CHAPTER 8
Trade and Environmental Linkages for Food and Agriculture

This chapter provides a brief discussion of the issues relating to food and agriculture in the trade and environmental policy field. First, we focus on an overview of the trade, environment, food, and agriculture nexus, and second we discuss results from a specific study on trade and environment linkages in the context of economic integration in the Western Hemisphere.[7] While the results of the study are illustrative only, they do provide a perspective on the trade and environmental effects of expanding regional or global integration. More extensive discussions can be found in Eglin 1995, Esty 1994, Krissoff et al. 1996, Rege 1994, Runge 1994, and Schlagenhof 1995.

Much of the trade and environment policy debate stems from concerns expressed by environmental, consumer, and business organizations. Environmental and consumer groups (Greenpeace, Sierra Club, and Public Citizen, for example) have generally expressed support for a closer scrutiny of the environmental impacts of multilateral and regional trade policies and an international consensus with their recommendations on conservation, sustainable development, and safer and healthier products. These organizations decry the allegedly negative environmental effects of shifts in production and trade due to trade liberalization. Also, some environmental groups worry that international trade agreements will encourage harmonization of environmental policies at lower national standards than those currently in force in industrialized nations. Finally, some environmental and consumer groups favor the use of trade instruments to achieve their environmental policy goals.

[7]For more information, see Gray, Krissoff, and Tsigas, 1995.

Business groups, including some farm and food organizations, also have expressed concern that domestic environmental regulations will impair their international competitiveness. If environmental regulations increase domestic costs of production, they argue, competing exporters should face similar constraints. A related issue of concern to food processors is the lack of standardization for labeling and packaging among countries. Industry groups wonder if different foreign standards are covert trade barriers. Harmonization of labeling and packaging standards, including "ecolabeling," has been raised at international forums as a means of addressing perceived unfair competition.

Multilateral and Regional Trade Accords

Since 1947, when the General Agreement on Tariffs and Trade (GATT) Articles were adopted by contracting countries, several rounds of GATT negotiations have lowered barriers to trade among an increasing number of countries to promote trade, economic growth, and full use of resources (Preamble, GATT 1947). Trade-related environmental matters, however, are not explicitly covered in the GATT Articles, although Article XX is an exception.

Article XX furnishes signatories with 10 exceptions to GATT's guidelines aimed at limiting trade restrictions. Trade measures that fall under Article XX are permitted on the condition that they "are not applied in a manner which would constitute a means of arbitrary or unjustifiable discrimination between countries where the same conditions prevail, or a disguised restriction on international trade." Article XX subparagraphs (b) and (g), respectively, relate to measures that are "necessary to protect human, animal, or plant life or health" and measures for "the conservation of exhaustible natural resources if such measures are made effective in conjunction with restrictions on domestic production or consumption." Additionally, the latest round of negotiations, the Uruguay Round, established rules on issues relating to food, health, and safety standards (see chapter 7).

The United States, Canada, and Mexico reached two regional accords with environmental provisions: the North American Free

Trade Agreement and the North American Agreement on Environmental Cooperation (NAAEC). In addition, the United States and Mexico agreed to establish a Border Environmental Cooperation Commission (BECC) and a North American Development Bank (NADBank). Together these agreements contain a wide array of provisions to encourage economic growth and to promote cooperation to improve environmental conditions throughout North America. NAFTA establishes the importance of international environmental agreements; renounces the relaxation of health, safety, and environmental measures for attracting foreign investment; addresses food safety, animal and plant health concerns, and other product-standard issues; and is sensitive to environmental issues in dispute settlement provisions. Contracting parties in NAFTA have also agreed to examine or monitor the environmental impact associated with post-reform changes in crop mix, regional production patterns, land and variable farm input use, and trading patterns. An Economic Research Service/USDA report details changes in primary and processed agricultural product trade after the first year of NAFTA.

In December 1994 the democratically elected leaders of the Western Hemisphere countries met in Miami to discuss further economic integration in the Western Hemisphere. Among their objectives were reduction in trade and investment barriers, economic growth, and improvement of environmental quality. While the prospects of negotiating an expanded Western Hemisphere integration are not clear, the potential for further economic integration has spurred the development of domestic institutions that regulate and enforce environmental laws in Latin America. These include:

• Mexico established new norms, especially with respect to emissions of dangerous waste materials, to be brought in line with other OECD countries (*International Environmental Reporter*, 1995).

• In 1990, Chile established the National Commission on the Environment, and in 1994 the Basic Law on the Environment gave

the Commission authority to establish and coordinate national environmental standards.

• In Brazil, the ministries of the Environment and Agriculture are preparing guidelines for environmental regulations for farmers. The regulations will mainly focus on the prevention of soil erosion (*International Environmental Reporter*, 1995).

The Food Sector

The Uruguay Round Negotiations, the North American Free Trade Agreement (NAFTA), and extensions to NAFTA now under consideration will lead to a much freer trade regime for food commodities. Many in the food sector support multilateral and regional trade reform because they see increased business opportunities through improved market access to large populations with a potential for growth in per capita incomes. At the same time, freer trade in food commodities will give increased significance to the effects of environmental regulations. They affect production costs and thus may make it difficult for domestic producers to compete with foreign producers who may not face the same environmental policies. Several of these environmental problems are associated with the production, consumption, and disposal of food: loss of top soil, water pollution due to excessive use of chemicals, emissions from livestock operations that damage drinking water and pollute the air, the loss of wildlife and endangered species from extensification of farming and expansion of fishing, atomic radiation of food, packaging regulations for beverages (e.g., bottles versus cans), and disposal of packaging materials.

Several areas of potential conflict between trade and environmental interests may influence the food sector. Most relate to divergent national environmental standards. Some laws do impose the same environmental standards on imports as on domestic products. In some cases, the standards are allowed by the provisions of GATT Article XX or under the sanitary and phytosanitary measures. The legality of other standards, however, has been called into question

and has created conflict among trading partners. U.S. restrictions on harvesting tuna are a prominent example of differences in national standards affecting the U.S. food sector. The U.S. Marine Mammal Protection Act sets dolphin protection standards for the domestic fishing fleet and for imports from international fishing boats that harvest yellowfin tuna in the eastern tropical Pacific Ocean. This has created strife between the United States and countries that export tuna to the United States.

Product packaging and labeling requirements and guidelines for applying such domestic requirements to imported products were not discussed in the Uruguay Round, but these issues have been on the agenda of recent meetings of the WTO's Committee on Trade and Environment. Packaging regulations pertain to the materials used or the handling of the materials used in shipping. These regulations might, for example, require packaging to be recyclable or, if not, to be returned to the country of origin. Labeling requirements might mandate the provision of certain nutritional or other consumer information such as the environmental implications of a product's life cycle. "Dolphin safe" labels on tuna cans are an example of environmental labeling. Other product-related requirements might pertain to the procedures that must be followed for registering a new product, including numbers, types, and results of product tests that must be conducted before a product can be introduced to the market. Both the nature of those requirements and the processes that must be followed differ by country.

Conflicts related to trade and environment are not restricted only to conflicts between developed and developing countries. They also arise in trade between industrialized countries. The European Union (EU) is now considering eco-labeling schemes, in an effort to harmonize environmental regulations across its 15 member states. One of these eco-labels will be awarded to cotton products that meet certain chemical residue criteria. In addition to its effect on EU producers, this policy will have important implications for producers in the United States. In anticipation of similar developments in the future, the Final Act of the Uruguay Round Negotiations established the Committee on Trade and Environment to study the linkages between trade and environmental policies.

Trade and Environmental Policy Reform in the Western Hemisphere

We used a simulation model to analyze the impacts of trade and environmental policy reform in the Western Hemisphere, and its implications for food and agriculture. Table 32, part A shows estimates of pollution emissions (toxic substance release) by the food and manufacturing sectors in the Western Hemisphere.[8] About 80 percent of all pollution emissions are generated by chemical manufacturing and the resource-based industries. Among the food-processing industries, the "other food products" category contributes more pollution than all the other food-processing industries (meat products, milk products, and beverages/tobacco) combined. In the north, food processing accounts for about 1.7 percent of all pollution, and in the south, about 2 to 3 percent of all pollution. Table 32, part B shows regional and sectoral abatement expenditures for the food and other manufacturing sectors in the Western Hemisphere.[9] As with pollution emissions, the chemical manufacturing and resource-based industries account for most of abatement expenditures in the United States and Canada. However, the food-processing industries are estimated to account for a larger share of abatement expenditures than pollution. In the United States, for example, food processing contributes about 1.7 percent of total pollution, but its abatement expenditures account for about 7.7 percent of the total.

In the policy reform scenarios under consideration, the three NAFTA countries (Canada, the United States, and Mexico) form an extended free trade agreement with the MERCOSUR countries of

[8]U.S. toxic substance releases are based on EPA estimates and, for other countries, we assumed pollution intensities similar to those in the United States.

[9]U.S. abatement expenditures are based on EPA estimates and, for Canada and other developed countries, we assumed that there are environmental regulations similar to those in the United States. Although citizens in developing countries value environmental quality, we specified that there are no environmental regulations, due to market or government failures.

Argentina and Brazil.[10] Although this supposition abstracts from discussions with Chile to join NAFTA, it does reflect the inclusion of the five largest countries in the Western Hemisphere. The scenarios simulate:

I. elimination of import barriers for trade between the United States, Canada, Mexico, Argentina, and Brazil, and

II. elimination of import barriers, as in (I), coupled with

[10]The MERCOSUR (Southern Cone Common Market) trade agreement was established in 1991 and, upon completion, will completely integrate the economies of Argentina, Brazil, Paraguay, and Uruguay.

Table 32—Sectoral pollution emissions and abatement expenditures in the Western Hemisphere

	CAN	USA	MEX	ARG	BRZ
A. Pollution emissions					
		Pounds of toxic substance releases			
Resource Based Industries	1517370.	11554900.	499190.	588704.	927089.
Meat Products	7329.	45499.	9889.	6264.	8630.
Milk Products	18575.	107674.	4611.	12217.	14210.
Beverages/Tobacco	5234.	46152.	4923.	7889.	5274.
Other Food Product	35863.	333233.	44288.	38222.	48281.
Clothing	181725.	1371640.	161470.	246289.	336754.
Chemicals	1240670.	10673300.	818583.	995859.	1678970.
Final manufacturing	419403.	3902930.	134574.	125112.	289145.
Total	3426170.	28035300.	1677530.	2020550.	3308350.
B. Abatement expenditures					
			Million dollars		
Resource Based Industries	518.156	4689.100	0.315	0.566	0.445
Meat Products	30.119	222.199	0.075	0.072	0.049
Milk Products	21.223	146.199	0.009	0.039	0.022
Beverages/Tobacco	25.317	265.299	0.044	0.107	0.035
Other Food Products	64.461	711.799	0.147	0.193	0.122
Clothing	34.527	309.700	0.056	0.131	0.089
Chemicals	787.449	8050.500	0.961	1.780	1.498
Final Manufacturing	277.747	3071.600	0.164	0.233	0.269
Total	1759.000	17466.4	1.775	3.124	2.533

Continued—

harmonization of environmental policies. In particular, two harmonization schemes are considered:

II.A. *absolute* harmonization according to which Argentina, Brazil, and Mexico impose environmental regulations that duplicate U.S. environmental regulation, and
II.B. *relative* harmonization according to which Argentina, Brazil, and Mexico impose environmental regulations similar to U.S. standards but adjusted for their own stage of development. Table 32, part D shows the pollution tax rates applied in Mexico, Argentina, and Brazil in this scenario.

The critical factors in determining the impact of regional trade integration are the magnitude of import barriers and trade shares. Table 33 shows import barriers that reflect the level of tariff and

Table 32—Sectoral pollution emissions and abatement expenditures in the Western Hemisphere—cont.

	CAN	USA	MEX	ARG	BRZ
C. Benchmark environmental tax rates					
			Percent		
Resource Based Industries	0.3927	0.4667	0.0007	0.0011	0.0006
Meat products	0.2342	0.2784	0.00004	0.0007	0.0003
Milk Products	0.2571	0.3055	0.0005	0.0007	0.0004
Beverages/Tobacco	0.2806	0.3334	0.0005	0.0008	0.0004
Other Food Products	0.2696	0.3204	0.0005	0.0008	0.0004
Clothing	0.1685	0.2003	0.0003	0.0005	0.0002
Chemicals	1.0352	1.2302	0.0019	0.0029	0.0015
Final Manufacturing	0.2649	0.3148	0.0005	0.0007	0.0004
D.Harmonized environmental tax rates					
			Percent		
Resource Based Industries	0.3927	0.4667	0.0727	0.1106	0.0552
Meat Products	0.2342	0.2784	0.0434	0.0660	0.0329
Milk Products	0.2571	0.3055	0.0476	0.0724	0.0361
Beverages/Tobacco	0.2806	0.3334	0.0519	0.0790	0.0394
Other Food Products	0.2696	0.3204	0.0499	0.0759	0.0379
Clothing	0.1685	0.2003	0.0312	0.0475	0.0237
Chemical	1.0352	1.2302	0.1916	0.2916	0.1456
Final Manufacturing	0.2649	0.3148	0.0490	0.0746	0.0372

non-tariff barriers in effect during the Uruguay Round negotiations. The United States and its partners tend to have greater import protection rates in the food sector than in other sectors. U.S. food sector rates vary from an ad valorem equivalent high of 100 percent in milk products; to 18 percent in meat products; 4 to 15 percent in beverages and tobacco; and 7 percent in other food products. Canadian import protection placed on U.S. milk and meat products is also large, 136 and 22 percent, respectively. Among the other Western Hemisphere trading partners, Brazil has the highest level of tariff equivalent rates on U.S. food products, ranging from 25 to 85 percent, followed by Argentina and Mexico, with protection rates ranging from 3 to 18 percent.

Results from integration scenario (I) indicate that regional trading patterns are promoted with liberalization. Of the food sectors, the United States mainly increases its exports in meat, milk, and other food products, totaling approximately $1.2 billion (table 34). Exports are mainly fresh or frozen bovine, chicken, turkey, and pig

Table 33—United States - trading partners bilateral import barriers

	U.S. protection				Trading partner protection			
Product	CAN	MEX	ARG	BRZ	CAN	MEX	ARG	BRZ
	Percent							
Grains	7	4	4	4	13	20	17	11
Non-grain crops	8	19	7	7	36	1	14	51
Livestock	18	18	15	18	21	2	18	1
Resource-based industries	1	1	3	2	5	9	21	2
Meat products	18	18	18	18	22	5	12	30
Milk products	100	100	100	100	136	10	10	36
Beverages/ tobacco	15	4	6	11	7	18	10	85
Other food product	7	7	7	7	7	3	16	25
Clothing	11	15	12	11	21	17	38	60
Chemicals	6	8	6	16	10	6	21	11
Final manufacturing	3	4	5	4	8	12	26	29
Services	0	0	0	0	0	1	0	0

meats; nonfat dry milk, butter, and cheese (mostly to Mexico); and fruits, vegetables, and oilseed products. U.S. imports increase across all food product categories, particularly beverages (malt beverages), tobacco, and other food products, for a total of approximately $1.3 million (table 35). Thus, there is a small decrease in the balance of U.S. food trade. This is true for all trade as well.

Table 34—Bilateral and global trading patterns: U.S. exports

	Canada	Mexico	Argen-tina	Brazil	Western Hemi-sphere	All regions
			Million dollars			
A. Base Level - Value of U.S. Exports						
Grains	102	781	5	155	1043	10982
Non-grain crops	1281	774	31	66	2153	11066
Livestock	215	361	5	25	606	2527
Resource-based industries	750	3606	127	728	11712	42005
Meat products	532	629	2	3	1165	4431
Milk products	24	143	2	4	172	411
Beverages/tobacco	131	98	40	5	275	6749
Other food products	1881	975	34	115	3006	11119
Clothing	1918	1559	148	87	3713	13034
Chemicals	14518	6903	662	1330	23414	73193
Final manufacturing	46773	20605	1957	3658	72994	248191
Services	6391	6036	938	1650	15015	135053
All commodities	81018	42470	3952	7827	135267	558759
			Percent change			
B. Scenario I - Change in Value of U.S. Exports						
Grains	37	45	60	43	44	3
Non-grain crops	82	8	52	365	64	11
Livestock	37	14	109	-1	22	3
Resource- based industries	17	27	103	6	21	4
Meat products	70	18	48	176	42	10
Milk products	1481	43	52	203	246	102
Beverages/tobacco	44	110	49	1911	105	1
Other food products	19	9	68	-4	16	3
Clothing	144	101	368	595	145	38
Chemicals	25	20	82	32	26	6
Final manufacturing	26	30	104	137	35	7
Services	2	7	4	-1	4	-2
All commodities	27	27	85	82	32	—

In table 36, the production and trade flow results under the harmonization scenarios (II.A) and (II.B) are very similar to those for the integration scenario (I). Harmonization policies thus appear to have little additional effect on production and trade flows. This happens because the costs of environmental regulation are small relative to total production costs. For the chemical sector, the

Table 35— Bilateral and global trading patterns: U.S. imports

Item	Canada	Mexico	Argen-tina	Brazil	Western Hemi-sphere	All regions
			Million dollars			
A. Base Level - Value of U.S. Imports						
Grains	349	5	11	0	365	495
Non-grain crops	385	1414	52	569	2420	8521
Livestock	1176	385	10	9	1580	2142
Resource-based industries	28330	6769	301	1043	36442	96511
Meat products	679	20	201	58	958	3143
Milk products	17	0	10	0	27	515
Beverages/tobacco	914	290	55	256	1515	5812
Other food products	1589	519	235	671	3015	8914
Clothing	1308	1892	201	1639	5040	56728
Chemicals	15798	3404	269	1597	21069	79391
Final manufacturing	46977	19879	130	1999	68985	286606
Services	12724	6111	158	422	19416	70087
All commodities	110246	40689	1632	8265	160832	618866
			Percent			
B. Scenario I - Change in Value of U.S. Imports						
Grains	19	-2	0	7	18	11
Non-grain crops	28	73	13	23	53	10
Livestock	64	53	35	67	61	37
Resource-based industries	1	-3	5	11	1	2
Meat products	72	63	62	76	70	11
Milk products	1369	1287	1286	1404	1338	46
Beverages/tobacco	100	4	15	76	74	12
Other food products	29	24	19	3	28	7
Clothing	106	133	93	113	118	7
Chemicals	21	35	19	94	29	6
Final manufacturing	22	25	48	42	24	5
Services	-2	-5	-6	1	-3	2
All commodities	17	24	38	59	21	—

environmental abatement operating costs are around 1.25 percent; for food processing they are less than 1 percent.

The environmental implications of trade liberalization are determined by changes in the scale and composition of output. Since output increases with regional liberalization, Western Hemisphere

Table 36—Simulation results for pollution emissions, abatement, and welfare

Scenario/ region	Pollu-tion	Abate-ment	Net pollution	Environ-ment	Other	Total welfare	Welfare[1]
				Percent			
Scenario I: Trade Policy Integration							
Canada	-0.029	1.788	-0.483	0.161	0.228	0.221	1165
USA	0.172	0.266	0.148	-0.049	0.091	0.077	4024
Mexico	0.474	2.308	0.471	-0.157	0.358	0.300	881
Argentina	-0.234	1.424	-0.237	0.079	0.391	0.358	711
Brazil	0.799	0.672	0.800	-0.267	0.508	0.416	1417
OLA	-0.124	-0.015	-0.124	0.041	-0.312	-0.279	-619
ODV	-0.078	-0.117	-0.069	0.023	-0.052	-0.045	-4626
ROW	-0.101	-0.301	-0.101	0.034	-0.091	-0.079	-8173
Scenario IIA: Trade Policy Integration coupled with Absolute Harmonization of Environmental Policies							
Canada	0.004	1.824	-0.451	0.150	0.231	0.223	1173
USA	0.202	0.302	0.176	-0.059	0.092	0.076	4015
Mexico	0.236	65634.	-131.298	43.766	-0.090	0.125	367
Argentina	-0.063	42774.	-85.784	28.595	-0.306	-0.091	-182
Brazil	0.843	85878.	-171.225	57.074	-0.163	0.052	177
OLA	-0.031	-0.378	-0.030	0.010	-0.320	-0.289	-641
ODV	-0.065	-0.102	-0.055	0.018	-0.049	-0.042	-4395
ROW	-0.083	-0.370	-0.082	0.027	-0.090	-0.079	-8148
Scenario IIB: Trade Policy Integration coupled with Relative Harmonization of Environmental Policies							
Canada	-0.024	1.792	-0.478	0.159	0.229	0.222	1169
USA	0.176	0.271	0.152	-0.051	0.091	0.076	4013
Mexico	0.437	10128.	-19.858	6.619	0.289	0.494	1449
Argentina	-0.200	10026.	-20.295	6.765	0.228	0.433	862
Brazil	0.809	10034.	-19.299	6.433	0.431	0.634	2161
OLA	-0.110	-0.246	-0.109	0.036	-0.313	-0.281	-622
ODV	-0.076	-0.115	-0.067	0.022	-0.051	-0.044	-4542
ROW	-0.098	-0.144	-0.098	0.033	-0.091	-0.079	-8183

[1] Change in total welfare in dollar values is measured in million dollars.

partners are more likely to experience increased pollution while non-Western Hemisphere partners, which may have experienced a decline in trade and output, witness less damage. The United States, Mexico, and Brazil endure small increases in pollution while other Latin America, other developed economies, and Rest-of-World regions enjoy a small decrease in pollution (first column in table 36). Argentina realizes a small decrease in pollution as well because the change in the composition of output to less polluting industries outweighs the effect of increased output levels. In all scenarios, the United States and Canada are able to increase their pollution-cleaning activities because more environ- mental tax revenues are collected (second column in table 36).

The economy-wide impacts of policy reform are reported in Table 36 in both percent change and dollar terms (columns 6 and 7, respectively). In scenario (I), all participating countries benefit from regional trade integration. Environmental welfare declines for Mexico and Brazil since pollution is increasing, a result of a liberalized output mix and no change in environmental policies. For the United States, environmental welfare falls because of the change in output mix even though there are increased efforts in pollution cleaning. The change in environmental welfare for the United States, though, is very marginal.

In the harmonization scenarios, Mexico, Argentina, and Brazil experience large increases in abatement activities, as they adopt stricter environmental regulations. In the trade integration and relative harmonization scenario (II.B), environmental and overall welfare increases for the United States, Canada, Mexico, Argentina, and Brazil, with the exception of the U.S. environment. Again, the U.S. environmental welfare change is very marginal. Trade liberalization contributes more of the benefits than the imposition of environmental regulations, although this result is sensitive to model specification. When the Latin American partners implement U.S.-type environmental regulations in scenario (II.A), then overall welfare gains are diminished relative to scenarios (I) and (II.B). U.S.-type environmental regulations lead to substantial gains in welfare from a cleaner environment, but they appear to be too costly for Mexico, Brazil, and Argentina.

Policy Challenges

Trade liberalization in food and agriculture raises concerns regarding differences in environmental regulations among trading partners. With no changes in current national environmental policies, trade liberalization among Western Hemisphere countries is shown to generate net gains as benefits from increased trade in all countries outweigh relatively small increases in environmental degradation in some countries. With harmonization of environmental policies among trading countries at current U.S. standards, pollution abatement activities increase in the region as a whole enough to improve environmental quality relative to the pre-trade liberalization levels without diminishing gains from increased trade. Thus, multinational coordination of environmental regulation further enhances overall gains associated with the removal of restrictive trade policies. However, gains to Latin American countries increase significantly more, at the cost of a relatively small increase in environmental degradation in the United States, if the harmonized policy is somewhat below current U.S. standards.

From a multinational policy perspective, the issue is clear. Analysis yields compelling evidence that international agreement on environmental policy as a part of trade liberalization accords is multilaterally beneficial. But, the unresolved question is, at what level of environmental quality? While overall gains result from stringent requirements, even greater gains to both the region as a whole and to individual countries other than the U.S. result from multinational adoption of standards that are more modest than current U.S. policy. The policy challenge, therefore, is one of enticing other countries to adopt increased environmental regulations that approach U.S. standards while recognizing that respect for national differences may be necessary to reach international accord.