



# **Reference Manual for the Integrated Assessment of Trade-Related Policies**



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**UNITED NATIONS**  
**New York and Geneva, 2001**

## **NOTE**

The views and interpretation reflected in this document are those of the author(s) and do not necessarily reflect an expression of opinion on the part on the United Nations Environment Programme.

UNEP/01/4

## EXECUTIVE SUMMARY

This Manual is designed to help policy makers and practitioners—in the developed world and in developing countries—to conduct *integrated assessments* of the economic, environmental and social impacts of trade policy and trade liberalization. An *integrated assessment* considers the economic, environmental and social effects of trade measures, the linkages between these effects, and aims to build upon this analysis by identifying ways in which the negative consequences can be avoided or mitigated, and ways in which positive effects can be enhanced.

There is no single, all-encompassing approach to the *integrated assessment* of trade-related policy. Rather, in the preparation of this Manual, the theory and practice of conducting assessments have been reviewed and a variety of approaches are presented, along with supporting evidence. This Manual is designed to help and to encourage countries to design assessments that respond to the policy priorities and circumstances that are unique to each situation.

That international trade can have both positive and negative economic, environmental and social effects is well known. These effects vary across individuals, households, regions and ecosystems, across companies and across industries.

Trade can promote the efficient allocation of resources worldwide and therefore reduce the pressure caused by the over-exploitation of global natural resources. Trade can make people better off, through the expansion of production, employment, and consumption opportunities, which raises living standards and improves social indicators. Higher income levels can lead to higher investment in environmental management and protection.

Without appropriate environmental policies and regulations, trade liberalization can increase transport-related pollution, for example, by facilitating the movement of hazardous substances. Increased production and consumption may translate into greater waste emission and greater demand for natural resources—hastening environmental degradation and depletion.

A number of theories have been developed in the trade-environment literature to explore these relationships. Two of the most important are the Environment Kuznets Curve hypothesis and the Pollution Haven hypothesis.

The Environment Kuznets Curve asserts that in the process of economic development, a country pollutes more in the early stages, but that economic growth and greater wealth means that countries, in later stages of development, can invest in environmental improvement. The Pollution Haven hypothesis, on the other hand, contends that international trade agreements will cause pollution-intensive industries to migrate to countries where environmental standards are more relaxed—which is likely to be poorer, developing countries. Both theories contain elements of truth. Both continue to attract controversy.

The growing interest in the social impacts of trade liberalization suggests that in order to conduct a full assessment of the impact of trade policy on sustainable development, the trade-environment relationship must be extended to include social interdependence. It is this full range of relationships and impacts that an *integrated assessment* aims to investigate.

An *integrated assessment* serves a number of purposes: exploring the linkages between trade, the environment and development; informing policy makers across government departments and

international negotiators; developing policy packages to integrate policy objectives on trade, the environment and development; and increasing transparency in policy-making.

An assessment can be undertaken as part of negotiations within national governments deciding approaches to trade policy and liberalization. It can be undertaken before, along side, or following international trade negotiations, to investigate the environmental and social impacts of policies that may be, or have been, introduced. *Ex ante* assessments can help to plan the nature and timing of trade measures, and the introduction of complementary policies. *Ex post* assessments provide a retrospective examination of the environmental and social impacts of a trade policy, and can provide evidence of effects that can be mitigated or encouraged through the introduction of complementary policies designed to promote sustainable development. Both *ex ante* and *ex post* assessments can provide lessons and data for future assessments.

Central to a successful *integrated assessment* is the meaningful participation of stakeholders. This provides data, insights and information that is not available to the traditional economic policy analyst. There are a number of ways in which meaningful participation can be encouraged at various stages in the process. The benefits extend beyond simply enhancing the quality of the exercise to encouraging cooperation, building relationships, building capacity and enhancing support among stakeholders who might otherwise oppose the measures under consideration.

Given this broad remit, one challenge in conducting an *integrated assessment* lies in identifying what assessment methodologies are appropriate, what types of policy should be assessed, and what types of impacts should be measured. Also important is the issue of data constraints in the countries and sectors to be covered by the assessment. In some cases, a lack of data can make it difficult to identify impacts and assess specific policy options. Moreover, though some modelling techniques have been shown to perform well when applied to environmental assessment, their extension to measuring social well-being—central to an integrated assessment—has not been proven. It is often necessary, therefore, to include both qualitative and quantitative techniques as part of an assessment.

Other challenges include the lack of consensus on appropriate indicators for environmental and social variables, compared with those used routinely in economics. Furthermore, environmental and social data are scarce in some instances, and some variables are difficult to quantify. This has hampered theoretical and empirical efforts to integrate economics, environmental and social indicators into a systematic model incorporating all the varying effects.

There is an emerging consensus that one way forward is to adopt a range of approaches. In addition to formal modelling exercises on the one hand, or qualitative analysis on the other, this Manual presents a number of other approaches that can be used in an *integrated assessment*. These include such tools as benefit-cost analysis, risk assessment, multi-criteria analysis, extended domestic resource cost analysis, life cycle analysis, global commodity chain analysis and scenario building.

The aim of an *integrated assessment* is to influence policy-making. This Manual suggests that policy responses can take the form of the modification of trade agreements or policies, prior to implementation. Alternatively, policies can be adopted following the implementation of a trade agreement to mitigate any harmful impacts of trade liberalization on the environment or society and to promote positive effects. These policies can be implemented at the national, regional or global level. Such “flanking” policies promote the simultaneous pursuit of economic, environmental and social development goals.

An adjustment to a trade-related policy or agreement might include modifying the nature of a specific trade measure, such as a subsidy, or adjusting the timing of the implementation of the trade agreement so that complementary measures can be introduced. In other cases, where there

are positive impacts, an agreement might include provisions for accelerated tariff reduction on environmentally or socially beneficial products or inputs.

Where a trade agreement or a trade measure is expected to have significant environmental or social impacts there may be time, as a result of an *ex ante* assessment, to propose a parallel regime that will address environmental and social issues in conjunction with the implementation of trade liberalization. This can occur at the national level or, where the issues cannot properly be addressed domestically because of their cross-border or global character, at the regional or multilateral level.

“Flanking” policies can be developed and implemented by countries both before the introduction of a policy or following its introduction, and before an international negotiation or following its conclusion. The range of policy instruments includes: the implementation of market-based instruments targeted to address market distortions arising from environmental and social externalities; traditional command-and-control measures including legal reforms and regulations and standards; or the adoption of voluntary measures in the private sector, such as the promotion of environmental management systems or eco-labelling.

Finally, it is important to examine how the results of an *integrated assessment* translate into successfully implemented policies in practice, and the extent to which they meet their specified goals. *Integrated assessments* therefore need to include specific provisions for evaluation and monitoring. A follow-up process might also be warranted to track the long-term effects of economic activities, induced by trade measures and agreements, and so to identify where future *integrated assessments* might be needed.



## **ABBREVIATIONS AND ACRONYMS**

CSD	Commission on Sustainable Development (UN)
ECLAC	Economic Commission for Latin America and Caribbean (UN)
FTAA	Free Trade Agreement of the Americas
JPAC	Joint Public Advisory Committee (NACEC)
MEA	multilateral environmental agreement
NACEC	North American Commission for Environmental Cooperation
NAFTA	North American Free Trade Agreement
OECD	Organisation for Economic Co-operation and Development
SEA	Strategic Environmental Assessment
TPRM	Trade Policy Review Mechanism (WTO)
TRIMs	Trade-Related Investment Measures (WTO)
TRIPS	Trade-Related Aspects of Intellectual Property Rights (WTO)
UN	United Nations
UNCED	United Nations Conference on Environment and Development
UNCTAD	United Nations Conference on Trade and Development
UNEP	United Nations Environment Programme
UNHCR	United Nations High Commissioner for Refugees
URL	Uniform Resource Locator
USTR	United States Trade Representative
WTO	World Trade Organization





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## ACKNOWLEDGEMENTS

This Manual is the result of cooperation among a number of organizations and individual experts. Special thanks are extended to the lead author, Sarah Richardson (Maeander Enterprises Ltd., Canada), and to Tariq Banuri (Stockholm Environment Institute, United States), Ron Bisset (Cordah Limited, United Kingdom), and Herminia Francisco (University of Philippines, the Philippines), who were the collaborating authors of the document.

The following individuals are acknowledged for their contributions as authors, reviewers, and participants in the expert group meetings: Maria Amparo Alban (Centro Ecuatoriano de Derecho Ambiental, Ecuador), Dale Andrew (OECD), Godfrey Bahigwa (Economic Policy Research Centre, Uganda), Debapriya Bhattacharya (Centre for Policy Dialogue, Bangladesh), Nicola Borregaard (Centro de Investigación y Planificación del Medio Ambiente, Chile), Karim Dahou (ENDA Third World, Senegal), Edwino Fernando (Makiling Center for Mountain Ecosystems, the Philippines), Annie Gabriel (Environment Australia, Australia), Delfin Ganapin (Philippine Federation for Environmental Concern, the Philippines), Aimee Gonzales (WWF International), Ulrike Grote (Center for Development Research, Germany), Naseef Huda (European Commission), Ulf D. Jaeckel (Federal Ministry of Environment, Germany), Sitanon Jisdapipat (Centre for Ecological Economics; Chulalongkorn University, Thailand), Godius Kahyarara (Centre for Environmental Economics and Development Research, Tanzania), Rashid S. Kaukab (South Centre), Alexander Keck (WTO), Colin Kirkpatrick (University of Manchester, United Kingdom), Monika Luxem (European Commission), Ricardo Meléndez-Ortiz (International Centre for Trade and Sustainable Development), Naftali Ndugire (Ministry of Environment, Kenya), Naomi Neiland (Department of Environment, Transport and Regions, United Kingdom), Peter Adebola Okuneye (The University of Agriculture, Nigeria), Maria Onestini (Centro de Estudios Ambientales, Argentina), Theodore Panayotou (Harvard University, United States), Laura Parker (European Commission), Mireille Perrin (WWF International), Jan Pieters (Ministry of Housing, Spatial Planning and Environment, the Netherlands), Mustafizur Rahman (Centre for Policy Dialogue, Bangladesh), Esther Reilink (Ministry of Housing, Spatial Planning and Environment, the Netherlands), Barry Sadler (Institute of Environmental Management and Assessment, United Kingdom), Rami Abu Salman (Ministry of Environment, Lebanon), Marianne Schaper (ECLAC), David Schorr (WWF-United States), David Stone (UNHCR), Janet Strachan (Commonwealth Secretariat), Cristina Tébar Less (OECD), Hector Torres (Mission of Argentina to the United Nations), Vincent van den Bergen (Ministry of Housing, Spatial Planning and Environment, the Netherlands), Alex Vikhlyaev (UNCTAD), Konrad Von Moltke (Vrije University, the Netherlands), René Vossenaar (UNCTAD), Shudong Zhou (Nanjing Agricultural University, China).

At UNEP, the project was initiated and led by Hussein Abaza, coordinated by Mariko Hara. Charles Arden-Clarke provided reviews and other assistance. Rahila Mughal, Beth Peoch, Desirée Leon and Fatma Gordon provided administrative support.



## THE UNITED NATIONS ENVIRONMENT PROGRAMME

The United Nations Environment Programme (UNEP) is the overall coordinating environmental organization of the United Nations system. It has a mandate to assist developing countries and countries in transition in strengthening their efforts to protect the environment and achieve sustainable development. Some of the most difficult sustainability issues concern managing the impacts of environmental change on human life and livelihood. These issues can be addressed only by taking a strategic approach, which integrates environmental considerations into all aspects of development decision-making. In order to assist developing countries in meeting this challenge, UNEP undertakes a broad programme of work to build and enhance their institutional and human capacity for environmental management.

UNEP's Economics and Trade Unit (ETU) is one of the units of the Division of Technology, Industry and Economics (DTIE). The work programme of the Unit consists of three main components: economics, trade and financial services. The trade component of the programme focuses on improving countries' understanding of the linkages between trade and environment and enhancing their capacities in developing mutually supportive trade and environment policies, and providing technical input to the trade and environment debate through a transparent and a broad-based consultative process.

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## PREFACE

World trade and foreign investment have expanded dramatically over the past 25 years, making a major contribution to global economic growth. This process, often referred to as globalization, involves the integration of national economies into a single market for goods and services, and for capital and investment flows. Globalization has increased as trade and investment liberalization policies have been adopted by reforming economies throughout the world, bringing down national market boundaries.

With the recent acceleration of global trade, many countries have benefited from higher investment, more rapid industrial development, and faster employment and income growth. However, these benefits have been unevenly spread across and within countries, and some countries are finding that free trade has significant developmental costs as well as benefits. Many developing countries have witnessed growing trade deficits and falling annual growth rates. From an environmental perspective, increased trade and investment in natural resource-based sectors is placing unprecedented pressures on the world's ecosystems. Many countries have found that rapidly expanding trade can result in serious environmental degradation unless complementary environmental policies are implemented.

A clear analysis of both the positive and the negative impacts of trade liberalization is needed, together with effective policies to reduce the negative impacts, and strengthen the positive ones. Policy tools are available for these purposes, but there is a need to encourage greater adoption and use of these tools, as well as to develop and apply new ones.

Since its establishment, UNEP has worked with developing countries and economies in transition to assist them in their efforts to assess the environmental impacts of national economic development policies and to address them through policy reform. Over the past decade, these efforts have been supported by UNEP's development of methodologies and guidelines for environmental impact assessment; for the valuation of natural and environmental resources; integrated environmental and economic accounting; and for the selection, design and implementation of economic instruments to sustainably manage natural resources.

Better design and application of environmental assessments will help to integrate environmental considerations into macroeconomic policies and decision-making, and facilitate sustainable development. With impact assessments feeding into the policy development process, effective market-based incentives can be designed to influence production and consumption patterns, leading to a more sustainable use of resources. The technical challenges of developing and applying policy tools for assessment and policy development are being addressed by UNEP, with an emphasis on developing practical tools to integrate national environment and development objectives in the context of open trade relations.

Recently, UNEP has worked to develop more practical and effective assessment tools: to extend assessments beyond environmental impacts to include social and economic impacts; to focus assessments on trade-related policies, where impacts are often more difficult to assess; and to adopt an *ex ante* rather than *ex post* approach to assessment and policy development.

This Reference *Manual for the Integrated Assessment of Trade-Related Policies* (hereafter "the Manual") is UNEP's response to growing demand for a guide to assessing trade policies. It is designed to assist developed and developing country negotiators, policy makers and trade-

environment experts to assess multilateral trade policy during its negotiation. To prepare the Manual, UNEP established an expert group—comprised of a multidisciplinary team of environmentalists, trade specialists, economists, sociologists and experts on the impact assessment from governments, intergovernmental organizations and academia as well as national team members of UNEP country projects—and met in four international workshops during 2000. The manual will be used as a primary reference tool in both UNEP country projects on trade liberalization and the environment, and UNEP-UNCTAD capacity-building task force country projects. It will also be introduced to WTO negotiators through a UNEP workshop to be convened in Geneva in 2001. The Manual represents an initial effort for the integrated assessment of trade-related policies, to be revised based on feedback from users.



## I. INTRODUCTION

Sustainable development means fulfilling a country's current economic, environmental and social needs, while protecting the ability of future generations to meet their needs. If policy makers want to promote sustainable development, they must consider the consequences of their actions over a long time-horizon, in order to ensure that economic development does not come about at the cost of the erosion of environmental and social capital.

Carrying out an *integrated assessment* of the economic, environmental and social impacts of trade-related policies and agreements is an important step towards promoting sustainable development. An effective *integrated assessment* can be an invaluable tool for policy makers attempting to assign appropriate weights to competing considerations.

The implementation of trade-related policies or trade liberalization agreements can have wide-ranging effects on the economy, the environment and society. Directly, multilateral, regional or bilateral agreements can promote or deter trade in environmentally beneficial goods or methods of production. Indirectly, trade liberalization can reinforce patterns of comparative advantage, leading to increased specialization. This may have the unwelcome consequence of concentrating economic activity in sectors, firms or geographic areas unsupported by adequate management or physical infrastructure, or where environmental stress is already acute.

Increasingly, trade liberalization also affects the conduct of domestic regulation.<sup>1</sup> Countries may find it more difficult to regulate for environmental protection, for example, or to pursue certain social objectives. Trade policies may also encourage the development of environmental standards towards a common norm.

Few governments have yet given sufficient attention to the broad economic, social and environmental impact of past or prospective trade reforms. It is important that they now start to develop their analytical capabilities, for a number of reasons.

***Analytical awareness in an era of globalization.*** As the volume of global trade continues to expand, and liberalization policies penetrate deeper into areas of national interest, there is a pressing need for policy makers in all areas of government to be able to assess the environmental and social impacts of trade policies, as well as their economic effects. A method of assessment is needed which can trace the complex and often subtle effects of trade liberalization, and identify the economic, social and environmental opportunities that can arise.

***National policy development to support sustainability.*** An effective *integrated assessment* can help national policy makers in their efforts to support sustainable development. It can identify policies that meet economic, environmental and social goals simultaneously, or at least suggest how changes in economic activity can be complemented by appropriate environmental and social policies. Governments can use the results of an *integrated assessment* to focus resources on particular sectors, and to ensure overall coherence and consistency in policy. The *integrated assessment* can also be used to build support within governments for trade liberalization, by identifying how trade-related policy can help to accomplish desired policy changes in related fields.

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<sup>1</sup> Organisation for Economic Co-operation and Development, *Assessing the Environmental Effects of Trade Liberalization Agreements: Methodologies* OECD Proceedings (Paris, 2000).

***International competitive and negotiating advantage.*** As some countries are already realizing, the results of an *integrated assessment* can be a useful tool for policy makers aiming to shape the agenda of trade negotiations. In addition, an assessment can help to demonstrate to the public that trade policy makers are addressing a broader set of issues than merely economic ones. If it is carefully conducted, an *integrated assessment* can encourage civil society participation in the process of formulating trade policy, and lead to improved transparency. Ultimately, this could secure public support for existing and future trade policies.

The aim of this Manual is to contribute to the development of appropriate methodologies for *integrated assessments*, and to encourage their practical application by giving advice on how to produce a credible and policy-relevant analysis. It is intended to be used by policy makers, practitioners, trade officials and other groups or individuals undertaking *integrated assessments*, and applies to both developed and developing countries. It puts forward suggestions for the development of a framework for *integrated assessments*, rather than prescribing the use of a specific methodology, presenting a range of options which a user can employ, depending on what is appropriate for a particular situation, level of resources, and set of priorities. The Manual also aims to provide guidance on how the results of an *integrated assessment* might best be used to inform national policies and promote sustainability.

Chapter II Setting the Stage discusses the need to identify the purpose of any *integrated assessment* right at the outset. Five possible purposes are highlighted: exploring the linkages between environment, trade and development; informing policy makers; informing negotiators; developing policy packages; and promoting transparency in decision-making. Section B highlights the importance of establishing appropriate parameters for the *integrated assessment*. Although the emphasis is likely to be placed on trade reforms, other policies including those on the exchange rate, interest rates, private investment, income distribution, or land tenure arrangements may be relevant. The assessment might also usefully focus on a specific sector, issue, geographical area, or ecosystem.

Chapter III Designing an Integrated Assessment outlines the preliminary decisions which must be taken at the beginning of the process. The section looks at issues of timing, public participation, the choice of indicators and capacity-building. It includes a discussion of various timing options, including consideration of the roles fulfilled by *integrated assessments* at different points in the trade policy-making process, which emphasizes the fact that choices over the methodology of an assessment will depend very much on its purpose.

Chapter IV Integrated Approaches and Techniques considers a range of techniques that might be employed to undertake an *integrated assessment*. A number of methods are identified which may be used to analyse the links between trade and the environment, including macro-economic models, sector-based or microeconomic analysis, life cycle and scenario approaches. The problems of valuing environmental impacts are also addressed, and a number of possible methodologies for evaluation outlined. The section also discusses related issues of capacity, and highlights the need to select methods that support the particular priorities of the user.

Chapter V Integrated Policy Responses provides guidance on how to maximise the policy relevance of an *integrated assessment*, and make the transition from analysis to policy. It outlines a range of potential policy responses, from the macroeconomic, such as changes in fiscal and monetary policies, to the microeconomic, including environmental and social policy. The section also discusses how an *integrated assessment* at the national level may lead to the identification of global or regional policy priorities, and considers the role of international organizations in promoting a policy response.

Reference Materials present a list for further reading. While there is no one approach, or one study, that deals comprehensively with the subject of *integrated assessment*, there have been a number of relevant efforts to construct frameworks that examine the economic, environmental and in some cases the social impacts of trade agreements or policies. There have also been some

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attempts to undertake quantitative and qualitative economy-wide and sectoral assessments of trade. The reference material in this manual is presented to illustrate the range of work that has been undertaken. It should allow a user to select and review relevant documentation in order to learn from, and build on, past work in this field. Where possible, Internet references have been provided to facilitate access to the materials.

A List of URLs for Online Reference Materials indicates Uniform Resource Locators (URLs) where online materials can be found on the Internet. In the main text, those materials that have online reference materials are referred to as “online” in the footnote. A UNEP Web page to maintain these URLs as links can be found at the ETU Web site.

A Glossary provides a short description of concepts, and additional information on key organizations mentioned in this Manual.





## II. SETTING THE STAGE

The first step in an *integrated assessment* of trade-related policy or trade liberalization is to decide upon the purpose and scope of the assessment. The process of informing policy makers, across departments, of the purpose of the assessment, and informing negotiators in the case of international trade agreements, itself helps to promote efficient, coordinated policy-making, including the development of packages of policy to support trade policies and liberalization. Informing interest groups and the general public promotes open and transparent policy-making—and helps to build consensus.

Focusing an *integrated assessment* on the relevant trade-related measures and the relevant economic, environmental and social impacts—across sectors, regions and ecosystems—promotes a better understanding of these crucial linkages, and can encourage policy makers to develop sustainable development policies and strategies, and to set development priorities.

Section A of this chapter concentrates on the purpose of an *integrated assessment*. This includes exploring the linkages between trade, the environment and development, informing policy makers, informing negotiators, developing policy packages, and increasing transparency in decision-making. Section B concentrates on the focus of an *integrated assessment*, on trade policies and measures, trade liberalization agreements, other trade-related policies; and on sector, geographic regions and ecosystems, development priorities, and the time-frame for the assessment.

### A. Purpose

- (a) Exploring the linkages between trade, the environment and development.
- (b) Informing policy makers across government.
- (c) Informing negotiators.
- (d) Developing policy packages.
- (e) Increasing transparency in decision-making.

The first step in an *integrated assessment* of trade-related policies or trade liberalization is to agree upon and state the purpose of the exercise. This statement should guide the subsequent design of the methodology, the implementation process and, ultimately, the policy decision.

#### (1) Exploring the linkages between trade, the environment and development

An *integrated assessment* can help to clarify the linkages between trade, the environment and development. Over time, a better understanding of these relationships can encourage policy makers to develop sustainable development strategies and to build understanding and support among stakeholders.

Over the last ten years, governments, international organizations, non-governmental organizations (NGOs) and academic institutions have conducted various assessments of trade-related policies. These assessments have mainly been concerned with the environmental impact of trade policy, although there has been some investigation of broader social issues.

These studies have produced numerous insights into the relationships between trade, the environment and development, as well as highlighting the key factors to consider when examining

such relationships. For example, independent studies conducted by the World Wide Fund for Nature (WWF) and the North American Commission for Environmental Cooperation (NACEC) into trade, sustainable development and Mexican maize farming pointed to the importance of assessing the impact on migration patterns and on cultural and social factors.<sup>2</sup>

### Box 2.1 Oxfam/WWF Study on the Mexican corn sector

In 1998, Oxfam and WWF commissioned a study to review the impacts of economic liberalization on the Mexican corn sector. Although carried out in the context of an examination of the impacts of the North American Free Trade Agreement (NAFTA), the study examined a range of liberalization measures including trade policies, domestic price and subsidy policies, as well as other domestic agricultural policies. In this regard, one of the principal contributions of the study is to demonstrate how trade liberalization must be understood in a broader context of economic, environmental and social change.

The study provides an important example of the social and environmental problems resulting from a rapid and poorly-planned adjustment to a more liberal agricultural regime in the absence of adequate transitional state support. It also clearly demonstrates that in implementing liberalization policies, full account must be taken of the human and environmental impacts.

In spite of a sharp drop in corn prices and an increase in imports, Mexico's production has not declined, as expected, but has remained stable. In fact, the cultivated surface devoted to corn has expanded, while yields have dropped. There has been little incentive and opportunity for farmers to reallocate productive resources to other crops.

While modernization or crop substitution may be options for a small group of competitive producers, a number of less profitable growers are being forced to migrate (to urban areas or to other countries). The restructuring of the corn sector is also contributing to accelerating soil erosion trends because of more intensive land use caused by the extension of the agricultural frontier to marginal lands by traditional producers.

To mitigate these negative effects, the study proposes a set of policy recommendations that cover not only agricultural policy but also changes required in macroeconomic and social policy.

- (a) Macroeconomic and social policies should be put in place to support agricultural production. Policies are needed to ease the transition period for traditional producers faced with subsidized competition from cheap US corn.
- (b) Sustainable measures to increase crop yields and to promote two crop-cycles per year should be pursued to help move towards a sustainable intensification of agricultural production.
- (c) Targeted subsidies should be used to strengthen the capacity of producers to develop and conserve their knowledge.

*Source:* Alejandro Nadal, "The environmental and social impacts of economic liberalization on corn production in Mexico", a study commissioned by Oxfam GB and WWF International, (2000, online).

There has been a lot of progress. But much work remains to develop credible and comprehensive approaches to analyzing the linkages between trade, the environment and development.

## (2) Informing policy makers across government

- (a) To identify a comprehensive set of policy priorities prior to the start of negotiations.
- (b) To allow for the development of an integrated negotiating position or develop integrated trade-related policies.
- (c) To direct the pace of liberalization and to allow the introduction of appropriate "flanking" policies.
- (d) To build capacity and consensus throughout the government.

<sup>2</sup> A. Nadal, "The Environmental and Social Impacts of Economic Liberalization on Corn Production in Mexico", a study commissioned by Oxfam GB and WWF International (2000, online). North American Commission for Environmental Cooperation, "Maize in Mexico: Some Environmental Implications of the North American Free Trade Agreement" in *Assessing Environmental effects on the North American Free trade Agreement (NAFTA): An Analytic Framework*, (Montreal, 2000), Issue Study 1, pp. 65-182.

An *integrated assessment* helps to identify a comprehensive set of policy priorities, for example, before a round of international trade negotiations begins. Informing policy makers across government departments of the implications of proposed trade policies helps to coordinate actions across departments, to facilitate communication and cooperation across departments, and to build consensus and administrative capacity.

The policy process begins, often, with the decision by political leaders that a liberalization measure is in the economic and political interests of the community, though the impetus may come from other social actors, for example, from industry itself. Various interest groups and formal trade advisory bodies—and sub-federal governments in federal systems—are systematically consulted in order to determine the policy-making or negotiating agenda—and set out different priorities and positions on particular issues. The rising interest of the general public in trade issues increasingly involves special consultation, conducted by legislative and other bodies, to include the views of a broad array of stakeholders in the process.

An *integrated assessment* can help policy makers and stakeholders to judge the results of trade measures that have already been introduced. In the case of an *ex ante* assessment, ahead of international negotiations, an assessment contributes to the process of developing policy prior to the start of formal negotiations, in a number of ways. It helps the country (or region) to identify policy priorities and the outline of the negotiating position. It can also help to decide the scope of trade liberalization and to direct its pace—including the proper sequencing of liberalization measures, and efforts to ensure that effective national environmental and social policies are in place to protect vulnerable sectors.

### (3) Informing negotiators

- (a) To pursue trade-related policies in ways that promote sustainable development.
- (b) To identify the environmental and development effects of trade policies or agreements early in the process.
- (c) To allow for modification of the trade-related policy or agreement if appropriate.

In the case of international trade agreements, once the domestic agenda and legislation for trade liberalization is in place, along with the necessary legislation, the policy process moves into the international arena. An *integrated assessment* informs negotiators of the main environmental and social trade-offs that are associated with the economic initiatives being considered.

The first step is the initiation of the formal process to launch an international negotiation. Typically this begins with a ministerial-level meeting to specify the broad parameters of the negotiation: the agenda, the timetable, the negotiating schedule and the timetable for interim reviews, and the agreed principles to guide the negotiations. The next stage is the mid-term review, at a designated interval. This provides an opportunity for political assessment/approval of the progress to date, and the opportunity to set directions and deadlines—and to inject political energy into the process.

Alternatively, in negotiations under the auspices of the World Trade Organization (WTO), or other institutions such as the Free Trade Agreement of the Americas (FTAA), a series of ministerial meetings is scheduled during the process to serve a similar purpose. The final stage involves reaching an international agreement among the countries engaged in the process. It is at this point that individual countries, committed to specific issues or principles, can exert the most pressure in support of their particular priorities on other countries that are anxious to conclude the agreement.

An *integrated assessment* ensures that trade, environmental and social and economic issues are all addressed during negotiations. It can identify environmental and development effects of different trade-related policies at an early point in the negotiations. This allows time for the appropriate “flanking” mechanisms—implementing complementary environmental and social

policies to enhance the beneficial effects and mitigate negative impacts of the trade measure—which, at this early stage, could include the modification of the policy or agreement under negotiation.

#### **(4) Developing policy packages**

- (a) To encourage beneficial effects of trade-related policies or trade agreements on the environment and on development.
- (b) To mitigate any harmful impacts of trade policy on the environment and on development.

An *integrated assessment* can help policy makers to develop an appropriate package of domestic policies to implement alongside trade measures, as discussed above. International trade agreements involve negotiations at the national level. But, after international agreement has been reached, the process passes back to the national political and legislative process of the signatory states. This makes it important to manage any change or compromise in preferred national positions, and domestic expectations, in light of the negotiated agreement. This is a crucial part of the process and is often the main focus of national political attention.

Following domestic approval and formal ratification the task of implementing and monitoring the trade agreement begins. In some cases national authorization comes attached with particular conditions that affect how liberalization is implemented. Agreements often assign the task of implementing liberalization, especially on technical issues, to institutions constructed as part of the agreement. Recently negotiated agreements have contained provisions for the ongoing process of monitoring and implementation. The WTO's Trade Policy Review Mechanism (TPRM) is one example.<sup>3</sup> A final stage in the process is to conduct a review, often under conditions defined in the initial agreement, as a prelude or catalyst for a new round of liberalization.

The results of an *integrated assessment* can help countries to design complementary economic, environmental and social policies at the national level to accompany the trade-related policy/agreement. Sometimes this is also possible at the international level. These policies can be designed to promote any beneficial impacts of the policy, or to mitigate any negative impacts. Additional policies could be implemented as necessary as a result of monitoring or review processes, or as a result of consultation, in order to support the trade-related policies and to build public support for liberalization. In the same way, they can help to build confidence and trust in trade liberalization process at the international level.

#### **(5) Increasing transparency in decision-making**

- (a) To increase access to information.
- (b) To build trust.
- (c) To build capacity of stakeholders to participate in domestic policy processes.

National governments and international institutions have received calls for greater openness in policy-making—and there have been some high-profile public demonstrations. Greater transparency in trade-related policy could help to allay fears about processes conducted behind closed doors, through public disclosure.

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<sup>3</sup> The Trade Policy Review Mechanism (TPRM) was established in 1989, on a provisional basis, following the mid-term review of the Uruguay Round. It was confirmed as an integral element of the WTO in Annex 3 of the Marrakesh Agreement. The aims of the mechanism are to contribute to improved adherence by all members of the WTO to its rules, disciplines and commitments, and thus to the smoother functioning of the multilateral trading system. The reviews aim to achieve transparency in and understanding of the trade policies and practices of members. The mechanism enables the regular collective evaluation by the members of the full range of individual members' trade policies and practices in all covered by the WTO Agreements, and their impact on the functioning of the multilateral trading system. Reviews are conducted in the Trade Policy Review Body (TPRB), a full-membership body of equal ranking to the General Council and the Dispute Settlement Body. (WTO Annual Report 1998, p. 118).

*Integrated assessments* can increase transparency in the process of government policy-making. The involvement of NGOs, political parties and other domestic interest groups can help to build consensus and to strengthen national capacities, as well as ensuring that a broad range of views are considered in the assessment. An assessment that puts economic, social and environmental issues on the table for consideration together—with a range of stakeholders involved—can build public confidence and public support in the policy-making process.

## **B. Focus**

An *integrated assessment* can range from the analysis of a specific trade measure—such as the impact of a subsidy or tariff—to the analysis of comprehensive multilateral agreements or regional trade agreements, before or after the introduction of these trade measures. Assessments can be used in the case of economic and other policies that impact on the openness and performance of a country and its relationship with other countries. They can also extend to investment and institutional issues that affect global or regional governance.

The focus of an *integrated assessment* should be determined at the outset in order to focus the analysis. Typically, the process first focuses on the specified trade-related policy or agreement and then move to consider related trade-induced economic, environmental and social issues, and to set the parameters for the investigation.

### **(1) Trade measures, trade liberalization agreements and trade-related policies**

***Tariffs and related measures.*** When tariffs are increased they discourage trade; when they are lowered, or eliminated, they promote trade. Tariffs affect trade flows, making it more expensive for domestic households and companies to buy foreign goods, and promoting domestic production. Higher tariffs make imported goods more expensive. The higher the tariff imposed, the more expensive it is for the exporting country to access the importing country's markets. In the case of tariff escalation, higher tariffs are charged on goods that are processed to a higher degree.

A country can use tariffs to encourage trade in products that are environmentally benign, or less harmful, by lowering or removing their corresponding tariffs. In the same way, countries can discourage trade in environmentally harmful substances or products by maintaining or increasing tariffs. The effects of international negotiations on tariffs are therefore likely to impact the environment.

To the extent that tariffs are used to protect domestic production and markets, they can have additional important socio-economic impacts related to employment, innovation, and production practices. The practice of tariff escalation can encourage countries to export raw materials, as opposed to processed goods, resulting in the depletion of that country's natural resource base and removing the social and economic benefits, for example in terms of employment, of processing those raw materials domestically.

***Non-tariff measures.*** Non-tariff measures can affect imported goods, without the imposition of a specific tariff. Non-tariff measures include quantitative restrictions, such as quotas or special regulations. Non-tariff measures that relate to mandatory regulations and other standards are called technical barriers to trade. Other kinds of non-tariff measure include those related to food standards, to ensure food safety and to protect human health from plant or animal-spread diseases, and regulations to protect plant and animal health from pests and diseases.

***Trade-related subsidies.*** Trade-related subsidies include production subsidies and export subsidies. Both affect the pattern of trade and support uncompetitive production on world markets and can encourage environmentally harmful behaviour. Production and export subsidies can also be used to promote environmentally friendly production techniques and products. The imposition

or removal of trade-related subsidies can also have important socio-economic impacts related to protection of domestic industry, culture and employment.

**TRIPS.** The WTO Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS) is based on a recognition that increasingly, the value of goods and services entering into international trade resides in the know-how and creativity incorporated into them. The agreement holds WTO members to minimum standards of protection over intellectual property through instruments such as copyright for books and patents for industrial design. By protecting the innovator's right to sell their innovation TRIPS may encourage such innovation, including the development of new technologies and processes that will benefit sustainable development. On the other hand, such innovation might be slower to make a contribution if new, more environmentally benign technologies or pharmaceuticals become so expensive as to be inaccessible by the countries and people most in need.

**TRIMs.** Trade-Related Investment Measures (TRIMs) are investment measures that affect trade in goods by restricting or distorting that trade. These include such measures as rules that discriminate against foreigners or foreign products, investment measures that lead to quantitative restrictions, measures which require particular levels of local procurement by an enterprise or measures which limit a company's imports or set targets for the company to export. TRIMs can affect the use or transfer of environmental products and technologies through foreign investment and the environmental performance of foreign firms.

### Trade Liberalization Agreements

An *integrated assessment* can also be applied to international trade liberalization agreements. Commodity agreements, preferential trade agreements and sector-based trade agreements can also be the subject of an *integrated assessment*, limited by the nature and subject matter of the particular agreement. For example, commodity agreements, cooperative arrangements by producer and consumer countries of a particular commodity; will be limited to the commodity that is the subject of the agreement. Sector-based trade agreements designed to restrict imports or expand exports of particular goods are focused on the sectors involved.

#### Box 2:2 International agreements

##### Trade Liberalization Agreements

General Agreement on Tariffs and Trade  
North American Free Trade Agreement  
Free Trade Agreement of the Americas

##### Commodity Agreements

International Tropical Timber Agreement  
International Rubber Agreement

##### Preferential Trade Agreements

Generalised System of Preferences (GSP)  
Lomé Convention  
Cotonou Convention

##### Sectoral Trade Agreements

Voluntary Export Restraint (automobile sector)  
Multifibre Agreement (textiles sector)

Trade liberalization agreements designed to promote less restricted trade involve the broadest assessment because they have a wide range of effects and generally involve changes to all types of trade measures, including tariffs, non-tariff measures, subsidies, TRIPS and TRIMs.

Trade liberalization agreements have legal implications for the use of different environmental policies and instruments in setting rules for permissible trade restrictions on imports and exports. They also have an impact on national, bilateral and multilateral institutions which are involved in the implementation of the agreement. Examples include the WTO and its Committee on Trade and Environment, or North American Commission for Environmental Cooperation.

### Box 2:3 The US approach

In the United States, the *Guidelines for Implementation of Executive Order 13141 on the Environmental Review of Trade Agreements* identifies three categories of agreements for which an environmental review is mandated:

- (a) comprehensive multilateral trade rounds;
- (b) bilateral free trade agreements; and
- (c) major new trade liberalization agreements in natural resource sectors.

The executive order also provides that a review can be conducted for other agreements, based on an objective assessment of the particular case. The order anticipates that most sector-based liberalization agreements will not require a review because they are unlikely to result in significant environmental impacts.

*Source:* United States Trade Representative (USTR) and Council on Environmental Quality (CEQ). "Guidelines for implementation of Executive Order 13141, Environmental Review of Trade Agreements" (2000, online).

### Other Trade-Related Policies

- (a) Industry and export-subsidies, including investment subsidies.
- (b) Macroeconomic policy and exchange rate and current account regimes.
- (c) Deregulation and privatization.
- (d) Tax policy.
- (e) Policies affecting banking and credit systems.

An *integrated assessment* can also focus on trade-related policies within a specific country. To take one example, the UNEP study of trade-related policies in Uganda examined the impacts of policies contained in Structural Adjustment Programmes (SAPs) on Uganda's fisheries sector. The study examined trade liberalization, privatization, deregulation, promotion of investment, profit repatriation and guarantees of property rights.<sup>4</sup>

Economic reform at the domestic level is often designed to promote policies and to encourage activity that stimulates private investment and leads to the development of a more export-oriented economy. Such policies include the increased use of market mechanisms, the reduction of government intervention in economic activity and competition policy to create a more competitive environment and hence to improved productivity and efficiency.

A range of macroeconomic and microeconomic policies affects trade performance, as well as economic performance, and should be considered for inclusion in an *integrated assessment*. Shifts in relative prices due to changes in taxation, tariffs, or real wages have positive and negative impacts on the environment. For example, changes in the relative prices of energy sources can affect production patterns and consequently can cause fuel-switching between energy sources can affect pollution levels associated with production. Foreign exchange policy and the liberalization of capital flows affects the allocation of foreign direct investment. Foreign direct investment by multinational corporations brings capital, management, technology, distribution systems and other assets that affect sustainable development.

The criteria for selecting priorities in a trade assessment includes the following questions:

- (a) Is the policy likely to give rise to significant sustainability impacts (positive or negative)?
- (b) Are the areas likely to be affected by a trade-related policy already under economic, social or environmental stress?

<sup>4</sup> United Nations Environment Programme, *Environmental Impacts of Trade Liberalization and Policies for the Sustainable Management of Natural Resources: a Case Study on Uganda's Fisheries Sector* (Geneva, 1999, online).

- (c) Is the trade-related policy likely to make a significant contribution to the cumulative impacts of a new trade liberalization regime?
- (d) What resources are available and can they be used to effectively conduct an *integrated assessment*?
- (e) Is useful data available to undertake the analysis?

## (2) Establishing the parameters of an *integrated assessment*

Before undertaking an *integrated assessment*, it is important to decide the priority area for the analysis. Priorities can range from a specific economic sector of interest, a geographic region, an environmental or social issue or issues or a specified time-frame. The nature of the issues the *integrated assessment* focuses on—whether economic, environmental or development related—and importance accorded to them will vary with national priorities.

**Sector.** A number of organizations and institutions have adopted a sector-based approach to the assessment of trade policy and trade liberalization.<sup>5</sup> Rather than focusing on economy-wide impacts they examine the impact on a specific sector or product within that sector. The advantage of the sector-based approach is that it makes it possible to identify, early on in the assessment, the positive and negative effects of the policy or agreement under consideration. Starting at the sector-level also provides the most effective opportunities for collecting empirical data. The disadvantage of this approach is that economy-wide impacts are not immediately identified and that important cross-sector links are not captured at the start of the process.

A sector-based approach requires clear criteria for selecting which sectors and industries to investigate. A number of criteria have been developed, by various organizations, for the selection of appropriate and priority sectors—mainly in environmental assessment.

Criteria for the selection of priority sectors proposed in this Manual reflect its potentially very broad application, outlined in Box 2:4.

### Box 2:4 Criteria for selecting priority sectors

- (a) The sector is important to the national economy and in particular in its contribution to export revenues.
- (b) The sector relates directly or indirectly to major environmental media and natural resources.
- (c) The sector relates directly or indirectly to important issues of equity and social well-being.
- (d) The sector provides a strategic natural resource (such as a certain foodstuff) that a large proportion of the population depend upon for their livelihood.
- (e) The sector has been, or might become, the subject of changes in economic rules induced by trade-related policies.
- (f) The sector is one with significant trade flows in both volume and financial terms and is experiencing changes in trade flows.
- (g) The sector is one where one might expect, a priori, that there are important sustainability effects attributable to trade-related policies.

<sup>5</sup> Organisation for Economic Co-operation and Development, *Methodologies for Environmental and trade Reviews* (Paris, 1994, OCDE/GD(94)103, online). North American Commission for Environmental Cooperation, *Final Analytic Framework for Assessing the Environmental Effects of the North American Free Trade Agreement (NAFTA)*, (Montreal, 2000). *Initiating and Environmental Assessment of Trade Liberalization in the WTO* an International Discussion Paper, World Wide Fund for nature (Gland, Switzerland, 2000), Vol. II.



Investigating both upstream and downstream impacts as part of the study can reduce the risk of missing potentially important cross-sector impacts in a sector-based assessment. For example, in an environmental assessment of the impacts of NAFTA on cattle feedlots in the United States, the NACEC extended its sector-based analysis upstream to the feed-grain sector, and downstream to the beef-processing sector.<sup>6</sup>

To capture related cross-sector effects an *integrated assessment* must set the boundaries of the sector analysis to be able to include changes in the major upstream inputs or downstream products. Box 2:5 provides guidelines for considering related sectors.

### Box 2:5 Criteria for selecting related sectors

- (a) Is there a related sector that is a major input into and/or consumer of the sector under consideration?
- (b) Are there economic or environmental dynamics that cross over from one sector to another?
- (c) Is there a sector that has important environmental or social impacts related to the sector under consideration?

**Geographic Region/Ecosystem.** An *integrated assessment* can also be focused on a geographic region. It can be conducted at the national level, at the local level, or based on a specific ecosystem or vulnerable area. Although the main focus of the assessment might be domestic, there may also be some cases in which it is useful to extend the analysis to the consideration of cross-border, regional or even global impacts. Such extensions depend upon the economic, social and environmental priorities examined within the study. For example, if the main development focus of an assessment is migration, cross-border effects might be particularly important. And if the main environmental issue under consideration was greenhouse gas emissions, then an assessment might need to consider the potential global impacts.

In determining whether cross-border impacts need to be included in the assessment, relevant criteria include the scope and magnitude of potential impacts, the availability of data and resources, and the national implications related to international commitments and agreements.

**Sustainable Development Priorities.** An *integrated assessment* might also be focused on specific environmental or social issues that reflect the sustainable development priorities of the country, where there is a clear link with trade policy. Early environmental and social monitoring, based on indicators, can provide early-warnings on adverse environmental and social impacts and therefore provide the maximum amount of time to make modifications in the trade policy or to introduce complementary policies to reduce the impacts to an acceptable level.

**Time-frame.** At the outset, an *integrated assessment* must determine the relevant time-frame for investigating the effects of the policy. It is necessary to consider those effects that occur in anticipation of a trade-related policy or an international agreement—including strategic adjustment on the part of relevant actors in government and the private sector. Other immediate or short-term impacts might include the confirmation or consolidation of changes already underway, for example, codifying existing practices and legitimizing and stabilizing existing economic and corporate activity. The dynamic nature of the impact of trade necessitates the consideration of medium and long-term impacts.

<sup>6</sup> North American Commission for Environmental Cooperation, “Feedlot Production of Cattle in the United States and Canada: Some Environmental Implications of the North American Free Trade Agreement” in *Assessing Environmental Effects of the North American Free Trade Agreement (NAFTA): An Analytic Framework*, (Montreal, 1999, online), Issue Study 2, pp. 183-258.



### III. DESIGNING AN INTEGRATED ASSESSMENT

Careful planning is necessary to ensure that an *integrated assessment* meets its objectives in a timely and cost-effective way. Questions of how, when and by whom it will be conducted must be answered before substantive work on the assessment begins.

In making these decisions, a range of factors needs to be taken into account. First and foremost, policy makers must choose methods that ensure that the aims of the assessment will be met. So, for example, the timing of an assessment may be dictated by the fact that trade negotiators wish to use it to develop their negotiating positions ahead of a trade round.

But other considerations also have to be taken into account. The availability of financial and human resources, data limitations, and the level of experience in conducting such studies will determine, to some extent, the way in which the assessment is conducted. Governments also have to ensure that all individuals and groups with an interest in the issues covered by the assessment are encouraged to participate in the process—and that the end product is both credible and useful to policy makers.

Section A of this chapter considers the timing of *integrated assessments*. Section B looks at how consultation and participation mechanisms should be designed, and discusses the importance of information provision. Section C discusses the use of indicators to identify and describe the impact of a trade-related policy or trade agreement. Section D looks at issues of capacity-building.

#### A. Timing

An *integrated assessment* can take place prior to the implementation of a trade measure or the negotiation of a trade agreement (*ex ante*); during the process of negotiating a trade agreement (concurrent); or following the implementation of a trade-related policy or the final ratification of a trade liberalization agreement (*ex post*). *Integrated assessments* could also stretch over more than one of these time periods, or could even be conducted as a continuous process. For instance, the results of a particular *ex post* assessment could be used as the baseline for a future *ex ante* assessment.

##### (1) *Ex ante* integrated assessment

An *ex ante* assessment is one that is undertaken prior to the negotiation of a trade liberalization agreement or implementation of a trade-related policy. The main advantage of carrying out an assessment at this early stage is that it can produce a consistent set of national positions. It can help avoid negative impacts before they occur, mitigate their incidence or reduce remedial costs. The disadvantages, though, are that the assessment will necessarily be based on a limited amount of information, and that it could be rendered irrelevant should the direction of policy change during subsequent discussions.

An *ex ante* assessment is best suited to national initiatives, where the options for structuring and implementing the policy are usually known in advance. Although their usefulness in assessing international trade liberalization agreements is more limited, since it is difficult to predict the final outcome, *ex ante* assessments can still help to clarify national goals, identify required supporting policies, build support for such policies, and prepare the ground for subsequent assessments.

### Box 3:1 Environmental review and assessment in Canada

In 1994 the Canadian Government conducted an *ex post* environmental review of the Uruguay Round of multilateral trade negotiations. The review evaluated the extent to which the Uruguay Round commitments would affect Canada's ability to regulate for environmental protection.

In 1999 the Canadian Government launched an *ex ante* Strategic Environmental Assessment (SEA) of the WTO's new multilateral trade round, to ensure that Canadian negotiators could consider environmental issues at an early stage in the negotiations.

The first phase of the SEA, conducted in 1999, reviewed the conclusions of the 1994 review using it as a baseline analysis from which to identify any regulatory impacts of the Uruguay Round. The SEA also examined trade flows and other economic impacts, and discussed potential environmental effects. The second phase of the SEA includes the finalization of *Canada's Draft Environmental Assessment Framework for Trade Negotiations*.

The Canadian Government proposes to use the results of the SEA in future *ex post* assessments.

*Source:* Government of Canada, *Uruguay Round of Multilateral Trade Negotiations: Canadian Environmental Review* (Ottawa, Department of Foreign Affairs and International Trade, 1994, online); *Canada's Draft Environmental Assessment Framework for Trade Negotiations*, (Ottawa, Department of Foreign Affairs and International Trade, 2000, online).

An *ex ante* assessment must be undertaken at an early stage if it is to be effective in determining national priorities and informing policy makers. A timely assessment can support policy integration by allowing all relevant environmental and social considerations to be taken into account when governments' negotiating positions are set. It can also influence the international policy debate.

For these reasons, an *ex ante* assessment should ideally be undertaken at the very outset of any trade liberalization process or change to trade-related policies. Such an assessment will probably focus on the national trade objectives being developed, although there should also be some analysis of the range of likely outcomes of any intergovernmental agreement. In addition, the assessment can highlight sustainability concerns, articulate basic principles, and establish a minimum standard against which a final negotiated agreement can be measured. An *ex ante* assessment can also be accompanied by an analysis of the social and environmental effects of past agreements, where such information exists.

## (2) Concurrent integrated assessment

A concurrent assessment is conducted in parallel to trade negotiations. It will suffer from some of the same uncertainty regarding the outcome of the process as an *ex ante* analysis, although it will have the benefit of known national positions, a negotiating agenda, a time-frame and the ability to track any political direction that may emerge following the initiation of the negotiations. A concurrent assessment is a good way of keeping trade negotiators informed of sustainable development issues.

This type of assessment would also be useful at the point of a mid-term review in negotiations. By this point, contingent agreements may have been reached on important matters, settled national positions will probably exist on other items, and realistic scenarios for the final deal may be in place. An *integrated assessment* at this stage has the advantages of being both specific and policy-relevant, as well as being conducted sufficiently far in advance of the final agreement to be influential.

National governments might also wish to conduct an *integrated assessment* once the details of the final deal are in place, but before the agreement is ratified. However, as there is often little

time between the final agreement and the subsequent national ratification, it would be difficult for national authorities to conduct a full-scale assessment from scratch at this stage. Conducting an *integrated assessment* prior to ratification may therefore only be possible if full-scale assessments have already been made at the initiation and mid-term stages of the negotiations.

### (3) *Ex post* integrated assessment

An *ex post* assessment takes place after an agreement has been negotiated and implemented. *Ex post* assessments are critical for understanding the linkages between trade, development and the environment, as they are based on actual evidence of the impact of trade liberalization, rather than on projections. They can also draw on a much larger data set.

The results and lessons drawn from *ex post* assessments can help to define the content of any future *ex ante* exercises, and to inform preparations for subsequent trade liberalization agreements and changes in trade policy.

An *ex post* approach may also be appropriate if the purpose of the *integrated assessment* is to develop policy packages to mitigate any negative effects of trade policies. *Ex post* assessments can also be part of regular trade monitoring mechanisms—such as the Trade Policy Review Mechanism, discussed in Chapter 2—and can be used as a basis for assessing how well national governments are meeting their commitments to sustainable development.

## B. Information, consultation and participation

In order for an *integrated assessment* to be perceived as legitimate, credible and independent, it is vital to build in a strong component of public participation. A wide range of actors from government and civil society should be brought into the assessment process.

Public participation offers the following advantages to those undertaking an *integrated assessment*:

- (a) **Cooperation.** Provides opportunities for cooperation and coordination within and between government and civil society, leading to the creation of long-term collaborative relationships.
- (b) **Expertise.** Introduces a broad range of ideas, experiences and expertise to the *integrated assessment*, enhancing the knowledge of policy makers and promoting the development of a comprehensive range of policy options.
- (c) **Ownership.** Provides participants with a sense of ownership over the final product, thereby reducing the potential for serious conflict and increasing the likelihood of lasting solutions.
- (d) **Capacity-Building.** Ensures that the interests of groups that have traditionally played only a marginal role in policy development can be incorporated into the whole decision-making process, building capacity among those groups.
- (e) **Trust.** Builds trust among the various stakeholders in the process, making it easier for governments to generate widespread public support for liberalization initiatives.

### Box 3:2

#### Public participation at the Earth Summit, 1992

Principle 10 of the 1992 Rio Declaration states that “environmental issues are best handled with the participation of all concerned citizens at the relevant level,” and that to advance such participation, emphasis should be placed on (1) access to information; (2) access to process; and (3) access to justice. In Agenda 21 governments pledged to pursue broader public participation in decision-making processes and policy formulation for sustainable development, understood as development that meets our present needs without compromising the ability of future generations to meet theirs.

Source: UNCED. *Rio Declaration on Environment and Development* (online).

It is important to draw a distinction between consultation and participation. The former involves asking for contributions from experts and the general public, without necessarily offering them a substantive role in policy development; the latter is a more inclusive process, whereby participants have a significant involvement in forming and implementing trade policies.<sup>7</sup> Widespread consultation is an important component of any participatory process. But in the context of an *integrated assessment*, where the common goal of sustainable development is shared by many different sectors of society, full participation should be the aim.

### (1) Who initiates the integrated assessment?

In most cases, *integrated assessments* of trade-related policies are conducted in the public sector, usually by the government departments responsible for the development of trade reforms. Initiating the process in the public sector helps to ensure that its results are translated into policy recommendations.

Within national governments, it is likely that the responsibility for carrying out *integrated assessments* will lie with one of three ministries: trade, environment or development. The primary responsibility for the delivery of the assessment may be given to one department, with others making contributions. It is important to make an effort to involve all relevant government departments in the process, since conducting an *integrated assessment* requires a broad range of expertise. Cooperation between departments also helps to promote integrated policy-making.

### (2) Who should participate?

Any *integrated assessment* will benefit from a wide range of contributing views, although the nature of participation may vary according to individual circumstances. There are three possible levels of participation:

- (a) ***National and sub-national participation:*** Includes all relevant national government departments and agencies, as well as representatives from appropriate sub-federal governments.
- (b) ***Private sector participation:*** Includes environmentalists, industry representatives, trade unions, consumer groups, think-tanks, academics. It is also important to reach out to groups which are often excluded from the decision-making process, including young people and minorities such as indigenous peoples.
- (c) ***International participation:*** Where trade measures have potential cross-border or global sustainability impacts governments may want to consult with other countries during the review process.

In order to assure the independence and therefore the credibility of the assessment, it might also be useful to involve members of civil society with knowledge of the issues as members of an independent advisory process overseeing the conduct of the assessment.

### (3) How should consultations be organized?

There are a number of possible mechanisms for consultation, depending on whether the aim is participation or simply consultation. Box 3:3 gives an example of one institution's guidelines.

Face-to-face meetings have the advantage of providing direct access to those undertaking the assessment, but are costly and only allow limited participation. Written comments provide a

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<sup>7</sup> For an example of a consultation process, see the Joint Public Advisory Committee (JPAC), *Public Consultation Guidelines of the Commission for Environmental Cooperation*, online. For a participatory approach, see the Organization of American States, *Inter-American Strategy for the Promotion of Public Participation in Decision-making for Sustainable Development (ISP)*, online.

**Box 3:3 North American Commission for Environmental Cooperation:  
Joint Public Advisory Committee (JPAC).**

***Structure***

Consultation meetings will generally be structured along the following lines:

- (a) advance notification;
- (b) introduction and information;
- (c) early break-up into work groups or round tables;
- (d) at the beginning of each of the smaller group meetings, opportunity for each participant to make a presentation; and
- (e) a closing plenary session to provide opportunity for workshop reports and recommendations, for short, open discussion between participants and JPAC members.

broader range of input over a longer period of time, but are less direct. Another difficulty with this method is that resource limitations may dictate the extent to which documentation can be made available by mail.

In recent years, an increasing amount of consultation has taken place through the Internet, where policy documents have been publicly posted. This method enhances access to information, and requires minimal resources. However, it relies on the existence of widespread access to information technology. Whatever the method chosen, the consultation must establish a clear process for following up on various contributions, and providing feedback to participants.

**(4) How much information do participants need?**

The availability of information is vital in ensuring the participation of civil society in the process of conducting an *integrated assessment*. It is therefore important that stakeholders are provided with as much documentation as possible at an early stage in the process.

This documentation could include terms of reference for the assessment, advance notice of any consultations, a proposed time-frame, key references, minutes from relevant meetings, submissions and comments received from the public or produced within the government, and any other information relevant to the assessment. Any *ex ante* assessments that might have been conducted in advance of the consultation, and other relevant analyses of trade reforms, are likely to be particularly useful. In determining the levels of information that will be provided, the accessibility and complexity of the information, issues of language, resource issues, and other practical considerations may have to be taken into account.

To facilitate participation, a point of contact should be established at relevant levels of government, and if possible, the names of the relevant individuals or groups responsible for the *integrated assessment* should be published. Clear procedures should be established for requesting and receiving information. Periodic and well-publicized briefings would also be helpful in attracting the broadest possible audience. Briefings might be held in person, or through the Internet, on issues related to methodology and empirical research. These measures will require some human and financial resources.

## **C. Indicators**

The use of indicators is essential in monitoring and assessing the impact of trade reforms. In contrast to primary statistical data, indicators provide meaning beyond what is being directly measured. For example, the size of a population of seals may be selected as an indicator for

### Box 3: 4 Indicators

An indicator is a statistic which, beyond its direct meaning, can be used to derive information about an underlying situation. They are particularly useful when primary data would be impossible to collect, or could only be observed after a time lag.

Indicators can provide a useful early indication of trends, and suggest causal relationships. Their use can reduce the amount of information that needs to be collected to monitor a situation, and may also provide a simplified way of presenting results.

*Source:* OECD, “Towards sustainable development. Environmental indicators” (1998).

changes in coastal habitats, in place of measuring many different water quality and ecological attributes. Therefore, a decrease in seal numbers can be interpreted as showing that coastal environmental quality is declining.

Regular measurement of indicators is required to determine their condition (or “status”). Changes in status can then be tracked, and trends identified and evaluated. While the indicator itself can be objectively measured, interpreting its movements will require careful judgement.

#### (1) Selecting indicators for integrated assessments

Indicators for *integrated assessments* have to be selected on a case-by-case basis. The focus of the assessment, its complexity and the methodology it employs will all help to determine which indicators will be most appropriate. For example, some methodologies require a long series of data points, while others might use short-term data, or be aimed at developing baseline information. As a minimum, though, any *integrated assessment* of trade reforms must include economic indicators that identify changes in trade flows, in addition to appropriate indicators of environmental and social well-being. Examples of these general indicators are given in Box 3:5.

### Box 3:5 Examples of core sustainability indicators

#### Economic

average real income  
net fixed capital formation  
employment

#### Environmental

environmental quality (air, water, land)  
biological diversity  
other natural resource stocks

#### Social

equity and poverty  
health and education  
gender inequalities  
issues affecting minorities

A simple “scoping” exercise, which takes into account the priorities and focus of the individual *integrated assessment*, can be a good way to select sustainability indicators. Such an exercise should put the sector under consideration into its economic, environmental, and social context in order to identify key sustainability issues and guide the selection of appropriate indicators.<sup>8</sup> Specific indicators, “tailor-made” for a particular *integrated assessment*, can be developed and selected to cover the most important issues (Box 3:6).

*Source:* Colin Kirkpatrick and Norman Lee. “WTO New Round Sustainability Assessment Study, Phase Two Main Report” (University of Manchester: Institute for Development Policy and Management and Environmental Impact Assessment Centre, 1999, online).

<sup>8</sup> See Annex 1 for examples of key issues and specific indicators selected for four sectors.



### Box 3:6 Examples of “tailor made” environmental indicators

#### *By Key Issue:*

##### **Electricity Restructuring in Canada, Mexico and the United States**

**Air:** air emission inventories and ambient air quality records (SO<sub>x</sub>, NO<sub>x</sub> and O<sub>3</sub>); particulate matter (PM<sub>10</sub>); greenhouse gases; mercury; heavy metals

**Water:** fuel treatment and processing; acidified lakes and water bodies; mercury

**Land:** waste disposal; acid deposition; reservoirs and corridors; forest health

#### *By Sector:*

##### **Cattle Feedlots in the United States and Canada**

**Feed Grains:** nitrates and atrazine

**Beef Feeding:** phosphorus cycles

**Beef Processing:** biological oxygen demand and total suspended solids

Source: North American Commission for Environmental Cooperation, *Assessing Environmental Effects of the North American Free Trade Agreement (NAFTA): An Analytic Framework*, (Montreal, 1999, online).

“Flanking” policies to build institutional capacities may be tracked by indicators such as numbers of specialist staff employed by key regulatory agencies, caseload determination times, the number of on-site inspections and follow-up actions, and the numbers of meetings with representatives of civil society.

There are a number of ways in which indicators can be used to track the impact of policy changes. One approach is to use a “Pressure-State-Response” model.<sup>9</sup> This method links a series of indicators in a causal relationship. For example:

**Pressure**—immediate cause of change—over-fishing.

**State**—quality and quantity—fish stocks and age distribution.

**Response**—social response to changes—catch quotas.

Where possible, public participation should be part of the process of selecting indicators. The methods described in Section B of this chapter can be used to help to develop indicators in this way.

Indicators should include a mix of short, medium and longer-term measures, in order to capture the full range of effects on sustainability. Longer-term indicators, for instance, are particularly relevant in assessing the irreversibility of environmental damage.

A combination of local, national, regional or global indicators may also be desirable. For instance, a national indicator of fishery catch sizes may be complemented by a measure of change at the local level, such as the change in per capita incomes in selected fishing communities.

The number of indicators selected will depend in part on the availability of resources. While selecting a smaller number of measures might limit the amount of information generated, it can

<sup>9</sup> A variant of this approach, the “Driving Force-State-Response” model, was used by the UNCSO to derive its core set of sustainable development indicators. Recent testing of these indicators has shown that this model is useful for selecting environmental indicators, but is less useful in identifying social, economic and institutional indicators.

### Box 3:7 Examples of indicator sets

- (a) United Nations Commission on Sustainable Development (1999) CSD working list of indicators. Online.
- (b) Organisation for Economic Co-operation and Development (1993) OECD list of core indicators “Measuring Development Progress: A Working Set of CoreIndicators”. Online.
- (c) European Environment Agency (2000) EEA Environmental signals 2000 (Chapter 16). Online.

have the advantage of making the work more manageable and focused, which may make it easier to communicate to policy makers.

The following criteria may be useful in selecting indicators for an *integrated assessment*. Indicators for an *integrated assessment* should be:

- (a) A reflection of the full range of key sustainability issues.
- (b) Capable of showing trends over time.
- (c) Easily understood by non-specialists.
- (d) Credible.
- (e) Available.
- (f) Measurable with an acceptable level of financial and human resources.

## (2) Data availability and sources

There are many sets of indicators produced by international agencies. The United Nations Commission on Sustainable Development (CSD) has, for instance, approved a work programme to create a set of indicators that can be used by national governments to measure progress towards sustainability. These existing sets of indicators provide an excellent resource for governments and agencies wishing to select specific indicators for the purposes of an *integrated assessment*.

Some caution should be exercised when using pre-existing sets of indicators. Each set is constructed for a particular purpose and over time, as priority given to particular issues changes, they have a tendency to become obsolete. Nevertheless, existing sets form useful bases for selecting “tailor-made” sets.

Efforts to develop indicators are also being made by NGOs, and by national and local bodies. In the United Kingdom, for example, the Ministry of Agriculture, Fisheries and Food and the Department for International Development both developed indicators in 2000.<sup>10</sup>

There may be occasions when the most appropriate indicators cannot be used, perhaps because measurement is not practical or is too expensive. In such circumstances, a surrogate or “proxy” may be identified which can substitute for the original indicator. The scope for error increases when using a proxy, but its use can be justified if it is believed that it gives a reasonable indication of trends. An example of a proxy for per capita income in a village might be the number of bicycles seen in the village streets during a fixed period of time. The use of “keystone” species, such as birds of prey, to determine the status of a habitat or ecosystem is another example of the use of proxy indicators.

<sup>10</sup> United Kingdom, Ministry of Agriculture, Fisheries and Food, *Towards sustainable agriculture: a pilot set of indicators*, (London, 2000, online). United Kingdom, Department for International Development, *Achieving Sustainability: Poverty Elimination and the Environment* (London, online).

## D. Capacity-building

Capacity-building means strengthening the capability of individuals or organizations to work towards their goals. In the short-term, it is essential for ensuring that optimal policies are selected and implemented. In the medium term, it is an important ingredient of economic growth, as well as poverty eradication. In the long-term, it helps to ensure that the vision of sustainable development is broadly shared and is a goal of policy-making. For these reasons, capacity-building is an important consideration for policy makers.

Capacity issues are relevant to governments, civil society, independent researchers and the private sector. Within governments, the making and implementation of informed choices requires investment in the skill levels of government officials, as well as the creation of capacity for monitoring, regulation, and surveillance. Civil society requires capacity in research, advocacy, and networking in order to contribute to the decision-making process, as well as adequate financial resources. The research sector needs to be capable of accessing information, collecting data, using tools of assessment, orienting research towards practical solutions, and publishing and disseminating results. Finally, the private sector requires capacity for collective action, engagement with research institutions, and ensuring the disclosure of socially relevant information.

The conduct of an *integrated assessment* will make certain demands on capacity. Indicator monitoring, for instance, has both technical and institutional capacity requirements. An institutional framework is needed to manage the monitoring programme; receive the evaluations of the data and recommendations for action; accept, reject or amend the recommendations; and finally to decide upon and implement a course of action. Decisions on the scope and time-scale of the monitoring programme are also institutional responsibilities.

Without adequate capacity for research, analysis, participation and policy-making, the scope for conducting *integrated assessments* will be severely limited. In the field of trade and the environment, in particular, poorer countries may lack adequate analytical resources, and may therefore find it difficult to participate in global decision-making.

International organizations can play an important role in supporting capacity-building. Through country projects, they can help national governments to conduct *integrated assessments*. Different organizations sharing a common goal of sustainable development can also pool their expertise, improving the overall state of knowledge. Such cooperative efforts will make the most of the individual specialization of international organizations, and will enhance the links between them. Countries' capacities to deal with trade, environment and development related issues would then be strengthened, giving them the ability to conduct effective *integrated assessments*.



## IV. INTEGRATED APPROACHES AND TECHNIQUES

A wide range of methodologies can be used in an *integrated assessment* of trade policies and agreements. A good assessment is likely to use a mix of these methodologies, depending on the type of trade policy being analysed, and the impacts being measured. The availability of data may also constrain the choice of the appropriate methodology.

This chapter—which is based in part upon the 1994 and 1999 OECD methodology workshops—aims to provide a comprehensive review of these methodologies. Suggestions on the appropriateness of their use are given, together with some case studies on their application. It concentrates on the impact of trade on the environment, but similar methods can be used to assess the social implications of trade policy.

Section A discusses linkages between trade and the environment, using a breakdown into product, technology, scale, structural and regulatory effects. Section B presents a comprehensive range of methodologies for analyzing and valuing these links within the context of an *integrated assessment*. Section C draws out a number of lessons from assessments of past and ongoing trade reforms. Section D makes some concluding remarks.

### A. Linkages between trade and the environment

An *integrated assessment* must consider the full range of effects—direct and indirect—that trade reforms may have on the environment and on society. Policy makers can only make decisions on the trade-offs between economic gains, environmental impacts and social effects if these

#### **Box 4:1 Guiding the environmental reviews of trade agreements: the United States example**

1. Since trade agreements exhibit a broad variation, it is likely that each environmental review will incorporate uniquely tailored analytical approaches. A different mix of analytical methodologies may be needed for different types of trade agreements.
2. The analysis shall entail an objective, rigorous assessment of the environmental issues under consideration, and shall be based on scientific information and principles, documented experience and objective data. Analysis shall normally be both qualitative and quantitative. The analytical process should take into consideration assumptions and/or uncertainty in the data and methodologies and should document limitations due to those assumptions and uncertainties.
3. Agencies shall use best efforts to identify sources of data and analytical methodologies available within and outside of the US Government, which would then provide a foundation for subsequent specific environmental reviews. A list of such sources shall be created and made available to the public. The list may be updated over time, on the basis of public comments.

*Source:* United States Trade Representative (USTR) and Council on Environmental Quality (CEQ), “Guidelines for implementation of Executive Order 13141, Environmental Review of Trade Agreements” (2000, online).

### Box 4:2 The scale effects of trade on the environment

An expansion in the level of economic activity can have positive impacts on the environment by improving efficiency, meaning that the demands on natural resources are reduced, and less polluting waste is produced. Specifically, trade may promote:

- (a) Allocative efficiency, as the country specializes in the production of goods and services where it has comparative advantage.
- (b) Increased efficiency, brought about by competition that forces firms to become innovative and more efficient.
- (c) Imported efficiency, caused by the flow of more efficient production technology.

Higher economic growth also makes people wealthier, which may lead to increased demands for environmental protection. But an expansion in economic activity could also have negative environmental effects:

- (a) Higher output increases the demand for natural and environmental resources, especially if there is no effective environmental regulation in place.
- (b) Experience shows that increased wealth tends to be associated with increases in some kinds of pollution, including the emission of greenhouse gases, toxins such as PCBs, and dioxins.

impacts can be reasonably accurately measured. Five broad categories of environmental impacts from trade reforms can be identified:<sup>11</sup>

**Product effects.** These are effects related to the flow of products (or services) between countries. Some of these products may be environmentally friendly, while others may be hazardous to the environment. Overall product effects therefore can be positive or negative, depending on the nature of the products traded as well as their volume.

**Technology effects.** More open trade policies may lead to the transfer of production technologies across borders. Again, these technologies may be harmful or friendly to the environment. There is a positive technological effect when a trade policy allows the flow of environmentally friendly technologies; and a negative effect when it prompts the transfer of harmful technologies.

**Scale effects.** Reforms that promote trade will often raise the overall level of economic activity, which translates into a higher rate of use of natural and environmental resources. However, this may be offset if efficiency is improved, or if higher economic growth makes greater investment in environmental projects possible (Box 4:2).

**Structural effects.** Trade liberalization could lead to changes in the sectoral composition of a country's economy, as it specializes in the production of goods or services where it has comparative advantage. If the changes favour the less-polluting industries, then positive environmental effects could be felt in that country. Trade liberalization may also result in the removal of subsidies, quotas, or other restrictive measures that hinder the attainment of allocative efficiency. On the negative side, the products where the country has comparative advantage may have a higher pollution intensity, or may require a greater use of the country's natural resources. Without the appropriate environmental policies, negative environmental effects may result.

**Regulatory Effects.** Trade reforms may have an impact on environmental regulations and standards. On the positive side, trade agreements may explicitly include measures to improve envi-

<sup>11</sup> Organisation for Economic Co-operation and Development, *Methodologies for Environment and Trade Reviews* (Paris, 1994, OCDE/GD(94)103, online).

ronmental standards. But it is also possible that particular provisions of trade reforms may impinge on a government's ability to set environmental protection standards.

These five types of effects can have a range of environmental, health, and social impacts. Environmental impacts would include higher air, water, or land pollution. There could also be natural resource effects associated with changes in the demand for the use of natural resources, leading to either faster resource depletion or resource degradation. In the case of social impacts, more open trade may result in certain sectors expanding and others contracting, possibly leading to a rise in inequality. A preliminary identification of these impacts and their magnitude could be carried out using the matrix shown in Table IV-1.

TABLE IV-1

**Preliminary assessment of the environmental, health, and social  
impact of trade policies and agreements**

<i>Trade-related Effects</i>	<i>Impact on Pollution</i>	<i>Impact on Health and Safety</i>	<i>Impact on Resources</i>	<i>Impact on Society</i>
Product effects				
Technology effects				
Scale Effects				
Structural Effects				
Regulatory Effects				

This matrix can help identify what impacts may be related to the various trade-related effects given in the first column. Entries to this matrix may range from no entry (no effect/insignificant effect) to five asterisks, with more asterisks denoting severe environmental, health, or equity impacts. The matrix provides a good way of selecting which issues an *integrated assessment* should focus on for more quantitative assessment, particularly given financial and time constraints.

Table IV-2 shows the most likely direction of the various impacts for OECD countries, based on a recent study of the subject.<sup>12</sup> In some cases, the effects are ambiguous, demonstrating the need for further analysis and quantification.

TABLE IV-2

**Matrix showing “most likely” impacts of trade liberalization on the economy and on the  
environment in OECD (home) countries<sup>13</sup>**

<i>Globalization- related activity</i>	<i>Anticipated economic effects</i>	<i>Anticipated pollution/resource use effects--</i>	
		<i>--at home</i>	<i>--at cross-border transport</i>
Scale effects	Change in the volume of exports and imports; increase in cross-border transport	(+)	(+)
Structural effects	Change in the composition of exports and imports; increase in cross-border transport	(+, -)	(+, -)
Product effects	Change in the composition of exports and imports; increase in cross-border transport	(+, -)	(+, -)
Technology effects	Change in the composition of exports and imports; increase in cross-border transport	(-)	(-)

<sup>12</sup> T. Panayotou, *Globalization and the Environment*. CID Working Paper No. 53. (Harvard University, Center for International Development, 2000, online).

<sup>13</sup> R.-U. Sprenger, “Globalization, Employment and Environment” in Panayotou, 2000 (see footnote 12).

An application of the matrix-based approach is shown in Box 4:3, which describes how this method was used to analyse the environmental impacts of trade liberalization in Chile. A similar approach was used by the NACEC for an *ex post* examination of the environmental impact of NAFTA.<sup>14</sup>

### Box 4:3 The application of the OECD methodology in Chile

In the study *Environmental Impacts of Trade Liberalization and Policies for the Sustainable Management of Natural Resources: A Case Study on Chile's Mining Sector* the environmental effects of trade liberalization were analysed applying the OECD's 1994 methodology. In a first phase of the study economic changes that had taken place as a result of trade liberalization were established, considering scale effects, structural effects and product-related effects. These changes were then linked to the corresponding environmental effects and regulatory and technology effects were added to the analysis. The most pervasive difficulty in the study was distinguishing between the overall effects of economic activity and the specific effects of trade liberalization, the latter consisting of a complex process of deregulation, privatization and favorable foreign investment conditions combined with the limited availability of environmental data. Thus, the study focused on qualitative findings. A qualitative assessment framework was established to identify priority environmental problems, the significance or share of sector responsibility in these priority problems, crosscheck these problems with those that are attributable to trade policy, and identify the existence of environmental policies to attack the problems. The following table illustrates how the link between trade liberalization and environmental impacts was qualitatively summarized in the study:

#### Summary of principal environmental effects

Economic effect	Related economic environmental factor	Environmental Indicators						
		Air quality	Water quality	Quality of the soil	Water use	Security of abandoning of sites	Biodiversity	Use of non-renewable resources
Scale effect	Increase in production					-	-	---
	Increase in concentrates	-	-	-	---			
	Increase in cathodes	-	-	-	--			
	Increase in blister	--	-	-	-			
Product effects	Relative increase in concentrates	-	-	-	---			
Technological effects	Changes in pyrometallurgy	+++	+	++	++	0		
	Increase in hydrometallurgy	++	+++	++	++	--		
	Desalinization	0	0	0	+	0		
Regulatory effects	Environmental regulation	+++	+	0	0	+	0	0
Industry management	Environmental management	+	+	+	+	+	+	+

NOTE: - light negative impact; -- moderate negative impact; --- significant negative impact; 0 no noticeable impact

Source: UNEP, *Environmental Impacts of Trade Liberalization and Policies for the Sustainable Management of Natural Resources: A Case Study on Chile's Mining Sector* (New York and Geneva, 1999, online).

<sup>14</sup> North American Commission for Environmental Cooperation, *Final Analytic Framework for Assessing the Effects of NAFTA on the Environment* (Montreal, 2000).



Categories such as those developed by the OECD and the NACEC, enumerating ways in which effects of trade liberalization might be felt on the environment or social values, can be put to use, *inter alia*, in a qualitative assessment of such impacts. These categories can be used to develop analytical questions and hypotheses to guide an analysis in an *integrated assessment* that does not rely on quantitative techniques. Rather, techniques used in a qualitative assessment include standard social science methods. These could include conducting case studies, data collection, and other research. Additional techniques include specialized interviews, consultation and other participatory approaches. In addition, analysis might be guided by testing hypotheses, or generating a series of targeted analytical questions, based on an initial identification of key economic, environmental and social issues, that can be addressed in the assessment. Annex 2 includes examples of the types of questions that could be posed in an *integrated assessment*, for four sectors: agriculture, travel and tourism, textiles and fisheries.

## B. Methodologies

The environmental impacts of trade agreements can be traced and quantified using a range of frameworks, including econometric approaches, gravity models, ecological models, biological systems models, partial equilibrium economic models, and general equilibrium economic models. Ideally, a methodology should be chosen which best suits the nature of the system being examined. In practice, the choice may be constrained by factors such as the user's familiarity with the model, and also by its availability.

Any model will require a clear definition of the policy measures to be assessed, as well as identification of the impacts to be included in the model, which will typically include product, technology, structural and scale effects. The regulatory impact of trade agreements may also be considered.

### (1) Macroeconomic models

The first stage in constructing a macroeconomic model is to define the boundary of the system to be studied. If the analysis can be restricted to one sector or ecosystem, then a partial equilibrium model will be most appropriate. But if the aim is to study the impact of a trade policy on one or more countries, or on the world as a whole, then a general equilibrium model should be used. This choice will depend partly on the nature of trade-dependence of the country in question.<sup>15</sup>

Another consideration in choosing the scope of the analysis is the extent of environmental externalities. Where the impacts are localised, then a national model may be sufficient, but where there are significant cross-country effects, a regional analysis may be more appropriate. There are three broad groups of models, which can be used to assess the linkages between trade and environment. These are input-output models and social accounting matrices; general equilibrium models; and a group of other macroeconomic models.

**Input-Output Models.** Input-output (I-O) analysis was first developed by Wassily Leontief in the 1930s. I-O models look at the relationships between different sectors of the economy in terms of their input-output interdependence, so that each sector's product is viewed both as a product for final consumption, and as an input into further production activity. The basic assumption of the model is the existence of fixed input-output coefficients, making it possible to estimate the total quantities of goods needed as inputs to produce a given amount of output for final consumption.

The model is often represented as a matrix or table that shows the input-output coefficients for all the sectors making up the economy. If it is assumed that there are three sectors, agriculture, industry, and households, then the I-O matrix can be represented as in Table IV-3.

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<sup>15</sup> W. Martin, "Modeling the Impacts of Trade Agreements on the Environment" (1999, online).

TABLE IV-3

**A simple illustration of the input-output table**

<i>Sector</i>	<i>Agriculture</i>	<i>Industry</i>	<i>Households</i>	<i>Total Output</i>
Agriculture	50	40	110	200
Industry	28	12	60	100
Households	160	360	80	600

The rows show how one sector's total output is allocated between the sectors. Of the 200 units produced by agriculture, for instance, 50 are kept for its own use, 40 are sold to industry, and 110 are allocated to households. The columns give the combination of productive resources (inputs) used by that sector. In this example, agriculture uses up 50 agricultural units, 28 industrial units and 160 household units.<sup>16</sup> Using linear algebra, I-O analysis makes it possible for all economic activities to be directly related to gross domestic product. They are useful in predicting how changes in one sector would affect other sectors. They have also been used to plan how much output should be produced by each sector in order to meet the demands of others.

The I-O analysis can be extended to show the environmental impact of economic activities by including the environment as one of the sectors, as suggested by Markandya.<sup>17</sup> This is shown in Table IV-4.

TABLE IV-4

**Input-output table including the environment**

<i>Sector</i>	<i>Agriculture</i>	<i>Industry</i>	<i>Household (final demand)</i>	<i>Environment</i>
Agriculture				
Industry				
Household				
Industry				

Alternatively, an environmental input-output table can be constructed which corresponds to the economic input-output table. These two matrices are linked, as the production and consumption of goods and services is associated with flows of natural resources and environmental pollution. This approach was developed by Schroeder<sup>18</sup>, and software has since been developed to facilitate the analysis.

In an environmental input-output table, the entries are environmental goods, defined in terms of energy, water and materials. The system traces the flow of these environmental goods from the initial extraction of resources, to their use in producing goods, and their transformation into environmental waste. As Shroeder puts it: "where economic input-output analysis asks what enters the production processes, the environmental input-output analysis asks what leaves them and where it goes."

By linking the economic and environmental input analyses, the environmental consequences of economic activities can be directly estimated.<sup>19</sup> The final output of the analysis is often called an "environmental declaration." This states how many units of energy and water are consumed,

<sup>16</sup> Leontief in his example uses bushels of wheat for agricultural units, yards of cloth for industrial units, and man-years of labour for household units.

<sup>17</sup> A. Markandya, "New Initiatives for Environmental Assessments", (1999, online); N. Lee, "Comments on EU Sustainability Impact Assessment Study: Purpose and Working Method" (1999, online); and M. Perrin, "Sustainability Assessments of Trade Liberalization Agreements" (1999, online).

<sup>18</sup> H. Shroeder, "Merging Economic and Environmental Input-Output Analysis". Online; H. Schroder, "Input management of Nitrogen in Agriculture", *Ecological Economics*, Vol. 13, pp. 125-140.

<sup>19</sup> *Ibid.*

and how much pollutant is emitted, in the production of one unit of a good. With this information, it is possible to design policies for environmental management.

**General Equilibrium Models.**<sup>20</sup> The solution to general equilibrium (GE) models defines a stable economic situation, where demand and supply are equalized in all sectors. The basic components of the models are “preferences”, described in consumers’ utility functions; “technology”, which defines how inputs are transformed to outputs; “activities”, which are actions that use a certain amount of inputs per unit of operation; and “endowments”, which define the initial ownership of commodities and factors of production. GE models focus on the interconnectedness of markets. In the context of an *integrated assessment*, a GE model makes it possible to trace the impact of trade policy externalities on the costs of production and consumer welfare.

There are several variants of GE models, including goods/factors models, trade models, taxes/public goods models, externalities/environmental models, and development-agricultural transformation models. Several examples of GE models which have been developed involve natural and environmental sectors such as forestry, agriculture and manufacturing (Box 4:4).

#### Box 4:4 Global trade analysis project (GTAP)

The global trade analysis project or GTAP is a widely used applied general equilibrium (AGE) model dealing with the interaction between trade and the environment. Developed by the Center for Global Trade Analysis in Purdue University, Version 3 of GTAP divides the world economy into 37 industries or sectors in 20 countries, and 10 composite regions or country groups. Hertel<sup>21</sup>, Hertel and Tsigas<sup>22</sup>, and Brockmeier<sup>23</sup> provide details of the structure of the model.

Strutt and Anderson<sup>24</sup> used the GTAP database to analyse the impact of trade agreements on air and water in Indonesia. A separate environmental module was created and attached to the Indonesian part of the GTAP. The authors compared a base scenario with two alternatives: one assuming full implementation of WTO members’ Uruguay Round commitments by 2010, and the other with a move to Most Favoured Nation free trade by APEC countries by 2020. The study then measured the environmental impact of the resulting changes in the level and composition of output, and in production technologies. It found that trade policy reform in Indonesia in the next two decades would improve air and water pollution and reduce depletion of natural resources. Under the least favourable assumptions, it would only cause a slight deterioration in the environment-even in the absence of effective environmental regulations. For a detailed account of the magnitude of scale, structural and technology effects, refer to Strutt and Anderson.<sup>25</sup>

Ferrantino used the GTAP Model to estimate the effects of trade liberalization on manufacturing pollution.<sup>26</sup> The study runs two simulations using comparative static analysis, assuming constant returns to scale and perfect competition. The first simulation considers changes in trade protection agreements reached in the Uruguay Round, specifically referring to changes in the levels of import tariffs affecting other traded sectors, elimination of voluntary export restraints (VERs) and the bilateral quotas imposed under the multi-fibre agreement (MFA). For the second simulation, the same changes in VERs and MFA are assumed, but in addition, import tariffs were removed only for manufacturing and selected primary products. This was in contrast to the imposition of partial liberalization of tariffs across all traded sectors.

The analysis shows that the favourable structural and technology effects of trade liberalization offset the negative environmental scale effects. The net result is a moderate reduction in global pollution brought about by a reduction in production in protected dirty industries, and by the reallocation of dirty industries from developing to developed countries. The model predicts, though, that some parts of Asia would become more polluted. As in other models, the most serious constraints are data limitations, particularly in relation to the availability of reliable estimates of emission coefficients.

<sup>20</sup> Online references are available for an overview of other computational equilibrium models. (see the List of URLs).

<sup>21</sup> T. Hertel, Department of Agricultural Economics, Purdue University, “Future Directions in Global Trade Analysis”, Staff Paper#99-8 (1999, online).

<sup>22</sup> T. W. Hertel and Metsigas, “The Structure of GTAP” (1996, online).

<sup>23</sup> M. Brockmeier, “A Graphical Exposition of the GTAP Model”, GTAP Technical Paper No. 8. (Purdue University, Center for Global Trade Analysis, 1996, online).

<sup>24</sup> A. Strutt and K. Anderson, “Estimating Environmental Effects of Trade Agreements with Global CGE Models: A GTAP Application to Indonesia”. (1999, online).

<sup>25</sup> Strutt, A. and K. Anderson. 1998. “Will Trade Liberalization Harm the Environment? The Case of Indonesia in 2010 to 2020”, Seminar Paper 98-04 (Center for International Economics Studies, University of Adelaide, 1998).

<sup>26</sup> M. Ferrantino, “Modelling the Effects of Trade Liberalization on Forest Cover: Some Methodological Issues” (1999, online).

While a dynamic model should ideally be used, data constraints mean that a comparison of static states of environmental situations is often more realistic.

GE models have also been widely applied in analyses of the costs of reducing greenhouse gases. Examples include the OECD's general equilibrium environmental (GREEN) model, a multi-region, multi-sector dynamic applied general equilibrium model; the carbon rights trade model (CRTM), which looks at the economic costs of reducing carbon dioxide emissions as far ahead as the year 2100; and the Whalley and Wigle model, which examines the international implementation of carbon taxes over the period 1990-2030.<sup>27</sup>

## (2) Sector-based/microeconomic analysis

**Partial Equilibrium Models.** Partial equilibrium models calculate the effects of policy changes on one good (or sector, or ecosystem), while ignoring the effects on other goods, on the assumption that the good being examined is too small to have any significant impact on the rest of

### Box 4:5 Other general equilibrium models

TEQUILA was developed by Beghin et al.<sup>28</sup> at the OECD Development Centre for Research and Sustainable Development. It has been used in OECD-sponsored case studies in Chile, China, Costa Rica, Indonesia, Mexico and Vietnam. The model computes a static equilibrium solution for each time period, given fixed proportions of saving and consumption. It treats commodity and environmental consumption separately, and these make up an aggregate welfare measure.

In the Chile case study<sup>29</sup>, 72 sectors were delineated into pollution-intensive and natural resource-based sectors. Pollution levels by sector were derived using information on energy and input use, taken from a social accounting matrix using the 4-digit international standard industrial classification, alongside the corresponding industrial pollution projection system database of the World Bank. The model imposes an excise/effluent tax (variable across sectors) to achieve a reduction in pollution. The results show that biggest health impacts were linked to the harmful pollutants particulate matter PM<sub>10</sub>, sulphur dioxides, and nitrogen dioxides, the level of which increases with integration into NAFTA. They further suggest that taxing air pollutants would have welfare gains, due to improvements in health and efficiency.

The comprehensive model for policy assessment (COMPASS) is a multi-sectoral, multi-regional econometric model that simulates interactions between economic growth, energy use and the environment. It covers 60 regions, accounting for 99.5 per cent of world GDP.<sup>30</sup>

The model uses the input-output framework to analyse the national accounts of the countries covered over a 25-year period. It also uses detailed data on energy balances and CO<sub>2</sub> emissions. The model projects the value of impacts until 2010, and provides information on production, trade, balance of payments, saving, investment, energy demand and supply, and environmental impact, at both the regional and global level.

COMPASS can trace the impact of policy measures such as trade liberalization and environmental regulation. In addition, it can measure the effect of lifestyle changes, such as shifts in consumption patterns and developments in technology, which might lead to changes in input coefficients or substitution of energy sources. Since COMPASS relies on time-series data, its biggest constraint is data availability.

<sup>27</sup> J. Whalley and R. Wigle, "Terms of Trade Effects. Agricultural Liberalization and Developing Countries" in O. Knudsen and I. Golden (eds). *Agricultural Trade Liberalization: Implications for Developing Countries*, 1990 (Washington, D.C., The World Bank), as cited by Hertel, 1999 (see footnote 21).

<sup>28</sup> J. Beghin and others, "Prototype CGE Model for the Trade and the Environment Programme Technical Specification." Technical Paper No. 116 (Paris, OECD Development Centre, 1996).

<sup>29</sup> J. Beghin and others, "Trade Integration, Environmental Degradation, and Public Health in Chile: Assessing the Linkages". Online.

<sup>30</sup> K. Uno and others, "Environmental Effects of Trade Liberalization Agreements: The Compass Approach" (1999, online).

the economy. Where there are substantial economy-wide environmental externalities, therefore, the results of the partial equilibrium analysis may be of limited use. These models are important because their micro-focus makes their predictions easy to verify. Data constraints are also less significant at this level of analysis. An example of a partial equilibrium model (focused on material markets) is the STREAM or substance throughput related to economic activity model (Box 4:6).

#### **Box 4:6 Substance throughput related to economic activity model (STREAM)**

STREAM is a partial equilibrium model for materials flows developed by the CPB Netherlands Bureau of Economic Policy Analysis. It describes the material flows of steel, aluminium, plastic, paper, ammonia, phosphorus, and potassium. The model however was designed to go beyond other more descriptive tools in the sense that it measures the relative scarcity of certain goods, and incorporates adaptive mechanisms such as the use of resource-saving technologies. This is possible since the model allows the material producer to choose between primary and secondary production and technologies that subsequently depend on the use of such inputs as: labour, capital, electricity, coal, oil, gas, and raw materials or scrap.

As described also by the author, the model allows one to do long-term scenario analysis and understand better the future demand and supply conditions for natural resources. Furthermore, the model is used to analyse the effects of changes in policies on material flows and on the supply and demand conditions for the markets of the materials listed in the preceding paragraph.

A detailed description of the model is found in the research memorandum written by H.J.B.M. Mannaerts for the CPB Netherlands Bureau of Economic Policy Analysis.<sup>31</sup>

**Environmental Impact Assessment.**<sup>32</sup> EIA was designed originally to identify, predict and evaluate the environmental impacts of alternative proposed activities or projects. A goal of EIA is to identify ways in which the impacts could be mitigated, and for this reason should ideally be undertaken at the start of the project or during the design stage. In practice, most EIAs have not placed a monetary value on environmental impacts, there is a trend amongst some multilateral lenders for such an evaluation to be undertaken.

EIAs have become a standard method of assessment for governments evaluating the acceptability of project proposals. The methodology has also been recommended for the evaluation of economic policies, including trade policies. For instance, EIAs were used in the 1992 Canadian environmental review of NAFTA and the 1994 Swiss Government review of the Uruguay Round. Based on such experiences, however, it was found that EIA analysis in its current form is more appropriate at project level than when used to evaluate the impact of economic and trade policies.

**Benefit-Cost Analysis.** Benefit-cost analysis (BCA) is a framework that allows the monetized costs and benefits of an activity, project, or policy to be compared, using the various valuation tools discussed in Section B of this chapter. It is a useful way of converting all the information relevant to the assessment of a proposed action into a comparable and easily understood form. The main difficulty is putting a monetary value on environmental and social costs and benefits for which no market prices generally exist. Some form of shadow pricing for both marketed and non-marketed commodities and services therefore becomes necessary. The end product is a measure of the aggregate net benefit of the policy, discounted to the present. BCA can be undertaken *ex ante*, *ex post* or during project implementation. An *ex ante* analysis can help to determine whether a policy should go ahead or not, while *ex post* analysis is valuable as a learning exercise. Benefit-cost analysis has so far been used mostly at the project level.

<sup>31</sup> H.J.B.M. Mannaerts, "STREAM: Substance Throughput Related to Economic Activity Model", Research Memorandum No. 165 (The Hague Netherlands Bureau for Economic Policy Analysis, 2000).

<sup>32</sup> See United Nations Environment Programme, *EIA Training Resource Manual*, Forthcoming. Online.

**Risk Assessment.** Risk assessment procedures aim to “balance what is known for certain, what is estimated as a potential and probable threat, and what is unknown.”<sup>33</sup> A risk-based approach is likely to be useful in *integrated assessments*, since policy impacts can be subject to considerable uncertainties, including the difficulty of establishing causal relationships and the problems involved in the accurate measurement of scale effects. One practical application of the risk assessment methodology is an analysis of how trade reforms might influence the use and movement of chemicals that could be hazardous to health. This analysis requires valuation tools for measuring health impacts, as set out in Section B.

The first stage in a risk assessment is to list all possible sources of hazards. As well as substances or emissions, consideration should also be given to the potential for institutional or policy failures which might threaten the realization of policy goals. The second step is to establish the linkages between pollutants and health or environmental damage. This task requires extensive data sets that are often not available in developing countries, and as a result, many studies rely on the use of benefits transfer.<sup>34</sup> The extent of exposure to the hazardous elements is established using primary and/or secondary data. Probabilities can then be estimated of various events occurring. These can be calculated from historical data or related studies, or may rely on expert consultations, such as the Delphi technique.<sup>35</sup> The final step is to model the likely impacts of the policy change (known as consequence modelling).

This procedure should be carried out with the participation of as many stakeholders as possible. The stakeholders should not simply be considered as a source of information for impact assessment, but as active participants in the difficult process of evaluating the probabilities that uncertain events may take place.

**Multi-Criteria Analysis.** Where trade-offs between conservation and development goals exist, multi-criteria analysis (MCA) attempts to take into account the preferences of stakeholders in the use of natural and environmental resources. The process is participatory, as stakeholders themselves make decisions about how the environmental resource should be managed. These decisions are arrived at by identifying alternative options for the use of the resource, together with a set of criteria to be used in evaluating the options, and by setting weights for each criterion.

The most important criteria used in MCA include economic efficiency (measured in terms of the net present value of goods and services produced, and the value of the environmental services); distributional impact (incidence of costs and benefits by socio-economic group, stakeholder, or by geographic area); employment; social acceptability; sustainability; biodiversity, and environmental impacts. The process requires ranking the various options using combinations of quantitative and qualitative marks, and putting weights on the various criteria. MCA should not be viewed as an alternative to BCA, but rather as a complementary tool. MCA’s main advantage is its ability to identify and resolve conflicts among the various stakeholders over a particular resource or environment, or a policy under consideration.

**Extended Domestic Resource Cost Approach.** Domestic resource cost (DRC) analysis was originally applied to agriculture in the 1960s. Its aim is to measure distortions (such as taxes) in the domestic sector, so that the gains from trade liberalization can be correctly estimated. When environmental costs are included in the calculations, so that the prices in the model reflect the true social value of goods and services, then DRC becomes extended domestic resource cost (EDRC).

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<sup>33</sup> See United Nations Environment Programme, “Selected Environmental Assessment Procedures and Procedural Harmonization: Information Note”. (1994, online).

<sup>34</sup> The benefits transfer process, developed by Desvousges, Naughton and Parsons in 1992, involves transferring the monetary values of environmental effects from the sites where original valuation studies were conducted to the study site under consideration (Environmental Protection Authority: Australia, *ENVALUE: NSW EPA Environmental Valuation Database Handbook*. 1995, online). This procedure can be used where time and budget constraints prohibit the conduct of original studies. Various databases providing environmental valuations exist online.

<sup>35</sup> This is a method of obtaining inputs from groups, usually experts in the field, for ideas to solve a given problem. The process was pioneered by the RAND Corporation and is based on anonymity, statistical analysis, and feedback of reasoning (Armstrong, *The Delphi Technique*, Princeton Economic Institute, 1989, online). More information is available online.

### Box 4:7 Applications of extended domestic resource costs (EDRC) analysis

Three studies using EDRC to analyse the linkages between trade and the environment were carried out in Chile. The sectors covered include mining, forestry and fisheries.<sup>36</sup> Environmental costs were included in the computation of the domestic costs of export production, which were then compared to foreign exchange earnings. The studies found that the net negative environmental impact was significant when compared to total foreign exchange earning. This environmental effect was largely caused by market failures, together with some policy failures. Large differences were noticed between the values produced by the DRC and EDRC, again indicating the significance of the environmental impact. The authors conclude that despite the limitations (particularly data constraints) of the EDRC, this methodology is potentially a good way to evaluate the environmental effects of trade reforms along the production chain. They recommend that environmental policies targeted to key export industries should be formulated.

EDRC gained popularity in the assessment of linkages between trade and the environment in the latter part of the 1990s (see Box 4:7). A detailed methodology on how it is applied, together with generic spreadsheets for its application, can be found online.

At the outset of an EDRC analysis, inputs (primary and intermediate) and outputs should be classified, and information obtained on how enterprises convert inputs into outputs. Social and market prices can then be calculated for all goods and services. Possible environmental effects can then be identified and quantified, and relevant ratios calculated, such as the nominal and effective protection coefficient<sup>37</sup>, and domestic and extended resource costs. The generic spreadsheets mentioned earlier provide detailed information on how domestic and border prices are determined and adjusted for policy-induced distortions. There is no discussion, however, on how environmental costs are estimated. This, however, is not a serious limitation, as many references exist on this subject.

A number of the above-mentioned approaches have been utilized in the WTO New Round Sustainability Assessment Study done by the University of Manchester (Box 4:8). In addition to those approaches discussed in this chapter, the University of Manchester researchers also recommended the use of complementary research tools such as case studies, socio-economic impact analysis, and distributional analysis, among others. It also suggested the choice of a wide variety of social science approaches in research works such as stakeholder analysis, consultative and participatory techniques, social survey and interviewing, among others.

### (3) Other approaches

**Life cycle analysis.** The focus of some environmental policies is changing, from an almost exclusive emphasis on the reduction of emissions, to a broader consideration of the entire processes involved in the production and consumption of a product. Accordingly, the end goal is now the development of a “product policy” aimed at reducing the environmental impacts along the entire life cycle of the product.

Life cycle analysis (LCA) has its origin in the natural sciences.<sup>38</sup> It can be used as part of an *integrated assessment* to analyse the links between the use of natural resources and the environmental outputs (emissions) of production processes.

LCA is sometimes known as “cradle to grave” analysis, as it analyses the use of environmental resources and the generation of emissions right through the production process, from the

<sup>36</sup> N. Borregaard and T. Bradley, “Towards Understanding Costs and Benefits of Trade Liberalization: A Developing Country Perspective” (1999, online).

<sup>37</sup> The nominal Protection coefficient compares domestic output prices with international (f.o.b.) prices. The effective protection coefficient is the ratio of value added (output price less costs of all intermediate inputs) measured in domestic prices to value added measured in border prices.

<sup>38</sup> United Nations Environment Programme. *Policy Effectiveness and Multilateral Environment Agreements*, Environment and Trade 17 (Geneva, 2998).

### Box 4:8 WTO New Round sustainability assessment study

This effort, commissioned by the European Union, is being led by the University of Manchester in the United Kingdom. It has been developed for use in the proposed WTO New Round of Multilateral Trade Negotiations. The methodology suggests the potential utility of the following models and other forecasting techniques in the appraisal of both economic and environmental impacts:

- (a) economic: computable general equilibrium (CGE) models; applied general equilibrium (AGE) models; regression analysis; cost-benefit analysis;
- (b) environmental: general equilibrium environmental model (GREEN); trade and environment equilibrium analysis (TEQUILA); global trade analysis project (GTAP); environmental assessment models that establish relationships between certain economic variables and their environmental effects; simultaneous-equation models; cause-effect diagrams; networks; policy evaluation techniques such as extended cost benefit analysis (CBA) and multi-criteria analysis (MCA); and scenario analysis.

The methodology suggests the additional use of case studies. It also recommends a number of social science techniques such as checklists, surveys, matrices, scoring, consultative and participatory approaches, stakeholder analysis, social survey and interviewing methods, cross-country regression analysis and case studies. It contemplates the possibility of extending CGE/AGE economic models by including, for example, a social accounting matrix. For regulatory appraisal, methods suggested include socio-economic impact analysis, distributional analysis, cost-benefit analysis or regulatory competition effects, fiscal analysis, budget-cost analysis, rule-specific analysis and checklists.

*Source:* Colin Kirkpatrick and Norman Lee, "WTO New Round Sustainability Assessment Study, Phase Two Main Report" (University of Manchester: Institute for Development Policy and Management and Environmental Impact Assessment Centre, online).

extraction of raw materials or cultivation, to processing, transportation, manufacture, use and finally disposal. The aim of LCA studies is to give policy recommendations about which products should be promoted and which should be restricted in some way, depending on how the activities that "surround" products affect the environment. Because of the way the model is formulated, these recommendations will tend to favour recycling and the re-use of products and by-products as a way to reduce environmental waste.<sup>39</sup>

OECD identifies three distinct types of life cycle assessment: life cycle inventory, life cycle impact analysis, and life cycle improvement analysis.<sup>40</sup> Inventory analysis identifies all the relevant information on the use and disposal of energy, materials, and wastes in the production process, with the aim of finding ways in which the use of energy and materials, as well as waste generation, can be reduced. In life cycle impact analysis, the emphasis is on determining the overall impact of the product and its production activities in terms of the environment, human health, natural resource use and others. Lastly, life cycle improvement analysis evaluates ways in which production processes may be improved to reduce environmental impacts.

The application of the LCA requires a huge data set, involving a large volume of consumer products that use a variety of inputs from different sources. As such, it has been successfully applied to only a limited number of products, mainly those with potentially serious environmental consequences. Furthermore, past applications reveal that results of LCA may be inconclusive, meaning that recommendations are often not clear cut.

**Global Commodity Chains Analysis.** A variation of LCA is global commodity chains analysis (GCCA).<sup>41</sup> Unlike the LCA, the commodity approach does not focus on the inputs and outputs at the various stages of the product's life cycle. Instead, it evaluates the social and economic relationships between all the actors involved in the chain. These actors include produc-

<sup>39</sup> Organisation for Economic Co-operation and Development. *Environmental Principles and Concepts* (Paris, 1995).

<sup>40</sup> *Ibid.*

<sup>41</sup> See footnote 38.



ers, consumers, traders, government agencies and others, all linked through the product markets. The analysis considers the four dimensions of global commodity chain as defined by Gereffi.<sup>42</sup> These four dimensions include the analysis of the input-output structure along the chain, an analysis of the territory serviced by the various actors, an assessment of the chain's internal governance structure, and, lastly, that of its institutional framework as defined by the conditions and policies at the local, national, and international level.

An application of GCCA is demonstrated in the work done by Banuri.<sup>43</sup> The author used GCCA to investigate the environmental impact of cotton production and trade. The analysis of the environmental impacts though is largely qualitative. It discusses extensively the environmental costs of using agro-chemicals from the primary stage (cotton production) to the secondary stage, involving the use of industrial chemicals in processing. It then presents ways to achieve a switch to more environmentally-friendly and sustainable production systems ranging from technological measures to policy reforms, both at the national and international levels. Among the technological options are the use of integrated pest management and chemical-free textile processing technologies. The policy reforms considered are stricter pesticide regulation, price intervention, and support for research and extension towards the promotion of integrated pest management. There are also initiatives at the international level comprising of eco-labelling and restrictions on environmentally-hazardous products. The study analysed the responsiveness of the actors in the chain to these various measures and defined necessary conditions to affect the switch to more sustainable (and environmentally-compatible) production systems.

***Sustainable livelihoods approach.*** The aim of the sustainable livelihoods (SL) approach is to assess interventions on the basis of their impact on poverty. However, unlike traditional approaches that define poverty in terms of a deficiency or shortfall—typically of income and the lack of access to basic need and services—this approach starts from an assessment of the capacities and assets of the poor, and their strategies of coping and adaptation. The purpose is twofold: first, to introduce a pro-poor perspective in order to ensure that the interventions help rather than hinder the actions that the poor undertake themselves; and second, to divert the object of the interventions from charity towards capacity. In other words, the goal is to ensure that the goal of the intervention is to free the poor from dependence, not to create a new form of dependence.<sup>44</sup>

Most sustainable livelihoods analyses start with a catalogue of the tangible and intangible assets of the poor. These include physical assets, natural assets, human assets/skills, financial assets, and technological assets. In many situations, the existing economic and political institutions serve to siphon away the assets of the poor. The goal of the exercise is to determine how these assets could be retained and enhanced within the community. This involves the creation of support institutions, which enable the retention, expansion, and strengthening of financial resources, human capital, institutional assets, and natural resources within the community.

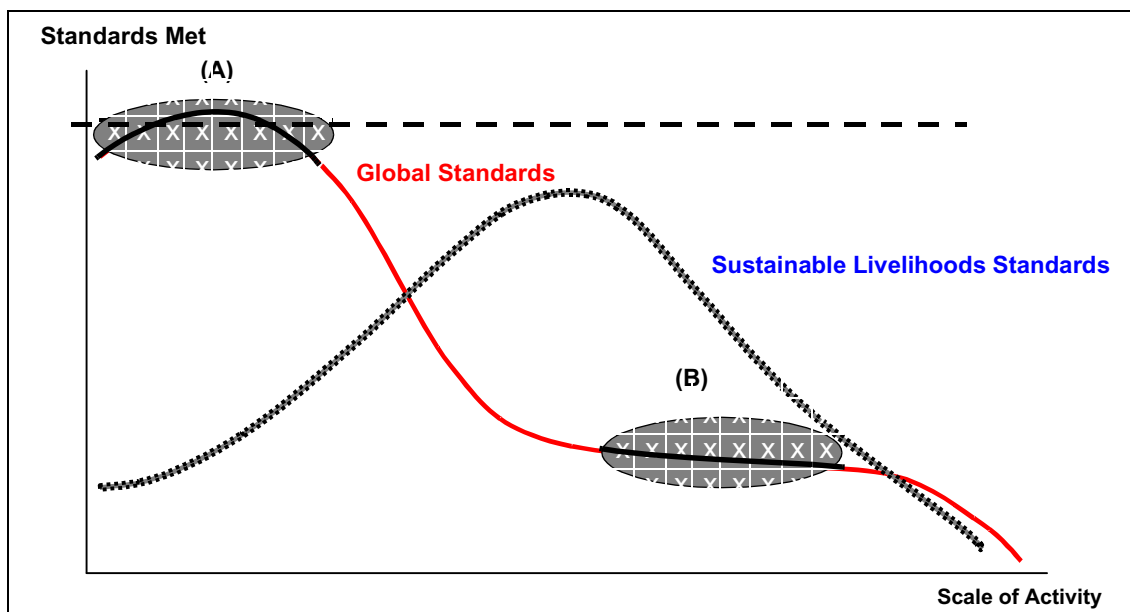
An assessment exercise based on the sustainable livelihoods approach would take a community or a local area as the subject of analysis, and inquire the impact of the change on the overall assets of the community. As mentioned, the key concept here is the impact on the strategies for coping and adaptation. While such an approach is focused on a restricted area, it can provide an indication of a larger pattern. An example of the different results that can be produced through the SL approach is provided in Fig. IV-1. This figure plots the dispersion of firms, say forestry entities, according to their adherence to global/universal and to SL standards. The solid line shows the adherence to global standards (environmental quality standards, labour rights standards). It shows

<sup>42</sup> Gary Gereffi, "The Organization of Buyer Driven Global Commodity Chains: How US Retailers Shape Overseas Production Networks", in *Commodity Chains and Global Capitalism*, G. Gereffi and Korzeniewicz, eds. (Westport, CT: Praeger, 1994).

<sup>43</sup> T. Banuri, "Pakistan: Environmental Impact of Cotton Production and Trade". Paper prepared for a UNEP project on trade and environment. (Geneva United Nations Environment Programme, 1998).

<sup>44</sup> Robert Chambers and Gordon R. Conway "Sustainable Rural Livelihoods: Practical Concepts for the 21<sup>st</sup> Century", *IDS Discussion Paper*, No. 296 (1992); Robert Chambers, "Vulnerability, Coping and Policy", *IDS Bulletin*, (20(2): 1-7 (1989); A Agarwal and Sunita Narain "It is possible to Deal With Poverty: A New Paradigm for Poverty Eradication, Employment and Natural Resources Management", (1997); United Nations Development Programme, *Productive Employment and Poverty Reduction: How Can Livelihoods be More Sustainable?* (New York, BPPS/UNDP 1997).

FIGURE IV-1  
Alternative sustainability indicators



that a small number of large firms (A) adhere to virtually all standards, while the mass of small firms (B) do very poorly. In contrast, the hash line shows the contribution of the same entities to the enhancement of secure and sustainable livelihoods for the poor. On these standards, the larger firms do not fare very well, nor many of the small, subsistence-level activities. However, a middle group is far more conducive to livelihood enhancement than either of the two extremes.

Policy prescriptions that derive from a sustainable livelihoods approach pertain to the trade policies themselves—namely ensuring that the policy changes do not undermine the assets of the poor communities—as well as ancillary policies, which are aimed at enabling the poor to take advantage of emerging opportunities and protecting themselves against adverse impacts. In principle, these actions need to be taken prior to the change itself, rather than as a corrective exercise once the adverse impacts have already manifested themselves.

**Scenario-building.** Scenario-building is a planning tool. It does not aim to project the most likely outcomes (forecasting), nor does it attempt to judge what should happen. Instead, analysts identify a range of possible outcomes, preferably limited to not more than four scenarios for practical reasons.

The process starts by defining the area for investigation, which may be the impact of globalization, trade liberalization or trade agreements. Information is then gathered on the current situation, trends, and possible future scenarios. The major determinants of the various possible outcomes should also be identified, examples of which include environmentalism, population growth, the power of the environment agency, and industrialization.

In an *integrated assessment*, one scenario would be the “business as usual” or baseline scenario. Another should be the full implementation of the trade reforms. There could also be some intermediate scenarios. The trade impacts under all the plausible scenarios can then be identified and valued.

### C. Approaches used in the valuation of the trade-environment linkages

Once the intricate task of tracing all the effects of specific activities or policies on the environment is completed using the various approaches described above, the next step is the quantification and valuation of these impacts.

The environmental deterioration associated with any policy change may usefully be classified into health and non-health effects. The health impacts result from exposure to air or water contaminants that are associated with the production cycle. Non-health impacts may include the loss of ecosystem functions and damage to the natural resource base associated with trade reforms.

Valuation techniques can be classified into conventional market-based, surrogate market-based and constructed market-based approaches.

### (1) Conventional market-based approaches

Valuation techniques that make use of market prices, properly adjusted for inefficiency, have traditionally been used where the goods and services being examined are traded in the market. These techniques include the change in productivity approach, cost of illness approach, and cost-based approaches. The latter includes defensive and preventative expenditures, and the replacement cost method.

***The Change in Productivity Approach.*** Also referred to as the production function approach, this technique may be used to value the contribution of the ecological functions of an ecosystem to the system's productivity. There are two steps involved in the application of this technique. The first step entails establishing the physical relationship between output (production) and inputs (which will include environmental inputs such as ecological services). The second step involves putting monetary value on the marginal contribution of the environmental input to the output levels derived in the first step. The second step involves translating these physical impacts to a monetary measure. This stage is straightforward so long as market prices (adjusted for inefficiency) are available. In the case of losses in production, for example, the price of the crops may be used in the valuation.

An application of the change in productivity approach is seen in studies valuing the effects of soil erosion (or soil conservation measures) on the productivity of crop. In the first step, the crop yield is related to varying levels of inputs such as labour, material inputs, and soil conservation technology or soil erosion levels among others. The regression coefficients for all the usual sets of inputs are expected to be positive (yield enhancing inputs) while it is negative for soil erosion (a yield reducing input). The reduction in productivity due to soil erosion is valued using the net price for the crop in the second step. Other applications in developing countries are in valuing impacts of deforestation, wetland and reef destruction, and water pollution in agriculture and fisheries.

***The Cost of Illness Approach.*** The cost of illness (COI) approach involves estimating the cost of medicine, consultation, admission to hospitals, and other incidental expenses associated with contracting an illness. It also includes the cost of lost earnings, valued as the opportunity cost of work-loss days or reduced-activity days. The results of a COI analysis are often considered to be underestimates, as the full value of suffering is not included.

***Cost-based Approaches.*** These techniques measure the cost of ensuring the maintenance of the benefits provided by environmental commodities. Such measures are imperfect estimates of the true benefits, and should therefore be viewed as proxy measures, to be used only where direct benefit estimation is not feasible.

The valuation techniques under this category include the replacement cost and the defensive or preventive expenditure methods. The replacement cost methodology measures how much it would cost to revert to the original (desirable) environmental situation, given that a change has taken place. An example would be the cost of inorganic fertilizer required to replace a loss in soil fertility. Defensive expenditures, also referred to as preventive spending, measure how much people spend to protect themselves or their environment against deterioration. An example would be the cost of conservation measures to prevent soil erosion. The purchase of bottled waters or water purifiers to avoid the effects of water pollution is another example.

## (2) Surrogate market-based approaches

Where no price is available for non-marketed environmental commodities, it may be possible to use the prices of related marketed goods to estimate their value. For instance, the markets for property, labour, and recreational services can be used as surrogate markets to infer the value of the environmental characteristics of particular areas, labour markets, and national parks, respectively. Two applications of the surrogate market-based approach are hedonic pricing and the travel cost methodology.

***Hedonic Pricing Approach.*** Hedonic pricing methodologies include the property value approach and the wage labour differential approach. In both cases, the basic principle is the same. The property (or labour) is characterised by several attributes, such as its physical aspects, its location, and various environmental characteristics, such as the level of pollution. The value of the property (or labour) is a product of these composite characteristics. The specific contribution of the individual attributes can be obtained through a regression analysis to estimate the implicit price of, say, the environmental component. A demand function can then be derived for the environmental characteristic, and its value derived.

***Travel Cost Method.*** This method is used to measure the recreational value of scenic areas that are normally un-priced or priced with a very low entrance fee. The fee collected is often based on cost recovery for the staff manning the area, and may not even be enough to cover the improvements made to a country's national parks. To obtain an idea of how much value people attach to the resource for recreation, this approach assumes that the amount that people are willing to spend to visit the site is a good indicator of the value to them of the resource.

The travel cost includes not only the direct cost of transport, but also the foregone income from work-loss days (adjusted to reflect value of leisure time), accommodation expenses, entrance fee, and other incidental expenses associated with the trip. The travel cost estimate is then used as a proxy to the price of recreation. A demand function for recreation (measured in visit-days per year or visitation rate per 1,000 population) with price, income, and prices of related goods as dependent variables can then be constructed. From this demand function, the value of the recreation benefits can be estimated.

## (3) Constructed market-based approach

The absence of markets for most environmental goods and services did not deter environmental economists from putting monetary values to these goods and services. What was done is to construct hypothetical market situations where preferences for the environmental good can be observed. Sometimes called direct elicitation technique, the respondents are asked directly to reveal their preferences by answering question of how much they would be willing to pay for an environmental improvement to happen or for an environmental damage to be avoided. Sometimes, the question is posed in terms of willingness to accept (WTA) compensation for environmental deterioration. It is also possible for respondents to be given choices where each choice consists of combinations of an environmental good and a price.

***Contingent Valuation Methodology.*** The contingent valuation methodology (CVM) technique is a constructed market-based approach, with a potentially wide application in both developed and developing countries. The method involves creating a hypothetical market for the good (which may be an improvement in environment services, or the reduction of an environmental "bad"), and asking survey respondents how much they are willing to pay for it. The crucial elements of this approach are a clear definition of the product; specification of a payment vehicle; and careful framing of the willingness to pay (WTP) questions. The hypothetical nature of the market makes the application of this technique open to a number of biases, such as starting point or strategic bias, and the technique should be implemented with this in mind. The CVM can be applied in areas such as water quality, air quality, biodiversity, protection of endangered species and recreation.

**Contingent Ranking.** This is implemented in the same manner as the contingent valuation methodology. The only difference is that the respondents are asked to rank preferences for options or alternatives consisting of various combinations of environmental goods and prices. A combination with high “quantity” of environmental good is usually paired with low amount of money and vice versa. The “quantity” of the environmental good could also be expressed in terms of various combinations of the attributes of the environmental good. In effect, the technique focuses on trade-offs among alternatives with different characteristics or attributes. Using the random utility framework, the complete ranking of all alternatives could be made. Using the rank order information, a statistical analysis is used to derive the implicit prices for the environmental goods or attributes of the environmental good. Experiences with the use of this technique show that respondents generally have difficulty in ranking a large number of alternatives. Also known as contingent choice method, a more in-depth discussion is provided online.

Box 4:9 presents a number of factors which are often considered in the choice and application of the various valuation techniques. Some typical applications are given in Table IV-5.

### **Box 4:9 Considerations in the choice and use of valuation methods**

#### ***Cost versus credibility***

Cost will always place a limit on the use of valuation techniques. Budget constraints may mean that surveys are undertaken with a limited sample size; some of the more expensive data collection methods, such as field studies, may be sacrificed altogether. Policy makers must, however, trade off any benefits in cost reduction against the risk of undermining the credibility of the final results of any study.

#### ***Data Availability and Accuracy/Reliability of Results***

Even with ample budget resources, the availability of data, particularly time series information, may be a limiting factor in the conduct of *integrated assessments*. In fact, the choice of valuation methodology is often determined on the basis of the available data. When this happens, the final report must contain some discussion on the limitations and assumptions imposed by the data, and on how budget constraints may have affected the accuracy and reliability of results. When these problems arise, the use of sensitivity analysis is important, especially where there is uncertainty about the quality of the data. This type of analysis may be particularly helpful to policy makers in interpreting the results of an assessment. An improved assessment methodology may be suggested for future studies, along with a discussion of possible data requirements.

#### ***Rapid Appraisal versus Intensive Surveys***

Carefully designed and implemented surveys are preferable to those that are planned and carried out in a short space of time. Contingent valuation methodology, for instance, is susceptible to many biases, and careful attention is needed to avoid or minimize these biases. Survey household data have the additional advantage of providing other information that could be useful to policy makers. If carefully collected, this could be the basis of a new time-series data set, which could be used to monitor environmental conditions and household behavior over time.

#### ***Choice of Discount Rate***

The discount rate determines the time preference of society. A higher discount rate gives lower preference to future consumption, and can be thought of as “anti-conservation”, in the sense that it will discriminate against projects with high future returns. A lower rate, however, can discriminate against current consumption, and may mean that fewer resources are available for investment in economic activities and development.

Discount rates are set according to either the opportunity costs of capital, or the consumption rate of interest. The former usually ranges from 10-12 per cent in real terms, while the latter is typically 4-6 per cent, based on developing country experience. The latter is preferred, since any investment displaces consumption flows.

#### ***Capacity in the use of Valuation Techniques***

Familiarity with a technique is essential in order to apply it correctly. Several training courses on valuation techniques are being given by international organizations worldwide. More support is also being given to developing countries, where there is limited capacity in the application of techniques for *integrated assessments*. Expertise is being built up, but more resources need to be devoted to the process of training, particularly in relation to valuation techniques.

Table IV-5 shows specific applications of the various valuation techniques described above. A summary assessment of the usefulness, validity and procedure of the various techniques is given in Table IV-6.

TABLE IV-5  
Valuation methods application<sup>45</sup>

	<i>Country</i>	<i>Environmental Issues</i>	<i>Valuation methods or components</i>
Africa	Kenya	Value of time spent in collecting water	Revealed preference approach (application of the discrete choice model theory); random utility theory approach
	Kenya	Value of wildlife viewing	Travel cost method; contingent valuation method
	Ghana	Determinants of land values in Accra	Hedonic pricing method
	Cameroon	Cost of rainforest conservation	Costs of forgone benefits from commercial logging and hunting; benefits from tourism, fisheries protection flood control, and soil fertility maintenance
Asia	Philippines	Profitability of forest plantations	Replacement cost method; change in productivity; loss of earnings method; shadow project method
	Taiwan	Air pollution and health of highway construction	Contingent valuation method, loss of productivity in fisheries and agriculture; loss of non-agricultural land and buildings; costs of noise, air and water pollution
Eastern and Central Europe	Poland	Air pollution-related damage to forests	Loss of productivity; losses from premature felling construction costs; loss of non-productive uses
	Estonia	Environmental problems of oil shale extraction	Costs of land reclamation; costs of compensation payments; reproduction costs of (polluted) water resources
	Russian Federation	Forest parks in the Moscow region	Reproduction cost method; travel cost method
Latin America and Caribbean	Chile	Air pollution control in Santiago	Human capital approach; mitigation cost approach
	Netherlands Antilles	Reef conservation	Loss of income method; contingent valuation methodology; costs of protection
	Haiti	Water services	Contingent valuation method
	Mexico	Forest valuation	Damage cost avoided; mitigation costs available; loss of production avoided; contingent valuation method, travel costs
	Nicaragua	Valuation of mangroves	Loss of income method; change in productivity method; contingent valuation method; travel cost method

<sup>45</sup> J. McCracken and H. Abaza (eds). *Environmental Valuation: A Worldwide Compendium of Case Studies* (London, Earthscan, 2000).

TABLE IV-6  
**Summary of valuation techniques and their strenghts<sup>46</sup>**

<i>Method</i>	<i>Range of applicability</i>	<i>Procedure</i>	<i>Validity<sup>47</sup></i>
Contingent Valuation Method	Extensive, with successful application in water quality, water supply and forest access	Carefully worded questionnaire asking either a WTP or WTA for a given environmental change. Uses econometrics to analyse data	Several potential biases. High costs because of the given large sample size requirement. Convergent validity is good
Conventional approaches: dose-response (DR), replacement costs (RC), and opportunity cost (OC) method	Extensive, especially if dose-response function is available. Limited to cases with markets or where shadow prices can be estimated. Often used because of data availability	Using dose-response equation, DR is theoretically sound but estimate the impact due to pollution. Uses regression analysis. RC computes costs of restoration while OC requires data on alternative uses of resources and of time	DR is theoretically sound but requires huge data sets; criterion validity not relevant since markets exist. RC limited validity only in the contexts of some standards. OC is sound
Surrogate market: aversive behaviour	Limited to cases where households spend to offset environmental hazards-hence, may not be applicable to developing countries	Obtain data on household expenditures to offset environmental risks	Theoretically correct but no sufficient basis for assessment of convergent validity. Criterion validity is present since actual expenditures are used
Surrogate: Travel Cost Method	Limited to site characteristics (recreation areas) and to valuation of time (discrete choice); does not capture non-use value	Survey of travellers to obtain travel cost data, recreational experiences, information on substitute sites, etc. Uses econometric analysis	Theoretically correct but is difficult to implement with multi-purpose trips and with competing uses
Surrogate: Hedonic Pricing	Applicable to environmental attributes likely to be capitalised in property values (e.g. noise and air pollution). Applicable also for determining wage differentials	Collection of cross-sectional data of house prices/wage rates and of other factors that are likely to influence prices. Uses econometric analysis to obtain implicit price function and subsequently, the demand function	Theoretically sound but may not work in cases where the land/labour markets are distorted. Limited tests on convergent validity. Data on prices and factors determining prices are difficult to collect

## D. Towards an integrated approach

This chapter has discussed a wide range of approaches and techniques available for any *integrated assessment*. Some approaches allow inter-sectoral/country modelling, while others are more specific to a given sector or commodity. There are also macro-models and micro-level assessment tools, with the latter being fairly well developed, having been applied in project level/commodity level analyses in the past. The use of models is fairly recent, but is expanding rapidly, and may prove to be one of the most useful tools for *integrated assessments*. There is a need for more empirical applications, following in the path of the global trade analysis project.

The OECD workshop on methodologies for environmental assessment of trade liberalization agreements emphasized that while models are useful analyzing the impacts on several countries of

<sup>46</sup> S. Georgiou and others, *Economic Values and the Environment in the Developing World* (Lyme, Edward Elgar Publishing, Inc., 1997).

<sup>47</sup> Convergent validity is satisfied when the values obtained using the Contingent Valuation Method (CVM) converge on, or are close to, the estimates derived from others techniques such as travel cost and hedonic pricing methods.

Criterion validity is met if the CVM estimates are consistent with the 'true' values of the good under analysis. Since deriving the 'true' value for most environmental commodities is not feasible, an indication of said value is derived using simulated markets where real money payments are made.

different sources of environmental damage, this approach has its limitations.<sup>48</sup> The biggest problems faced are data, time and cost limitations. Partial equilibrium approaches may therefore be more practical while data sets are being built up, so long as it is recognized that these will fail to capture cross-sectoral and economy-wide effects.

There is also a need to do more micro-level analysis using such tools as EIA, EDRC, BCA with MCA, and Risk Assessment. The information generated by these techniques will tend to be specific and easily understandable, and so may be particularly useful to policy makers. An *integrated assessment* should show how individual sectors could be protected from the negative environmental effects of trade, either through “flanking” policies or safeguard provisions in trade agreements.

These micro-level results need to be linked to macro-economic policies such as trade policies. It is in this task where modelling will be particularly useful. General or partial equilibrium models can be calibrated using coefficients generated from micro-level studies.

As this chapter demonstrates, one approach towards analyzing and quantifying the effects of trade policy cannot be considered superior to the other. Many of the approaches discussed are likely to be complements, not substitutes, and different techniques will be appropriate in different situations. This only emphasizes the importance of using, where possible, a mix of techniques.

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<sup>48</sup> Organisation for Economic Co-operation and Development, *Key Approaches Used in Past Environmental Reviews of Trade Agreements*. Background Paper for Panel 1. OECD Workshop on Methodologies for Environment Assessment of Trade Liberalization Agreements. Paris, 26-27 October 1999 (online).



## V. INTEGRATED POLICY RESPONSES

The fundamental objective of an *integrated assessment* of trade policy or a trade agreement is to provide decision-makers with information on the anticipated consequences of a trade-related policy—or on the actual consequences of a trade measure that has already been introduced.

At the same time, in many cases, an assessment will also develop policy recommendations to address harmful economic, environmental and social impacts—and to promote any positive effects. An *integrated assessment* is a policy development tool with technical and participatory inputs rather than simply a technical methodology with incidental policy implication.

Section A discusses the criteria for policy responses. Section B explores the potential for modifying trade policies, following an assessment. Section C discusses “flanking” policies, to complement trade measures, in terms of market-based instruments, voluntary measures and institutional measures. Section D concludes with a discussion of monitoring and evaluation.

### A. Selecting the policy response

A range of policy responses is available to policy makers—at the national, and regional level, and at the international level, to complement the purposes of an *integrated assessment* and to promote related economic, environmental and social goals. This chapter surveys a range of policy responses that governments could introduce following an *integrated assessment*. Box 5:1 explains the OECD’s approach.

#### Box 5:1 The OECD’s approach

The OECD’s methodology for the environmental assessment of trade measures acknowledges that it is important to monitor how the results are used both during and after the decision-making process. It suggests that environmental reviews should include specific provisions for follow-up and monitoring, including mechanisms to enhance positive environmental effects and to address potential negative effects. Its suggested policy responses include:

- (a) Modification of some aspects of the trade measure or agreement;
- (b) Inclusion of environmental safeguards in the trade measure or agreement;
- (c) Implementation of a complementary environmental mechanism to accompany the trade measure or agreement.

The OECD methodology also provides for a follow-up process where subsequent environmental reviews may be warranted to reflect long-term effects of economic activities induced by broad trade measures and agreements.

*Source:* OECD, *Methodologies for Environmental and Trade Reviews*. (Paris, OCDE/GC(94)103, 1994, online).

Policy responses are divided into two general categories: modifying and extending by inclusion of safeguards the trade agreement or policy; and implementing complementary environmental and social policies to enhance the beneficial effects and mitigate negative impacts. Implementation of such policies should take account of:

- (a) ***Sustainable development priorities.*** Policies should address the country's sustainable development priorities including development interests, environmental protection priorities, capacity and institutional dimensions, and the impact on poverty.
- (b) ***Regulatory consistency.*** Policies should be practical and consistent with domestic and international legal regimes.
- (c) ***Policy coherence and coordination.*** Policies should be designed to avoid duplication and to be consistent with other measures proposed.
- (d) ***Level of resources.*** Policies should be cost-effective and should be prioritized according to urgency and the level of resources available.
- (e) ***Existing capacity.*** Policy decisions should reflect the existing regulatory, institutional and financial capacities in the affected areas.

## **B. Modifying trade policies**

A policy response that involves modifying a trade-related policy or a trade agreement can arise out of an *ex ante* assessment or following an *ex post* assessment. It could include modifying the nature of a subsidy, or allowing for broader use of subsidies to promote environmental and social goals. Adjustments might also be made to mechanisms proposed within a trade liberalization agreement. For example, a dispute resolution process allowing for a significant environmental or social input and exceptions designed to promote sustainability by protecting environmental and social priorities.

Modifications may also address the timing of the implementation of the trade measures. For example, maintaining negotiated commitments but delaying the implementation of certain measures to provide time for the introduction of complementary, mitigating government policies. Where an *integrated assessment* shows that a policy has a potentially disruptive social impact or environmental effect, under the terms of an agreement, a government might also phase the measure in gradually to allow a longer period of time for adjustment through incremental liberalization. Where there is a positive impact, an agreement might provide for accelerated tariff-reduction on environmentally or socially beneficial products.

If a trade measure is seen to have significant adverse environmental or social impacts it may be possible, following an *ex ante integrated assessment*, to propose a parallel institutional approach in order to consider and act on environmental and social concerns, in conjunction with the implementation of the liberalization. Such an institution could operate at the national level, or where the issues are cross-border or global (or where there are capacity concerns at the national level), it might be appropriate to propose an institutional response at the regional or multilateral level. This occurred in the early 1990s in conjunction with the passage of the North American Free Trade Agreement (NAFTA). NAFTA came into force alongside two parallel agreements, one on labour issues and one on environmental issues. In both cases, joint institutions were created by the United States, Canada and Mexico, to implement programmes on issues of common interest and to consult stakeholders.<sup>49</sup>

In an extreme case the results of an *integrated assessment* might suggest that environmental and social issues cannot effectively be considered within the negotiating framework. Then, in theory, it might be necessary to seek an agreement to abandon the proposed policy altogether and revisit it once appropriate consideration has been given to its impact on sustainability.

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<sup>49</sup> The *North American Agreement on Environmental Cooperation* created the Commission for Environmental Cooperation headquartered in Montreal. The *North American Agreement on Labor Cooperation* created a similar commission headquartered initially in Dallas, and moved in 1999 to Washington D.C.

## C. “Flanking” policies

A range of policies can be implemented to complement the positive impacts and reduce or offset the adverse impacts of trade measures.

### (1) Market-based instruments

Traditionally, governments have addressed pollution-related environmental management problems through the use of “command-and-control” measures and regulations. However, since the Brundtland Commission reported its findings in 1987 there has been increased reliance on the use of economic instruments for environmental management.<sup>50</sup>

Approaches based on changing relative prices are often viewed as being inadequate in addressing urgent or acute environmental problems. But economic instruments form an important part of the domestic environmental policy approach of many countries, to address a wide range of pollution emission problems and integrated resource conservation and sustainable management issues.

Market-based instruments can be used to address market distortions arising from environmental and social externalities. These might be the result of government-support measures, which encourage the use of resources that harm the environment. Or, simply, because those who enjoy the benefits from the over-exploitation of resources do not bear the cost. And because those that bear the cost of conservation gain few of the benefits. One way to overcome externality problems is to internalize environmental and social costs through appropriately targeted measures.

While market-based or other economic instruments are often considered as part of a package to offset adverse impact of international agreements, many countries lack the institutional capacity to deploy such policies effectively. Investment in institutions—for example, in those responsible for environmental standards, monitoring, research and analysis, policy development and implementation—can broaden the range of options available to a country. Market-based instruments include a range of macroeconomic and microeconomic policies: tax policies, subsidies, deposit refund systems, environmental funds, user fees and administrative charges and monetary and credit policies.

**Tax policies.** A range of domestic taxes that could be used to offset specific impacts of the reduction of international tariffs and non-tariff barriers. Tax policies can be used to limit or promote various aspects of any given policy to address market distortions arising from environmental effects and social externalities. They can also be used to offset negative social or environmental associated with the production or use of a particular product and encourage the production or use of environmentally or socially beneficial products. Tax policies include:<sup>51</sup>

- (a) Environmental taxes to promote pricing that takes account of the social and environmental cost of an action, the externality, as well as the private cost.
- (b) Emission and effluent taxes imposed directly on the pollutant, and again can be used to bridge the gap between the social and environmental cost, and the private cost.
- (c) Differential tax structures levied according to the amount of pollution generated. Tax differentiation, for example, can be applied to leaded and unleaded gasoline, with leaded gasoline charged at the higher level.
- (d) Investment tax incentives to raise the private cost of pollution. The most common examples of investment tax incentives are investment tax credits and accelerated depreciation for pollution control equipment and waste treatment facilities.

<sup>50</sup> The World Commission on Environment and Development, *Our Common Future* (Oxford University Press, 1987).

<sup>51</sup> This section draws on T. Panayotou, *Instruments of Change: Motivating and Financing Sustainable Development* (London, Earthscan 1998).

### Box 5:2 Pollution charging in Pakistan

In March 1999, the Federation of Pakistan Chambers of Commerce and Industry (FPCCI), in its general body meeting, adopted a resolution to ask for the imposition of a pollution charge on all industrial activities. The charge which starts at 75 rupees (US \$1.5) per index unit of pollutant load is to be increased over time. The receipts from the pollution charge are to be placed in a special fund, to be managed jointly by the government, the private sector, and the NGOs, and allocated to support for pollution abatement, such as training, credit provision and capacity-building.

This unprecedented move on behalf of the private sector came after more than two years of research, consultation and consensus building. The process was spearheaded by a non-governmental organization, the Sustainable Development Policy Institute, which undertook research on pollution loads and abatement options for key industrial sectors, beginning with pulp and paper and textile processing. The results from the research were presented to a business-government-NGO roundtable on sustainable industrial development. The roundtable proposed a package of policies for the consideration of the Pakistan Environmental Protection Council (PEPC), the country's central body for environmental policy formulation. The PEPC appointed a standing committee on environmental standards, chaired by a leading academic, and the recommendations of the standing committee were duly adopted by the PEPC, and forwarded to the government for approval. However, the FPCCI took the initiative of approving the resolution on its own, without waiting for governmental action.

The success of this initiative derived from a number of different factors: solid research, conducted on the shop-floor, as well as international research; a transparent and participatory process; strong and respected leadership; and continuous consultation, mutual education, and co-ownership of the process.

Source: Haroon Ayub Khan and Abdul Matin Khan, "Implementing NEQS: Pakistan's Response to Industrial Pollution" SDPI Working Paper Series (Islamabad, SDPI, 2000). No. W-56.

**Subsidies.** Subsidies can be used to promote sustainable development, and can be removed from products that damage the environment. For example, the removal of subsidies on pesticide use in agriculture could help offset the negative environmental impact of expanded agricultural production due to trade liberalization.

**Deposit Refund Systems.** Deposit refund systems apply a refundable deposit to the purchase price of an item or a pollutant. This could be applied to an item as simple as a glass bottle that would be returned to the place of purchase for the deposit to be refunded. This idea could also be extended, for example, to include a bond that would be posted by a firm to ensure that the consequences of pollution are rehabilitated effectively.

**Environmental Funds.** Funds can be set up to provide low interest loans to individuals or companies that promote an environmental good. Creating an environmental fund may serve as a vehicle to internalize positive environmental externalities, and mobilize financial resources for some specific, environmental purposes.

**User Fees and Administrative Charges.** These are direct payments for the costs of the treatment of pollution. Administrative charges are the costs that are incurred from the implementation and enforcement of these environmental regulations. This could include the collection and treatment of solid or hazardous waste.

**Monetary and credit policies.** This can refer to two different types of responses. First, the expansionary impact of trade liberalization could be offset by restrictive monetary and credit policies. Second, targeted credit could be provided to sectors or groups that may need to invest in restructuring in the wake of liberalization measures.

### Box 5:3 Recommendations in Uganda

A recent study conducted in Uganda revealed the following three main issues to be addressed in light of trade liberalization as it related to the fisheries sector:

1. the possibility that over-fishing is occurring;
2. the discharge of poorly treated or untreated effluent into water bodies by fish processing and other firms; and
3. quality concerns at various stages in the fish marketing chain from Lake Victoria to landing, to processing and finally to export.

In response, the study proposed the following economic instruments to address the concerns:

- (a) A combination of quality standards and differential pricing of fish to encourage and finance the fitting of fishing boats with cold storage facilities.
- (b) Partial privatization of landing sites and charging of a user fee to generate revenue for the installation and maintenance of improved facilities at landing sites.
- (c) A system of effluent discharge fees.
- (d) Implementation of a transferable, landing site-based fish quota system whereby officials based at landing sites will supervise and allow fishing boats a maximum fish catch per year.
- (e) Targeting taxes, particularly at the processing and export levels, to generate revenues for resource management and to induce possible relocation of excess capital in the sector to other productive sectors of the economy.
- (f) Limiting licensing of new fish processing firms until the size of fish stocks is clearly known.

*Source:* UNEP, Environmental Impacts of Trade Liberalization and Policies for the Sustainable Management of Natural Resources: A Case Study on Uganda's Fisheries Sector, (Geneva, online), p. 144.

## (2) Command and control policies

Command and control policies rely on the direct control of market flows by governments, rather than on the price system and market forces. Command and control policies include measures such as land-zoning, licensing, strengthening of property rights and legal reform. Examples of command and control policies include: regulatory measures, standard setting, property rights, and insurance and liability-related policies.

**Regulatory measures.** Governments can regulate to protect environmental resources or social imperatives, for example, a ban on tree cutting to protect forest resources. A recent study on Bangladesh's shrimp farming industry recommended a ban on trawler shrimp catch to increase the supply of broods for hatcheries and to enhance the productivity of the natural breeding cycle in Bangladesh.

**Standard setting.** Standard setting can be government-directed or voluntary/market-based. Standards could involve environmental quality standards for industry, environmental and social standards for foreign direct investment.

**Property Rights.** Trade liberalization may impose adverse impacts on populations or resources where the individual or collective property rights are weak or unrecognized. An important strand of offsetting instruments is those that either recognize such rights in law, or create or strengthen institutions that may help enforce such rights. The latter may be in the executive or the judicial domain. In the latter, they may involve support for public interest litigation, legal aid resources, and related measures. Property rights are discussed, in the context of Bangladesh's shrimp industry, in Box 5:4.

### Box 5:4 A policy response for Bangladesh's shrimp farming industry

Strengthening Property Rights: Land use rights favouring local people are one of the prerequisites for sustainable shrimp culture activity. At present *khas* government lands are leased out to the shrimp cultivators on flexible terms, leading to inefficient use of land. Expanded programmes in land registration and titling are needed to clarify property rights. Adequate compensation for those people losing lands to shrimp cultivation should be ensured. The government can introduce a minimum cost for per-unit leasing of agricultural land for shrimp farming. Securing property rights will reduce institutional constraints that prevent "buy outs" or the mixing of shrimp and rice farming activities. Strengthening of rights may also be attractive for equity reasons.

Source: UNEP, *Environmental Impacts of Trade Liberalization and Policies for the Sustainable Management of Natural Resources: A Case Study on Bangladesh's Shrimp Farming Industry*, (Geneva, 1999, online), p.38.

**Insurance and liability-related policies.** These are closely linked to the policies that protect property rights. The rights in this case are the avoidance of intentional harm to others. This can be facilitated by establishing procedures for the enforcement of civil liabilities for intentional damage.

### (3) Voluntary measures

Voluntary approaches and initiatives have gained popularity during the last decade, with the private sector and with governments.<sup>52</sup> Examples include voluntary agreements, programmes, standards, codes of conduct, guidelines, and principles, agreed by companies and industries, in conjunction with governments and interest groups. The private sector may benefit from greater flexibility in reaching targets, and from the public relations opportunity. Governments may benefit from promoting dialogue with the private sector and raising their awareness of environmental issues.

Voluntary measures are most effective when used in tandem with other environmental policy instruments. The effective use of regulatory and market-based instruments by governments can encourage the private sector to make such commitments. As a result, voluntary approaches can encourage an economy's environmental performance and resource productivity to reach beyond previously agreed regulatory targets.

Notable examples of voluntary measures include eco-labels and energy efficiency standards. While the WTO principle of "like products" may not recognize the environmental implication between different non-product related process and production methods (PPMs), eco-labelling practice informs consumers of an industry's voluntary initiatives and processes that go beyond existing environmental laws and regulations. It will raise consumer awareness to create niche markets for environmentally friendly products and add premiums in the competitive market when accompanied by an effective marketing strategy.<sup>53</sup>

### (4) Institutional measures

The results of an *integrated assessment* might also point to the need for mechanisms to enhance transparency and to promote effective public participation in the consideration of trade-related policies and liberalization agreements.

**Community Development and Support Organizations.** If rural communities or poor/vulnerable groups lack the institutional, legal, or organizational resources to protect their rights, investment to empower their collective capability through community support programmes can

<sup>52</sup> United Nations Environment Programme IE, "Voluntary initiatives: improving environmental performance and helping achieve sustainability" *Industry and Environment*, vol. 21 No. 1-2 (1998, online).

<sup>53</sup> For a discussion on eco-labelling and PPMs, see *Environment and Trade: A Handbook* (Geneva, United Nations Environment Programme-IISD, 2000, online). On energy efficiency standards, see Duncan Brack and others, *International Trade and Climate Change Policies*, (London, Earthscan, 2000), chapter 3.

help avoid adverse environmental and social impacts. Producers in some parts of a commodity chain do not have adequate collective resources to make collective decisions and to ensure that they have access to financial and technological resources to undertake needed restructuring

**Transparency.** This refers to the general operation of the government, and is intended to avoid the adverse impact of policy changes that arise from rent-seeking, corruption, and denial of access to information to marginalized groups. In order to increase transparency and promote effective public participation in an *integrated assessment*, it is critical to provide stakeholders with comprehensive information in a timely fashion. Such information might include statistical data, research results, project-related information, and negotiation results. The timely dissemination of this information may well require the establishment of mechanisms through which such information can be released automatically.

Building trust and public participation. An effective *integrated assessment* not only mobilizes ideas, but also mobilizes the people who contribute to the process. A participatory process can accommodate perspectives and concerns of various stakeholders, and provide ownership of the results to a broad cross-section of society, thereby building trust in the process and confidence in the policies under consideration. This is also true at the international level where issues of trade-related policy and liberalization are debated among a fairly large and coherent policy community that includes key NGOs, academic experts, business and labour groups. The importance of a participatory process in an *integrated assessment*, points, in turn, to the importance of enhancing the capacity of the full range of stakeholders that participate in the process.

## D. Monitoring and evaluation

Following the introduction of a “flanking” policy, the government has two options. It can trust that the policy responses will work sufficiently to ensure that the trade policy or agreement is effective and does not result in unexpected costs to the national economy, the environment or to social welfare. This has no cost to government, but carries the potentially serious risk that actual significant, adverse impacts will not be identified until serious harm may have been done. A second approach is to assess the impact of the policy and the effectiveness of the “flanking” policy response. This option has cost and resource implications, but provides a means to assess risks early so that targeted remedial action can be taken.

If a government establishes an impact tracking system, it can be based on a set of indicators, chosen explicitly during the *integrated assessment* phase, which can be assessed over time to determine whether adverse economic, environmental or social impacts are occurring. Also, an institutional framework is needed to manage this work.

One option is to mandate a competent research institution to design an indicator-based monitoring programme to ensure, as far as possible, that the monitoring results show the impact of the trade policy (including any ancillary policies) only and not the combined influences of other extraneous factors.

A second option is to identify a current government initiative already in place such as national-level “State of the Environment” reporting. A number of countries have a legal requirement for such reports to be prepared on a regular basis (for example, biannually). Early in the assessment phase the impact indicators need to be compared with those being tracked for the “State of the Environment” reports. Any additional indicators needed for the trade policy impact tracking can be added to the existing list. Some extra resources may need to be made available for this option to be credible and effective. Subsequently, the institution provides regular evaluations, of indicator status, to the policy community as part of its reporting function, but perhaps at different points in time from the publication of the “State of the Environment” report. The results will not have the ability to demonstrate conclusively that an impact is due to a trade initiative alone, but the balance of probability could be determined, one way or the other, to the satisfaction of the policy community.

A third option would be to establish an independent commission of specialists and stakeholders to report on the impacts of trade policies. This group commission would require a budget to enable it to undertake specific studies. This option would be appropriate for implementing *ex post* assessments as well as trying to determine whether, or not, the impacts expected to arise as a result of *ex ante* and concurrent assessments actually did occur.



# **ANNEXES**



## ANNEX I

### 1. Agriculture

<i>Topic</i>	<i>Area</i>	<i>Indicator</i>	
Economic	Incomes	Agricultural productivity	
		Total farming income	
		Average earnings of farmers and farm workers	
		Price of staple foods	
	Employment	Average farm size	
		Agricultural employment levels (increase or decrease of job opportunities)	
		Rural employment levels	
		Rate of creation of food processing business	
	Environmental	Inputs	Rate of pesticide use
			Rate of artificial fertilizer use
Energy consumption			
Resource use		Amount of water diverted for irrigation	
		Amount of organic matter in topsoil	
		Area of land under agriculture	
Outputs		Emission rates of greenhouse gases	
		Water quality trends	
		Area sprayed by pesticides	
		Pesticides residues in water, soil and food	
	Nitrate and phosphorous losses from agricultural land		
Biodiversity	Erosion rates		
	Area converted to organic farming		
Populations of key farm land flora and fauna			
Social	Demography	Age of farmers	
		“Farm” family size	
		Rural-urban migration rates	
		Ratio of female to male rural household heads	
		Ratio of subsistence farmers to waged agricultural labourers	
		Ratio of male to female time inputs to farming	
	Food security	Amount of storage for staple foods	
		Amount stored	
		Distribution of storage depots	
		Average distances from depots to vulnerable communities	
Nutritional characteristics of children and young adults			
Area of non-food crops			

## 2. Capture Fisheries

<i>Topic</i>	<i>Area</i>	<i>Indicator</i>
Economic	Incomes	Fish catch sizes, composition and values Fisheries' incomes Average earnings of fishermen Profitability of fishing companies
	Employment	Fishery employment levels (increases or decreases of job opportunities) Unemployment levels in fishing communities Rate of creation of processing businesses
Environmental	Inputs	Energy consumption
	Resource use	Status of important fish stocks
	Outputs	Amount of solid waste generated from onshore activities
	Biodiversity	Population of key bird and mammalian species in fishing areas
Social	Demography	Number of independent fishermen-artisans Age of fishermen Number of families dependent on fishing Fisher family size Ratio of independent fishermen to waged workers in the fishing industry Population of fishing communities
	Food security	Proportion of fish catch available for local consumption Nutritional value of locally consumed fish Location of fishing areas
	Health	Nutritional characteristics of children and young adults in fishing communities Accident and mortality rates during fishing activities

## 2. Services (travel and tourism)

<i>Topic</i>	<i>Area</i>	<i>Indicator</i>
Economic	Incomes	National income Regional disparities in income Per capita incomes in tourism sector
	Employment	Creation of employment opportunities Unemployment rates/ethnic distribution Rate of creation of locally-owned businesses servicing tourists Male/female employment ratios
Environmental	Inputs	Energy Consumption
	Resource use	Water consumption including irrigation (e.g. golf courses) Aggregates for construction Wood for curio making Conversion of agricultural lands and forests
	Outputs	Coastal water quality trends
	Biodiversity	Proportion of tourist expenditures allocated to biodiversity management (e.g. national park maintenance) Species diversity of sensitive habitats (depending on location of tourist centres, e.g. coral reefs) Population of key bird and mammalian species

<i>Topic</i>	<i>Area</i>	<i>Indicator</i>
Social	Demography	Internal migration rates between tourist and non-tourist areas
	Socio-cultural	Ethnic relations/conflicts
		Harassment of visitors
		Crime rates
		Prostitution (adult/child)
Health	Internal community conflicts on maintenance of traditional values and practices	
Health	Sexually transmitted diseases	
Infrastructure capacity	Infrastructure capacity	Ratio of school places to demand
		Ratio of doctors/clinics to patients
		Potable water supply/dead of population
		Waste treatment and/or disposal capacity per capita
		Growth rates of informal settlements

#### 4. Textiles and Apparel

Economic	Incomes	National income Regional disparities in income Per capita income of textile workers
	Employment	Creation of employment opportunities Unemployment rates/ethnic distribution Rate of creation of locally-owned textile businesses Male/female employment ratios
Environmental	Inputs	Energy consumption (crop production for textile industry and manufacturing facilities for man-made fibres) Pesticide input for crops used in textile manufactures Fertilizer input for crops used in textile manufacture (cross refer to output indicators for agricultural sector)
	Resource use	Water consumption (crops and manufacturing facilities) Hydrocarbons used to make intermediate products for man-made fibres production Conversion of food crop land and other types of land areas to growing crops for textiles
	Outputs	Surface water quality trends (especially heavy metals and biological oxygen demand) Amount of solid waste generated
Social	Demography	Internal migration rates to areas with growing textile manufacturing
	Socio-cultural	Trends in employment of children under 14 years of age
		Average working hours per day
		Ethnic origin or workers/entrepreneurs
	Food-security	Total food crop production Mix of food crops
Infrastructure capacity	Potable water supply per head of population Waste treatment and/or disposal capacity per head of population Growth rates of informal settlements	

## ANNEX II

### EXAMPLES OF ANALYTICAL QUESTIONS, BY SECTOR

#### 1. Agriculture

##### ✓ Checklist

- Do domestic support measures exist that promote the unsustainable use of natural resources or the increased application of chemical inputs?
- What scale impacts associated with tariff liberalization, particularly in regions where agriculture represents an increasingly important share of exports and determine in what crops and using what technologies is this true?
- Is trade liberalization likely to result in (a) a changing product mix, (b) product shifts, (c) output substitution and (d) moves towards crops that are more or less pollution intensive requiring increased irrigation and use of chemicals, taking into account their value?
- Is increasing liberalization expected to encourage intensive production techniques, an increased reliance on inputs, and increases in land under cultivation?
- Will the removal of supports lead to effects on land conversion; intensity of livestock production; or adoption of technologies that promote conservation, such as Integrated Pest Management practices?
- What are the impacts of prices and to what extent are the incomes of producers and exporters likely to rise, and is this likely to: (a) offset the effects of a decline in subsidized inputs at the farm level, (b) encourage more environmentally friendly production techniques, or (c) take marginal land out of production?
- Where are the effects of liberalization likely to be most acutely felt, by sector or by geographic area? Are these sectors and areas well placed to take advantage of efficiencies that prevent a move towards environmentally degrading techniques to intensify production?
- Is the Sanitary and Phytosanitary (SPS) Agreement of the WTO, and the risk assessment methodologies that it currently relies on, well placed to address emerging issues that could involve questions of biological risk assessment?
- Given the complexities behind procedures involved in the application of SPS measures, how can effective participation be assured?
- Are technologies to support relatively environmentally friendly production techniques universally available and do mechanisms exist, including allowable support measures, to ensure their availability at the lowest possible cost?
- Do appropriate tools exist to ensure the ongoing preservation of biodiversity, including genetic diversity?

- Are there appropriate parallel environmental and resource conservation policies to be taken in conjunction with trade liberalization?
- Are national institutions, regulatory regimes, and domestic social structures and, if necessary, safety nets, in place to support agricultural reform?

## 2. Fisheries

### ✓ Checklist

- Given the close links between production and trade in this sector, is liberalization expected to increase production?
- What are the likely environmental and social impacts of removing subsidies that promote overcapitalisation of the industry?
- Can appropriate measures be devised that would support more sustainable practices, either through altering existing subsidies or recommending new forms of support?
- What impacts on fisheries resources, including the removal of the natural resource and maritime biodiversity, are likely to result from increased or altered production?
- Do appropriate support measures exist to help meet increasingly overreaching health and safety standards imposed on processing facilities?
- To what extent are countries able to effectively address issues that arise under the SPS Agreement?
- Which issues related to fisheries production, such as by-catch, protection of marine species, or sustainable harvesting practices should be addressed through existing, or new, multilateral agreements based on international consensus?
- What steps can be taken towards adopting effective fisheries management programmes in conjunction with further liberalization?

## 3. Trade in Services (travel and tourism)

### ✓ Checklist

- Are important environmental and social impacts of trade in commercial services being given due consideration, in particular in those areas such as transportation and travel services where trade is the greatest?
- What infrastructure is needed to support increased trade in commercial services? Does the capacity exist to meet those needs, and what are the environmental and social consequences of meeting them?
- Do appropriate regulatory regimes that promote high levels of environmental protection exist across a broad range of services, and are there mechanisms to ensure effective compliance?
- Are policies in place to harness the economic benefits arising from increased trade in commercial services?

- Is there a need to extend the training and education of workforces in developing countries to increase the opportunities for service providers to take full advantage of the liberalization of services at home?
- To what extent does an influx of labour associated with the liberalization provide service providers an increased opportunities in providing high-income or labour intensive services abroad?

#### **4. Textiles and Apparel**

✓ *Checklist*

- To what extent could the production of inputs increase as a result of reform in this sector?
- What value added will come from increased exports of textiles or clothing?
- What are the environmental implications of increasing crops for textile production?
- To what extent is parallel policy reform necessary to address issues of pollution that could be caused by the rapidly expanding production activity in this sector?
- What is the availability of cleaner and more efficient production technologies; technologies for effectively treating and containing wastes; or chromium recovery?
- What are the social implications, including training, of adopting mechanised technology?



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## **B. By theme**

- An overview of computational equilibrium models in chapter IV-B (1), General equilibrium models.  
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## **GLOSSARY**

### **A. Organizations**

#### **Commission on Sustainable Development (CSD) United Nations**

The Commission on Sustainable Development (CSD) was created in December 1992 to ensure effective follow-up of UNCED and to monitor and report on the implementation of the Earth Summit agreements at the local, national, regional and international levels. The CSD is a functional commission of the United Nations Economic and Social Council with 53 members. It was agreed that a five-year review of Earth Summit progress would be made in 1997 by the United Nations General Assembly meeting in special session. The CSD Secretariat is located in New York.  
<http://www.un.org/esa/sustdev/csd.htm>

#### **Free Trade Area of the Americas (FTAA)**

The Free Trade Area of the Americas (FTAA) is part of the effort to unite the economies of the region into a single free trade arrangement, initiated at the Summit of the Americas, held in Miami in December 1994. The Heads of State of the 34 democracies in the region agreed to construct a “Free Trade Area of the Americas” or FTAA and to complete negotiations for the agreement by 2005. The leaders also made a commitment to achieve substantial progress towards building the FTAA by 2000.

Since the Miami Summit, the region’s trade ministers have met four times to formulate and execute a work plan for the FTAA. The first meeting was in June 1995 in Denver, USA; the second in March 1996 in Cartagena, Colombia; the third in May 1997 in Belo Horizonte, Brazil; and the fourth in March 1998 in San Jose, Costa Rica. During the Belo Horizonte ministerial meeting, it was agreed that the formal negotiations leading towards a FTAA would begin in March 1998, at the Second Summit of the Americas in Santiago, Chile.

The FTAA represents the largest regional integration effort ever undertaken involving both developed and developing countries, in the common objective of realizing free trade and investment in goods and services, on the basis of strengthened trading rules and discipline. The breadth of the negotiations is unprecedented even by the standards of the Uruguay Round. These negotiations will encompass all areas previously negotiated and which fall within the World Trade Organization’s ambit, with the goal of going beyond previously agreed multilateral liberalization within the region, wherever possible. Importantly, the FTAA negotiations will include areas presently not addressed under the WTO, such as a common investment regime, government procurement, and competition policy, which are not yet subject to commonly-agreed discipline among a large number of trading nations.

A tripartite committee, which consists of the Inter-American Development Bank (IDB), the Organization of American States (OAS) and the United Nations Commission for Latin America and the Caribbean (ECLAC), provides technical assistance to the process. [www.alca-ftaa.org](http://www.alca-ftaa.org)

#### **North American Commission for Environmental Cooperation**

The North American Commission for Environmental Cooperation (NACEC) is an international organization created by Canada, Mexico and the United States under the North American Agreement on Environmental Cooperation (NAAEC). The NACEC was established to address regional

environmental concerns, help prevent potential trade and environmental conflicts, and to promote the effective enforcement of environmental law. The agreement complements the environmental provisions of the North American Free Trade Agreement (NAFTA).

The NACEC is composed of the following:

- The council, the governing body of the NACEC, consists of the environment ministers (or the equivalent) of each country. It meets at least once a year to discuss CEC programmes and activities.
- The Joint Public Advisory Committee (JPAC) is composed of fifteen members, five from each of the three countries (Canada, Mexico and the United States), who are appointed by their respective governments. Its members act independently and their responsibility is to provide the council with their advice on all matters within the scope of the NAAEC. The chair is elected for a one-year term and by rotation from among the JPAC members appointed for each country.
- The secretariat is composed of professional staff who implement initiatives and conduct research in core programme areas on topics pertaining to the North American environment, environmental law and standards, and other environment/trade issues, in addition to processing citizen submissions on enforcement matters. The secretariat, which is located in Montreal, Canada with a liaison office in Mexico City, provides technical and operational support to the council, as well as to committees and groups established by the council.

### **North American Free Trade Agreement (NAFTA)**

The North American Free Trade Agreement is a comprehensive trade agreement entered into by Canada, Mexico and the United States on 1 January 1994. NAFTA opened a huge market comprising some 400 million consumers with a combined gross domestic product (GDP) of \$9.5 trillion.

### **World Trade Organization (WTO)**

The World Trade Organization (WTO) is the only global international organization dealing with the rules of trade between nations. It was created by the GATT Uruguay Round negotiations (1986-1994) and established on 1 January 1995. As of 30 November 2000 the WTO had a membership of 140 countries. The Secretariat of the WTO is located in Geneva, Switzerland and consists of a staff of approximately 500 professionals under the leadership of a Director-General.

The main functions of the WTO are: Administering WTO trade agreements; serving as a forum for trade negotiations; handling trade disputes; monitoring national trade policies; providing technical assistance and training for developing countries; and co-operating with other international organizations.

## **B. Methodologies and concepts**

### **Agenda 21**

Agenda 21 is a comprehensive plan of action to be taken globally, nationally and locally by organizations of the United Nations system, governments, and major groups in every area in which human activities impact on the environment. At over 300 pages, it puts forward a plan of action for achieving sustainable development in the 21st century. Agenda 21, the Rio Declaration on Environment and Development, and the Statement of principles for the Sustainable Management of Forests were adopted by more than 178 governments at the United Nations Conference on Environment and Development (UNCED) held in Rio de Janeiro, Brazil, 3-14 June 1992.



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## **Benefit Cost-Analysis**

Benefit cost analysis is a tool used to compare costs and benefits of an action-be it a policy, a project or a simple activity. Where benefits exceed costs, then, the action is deemed desirable. Through discounting, the stream of costs and benefits over time are compared using such evaluation criteria as net present value (NPV), benefit-cost ratio (BCR), and internal rate of return (IRR). The most reliable criterion is that of the NPV which says that an action is desirable if the present value of benefits exceeds the present value of costs, or simply, if the NPV is positive. When comparing mutually exclusive competing alternatives, the option with the highest NPV is preferred.

## **Change in Productivity Analysis**

This technique entails relating production levels to varying levels of inputs. One of these inputs relates to the environment, measured directly (e.g. tons of soil loss, tons of biochemical oxygen demand) or indirectly using some index of environmental quality such as degree of soil loss or water pollution. A change in the level of inputs is expected to bring about a corresponding change in the output levels or productivity of the system under question. With the environmental variable of interest, different levels of environmental input will result in varying levels of output-thus making it possible to measure the changes in productivity associated with changes in the environment.

## **Concurrent Integrated Assessment**

A concurrent *integrated assessment* is one that is undertaken in conjunction with the negotiation of a trade liberalization agreement or the implementation of a trade-related policy.

## **Contingent Valuation Methodology**

In the absence of markets for most environmental goods and services, the use of hypothetical markets to elicit demand for these environmental commodities has gained wide acceptance in resource valuation. The contingent valuation methodology (CVM), also a form of market research, asks respondents how much they are willing to pay for an improvement in the environment or the avoidance of an environmental deterioration. The responses obtained through such a question are contingent on how the "commodity" is defined, the form of payment, and the payment vehicle. This technique has wide applications in valuation of changes in air and water quality, recreation, biodiversity, risks to life and health, alterations in natural habitat, and water, sanitation and sewerage.

## **Cost of Illness Analysis**

Changes in the environment, particularly air and water quality, once they exceed critical levels, can have serious health impacts. Economic impacts on health can be measured by the costs of medical treatment (paid for by the victims and also subsidized by the state) and the foregone earnings (or wages) from a reduced capacity to work. This measure is often viewed as a lower bound estimate of health impacts since it does not include the pains and sufferings of the victims.

## **Deposit Refund Systems**

This is an economic instrument used to reduce disposal of potentially-environmentally harmful products. A deposit is paid when the potentially harmful products are acquired. Once these products are returned, thus avoiding the environmental harm, a refund follows.

## **Ecosystem**

Ecosystem refers to a dynamic complex of plant, animal and micro-organism communities and their non-living environment interacting as a functional unit. It does not necessarily correspond to an “ecological zone”, but can refer to any functioning unit at any scale. An ecosystem could be, for example, a grain of soil, a forest, a biome or the entire biosphere.

## **Environmental Funds**

Environmental funds are basic instruments for the implementation of projects, programmes and even policies to sustain needs for the protection of the environment and its related resources. The main purpose of environmental funds is to provide financial support for environmental protection investments. The major sources of these funds are generated from user fees, disposal charges and non-compliance fines, among others.

## **Environment Kuznets Curve**

This is a hypothesis which suggests that the association between GDP (gross domestic product) and the quality of the environment is “U-shaped”, i.e. environmental quality will deteriorate in the first phase of economic development, but as GDP per capita grows, an improvement in the environmental situation may be expected.

## **Environmental Impact Assessment (EIA)**

The systematic and interdisciplinary identification, prediction, evaluation, mitigation and management of impacts from a proposed development and its reasonable alternatives. The results are presented to decision-makers, and stakeholders, in a report often known as an environmental statement to be used in the decision-making process on the future of the proposal. Sometimes known as environmental assessment.

## ***Ex ante* Integrated Assessment**

An *ex ante integrated assessment* is one that is undertaken prior to the negotiation of a trade liberalization agreement or a decision to adopt a trade-related policy.

## **Extended Domestic Resource Cost Analysis (EDRC)**

Domestic Resource Cost Analysis has traditionally been applied to measure the effects of economic policy distortions in the domestic sector, with the end goal of analyzing gains from trade liberalization. The analysis has since been extended to measure the environmental impacts that occur in the production and exchange of goods and services, hence the term EDRC. The value of the environmental damages is deducted from the domestic costs of export production, which are then compared to the foreign exchange earned.

## ***Ex post* Integrated Assessment**

An *ex post integrated assessment* is one that is undertaken following the implementation of a trade liberalization agreement or a trade-related policy.

## **“Flanking” Policies**

“Flanking” policies are complementary economic, environmental and social policies introduced in conjunction with or following a trade liberalization agreement or trade-related policy. These policies can be designed to promote any beneficial impacts of the trade-related policy or trade liberalization agreement, or to mitigate any negative impacts.

## **General Equilibrium Models (GEM)**

General equilibrium models are one of the basic tools of microeconomic. This approach is more often applied to exchange systems involving only consumers (and not producers) and is applied to all systems consisting of a set of actors and a set of goods. A GEM is guided by the behavioural assumption that the agents involved will choose more preferred bundles of goods over less preferred bundles. The solution—a competitive equilibrium—is one wherein the distribution of resources is such that there is no excess demand for any good (Whitmeyer 1997).

## **Global Trade Analysis Project (GTAP)**

GTAP is a multi-regional AGE (applied general equilibrium) model which captures the world’s economic activity. Essentially, the theory behind the GTAP model has little difference to that of other standard multi regional AGE. Two sets of equations are accordingly important in this model: a) the accounting relationships which ensure equilibrium between the receipts and expenditures of every agent in the economy; b) behavioural equations, based upon microeconomic theory. The optimising behaviour of the different agents in the economy is an integral part of these equations, i.e. demand functions (see Brockmeier, 1996).

## **Hedonic Pricing Approach**

This approach works on the basic premise that the value of a property reflects its characteristics (size, location, neighbourhood factors like peace and order conditions, access to markets, etc.), one of which is its environmental attribute. The environmental attribute may refer to the level of air or noise pollution in the locality, the distance from the solid wastes disposal area, and so on. Through regression analysis using large data set, the implicit price of the environmental variable can be derived. The technique will work in situations where property markets are active and where people perceive that differences in environmental quality can affect property values.

## **Indicators**

An indicator is a statistic which beyond its direct meaning can be used to derive information about an underlying situation. Indicators are particularly useful when primary data would be impossible to collect, or can only be observed after a time lag. They can provide a useful early indication of trends, and suggest causal relationships. Their use can reduce the amount of information that needs to be collected to monitor a situation, and may also provide a simplified way of presenting results.

## **Integrated Environmental and Economic Accounting**

Integrated environmental and economic accounting is the process of accounting for stocks and flows of environmental resources, i.e. accounting for the depletion and degradation of natural resources in order to reflect the actual cost resulting from economic activities. In 1993 the United Nations Statistic Division (UNSD) published a handbook of national accounting entitled Integrated Environmental and Economic Accounting. In 2000, UNEP in collaboration with UNSD published a reference document for the implementation of integrated environmental and economic

accounting at the national level, entitled Integrated Environmental and Economic Accounting: An Operational Manual.

### **Input-Output Models (I-O models)**

I-O models focus on how industries trade with each other, and how such inter-industry trading affects the total demand for labour and capital within the economy. These models show the flows of goods and services within an economy while illustrating the connection between producers and consumers.

### **Life Cycle Analysis**

This analysis is linked with the concepts of life cycle assessment which emblemizes the outgrowth of environmental management practices from incipient end-of-pipe solutions to the expansion of integrated environmental approaches resolved to encompass the entire “life cycle” of the product.

### **Multi-Criteria Analysis**

As a participatory approach, multi-criteria analysis considers the preferences of multiple stakeholders and the trade-offs among the competing goals of these various groups. The process requires the identification of an overall objective for the decision process; the identification of the options or alternatives under consideration; the elaboration of the criteria to be used in evaluating the options; and the method by which the alternatives will be ranked and the preferences aggregated.

### **Non-Tariff Barriers**

Non-tariff barriers are potential barriers to trade that are not based on tariff levels. They can include quantitative restrictions such as quotas or special regulations. Non-tariff measures that relate to mandatory regulations and other standards are called technical barriers to trade. Another example of non-tariff measures is related to food standards that ensure food safety and protect human health from plant or animal-spread diseases, or regulations that protect plant and animal health from pests and diseases.

### **Partial Equilibrium Models**

Partial equilibrium analysis basically examines the effects of policy actions in the markets which are directly affected. This analysis either overlooks effects in other industries of the economy or assumes that the sector in question is small and therefore has little if any impact on other sectors of the economy.

### **Pollution Haven Hypothesis**

The pollution haven hypothesis holds that less stringent domestic environmental regulations or more relaxed domestic enforcement regimes may alter patterns of foreign investment in industrial sectors that face relatively high pollution abatement or other environmental costs.

### **“Pressure-State-Response” Model**

A conceptual model developed to help identify environmental indicators. It is based on a simple linear sequence of cause and effect. Initially, there are identifiable pressures on environmental components, e.g. overfishing, which result in changes in the state of the component e.g. a decline

in certain fish stocks and reduced catch/unit of fishing effort. The state of the components elicits a social response such as quotas or moratoria on fishing in certain areas or at certain times. The response can subsequently lead to alterations in the pressures.

### **Risk Assessment**

Risk assessment is fundamentally connected with how to measure known scientific and other data, with uncertainty (e.g. uncertainty over cause-effect relationship, irreversibility of some effects and uncertainty about the scale of effects). Under this procedure, the important focal point is balancing what is known for certain, what is estimated as a possible and conceivable threat, and what is unknown.

### **Scenario Building**

This approach is designed as a planning tool to anticipate developments and changes that may come along the way of a certain project or programme. This approach heavily relies on forming alternative scenarios based on a variety of assumptions. Scenario building is very useful in considering strategies which will be most effective and prudent in future planning.

### **Structural Adjustment Programmes**

Structural adjustment programmes were initiated by the International Monetary Fund (IMF) and the World Bank during the early 1980s in response to the financial crises facing most developing countries. They were mainly intended to introduce macroeconomic structural reforms to enable those countries to overcome the financial crises and enable them to pay and service their debts.

The World Bank's structural and sector adjustment loans are the most commonly used adjustment instruments. The structural adjustment loan (SAL) supports reforms that promote growth, the efficient use of resources, and a sustainable balance of payments over the medium- and long-term. The sector adjustment loan (SECAL) supports policy changes and institutional reforms in a specific sector. SECALs focus on major sectoral issues such as the incentive and regulatory frameworks for private sector development, institutional capability, and sector expenditure programmes. Adjustment loans are available to IBRD and IDA borrowers not in arrears to the Bank group. Eligibility for an adjustment loan also requires agreement on monitorable policy and institutional reform actions, and satisfactory macroeconomic management.

Adjustment loans were originally designed to provide support for macroeconomic policy reforms, including reforms in trade policy and agriculture. Over time, they have evolved to focus more on structural, financial sector, and social policy reform, and on improving public sector resource management. Adjustment operations now generally aim to promote competitive market structures (for example, legal and regulatory reform), correct distortions in incentive regimes (taxation and trade reform), establish appropriate monitoring and safeguards (financial sector reform), create an environment conducive to private sector investment (judicial reform, adoption of a modern investment code), encourage private sector activity (privatization and public-private partnerships), promote good governance (civil service reform), and mitigate the short-term adverse effects of adjustment (establishment of social protection funds).

Coordination with the IMF is an essential part of the preparation of adjustment loans, which have traditionally been channeled through the enhanced structural adjustment facilities (ESAF) of the IMF. The ESAF was a concessional lending facility set up to help IMF's poorest members in their efforts to achieve rapid economic growth and a sustained improvement in their balance of payments. In September 1999, the ESAF was replaced by a poverty reduction and growth facility (PRGF). The PRGF was established to respond to the IMF mandate to integrate the objectives of poverty reduction and growth more fully into its operations in the 80 poorest countries. Under the

PRGF, the IMF and the World Bank will continue to support strategies elaborated by borrowing countries in a Poverty Reduction Strategy Paper (PRSP) which will be prepared with the participation of civil society and other development partners.

[www.worldbank.org](http://www.worldbank.org); [www.imf.org](http://www.imf.org)

### **Sustainable Development**

Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs. The concept of sustainable development implies limits imposed by the present state of technology and social organization on environmental resources and by the ability of the biosphere to absorb the effects of human activities. Sustainable development acknowledges that meeting essential needs requires economic growth, but requires that this be done while at the same time ensuring environmental protection and enhancement and promoting social equity.

The term came into popular use following the 1987 report of the World Commission on Environment and Development (WCED), *Our Common Future*. The WCED, headed by Gro Harlem Brundtland, was set up as an independent body in 1983 by the United Nations. Its mandate was to re-examine the critical environment and development problems on the planet and to formulate realistic proposals to solve them, so as to ensure that human progress would be sustained through development without bankrupting the resources of future generations.

### **Tariffs**

Tariffs are monetary levies on imports of a particular category of goods as listed in the tariff schedules of importing countries. When tariffs are increased they discourage trade; when they are lowered, or eliminated, they promote trade. Tariffs affect trade flows, making it more expensive for domestic households and companies to buy foreign goods, and promoting domestic production. Higher tariffs make imported goods more expensive. The higher the tariff imposed the more expensive it is for the exporting country to access the importing country's markets. In the case of tariff escalation, higher tariffs are charged on goods that are higher up the level of processing.

### **Trade Policy Review Mechanism (TPRM) WTO**

The Trade Policy Review Mechanism (TPRM) was established in 1989, on a provisional basis, following the mid-term review of the Uruguay Round. It was confirmed as an integral element of the WTO in Annex 3 of the Marrakesh Agreement. The aims of the mechanism are to contribute to improved adherence by all members of the WTO to its rules and discipline, and thus to the smoother functioning of the multilateral trading system. The reviews aim to achieve greater transparency in and understanding of the trade policies and practices of members. The mechanism enables the regular collective appreciation and evaluation by the members of the full range of individual members' trade policies and practices in all areas covered by the WTO Agreements, and their impact on the functioning of the multilateral trading system. Reviews are conducted in the Trade Policy Review Body (TPRB), a full-membership body of equal ranking to the General Council and the Dispute Settlement Body.

### **Travel Cost Analysis**

This technique uses travel costs as a proxy to the price of recreational use of natural resources such as parks, forests, wetlands and water bodies. The travel costs include the direct expenses of visitors in getting to and from the site, and to cover fares, fuel and other incidentals. It also includes the value of time travelling to the site and on the site. The technique involves a survey of visitors to the site and hence only captures the use value of the resource. The survey information allows the

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derivation of a demand function for the resource in question from which the total benefit from the use of the resource can then be estimated.

**TRIMs**

Trade-related investment measures (TRIMs) are investment measures that affect trade in goods by restricting or distorting that trade. They include such measures as rules that discriminate against foreigners or foreign products, investment measures that lead to quantitative restrictions, measures which require particular levels of local procurement by an enterprise and measures which limit a company's imports or set targets for the company to export. TRIMs can affect the use or transfer of environmental products and technologies through foreign investment and the environmental performance of foreign firms.

**TRIPS**

The WTO Agreement on trade-related aspects of intellectual property rights (TRIPS) is based on a recognition that increasingly the value of goods and services entering into international trade reside in the know-how and creativity incorporated into them. The agreement holds WTO members to minimum standards of protection over intellectual property through instruments such as copyright for books and patents for industrial design. By protecting innovators' right to sell their innovation TRIPS may encourage such innovation, including the development of new technologies and processes that will benefit sustainable development. On the other hand, such innovation might be slower to make a contribution if new, more environmentally benign technologies or if prices for pharmaceuticals become so expensive as to be inaccessible by the countries and people most in need.

