United States
Department of
Agriculture

Forest Service

Pacific Northwest
Research Station

General Technical
Report
PNW-GTR-517
August 2001

Economic and Environmental Effects of Accelerated Tariff Liberalization in the Forest Products Sector

David J. Brooks, Joseph A. Ferrante, Jennifer Haverkamp, Ian Bowles, William Lange, David Darr

Authors

David J. Brooks is a research forester, U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station, Forestry Sciences Laboratory, 3200 SW Jefferson Way, Corvallis, OR 97331; **Joseph A. Ferrante** is Director of Land Use Policy and Environmental Reviews, Office of the U.S. Trade Representative, 600 17th Street, SW, Washington, DC 20508; **Jennifer Haverkamp** is Assistant U.S. Trade Representative for Environment and Natural Resources, 600 17th Street, SW, Washington, DC 20508; **Ian Bowles** is Director of Environmental Affairs, National Security Council, and Associate Director for International Affairs, Council on Environmental Quality, Old Executive Office Building, Washington, DC 20503; **William Lange** is staff assistant, Science Policy Planning, Inventory, and Information; and **David Darr** is staff assistant, Resource Valuation and Use Research, U.S. Department of Agriculture, Forest Service, P.O. Box 96090, Washington, DC 20090-96090.

Economic and Environmental Effects of Accelerated Tariff Liberalization in the Forest Products Sector

A study by the Office of the United States Trade Representative and the White House Council on Environmental Quality

David J. Brooks
Joseph A. Ferrante
Jennifer Haverkamp
Ian Bowles
William Lange
David Darr

Published by
U.S. Department of Agriculture
Forest Service
Pacific Northwest Research Station
Portland, Oregon
General Technical Report PNW-GTR-517
August 2001

Abstract

Brooks, D.J.; Ferrante, J.A.; Haverkamp, J.; Bowles, I.; Lange, W.; Darr, D. 2001. Economic and environmental effects of accelerated tariff liberalization in the forest products sector. Gen. Tech. Rep. PNW-GTR-517. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 70 p.

This study assesses the incremental economic and environmental impacts resulting from changes in the timing and scope of forest products tariff reductions as proposed in the Accelerated Tariff Liberalization (ATL) initiative in forest products. This initiative was proposed for agreement among member countries of the World Trade Organization. The analysis of environmental effects focuses on possible changes in timber harvest, in the United States and worldwide, and rests directly on an analysis of the economic (trade, production, and consumption) effects of the initiative. The analysis is based on four sources of information: (1) simulation results using large-scale forest products sector and trade models, (2) literature describing analysis of the general effects of tariff and tariff reduction on trade, (3) literature that specifically addresses the role of tariffs and tariff changes on forest products trade, and (4) a review and assessment of information provided through public comments on the initiative. The ATL initiative likely will have no distinguishable impacts on aggregate U.S. timber harvest; the initiative is likely to modify the composition of products manufactured from timber harvested in the United States. United States consumption of most forest products is projected to change by less than 1 percent as a consequence of the ATL. At the world scale, the ATL is projected to increase aggregate world trade in forest products by a maximum of 2 percent. World timber harvest is projected to increase by about 0.5 percent because of the ATL, and aggregate world production and consumption of forest products are projected to increase by less than 1 percent.

Keywords: Trade, trade policy, ATL, forest products, supply and demand.

Acknowledgments

This study was done under the direction of the Office of the United States Trade Representative (USTR) and the White House Council on Environmental Quality (CEQ). It is the product of an interagency group, with lead technical assistance from the U.S. Department of Agriculture, Forest Service and the U.S. Environmental Protection Agency.

Lead authors were David J. Brooks (U.S. Department of Agriculture, Forest Service); Joseph A. Ferrante (U.S. Environmental Protection Agency); Jennifer Haverkamp (USTR); Ian Bowles (formerly with CEQ and National Security Council); William Lange (U.S. Department of Agriculture, Forest Service); and David Darr (U.S. Department of Agriculture, Forest Service). Significant contributions to the document were made by Allison Areias (USTR), Barbara Norton (USTR), and Jan McAlpine (Department of State). Michael Hicks (U.S. Department of Agriculture, Foreign Agricultural Service), David Ingersoll (International Trade Commission), and Gary Stanley (Department of Commerce) made important contributions to the analysis and the review. This study draws on analytical work done by Joseph Buongiorno (University of Wisconsin), John Perez-Garcia (University of Washington), and Roger Sedjo (Resources for the Future) that is published separately.

Ambassador Charlene Barshefsky and the Chair of the CEQ George Frampton gratefully acknowledge the contributions of the Departments of State, Commerce, Agriculture, and the Interior; the Environmental Protection Agency; the U.S. Agency for International Development; the National Economic Council; the Council of Economic Advisors; and the International Trade Commission.

This general technical report is an edited and reformatted edition of the original report that was published by USTR and CEQ in November 1999.

Preface

This study of the economic and environmental effects of the proposed Accelerated Tariff Liberalization (ATL) initiative was carried out between May and October 1999. As described in the "Acknowledgments," the study and the interagency process that supported it were jointly managed by the Office of the U.S. Trade Representative and the White House Council on Environmental Quality.

In addition to the contributions made by agencies and departments of the federal government, this study also relied on contributions made by the University of Wisconsin, the University of Washington, and Resources for the Future. In all three cases, these contributions were extensions of ongoing, cooperative research between these institutions and the USDA Forest Service, Pacific Northwest Research Station, Social and Economic Values Research Program.

The quantitative, model-based analysis of the effects of the ATL is based on results reported by Perez-Garcia (in press) and Zhu and others (2001) (see chapter 6 of this report). Sedjo and Simpson (1999) also draw on results from a global forest sector model in their analysis of the initiative. This report benefited from the analysis and conclusions contained in all three of these supporting studies.

For further information, readers are referred to three publications that document the contributions of these cooperators to the analysis of the effects of the ATL on the forest sector: Perez-Garcia (in press). Sedjo and Simpson 1999; Zhu and others (2001).

David J. Brooks
Research Forester

Contents

1 **Chapter 1: Summary and Key Findings**

1 **Introduction**

2 Forest Context

2 Description and History of the ATL Initiative

3 **Method**

3 **Findings**

3 Effects in the United States

4 Global Effects

4 Global Environmental Implications

5 **Conclusion**

7 **Chapter 2: A Study of the Economic and Environmental Effects of Accelerated Tariff Liberalization in the Forest Products Sector**

7 **Introduction**

9 International Forest-Related Activities of the United States

9 Trade and Environment

10 **The Global Context for Forest Products Trade**

11 Forest Policy Dialogue

13 Deforestation

14 Baseline Outlook for Forest Products

16 **Likely Economic Consequences of the ATL**

17 Impact on U.S. Forest Products Imports and Exports

18 Global Consumption of Forest Products

19 Production of Forest Products in the United States

19 Global Production of Forest Products

19 The ATL Initiative in a Broader Trade and Economic Context

20 **Method of Analysis of Environmental Consequences of the ATL Initiative**

22 **Environmental Implications of the ATL Initiative**

23 **Conclusions**
24 Environmental Considerations
25 Policy Implications
27 **Chapter 3: A Description of the Accelerated Tariff Liberalization Initiative**
27 **Background**
28 Overview of Public Comment Opportunities to Date
29 Review of the Uruguay Round Trade Results Applicable to This Sector
31 Congressional Authority Applicable to This Sector
31 **History of the ATL Proposal**
32 Tariff Initiative
32 Nontariff Measures
33 Standards and Conformance
34 Economic and Technical Cooperation
35 **Chapter 4: U.S. International Forest Activities**
35 **Introduction**
36 **Initiatives and Activities**
36 Major International Agreements, Organizations, and Initiatives
37 Bilateral Activities
38 Debt-Reduction Activities
39 Loan and Loan Guarantees
41 **Chapter 5: A Review of Literature on Forest Products Trade and the Environment**
41 **Introduction**
43 **Issues Related to Trade and Forests**
43 Trade and Resource Conditions
44 Trade Policies and the Forest Sector
46 Environmental Policies and Domestic Industries
47 Trade Measures for Environmental Objectives

49 **Chapter 6: Model-Based Analysis of the Effects of the Accelerated Tariff Liberalization Initiative on Trade in Forest Products**

49 **Introduction**

51 Scenario Analysis of the ATL Initiative

53 **Model Results**

61 **Chapter 7: Summary of Information and Analysis Provided Through Public Comments**

61 **Introduction**

61 Comments Received About the Scope or Methodology of This Study

62 General Comments About the ATL Initiative or U.S. Forest Trade Policy

63 Comments Received in Support of Tariff Liberalization in the Forest Products Sector

65 Comments Received to Clarify the Record

66 **Literature Cited**

This page has been left blank intentionally.
Document continues on next page.

Chapter 1: Summary and Key Findings

Introduction

This study assesses the incremental economic and environmental impacts resulting from changes in the timing and scope of forest product tariff reductions as proposed in the Accelerated Tariff Liberalization (ATL) initiative in forest products among member countries of the World Trade Organization. The study's analysis of environmental effects focuses on possible changes in timber harvest, in the United States and worldwide, and rests directly on an analysis of the economic (trade, production, and consumption) effects of the initiative.

After the announcement of the proposed ATL initiative, many environmental organizations expressed concern that these forest product tariff reductions would lead to increased timber harvest and, as a result, potential environmental degradation. In response, the Office of the United States Trade Representative and the White House Council on Environmental Quality committed to analyze the economic and environmental effects of the initiative and requested comments from the public.[1]

The environmental analysis is not a review of baseline trends in world forest area or condition; the analysis also does not attempt to determine, in detail, those levels, patterns, and methods of timber harvest that are "sustainable." Instead, it examines (1) the direction and magnitude of change in timber harvest that can be attributed to the ATL, and (2) the location of this change in harvest.

[1] 64 Fed. Reg. 34304 (June 25, 1999).

Forest Context

Forests worldwide are significantly influenced by factors that exist both within the forest sector and in the broader economic, social, and environmental context. In most countries, deforestation is caused by domestic market conditions and policy initiatives (within and outside the forestry sector), although the effect of domestic policies may be exacerbated by interaction with international markets. Major causes of deforestation and forest degradation include agricultural subsidies, large-scale industrial development projects, corruption, population pressures, lack of secure land tenure arrangements, fuelwood demand, domestic wood harvest and consumption, and the absence of an economic environment supportive of sustainable forest management. International trade in forest products is not a major factor affecting global forest conditions and management, though the effects can be locally or nationally significant in some exporting countries.

Descripentation

Nevertheless, the relation of international trade in forest products to sustainable forest management generally is receiving greater attention. Trade initiatives such as the ATL have heightened this attention in the United States. The relation between international trade and local and national forest conditions also will be influenced by national policies and national capacity related to the production of wood products in exporting and importing countries. Key among these are the implementation and enforcement of sound regulations for wood harvesting and processing.

The United States sought elimination of all tariffs in the forest products sector during the Uruguay Round of trade negotiations that concluded in 1993. The round resulted in a “zero-for-zero” (reciprocal tariff elimination) agreement, which included the United States, Canada, Finland, Austria, Singapore, Hong Kong, Japan, the European Union, Korea, and New Zealand for paper products (chapters 47, 48, and 49 of the global “Harmonized System” of tariff classification) by 2004, and an agreement between major producing countries to eliminate tariffs on all furniture (not just wood) by 1999. At the same time, there was an agreement to reduce, over 5 years, tariffs on wood products. In the United States, such reductions amounted to just over a one-third cut in average tariff levels from an average tariff level of 3.1 to 1.8 percent.

The forest products ATL is one component of an eight-sector initiative that began as an effort of the Asia Pacific Economic Cooperation (APEC) forum. The set of sectoral trade liberalization initiatives was designed as a balanced package with elements of interest to both developed and developing countries. Further liberalization of trade in these sectors is expected to yield a broad set of economic, social, and environmental benefits to the United States and other countries.

The ATL initiative includes further reductions and acceleration in the timing of reduc-

At the saargetseaesade in

- For pulp, paper, and printed products, existing parties to the Uruguay Round zero-for-zero agreement would accelerate tariff removal to January 1, 2000. Others would attempt to remove tariffs by the same date, but developing countries could delay tariff removal until January 1, 2002, on a case-by-case basis for a limited number of specific products.

The analysis begins with an examination of the effects of the initiative on trade in forest products. The trade effects of the ATL are then examined in the broader context of forest products markets, both domestic and international. This broader context provides a basis for judging the effects of the initiative on total production and consumption—and through this, the effects of the initiative on timber harvest. Timber harvest is used as a broad-scale, summary indicator of the environmental changes that may be triggered by the ATL. This "coarse-filter" approach is intended to reveal the possible existence and approximate magnitude of environmental consequences.

This analysis of the ATL is based on four sources of information: (1) simulation results using large-scale, forest products sector and trade models (see chapter 6); (2) literature describing analyses of the general effects of tariffs and tariff reductions on trade (see chapter 5); (3) literature that specifically addresses the role of tariffs and tariff changes in forest products trade (with specific reference to estimates of the effects of the Uruguay Round) (see chapter 5); and (4) a review and assessment of public comments on the initiative (see chapter 7). All four sources provide support for the estimate reached in this analysis of the type and magnitude of effects that the ATL is likely to have. Further support for these conclusions is provided by an independent analysis of the effects of the initiative (Sedjo and Simpson 1999). Because of certain characteristics of the modeling simulations, throughout the analysis, estimates of economic impacts reflect the maximum likely effects.[2]

The ATL initiative likely will have no distinguishable impacts on aggregate U.S. timber harvests compared to what would be the case without the ATL. The initiative is likely, however, to modify the composition of products manufactured from the harvested

Global Effects

By 2010, compared to the baseline, the ATL is projected to increase aggregate world trade in forest products by a maximum of 2 percent, timber harvest by 0.5 percent, and aggregate world production and consumption of forest products by less than 1 percent. The characteristic of the economic model simulations that lead to estimates of the maximum likely effects is particularly pronounced for developing countries.

As in the United States, at the worldwide level, the ATL likely will lead to greater changes in the composition and patterns of trade than in the aggregate volume of trade in forest products. The greatest increases in trade (as much as 6 percent by volume) will occur in value-added manufactures (such as panels, other manufactures, and furniture) and paper; trade in raw materials and some semiprocessed products is projected to decline, with trade in logs likely to decline by 5 percent by volume, compared to the baseline.

The ATL will affect geographic patterns of trade. Developed countries are likely to import more wood-based panels and other solid wood manufactures, whereas developing countries are likely to import more paper and paperboard products.

The ATL is likely to cause incremental increases in timber harvests in some countries, including Australia, Chile, China, Finland, Indonesia, Malaysia, New Zealand, and Sweden. For example, for Malaysia and Indonesia, these increases will be in the range of 2.6 and 4.4 percent, respectively, by 2010, compared to the baseline. Increases for Sweden and Finland will be in the range of 7.6 and 11 percent, respectively. The ATL also is projected to lead to reductions in timber harvesting in some countries. Decreases in Mexico and Russia will be in the range of 2.1 and 4.1 percent, respectively.

The effect of the ATL on timber harvest seems likely to reinforce existing trends toward timber harvest based on plantations and intensive management of secondary forests. On balance, it seems likely that decreases in timber harvesting will be concentrated in primary (natural) forests and that increases will be concentrated in secondary forests and plantations. This expectation is based on current resource conditions and patterns of harvest in countries where timber harvesting is likely to increase. It is also consistent with the raw material requirements of products whose trade and production is projected to increase.

Global Environmental Implications

Changes in timber harvest are used as the indicator of environmental impact projected to be caused by the ATL. Because of the ATL, global timber harvest is projected to be a maximum of 0.5 percent greater than baseline in 2010. This expected change in world timber harvest is the net effect of both increases and decreases as large as 11 percent in individual countries. Projected increases in timber harvesting will be concentrated for the most part in countries that are currently major producers and exporters of forest products (except the United States, as noted above).

Increased harvest in managed secondary forests and plantations is projected to account for more than half of the net increase in timber harvests. Increased reliance on such sources may lead to expansion of the area devoted to intensive management practices. This can result in the expansion of forest area or restoration of vegetation on degraded land. Plantations and intensive forest management also are recognized

as reducing pressure to disturb natural forests. Conversion of natural forests to plantations, however, may adversely impact the environment owing to loss of biological diversity and habitat for native species. In addition, plantation management, including pesticide and fertilizer use, could impact water quality and aquatic habitats.

The ATL is likely to result in positive environmental changes by reducing timber harvest in some countries. It also may lead to positive environmental changes if it stimulates increases in manufacturing efficiency in export-oriented developing countries. In addition, the overall ATL initiative (of which forest products is but one of eight sectors) may contribute to increasing income and rising standards of living in developing countries. Increases in income contribute to decreases in consumption of fuelwood[3] and increases in consumption of other wood products as well as greater interest in the ecological functions of forests.

There is uncertainty associated with estimates of the effects of the ATL on forest products trade. Important sources of this uncertainty are the difficulty in determining baseline conditions against which the effects of the ATL must be judged, and volatility in key determinants of these baseline conditions (such as timber supplies and forest policies, rates of economic growth, exchange rates, and developments in other sectors). In addition, the analysis does not explicitly account for the effects of provisions of existing regional trade agreements, and regional trade agreements currently under negotiation, many of which liberalize trade in forests products. This may lead to an overestimation of the effects of the ATL. The analysis also does not take into account the fact that some trade in forest products already faces reduced tariffs because of programs such as the Generalized System of Preferences, further contributing to the overestimation of the effects of the ATL. The greatest uncertainty is associated with estimates of the effects of the initiative on the production and trade patterns of individual countries. There is sufficient information, however, to conclude that the incremental effects of the ATL are likely to be small at the world scale and small as compared to the effect of changes in factors that determine baseline conditions.

Conclusion

The study concludes that the ATL will have no distinguishable impacts on aggregate U.S. timber harvest compared to what would be the case in the absence of the ATL. At a global level, compared to the baseline, the maximum projected effects of the ATL by the year 2010 are to increase aggregate world trade in forest products by 2 percent, timber harvest by 0.5 percent, and aggregate world production and consumption of forest products by less than 1 percent. It also should lead to greater changes in the composition and patterns of trade than in the aggregate volume.

The ATL is unlikely to alter the proportion of the world's timber harvest that comes from developing countries (including tropical) as compared to developed countries. Developed countries are likely to account for at least two-thirds of increases in timber production resulting from the ATL. Developed countries also will account for most of the expected decreases in production.

---

[3] Fuelwood currently accounts for more than half of world timber harvest and more than 80 percent of timber harvest in developing countries.

The findings of this study do not suggest the need for a separate U.S. domestic environmental policy response to the ATL. The study does, however, provide two valuable insights: the importance of (1) further improvement in baseline data to expand the usefulness of future analyses and thereby extend understanding of the relation between international trade in forest products and sustainable forest management, and (2) bilateral, regional, and multilateral cooperation, including continued technical assistance to help countries develop environmentally sound national forest management policies and practices.

Chapter 2: A Study of the Economic and Environmental Effects of Accelerated Tariff Liberalization in the Forest Products Sector

Introduction

The forest sector is one of nine original sectors selected by Asia Pacific Economic Cooperation (APEC) Trade Ministers in November, 1997, for early, voluntary sectoral liberalization of tariffs.[1] These sectoral initiatives were designed as a balanced package, with items of interest to both developed and developing countries. These initiatives include sectors dominated by large multinational companies, small manufacturers, natural resource-based industries, and industries affecting social goals such as improving health and decreasing pollution. Although components of these initiatives differ across each of the sectors, the package is intended to address trade liberalization in a comprehensive manner and is expected to contribute to the broad-based social and economic benefits of increased trade.

[1] The other sectors are chemicals, energy goods and services, environmental goods and services, fish, gems and jewelry, medical and scientific equipment, telecommunications, and toys. The initiative for a ninth sector, telecommunications, was completed in June 1998 as a Mutual Recognition Agreement. The package of sectoral liberalization that was moved to the World Trade Organization (WTO) for completion covers the remaining eight sectors.

For the forest sector, the Accelerated Tariff Liberalization (ATL) initiative includes further reductions and acceleration in the timing of reductions of tariffs agreed to as part of the Uruguay Round of trade negotiations. In the absence of agreement on the ATL initiative, tariffs on some forest products will continue to decline under existing trade agreements (see chapter 3 for a detailed description of the initiative).

This study focuses on the likely economic consequences in the forest sector and on the possible environmental effects on forests, both domestic and international, of the changes in the timing and scope of forest product tariff reductions proposed in the ATL. The study's analysis uses timber harvests as a broad-scale summary indicator of the environmental changes that may be triggered by the ATL. This "coarse-filter" approach is intended to reveal the possible existence and approximate magnitude of environmental consequences. Furthermore, underlying trends in the global forest sector and forest ecosystems—both of which have been affected by trade liberalization in the postwar period—are a necessary foundation for this assessment. The analysis assumes that these trends will continue in the absence of agreement on the ATL; therefore, the analysis focuses on the incremental effects of the ATL in the context of these broader trends and patterns.

Concern over the environmental consequences of the ATL must be viewed in the broader context in which national and international environmental issues associated with forests are debated. It is equally desirable to distinguish between policies designed to address resource and conservation concerns, including environmental concerns, and policies that focus on trade issues. Nevertheless, recognition of the interaction among trade, economic, and environmental policies is necessary, and is increasingly reflected in forest policy debates.

This analysis of the ATL is based on four sources of information: (1) simulation results using large-scale, forest products trade models (see chapter 6), (2) literature describing analyses of the general effects of tariffs and tariff reductions on trade (see chapter 5), (3) literature that specifically addresses the role of tariffs and tariff changes in forest products trade (with specific reference to estimates of the effects of the Uruguay Round) (see chapter 5), and (4) a review and assessment of public comments on the initiative submitted pursuant to the Federal Register notice[2] (see chapter 7). All four sources provide support for the estimate of the type and magnitude of effects that the ATL is likely to have. Further support for these conclusions is provided by an independent analysis of the effects of the initiative (Sedjo and Simpson 1999).

---

[2] 64 Fed. Reg. 34304 (June 25, 1999).

International Forest-Related Activities of the United States[3]

In June 1993, the United States announced its commitment to the national goal of achieving sustainable management of U.S. forests by 2000. To define this objective, and to measure progress toward it, the United States has joined more than 150 countries in developing national level criteria and indicators for sustainable forest management. The United States also initiated the G-8 Action Program on Forests, which was endorsed by world leaders in 1998.[4] Finally, the United States is also pursuing the goal of forest conservation and sustainable management through international agreements, organizations, and fora, including the United Nations (U.N.) Intergovernmental Forum on Forests, the U.N. Food and Agriculture Organization, the International Tropical Timber Organization, the Convention on International Trade in Endangered Species (CITES), the Center for International Forestry Research, and the Convention on Biological Diversity.

The U.S. government also addresses global concerns related to forests through various bilateral activities implemented by federal agencies, including the Agency for International Development, the U.S. Department of Agriculture Forest Service, the U.S. Department of the Interior Fish and Wildlife Service, the U.S. Environmental Protection Agency, the U.S. Peace Corps, and the National Science Foundation. These activities include cooperation with other governments and cooperation with the private sector domestically and abroad. Forest conservation, environmental protection, and sustainable management of natural resources also are promoted through debt reduction, debt relief, and loan guarantee programs. In 1998, the President signed the Tropical Forest Conservation Act, which provides debt relief to qualifying developing countries to make funds available for forest conservation projects.

Trade and Environment

Trade measures generally are not used to achieve U.S. environmental goals; however, there are some exceptions. For example, parties to the CITES, whose goal is protecting threatened or endangered species, may make decisions to monitor and restrict international trade in species that are threatened or endangered in the wild. Trade policies and regulations also can be used to address domestic environmental concerns. An example is the goal of preventing the introduction and dissemination of exotic plant and animal pests and pathogens. Trade restrictions address these sanitary and phytosanitary concerns, and through the work of the U.S. Department of Agriculture Animal and Plant Health Inspection Service, the United States regulates imports that may harbor plant pests and diseases.

The United States has consistently advocated the domestic and international economic benefits of expanding international trade. Growth in trade has contributed to sustained economic growth in the United States. International trade, across all sectors and stimulated in part by reductions in tariffs, is also widely recognized for its contribution to economic development in many developing countries. The United States also recognizes and actively promotes the idea that mutually-supportive trade and

---

[3] See chapter 4 for a detailed description of U.S. actions and programs addressing international forestry issues.

[4] Elements of the G-8 Action Plan for Forests include monitoring and assessment of the state of forests, development of national programs for sustainable forest management, designation of protected areas, emphasizing the role of the private sector, and combating illegal logging and illegal trade.

environment policies can contribute positively to the conservation and sustainable management of natural resources. The United States recognizes that international trade can have both positive and negative effects on efforts to promote sustainable resource use and management. Consequently, the United States is an active participant in policy discussions on the interaction between trade and the environment in many venues, and specifically promotes recognition of the need for, and effective implementation of, appropriate policies and regulations designed to promote conservation and sustainable management of forests.

The Global Context for Forest Products Trade

Expansion of international trade in forest products in the postwar period has increased interdependence among producers and consumers of forest products. The increased importance of trade is one basis for interaction and interdependence among trade policies and policies focused on forest conservation and management. The expansion of forest products trade has been comparable in scale and timing to increases in all merchandise trade and, as with other sectors, increased commodity trade also has been accompanied by the rising importance of foreign investment and transnational corporations.

World trade in forest products is now valued at roughly U.S.$150 billion to U.S.$200 billion, and has increased nearly fourfold, in real terms, over the past three decades. On average, international trade now accounts for about 30 percent of world production and consumption of forest products (see tables 1 and 2). Although forest products are a component of the commodity imports of nearly every country, a relatively small number of countries account for the majority of exports of most forest products.

At the same time that trade has increased substantially over the past 40 years, production for domestic markets continues, on average, to account for most of the timber harvest in both developed and developing countries. The share of industrial timber harvest that enters world trade as raw material or manufactured products is estimated to be 35 percent for developed countries and 20 percent for developing countries. If fuelwood harvest is included in this calculation, only about 5 percent of developing country timber harvest enters world trade (see table 2). In addition, international trade remains strongly intraregional. Trade within Europe accounts for nearly half of all world forest products trade, and trade within North America accounts for an additional 30 percent of world forest products trade. In the past two decades, developing countries have significantly increased their participation in forest products trade as both exporters and importers. Nevertheless, international trade in forest products is dominated by harvest and consumption in, and trade among, developed countries.

The United States is the largest single importer, and the second largest exporter, of forest products in the world, and is a net importer of forest products (based on the value of trade).[5] In spite of this role in the world forest products economy, U.S. dependence on international trade is below the world average for most products (see table 1). This is due to the scale of U.S. domestic production and the continuing importance

[5] The dominance of the United States as an importer is primarily due to the size of the U.S. economy. For comparison, the 15 countries of the European Union have an aggregate economy and population roughly equal to that of the United States and import nearly double the value of forest products as compared to the United States.

Table 1—International trade as a share of forest products consumption for the world and the United States[a]

Product	World 1970	World 1980	World 1990	World 1997	U.S. 1997
	Percent				
Industrial roundwood	7.3	8.1	6.6	8.7	0.5
Sawnwood	13.6	17.3	18.0	26.3	30.1
Wood-based panels	14.3	15.6	24.5	31.2	18.2
Pulp	16.3	16.4	16.2	21.2	5.7
Paper and board	18.1	20.0	23.2	28.4	13.6

[a] Imports as a share of consumption, quantity basis.

Source: Calculated from data reported by the Forestry Department, Food and Agriculture Organization; data available at http://apps.fao.org.

Table 2—Estimated share of world timber harvest that enters international markets, 1996[a]

Region	Industrial roundwood: Logs only	Industrial roundwood: All products	All timber[b]
	Percent		
Developing countries	8	20	5
Developed countries	8	35	27
World	8	30	16

[a] Exports as a share of harvest.

[b] Includes fuelwood harvest.

Source: Calculated from data reported by the Forestry Department, Food and Agriculture Organization; data available at http://apps.fao.org.

of the U.S. market to domestic producers. In addition, trade with Canada accounts for about half of all U.S. forest products trade and roughly 70 percent of U.S. imports of forest products. Tropical timber (including products manufactured from tropical timber) accounts for about 10 percent of U.S. imports of forest products. The United States is a net exporter of forest products to developing countries (see table 3).

Forest Policy Dialogue

Increasing trade and interdependence is only one among many factors that have heightened awareness of the importance of forests, and the environmental issues associated with world forests. In addition to their role in providing wood and wood products, forests are increasingly recognized for their role in conserving biological diversity and as sources of various ecological functions, such as water quality protection and carbon sequestration.

In the last decade, interest in world forests has been intensified by concern over continuing deforestation and forest degradation in developing countries, and conflicts over management of forests in developed countries. Although national objectives for forests differ from country to country, and the biological, social, and economic challenges of forest conservation are great, the goal of sustainable forest management is broadly

shared. The essential biological, social, and economic elements of sustainable forest management also have been broadly agreed to by countries. In 1992, the Rio Earth Summit focused world attention on the importance of forests and recognized that sustainable forest management was an essential component of sustainable development. Forest issues continue to receive high-level, multilateral attention through several international organizations and fora, including the work of the U.N. Commission on Sustainable Development (CSD) and its ad hoc subsidiary bodies.[6]

Recognition of the scope and complexity of the ongoing, international forest policy dialogue—and the issues it addresses—is a necessary backdrop for an examination of the possible environmental consequences of a trade policy action such as the ATL. In this broader context, the relation between trade in forest products and sustainabl

challengance of forade pobod le f countr4-15.1(ies)14.9(.)-246.1(nd imoorato remeSttility of t)41

the uncertain effects of trade policies); (2) recognition of the importance of links between the forest sector and other sectors; and (3) the increasingly complex interaction between public policies and the expanding private sector (in nearly all countries).

Even as the forest policy dialogue expands to cover all aspects of social, economic, and environmental contributions of forests, deforestation continues to be a concern. Deforestation results in losses in local—as well as global—benefits. Between 1990 and 1995, the worldwide area of forests is estimated to have declined by nearly 60 million hectares, a slightly lower rate of forest loss than that reported for the decade 1980-90. In most developed countries, forest area is stable or increasing, and biomass per hectare is increasing, often substantially. Forest loss is concentrated in the tropical zone and in developing countries (see table 4). The factors leading to deforestation differ widely across and within countries.

Major causes of deforestation (defined as a change in land use) include conversion of forest to agricultural land and large infrastructure development in developing countries.[7]

of indigenous and local communities, and the absence of an economic environment that supports sustainable forest management. The extent to which timber harvesting for industrial wood products plays a central or even indirect role in deforestation remains a subject of continuing debate and inquiry. In some countries, and especially in relatively undisturbed forests, timber harvesting (and associated road building) is often the first step in the process of degradation and deforestation.

Concerns about continuing deforestation, along with recognition of the extent to which national economies and environmental conditions are linked, have contributed to concerns that the ATL may have undesirable environmental consequences through links between industrial timber harvest,[8] international trade, and deforestation. At the same time, there is increasing evidence that industrial timber harvest in tropical countries is only one among many factors contributing to deforestation and, in many countries, the contribution is small and indirect. In most developing countries, timber harvesting for industrial products, which are primarily consumed domestically, is a minor component of timber use.[9] Domestic market and policy initiatives (within and outside the forestry sector) are a major cause of deforestation in most countries, although the effect of domestic policies may be exacerbated by interaction with links to international markets.[10]

Baseline Outlook for Forest Products

The baseline outlook for forest products consumption and production forms a necessary backdrop for an analysis of the effects of the ATL.[11] Demand for forest products is expected to increase in response to economic growth, but increases over the period 1990-2010 are projected to be considerably less than the growth observed over the period 1970-90 (see table 6). In the last decade, the composition of trade in forest products has changed significantly, both in terms of consumption and production. Although consumption of wood-based panels and paper and paperboard continues to increase, world consumption of sawnwood declined by more than 20 percent between 1990 and 1996. Consequently, world production of industrial roundwood (timber harvest for industrial products) declined by nearly 15 percent over this period (see table 6).

Future demand for raw material to produce forest products will be further moderated by the continued development of resource-efficient manufacturing technologies and increasing use of recovered fiber in the manufacture of paper and paperboard (see tables 6 and 7). Changes in the composition of demand, along with changes in manufacturing technology, make the use of smaller logs increasingly possible—and increasingly economic. This will affect both prices and sources of wood fiber used for industrial

---

[8] Timber harvesting to produce raw material for all industrial wood manufacturing (such as lumber, wood-based panels, and pulp and paper products).

[9] Table 5 summarizes patterns of world timber harvest in 1996.

[10] Recent literature on deforestation is described in chapter 5.

[11] Although many of the broad features of future forest products demand and supply can be reasonably foreseen, there is considerable uncertainty associated with current projections. Among the most significant sources of uncertainty are rates and patterns of future economic growth, possible changes in timber supply policies, and the effects of developments in other sectors (agriculture, transportation, etc.).

Table 5—World timber harvest by economic group and product category, 1996

Region	Industrial[a]	Fuelwood[b]	Total
	- - - - - - - *Million cubic meters* - - - - - - - -		
Developing countries	470	1685	2055
Developed countries	1019	179	1298
World	1489	1864	3353

[a] All timber used as raw material for manufacturing.

[b] Estimated by Food and Agriculture Organization.

Source: Food and Agriculture Organization 1999a.

Table 6—Actual and projected world consumption of wood, recovered paper, and forest products, 1970-2010

	Actual[a]				Projected[b]		Annual growth rate		
Item	1970	1980	1990	1996	2000	2010	1970-1990	1990-2010	1996-2010
	- - - - - - - *Million cubic meters* - - - - - - -						- - - - *Percent* - - - -		
Fuelwood	1113	1366	1780	1864	1906	2210	2.38	1.09	1.22
Industrial roundwood	1277	1391	1713	1490	1667	1872	1.48	0.45	1.64
Sawnwood	413	423	550	430	442	501	1.44	-0.47	1.10
Wood-based panels	69	88	126	149	143	180	3.06	1.80	1.36
Paper and paperboard	128	156	240	284	313	394	3.19	2.51	2.37
Recovered paper	30	51	82	108	116	171	5.16	3.74	3.34

[a] Data reported by the Forestry Department, Food and Agricultural Organization; data available at http://apps.fao.org.

[b] Food and Agricultural Organization 1997, and 1999a.

products. For example, recovered fiber (from paper and paperboard recycling) already accounts for about 20 percent of all fiber used worldwide for industrial wood products; this contribution is expected to increase to 35 percent or more over the next two decades (see tables 7 and 8). Collection and use of recovered paper is expected to increase by 60 percent between 1996 and 2010.

Changes in the composition of products produced and consumed, along with changes in public perceptions of and objectives for forests, will contribute to a shift away from harvest in primary forests and toward harvest in secondary forests and plantations. Plantations are projected to account for nearly half of all world timber harvest by 2040 (see table 9). The environmental consequences of these trends are uncertain and depend in large measure on the source of land used to establish plantations. Environmental impacts from the conversion of natural forests to plantations include

Table 7—World harvest of industrial roundwood and production of waste paper in 1990 and 1996 with projections to 2010

Product	Year 1990	Year 1996	Year 2010	Annual change 1990-2010
	Million cubic meters			*Percent*
Industrial roundwood	1713	1490	1872	0.45
Waste paper	82	108	171	3.74

Source: Food and Agricultural Organization 1997 and 1999a.

Table 8—Estimated and projected sources of industrial wood fiber

Forest type	Year 1995	Year 2010
	Percent	
Primary forest	50	30
Secondary forest and plantations	30	40
Recovered fiber	20	30

Source: Solberg 1996 and Brooks 1997.

the loss of biological diversity and habitat for native species.[12] In some cases, however, plantation establishment results in the expansion of forest area or restoration of vegetation on degraded land. Plantations and intensive forest management also reduce pressure to harvest natural forests.

Likely Economic Consequences of the ATL

This analysis of the study indicates that the effect of the ATL initiative on trade in forest products is likely to be small, and includes both increases and decreases in trade. Trade in some products (e.g., logs) is likely to decline; whereas trade in other products (e.g., some wood-based manufactured products) is likely to increase. For products whose trade is likely to increase because of the ATL, the range of likely change in the quantity of trade is from negligible to an increase of 5 to 6 percent. Aggregated across all products, the ATL is likely to lead to a small net increase in the quantity of forest products trade, based on analysis using large-scale forest products trade models (see chapter 6). Aggregate trade is likely to increase by about 2 percent (quantity basis) as compared to baseline projections. Other estimates of the effects of the ATL on trade, which reflect the impact on the value of traded products, suggest net effects in the range of a 0.4- to 0.6-percent increase.[13]

[12] Additional environmental concerns associated with the expansion of plantations include the introduction of exotic species and impacts on soil and water from the use of fertilizers and pesticides

[13] See Sedjo and Simpson (1999); these estimates are comparable to estimates of the effects of the Uruguay Round on forest products trade (Barbier 1996).

Table 9— Predicted contribution of plantations to world timber harvest, 2000-2040

Country	Year 2000	2020	2040
	- - - - - - - - - - - -	*Percent*	- - - - - - - - - - -
Africa	20	39	40
Asia	32	46	48
Europe and former U.S.S.R.	46	53	55
North and Central America	22	29	31
Oceania	55	66	67
South America	63	65	66
World	35	44	46

Source: Australian Bureau of Agricultural and Resource Economics 1999.

The ATL is likely to have a somewhat greater effect on the composition of trade. As it is intended to do, the ATL is likely to contribute to the long-term trend toward the increasing importance of processed products in international trade. This is indicated by both the model-based analysis and the qualitative analysis. World trade in logs may decline, perhaps sharply, because of the ATL, and trade in other forest products is likely to shift toward more processed products and away from commodities.

Neither of the models used in this analysis provides explicit information on the statistical properties of their projections, such as standard errors. Nevertheless, in evaluating the results of the scenario analyses, it is appropriate to interpret the results with the understanding that there is a magnitude of change that is indistinguishable from no change. Based on previous experience with these and other large-scale models, the magnitude of change (ATL scenario compared to the baseline) that is judged to be indistinguishable from no change is any figure less than 0.5 percent.

Impact on U.S. Forest Products Imports and Exports

The ATL is likely to have little impact on U.S. imports of forest products. Tariffs on forest products imported by the United States are already low, and existing tariffs have relatively little effect on the level, composition, or pattern of U.S. imports. More than 70 percent of current U.S. imports (by value) originate in Canada and will not be affected by the ATL. Because of regional trade agreements (such as the North American Free Trade Agreement) and preferential treatment programs (such as the Generalized System of Preferences), a substantial portion of the remainder of U.S. forest products imports already face low or zero tariffs. This study suggests, therefore, that there will be only modest changes in U.S. imports because of the initiative. The largest increases in U.S. imports are likely to be in wood-based panels.

Exports of forest products are likely to change as a result of the ATL. The ATL will bring about reductions in tariffs in many existing markets for U.S. producers; therefore, exports of some forest products (specifically some grades of paper and board and some engineered wood products) are likely to increase, at least incrementally.[14] The magnitude of increases is likely to be relatively small, and these increases, when

[14] See chapter 6 for a description of model-based projections of changes in world and U.S. production, consumption, and trade resulting from implementation of the ATL.

combined with likely decreases in log and chip exports, will have little net effect on U.S. timber harvests. This analysis suggests that prospective increases in exports are not only relatively small, holding everything else constant, but that other factors—such as exchange rates and rates of economic growth in trading partners—will not be constant and will therefore be the dominant factors affecting U.S. forest products exports.

Global Consumption of Forest Products

The cumulative, aggregate effect of the ATL on world consumption of forest products may be smaller than its impact on the volume of trade. The ATL may lead, in some countries, to the substitution of imports for products that are currently produced domestically. This analysis suggests that this will occur in many markets in developing countries; therefore, the aggregate effect of the ATL on consumption of forest products will be smaller than the effect on trade. At the world scale, the effect of the ATL on production and consumption of forest products will range from no change to an increase of no more than about 0.5 percent by 2010, compared to the baseline.

It is important to consider this conclusion in context, because much attention has been given to assertions that the ATL is likely to lead to increases in world consumption of forest products by as much as 3 to 4 percent. This statement was first made by proponents of the initiative in a press release, with reference to studies done by the Jaakko Poyry Consulting Group (JPC). The original statement argues that "free trade in forest products could generate 3 percent to 4 percent additional growth in consumption, worldwide."[15]

This statement has been subsequently repeated by critics of the initiative who have as one of their primary concerns the effects of liberalized trade on levels of consumption. Public comments on the ATL reflect the depth and extent of these concerns (see chapter 7). However, no public testimony specifically documents or supports the initial statement. Instead, a submission to the public record by JPC clarifies its original findings. The submission describes the 3- to 4-percent growth estimate as the rate of likely increase in global GDP resulting from "rapid technology introductions around the world, combined with strong global economic developments in an essentially *free trade* environment."[16] This submission goes on to state:

> These observations were derived from JPC's long-term studies of global economics and resulting implications for the forest products industry. They were not the outcome of any specialized study designed to specifically address the impacts of trade barriers and evolving free trade on the world's economy in general, and the forest products industry in particular.

Taking this clarification into account, the conclusions reached here about the incremental impact of the ATL on forest products consumption are consistent with previous studies that have examined the effects of tariff reductions on the forest sector. Chapter 5 summarizes the findings contained in recent literature.

---

[15] "Forest industry leader urges worldwide tariff elimination," American Forests and Paper Association, Press Release dated 28 April 1999.

[16] "Comments regarding the economic and environmental effects of tariff elimination in the forest products sector," Jaakko Poyry Consulting; 19 August 1999; submission to the Office of the U.S. Trade Representative.

Production of Forest Products in the United States

The ATL initiative will have no distinguishable impacts on aggregate U.S. timber harvests compared to what would be the case in the absence of the ATL. The initiative will, however, modify the composition of products manufactured from the harvested timber. The production of sawnwood products in the United States is likely to increase by as much as 3 percent, by 2010, because of the ATL initiative. Compared to the baseline, U.S. production of some wood-based panels is expected to decline. Production of paper and paperboard in 2010 is projected to increase in the United States by 0.2 percent because of the ATL initiative (see chapter 6).

Global Production of Forest Products

At the world scale, the effect of the ATL on production of forest products will be identical to its effect on consumption. However, the effects of ATL on the consumption of raw material needed to produce those products is likely to be smaller. This analysis suggests that the removal of tariff barriers to trade will contribute to conditions that encourage increasing cost and resource efficiency among manufacturers.[17] Although these effects may not be immediate, they likely will occur relatively quickly. In several markets, especially in developing countries with tariffs that provide effective protection for firms producing for domestic markets, there are opportunities for significant improvements in manufacturing efficiency.

The ATL Initiative in a Broader Trade and Economic Context

The impacts of the ATL on timber harvest will be less significant than the impacts of the initiative on production of products.[18] This is a direct result of evidence that open, competitive, markets encourage cost- and resource-efficient production methods.[19] In countries that currently account for most world forest products trade (i.e., countries that are most likely to increase trade because of the initiative), technological change has yielded efficiency gains that result in lower rates of change in timber consumption compared to changes in product output. Increasing efficiency in harvesting and processing, along with increasing use of recovered wood fiber (waste paper and residues), are the sources of these gains. These likely effects further moderate expected effects of the initiative on harvest from forests. As for the effect on trade and consumption, however, this assessment suggests that the contribution of the ATL to these shifts will be small.

---

[17] Evidence for this is described in literature on the effects of trade restrictions on domestic industries; (see chapter 5 and especially Barbier et al. [1994]).

[18] The estimate of the effects of the ATL on the volume of product output, and the volume of wood raw material required to manufacture wood products, is not sufficient to judge the direct environmental effects of the initiative. Therefore, the analysis underlying this study also includes an examination of the effects of the ATL on the type of raw material likely to be used, and the type and location of timber harvest likely to be affected by the changes triggered by the initiative.

[19] Many factors contribute to determining the efficiency of production; nevertheless, the role of freer trade is documented in the literature (see chapter 5) and summarized by FAO (1999a).

The fact that the ATL is likely to have a less significant impact on trade than the effects estimated for the Uruguay Round as a whole is based on two characteristics of the ATL. First, for some products, the ATL simply accelerates (by 4 years) the agreed on reduction to zero tariffs.[20] This aspect of the ATL applies to products that account for about half of the volume and roughly two-thirds of the value of world (and United States) trade in forest products. Second, tariff reductions proposed in the ATL for the remaining forest products are smaller, in absolute magnitude, than the tariff reductions agreed to under the General Agreement on Tariffs and Trade (GATT). (See table 6 for a comparison of pre- and post-Uruguay Round tariff rates for developed countries.) However, tariff rates tend to be high in developing countries, and were largely unaffected by the Uruguay Round of trade negotiations. Consequently, tariff reductions in developing countries will be greater than those in developed countries.

Finally, the effect of macroeconomic factors—macroeconomic policies, rates of economic growth, and exchange rates in particular—on consumption of forest products is substantially greater than the effect of a change in price through reduction in existing tariffs. This is especially true at the scale of price changes that would result from accelerated reductions in tariffs as proposed by the initiative. In addition, these prospectively small changes in price are likely to lead to small changes in the quantity of forest products consumed because price elasticities for forest products are low, especially for those products for which post-Uruguay Round tariffs remain relatively high. Table 10 displays long-term price elasticities for forest products.[21] Table 11 displays changes in tariffs resulting from the Uruguay Round agreement.

Method of Analysis of Environmental Consequences of the ATL Initiative

Timber harvest is used as a broad-scale, summary indicator of the environmental changes that may be triggered by the ATL. This “coarse-filter” approach is intended to reveal the possible existence and approximate magnitude of environmental consequences. This study concentrates on the direct effects on forests from timber harvesting by analyzing the quantity and type of timber raw material needed to manufacture the products affected by the initiative. Even at this resolution, however, analysis of the environmental effects of the ATL is complicated by the absence of data about other indicators of positive and negative changes in forest conditions, such as impacts on biological diversity, forest health, and soil and water conservation.[22]

---

[20] See chapter 3 for a detailed description of the initiative.

[21] The price elasticity is the percentage of change in the quantity consumed resulting from a 1-percent change in price.

[22] The analysis does not address the effects of, for example, road building, or the secondary environmental impacts of manufacturing activity.

Table 10—Long-term price and income elasticities for forest products[a]

Commodity group	Price	Income (GDP)[b]
Fuelwood	-0.08	-0.63
Other industrial roundwood	-.17	.26
Sawnwood	-.23	.29
Veneer and plywood	-.16	.73
Particleboard	-.10	.63
Fiberboard	-.29	.86
Newsprint	-.32	.77
Printing and writing paper	-.70	.50
Other paper and board	-.35	.44

[a] The percentage of change in consumption resulting from a 1-percent change in either price or income.

[b] GDP = gross domestic product.

Source: Zhu and others 1998.

Table 11—Summary of the effects of the Uruguay Round and ATL (proposed) on tariff rates for forest products imported by developed countries[a]

Commodity group	Pre-Uruguay Round	Post-Uruguay Round	ATL (proposed)
Wood:[b]	- - - - - - - -	*Percent ad valorem*	- - - - - - - -
Wood in the rough	0.0	0.0	0.0
Wood-based panels	9.4	6.5	.0
Semimanufactures	.9	.4	.0
Wood articles	4.7	1.6	.0
Group weighted average	2.0	1.1	.0
Paper:[c]			
Pulp and waste	.0	.0	.0
Paper and paperboard	5.3	.0	.0
Printed matter	1.7	.3	.0
Paper articles	7.3	.0	.0
Group weighted average	3.5	.0	.0

[a] ATL = Accelerated Tariff Liberalization initiative.

[b] Uruguay Round tariff reductions were fully implemented as of January 1999.

[c] Uruguay Round reductions will not be fully implemented until January 1, 2004.

Source: Bourke and Leitch 1998.

Also complicating the environmental analysis are (1) underlying trends in patterns and methods of timber harvest that are unlikely to be affected by the ATL and (2) differing views on whether harvesting (followed by reforestation) should be classified as "environmental damage." The first of these is especially important. Changes indicated by the economic assessment must be understood as changes relative to a set of "baseline" developments. In many countries, baseline trends and conditions (such as forest policy priorities or forest management methods) are themselves controversial. With few—if any—exceptions, however, these baseline trends and conditions can be expected to continue whether or not the ATL is implemented.[23]

This analysis of the possible environmental effects of the ATL focuses on possible changes in worldwide timber harvest and rests directly on the analysis of economic (trade, production, and consumption) effects of the initiative. Likely impacts on world forests through increases in timber harvesting have been the predominant environmental concern raised by critics of the initiative. This environmental analysis is not a review of the trends in world forest area or condition; the review also does not attempt to determine, in detail, levels, patterns, and methods of timber harvest that are "sustainable." Rather, it is an examination of the direction and magnitude of change in timber harvest that can be attributed to the ATL and the change in the geographic location of harvest.

Environmental Implications of the ATL Initiative

The absence of large changes in timber harvest—at the world scale—suggests that the most significant (prospective) environmental effects of the ATL will be on the location of harvest. That is, the initiative may lead to changes in the forests where harvesting will occur in the future, even if it does not lead to changes in the aggregate level of harvest. The analysis suggests that the ATL will lead to changes in the location of timber harvest through its effect on patterns of trade (see chapter 6).

Based on the analysis of trade and economic impacts, the environmental impacts of the ATL are likely to be small (a net increase in world timber harvest of 0.5 percent by 2010, compared to the baseline). Among developing countries, changes in timber harvest are expected to be relatively small (less than a 5-percent increase as compared to the baseline). Expected timber harvest increases in developed countries that are likely to result from the ATL are relatively larger (around 11 percent). The type, location, and magnitude of change shown in chapter 6 (based on scenario analysis using large-scale trade models) is confirmed by Sedjo and Simpson (1999).

---

[23] Additional environmental concerns that have been raised in the context of trade-related initiatives are the environmental effects of increasing the international (especially intercontinental) shipments of merchandise. The focus is on the increasing likelihood of the importation of exotic species and pests and the subsequent environmental changes. Forest products trade—especially unprocessed logs and wood chips, and roughly processed lumber—has been a particular focus of these concerns. Existing phytosanitary rules and agreements address these concerns. Nevertheless, these rules have been criticized by some as being too restrictive, and by others as being insufficient to ensure adequate protection.

The net environmental consequences of the changes likely to be caused by the ATL are uncertain. Although there is likely to be no effect on U.S. forests, there is no definitive basis for comparing and aggregating the expected environmental consequences across countries and types of forests. For example, there is no simple way to compare an increase in timber harvest in one country to a decrease in another country. On balance, however, it appears likely that decreases in timber harvesting will be concentrated in primary (natural) forests and that increases will be concentrated in secondary forests and plantations. The analysis did not examine possible secondary environmental impacts of changes in manufacturing.

Based on the magnitude of change in timber harvesting indicated by the economic analysis, as well as prospective changes in patterns of trade, the analysis concludes that the ATL will have little effect on the broad type of forest likely to be harvested in the future. The baseline expectation is that the share of timber harvest coming from "primary forests" will continue to decline as intensively managed, secondary forests and forest plantations increase in importance (see tables 8 and 9).

The ATL also is unlikely to alter the proportion of the world's timber harvest that comes from developing (including tropical) as compared to developed countries. Developed countries are likely to account for at least two-thirds of increases in timber harvest resulting from the ATL; developed countries also will account for most of the expected decreases in harvest. With or without the ATL, the contribution of developing countries to the world's industrial timber harvest is expected to increase, although slightly. Developing countries currently account for about 30 percent of industrial timber harvest (see table 5); this is likely to increase to about 33 percent by 2010, based, in part, on increasing harvest from plantations, with or without the ATL.

By way of comparison with this study, Sedjo and Simpson (1999) conclude that overall pressures on the world's forests from increased wood harvests associated with the tariff reductions are "likely to be small and manageable." They estimate that the ATL will generate an increase in world timber harvest of less than 10 million m^3 per year—less than a 0.5-percent increase. This conclusion is consistent with the model results (chapter 6). Sedjo and Simpson further state that countries likely to experience increased harvest (because of the ATL) are found largely in the Northern Hemisphere and "are likely to be able to facilitate additional harvests with minimal effects on the forests due to the modest nature of the impact, the effectiveness of new and existing laws, and movement toward improved practices designed to achieve multifaceted sustainable forestry." They also conclude that there is little reason to expect that tariff reductions will significantly increase harvests from tropical forests because "earlier tariff reductions appear to have had minimal impacts on tropical harvests or exports."

Trade liberalization generally, and the package of ATL initiatives in particular, may contribute to higher incomes, especially in developing countries.[24] There is also widely accepted evidence that increasing income in developing countries will eventually contribute to greater investments in environmental protection and a reduction in consumption of fuelwood.[25] Fuelwood currently accounts for 80 percent of wood consumption in developing countries. Increasing income and, in particular, the process of industrialization, may be beneficial to forest conservation by reducing dependence on low-intensity and subsistence agriculture that is the greatest single cause of deforestation. The likelihood of these benefits, however, depends on the equity of income (and property) distribution (perhaps more than on the rate of income growth) and the existence and effectiveness of policies and institutions to direct land use and environmental change.

Conclusions

Our study's analysis reflects the *maximum* likely effects of the ATL tariff liberalization initiative. Its central findings include that the ATL initiative likely will:

- Have mixed impacts on the volume of U.S. trade across various forest product categories. The new composition of traded forest products should create additional U.S. economic opportunities at the subsector and firm level.
- Marginally reinforce the trend in the United States toward export of value-added, processed products and away from export of unprocessed products such as logs and wood chips.
- Have no distinguishable impacts on aggregate U.S. timber harvest compared to what would be the case in the absence of the ATL.
- Lead to an increase in world trade in forest products by a maximum of 2 percent in 2010 and in world production and consumption of forest products by less than 1 percent over the same timeframe.
- Lead to an increase in global timber harvest of not more than 0.5 percent over baseline predictions for 2010.
- Lead to greater changes in the composition and patterns of trade than in the aggregate volume of trade in forest products at the worldwide level.
- Marginally accelerate the baseline trend away from natural forests toward harvesting of secondary managed forests and plantation forests.
- Result in more efficient use of raw materials based on increased competitiveness in the value-added forest products sector, such as processed wood products.

---

[24] This possible effect of the ATL is consistent with findings in the literature and is advanced in a number of the public comments (see chapter 7).

[25] Evidence of the relation is apparent in table 10; the magnitude of the possible effect of changes in income is illustrated in, for example, Solberg (1996).

Environmental Considerations

Environmental effects of the ATL are likely to be mixed (both positive and negative) and small. For the United States, the environmental impacts of the ATL on U.S. forests are expected to be indistinguishable compared to what would be the case in the absence of the ATL. Exports of some paper and board products are likely to increase because of the initiative; U.S. exports of logs and wood chips are likely to decline. Taken together with no distinguishable aggregate change in levels of harvest, this result implies marginally greater domestic processing and fewer exports of unprocessed raw material.

On a global scale, the initiative likely will increase annual timber harvesting by not more than 0.5 percent in 2010, compared to the baseline. This expected change in timber harvesting is the net effect of projected increases of as much as 9 percent in some countries and decreases of more than 11 percent in other countries. These general conclusions are accompanied by uncertainty about specific changes in production, consumption, and trade that can be reasonably attributed to implementation of the ATL. On balance, it seems likely that decreases in timber harvesting (relative to the baseline projections) will be concentrated in primary (natural) forests and that increases in timber harvest (relative to the baseline projection) will be concentrated in secondary forests and plantations.

Increased timber harvest in countries that rely largely or exclusively on plantations may lead to expansion of the area of plantations, or the use of more intensive management practices. From a biodiversity conservation perspective, the shift over time from harvest of primary forest to plantation forest may be a positive environmental consequence. The net environmental consequences of these trends are uncertain. For example, reforestation for plantation use may result in restoration of degraded land and watershed protection. Increases in plantation forestry, however, also may increase pesticide and fertilizer use, and may lead to water and habitat impacts.

At the country-specific level, the ATL is likely to increase timber harvests in some developing and developed countries, while reducing timber harvests in others. The environmental consequences of increased timber harvest (such as habitat and biodiversity loss) may be a concern, especially in protection regimes; however, increased harvest in managed, secondary forests and plantations is likely to account for more than half of any net increase in timber harvests due to the ATL. For developing countries, such concerns also should be placed in the context that on average, only 5 percent of timber harvest (including fuelwood) in developing countries enters international trade.

Positive environmental changes also may be a result of the ATL; these include increases in manufacturing efficiency in export-oriented developing countries and reductions in timber harvests in some countries. To the extent that the multisector ATL contributes to increasing income, fuelwood consumption may decline in some developing countries. Fuelwood currently accounts for more than half of world timber harvest and more than 80 percent of timber harvest in developing countries.

Policy Implications

The findings of this study do not suggest the need for a separate U.S. domestic environmental policy response to the ATL. The study does, however, provide at least two valuable insights for future work relating to potential impacts outside the United States: the importance of (1) further improvement in baseline data to expand the usefulness of future analyses and thereby extend the understanding of the relation between international trade in forest products and sustainable forest management, and (2) bilateral, regional, and multilateral cooperation, including continued technical assistance to help countries develop environmentally sound national forest management policies and practices. The findings of this study should be fully integrated into the policy deliberations of U.S. government agencies with jurisdiction over matters of natural resources, environment, trade, commerce, development assistance, and foreign affairs.

The analytic and methodological experience gained from the production of this study also will inform those involved in U.S. policymaking. At the domestic level, it is instructive for the ongoing consideration of the potential environmental impacts of trade agreements and the methodological issues connected with that effort. At the international level, it may be a useful point of reference for other governments as they consider options for similar such analyses in their own countries. Finally, this study, and the U.S. experience with its production, will be shared with the range of relevant international and intergovernmental institutions that are or may in the future play a role in the consideration of the environmental impacts of trade liberalization.

Chapter 3: A Description of the Accelerated Tariff Liberalization Initiative

Background

The forest products initiative is one of nine that was selected by the trade ministers of the Asia Pacific Economic Cooperation (APEC)[1] forum in November 1998 for early sectoral liberalization. The other sectors are chemicals, energy goods and services, environmental goods and services, fish, gems and jewelry, medical and scientific equipment, telecommunications, and toys. The telecommunications initiative, which is a Mutual Recognition Agreement (MRA), was completed in June 1998. In November 1998, APEC leaders agreed to move the tariff portions of the remaining eight sectoral initiatives to the World Trade Organization (WTO) in order to gain support for concluding an agreement in all eight sectors by the end of 1999.

[1] The 16 participating APEC members are Australia, Brunei, Canada, China, Chinese Taipei, Hong Kong China, Indonesia, Japan, Korea, Malaysia, New Zealand, Papua New Guinea, the Philippines, Singapore, Thailand, and the United States. Chile and Mexico are also members of APEC but did not participate in the sectoral initiatives.

The eight sectoral initiatives represent a balanced package, with items of interest to both developed and developing countries. Within the eight initiatives are sectors dominated by large multinational companies (e.g., chemicals and energy), small manufacturing sectors (e.g., gems and jewelry and toys), resource-based sectors (e.g., fish and forest products), and sectors aimed at addressing social goals such as improving health and decreasing pollution (e.g., medical and scientific equipment and environmental goods). Liberalization of these sectors is expected to create jobs, help to build infrastructure and manufacturing base, enable participating countries to bring energy to consumers more efficiently, lower pollution, and promote higher quality and less expensive health care.

Although each of the sectoral initiatives has different components, they were designed to address trade liberalization in a comprehensive manner. Each of the nine initiatives contains a tariff element and a program of economic and technical cooperation (ecotech); many of the initiatives also include a nontariff barrier[2] study and trade facilitation elements. As noted above, only the tariff portions have been moved to the WTO for completion.

Overview of Public Comment Opportunities to Date

Public comments about the economic and environmental effects of tariff liberalization in the forest products sector have been received in conjunction with studies undertaken by the U.S. government relating to this subject and in response to other requests for public comments. On April 1, 1998, the U.S. International Trade Commission solicited public input[3] concerning APEC sectoral liberalization, including forest products, and a public hearing was conducted on April 21, 1998. The resulting study was transmitted in accordance with the rules and proceedings of the International Trade Commission to the Office of the United States Trade Representative (USTR).

On May 15, 1998, the USTR issued a Federal Register notice[4] soliciting advice on negotiations of sectoral opening agreements and how those sectors may be affected by such negotiations. Forest products was one of the sectors where public advice was sought and received. The public comments were taken into account in the development of the negotiating strategy.

---

[2] The APEC forestry study contractor has defined nontariff measures (NTM) broadly to include "government laws, regulations, policies and/or practices which either protect domestically produced products from the full weight of foreign competition or which artificially stimulate exports or particular domestic products" and "in cases where there is doubt over whether a particular measure is or is not an NTM it has, if for no other reason than completeness, been included in the report." Note that "non-tariff measure" is not a pejorative but a descriptive term for measures, other than tariffs, which have an impact on trade. The term, in itself, says nothing about the consistency of the measure with the requirements of the General Agreement on Tariffs and Trade or the WTO.

[3] 63 Fed. Reg. 15861 (April 1, 1998).

[4] 63 Fed. Reg. 27113 (May 15, 1998).

On April 14, 1999, USTR's Trade Policy Staff Committee issued a Federal Register notice[5] requesting comments on negotiations on market access and other issues in the WTO and under the Free Trade Area of the Americas. As with the sectoral opening agreement negotiations, the comments received were carefully considered by the U.S. negotiators.

On November 12, 1998, the U.S. International Trade Commission issued a Federal Register notice[6] indicating that the commission was undertaking a study to examine the conditions of competition on forest products trade and announced a public hearing for May 25, 1999. The hearing was well attended, and a report on the findings, incorporating the testimony and posthearing submissions, was transmitted to the Senate Finance Committee in October 1999.

Review of the Uruguay Round Trade Results Applicable to This Sector

Trade liberalization through the reduction of market access barriers, including both tariff and nontariff measures, has been a guiding principle of the global trading system through successive rounds of the General Agreement on Tariffs and Trade (GATT) and is now embodied in the WTO. The U.S. government has traditionally been one of the world's leading proponents of this principle and has long been a leading advocate for fair and equitable market access for all global economies. The foundation of the Accelerated Tariff Liberalization initiative exercise in the WTO is rooted in previous rounds of the GATT, including the Kennedy, Tokyo, and Uruguay Rounds.

The tariff reduction schedules negotiated as part of the Uruguay Round constituted the most substantial tariff cuts in history, reducing global tariffs by an average one-third from base rates. In many key industrial sectors, a broad range of countries, representing a "critical mass," agreed to the elimination of all tariffs within a specific commodity range, whereas others agreed to significant reduction. Commodity sectors in which tariff elimination was agreed to by major trading partners included beer, brown distilled spirits, pharmaceuticals, steel, construction equipment, agricultural equipment, medical equipment, toys, furniture, and paper and paper products. In addition, many trading partners agreed to harmonize chemical tariffs at low rates.

As a general rule, the agreements reached in the context of the Uruguay Round called for tariff reductions to be made over 5 years in equal annual staged reductions, although in some cases, such as pulp and paper, the reductions are being implemented over 10 years. The first reduction took place on January 1, 1995, coinciding with the date of entry into force of the WTO Agreements. Subsequent reductions have taken and will take effect on January 1 of each following year until the scheduled reductions and elimination are complete, except in those instances where the negotiated staging schedule is different.

---

[5] 64 Fed. Reg. 18469 (April 14, 1999).

[6] 63 Fed. Reg. 64101 (Nov. 18, 1998).

The U.S. forest products industry, which includes both the paper products and solid wood products sectors, was the first industrial-manufacturing sector to propose reciprocal tariff elimination (also referred to as the "zero-for-zero" tariff initiative). Industry representatives made this proposal to U.S. government trade officials in the hopes of leveling the global playing field for U.S. producers and exporters of forest products, which, at that time, were facing relatively high tariffs and nontariff market access barriers.

In the **paper and paper products subsector**, the Uruguay Round achieved the complete removal of tariffs by the United States and its principal WTO trading partners in Europe and Asia. According to the Uruguay Round market access agreement, the implementation of tariff reductions involved a 10-year staging period. The zero-for-zero initiative for paper and paper products was agreed to by the United States, the European Union, Canada, Japan, Korea, Finland, Austria, New Zealand, Hong Kong, and Singapore. In addition, Australia, Brazil, and Chile agreed to either significant reductions in tariffs or to bind their tariffs at lower levels than those that had prevailed in the past.

On nontariff measures, there were agreements on preshipment inspection, improved dispute settlement procedures, and extension of the signatories to the agreement on subsidies to developing countries as well as developed country trading partners. The elimination of those NTMs was intended to reduce the amount of time and costs involved in the transportation, handling, processing, and shipping of paper and paper products.

In the **lumber and wood products subsector**, the Uruguay Round did not achieve the zero-for-zero initiative for wood products. Although the United States, Canada, the European Union, Hong Kong, New Zealand, Singapore, and Sweden supported the initiative for zero tariffs in wood products, Japan was able to block an emerging international consensus that favored the elimination of tariffs on wood products.

Although Japan offered to cut tariffs on wood products by as much as 50 percent of its bound rates (as opposed to applied rates), this did not realize the goal of the United States to complete tariff elimination by the European Union, Japan, and other important markets. Since the end of the round, the U.S. government has continued to work within various bilateral and multilateral fora to secure Japanese interest and participation in a zero-tariff agreement on lumber and wood products.

In the **furniture subsector**, the Uruguay Round achieved a zero-for-zero agreement with key countries covering all furniture, not only wood, with tariffs to be eliminated over 5 years (i.e., by January 1, 1999). The U.S. government continues to be interested in eliminating furniture tariffs in countries that did not agree to tariff elimination in the Uruguay Round.

Congressional Authority Applicable to This Sector

Under the Uruguay Round Agreements Act (URAA)[7] and its accompanying Statement of Administrative Action (SAA), Congress listed several industrial or agricultural sectors in which complete tariff elimination was not achieved in the Uruguay Round but for which Congress determined that obtaining further reductions and elimination was a priority objective. Under section 111(b) of the URAA, Congress notes that despite the partial success achieved in the negotiations to eliminate tariffs in some sectors, this objective was not met in certain key sectors, especially lumber and wood products, nonferrous metals, and electronics.

The SAA states that "obtaining further reductions and elimination of duties in these sectors is a priority objective for U.S. multilateral, regional and bilateral negotiations." (Note: an example of multilateral negotiations would be those taking place under the auspices of the WTO; examples of regional negotiations include APEC, or the North America Free Trade Agreement.) In direct reference to the forest products sectors, the SAA drew particular attention to efforts to achieve further reductions in tariffs on lumber and wood products and to accelerated staging of tariff reductions on paper and paper products. The URAA provides the administration with limited residual authority to negotiate further reduction or elimination of tariffs on various product sectors; this authority has proven useful in subsequent bilateral and regional negotiations and further negotiations within the context of the WTO (for example, the Information Technology Agreement, which eliminated tariffs on many electronics items, was implemented by using this residual authority).

History of the ATL Proposal

In 1994, APEC leaders agreed to a goal of free and open trade in the APEC region by 2010 for developed countries and by 2020 for developing countries. To begin taking steps toward this goal, APEC Trade Ministers in mid-1997 called on APEC members to nominate sectors for early voluntary sectoral liberalization (EVSL). Within a group of over 60 proposals, the forest products sector received nominations from the United States, Canada, Indonesia, and New Zealand. In September 1997, the forest products proposals of the four countries were merged together in order to constitute the Forest Products EVSL initiative. New Zealand agreed to act as overall country coordinator for the proposal. Canada, Indonesia, and the United States remained active proponents of the proposal in a cosponsor role.

The merged proposal was intended to address trade barriers in the forest products sector (wood, rattan, pulp, paper, printed products, wood furniture, wood chemicals, and prefab housing) in a comprehensive manner, including tariffs, nontariff barriers, standards, and economic and technical cooperation. Each of the four cosponsors assumed responsibility for overseeing one element of the initiative: New Zealand for tariffs, Canada for standards, Indonesia for economic and technical (eco-tech) cooperation, and the United States for nontariff measures.

In November 1997, APEC leaders selected forest products as one of 15 EVSL sectors. Within that group of 15, forest products was selected as one of the nine for immediate action. In June 1998, APEC Trade Ministers agreed on a general framework for the sectors, including product coverage, end-dates and end-rates, and measures covered.

---

[7] 19 U.S.C. 3501 et. seq. (1994).

Between June and the November 1998 APEC Trade Ministers Meeting, APEC economies focused primarily on the tariff element of each sectoral initiative and the specific details of how economies could bring their tariffs into line with the agreed framework. At the APEC Summit in Kuala Lumpur in November 1998, APEC Leaders agreed to move the tariff portions of the sectoral EVSL initiatives to the WTO to seek a critical mass of support for concluding an agreement in all eight sectors by the end of 1999 (note: the telecommunications MRA–the ninth sector—did not contain a tariff component). Work on the other elements of the sectoral EVSL initiatives continues within APEC.

Tariff Initiative

The ATL initiative includes further reductions and acceleration in the timing of reductions of tariffs agreed to as part of the Uruguay Round.[8] Because of the existence of the Uruguay Round zero-for-zero agreement on pulp, paper, and printed materials, different disciplines were proposed for these commodities than for the other products covered by the proposal. The proposal is:

- For wood chemicals, wood, rattan, and wood furniture, developed countries would eliminate tariffs by January 1, 2002. The proposal suggests that developing countries should strive to meet the same targets, but accepts that in special circumstances and on a case-by-case basis, elimination could be delayed until January 1, 2004.
- For pulp, paper, and printed products, existing parties to the Uruguay Round zero-for-zero agreement would accelerate tariff removal to January 1, 2000. Others would attempt to remove tariffs by the same date, but developing countries could delay tariff removal until January 1, 2002, on a case-by-case basis for a limited number of specific products.

The above targets have been endorsed three times by APEC Trade Ministers—at Kuching in June 1998, Kuala Lumpur in November 1998, and Auckland in September 1999.

Nontariff Measures

The second element of the APEC forest products sectoral initiative concerned nontariff measures. The initiative called for the completion of a study of nontariff measures by October 1, 1998. (The date was subsequently modified to November 26, 1999.) After extensive discussions during the early part of 1998, an agreement was reached in Kuala Lumpur in April 1998, on the terms of reference for the study. The United States, as study coordinator, put forth a project proposal (CTI 17/99) based on the agreed terms of reference, which was endorsed by the Committee on Trade and Investment (CTI) in Kuching, Malaysia, in June 1998. Funding for the study in the amount of U.S.$150,850 was approved by the Budget and Management Committee in July 1998. A Request for Proposals was prepared and sent out to APEC countries, as well as posted on the APEC internet homepage, on April 16, 1999. Seven proposals were received within the specified timeframe and, subsequently, evaluated by the APEC Secretariat and the cosponsors. Based on the evaluation, Forest Research, a New Zealand-based firm, was selected by the APEC Secretariat to undertake the study.

---

[8] See table 11.

The contract obligated the consultant to produce a draft report by August 27, 1999, containing:

- A comprehensive inventory of nontariff measures and other policies impeding or distorting the trade of forest products within the APEC region
- An enumeration of the most frequently used measures and policies
- A qualitative and quantitative analysis of the impact of these measures and policies on trade, including a broader analysis of the policy goals underlying those measures and policies and the economic and environmental costs and benefits stemming from their application.

The APEC Secretariat circulated the draft report to APEC members in early September 1999 for their review and comment. The consultant is to take these comments under consideration, particularly any deficiencies, and prepare a final report. This report will then be taken up by the Forestry Experts Group, which is a yet-to-be defined body of forestry experts from APEC member economies. The group will develop appropriate recommendations during 2000 for the consideration of the CTI and Senior Officials.

The consultant relied heavily on available work or work underway on nontariff measures within APEC, the WTO, the Food and Agriculture Organization (FAO) of the United Nations, the International Tropical Timber Organization (ITTO), etc., and notifications by APEC economies. Each APEC member was asked to notify the Study Coordinator of measures and policies in its own country, as well as in other countries in the region, that impede market access and should be included in the study, as well as to provide a description of the measure and policy, and, if possible, its estimated trade and environmental impact. Only three APEC members (Hong Kong, Malaysia, and the United States) made notifications, even after repeated requests. The consultant also visited selected countries in the region and was encouraged to meet with the full range of interested parties in the various APEC member countries.

Standards and Conformance

The third element of the APEC Forest Products EVSL initiative includes working to develop an APEC position on standards involving the use of forest products. The APEC Committee on Trade and Investment, Sub-Committee on Standards and Conformance (SCSC) was established by the Declaration on an APEC Standards and Conformance Framework (November 1994). The principal objectives of the SCSC are to encourage alignment of standards of members with international standards; achieve mutual recognition among APEC economies of conformity assessment in regulated and voluntary sectors; promote cooperation for technical infrastructure development to facilitate broad participation in mutual recognition arrangements in both regulated and voluntary sectors; and ensure the transparency of the standards and conformity assessments of APEC economies.

Most of APEC's forest products standards work is focused on wood products and their use in construction applications. Canada has lead responsibility for this element of the EVSL package. Four technical groups relating to wood products and international standards in the areas of building and construction have been established. Ad hoc

groups on loading and structural design standards, performance-based housing, timber standards, and, recently, fire safety testing standards have been established. Country participation in these various ad hoc groups is voluntary. Reports of the work of these various ad hoc technical groups are available via the APEC web page *(http://www.apecsec.org.sg)*.

Economic and Technical Cooperation

The fourth element of the original APEC Forest Products EVSL initiative is economic and technical cooperation (so called ecotech), which is technical assistance to developing countries to support the broader APEC goals of trade liberalization and trade facilitation. Indonesia has lead responsibility for the eco-tech portion of the initiative. Members of APEC agreed that candidate initiatives for economic and technical cooperation should focus particularly on programs that further several environmental goals.

Members of APEC have agreed that candidate initiatives for economic and technical cooperation could include (a) cooperation to increase forestry knowledge and the ability to develop solutions to such forest-related issues as forest resource assessment using criteria and indicators of sustainable forest management; (b) cooperation to enhance local industry development in a sustainable manner through training programs on sustainable forest practices (e.g., prompt reforestation, protection of water quality, protection of special sites, and logger training), and more efficient use of by-products; and (c) cooperation to enhance collaborative work on forest fire prevention and management and the development of forest fire monitoring and information systems. It also would include enhanced cooperation to facilitate more liberalized trade in the forest product sector in areas such as standards conformance, training programs on topics such as recycling and waste reduction, simplifying customs procedures, and improving information and monitoring systems associated with harmful forest pests.

Chapter 4: U.S. International Forest Activities

Introduction

President Clinton has committed the United States to conservation and sustainable management of the world's forests, both at home and abroad. In June 1993, one year after the Rio Earth Summit, the United States became the first country to "commit to the goal of sustainably managing U.S. forests by the year 2000." Since then, the United States has joined more than 150 other countries in developing national level "criteria and indicators for sustainable forest management." These criteria and indicators identify for the first time the essential components of sustainable forest management and ways to assess trends in these components, which include conservation of biological diversity, maintenance of forest health and vitality, maintenance of productive forest functions, soil and water conservation, forest contribution to global carbon cycles, maintenance of socioeconomic benefits, and the policy framework needed to facilitate forest conservation and sustainable forest management.

The conservation of biological diversity, particularly in the tropics, has become a major focus of U.S. activities and investments abroad, notably through the U.S. Agency for International Development (AID), which has undertaken significant conservation programs in Africa and Latin America as well as parts of Asia.

Initiatives and Activities

Major International Agreements, Organizations, and Initiatives

The United States is active in various intergovernmental agreements, organizations, initiatives, and other fora that undertake forest-related work and policy discussions. Key among them is the Intergovernmental Forum on Forests, which was established under the U.N. Commission on Sustainable Development in 1997 with a time-limited mandate to continue the international forest dialogue begun by its predecessor, the Intergovernmental Panel on Forests (IPF), and to further implement the more than 100 proposals for action agreed by the IPF to promote sustainable forest management. The United States is a member of the 12-country Montreal Process Working Group on Criteria and Indicators for the Conservation and Sustainable Management of Temperate and Boreal Forests and will host the 11th meeting of the working group in November 1999 in Charleston, South Carolina. The United States initiated the G-8 Action Program on Forests, which world leaders launched at the Denver Summit in 1997 and endorsed a year later. A progress report on implementation of the G-8 Action Program will be submitted to G-8 leaders at the Okinawa Summit in 2000.

The United States is also a party to the International Tropical Timber Agreement (ITTA) 1994, the Convention on Trade in Endangered Species of Flora and Fauna (CITES), the U.N. Framework Convention on Climate Change, the Western Hemisphere Convention, and the Convention on Long-Range Transboundary Air Pollution, all of which have forest components or potential implications for forests. The ITTA is implemented through the Yokohama-based International Tropical Timber Organization with the purpose of facilitating discussion, consultation and international cooperation on issues related to international trade in tropical timber, including sustainable management of tropical forests used primarily for production. The Convention on Trade in Endangered Species of Flora and Fauna has established an ad hoc Timber Working Group to consider issues related to the listing on CITES appendixes of commercially traded timber species. The recently concluded Kyoto Protocol to the Climate Change Convention, which the United States has signed but not yet ratified, includes provisions for forests as carbon sinks. Although the United States is not a party to the Convention on Biological Diversity (CBD) or the Convention to Combat Desertification, it has provided funding under both treaties, which have forest-related mandates and, in the case of the CBD, an initial work program on forests.

The United States provides substantial resources for forests, particularly tropical forests, through its contributions to international organizations. As a member of the Food and Agricultural Organization (FAO) of the United Nations, which is the specialized U.N. agency with responsibility for forests, the United States contributes to global forest assessments, community-based forestry, technical assistance, and information gathering and dissemination. Other forest-related organizations and U.N. agencies supported by the United States include the U.N. Environment Program (UNEP), the U.N. Development Program (UNDP), the Center for International Forest Research, the Center for Agroforestry Research, and the World Bank (the world's largest forest donor).

Of special note is the Global Environment Fund (GEF), which was established in 1991 as a joint effort of the World Bank, UNDP and UNEP to fund the "incremental costs" of actions designed to achieve global environmental benefits. Two areas of project funding under the GEF, biological diversity conservation and climate change, are directly related to forests. Also of note is the G-7 Pilot Program to Conserve the Brazilian Rain Forest, which is an innovative multidonor program administered through the World Bank to promote conservation of the Brazilian Amazon and Atlantic Rain Forest. Support for the pilot program is provided by the United States through AID and the Department of State.

Bilateral Activities

The United States provides substantial bilateral technical and financial assistance on forests, primarily through AID. Sections 118 and 199 of the Foreign Assistance Act direct AID to include tropical forests and the conservation of biological diversity as priority development goals. Today, AID has a portfolio of 20 forest-related projects in 16 countries around the world, including many tropical countries. These projects are undertaken in partnership with local and U.S.-based nongovernmental organizations (e.g., the World Wildlife Fund, Conservation International, The Nature Conservancy), as well as with government partners. They support various activities in the areas of forest protection, policy formulation, training and institution building, watershed and related land use management, natural forest management, park and wildlife management, forest regeneration, fuelwood plantations and shelter belts, species inventory, and research.

The U.S. Department of Agriculture (USDA) Forest Service, working with AID, the Peace Corps, other USDA and U.S. government agencies, the private sector, and the nongovernment organization community, carries out many programs in other countries, including training and technical assistance in special emphasis areas such as forest assessment, ecosystem management, and fire management and suppression; technical exchanges between U.S. and international forest managers; natural disaster response; and cooperative research and scientific exchanges between U.S. and international scientists.

The U.S. Peace Corps, with AID programming support, has over 900 volunteers in 40 countries dedicated to natural resource-related projects, including community reforestation, forest management, nursery development, agroforestry, park management, and environmental education.

The National Science Foundation supports research on biodiversity and ecosystems. The Environmental Protection Agency has cooperative agreements for climate change research in Mexico, Brazil, and China. The National Aeronautics and Space Administration (NASA) works with other space agencies to improve remote sensing as a tool for general forest inventory, assessment, and monitoring, and for fire detection, management and suppression in particular; NASA also has a joint program with Brazil's National Institute for Space Research.

The U.S. Fish and Wildlife Service provides support for forest habitat and species management programs in Latin America and the Caribbean, training programs for protected area managers under the RESERVA program, and graduate level training and regional outreach institutes and clearing houses for information on biodiversity and habitat management in Latin America. The National Park Service has training programs for park managers in several countries.

The Animal and Plant Health Inspection Service guards U.S. borders against foreign agricultural and forestry pests and diseases through a search and monitor system. It uses biological controls and integrated pest management to help fight insects and plant diseases, including extensive domestic quarantines to control the spread of highly destructive insects and plant diseases such as the Asian long-horned and pine shoot beetles. The Animal and Plant Health Inspection Service also controls wildlife damage and helps protect endangered species.

The Department of State manages the U.S. Man and the Biosphere Program, which develops information inventories on forest flora and fauna in Latin American and other regions of the world. Under the former Special Fund for Global Change Research and International Cooperation, the Department of State funded several bilateral forest inventory, conservation, and management projects around the world, primarily in Brazil and Russia. Currently, the Department of State supports a modest project fund under its East Asia and Pacific environmental initiative. The original purpose of this initiative was to combat haze and air pollution problems and support forest management projects, in response to the catastrophic fires in Indonesia in 1997. It has since broadened its scope to include other environmental and forest-related projects in the region.

Debt-Reduction Activities

In 1998, the President signed into law the Tropical Forest Conservation Act (TFCA), which is intended to provide debt relief to qualifying developing countries to make funds available for forest conservation projects. Under the TFCA, part or all of a qualifying country's AID and PL 480 debt may be covered by three mechanisms: debt reduction, debt buy backs, or debt-for-nature swaps.

In 1991, the United States established the Enterprise for the Americas Initiative (EAI), which linked debt reduction and the generation of local funds for the environment and child survival projects in eligible Western Hemisphere countries. The United States has since signed agreements with Argentina, Bolivia, Chile, Colombia, El Salvador, Jamaica, and Uruguay to cancel $875 million in official (AID and PL 480) debt owed the United States; Peru signed an agreement to buy back debt owed to the United States valued at $177 million. Local currency interest payments over the life of the agreements (expected to total $154 million) are being used within these countries to support child development initiatives, as well as environmental and conservation programs, some of which may be forest related.

Since 1986, the United States through AID has provided $16 million in grants to non-governmental organizations for 17 debt-for-nature swaps in Bolivia, Cameroon, Chile, Cote d'Ivoire, Ghana, Jamaica, Madagascar, and the Philippines. These swaps have retired nearly $100 million in external debt and generated significant local currency for in-country forest conservation programs.

Loan and Loan Guarantees

The U.S. Overseas Private Investment Corporation supports private U.S. investment in developing countries and countries with economies in transition, including investment in the forest sector, via loan guarantees. These guarantees may be through insured or financed private investment for such projects as reforestation, improved plantation productivity, and forest concession management, as well as through an environmental investment fund using insurance and guarantee authority. The corporation has adopted a policy that prohibits financing of development projects in primary tropical forests.

The Export-Import Bank of the United States has environmental procedures and guidelines against which applications for financial support of foreign projects are evaluated. Forest sector projects, mainly pulp and paper mills, are evaluated for ecological soundness and mitigation measures.

Project sponsors are required to develop a forest management plan that considers, among other things, impacts on water resources, endangered and threatened species, and local communities from construction and operation.

This page has been left blank intentionally.
Document continues on next page.

Chapter 5: A Review of Literature on Forest Products Trade and the Environment

Introduction

This study's assessment of the economic and environmental consequences of the Accelerated Tariff Liberalization (ATL) initiative has drawn on an expanding, contemporary literature that examines various dimensions of the relations among forests, forest policies, timber harvest, international trade, and trade policies. An even larger body of published work can be used to examine general issues associated with the broad topic "trade and the environment" and the more specific question of the effect of tariffs on commodity trade.

In addition to providing background and context for understanding the issues that should be taken into account when assessing the ATL, this literature is especially useful in guiding expectations for the specific economic consequences that can be expected from tariff reductions. The literature provides evidence that reductions in tariffs up to and including the North American Free Trade Agreement (NAFTA) and the Uruguay Round of the General Agreement on Tariffs and Trade (GATT) have impacted forest products trade. Most estimates of the magnitude of this impact, however, suggest that it has been generally small, even for tariff reductions that are larger in magnitude than those proposed in the ATL initiative. This supports the conclusion that further (even smaller) reductions in tariffs, and acceleration in the timing of reductions are likely to have small impacts on trade, production, and consumption.

In the last 10 years, links between international trade and the environment have been an increasingly common topic in both academic and popular literature. This review is not designed to address all of this literature—or all of it with direct relevance to forestry. Rather, the focus here is on the parts of this literature that contribute to examination and anticipation of the economic and environmental effects of tariff reduction.[1]

It is a safe generalization that there are sharply differing views on whether increasing trade is good or bad for the environment.[2] Arguments that trade is harmful to the environment emphasize, for example, that greater dependence on the international economy reduces local self-reliance, encourages greater consumption, and reduces the effectiveness of domestic environmental regulations. The possibility that developed countries exploit developing countries in trade relations—in effect, exporting environmental damage—is also a basis for concern.

Arguments in favor of freer trade emphasize that trade promotes economic growth and may enhance environmental quality by increasing the ability and willingness of a country to pay for environmental protection measures. A further argument in favor of expanding trade is that international trade facilitates the diffusion of technologies that have various environmental benefits.

These arguments often are a reflection of differing philosophical views more than they are based on analysis or a close reading of academic literature. Among other factors, the complexity of economic and environmental interactions, and the absence of reliable data, has limited empirical investigation of trade and environment questions (Dean 1992a). Although there is a general consensus among economists that policies that attempt to directly correct environmental externalities are typically more efficient than trade policies in achieving environmental ends, there are few empirical studies of the different policy options.

Four broad issues relating to trade and forests are addressed here: (1) the connection between trade and forest resource conditions, (2) the effect of trade policies on the forest sector, (3) the impact of environmental and resource policies on domestic industries, and (4) the suitability of trade measures for achieving environmental objectives.

---

[1] This review is adapted from Tomberlin et al. (1998) and draws on Schallau (1999).

[2] These views are well displayed in public comments on the ATL (see chapter 7).

Issues Related to Trade and Forests

Trade and Resource Conditions

It is difficult—and perhaps ill-advised—to try to draw broad conclusions about the relation between international trade in timber and forest resource trends and conditions. Although much of the literature addressing this topic has focused on deforestation in tropical, developing countries, international forest policy issues are no longer restricted to tropical countries and forests. Even within the tropical zone, however, there are widely different economic conditions and institutions for land ownership and management, and diverse ecological conditions. Consequently, it is nearly impossible to make broad, simple statements about dependence on trade (either economy-wide, or for forest-based industries), resources, and harvest methods used to support export-oriented industries, or the ecological consequences of failure to conserve and protect forests.

The U.N. Food and Agriculture Organization (FAO 1999b) summarizes the view that timber trade is not the major cause of tropical deforestation. Among the studies that report empirical results that support this conclusion are Amelung (1991), Barbier and Burgess (1997), Barbier (1994), and Barbier et al. (1994, 1995). Amelung (1991) suggests that more than 80 percent of deforestation in tropical countries (defined as permanent forest loss) is attributable to agriculture.[3] Johnson (1991) estimates that 18 percent of tropical deforestation is attributable to commercial logging, and 10 percent to fuelwood gathering; the remainder is attributable to agriculture and cattle ranching. Although these studies suggest a relatively minor role for timber harvest and trade, commodity production and export markets are identified as factors in this process.

Many authors acknowledge the direct effects of agriculture in deforestation but argue that timber harvest is a factor in both forest degradation and in the sequence of events that may eventually lead to deforestation. Marchak (1995), for example, asserts that logging has a greater impact (than suggested by the results described above) because it sets the stage for agricultural clearing. Braga (1992) also argues that the effort to break down the causes of deforestation by activities ignores their interconnection. Menotti (1998) argues "globalization" contributes to forest loss in developing and developed countries; examples of globalization include free trade agreements, integration of financial markets, and the Structural Adjustment Programs of international lending institutions. Recent efforts to identify the "underlying causes" of deforestation and the interaction among these causes are described by Verolme and Moussa (1999).

Much empirical work has been done on land use competition and forest land conversion. El Nagheeb and Bromley (1994) trace deforestation in the Sudan to the collapse of the international gum Arabic trade. Coxhead and Jayasuriya (1993) find that employment effects in other sectors are a crucial determinant of land clearing in the

---

[3] Deforestation is a permanent change in land use from forest cover to another use, such as clearing forests for agriculture. Table 4 (chapter 6) summarizes recent data on patterns and trends in forest area. Forest degradation is somewhat more difficult to define but generally is taken to refer to a significant reduction in ecological and other characteristics of forests, often through timber harvesting.

upland Philippines; Thiele and Wiebelt (1994) report similar findings for Cameroon. Vincent and Hadi (1991) analyze the effect of a boom in the world market for rubber and palm oil on deforestation in Malaysia, concluding that the long-term yields of these tree crops enables them to move into forested areas where other agricultural endeavors could not be profitable. This literature suggests that the effects of trade on sectors that compete with forests for land can be significant, although accurate quantification of the effects is difficult.

The results of Grossman and Krueger (1993) on income as a factor in environmental degradation suggest that the relation between economic growth and environment is a particular concern in developing countries. Chichilnisky (1993) shows that property rights problems in developing countries make them more vulnerable to environmental degradation owing to trade with industrialized countries. Ritchie (1992) argues that property rights problems in developing countries may themselves be worsened by trade, as the incentive to own land for export crop production causes smallholders to be further marginalized by more powerful interests. Experience in developed and developing countries suggests that other factors, notably land tenure and public land management decisions, are equally important determinants of the issue, but that low income levels are generally associated with resource degradation (Kaimowitz and Angelsen 1998).

Trade Policies and the Forest Sector

Sector models have been used to examine forest products trade issues for some time.[4] Interest in the effects of regional trade agreements (such as NAFTA) increased the amount and variety of attention given to model-based analysis of trade policies. Examples of recent work include investigation of the impact of U.S. tariffs on timber imports from Canada (Boyd et al. 1993); they conclude that removing tariffs would result in a 4.5-percent increase in Canadian softwood exports to the United States. Prestemon and Buongiorno (1996) use partial equilibrium trade models to examine the effects of NAFTA on forest products trade in North America, whereas Boyd and Krutilla (1992) explore the same issue in a general equilibrium framework. These studies demonstrate that changes in trade regulation seem likely to have an effect on the volume of trade—and therefore on levels of production of at least some forest products. Consequently, there(ticowo atte.9(es f)30.1(ktheeemnkion be9)10.9(eof tr)9.9(ade poli
Man(le)14y [(studito 2e)30.9(3)24.9(e)add9(on usef the impact ts t1r)9.9e quigener

Several studies conclude that log export restrictions (such as those applied by Indonesia) have been economically inefficient and have exacerbated environmental degradation by encouraging wasteful resource use (Braga 1992, Gillis and Repetto 1988, Manurung and Buongiorno 1995). Deacon (1995) disputes this conclusion, arguing that employment policy and not log export policy per se is the key element in the link between timber trade policy and the forest.

An important and relevant point of debate has been whether international trade creates environmental problems or merely exacerbates existing ones. Most economists believe that the most significant environmental effect of trade is to make existing problems worse. Anderson and Blackhurst (1992), for example, emphasize the fundamental role of government and market failures as the cause of environmental degradation, whereas Dean (1992b) states categorically that trade does not cause pollution. Ropke (1994) takes the opposite position, arguing that trade is inherently detrimental to the environment. Within the forestry literature, similarly disparate views are represented by Vincent (1992), who argues that trade can potentially protect the forest by enhancing its market value, and Nectoux and Kuroda (1989), who claim that Japanese demand for tropical timber is responsible for significant forest destruction in Southeast Asia.

Perhaps the most direct influence of international trade on forests is through the effects of international markets on prices and, as a result, on the commodity production and management decisions of forest owners. In contrast to the general downward trend in commodity prices, deflated forest products prices have tended to fluctuate around a stable or somewhat increasing average (Lyon and Sedjo 1992). In the short run, the effect of higher prices on forest conservation is ambiguous: higher prices are an incentive to exploit and market forest resources, but they also provide an incentive to retain forests (rather than convert land to other uses). Higher prices also enable forest owners to use harvest techniques that may be more environmentally benign but more costly. Over a longer period, timber prices affect investment in afforestation and plantation development.

Lyon and Sedjo (1992) argue that the primary determinants of comparative advantage in timber have shifted from harvest and transport costs to the ecological and other costs of afforestation and reforestation. They conclude that long-term real price increases have reduced the comparative advantage of remote natural stands in the long run. Such changes in trade and harvest patterns have direct implications for the distribution of environmental costs and benefits associated with the forest resource. Thus, opportunities for international trade link harvest decisions and associated environmental impacts across countries.

Although sector models provide a framework for linking changes in trade and production, predicting the effects of changes in timber harvest on the environment is more difficult. Important factors conditioning the degree and distribution of forest impacts are the market-responsiveness of landowners, the source of harvest (primary, secondary, or plantation forests), domestic policies and institutions, and market structure. Perez-Garcia (1995) uses a coefficient to relate timber harvest levels to land use change in

order to explicitly link trade-induced changes in harvest to environmental change. Although such a conversion factor is useful as a rough estimate of one important environmental consideration, it does not account for the distribution of harvest across wood sources (types of forests, i.e., primary, secondary, or plantation), which may be a more important determinant of environmental impact than simply the amount of harvest. Furthermore, as noted by Barbier et al. (1995), management practices are at least as important a determinant of forest degradation as the level of harvest.

The possibility that domestic forest sector policies might transfer environmental impacts to other countries via international market pressure has been examined with regard to log export restrictions and timber supply reductions in the United States. Brooks (1995) argues that the global environmental effects of reductions in federal timber harvest in the West are unlikely to be large, owing to the relatively small contribution of the U.S. Pacific Northwest to world timber supply. Brooks (1995) concludes, however, that because there is no basis for comparing the various international environmental consequences, the net international environmental effects are uncertain. Using a global trade model, Perez-Garcia (1993, 1995) suggests that the international impact of domestic restrictions on production or export may be substantial. Using a different model, Sedjo (1996) demonstrates that reductions in U.S. timber harvest will alter patterns of production and could have significant international environmental effects.

In the last decade, several studies have attempted to examine the effects of trade agreements—and specifically tariff reductions—on forest products trade. Barbier (1999) builds on and extends his earlier studies of the effects of the Uruguay Round (Barbier 1995, 1996). Although the overall effects of the agreement (considering all sectors) are expected to be significant, neither Barbier (1999) nor Brown (1997) expect large changes in forest products trade to be a consequence of the Uruguay Round. Barbier (1996, 1999) estimates the likely effects to be an increase in trade in the range of 0.4 to 0.5 percent (calculated on a value basis). The calculation of such a small increment in trade is based on the fact that tariffs on forest products are already low, and the market response to price changes is typically low (Brown 1997, Barbier 1999). Bourke and Leitch (1998) point out that the effect of the Uruguay Round is likely to be greater for some products (such as wood-based panels and value-added products), and that results will differ widely across countries based on the complexity of existing trade flows.

Environmental Policies and Domestic Industries

In the 1970s, the potentially adverse effects of environmental legislation in the United States and Europe on trade competitiveness were researched in some detail. Examples of this work include d'Arge and Kneese (1972) and Walter (1975). Less demanding environmental regulations may confer a cost advantage, leading to more production in pollution-intensive industries in countries with lax environmental protection (Srinivasan and Bhagwati 1995). Dean (1992a) provides a survey of evidence on the importance of environmental regulations to trade, addressing shifts in trade patterns owing to regulation; and relocation of industries across regulatory regimes.

The first question has been addressed by several researchers using both partial and general equilibrium approaches. In general, findings indicate the effects of regulation on trade range from small but significant (Robison 1988) to no clear impact (Leonard 1988, Tobey 1990). More recent work cited in Jaffe et al. (1995) reaches similar conclusions.

As to the extent to which whole industries have shifted locations in response to regulation, Dean (1992a) notes that industries might move because of comparative advantage in the ecological function of forests (e.g., a greater capacity for assimilating pollution) or because of the undervaluation of ecological function. Jaffe et al. (1995) point out that industrialized countries historically have exported most of the pollution-intensive goods on the world market (although the share of developing countries has increased), and that demand for the products of polluting industries is largely domestic.

Research on the competitive effects of forest sector regulation is much less developed than the environmental economics literature surveyed by Jaffe et al. (1995). Although there are no studies that explicitly link the international location decisions of forest products industries to environmental regulations, there is evidence that an increasing share of world harvest of timber for industrial manufacturing takes place in developing countries. Many of these countries have a combination of environmental assets (such as forest-based biological diversity), export-oriented macroeconomic policies, and weak or poorly enforced land use regulations. There is, therefore, an obvious basis for examining the role of international markets in causing environmental damage, and the effect of domestic policies on trade performance. Complicating the assessment of the role of environmental regulations in timber industry expansion are the role of favorable growing conditions in the tropics, the resulting expansion of forest plantations, and the fact that domestic markets in developing countries are among the fastest growing markets for various wood and other products.

Trade Measures for Environmental Objectives

Environmental and other regulations have had identifiable consequences on forest products trade flows. Opinion is strongly divided on the suitability of trade interventions to achieve environmental ends. In addressing domestic externalities, Perroni and Wigle (1994) conclude that trade restrictions are a poor substitute for direct interventions. Runge (1994) and Subramanian (1992) concur with this position, but Srinivasan and Bhagwati (1995) argue that trade sanctions against international polluters may improve global welfare in certain situations.

Barbier and Rauscher (1994) analyze various domestic and international policies intended to promote sustainable forest management in the tropics. In addition to providing a useful general model for the analysis of such policies, they derive conditions under which trade interventions support or hinder conservation policies and demonstrate the superiority of international transfers to trade restrictions as a way to conserve the forests. Barbier et al. (1995) conclude that “there seems little scope for the use of trade policy interventions as a means to reducing tropical deforestation in Indonesia.”

Buongiorno and Manurung (1992) find that European importers of tropical timber would bear the burden of import tariffs intended to diminish forest exploitation, whereas tropical exporters would be able to sell to other markets. This illustrates the potential importance of market power in the effectiveness of market-based environmental policies. Perroni and Wigle (1994), in arguing that trade and environment links are, in fact, weak, note that the links would have been stronger had they not assumed perfect competition in their model. Although the existence of significant economies of scale or market power in trade might suggest the opportunity for welfare-enhancing trade interventions, research into the conditions under which such opportunities exist has not produced broadly applicable results. Barbier and Rauscher (1994) argue that market power, by enabling a country to extract greater unit revenues, may contribute to conservation. In contrast, Karp (1996) finds that market power can actually reduce profits for a monopoly producer of a nonrenewable resource.

Chapter 6: Model-Based Analysis of the Effects of the Accelerated Tariff Liberalization Initiative on Trade in Forest Products

Introduction

Two forest products trade models were used to examine the possible effects of the Accelerated Tariff Liberalization (ATL) initiative on world trade, production, and consumption of forest products. These models provide a means of examining the magnitude and direction of changes likely to result from the ATL within a consistent framework that explicitly accounts for and quantifies market dynamics. Among the most important of these dynamic changes are the magnitude of consumption response to changes in price (resulting from tariff reductions) and the magnitude and location of changes in production in response to market opportunities.

As with any model, the simulations and scenario analyses cannot be taken as exact descriptions of the likely outcome should the ATL be implemented.[1] The scenarios can, however, be taken as clear demonstration of the direction and approximate magnitude of change that can be expected from the ATL. The models provide evidence that the likely effect of the ATL on production and consumption is small, evidence that the ATL likely will affect the structure of forest products trade, and an indication that the ATL is unlikely to have a uniform effect on timber harvesting, even within broad regions or country groupings.[2]

The two models used for this analysis provide different but complementary opportunities for examining the effects of the ATL. The Global Forest Products Model (GFPM) is based on the Price Endogenous Linear Programming System (PELPS III) (Zhang et al. 1993), with recent modifications.[3] The model simulates market equilibrium by mathematical programming and solves for equilibrium quantities and prices by maximizing the value of the products, minus the cost of production, subject to material balance and capacity constraints in each country and each year. Because material flows throughout the system must balance, the model ensures data consistency within countries and coherence of projections between countries. The general principle of the GFPM is that global markets optimize the allocation of resources in the short run (within 1 year). Longrun resource allocation is partly governed by market forces, as in capacity expansion and trade, and partly by various policies, such as timber supply shifts determined by forest policy, waste paper recovery rates by environmental policy, and trade by tariffs that change the cost of imports.

The GFPM provides a representation of 180 countries and all major forest products (aggregated into 14 groups). In its parameters and data, the GFPM relies directly on the most commonly used database describing international trade in forest products: production and trade data compiled and reported by the Food and Agriculture Organization (FAO) of the United Nations.

Earlier versions of PELPS and the GFPM have been used by the United States and Canada Forest Services to develop a pulp and paper markets model in North America (the NAPAP model) and a solid wood product markets model in North America (the NASAW model), and by the International Tropical Timber Organization (ITTO) to develop an Asia-Pacific tropical timber trade model. The Asia-Pacific Forest Products Model (Zhang et al. 1997) also was built with PELPS, and the FAO 1999 forest products outlook study included GFPM-based projections (Zhu et al. 1998).

---

[1] Large-scale trade models are seldom able to replicate—or predict—bilateral trade flows; nevertheless, large-scale forest sector models in which trade is explicit often provide reliable indications of broad trends in production and consumption.

[2] Neither of the models used in this analysis provides the opportunity to link projected changes in timber harvests to specific types of forests (i.e., primary, secondary, or plantation) within countries or regions. Knowledge of resource conditions and general patterns of production, however, provides a basis for inferring these consequences.

[3] This analysis of the ATL was supported in part by a research joint venture agreement (98-7037-RJVA) between the USDA Forest Service, Pacific Northwest Research Station and the University of Wisconsin.

The second model used to examine the ATL is the CINTRAFOR Global Trade Model (CGTM) (Cardellichio et al. 1989).[4] This model is an extension and revision of the Global Trade Model (GTM) developed at the International Institute for Applied Systems Analysis (IIASA) (Kallio and others 1987). The CGTM provides a detailed description of the solid wood sector (logs, sawnwood, and plywood) of world forest products markets. In many respects, the structure and the theoretical assumptions about market behavior in the CGTM are comparable to those in the GFPM: the CGTM is a spatial equilibrium model that simulates the behavior of producers and consumers in competitive markets. The CGTM projects production, consumption, trade, and prices of eight forest products in 43 regions, some of which are portions of large producers (such as the United States, Canada, and Russia).[5] The CGTM provides a more detailed description of the solid wood sector (for example, distinguishing product groups by species) as compared to the GFPM. The CGTM, however, does not provide information on likely changes in trade in paper and paperboard products, and does not provide separate representation of all countries in all regions.

The CGTM has been used to examine several trade and resource policy questions that include the global impacts of reductions in timber supplies, the international market impacts of climate change mitigation programs, and log export restrictions in North America (see Perez-Garcia et al. 1997 and Perez-Garcia 1993, 1994). Because there are limits to the CGTM specification of the world forestry sector (notably, the absence of a pulp and paper sector), the analysis of the ATL using this model is not as comprehensive as that provided by the GFPM. Nevertheless, the CGTM provides an opportunity to extend the analysis of the effects of the ATL, especially for key countries of interest (such as the United States) and for selected products.

Scenario Analysis of the ATL Initiative

In each model, the ATL initiative was examined by means of "scenario analysis." To do this, a baseline projection was developed with each model, and the likely effects of the ATL were calculated by comparing this baseline to a second simulation in which tariff changes proposed by the ATL are introduced. Based on the structure of the models, and the design of the ATL scenario, this approach has two important characteristics: (1) only the incremental effects of the ATL are displayed, and (2) the ATL model scenario tends to overstate the possible effects of the actual ATL initiative.

---

[4] This analysis of the ATL was supported in part by a cooperative research agreement (98-7033-CA) between the USDA Forest Service, Pacific Northwest Research Station and the University of Washington.

[5] Some countries and regions in the CGTM are "non-responsive;" that is, projected production, consumption, and trade are assumed and not computed.

Incremental effects of the ATL—By design, this analysis examines only the incremental effects of the ATL. The analysis is not an attempt to assess the effects of trade liberalization in general, or the Uruguay Round.[6] Several studies, both analytical and qualitative, have attributed the expansion in forest products trade in the postwar period to a combination of tariff reductions and a broad set of national and multilateral actions designed to promote greater economic integration. Patterns of world population and economic growth also have been factors in the greater importance of trade over the past 50 years. The model-based analyses described here do not explicitly assume or examine these trends and relations. Instead, the effects of the ATL are examined with all other factors influencing production, consumption, and trade held constant at the values assumed in the baseline projection.

The likelihood of changes in these other factors, and their influence on production, consumption, and trade, must be considered when evaluating these model-based results. For example, among the plausible effects of increasing trade and more open markets are (1) the diffusion of manufacturing technologies and (2) increasing incomes (as compared to a future in which trade is restricted).

In the scenario analysis, however, trends in both technology and income are identical to those in the baseline. Changes in technology can be expected to lead to reductions in consumption. Increases in income contribute to increases in consumption of some kinds of wood products, such as paper products and construction materials—as well as greater interest in the ecological function of forests and decreases in consumption of some other wood uses, such as fuelwood.[7]

Overstating the effects of the initiative—Model structure and scenario design combine to produce a "maximum-effect" analysis of the ATL. This is largely by design. Where it was necessary to make judgments, the preferred approach was one that would emphasize rather than de-emphasize the possible effects of the initiative. Two aspects of the approach to scenario design illustrate this. First, in the baseline projection for each model, tariff rates for each country are applied uniformly to commodities imported from all sources. Many developed countries, however, already allow goods produced in developing countries to enter at reduced tariff rates through the Generalized System of Preferences. In addition, the analysis also does not explicitly account for the effects of provisions of existing regional trade agreements (RTAs), and RTAs currently under negotiation, many of which liberalize trade in forests products. The structure of these trade models does not allow for exact and detailed representation of the complex structure of tariffs as applied by all countries—such as country-specific tariff rates. Consequently, the projections are likely to overstate the effects of tariff elimination, especially in terms of imports from (exports by) developing countries.

---

[6] See chapter 5 for description of some literature that addresses these questions.

[7] Decreasing consumption of fuelwood is associated with increasing income.

The ATL scenario also assumes full and immediate implementation of the initiative by all Asia-Pacific Economic Cooperation members (and selected "critical-mass" countries such as the European Union and Brazil). The initiative does allow, however, developing countries to delay full implementation until 2004. In combination, all these characterizations of the ATL produce comparisons to the baseline that are likely to overstate the effects of the ATL, especially with respect to changes in exports and production in developing countries.

Second, both models simplify the large number of forest products to which tariffs are applied by using aggregate commodities. In both models, the aggregate commodities are roughly equivalent to the four-digit level of aggregation of the Harmonized System. Because tariff rates are specified by countries at the six-digit (or more detailed) level, it was necessary to calculate or assign weighted average tariffs for the aggregate commodities. In general, this approach is more likely to overstate than to understate tariffs because some commodities (within the aggregate) will be assigned higher tariffs than are actually applied. This too, therefore, will contribute to a tendency for these models (and the assumptions associated with the ATL scenario) to overstate the effects of complete elimination of tariffs.

Model Results[8]

Results of the simulation of the effects of the ATL using the GFPM are summarized in tables 12 through 15; results using the CGTM are summarized in tables 16 and 17. Because there are differences in their scope and structure, as described above, these models cannot be expected to produce identical results. Nevertheless, the models provide a broadly consistent indication of the likely effects of the ATL. Based on both models, the effects of the ATL are likely to include:

- The absence of significant changes in production and consumption, at the world scale. For both models, and all products, production and consumption change by less than 1 percent, and typically by less than 0.5 percent, compared to the baseline, in 2010.
- Changes in the commodity composition of trade (a shift toward more processed products), and in geographic patterns of production and trade. Both models indicate that the ATL is likely to increase production in, and exports from northern Europe, Oceania (Australia and New Zealand), South America (Chile), and Asia (Indonesia and Malaysia).
- The likelihood of changes in U.S. trade (both imports and exports)—accompanied by little or no net effect on U.S. production and consumption. Both models indicate the likelihood of reductions in U.S. exports of logs and increases in exports of some processed products.

---

[8] Neither of the models used in this analysis provide explicit information on the statistical properties of their projections, such as standards errors. Nevertheless, in evaluating the results of the scenario analyses, it is appropriate to interpret the results with the understanding that there is a magnitude of change that is indistinguishable from no change. Based on previous experience with these and other large-scale models, the magnitude of change (ATL scenario compared to the baseline) that is judged to be indistinguishable from no change is any figure less than 0.5 percent.

Table 12—Summary of the effects of the ATL across all regions, as compared to baseline, using the global forest products model

Product	Change in 2010 as compared to the baseline	
	Production and consumption	Trade
	- - - - - - - - - *Percent* - - - - - - - - -	
Industrial roundwood[a]	.5	-5.5
Sawnwood	.3	4.5
Wood-based panels	-.1	6.3
Wood pulp	.2	1.1
Paper and paperboard	.0	1.7
All products[b]		2.0

[a] Industrial roundwood production is equivalent to timber harvest.

[b] Weighted average (weights are based in the 1996 value of trade).

Source: Global Forest Products Model (Zhu and others 2001).

Table 13—Expected changes in U.S. consumption, production, and trade in 2010 attributable to the ATL[a]

Product	Change in 2010 as compared to the baseline			
	Consumption	Production	Imports	Exports
	- - - - - - - - - - - - - - *Percent* - - - - - - - - - - - - - -			
Industrial roundwood	1.1	0.1	0.3	-35.5
Sawnwood	.0	3.1	-8.4	5.3
Wood-based panels (all)	.2	-2.4	14.8	1.0
of which:				
Veneer and plywood	.0	-2.0	17.3	.8
Particleboard	.6	-3.9	16.1	-9.9
Fiberboard	-1.2	.7	-17.1	9.2
Paper and paperboard (all)	-.2	.2	-3.8	-.2
of which:				
Newsprint	.1	1.6	-2.8	-.9
Printing and writing	-.6	-1.4	-4.3	-26.6
Other paper and board	.0	.9	-4.9	4.5

[a] Percentage of change in ATL scenario in the year 2010 compared to baseline; quantity basis, various units (roundwood, sawnwood and panels are cubic meters; paper and paperboard are metric tons).

Source: Global Forest Products Model (Zhu and others 2001).

Table 14—Projected change in timber harvest resulting from the ATL, by region, in 2010, compared to the baseline

Region	*Million cubic meters*	*Percent*
Africa	-734	-0.9
North and Central America	-5,858	-.4
South America	1,580	.9
Asia	4,976	1.1
Oceania	3,313	5.8
Europe	6,337	1.7
Former U.S.S.R.	-3,476	-2.7
World	9,138	.5

Source: Global Forest Products Model (Zhu and others 2001).

Table 15—Expected changes in patterns of timber harvest by country and type of forest, resulting from the ATL, compared to baseline, in 2010

Country	Change	Forest type [a]
	Percent	
Countries in which timber harvests are likely to increase:		
Malaysia	2.6	Primary/plantation
Indonesia	4.4	Primary/plantation
Chile	0.5	Plantation
New Zealand	3.8	Plantation
Australia	9.2	Plantation
Finland	11.0	Secondary
Sweden	7.6	Secondary
China	1.4	Secondary/plantation
Countries in which timber harvests are likely to decline:		
Russia	-4.1	Primary
Mexico	-2.1	Secondary
Canada	-1.4	Primary
Korea	-11.2	Secondary
France	-6.4	Secondary
Germany	-2.1	Secondary
Portugal	-2.5	Plantation
Japan	-5.8	Plantation/secondary

[a] "Primary" forest refers to relatively undisturbed forests of natural origin; "secondary" forest refers to forests in which there has been at least one cycle of harvest and regrowth; "plantation" refers to plantations of both native and exotic species.

Source: Global Forest Products Model (Zhu and others 2001).

Table 16—Summary of the effects of the ATL across all regions, as compared to the baseline, using the CINTRAFOR Global Trade Model (CGTM)

	Change from baseline in:			
	2000	2010	2000	2010
Product	Production and consumption		Trade [a]	
	- - - - - - - - - - - - - - - - Percent - - - - - - - - - - - - - - - -			
Softwood plywood	0.30	0.08	5.90	12.90
Softwood lumber	-.14	-.03	9.11	5.67
Softwood pulpwood	-.28	-.33	1.04	1.05
Softwood sawlogs	.14	.24	-4.16	-4.20
Hardwood plywood	.36	.62	1.00	2.05
Hardwood lumber	.00	.11	1.11	.95
Hardwood pulpwood	-.03	-.04	-.01	-.01
Hardwood sawlogs	.06	.08	.28	.28

[a] These data overstate the effects of the ATL on international trade because the model divides some countries into multiple regions and counts the internal trade among regions of those countries.

Source: CGTM (Perez-Garcia, in press).

Table 17—Summary of the effects of the ATL on U.S. production, consumption and trade, in 2010, compared to the baseline, using the CINTRAFOR Global Trade Model (CGTM)

Product	Production	Consumption	Imports [a]	Exports
	- - - - - - - - - - - - - - - - Percent - - - - - - - - - - - - - - - -			
Softwood sawlogs	0.48	1.00	0.00	-7.30
Softwood sawnwood	1.10	-.40	1.04	20.00
Softwood plywood	.12	-.23	NA	79.94
Hardwood sawlogs	.39	.39	.00	.39
Hardwood sawnwood	.40	-.22	.54	3.94
Hardwood plywood	.00	.00	.00	.00

[a] These changes (in imports and exports) overstate the effects of the ATL on international trade because the model counts internal trade among regions of the United States.

NA = not applicable.

Source: CGTM (Perez-Garcia, in press).

- Finally, both models suggest that the ATL is likely to change timber harvests in several countries, but both models indicate the likelihood that the net effect at the world scale will be small—less than a 0.5-percent increase in timber harvests for industrial products.

It also is important to note that these results are consistent with expectations formed from a review of literature describing analyses of forest products trade (see chapter 5) and an analysis of tariff removal using a multisector, general equilibrium model.

Table 12 summarizes the effect of the ATL on world production, consumption, and trade (in 2010, compared to the baseline) projected by using the GFPM. World consumption and production of forest products—and the timber harvested ("industrial roundwood" in table 12) to manufacture these products—are expected to change relatively little because of further and accelerated tariff reduction. The ATL is likely to have a much greater effect on trade than on consumption and production. At the world scale, expected changes in trade of manufactured products range from an increase of about 1 percent (wood pulp) to more than 6 percent (wood-based panels). Trade in raw material (industrial roundwood) is projected to decrease, by nearly 6 percent (table 12).

Table 13 summarizes the GFPM-based estimates of effects of the ATL on U.S. production, consumption, and trade. Consumption of forest products in the United States is largely unaffected by the initiative, although production and trade are projected to change. The initiative is expected to lead to increasing consumption of industrial roundwood (i.e., increased domestic manufacturing of timber-based products). Because exports of raw material are projected to decline, however, there is no net increase in timber production (table 13). The initiative is projected to reduce U.S. log exports by more than 35 percent. The effects of the initiative on U.S. production and trade in manufactured products are greater than its effects on U.S. consumption and include both increases and decreases. These results are consistent with the magnitude of tariff changes in the initiative and the fact that trade accounts for a low percentage of U.S. production and consumption (see table 1).

The absence of significant effects on timber production and consumption—at the world scale—suggests that the most significant (prospective) environmental effects of the ATL will be on the location of production. That is, the initiative may lead to changes in the forests where harvesting occurs, even if it does not lead to changes in the aggregate level of production. Table 14 summarizes GFPM-projected changes in timber harvests, by region, that are the result of the changes in production and trade. Among developing countries, changes are expected to be relatively small (less than a 5-percent increase in timber harvest as compared to the baseline). Expected timber harvest increases in developed countries that are likely to result from the ATL are relatively larger (around 10 percent).

The ATL also is unlikely to alter the proportion of the world's timber harvest that comes from developing (including tropical) as compared to developed countries (see table 14). Developed countries are likely to account for at least two-thirds of increases in timber production resulting from the ATL; developed countries also will account for most of the expected decreases in production. The contribution of developing countries to the world's industrial timber harvest is expected to increase, although slightly, either with or without the ATL. Developing countries currently account for about 30 percent of industrial timber production (see table 5); this is likely to increase to about 33 percent by 2010, based in part on increasing production from plantations.

Model-based projections were combined with information on current and prospective future patterns of timber production to estimate possible impacts of the initiative by type of forest. The type, location, and magnitude of change shown in tables 14 and 15 are confirmed by Sedjo and Simpson (1999). Based on the low magnitude of changes in timber harvesting indicated by both models (see tables 14 through 16), as well as prospective changes in patterns of trade, the analysis concludes that the ATL will have little effect on the type of forest likely to be harvested in the future. Table 15 combines information from the GFPM with information from contemporary resource assessments and assessments of current and prospective future forest and plantation management.[9] In both the baseline projection and in the ATL projection, the share of timber harvest coming from "primary forests" will continue to decline as intensively managed, secondary forests and forest plantations increase in importance (see tables 10 and 11). The ATL is likely to reinforce the baseline trend.

Simulation of the effects of the ATL using the CGTM produces results similar to those provided by the GFPM: the model projects relatively small changes in production and consumption (including decreasing consumption of some products), at the world scale, and increasing trade in products. As with the GFPM, the CGTM simulation indicates that the ATL is likely to reduce trade in logs, especially softwood logs. Table 16 summarizes the effects of the ATL as predicted by the CGTM. Here, too, the initiative is expected to have relatively little effect on total production and consumption, and a much greater effect on the level of trade and patterns of trade.

For softwood lumber, the CGTM results indicate that tariff elimination is likely to lead to increases in trade but a decline in production and consumption at the world scale. The sequence of market adjustments that produce these results is the following: lower tariffs initially reduce prices and increase consumption in many markets (especially in Asia). Eventually, these increases in demand lead to higher prices in markets where tariff elimination has relatively little direct effect (such as North America and Europe). Reductions in domestic consumption in large producing (and exporting) regions outweigh increases in consumption in other regions. Nevertheless, the ATL is expected to increase softwood lumber trade by nearly 6 percent by 2010, compared to the baseline (see table 16). The initiative is expected to have relatively little effect on world production and consumption of hardwood lumber, and only a modest effect on hardwood lumber trade (an increase of about 1 percent).

---

[9] Sources of information on current resource conditions and prospective changes in timber harvest and management include Solberg (1996), FAO (1999a, 1999b), and ABARE (1999).

The results shown in table 16 suggest that tariff elimination will likely have a similar effect on plywood—that is, that the greatest effect is on trade. For plywood, the initiative also is expected to lead to increases in global consumption and production, but the projected increase is less than 1 percent.[10]

The effects of tariff elimination on lumber and plywood production and trade directly impact production, consumption, and trade in sawlogs and pulpwood. The ATL has little or no direct effect on log trade because only a few countries apply import tariffs to raw material; consequently, projected changes in log trade are the consequence of the substitution of product imports for raw material imports. The CGTM results also illustrate that changes in raw material trade are further complicated by substitution of pulpwood for manufacturing residues. Projected increases in pulpwood trade are, in part, due to reductions in the availability of manufacturing residues that accompany declining sawlog trade.

---

[10] The effects of the ATL on softwood plywood trade are overstated because of the structure of the CGTM. The United States accounts for most production and consumption of softwood plywood; because the CGTM has multiple U.S. regions, changes in shipments among U.S. regions inflate the "trade" effect shown in tables 16 and 17.

This page has been left blank intentionally.
Document continues on next page.

Chapter 7: Summary of Information and Analysis Provided Through Public Comments

Introduction

Comments submitted in response to the Federal Register notice[1] soliciting public input provide an indication of the type of issues and concerns related to the Accelerated Tariff Liberalization (ATL) initiative. The main points are grouped thematically and summarized below.[2]

Comments Received About the Scope or Methodology of This Study

- The analysis must meet National Environmental Policy Act guidelines pursuant to Executive Order 12144 and should explore other alternatives (including a no-action and a forest-protection alternative).
- There is not enough time for public input and/or a comprehensive assessment. In addition, many important concerns raised by government agencies and the public are not being investigated.

---

[1] 64 Fed.Reg. 3404 (June 25, 1999).

[2] All comments are available to the public in the reading room of the Office of the United States Trade Representative, 600 17th St, N.W. Washington, DC 20508.

- The scope of the analysis is too limited. It should include a study of nontariff measures (including the effect of eliminating them), a study of the current environmental status of forests and the adequacy of forest protection laws, forest conservation internationally, resource diversification, existing trade policies and proposals for accelerated sectoral liberalization, global effects of the ATL, and recognition of the value of biodiversity hotspots. Some comments stated the analysis also should include the social costs of deforestation.
- The ATL negotiations should be stopped until the analysis is complete. Other comments suggest suspending negotiations until each country conducts its own environmental analysis.
- A study should be conducted to investigate whether an increase in logging will result in efficiency or, rather, an increase in global deforestation.
- Government should consider alternatives such as constraining environmentally destructive subsidies; eliminating tariff escalation rather than all tariffs; granting preferential treatment to independently certified imported wood producers; negotiating a binding code of conduct setting minimum standards for the forestry industry; imposing a small tax on cross-border trade in forest products (with revenues dedicated to forest protection); amending the General Agreement on Tariffs and Trade (GATT) to allow greater flexibility in adopting forest protection measures; and banning trade in forest products from primary forests.

General Comments About the ATL Initiative or U.S. Forest Trade Policy

- The ATL would increase unsustainable logging practices. A shift in production will lead to global increases in clearcutting.
- The World Trade Organization (WTO) represents only the interests of large corporations.
- Specific GATT rules should be changed: (1) the definition of “like products” in the National Treatment and Most-Favored Nation provisions of the GATT should be modified to allow distinctions based on the process by which forest products were harvested and produced; and (2) GATT Article XX(g) should be modified so that measures taken as part of a sustainable management plan should meet the requirements of Article XX, even if restrictions on exports are more severe than those placed on domestic production.
- The ATL in the forest sector may result in undervalued forest products being traded in an unsustainable manner.
- A future agreement on nontariff measures will eliminate environmental safeguards such as ecolabeling.
- Environmental protection should be fully integrated into U.S. trade policy.
- A dynamic, ongoing and transparent process should be established that would allow nongovernmental organizations and other civil society inputs into the forest ATL negotiations.
- The ATL will lead to deforestation, which violates the Kyoto Accord to reduce global warming.

- Free trade destroys ecosystems, and so tariff reductions must be accompanied by environmental protection adherence requirements.
- The United States should not condone the sanctioning of countries that use environmental controls to protect their environment.
- Tariff liberalization will increase industrial logging, and lead to deforestation, habitat destruction (which leads to species extinction), and a general degradation of the world's forests.
- The principles of the WTO agenda undermine the sovereign rights of states and the interests of the civil society.
- The United States should reject any forest products negotiations that threaten to treat legitimate conservation measures as illegal "nontariff trade barriers;" for example, by attempting to build new restrictions into the WTO's Sanitary and Phytosanitary and Technical Barriers to Trade Agreements.
- Governments should consider amending the Harmonized Tariff System to better reflect the sustainable harvesting of natural resource products, and promote increased flexibility in the tariff system to potentially allow for a zero-tariff model in certain categories of forest products (e.g., finished wood products) while maintaining capacity to continue moderate tariffs in other categories (e.g., raw, unprocessed logs or wood chips) if they were shown to have adverse environmental and economic consequences.
- The United States needs to increase protection from invasive species, pests, and fungus imported on untreated wood products from other countries.

Comments Received in Support of Tariff Liberalization in the Forest Products Sector

- The ATL will bring substantial economic and environmental benefits.
- The ATL will facilitate the transfer of environmentally friendly technology and promotion of more efficient use of resources and is therefore a "win-win" proposal.
- Reductions in tariffs improve market efficiency and reduce timber harvest. Tariffs cause reliance on higher cost producers who are less efficient, as well as more reliance on nonwood substitutes that have the effect of increasing levels of carbon emissions.
- Restrictions on market access have put the U.S. forest products industry at a disadvantage in international markets. Fair trade enhances the prospects for sustained environmental protection.
- Forestry in the United States currently has high environmental standards and is losing business to companies based in countries where there are no or little environmental standards. The ATL will help U.S. businesses compete in the global market.
- Tariffs that protect inefficient forestry also encourage environmental degradation. Because environmental protection correlates positively with standards of living, increasing wealth through international trade also will increase environmental standards.

- Many nations protect inefficient manufacturing sectors by using escalating tariff schedules. Zero tariffs on all products would allow the United States to export more processed wood and improve the trade balance. It also would relieve pressure on forestry and land use in developing nations.
- Subsidies and trade barriers devalue forest products and the forest land base and encourage overharvesting.
- Because trade expands economic growth, more resources would be available to address environmental needs. Other nations that do not invest in environmental equipment are able to invest more in productive capacity. This may result in a shift of U.S. jobs to those countries. A level, competitive playing field is needed.
- The U.S. forest industry maintains high levels of environmental performance and invests large amounts of capital in environmental purposes.
- Sustainable management of forests is impeded by tariffs because manufacturers must increase productivity to overcome tariffs.
- Increased consumption of forest products is environmentally desirable as compared to substitutes, such as steel, because forests are renewable, recyclable, and energy efficient.
- The United States should support international trade policies that maximize the net social benefits from forests within the United States.
- Because the ATL will increase access to foreign markets and yield higher prices for forest products, producers will not be forced to convert forest lands into nonforestry uses because of low or no return on investment.
- The United States is not destroying forests by overcutting them. The United States could increase timber cutting without reducing timber reserves.
- Tariff elimination should be pursued in order to increase the true value of wood and discourage alternate uses of the land.
- Accelerated market openings propel economic activity and market growth, providing benefits to communities and American workers. The forest products industry employs 1.5 million people, and it is estimated that each $1 billion of exports supports at least 20,000 jobs.
- Indonesia's export tax on Jelutong logs and lumber is hurting U.S. pencil slat producers. These taxes should be eliminated.

Comments Received to Clarify the Record

- One set of comments was submitted to clarify the record relating to a statement attributed to the commenter that the ATL is likely to lead to a 3- to 4-percent increase in world consumption of forest products. The comments clarify that the statement was not made in the context of the ATL debate, but rather, was part of a speech discussing the rate of likely increase in global GDP resulting from "rapid technology introductions around the world, combined with strong global economic developments in an essentially free trade environment."[3] The comments state that these observations were derived from long-term studies of global economics and resulting implications for the forest products industry. The observations were not the outcome of any specialized study designed to specifically address the impacts of trade barriers and evolving free trade on the world's economy in general, or the forest products industry in particular.

---

[3] "Comments about the economic and environmental effects of tariff elimination in the forest products sector," Jaakko Poyry Consulting; 19 August, 1999; submission to the Office of the U.S. Trade Representative.

Literature Cited

Amelung, T. 1991. Tropical deforestation as an international economic problem. In: Economic evolution and environmental concerns: Proceedings of the Egon-Sohem Foundation conference. Linz, Austria. [Publisher unknown]: [Pages unknown].

Anderson, K.; Blackhurst, R., eds. 1992. The greening of world trade issues. Ann Arbor, MI: The University of Michigan Press. 276 p.

Australian Bureau of Agricultural and Resource Economics (ABARE). 1999. Global outlook for plantations. Research Report 99.9. Canberra, Australia. 99 p.

Barbier, E.B. 1994. The environmental effects of trade in the forestry sector. In: The environmental effects of trade. Paris: Organization for Economic Cooperation and Development: 55-111.

Barbier, E.B. 1996. Impact of the Uruguay Round on international trade in forest products. Rome, Italy: Food and Agriculture Organization. 51 p.

Barbier, E.B. 1999. The effects of the Uruguay Round tariff reduction on the forest product trade: a partial equilibrium analysis. World Economy. 22(1): 87-115.

Barbier, E.B.; Bockstael, N.; Burgess, J.C.; Strand, I. 1995. The linkages between the timber trade and tropical deforestation—Indonesia. World Economy. 18(3): 411-442.

Barbier, E.B.; Burgess, J.C. 1997. The economics of tropical forest land use options. Land Economics. 73(2): 174-195.

Barbier, E.B.; Burgess, J.C.; Bishop, J.; Aylward, B. 1994. The economics of the tropical timber trade. London: Earthscan Publications, Ltd. 179 p.

Barbier, E.B.; Rauscher, M. 1994. Trade, tropical deforestation and policy interventions. Environmental and Resource Economics. 4: 75-90.

Binkley, C.S. 1987. Economic models of timber supply. In: Kallio, M. [and others], eds. The global forest sector: an analytical perspective. New York: John Wiley and Sons: 109-136.

Bourke, J.; Leitch, J. 1998. Trade restrictions and their impact on international trade in forest products. Rome, Italy: Food and Agriculture Organization. 33 p.

Boyd, R.; Doroodian, K.; Abdul-Latif, S. 1993. The effects of tariff removals on the North American lumber trade. Canadian Journal of Agricultural Economics. 41: 311-328.

Boyd, R.; Krutilla, K. 1992. The impact of the Free Trade Agreement on the U.S. forestry sector: a general equilibrium analysis. In: Nemetz, P., ed. Emerging issues in forest policy. Vancouver, BC: UBC Press: 236-253.

Braga, C.A.P. 1992. Tropical forests and trade policy: the cases of Indonesia and Brazil. In: Low, P., ed. International trade and the environment. World Bank discussion papers 159. Washington, DC: The World Bank: 173-193.

Brooks, D.J. 1995. Federal timber supply reductions in the Pacific Northwest: international environmental effects. Journal of Forestry. 93(7): 29-33.

Brooks, D. 1997. The outlook for demand and supply of wood: implications for policy and sustainable management. Commonwealth Forestry Review. 76(1): 31-36.

Brown, C. 1997. The implications of the GATT Uruguay Round and other trade arrangements for the Asia-Pacific forest products trade. APFSOS/WP/03. Rome: Food and Agriculture Organization. 37 p.

Buongiorno, J.; Manurung, E.G.T. 1992. Predicted effects of an import tax in the European Community on international trade in tropical timbers. Journal of World Forest Resource Management. 6: 117-137.

Chichilnisky, G. 1993. North-South trade and the dynamics of renewable resources. In Structural Change and Economic Dynamics. 4: 219-248.

Coxhead, I.; Jayasuriya, S. 1993. Tax and trade policies, erosion and economic welfare in developing countries. Economics Staff Paper 363. Madison, WI: University of Wisconsin. [Pages unknown].

d'Arge, R.C.; Kneese, A.V. 1972. Environmental quality and international trade. International Organization. 26: 419-465.

Deacon, R.T. 1995. Assessing the relationship between government policy and deforestation. Journal of Environmental Economics and Managment. 28: 1-18.

Dean, J. 1992a. Trade and the environment: a survey of the literature. In: International trade and the environment. World Bank Discussion Papers 159. Washington, DC: The World Bank: 15-28.

Dean, J. 1992b. Tropical forests and trade policy: the cases of Indonesia and Brazil: Comments. In: International trade and the environment. World Bank Discussion Papers 159. Washington, DC: The World Bank: 195-196.

El Nagheeb, A.H.; Bromley, D.W. 1994. Extensification of agriculture and deforestation: empirical evidence from Sudan. Agricultural Economics. 10: 193-200.

Food and Agriculture Organization. 1999a. State of the world's forests. Rome, Italy. 154 p.

Food and Agriculture Organization. 1999b. The global fibre supply model. Rome, Italy. 71 p.

Food and Agriculture Organization. 1997. State of the world's forests, 1997. Rome: Forestry Department. *www.fao.org/forestry/fo/sofo/sofo97/97toc-e.stm.* [5 April 2001].

General Agreement on Tariffs and Trade. 1992. Trade and environment. In: International trade 1990-91. Geneva: GATT.

Gillis, M.; Repetto, R. 1988. Public policy and the misuse of forest resources. New York: Cambridge University Press. 432 p.

Grossman, G.M.; Krueger, A.B. 1993. Environmental impacts of a North American free trade agreement. In: Garber, P., ed. The Mexico-U.S. free trade agreement. Cambridge, MA: Mit Press: 13-56.

Jaffe, A.B.; Peterson, S.R.; Portney, P.R. 1995. Environmental regulation and the competitiveness of U.S. manufacturing: What does the evidence tell us? Journal of Economic Literature. 33: 132-163.

Johnson, B. 1991. Responding to tropical deforestation: an eruption of crisis, an array of solutions. Washington, DC: World Wildlife Fund. [Pages unknown].

Kaimowitz, D.; Angelsen, A. 1998. Economic models of tropical deforestation: a review. Bogor, Indonesia: Center for International Forestry Research. 139 p.

Kallio, M.; Dykstra, D.; Binkley, C. 1987. The global forest sector: an analytical perspective. New York: John Wiley. 706 p.

Karp, L. 1996. Monopoly power can be disadvantageous in the extraction of a durable nonrenewable resource. International Economic Review. 37(4): 825-849.

Leonard, H.J. 1988. Pollution and the struggle for the world product : multinational corporations, environment, and international comparative advantage. Cambridge, UK: Cambridge University Press. 254 p.

Lyon, K.S.; Sedjo, R.A. 1992. Comparative advantage in timber supply: lessons from history and the timber supply model. In: Nemetz, P., ed. Emerging issues in forest policy, Vancouver, BC: University of British Columbia Press: 171-186.

Manurung, E.G.T.; Buongiorno, J. 1995. Effects of the ban on tropical log exports of the forestry sector of Indonesia. Journal of World Forest Resource Management. 8: 21-49.

Marchak, M.P. 1995. Logging the globe. Montreal, Canada: McGill-Queens University Press. 454 p.

Menotti, V. 1998. Globalization and the acceleration of forest destruction since Rio. The Ecologist. 28(6): 354-362.

Nectoux, F.; Kuroda, Y. 1989. Timber from the South Seas: an analysis of Japan's tropical timber trade and its environmental impact. Gland, Switzerland: WWF International. 189 p.

Perez-Garcia, J.M. 1993. Global forestry impacts of reducing softwood supplied from North America. CINTRAFOR Working Paper 43. Seattle: University of Washington, Center for International Trade in Forest Products. 35 p.

Perez-Garcia, John. 1994. An analysis of proposed domestic climate warming mitigation program impacts on international forest products markets. Working Paper 50. Seattle, WA: University of Washington, Center for International Trade in Forest Products. [Pages unknown].

Perez-Garcia, J.M. 1995. Global economic and land use consequences of North American timberland withdrawals. Journal of Forestry. 93(7): 34-38

Perez-Garcia, John. [In press]. The effect of a tariff elimination policy on the forest sector: a global approach. Working paper. Seattle: University of Washington, College of Forest Resources, Center for International Trade in Forest Products (CINTRAFOR). 31 p.

Perez-Garcia, John; Lippke, Bruce; Baker, Janet. 1997. Trade barriers in the Pacific forest sector: Who wins and who loses. Contemporary Economic Policy. 15: 87-103.

Perroni, C.; Wigle, R.M. 1994. International trade and environmental quality: How important are the linkages? Canadian Journal of Economics. 54: 325-338.

Prestemon, J.P.; Buongiorno, J. 1996. The impacts of NAFTA on U.S. and Canadian forest products exports to Mexico. Canadian Journal of Forest Resources Management. 26: 794-809.

Ritchie, M. 1992. Free trade vs. sustainable agriculture: the implications of NAFTA. The Ecologist. 22: 221-227.

Robison, H.D. 1988. Industrial pollution abatement: the impact on balance of trade. Canadian Journal of Economics. 21: 187-199.

Ropke, I. 1994. Trade, environment, and sustainability—a critical assessment of the free trade dogma. Ecological Economics. 9: 13-22.

Runge, C.F. 1994. Environmental effects of trade in the agricultural sector: a case study. Working Paper P92-1. St. Paul, MN: Center for International Food and Agricultural Policy. [Pages unknown].

Schallau, C. 1999. Some economic and environmental effects of tariff elimination in the forest products industry: a synopsis of relevant literature. Submitted to the Office of the U.S. Trade Representative in response to Federal Register notice FR Doc. 99-16242. [Place of publication unknown]: The American Forests and Paper Association. 37 p.

Sedjo, R.; Simpson, R.D. 1999. Tariff liberalization, wood trade flows and global forests. Discussion Paper 00-05. Washington, DC: Resources for the Future. 19 p.

Sedjo, R. 1996. Local timber production and global trade: the environmental implications of forestry trade. In: Adamowicz, W.L. [and others], eds. Forestry, economics, and the Environment. Wallingford, UK: CAB International: 49-67.

Solberg, B., ed. 1996. Long-term trends and prospects in world supply and demand for wood and implications for sustainable management. Res. Rep. 6. Joensuu, Finland: European Forest Institute. 150 p.

Srinivasan, T.N.; Bhagwati, J. 1995. Trade and the environment: Does environmental diversity detract from the case for free trade? Yale University Economic Growth Center Discussion Paper 721. New Haven: Yale University. [Pages unknown].

Subramanian, A. 1992. Trade measures for environment: A nearly empty box? The World Economy. 15: 135-152.

Thiele, R.; Wiebelt, M. 1994. Policies to reduce tropical deforestation and degradation: a computable general equilibrium analysis for Cameroon. Quarterly Journal of International Agriculture. 33(2): 162-178.

Tobey, J. 1990. The effects of domestic environmental policies on patterns of world trade: an empirical test. Kyklos. 43: 191-209.

Tomberlin, D.; Buongiorno, J.; Brooks, D. 1998. Trade, forestry and the environment: a review. Journal of Forest Economics. 4(3): 177-206.

U.S. International Trade Commission. 1997. The impact of the North American Free Trade Agreement on the U.S. economy and industries: a three-year review. Publ. 3045. Washington, DC: U.S. International Trade Commission. [Irregular pagination].

Verolme, H.; Moussa, J. 1999. Addressing the underlying causes of deforestation and forest degradation—case studies, analysis, and policy recommendations. Washington, DC: Biodiversity Action Network. 320 p.

Vincent, J.R. 1992. The tropical timber trade and sustainable development. Science. 256: 1651-1655.

Vincent, J.R.; Hadi, Y. 1991. Deforestation and agricultural expansion in Peninsular Malaysia. Development Discussion Paper 396. Cambridge, MA: Harvard Institute for International Development. [Pages unknown].

Walter, I. 1975. International economics of pollution. New York: Halstead Press. 208 p.

Wisdom, H.W. 1996. Conflicts between trade and sustainable forestry policies in the Philippines. In: Adamowicz, W.L. [and others], eds. Forestry, economics, and the environment. Wallingford, UK: CAB International: 81-90.

Zhang, D.; Buongiorno, J.; Ince, P. 1993. PELPS III: a microcomputer price-endogenous linear programming system for economic modeling. Res. Pap. FPL-RP-526. Madison, WI: U.S. Department of Agriculture, Forest Service, Forest Products Laboratory. 43 p.

Zhang, D.; Buongiorno, J.; Zhu, S. 1997. Trend and outlook for forest products consumption, production, and trade in the Asia-Pacific region. Working Paper APFSOS/WP/12. Rome: Food and Agriculture Organization, Forestry Department, Forest Policy and Planning Division. 179 p.

Zhu, S.; Tomberlin, D.; Buongiorno, J. 1998. Global forest products consumption, production, trade, and prices: global forest products model projections to 2010. FAO Working Paper GFPOS/WP/01. Rome, Italy: Food and Agriculture Organization, Forestry Department, Policy and Planning Division. 333 p.

Zhu, S.; Buongiorno, J.; Brooks, D. 2001. Global effects of accelerated tariff liberalization in the forest products sector to 2010. Res. Pap. PNW-RP-534. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 50 p.

This page has been left blank intentionally.
Document continues on next page.

This page has been left blank intentionally.
Document continues on next page.

The **Forest Service** of the U.S. Department of Agriculture is dedicated to the principle of multiple use management of the Nation's forest resources for sustained yields of wood, water, forage, wildlife, and recreation. Through forestry research, cooperation with the States and private forest owners, and management of the National Forests and National Grasslands, it strives–as directed by Congress–to provide increasingly greater Service to a growing Nation.

The United States Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, gender, religion, age, disability, political beliefs, sexual orientation, or marital or family status. (Not all prohibited bases apply to all programs.) Persons with disabilities who require alternative means for communication of program information (Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at (202) 720-2600 (voice and TDD).

To file a complaint of discrimination, write USDA, Director, Office of Civil Rights, Room 326-W, Whitten Building, 14th and Independence Avenue, SW, Washington, DC 20250-9410 or call (202) 720-5964 (voice and TDD). USDA is an equal opportunity provider and employer.

Pacific Northwest Research Station

Web site	http://www.fs.fed.us/pnw
Telephone	(503) 808-2592
Publication requests	(503) 808-2138
FAX	(503) 808-2130
E-mail	desmith@fs.fed.us
Mailing address	Publications Distribution Pacific Northwest Research Station P.O. Box 3890 Portland, OR 97208-3890

U.S. Department of Agriculture
Pacific Northwest Research Station
333 S.W. First Avenue
P.O. Box 3890
Portland, OR 97208-3890

Official Business
Penalty for Private Use, $300