive impact on forestry practices. So has certification under the Forest Stewardship Council, an increasing necessity in export markets. Environmental organizations succeeded in blocking two large investment projects directed at the exploitation of the native forest.

While these are not the only important sectors studied, they are indicative of a pattern that involves some improvements in environmental management practices and technology in export sectors, but scale effects that put added pressure on the environment despite the improvements. The assessments are focused on environmental aspects and mention only marginally potentially important social impacts such as the danger of intensifying the precarious circumstances faced by small farmers, fishing communities, and the forest-based Mapuches.

Conclusions and Policy Recommendations

Effectively addressing the social and environmental challenges that have arisen in the context of liberalization in Chile will require a more comprehensive approach and one that identifies and addresses the structural changes brought about by the liberalization process. First, Chile must address its continued dependence on primary material exports, determining whether it is desirable to do so, and, if not, how value-added production can be increased. Second, the country must examine the role of small and medium-sized companies in different productive sectors. Third, Chile must exploit the ways in which liberalization can spur innovation for more sustainable production and products. Finally, Chile needs to expand its institutional capacity to direct the development process in more sustainable directions.

Chile's experience was found to be quite representative of other countries in the region. A study of changing export structures in nine countries – Chile, Argentina, Bolivia, Brazil, Colombia, Costa Rica, Jamaica, Mexico and Peru – found that the export structure of all countries after liberalization increased pressure on the environment. Exports increased three-fold or more in primary products and in products from “dirty” industries. The same study found that trade-led growth did not automatically improve environmental practices, but did so only when strong environmental policies and enforcement were combined with trade policy to foment sustainable practices. Another study emphasized the need to harmonize environmental standards, internalize environmental costs, and promote monitoring, planning, and research.

For Chile, a key focus should be the development of a government policy for sustainable development that is a product of all of the government ministries and focuses on the strategic issues facing the country. There is a pressing need for improved land management, for instance, to address the challenges associated with large investments, as well as the rights of indigenous people. Regulations are currently inadequate to deal with the environmental impacts of growing export sectors. Social aspects of sustainable development need to be integrated into impact assessment studies and into strategy discussions. In addition, there is a need for a better understanding of the drivers of innovation and value-added production, as well as the sustainability

implications of a dependence on primary product exports. Reaping the benefits of liberalization has to be facilitated for environmentally and socially benign products, a challenge that involves preparing national institutions for standards, certification, and accreditation for sustainable products.

Chile has been one of the few countries in the region to see significant economic growth from the trade-led, export-oriented, neo-liberal development model. Unfortunately, this economic growth has not automatically led to environmental and social sustainability. The studies reviewed here suggest that foreign influences through trade can have positive impacts on the environment, but this will only happen if the government has sustainability as a goal and develops the strategy and capacity to direct the development process.

The original Brasilia Discussion Paper is available at:

<http://ase.tufts.edu/gdae/pubs/rp/DP05BorregaardJuly04.pdf>

LESSONS AND RECOMMENDATIONS

What lessons can be drawn from these related but disparate studies of the sustainability impacts of economic reforms in Latin America? Based on these experiences, what concrete policy changes are recommended? And what do these cases imply for current trade negotiations?

These questions were the subject of an extensive roundtable discussion among Working Group members in Brasilia, as well as subsequent discussions in collectively drafting this chapter. As noted earlier, with the exception of Chile, economic growth rates have been quite low for countries in the region. Slow growth rates, economic crises in many countries, and generally worsening distribution of income in the region have combined to make the social aspects of sustainability worse.

Perhaps the one benefit of slow growth is that the demands of economic activity on the environment, which generally increase with the scale of activity, have grown more slowly than they would have with faster economic growth. Still, rates of pollution continue to worsen.

In addition to scale effects, trade and environment analysts examine two other types of impact. Composition effects relate to the changing composition of economic activity, with increases in some economic sectors and decreases in others creating changing demands on the environment. It is generally assumed that economic development leads in the long run to beneficial composition effects as economies shift more toward services and away from more damaging natural resource sectors and industry. The technique effect refers to changing environmental impact from technological change, for example, the adoption of cleaner, modern industrial equipment. This, too, is generally assumed to improve with economic development.

On average, countries in Latin America and the Caribbean experienced positive composition effects, meaning that the composition of industry shifted toward “cleaner” production. However, pollution in Latin American industry is increasing because nations in the hemisphere lack the proper policies to stem the environmental consequences of trade-led growth in those sectors. In addition, many firms lack the will or ability to adhere to the environmental ramifications of their operations and non-governmental organizations have not always been there to apply appropriate pressure. Of the case studies conducted here, Brazil has actually experienced a general increase in pollution-intensive activity, whereas Mexico follows the general trend.

Reinforcing Resource Dependence

Latin America's comparative advantages include inexpensive labor in some areas and natural resource abundance in general. The trade-led model of development in the region has reinforced these patterns, with significant implications for the environment. Governments now face important challenges to their ability to manage natural resources in the face of the globalization process.

Chile has seen the strongest economic performance and has developed the most diverse trade relations, yet its strong export performance continues to depend on natural resources – copper, agriculture, and fish and other coastal products. All have significant environmental impacts. Brazil and Argentina have seen the most dramatic export growth in agriculture. While Argentina's soy expansion may bring some possible environmental benefits, Brazil is experiencing a soy boom that is imposing high environmental costs. Central America, too, has seen demand increase for the agro-exports that impose the highest costs on the environment.

Some compositional economic shifts have had positive environmental benefits, perhaps in ways unforeseen by trade negotiators. Certainly El Salvador's shift from an agro-exporter to a labor exporter represents one of the more sizable compositional shifts in this report. This is not an isolated phenomenon. Mexico and other countries in Central America and the Caribbean are exporting labor at an increasing rate while growing more dependent on migrants' remittances for foreign exchange. In El Salvador, there have been positive environmental impacts of this shift as land-use pressure has eased, yet there are new environmental costs associated with urban growth. It is noteworthy that trade negotiations continue to focus only on liberalizing the flow of goods, services, and capital, excluding labor. Yet migratory flows continue to rise, as labor markets seek international equilibrium despite Northern trade negotiators' reluctance to address the issue.

Mexico's shift from a resource-based economy – oil and agriculture – to export-oriented manufacturing represents the one case in this report in which development followed its predicted linear evolution toward industry and services. As Gallagher's study notes, this shift has not produced a widespread pollution-haven effect, with U.S. firms shifting their dirtiest production to Mexico. Unfortunately, the shift toward export-oriented manufacturing has not generated the predicted reductions in pollution intensity because Mexico has not put the proper environmental policies in place. In Brazil, liberalization has reinforced a specialization in pollution-intensive exports.

Technical Change a Mixed Blessing

One of the reasons the pollution intensity of industry has not decreased is the disappointing contribution of foreign investment to cleaner technologies. In Mexico, foreign investment has only brought such improvements in industries where new core technologies are required, such as steel. Where so-called end-of-pipe pollution controls are needed, weak Mexican environmental enforcement has allowed both foreign and domestic industrial firms to avoid environmental investments. Notably, the foreign firms show no higher tendency to impose strict environmental standards.

In Argentina, Chudnovsky found some limited evidence that foreign firms place greater emphasis on environmental management practices, but he notes that small and medium-sized enterprises (SMEs) remain unaffected by such changes. As with most countries in the region, SMEs remain the most important in terms of production and employment. Similarly in Brazil, Young found that 41 percent of the export-oriented firms responded that environment played a part in their overall innovation strategies, as opposed to only 18 percent of domestic firms.

Technical change does not always move economic activity toward more sustainable practices. Agriculture is a case in point. While a unique set of circumstances may have allowed Argentina's wholesale adoption of GM soy production to contribute some net environmental benefits, new technologies for genetic manipulation in agriculture can have direct negative impacts in other areas. To the extent GM soy helps Brazil expand its soy cultivation, this puts added pressure on sensitive lands. The contamination of traditional maize fields in Mexico with imported GM corn from the United States has raised concerns about the new technology's impact on agro-biodiversity.

In general, agriculture is a sector in which less sustainable, intensive agricultural practices tend to displace more sustainable, traditional techniques. As Nadal and Wise note, the net environmental impact of NAFTA on North American corn has been negative, as Mexico's biodiverse, low-input producers see their production supplanted by chemical- and water-intensive U.S. producers. Similar dynamics are at work in Central America. As Murillo and Pomareda point out, export demand is increasing production in those crops that impose the highest environmental costs, such as bananas, melons, intensive hog and poultry production, and sugar cane.

Changing Directions

Given the disappointing track record on sustainable development in Latin America, what policy changes do these studies suggest? Perhaps the most important is also the most obvious: An economic model premised on unmanaged liberalization poses significant perils for countries in the region. It is worth questioning the prevailing assumption that trade and investment

liberalization will lead to economic growth, and the related assumption that such growth will naturally lead to environmental improvements. These studies, and the extensive literature on which they are based, suggest that such assumptions are deeply flawed.

Many citizens, and some governments, are now questioning the wisdom of these assumptions and some of the policies that flow from them. In terms of the environment, one of the consistent findings in these studies is that domestic institutions have been inadequate to the task of ensuring that development be as sustainable as possible. The authors found that while environmental legislation is relatively strong, enforcement is weak. Such government failure relates to weak institutional development, one consequence of the tendency of these reforms to weaken government capacity to manage social and economic programs. This affects everything from regulatory capacity to inter-departmental cooperation, from agricultural extension services to institutions to foster innovation. These studies highlight both the costs of such policies and some of the ways in which proactive efforts to protect the environment can further growth and development. Environmental policies can indeed foster growth rather than detract from it.

One of the clear lessons for developing countries is that there is significant risk to signing trade agreements that mandate deep integration without putting in place the domestic institutions to address the environmental consequences of such agreements. Mexico stands as a clear case in which the government was unprepared to address the environmental impacts of liberalized trade and investment. The useful but limited contribution of the North American Commission for Environmental Cooperation, set up by NAFTA's environmental side agreement, suggests that developing countries should demand significant support from their industrialized trading partners to develop such institutional capacity. As Togiero's study of Brazil's capacity to deal with technical barriers to trade shows, trade itself imposes capacity demands on developing countries that industrialized nations should help address.

Finally, these studies suggest that one of the more troublesome aspects of most trade agreements is the extent to which they reduce governments' ability to direct the development process toward sustainability. From the WTO to NAFTA, from the proposed FTAA to CAFTA, trade agreements proscribe some of the tools that have proven most effective in promoting and distributing the gains of development. These same tools – performance requirements on foreign investment, technology agreements, broad social and environmental policies – are critical to making development sustainable. Developing country governments still have a wide range of tools – many unused – in their development toolbox, even under deep-integration agreements. But governments should be wary of agreements that take more of those tools out of their hands.

The studies in this report highlight the social and environmental costs of the present approach. They also point to some of the ways in which national policies and international trade agreements can be transformed to better meet societies' goals.

About the Working Group on Development and Environment in the Americas

The Working Group on Development and Environment in the Americas, founded in 2004, brings together economic researchers from several countries in the Americas who have carried out empirical studies of the social and environmental impacts of economic liberalization. The Working Group's goal is to contribute empirical research and policy analysis to the ongoing policy debates on national economic development strategies and international trade.

The Working Group held its inaugural meeting in Brasilia, March 29-30, 2004. Further information, as well as the full papers on which the country studies are based, can be found on the Working Group's web page: <http://ase.tufts.edu/gdae/WorkingGroup.htm>.

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