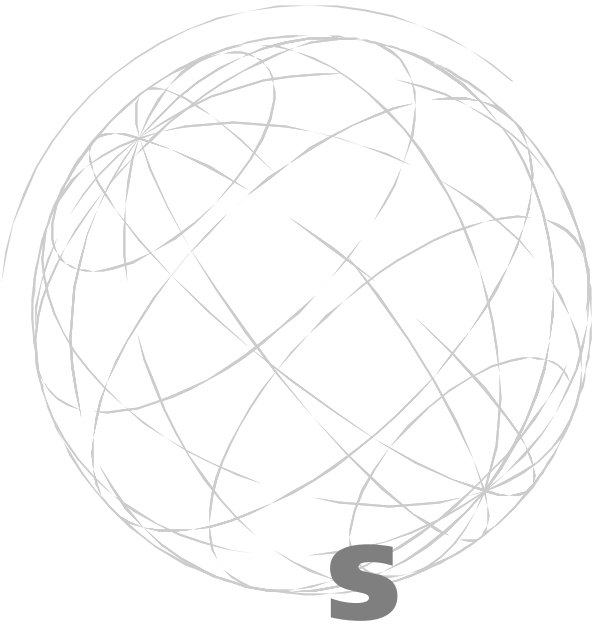
WORLD TRADE ORGANIZATION



SPECIAL STUDIES 4

TRADE AND ENVIRONMENT

HåkanNordström
andScottVaughan

ThisstudywasinitiatedbyHåkanNordströmoftheEconomicResearchandAnalysis DivisionoftheWTOandScottVaughanwhilehewasattheTradeandFinanceDivision oftheUNEnvironmentProgramme(UNEP).Mr.VaughanhassinceleftUNEPtojointhe NAFTACommissionforEnvironmentalCooperation.Theannexeshavebeenpreparedby theTradeandEnvironmentDivisionoftheWTO.Theauthorswouldliketothank Samir Abhyankar,AliDehlavi,DanielEsty,Karl-MichaelFinger,ChristinaHartler,HenrikHorn, AlexanderKeck,PatrickLow,DoaaAbdelMottaal,LydiaRumphorst,SabrinaShaw, Jan- EirikSørensenandananonymouscommentatorforvaluableinputsandcomments, aswellasLidiaCarlosSilvettiandJanetSpettelforsecretarialservices.Theopinionsexpressed inthisreportshouldbeattributedtotheauthorsandnottotheinstitutionstheyrepresent.

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ISBN 92-870-1211-3
Printed in Switzerland
X-1999, 3,500

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Executive Summary

The world economy has changed profoundly over the last 50 years. The sheer size of economic activity has increased tremendously as a result of population and per capita income growth. World population has more than doubled from 2.5 billion in 1950 to 6 billion today, at the same time as average income has risen by a factor of two-and-a-half. The cumulative effect is a six-fold rise in global GDP over just half a century. During this period, the world economy has become more integrated as a result of three factors: advances in communication and information technologies, reduced trade barriers, and reduced barriers to foreign investment. These factors have reduced the transactions costs of international commerce substantially, in turn stimulating trade directly, by allowing countries to specialize in different sectors, and indirectly, by allowing production processes to be subdivided geographically among specialized production units around the world. The net result is a 14-fold increase in trade since 1950. At the same time, industries have become more mobile, as reflected by an even more rapid growth in foreign direct investment.

The growing world economy has been accompanied by environmental degradation, including deforestation, losses in bio-diversity, global warming, air pollution, depletion of the ozone layer, overfishing and so on. (See Box 1). Part of the explanation, of course, is the sheer number of us. Six billion people obviously put more pressure on natural resources and ecological systems than 2.5 billion, and this pressure will continue to rise as we grow towards 10 billion in the next century. What is more, there is no indication that consumption per capita is slowing. On the contrary, globalization has led to an acceleration of economic growth. At the current growth trend, per capita GDP will double by 2035 and quadruple by 2070. In light of the strain already put on the environment, it is not difficult to appreciate the concern that current trends are not sustainable unless tough measures are taken to temper resource consumption and polluting emissions.

Slow progress in introducing adequate environmental taxes and regulations has in part been blamed on the multilateral trading system. There are essentially two sides to the argument, one legal and the other involving political economy considerations. As far as the *legal* argument is concerned, it is claimed that WTO rules circumscribe environmental policy-making. It is also claimed that the WTO rules provide legal cover for foreign countries to challenge domestic environmental policies that interfere with their trading rights. The *political economy* argument is that competitive pressure from the world market sometimes makes it impossible to forge the necessary political support at home to upgrade environmental standards. The perceived costs of acting alone in terms of lost investments and jobs often take the steam out of regulatory initiatives. In the worst case scenario, environmental regulations may even be bid down in the relentless competition for market share, investments, and jobs.

In addition, the environmental community is fearful that international trade will magnify the effects of poor environmental polices in the world. For example, demand from the world market may magnify the tendency of overfishing. Or more generally, economic growth driven by trade may speed up the process of environmental degradation unless sufficient environmental safeguards are put in place. These are among the issues explored in this study.

Objective of the study

One of the unfortunate features of the trade and environment debate is that at times it has generated more heat than light. Sweeping generalizations are too often heard from both the trade and the environmental communities. This study attempts to make a constructive contribution to the debate by taking stock of economic research on the subject, which has developed in the shadows of the public debate, and seemingly without much influence. Legal issues are not pursued in this study, such as the extent to which WTO rules accommodate trade measures for environmental purposes. However, the legal dimensions are partly addressed in the annexes, which include an overview of the ongoing deliberations of the WTO Committee on Trade and Environment, as well as some key reports, and a comprehensive reference list of the working documents covered so far.

Several key questions are addressed in this study. First, is economic integration through trade and investment a threat to the environment? Second, does trade undermine the regulatory efforts of governments to control pollution and resource degradation? Third, will economic growth driven by trade help us to move towards a sustainable use of the world's environmental resources?

We shall argue that economic integration has important environmental repercussions. Most importantly, perhaps, is that economic integration has, or at least is perceived to have diminished the regulatory power of individual nations. Of course, countries would be interdependent in an ecological sense even if they did *not* trade. Ecological systems do not begin and end at the border, nor does pollution travelling with wind and water. The point is, rather, that the ongoing dismantling of economic borders reinforces the need to cooperate on environmental matters, especially on transboundary and global environmental problems that are beyond the control of any individual nation. This is a key message of the study.

The roots of environmental degradation

To appreciate why and where trade enters into the sustainable development debate, it is important to understand the root causes of environmental degradation. These can often be traced back to various market and policy failures.

"Market failures" refer to situations in which the market forces of supply and demand fail to deliver an optimal outcome for society as a whole. Market failures commonly occur when producers and consumers do not have to bear the full cost of their actions, such as pollution inflicted on third parties (environmental externalities). In such cases, too many resources are invested in polluting activi-

Box 1. Selected environmental trends

— Global energy use has increased nearly 70 percent since 1971, and is projected to increase at more than 2 per cent annually over the next 15 years. This will raise greenhouse gas emissions by 50 per cent over current levels unless a concerted effort is made to increase energy efficiency and move away from today's heavily reliance on fossil fuel.

— The consumption of ozone-depleting substances have gone down by 70 per cent since the signing of the Montreal protocol in 1987. Yet, it will still take another 50 years before the ozone layer has returned to normal levels provided that all countries live up to their commitments. A significant black market and trade in CFCs and other ozone-depletion substances is endangering some of the progress already made.

— While acid rain is on the decline in many developed countries due to more stringent regulations on sulphur dioxide and nitrogen oxide emissions, the trend is on the rise in many developing countries. In Asia, sulphur dioxide emissions will double by 2020 if current trends continue.

— In the past 50 years, excess nitrogen—principally from fertilizers, human sewage, and the burning of fossil fuel—has begun to overwhelm the global nitrogen cycle, with a variety of ill effects ranging from reduced soil fertility and overfeeding of lakes, rivers and costal waters. At the current trend, the amount of biologically available nitrogen will double in 25 years.

— Deforestation shows no sign of abating. Between 1960 and 1990, some 20 per cent of all tropical forests in the world were cleared. In the Amazons alone, some 20'000 square kilometres are cleared every year. A leading cause of deforestation in developing countries is extension of subsistence farming and government-backed conversion of forests to large scale ranching and plantations. At the same time, the forest cover in developed countries is stable or even increasing slightly. However, natural forests (that have never been logged) still lack adequate protection in many places.

— Bio-diversity is threatened in many places, not just because of a reduction in the habitats as forests are cleared but also because of pollution. Another reason is the competition from non-native plants introduced by humans. Some statistics suggest that 20 per cent of all endangered species are threatened by so-called "exotic invaders".

— The aquatic environment and its productivity are on the decline. Some 58 per cent of the world's coral reefs and 34 per cent of all fish species are currently at risk from human activities. Most oceans are already overfished with declining yields.

— Global water consumption is rising quickly, and the availability of water is likely to become one of the most pressing issues of the 21st century. One third of the world's population lives in countries already experiencing moderate to high water shortages, and that number could (at given population forecasts) rise to two thirds in the next 30 years without serious water conservation measures.

Source: World Resources 1998-99: A Guide to the Global Environment. A collaborative report by the World Resource Institute, the United Nations Environmental Program, the United Nations Development Program, and the World Bank (1998).

ties and too few in pollution abatement. Undefined property rights over natural resources are another cause. If anyone, without restriction, can harvest the riches of the seas, extract the resources of forests, graze animals or collect firewood on common land, or tap water freely from municipal wells, the result is often overexploitation, a phenomenon known as the "tragedy of the commons".

In some cases, the people that depend on a given resource may be able to work out between themselves a conservation-cum-distribution scheme, which may include quotas and sanctions for overuse. However, age-old common property systems sometimes crumble under the pressure of rapid population growth, social changes, and increased mobility. Equally, polluters and victims of pollution may be able to reach a mutually satisfactory solution in cases where the source of pollution is indisputable and the cost of organizing collective action among victims is low. However, if the sources of pollution are diffuse and difficult to identify or the victims many and difficult to organize, a "market solution" may be difficult to find. Ultimately, therefore, it is up to governments to arbitrate conflicting claims over natural resources and to strike a balance between polluters and victims of pollution.

In many cases, however, governments not only omit to correct market failures by appropriate taxes and regulations, but they may add a few distortions of their own. Well-known examples include the subsidization of energy, agriculture, and fishing, which aggravates pollution problems and resource degradation rather than solving them. Such instances can be described as "policy failures".

Trade would unambiguously raise welfare if proper environmental policies were in place

In the best of all worlds, governments would use proper environmental polices to "internalize" the full environmental costs of production and consumption-the "Polluter Pays Principle." Specifically, market failures would be corrected directly at the source by appropriate taxes and regulations, and policy failures would promptly be removed, including subsidization of polluting and resource degrading activities. In this idealized world, trade liberalization would unambiguously raise welfare. However, as this is not always the case, trade liberalization could potentially exacerbate the consequences of poor environmental polices. For example, demand from the world market may encourage unsustainable logging, when no proper management scheme is in place. Indeed, such concerns are often voiced by the environmental community who opposes further trade liberalization until proper environmental polices have been put in place. In other in-

stances, removal of trade-distorting policy measures may mitigate the underlying distortions. For example, a reduction in trade-distorting fishing subsidies, currently amounting to some $54 billion annually, would reduce overcapitalization in the industry and lessen overfishing.[1]

In order to illustrate such indirect linkages between trade and environment, the study includes five case studies on chemical-intensive agriculture, deforestation, global warming, acid rain, and overfishing. For each case, we discuss the economic incentives that drive environmental degradation, the efficiency of various policy options, and the interaction between the underlying distortions and the trade policy regime. Each case study can be seen as a prototype for a broader range of environmental issues. For example, the agricultural study is representative of a wide range of environmental problems whose effects are mainly local. Likewise, the acid rain study applies also to other pollution problems that transcend national borders, but whose effects are limited to the immediate region. The deforestation study highlights the problem of missing markets, in this case the valuable but non-marketable service provided by forests in terms of absorbing carbon dioxide that otherwise would end up in the atmosphere. The global warming study illustrates the generic problem of fostering environmental cooperation in a world with national policy sovereignty. Finally, the overfishing study illustrates difficulties in managing common natural resources.

Trade barriers are poor environmental polices

One conclusion that arises from these case studies is that environmental problems are best addressed at the source, whether they involve polluting production processes or undefined property rights over natural resources. What is more, tackling the problems by targeting some indirect linkage, such as imports or exports, may divert attention from the underlying problems. In some cases, putative trade remedies may even aggravate the problems. This may be the case, for example, with tropical deforestation, where trade barriers on forest products may increase deforestation pressure by forcing people to convert land into alternative sources for employment, such as agriculture and ranching. As a general rule, whenever we sidestep the first-best principles of environmental policy-i.e., policies directed at the source of the problem-the benefits do not only become difficult to predict, but we also impose unnecessary costs on the society. This would not just be poor economics, but potentially bad for the environment as well, by making the costs of environmental polices look higher than they actually are were we to use the most efficient instruments available.

It must be recognized, however, that while trade measures are rarely, if ever, the first-best policy for addressing environmental problems, governments have found trade measures a useful mechanism for encouraging participation in and enforcement of multilateral environmental agreements in some instances, and for attempting to modify the behaviour of foreign governments in others. The use of trade measures in this way is fraught with risks for the multilateral trading system, unless trade policy is used in this manner on the basis of prior commitments and agreements among governments as to their obligations in the field of environmental policy.

Another conclusion is that environmental standards should not necessarily be harmonized across locations, whether nationally or internationally. The analysis only suggests a rationale for harmonizing standards across locations where the *same* conditions apply, taking into account that different nations may put different values on environmental amenities even if ecological conditions are identical. However, this conclusion refers only to *local* pollution problems that are arguably best addressed by standards targeted to the specificities of the local conditions. The case is different for transboundary and global problems where policy harmonization and collective management of common resources is perhaps the only feasible option.

General equilibrium linkages between trade and environment

While a great deal can be learned about the roots of environmental degradation by careful study of the problems in each sector, this approach could overlook important interlinkages between sectors and countries, so-called general equilibrium effects. We shall now summarize some results from general equilibrium models on trade and environment. Let us stress two important assumptions. Firstly, it is assumed that some sectors are inherently more polluting than others, e.g., energy-intensive primary processing as compared to services. Secondly, environmental polices are assumed to become tougher as a country grows richer, reflecting income-elastic demand for a clean environment. Given these parameters, environmental repercussions of economic integration depend on three interacting elements: a composition effect, a scale effect, and a technique effect.

The *composition effect* refers to the industrial restructuring that takes place when a country exposes itself to the world market. The repercussions on the local environment will be positive if expanding export sectors are less polluting than contracting import-competing sectors, and vice versa. Since one country's exportables are another country's importables, all countries cannot specialize in clean industries. Trade is therefore associated with a relocation of pollution problems in the world. The *scale effect* arises from the boost of economic activity stimulated by trade. Economic growth is harmful for the environment unless production becomes cleaner and less resource consuming at the same time, and consumers become more willing to recycle waste instead of merely jettisoning it. The silver lining of the scale effect is the associated income growth that drives a countervailing demand for a cleaner environment. Provided that governments respond to public demands, environmental policies will be upgraded as income grows, thereby offsetting or perhaps more than offsetting the scale effect. This effect is called the *technique effect*. The net outcome of these interacting elements is theoretically ambiguous, and is therefore ultimately an empirical question.

[1] The tonnage trawling the seas is currently two-to-three times larger than what would be needed to catch the amount of fish that the oceans can sustain without diminishing yields.

Which countries will attract the polluting end of production?

To some extent, the answer depends on which countries will attract the polluting industry when trade is liberalized. In the public debate it is often assumed that polluting industries are likely to migrate from developed to developing countries to take advantage of lax regulations, thereby shifting the pollution problems from richer to poorer countries, and also increasing overall emissions in the world. However, this assertion does not seem to be supported by standard trade theory, nor by empirical evidence.

Polluting industries tend to be capital intensive, including such industries as chemical industries, ferrous and non-ferrous metals, pulp and paper, and oil refining. According to classical trade theory based on differences in factor endowments, these industries are more likely to conglomerate in capital-abundant developed countries, and to a lesser extent, in economies in transition and newly industrialized countries. What complicates the analysis is that the pattern of trade is determined not just by "natural" comparative advantage, but also by government policies, including environmental regulations. However, pollution abatement costs in developed countries are no more than 1 per cent of production costs for the average industry, rising to perhaps 5 per cent for the worst polluters. It is questionable, although ultimately an empirical issue, if a regulatory cost-disadvantage of a few percentage points can turn comparative advantage around. If not, trade liberalization would tend to shift capital-intensive polluting industries towards developed countries in spite of tougher environmental regulations, and not the other way round.

Indeed, data seem to reject the assertion that polluting industries are migrating from developed to developing countries, although there are of course exceptions. Developed countries' share of polluting industries has remained more or less constant (at around 75-80 per cent) in recent decades, and has even increased marginally in the 1990s.

However, even if a larger share of polluting industries is located in developed countries with tougher environmental regulations, global emissions will not necessarily decline. While countries are often willing to control emissions that primarily harm themselves (and close neighbours), such as sulphur dioxide (SO_2) and nitrogen oxide (NO_X) emissions, they are not always equally ready to accept the costs of reducing carbon dioxide (CO_2) and other emissions with a global reach. In other words, we should not have any illusions that global environmental problems can be contained with less than a concerted effort to cut emissions, regardless of the location of polluting industries.

The gains from trade are sufficient to pay for additional abatement costs

What is more interesting, perhaps, is that the income gain associated with trade could *in principle* pay for the necessary abatement costs and still leave an economic surplus. This has been shown in various economic simulations. In other words, by combining trade and environmental reforms one can find ways to raise consumption without compromising the natural environment. At least in this sense, there is no inherent conflict between trade and environment. Rather, the conflict arises as a result of the failure of political institutions to address environmental problems, especially those of a global nature which require a concerted effort to solve.

Does economic integration undermine environmental policies?

Some have argued that regulatory shortcomings are related to the globalization of the world economy, which has made industries more foot-loose and therefore more difficult to regulate. This is an argument that we shall turn to now.

Let us start by noting the inherent problem of regulating and taxing mobile resources that can "vote with their feet." One the one hand, strict regulations may drive away industries, thereby reducing jobs and income. But lax regulations carry a price in terms of a polluted environment. One solution to this dilemma, which has been pursued with some success by federal states since the early 1970s, is to move regulatory power from the local level to the central level. In theory, this solves three problems but creates a new one. It prevents destructive competition for investments and jobs among local jurisdictions, which may result in excessively low standards across-the-board. It also solves the problem with pollution that spills across jurisdictional borders, and which local communities may fail to internalize in order to keep production costs competitive. Thirdly, it provides regulatory scale economies. Environmental problems are often very complex and require a lot of expertise, which local communities do not always have. But on the other hand, uniform standards carry a price in terms of reduced flexibility to target standards to local conditions. This is true at the national level, and perhaps more so at the international level, where ecological and economic conditions vary even more.[2]

Many pollution problems transcend national borders, and some are truly global in scope. Moreover, while capital was more mobile within countries in the past, and thus more susceptible to domestic variations in environmental regulations and taxes, international mobility is gradually catching up as trade and investment barriers are reduced. The concern of environmentalists is that increasing factor mobility and competitive pressures associated with greater openness will undermine the regulatory efforts of governments. In the worst case, governments may not just fail to upgrade standards to appropriate levels, but they may even feel compelled to reduce standards.

In our substantive review of this line of argument, we have divided the issue into four parts: Do stringent environmental regulations undermine the competitiveness of developed countries? Do polluting industries relocate from developed to developing countries to take advantage of lax environmental standards? Are environmental standards being bid down in accordance with the "race-to-the-bottom" hypothesis? Or, if not, has the globaliza-

2 It should be borne in mind, of course, that centralized regulatory authorities may be able to tailor regulations to a degree to local conditions in different parts of the jurisdictions over which they preside.

tion of the world economy been followed by increased political reluctance to address environmental problems, as suggested by the "regulatory chill" hypothesis?

The competitive effects of environmental regulations are minor

As far as the consequences of competition under regulatory diversity are concerned, we conclude that these have been somewhat overstated in the public debate. As noted above, the direct cost of pollution control is minor, just a few percentage points of production costs for most industries. No corresponding estimates are available for developing countries, but unless the regulatory cost is zero, the cost savings of moving offshore are less than suggested above. Moreover, some observers have noted that these numbers are in any event exaggerated. The "Porter hypothesis" holds that regulatory pressure, just like competitive pressure, encourages industrial innovations that make production both leaner (less energy and resource demanding) and cleaner at the same time, thereby offsetting the direct compliance costs. The empirical evidence partly supports this hypothesis, although it would be wrong to conclude that environmental regulations do not cost anything. They *do* cost, but they also bring significant benefit to society and the quality of life. How much they cost depends also on the kind of instruments used to regulate an industry. Command-and-control regulations are considerably more costly than modern market-based instruments that allow producers greater flexibility in meeting the targets, for example, through clean reengineering of the production process as an alternative to retrofitting end-of-pipe abatement equipment.

What is more, while the public debate has focused on the cost side, studies that have compared the profitability of firms in the same industry have not found much evidence that environmental leaders pay a price in terms of reduced profitability.[3] For several reasons, environmental leaders can often recoup costs in the marketplace. Firstly, a growing number of consumers are willing to pay a premium for "green labels." Secondly, firms that accord with the environmental management standards promulgated by the International Organization for Standardization (ISO 14000) seem to enjoy certain competitive advantages, including lower liability insurance, less regulatory oversight, and increased access to customers (including the public sector) that care about their own environmental reputation.

Nor is there much evidence that polluting industries are migrating from developed to developing countries to reduce environmental compliance costs, although there are of course exceptions. While it is certainly true that developing countries are net recipients of foreign direct investment, the composition of investments they receive is *not* biased towards polluting industries, but rather to labour-intensive industries that are less polluting on average. What the data tell us is that, to the extent developed countries are exporting their dirty industries, they are exporting them to each other, not to less developed economies. This suggests that environmental regulations are at most of secondary importance for international investment decisions.

It should also be noted that many multinational firms are moving towards a policy of standardized technologies for all their production plants in the world. The reason is simple. It is less costly to duplicate the home technology than to modify the process in each country. What is more, the choice of technology is not just based on current standards, but on what is expected in the future. It makes commercial sense to install state-of-the-art technology at the time an investment is made rather than retrofitting abatement equipment at a later stage at a much greater expense. Finally, multinationals are becoming more sensitive to the reputation they earn in the market place, at least those multinational firms that are based in countries with an active environmental community. Market forces often reward good environmental performance rather than cost savings at any price, including financial markets that react negatively to environmental mishaps. It has not always been this way, but the tide has changed in recent years. Much of this advance is thanks to the relentless efforts of non-governmental organizations around the world that have made consumers sensitive to the environmental profile of products and producers. In short, when consumers care, producers care.

Yet, environmental measures are sometimes defeated because of competitiveness concerns

This is not to say that market forces can be entrusted to solve all problems themselves. Governments must do their part by regulating polluting and resource degrading activities appropriately. And here we seem to have a difficult political dilemma. If policy makers and voters *think* that domestic industry is crumbling under environmental regulations at the expense of domestic investments and jobs, it may be difficult to forge the necessary political support for new regulatory initiatives. And this problem may become worse still when trade and investment barriers are removed, since industries then become more mobile and more difficult to regulate.

Indeed, some evidence suggests that industries often appeal to competitiveness concerns when lobbing against environmental regulations, and on occasion with some success. How serious is this problem? It would clearly be a serious problem if competitiveness concerns prevented environmental standards from being raised to appropriate levels, or if governments were compelled to build in protectionist elements in environmental regulations to "compensate" industry for alleged adverse competitive effects. However, competitiveness concerns could potentially be a positive force if governments that find it difficult to act individually for political reasons seek cooperative solutions to environmental problems. The growing number of multilateral environmental agreements (currently some 216) may be one indication of the trend in that direction. The lasting effect of the "regulatory chill" may then be more procedural than substantial. That is, initiative may have to shift from the national to the supranational level, just as we saw a shift from the local to the central level in federal states in the 1970s to overcome environmental policy foot-dragging at the local level. Admittedly, however, international cooperation in these matters is not easy to achieve unless governments are convinced of its urgency.

3 Environmental leaders are entities that embrace higher environmental standards than the average of the industry they represent.

Is economic growth part of the problem or part of the solution?

Turning now to the issue of economic growth, numerous reports in the last decades have questioned the sustainability of economic growth. The most influential report was perhaps the *Limits to Growth*, authored by the Club of Rome, forecasting that key natural resources-in particular non-renewable resources such as fossil fuels-would become increasingly scarce over time and eventually exhausted if economic growth, as we know it, were to continue. The same report also warned that the earth's environmental carrying capacities would become overburdened by different pollutants, and possibly collapse, unless human activities were held at bay. In short, economic growth and environmental quality were viewed as being on a collision course where one would eventually have to surrender.

Three decades later, some of the earlier warnings-in particular those related to fossil fuel exhaustion-have been found to be somewhat premature. The discovery of new deposits of fossil fuel in combination with less energy demanding technologies have kept pace with demand, and the current issue is rather whether we can afford to burn these plentiful reserves because of the potential consequences on the global climate. On the positive side, relatively simple abatement technologies, such as catalytic converters on cars and scrubbers on smokestacks, have proven effective in bringing down air pollution in countries were such equipment has become mandatory.

Yet the early warning signals were not misguided or unhelpful even if they may have turned out to be exaggerated. They served as a catalyst for governments to pass environmental legislation without which the gloomy scenarios may have proven more accurate. Moreover, the adoption of adequate environmental standards is still lagging behind in many places, and it is still true that economic growth without the necessary sensitivity to environmental quality is not sustainable over the longer run. One reason why environmental protection is lagging in many countries is low incomes. Countries that live on the margin may simply not be able to afford to set aside resources for pollution abatement, nor may they think that they should sacrifice their growth prospects to help solve global pollution problems that in large part have been caused by the consuming lifestyle of richer countries.

In any event, if poverty is at the core of the problem, economic growth will be part of the solution, to the extent that it allows countries to shift gear from more immediate concerns to long run sustainability issues. Indeed, at least *some* empirical evidence (see further below) suggests that pollution increases at the early stages of development but decreases after a certain income level has been reached, an observation that has become known in academic circles as the environmental Kuznets curve (EKC).[4]

How does trade enter the growth and environment debate?

Trade enters into this debate for several reasons. The most direct reason is that trade is one cylinder that propels the engine of growth. Another reason is that trade may affect the shape and relevance of the EKC. It is at least conceivable that the turning point enjoyed by developed countries as far as certain pollutants are concerned is partly due to migration of polluting industries to developing countries, although the evidence does not seem to support this position. In any event, if this *were* part of the explanation, it would become more difficult for the next generation of countries (higher income developing countries) to pass the peak of the EKC, and more difficult still for the least developed countries that may become stuck with the most polluting end of production. In short, the hypothesized inverted U-shaped pollution path[5] may not hold for lagging countries, nor for the world as a whole as far as global pollutants are concerned. A third reason why trade comes into the picture is the political economy of environmental policy making. Competitive pressure may prevent environmental standards from being upgraded to turn around the pollution path. Growth driven by liberalization of the world economy may then defeat the mechanisms that in principle could generate an environmental Kuznets curve. Indeed, there is some evidence of a "regulatory chill" which may call for increased policy coordination among governments.

Economic growth may be part of the solution, but primarily for local pollution problems

The empirical evidence in support of the EKC hypothesis is mixed. The evidence suggests that the EKC hypothesis may be valid for some types of environmental indicators, but equally untrue for other important indicators. Those indicators that appear to demonstrate some characteristics of an inverted U-shape pollution path are certain types of local, primarily urban air pollution, and to a lesser extent some types of freshwater pollutants. In contrast, pollutants of a more global nature do not seem to accord with the EKC hypothesis, notably emissions of carbon dioxide. In essence, countries seem more prone to act on pollutants that affect their own backyard than pollutants that degrade the global environment, although there are also some encouraging developments for the latter, such as the reductions in ozone-depleting substances rendered possible by international cooperation under the Montreal Protocol.

Economic growth is not sufficient for turning environmental degradation around

It should also be emphasized that nothing in the EKC literature suggests that environmental degradation will turn around with increasing income by compelling necessity. If economic incentives facing producers and consumers do not change with higher incomes, pollution will continue to grow unabated with the growing scale of

4 The hypothesis is named after Simon Kuznets, who received the Nobel Prize for economics in 1971 for his work on the relationship between the level and inequality of incomes, which tend to follow an inverted U-shaped relationship. That is, income inequality tends to become worse as a country grows out of poverty, stabilizing at a middle-income level, and then gradually becoming more equal.

5 If pollution rises as a country grow out of poverty, to stabilize at some middle income level, and then fall as the society becomes affluent, the EKC will have and inverted U-shape.

economic activity. In other words, income growth, while perhaps a necessary condition for allowing countries to shift gear from more immediate economic and social concerns to more long term sustainability issues, is not sufficient to reverse environmental degradation. Environmental polices must be brought to bear.

The importance of a democratic political process cannot be underestimated in this regard. Governments that are not held accountable for their actions, or rather inaction in this case, may fail to deliver the necessary upgrading of environmental polices. A recent study by Torras and Boyce (1998) makes this case convincingly. Comparing countries at the same income level, pollution tends to be worse in countries with skewed income distribution, a high degree of illiteracy, and few political and civil liberties. Moreover, these "political access" variables considerably weaken the relationship between per capita income and environmental quality. This suggests that the EKC relationship is not so much dependent on income levels *per se*, but rather on institutional and democratic reforms that tend to go hand in hand with increased income, and which are necessary for allowing ordinary citizens to articulate their preferences for environmental quality and influence the political decision-making process.

Of course, this insight is not just limited to the domestic context. Let us recall that one of the disturbing conclusions of the empirical literature is that the turning points of global environmental problems, such as global warming driven by CO_2 emissions and other greenhouse gases, are estimated at considerably higher incomes than more localized problems. One interpretation of this is that people do not care much about global warming and climate change. They would rather accept the consequences (on behalf of their children and their children's children) than the costs of curbing emissions. Another possible reason for political foot-dragging is that governments seek to free ride in the context of weak political institutions at the international level, including weak enforcement mechanisms. Indeed, one reason why the WTO has become the focal point for environmental disputes is that the WTO has an integrated adjudication mechanism backed by trade sanctions as the ultimate enforcement tool.

Environmental degradation will turn around when political conditions are ripe

The political obstacles to sound environmental policy should not be exaggerated. The turning points that have been estimated for different kinds of pollutants have a tendency to fall within the income range of leading countries at the time the specific problems became an issue of intense public debate. For example, there may be nothing special about a turning point for CFC emissions at some $12,000 to $18,000—it just happened to be the income range of the leading countries (which have also assumed the fastest phase-out commitments) at the time the Montreal Protocol was signed in 1987. And although we find estimates of a turning point of CO_2 emissions of up to several hundred thousand dollars in per capita income, reflecting the almost linear historical relationship between consumption of energy and income, the fact that global warming has now risen to the forefront of public attention may result in a curbing of emissions at an earlier date. This will require, however, that countries go from words to actions and honour their commitments under the Kyoto Agreement. In the end, the environmental Kuznets curve may not have a "natural" turning point—it will turn whenever political conditions are ripe for delivering the necessary policies to address environmental degradation effectively, including through transfers of resources and technologies to allow developing countries to modernize their production.

It should also be kept in mind that not all kinds of growth are equally benign for the environment. Economic growth requiring ever more inputs of natural resources is obviously not as benign for the environment as economic growth driven by technological progress that saves inputs and reduces emissions per unit of output. This kind of growth will not necessarily emerge spontaneously, but may require economic incentives that steer development in a sustainable direction.

Trade could play a positive role

Trade could play a positive role in this process by facilitating the diffusion of environment-friendly technologies around the world. Of course, this would require that countries be ready to scrap trade barriers on modern technologies and suppliers of environmental services. A new round of trade liberalization negotiations could make a contribution here. Another potential contribution of such a round would be to address subsidies that harm the environment, including energy, agricultural and fishing subsides. This would yield a double dividend by benefiting the environment and the world economy at the same time.

The way forward is multilateral environmental cooperation

Let us end with an observation quoted by Long (1995), which summarizes the core of the trade and environment debate. During an OECD meeting of Environment Ministers, one Minister noted that "his country, along with most others, had committed itself at the 1992 Earth Summit in Rio to the pursuit of sustainable development. However, whenever he tries to promote the behavioural and technological changes necessary to move in that direction, i.e., when he attempts to internalize the costs of environmental pollution and resource degradation, he is branded a 'green protectionist' outside his country, and a destroyer of national competitiveness at home."

In short, trade is really not the issue, nor is economic growth. The issue is how to reinvent environmental polices in an ever more integrated world economy so as to ensure that we live within ecological limits. The way forward, it would seem to us, is to strengthen the mechanisms and institutions for multilateral environmental cooperation, just like countries 50 years ago decided that it was to their benefit to cooperate on trade matters.

I. Introduction

When the international trading system was reconstructed after the Second World War, the environmental consequences of economic integration was not a primary concern. Only indirect references to the environment were included in the exception clause of GATT 1947, Article XX, which allows countries to sidestep the normal trading rules if necessary to protect human, animal or plant life or health, or to conserve exhaustible natural resources, provided that such measures do not discriminate between sources of imports or constitute a disguised restriction on international trade. In the first decades of the GATT, no references was made to the environment, neither in the general proceedings of the contracting parties, nor in any trade disputes. The issue was put on the agenda first in the early 1970s in the preparation for the UN Conference on the Human Environment, held in Stockholm in 1972. Besides mandating the GATT Secretariat to prepare, under its own responsibility, an analytical contribution to the conference,[6] the GATT Council established a Group on Environmental Measures and International Trade with a mandate "to examine *upon request* [italics added] any specific matters relevant to the trade policy aspects of measures to control pollution and protect the human environment, especially with regard to the application of the provisions of the General Agreement, taking into account the particular problems of developing countries." However, no request was made to convene this group until the beginning of the 1990s.[7]

One reason for the low environmental profile of the GATT in the formative decades was that trade was not perceived to be an environmental issue *as such*, neither among policy makers nor the public at large. Nor did economic analysis at the time suggest that trade had a direct impact on the natural environment, bar for the pollution generated when goods were shipped around the world. What the theory said was that if governments used proper environmental polices to internalize the environmental costs of production and consumption, trade would ambiguously raise welfare.[8] The fact that environmental polices were lagging behind in many countries, and hence that the basic presumption on which the free trade case rested was not satisfied, was not seen as a reason to halt or reverse the process of trade liberalization, but rather to strengthen environmental polices and institutions, including on the international level.

The only recurring environmental issue on the GATT agenda in the 1980s concerned exports of domestically prohibited goods. This issue was put on the agenda at the request of some developing countries who were concerned about becoming a market of last resort for hazardous goods that had been banned in exporting countries on health or environmental grounds. While nothing would prevent importing countries from banning domestic sales as well, they often lacked the resources and expertise to assess the risks associated with the products that entered their markets. The solution sought was a commitment by exporting nations to restrain exports of domestically prohibited goods unless a "prior informed consent" had been secured from the appropriate authorities of the importing nation. While no such agreement was reached within the GATT, the issue has by now, at least partially, been addressed by other international conventions and fora, including the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal, and the Convention on Prior Informed Consent for Hazardous Chemicals and Pesticides in International Trade.

If environmental issues had a low priority during the first four decades of the GATT, they came back with a vengeance in the early 1990s. The starting point of the current debate was a series of contentious environmentally-related trade disputes,[9] especially the "tuna-dolphin" dispute between Mexico and the United States that provoked a public outcry that still lingers. Just to recapitulate the basic elements, the dispute was over the extra-territorial application of the US Marine Mammal Protection Act (MMPA), which requires steps to be taken to curtail the incidental killing of marine mammals by commercial fishermen, including also foreign fishermen. In 1988 the US government introduced an import ban on tuna harvested in the Eastern Tropical Pacific Ocean that did not satisfy the standards for the protection of dolphins that the US government applied to domestic fishermen. The embargo was designed to discourage the practice of encircling dolphins with purse-seine nets in order to catch schools of tuna that swim below, thereby drowning dolphins caught up in the net. While the adjudication panel accepted the conservation objective of the US policy, it found the instrument employed (the import ban) to violate core provisions of the GATT, including the National Treatment provision of Article III which prohibits discrimination of imported products on basis of process and production methods (PPMs), in this case the controversial fishing method. The panel ruled moreover that the embargo was not excused under the exceptions listed in Article XX, because the measure was not deemed "necessary" to achieve the conservation objective. The panel suggested that less trade-restrictive policy options were available and consistent with GATT provisions, including "dolphin-safe" labelling of tuna cans to allow consumers to state their preferences in the marketplace. The panel also objected to the design of the standards, being related to the average incidental taking of dolphins by US fish-

6 GATT (1971).

7 For a more detailed historical exposé, see Annex I.

8 See, e.g., Markusen (1975), Pethig (1976), Siebert (1977), and McGuire (1982).

9 United States -Prohibitions of Imports of Tuna and Tuna Products from Canada, BISD 29S/91, adopted on 22 February 1982; Canada - Measures Affecting Exports of Unprocessed Herring and Salmon, adopted on 22 March 1988, BISD 35S/98; and United States - Restrictions on Imports of Tuna, not adopted, circulated on 3 September 1991, BISD 39S/155.

ermen, rather than some absolute standards that were known in advance.

While this ruling was never adopted by the GATT Council, and hence is not legally binding on the parties, it was viewed by the environmental community as a threat to environmental policy making in general, and the use of trade measures to support environmental objectives in particular, including the legal status of trade-provisions in multilateral environmental agreements (MEAs). Furthermore, it was feared that the ruling had opened up a window for foreign countries to challenge domestic environmental polices on the ground that they interfered, if only incidentally, with their trading rights. In short, legitimate environmental concerns were seen to be sacrificed on the altar of free trade by trade bureaucrats beyond the reach of democratic control.[10] Some in the trade community, on the other hand, were concerned that if governments were able to use trade measures for "extra-territorial" environmental objectives, such actions could potentially undermine the multilateral trading system.

The growing public anti-trade sentiment that followed the tuna-dolphin ruling was a difficult setback for the GATT, which at the time was trying to conclude the largest and most complex trade negotiations ever—the Uruguay Round. The need to restore public confidence and make a constructive contribution to the upcoming UN Conference on Environment and Development (UNCED), in Rio de Janeiro in 1992, prompted a request by the EFTA countries to reconvene the dormant Group on Environmental Measures and International Trade. After some initial hesitation among developing countries, fearing that the process would degenerate into a carte blanche for new trade measures directed against themselves, the Group was revived with a mandate carefully crafted to remain within the traditional mandate and competence of GATT. Specifically, the mandate was limited to examine trade provisions contained in existing multilateral environmental agreements vis-à-vis GATT principles and provisions, multilateral transparency of national environmental regulations likely to have trade effects, and trade effects of new packaging and labelling requirements aimed at protecting the environment. Later on, the mandate was expanded to include matters raised in Agenda 21 of UNCED with respect to making trade and environmental polices mutually supportive.

After a two-year work program, the Group reported back to the 49th Session of the Contracting Parties in January 1994. The report of the Chairman[11] include four propositions that summarize the current approach to these issues: *Firstly*, "the Group has been careful to ensure that the scope of its discussions remained well within its mandate and GATT's competence, namely the trade-related aspects of environment policies which may result in significant trade effects for GATT contracting parties. The GATT is not equipped to become involved in the tasks of reviewing national environmental priorities, setting environmental standards or developing global policies on the environment." (para. 9). *Secondly,* "the work ... has strengthened further the conviction that there need not be, nor should be, any policy contradiction between upholding the values of the multilateral trading system on the one hand and acting individually or collectively for the protection of the environment and the acceleration of sustainable development on the other. If problems of policy coordination do occur, it is important to ensure that they are resolved in a way that does not undermine internationally agreed trade rules and disciplines." (para. 10). *Thirdly*, "it is clearly important to ensure that the multilateral trade rules do not present an unjustified obstacle to environmental policy-making. An important point is the considerable extent to which the GATT rules already accommodate trade measures used in conjunction with environmental policies to protect national environmental resources." (para 11.). *Fourthly,* "an open, secure and non-discriminatory trading system underwritten by the GATT rules and disciplines can facilitate environmental policy-making and environmental conservation and protection by helping to encourage more efficient resource allocation and to generate real income growth." (para. 11). The report of the chairman formed the backbone of the Decision on Trade and Environment, which was added to the Uruguay Round Agreement at the concluding Ministerial meeting in Marrakesh, April 1994.

With the formation of the WTO in 1995, environmental issues, as they relate to trade, are now firmly anchored in the multilateral trading system. The objectives of the WTO, as spelled out in the preamble of the Marrakesh Agreement Establishing the World Trade Organization, now explicitly embrace the internationally recognized principle of *sustainable development*, defined by the World Commission on Environment and Development (1987)—the Brundtland Commission—as "development that meets the needs of the present without compromising the ability of future generations to meet their own needs." Moreover, the institutional machinery for investigating the trade and environment interface, and making positive suggestions towards the objective of sustainable development, is now in place and embodied with the Committee on Trade and Environment (CTE). An overview of the ongoing deliberations of the CTE, including a comprehensive reference list of the working documents covered so far, is provided in the annexes.

The objective of this study is to move behind the legal issues to the underlying economic and political economy dimensions of the debate, especially as regard the changing realities of environmental policy making in an ever more integrated world economy. The questions that we shall try to shed some light on include: Is economic integration a threat to the environment? Does trade undermine the regulatory efforts of governments to control pollution and resource degradation? Will economic growth driven by trade help us to move towards a sustainable use of the world's environmental resources?

We shall argue that economic integration indeed has important environmental repercussions, and not all of them favorable. The most important impact, perhaps, is that economic integration has, or at least is *perceived* to have diminished the regulatory power of individual nations. Of course, countries would be interdependent in an ecological sense even if they did *not* trade. Ecological sys-

10 For a detailed account of the public sentiment and debate at the time, see Esty (1994).

11 GATT (1994), reproduced in Annex II.

tems do not begin and end at the border, nor does pollution travelling with wind and water. The point is, rather, that the commercial linkages reinforce the need to cooperate on environmental matters, especially on transboundary and global pollution problems that are beyond the control of any individual nation. This is a key message of the report.

The study is organized as follows. Section II starts out with a discussion of the underlying sources of environmental degradation which are often linked to various market and policy failures, and which in turn may be exacerbated or mitigated by international trade. This argument is elaborated in five case studies on (A) chemical-intensive agriculture, (B) deforestation, (C) global warming, (D) acid rain, and (E) overfishing. For each case, we shall set out the economic incentives that drive environmental degradation, discuss the efficiency of various policy options, and analyze the interaction between the underlying distortions and the trade policy regime. Each case study can be seen as a prototype for a broader range of environmental problems of a similar nature. For example, the agricultural study is representative of a wide range of environmental problems whose effects are mainly local. Likewise, the acid rain study would apply also to other pollution problems that transcend national borders, but whose effects are limited to the immediate region. The deforestation study highlights the problem of missing markets and linkages to other environmental problems, such as global warming. In turn, the global warming study illustrates the generic problem of fostering environmental cooperation in a world with national policy sovereignty. Finally, the overfishing case study provides an illustration of the "tragedy of the commons". Taken together, we hope that these case studies will provide a representative introduction to economic analyzes of environmental degradation, and the linkages to international trade.

Section III surveys recent general equilibrium models of trade and environment which explicitly links sectors and countries together in a comprehensive model. It is shown that trade liberalization is likely to have a different environmental impact across countries depending on the pollution propensity of expanding versus contracting sectors. It is also shown that the income gains from trade could, in principle, pay for additional abatement costs in order to undo any negative repercussions on the environment and still leave a net economic surplus. In other words, by combining trade and environmental reforms one should be able to find a way to raise incomes without compromising the natural environment. In this sense, at least, there is no inherent conflict between trade and the environment. Rather, the conflict, to the extent it exists, arises as a result of a failure of political institutions to address environmental problems, especially those of a transboundary or global nature that require a concerted effort to solve.

Of course, political shortcomings may in turn be related to the globalization of the world economy, which has made capital more mobile and hence more difficult to regulate for individual countries. This line of argument is investigated in Section IV, which is divided into four parts: Do stringent environmental regulations undermine the competitiveness of developed countries? Do polluting industries relocate from developed to developing countries to take advantage of lax environmental standards? Are environmental standards being bid down in accordance with the race-to-the-bottom hypothesis? Or, if not, has the globalization of the world economy been followed by an increased reluctance to address environmental problems as suggested by the regulatory chill hypothesis? We conclude that, while competitiveness concerns seem to have been somewhat overstated in the debate, and while data do not seem to support the hypothesis that investments are fleeing developed countries for developing countries with more lax standards, environmental initiatives are nevertheless defeated occasionally because of competitiveness concerns. This finding suggests that at least the *perceived* regulatory autonomy has diminished with the increased factor mobility, which in turn underscores the need to seek cooperative solutions to common environmental problems in the world.

Section V discusses the relationship between trade, economic growth and the environment, and the Environmental Kuznets Curve (EKC) hypothesis. The EKC hypothesis holds that environmental degradation tends to follow an inverted U-shaped curve, with increasing degradation as a country grows out of poverty, a stabilization at some medium-income level, and thereafter a gradual improvement as a society become more affluent and priorities shift towards more quality-of-life aspects, including a clean and safe environment. A review of the empirical evidence suggests that the EKC hypothesis may be valid for some types of environmental indicators, primarily those of a local nature, while the relationship is weaker or nonexistent for global pollutants. We also conclude that income growth, while perhaps a necessary conditions for changing the focus from more immediate economic and social concerns to more long term sustainability issues, is not sufficient to reverse environmental degradation. Rising incomes have to be translated into real policy actions to curb the emissions that otherwise would grow unabated alongside the growing scale of economic activity. Finally, we also argue that the EKC relationship is not so much dependent on income levels per se, but rather on institutional and democratic reforms that tend to go hand in hand with increased income, and which are necessary to allow people to articulate their preferences for environmental quality and influence the political decision making process. This insight applies also to international institutions whose decisions directly or indirectly affect the global environment.

The study is concluded in Section VI.

II. Causes of Environmental Degradation and the Interaction with Trade

Environmental degradation, whether air pollution, deforestation, overfishing, global warming, or depletion of the ozone layer, is often the result of many small actions that are individually innocuous but harmful in aggregate. Ecological systems can normally withstand a degree of exploitation and pollution. For example, forests and land can withstand a degree of acid rainfall before the chemical and biological balance of the soil becomes impaired. Likewise, it is only when the emissions of carbon dioxide (CO_2) outstrip the capacity of the earth's biomass to absorb them that greenhouses gases start to build up in the atmosphere, a point that has long since passed.[12] Likewise, fish stocks can sustain some taxing of their natural growth before they decline or, if severely over-taxed, collapse. These ecological limits are not always known with certainty, nor are the effects of exceeding them. Caution is therefore called for to ensure some safety margins against possibly irreversible damage—the "precautionary principle".

At the same time, as the world's population grows in number and demands, it may become harder to respect the biological limits, let alone leave any safety margins. At the beginning of this century, the population stood at 1.6 billion. Today it is roughly 6 billion and projected to grow towards 10 billion before it peaks. Some 95 per cent of net births will be in developing countries, which have the least resources to pay for new and cleaner production technologies and pollution abatement equipment. In addition, average per capita consumption is increasing by roughly 2 per cent a year. At the current growth trend, per capita GDP will double by 2035 and quadruple by 2070. Given these considerations, it is not difficult to appreciate the concerns of the environmental community that the current trend is not sustainable.

Other observers put their faith in technological developments that would allow for continued economic growth at the same time as reducing pollution and the input of virgin resources through the use of more efficient pollution-abatement equipment, less resource-demanding production, and recycling rather than disposal. However, this more optimistic outlook will not be realized unless incentives are set accordingly. Economic incentives that influence the behaviour of producers and consumers must be aligned with the objectives of sustainable development, defined by the World Commission on Environment and Development (1987), also known as the Brundtland Commission, as "development that meets the needs of the present without compromising the ability of future generations to meet their own needs". This principle enjoys widespread international recognition, and is explicitly embraced by the Marrakesh Agreement Establishing the World Trade Organization.[13] There is still some divergence among nations, however, as to what sustainable development requires in terms of practical policies, including whether any modifications to the multilateral trading system are needed, and, if so, what form those modifications should take.[14]

To appreciate *why* and *where* trade enters into the sustainable development debate, it is important to understand the root causes of environmental degradation. These can often be traced back to various market failures or, equally bad, to policy failures.

"Market failures" refer to situations in which the normal market forces of supply and demand fail to deliver an optimal outcome for society as a whole. Market failures commonly occur when producers and consumers do not take into account the full cost of their actions, such as pollution inflicted on third parties (environmental externalities). In such cases, too much resources are invested in polluting activities and too few in pollution abatement. Undefined or ill-defined property rights over natural resources are another cause. If anyone, without restriction, can harvest the riches of the seas, extract the resources of forests, graze animals or collect firewood on common land, or tap water freely from municipal wells, the result is often overexploitation, a phenomenon known as the "tragedy of the commons".

In some cases, the people that depend on a given resource may be able to work out between themselves a conservation-cum-distribution scheme, which may include quotas and sanctions for overuse. However, age-old common property systems sometimes crumble under the pressure of rapid population growth, social changes, and increased mobility.[15] Equally, polluters and victims of pollution may be able to reach a mutually satisfactory solution in cases where the source of pollution is indisputable and the cost of organizing a collective action among victims is low. However, if the sources of pollution are diffuse and difficult to identify or the victims many and difficult to organize, a "market solution" may be hard to find. Ultimately, therefore, it is up to governments to define and

12 The increasing use of fossil fuels since the Industrial Revolution, in combination with deforestation, has raised the CO_2 concentration in the atmosphere by one third since 1800.

13 The preamble to the Marrakesh Agreement Establishing the World Trade Organization begins with the following words: "The Parties to this Agreement, Recognizing that their relations in the fields of trade and economic endeavours should be conducted with a view to raising standards of living, ensuring full employment and a large and steadily growing volume of real income and effective demand, and expanding production of and trade in goods and services, while allowing for the optimal use of the world's resources in accordance with the objectives of *sustainable development* [italics added], seeking both to protect and preserve the environment and enhance the means for doing so in a manner consistent with their respective needs and concerns at different levels of economic development."

14 Within the WTO, responsibility for identifying the relationship between trade and environmental measures, with a view to promoting sustainable development and, if necessary, making appropriate recommendations for modifications to the provisions of the multilateral trading system, rests with the Committee on Trade and Environment (CTE).

15 See, e.g., Chichilnisky (1994) and Mäler (1997).

enforce an appropriate balance between environment and economic interests.[16]

In many cases, however, governments not only fail to correct market failures by appropriate taxes and regulations, but they may add some distortions of their own. Well-known examples are the subsidization of energy, agriculture, and fishing, which aggravates environmental problems rather than solves them. Such instances can be described as "policy failures".

International trade may interact with these underlying market and policy distortions, either mitigating or exacerbating the environmental problems. In order to illustrate such indirect linkages between trade and environment, we shall begin with five sectoral case studies on (A) chemical-intensive agriculture, (B) deforestation, (C) global warming, (D) acid rain, and (E) overfishing. For each case, we shall set out the economic incentives that drive environmental degradation, discuss the efficiency of various policy options, and analyze the interaction between the underlying distortions and international trade.

Each case study can be seen as a prototype for a range of environmental problems of a similar nature. For example, the agricultural study is representative of a range of environmental problems whose effects are mainly local. Likewise, the acid rain study would apply also to other pollution problems that transcend national borders, but whose effects are limited to the immediate region. The deforestation study highlights the problem of missing markets and linkages to other environmental problems, such as global warming. In turn, the global warming study illustrates the generic problem of fostering environmental cooperation in a world with national policy sovereignty. Finally, the overfishing case study provides an illustration of the "tragedy of the commons".

A. Chemical-intensive agriculture

Agriculture is one area where environmental problems abound and threaten to become worse. The underlying problem is the pressure to extract more output for each passing year to feed the world's growing population. The increasing demand results partly in pressure to convert marginal land (hillsides, wetlands, and forests) into farmland, and partly in squeezing out higher yields per hectare through intensive irrigation and use of agro-chemicals (chemical fertilizers, pesticides, fungicides, and weed-killers). To some extent, the extensification and intensification of farming is unavoidable if the growing population is to be fed. Nonetheless, the environmental consequences of producing additional food hinge on the economic incentives available to farmers. Today, these incentives are more often than not distorted by a wide range of taxes, subsidies, and trade barriers, which not only contribute to food shortages in some countries and conspicuous surpluses in others ("wine lakes" and "butter mountains"), but may also accelerate environmental degradation. We will discuss here the chemical intensification of agriculture and return to the extensification dimension in the case study on deforestation.

Take the example of a farmer who is considering what quantity of agro-chemicals to use on his fields in order to maximize his profit. Assume that the return in terms of increased yields is high for the first units of inputs but declines gradually the more that is used (kilo of inputs per hectare of land). The optimal usage is given by the point where the marginal benefit just covers the marginal cost (i.e., the price of agro-chemicals). The farmer's decision would also be optimal for society at large if *all* costs were accounted for, including any environmental impact outside the farmer's own domain. However, it is almost inevitable that some agro-chemicals will drift away with the wind or be drained out of the soil over time. Such leakage may damage the ground water and biodiversity in the surrounding area. In addition, chemical residues in the food could, at least potentially, damage human health.[17] In other words, social costs are likely to exceed private costs, which in turn means that the use of agro-chemicals will most likely be excessive from society's point of view. The case is depicted in Figure 1, in which the difference between the social and private marginal costs is the pecuniary value of the environmental losses associated with each level of chemical intensity.

Overuse of agro-chemicals could be limited by appropriate policy interventions. A general principle of economics says that policy measures should be targeted as closely as possible to the problem at hand.[18] Applied to this context, the most efficient course of action would be to tax the *specific* inputs in order to persuade farmers to cut back on the inputs and to change to more environmentally friendly production methods. For example, a tax on fertilizers may induce farmers to rotate crops over seasons and fields, an old "technology" that does not exhaust the soil to the same extent as the monoculture of today (made possible by large inputs of agro-chemicals). The optimal tax would ensure that the private cost of agro-chemicals is equal to the social cost.

Another conceivable policy would be to tax either the consumption or the production of food. Both kinds of taxes would result in lower demand for all kinds of inputs, including agro-chemicals.[19] Unfortunately, such policies have unwanted side-effects. The problem is not production or consumption per se, nor the use of inputs in general, but the use of specific inputs that in large doses harm the environment.

Trade policies provide another indirect means of controlling pollution. For example, import duties on agro-chemicals would raise the domestic price of the products.

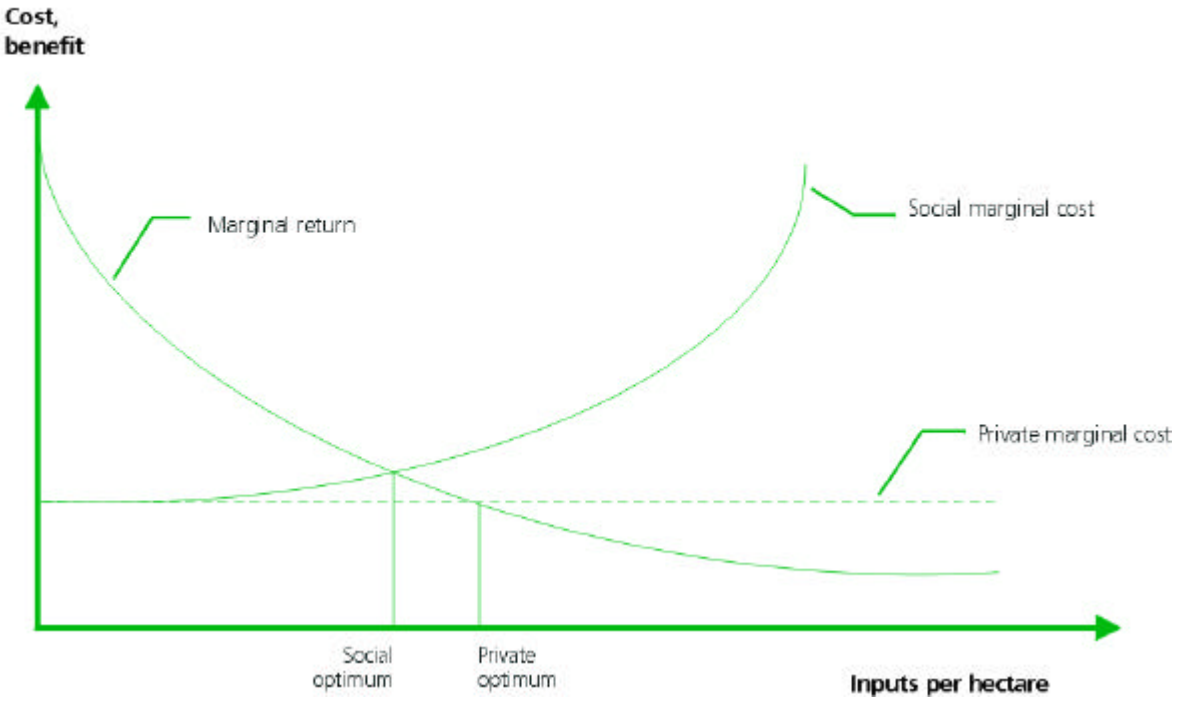
16 Some would argue that government interventions are not needed, referring to the "Coase theorem." In simplified terms, the "Coase theorem", due to Coase (1960), holds that no government interference is necessary to solve externality conflicts as long as organization and negotiation costs are low and property rights are in place. Moreover, the distribution of property rights (e.g., does the polluter have the right to pollute or the victims the right to an unpolluted environment) is immaterial to the outcome of negotiations.

17 Chemical residues in food are not strictly speaking an environmental externality as long as consumers are aware of their existence, are able to evaluate their potential health effects, and have alternatives to choose from. In reality, at least the second assumption is unlikely to be satisfied. If all these happy assumptions were to be true, however, the government could leave it to the consumers to trade-off acceptable health risks against higher-priced alternatives.

18 See, e.g., Fullerton, Hong and Metcalf (1999).

19 In Figure 1, a production tax would shift the marginal return schedule inward, thereby reducing the use of agro-chemicals.

Figure 1: Divergence between social and private costs and environmental degradation



Just how far prices would rise is difficult to predict, as are the environmental benefits, since it will depend on the substitutability of domestic and foreign brands and on the supply response of the domestic agro-chemical industry. An easier and more direct solution would be to impose domestic taxes instead, especially if the problem is not *foreign* agro-chemicals, but agro-chemicals in general. And if the environment impact of various types of agro-chemicals differ, the first-best option is to differentiate the tax rates accordingly.

Other forms of trade intervention may make things worse. For example, increased tariffs on agricultural products would lead to higher producer prices for domestic farmers, which in turn would result in greater demand for agro-chemical inputs, thereby aggravating the environmental problems. The same can be said for agricultural subsidies, except for those that are given to alternative "green" inputs or less harmful technologies.

As a general rule, trade measures that encourage polluting activities or the use of polluting inputs tend to exacerbate the effects of weak environmental policies. Conversely, trade measures that discourage polluting activities or the use of polluting inputs mitigate the effects of weak environmental policies.[20] While recognizing that well-crafted trade policies could in principle be used as a second-best instrument to address environmental problems, it begs the question why trade policies should do the job that targeted environmental policies would do better and cheaper, in this case a straightforward tax on agro-chemicals. When trade barriers are motivated on environmental grounds, there is a legitimate reason to ask why governments resort to inefficient instruments instead of first-best policies, especially in sectors like agriculture where protectionism is endemic.

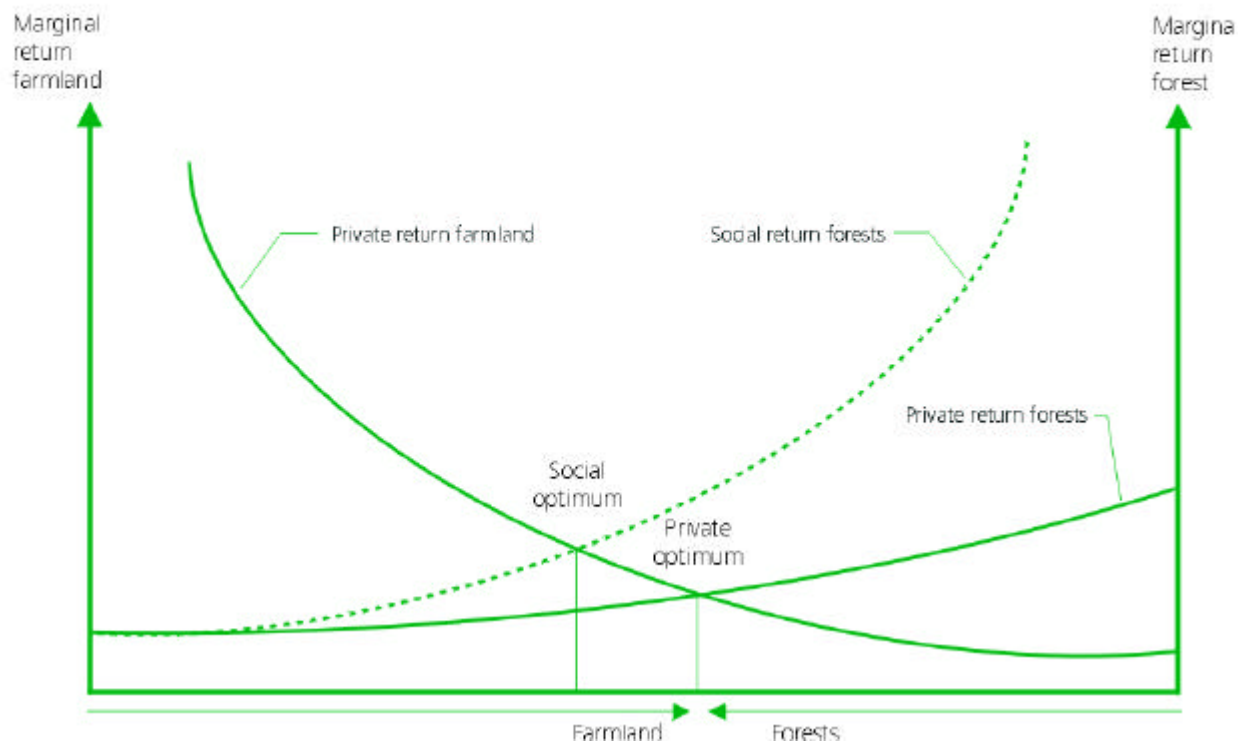
Of course, even if we can identify the first-best policies, such measures may be difficult to fine-tune. The first hurdle is to assess the pecuniary value of environmental losses associated with different levels of pollution, in this case the runoffs from the fields. This involves estimating the carrying capacity and environmental "value" at stake.[21] Any fine-tuning would require different standards to be set for different regions according to variations in ecological conditions, such as climate, soil composition, vegetation, past pollution, and other factors that affect the carrying capacity of the region. Moreover, even if the ecological conditions were identical, local variations in standards may be desirable to accommodate regional differences in income and ability to pay for environmental quality. The opportunity cost of environmental polices in terms of forgone income may differ considerably among poorer and richer communities, and neither would be served well by setting the standards at the average.

The more general point is that environmental standards should not necessarily be harmonized across locations, whether nationally or internationally. It should be stressed, however, that this insight refers only to local pol-

20 This is an application of a general proposition in economics—the theorem of the second best. See Anderson (1992).

21 For a discussion of different valuation techniques, see, e.g., Chapter 8 of Turner, Pearce and Bateman (1994) or Cropper and Oates (1992).

Figure 2: An opportunity cost analysis of deforestation



lution problems that are arguably best addressed by standards that are targeted to the specificities of the local conditions. The case is different for transboundary and global pollution problems where explicit policy coordination is perhaps the only feasible policy option.[22]

B. Deforestation

Deforestation is another issue that surfaces high on the environmental agenda. The current concern is mainly deforestation of tropical forests in developing countries, as the temperate forest cover in developed countries is constant or even slightly increasing, albeit from a very low level owing to the deforestation of the past.[23] Tropical forests make up just over half of the world's forest cover (about 1.8 billion hectares in 1990), and the share is on the decline. According to the Food and Agricultural Organization (FAO), the world lost 450 million hectares of tropical forest to logging, agricultural development and human settlements between 1960 and 1990. Asia lost almost one third, while Africa and Latin America each lost about 18 per cent.[24]

The environmental problems associated with deforestation are partly local and partly global in nature. At the local level, deforestation of hillsides and high land reduces the ground's water-retention capacity, making the lower land more prone to flooding and landslides. The landslides in Central America that occurred in conjunction with the tropical storm "Mitch" are a recent tragic example. Deforestation on a smaller scale, such as removing trees between fields, increases the rate of soil erosion by taking away natural wind-breaks. At the global level, forests bind huge volumes of CO_2. Deforestation therefore contributes indirectly to global warming by reducing the earth's "carbon sinks".[25] Another global concern is the loss of biodiversity. Deforestation of tropical forests is particularly serious in this regard, since this is where most of the earth's animal and plant species find their natural habitats.

22 Recall also that the Rio Earth Summit recognised the legitimacy of differentiated environmental standards at different levels of economic development—the principle of common but differentiated responsibilities. Principle 7 of the Rio Declaration on Environment and Development (June 1992) states the following: "States shall cooperate in a spirit of global partnership to conserve, protect and restore the health and integrity of the Earth's ecosystem. In the view of the different contributions to global environmental degradation, States have *common but differentiated responsibilities*. [italics added]. The developed countries acknowledge the responsibility that they bear in the international pursuit of sustainable development in view of the pressures their societies place on the global environment and of the technologies and financial resources they command."

23 There are also some deforestation issues in developed countries, in particular the need to protect old and natural forests that have so far escaped exploitation.

24 Data drawn from the website of the World Resources Institute (www.wri.org).

25 Forests bind carbon dioxide in the process of photosynthesis.

The economic forces behind deforestation can be illustrated in a simple figure based on the economic concept of opportunity cost or forgone return (see Figure 2).[26] Specifically, the opportunity cost of converting forests into other usage, say, farmland, is the forgone return of the forest. You cannot both have your cake and eat it. Choices have to be made as to how to use the land, and the decision is presumably based on the perceived returns of the available alternatives. In Figure 2, the length of the horizontal axis is the total area of land, divided between farmland (measured from left to right) and forests (measured from right to left). Other land uses are ignored for the sake of simplicity; this is only a modest abstraction from the real world since some 90 per cent of all tropical deforestation is for agricultural purposes.[27] It seems reasonable to assume that the return to farmland declines as more land is put under the plough. One reason for the decline could be that the most suitable land for agriculture is exploited first, and thereafter land of gradually poorer quality for agriculture. Another possibility is that prices fall when the supply of food increases relative to the demand. Conversely, the marginal return of forests is assumed to increase as they become scarcer, mainly because the long-term price of forest products is bid up when the supply is logged and not replanted. For later reference, Figure 2 also makes a distinction between the private and social returns of forests, the social return being higher because of various "non-commercial" values, such as carbon sinks, biodiversity, and water-retention services.

The private optimal division of land between farmland and forests is given by the point where the private marginal returns of the two alternatives are identical. Anything that changes the relative returns will lead to a corresponding adjustment in the division of land. For example, population growth increases the demand for food and in turn the demand for farmland.[28] This underlying pressure will continue as the world's population grows, unless the yield per hectare increases even faster.[29] Direct incentives to clear forests also alter the relative private returns. For example, until the late 1980s Brazil granted tax concessions and subsidies to farmers and ranchers to clear the forests in the Amazon.[30] Likewise, in Ecuador, forest dwellers were entitled to property rights first when they cleared the land for farming and ranching.[31]

Trade policies may also enter the equation. For example, higher import duties on food or increased domestic production subsidies will intensify the pressure to convert forests to farmland. Conversely, if foreign trade barriers or production subsidies are reduced, domestic farmers will expand production for export, which in turn will create a greater demand for farmland.

Conversely, should the marginal return of farming fall, one can expect some land to be reforested. Indeed, falling producer prices in OECD countries (owing to reduced farm subsidies) have led to some "retiring" of farmland, which will eventually be covered by forest unless the land is occasionally cleared. At the same time, the slow rate of reforestation suggests that it doesn't really pay to reconvert farmland into forests, at least not currently.[32] Indeed, OECD farmers sometimes receive direct subsidies for keeping the landscape open. Moreover, it may be costly to reconvert farmland into quality forests that give any reasonable return in the long run. In contrast, with modern forest-clearing techniques or by setting the forests on fire (slash-and-burn farming), it may be a matter of weeks to clear the land for agriculture. The point is that the conversion of forests, especially tropical forests, is to some extent irreversible, both from a biological and commercial point of view.[33]

This brings us naturally to a discussion of the global market failures that contribute to deforestation. As mentioned earlier, forests provide some key services for which there are currently no national or international markets. One such non-marketable service is the preservation of biodiversity by protecting the habitats of flora and fauna. Another is the carbon-binding service provided by the great forest nations to deficit nations (those emitting more CO_2 than they bind).

If we focus on the second non-marketable service, deforestation contributes indirectly to global warming by reducing the available biomass that binds CO_2.[34] The emphasis is on *indirectly*, since the CO_2 concentration in the atmosphere arises from the burning of fossil fuels. It would therefore be wrong to characterize the problem of deforestation in the context of global warming as a negative externality imposed on the world by countries that convert forests to other usage. Rather, the negative externality is CO_2 emissions, not the failure of others to provide free carbon-binding services by retaining their forests instead of converting the land into more profitable employment, such as farmland.

Let us, for the sake of argument, play with the idea that a market for "carbon-binding services" was created, perhaps as part of a future climate change convention. Assume that an annual quota of CO_2 emissions in the

26 This analysis draws on Swanson and Cervigni (1996).

27 This figure was reported in Chichilnisky (1994).

28 In Figure 2, population growth shifts the private marginal return schedule *rightward* for each year that goes by, resulting in a gradual conversion of forests into farmland.

29 Angelsen, Shitindi and Aarrestad (1999) found that the most important factor in deforestation in Tanzania was population growth and producer price increases. Southgate (1991) also establishes a positive link between the expansion of arable land and population growth, using data from 24 Latin American countries.

30 See Pearce and Warford (1993), p. 122.

31 See Southgate, Sierra and Brown (1989), cited in Pearce and Warford (1993).

32 The reforestation rate in high-income countries is 0.1 to 0.2 per cent per year, compared with a deforestation rate of 0.4 to 0.6 per cent in low- and middle-income countries. Source: World Bank (1998), Table 3.1.

33 The irreversibility could be represented in Figure 2 by a sudden drop in the marginal return curve of forests to the left of the current split between farmland and forest. Very strong incentives are then needed to reconvert farmland into forests.

34 Besides forests and plants, plankton in the oceans binds substantial quantities of CO_2.

world was set equal to the amount the earth's biomass can absorb, and that emissions rights were allocated in proportion to each country's share of the earth's biomass, or rather growth in biomass. Assume further that emissions rights were tradable internationally in order to avoid relocation of factories and people from countries with a deficit in forests to countries with a surplus. Obviously, this scheme would provide owners of forests, including public forests, with a strong commercial interest in retaining the forest cover. The result would not only be a halt to deforestation (and global warming by design), but also a process of reforestation that would eventually take us to the socially optimal division of land between different categories of usage.[35]

Needless to say, this hypothetical scheme is unlikely to be put into practice because of the likely opposition from countries with a deficit in forests in relation to their CO_2 emissions. Economic inferior measures may instead carry the day, including putative trade barriers against countries engaging in deforestation.

If industrialized countries (with the deforestation period behind them) raised their trade barriers against the forest products of developing countries, would it halt deforestation? Not necessarily. Rather, any policy that depresses the return on forestry could increase the incentives to convert forests into other categories of land, and thereby speed up the rate of deforestation in developing countries.[36]

In summary, it appears that the root causes of deforestation lie partly in the pressure to convert forests into farmland to feed a growing population, and partly in the absence of markets for various services provided by forests, such as carbon-binding and biodiversity. Of course, policies encouraging forest clearing, including subsidies and tax breaks, aggravate the problem. However, few governments would presumably pursue such policies if the full value of forests could be commercialized. Furthermore, trade barriers that depress the value of forests in relation to the alternative land usage—ranching, farming, plantations—could be directly counterproductive.

C. Global warming

Global warming is caused by the increasing emissions of carbon dioxide from sources that burn fossil fuel, including energy-intensive processing industries, fossil-fuelled power plants, automobiles, and so on. Since the early 1800s, when people began burning large amounts of coal and oil, the amount of carbon dioxide in the earth's atmosphere has increased by nearly 30 per cent, and average global temperature appears to have risen between 0.3° and 0.6° on the Celsius scale. Carbon dioxide gas traps solar heat in the atmosphere in the same way as glass traps solar heat in a greenhouse. For this reason, carbon dioxide is sometimes called a "greenhouse gas." Besides carbon dioxide, human emissions of methane and nitrous oxide contribute to the process of global warming.

Table 1: The prisoners' dilemma of global warming

		North: Maintain emissions	North: Reduce emissions
South	Maintain emissions	0, 0	2, -1
South	Reduce emissions	-1, 2	1, 1

The terminology "global warming" is somewhat of a misnomer. It does not mean that every day or every place will be warmer. It is the *average* temperature that will go up. This will cause changes in the amount and pattern of rain and snow, in the length of growing seasons, in the frequency and severity of storms, and in sea level that will rise as the polar icecaps start to melt. In turn, this will have repercussions on farms, forests, plants and animals, as well as on the well-being of humans, including the geographical reach of "tropical" diseases such as malaria that will migrate into temperate zones. For some countries, global warming may be little more than a nuisance, while for others it is a matter of long-run survival. A case in point is the Republic of Maldives in the Indian Ocean where the highest point over the sea level is just a few meters and which hence lacks any protection against the predicted rise in the sea level of up to 1 meter over the next century.

While a lot can be said about global warming and its likely costs[37], the main aspect we would like to highlight here is the "prisoners' dilemma" nature of the policy problem. The essence of this dilemma is well illustrated by the following remarks by Peter Sorensen, of the Copenhagen Business School, cited in Long (1995): "Not surprisingly, many opponents of the carbon tax argue that it would be irrational for Denmark to introduce such a tax unilaterally, thereby incurring a loss of competitiveness, since Denmark's contribution to global warming is very small." (p. 49) Since this is true for most countries in the world, bar for the very largest ones, it may be difficult to reach a cooperative agreement to curb emissions unless the free-riding incentives can somehow be overcome.

The policy dilemma can be illustrated in a simple game matrix with two countries called, for the sake of this exercise, "South" and "North".[38] Assume that each country considers its *own* CO_2 emissions to be optimal at the outset, that is, the marginal domestic benefits of reducing

35 This simple principle can be illustrated by Figure 2. If carbon-binding services were marketable, the private return of forest would approach the true social value of forests (the dashed curve), thereby initiating a process of reforestation.

36 In Figure 2, the private marginal return curve of forests is shifted downward, which would initiate a process of deforestation.

37 World Resources Institute et al. (1998).

38 For an accessible introduction to "game theory" analysis of policy formulation, and the prisoner's dilemma model in particular, see Axelrod (1984).

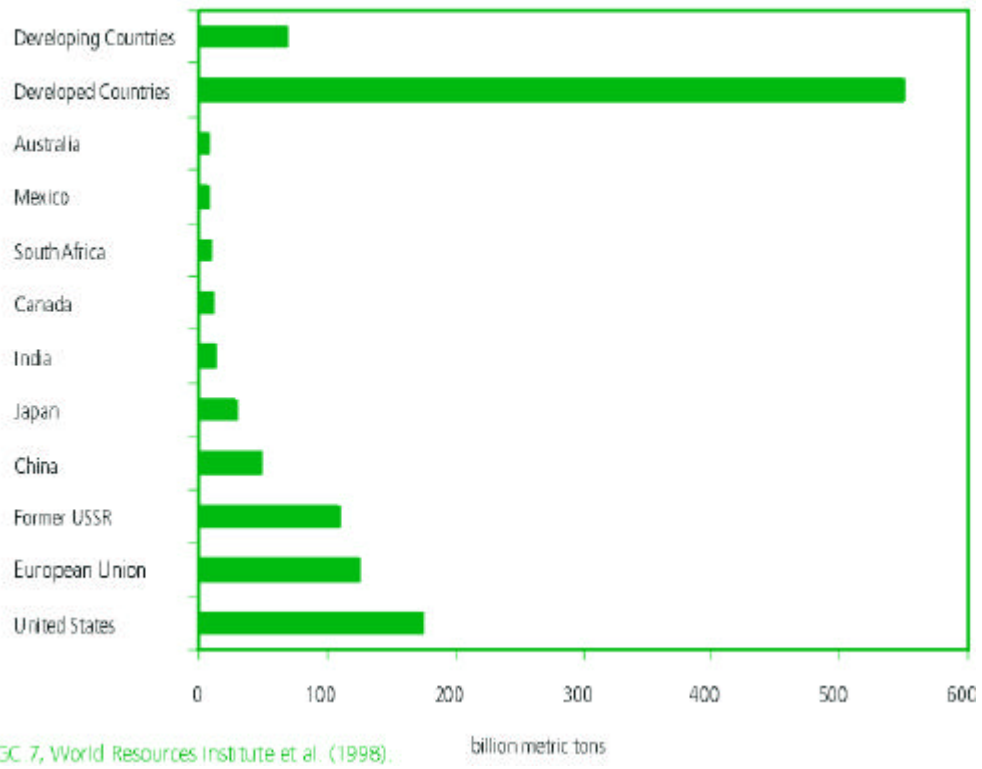
CO_2 emissions is exactly counterbalanced by the marginal costs of doing so. This initial equilibrium is depicted in the upper left corner of the policy matrix (Table 1), where the first number refers to the net benefit to South of the current policy combination (i.e, maintained emissions) and the second number to the net benefit to North. Assume that it would cost each country $3 billion to jointly halt the global warming by moving away from today's heavy reliance on fossil fuel. Say that the net benefit (environmental benefits minus adjustment costs) for each country of doing so would be $1 billion, as depicted in the lower right panel of the policy matrix. What are the prospects of the two countries reaching an agreement?

Given North's current emissions, South has no incentive to reduce its emissions on a unilateral basis, since the adjustment costs exceed the domestic environmental gains, leaving a net loss of $1 billion. If North were to contain its CO_2 emissions, would South be persuaded to reduce its emissions? Unfortunately not. The free-riding alternative has a $1 billion higher return ($2 billion as compare to $1 billion).[39] In other words, whatever North does, South has every interest in maintaining its current emissions. North is in the very same position. The inherent tendency is therefore towards the status quo, although both countries would benefit from a coordinated reduction in CO_2 emissions. The "prisoners' dilemma" outcome (the shaded window) arises because each side has an incentive to free-ride on its neighbour's reduction efforts. That is, individual rational behaviour leads to a collective irrational outcome.

One solution out of this dilemma is to negotiate a binding multilateral environmental agreement. Indeed, some initial steps have been taken towards a collective effort to halt global warming under the Kyoto Protocol, designed to reduce global emissions of greenhouse gases by 5 per cent by 2012 from the 1990 base level. The commitments differ among countries. The European Union has committed to reduce CO_2 emissions by 8 per cent, the United States by 7 per cent, and Japan by 6 per cent. Other countries have committed to stay within the current emissions, including the Russian Federation, while yet other countries have committed to reduce the projected increase in emissions.[40] As far as the developing countries are concerned, most of them have not tabled any commitments so far, fearing that it would harm their development prospects unduly. Moreover, they argue that it is up to the developed countries to lead the way since they have contributed the lion's share of the increased concentration of CO_2 in the atmosphere. See Table 2.

It should be stressed, however, that developing countries will contribute in an indirect sense. The Kyoto Protocol has established a Clean Development Mechanism which allows developed countries to receive credits

Table 2: Cumulative CO_2 emissions, 1950-1995



Source: Figure GC 7, World Resources Institute et al. (1998).

39 If anything, South may be tempted to cut down its own abatement efforts if North increases its efforts unilaterally. This option (increase emissions) is not shown in the game matrix to keep things simple.

40 See World Resources Institute et al. (1998).

against their own commitments for investments in developing countries that reduce greenhouse gas emissions, such as investments in energy-saving technologies. The intent is to help developing countries to minimize the emissions at the same time as providing leeway for economic development and growth.

Turning now to the trade dimension of the issue, trade itself is arguably a contributing factor to global warming through the carbon dioxide emitted when goods are shipped between different parts of the world. Of course, the problem is generic to all kinds of transportation using fossil fuel, whether domestic or international. The first-best policy follows: a tax on fossil fuel to curtail excessively long shipments of goods with a low value relative to weight or volume. While trade barriers could possibly be used as a second-best measure to reduce transport emissions, such measures would be only partially effective since they would not address emissions from domestic shipping The effective policy would be one that does not discriminate between international trade and trade within national boundaries

Let us also mention that some observers would argue that trade measures are necessary to ensure that the objective of the Kyoto Protocol is not defeated by a relocation of energy-intensive industries to non-signatory countries—the "carbon-leakage" problem. The idea would be to impose a tax on the carbon or energy content of imports from non-signatory countries to countervail any competitive advantage that may otherwise accrue. Such measures could imply potential problems for the WTO rules if they involve non-signatories to a multilateral environment agreement who may wish to exercise their WTO rights. On the other hand, where governments are signatories to MEAs, the situation is likely to be more straightforward. The basic point, however, is that both for the sake of the environment and for orderly trade relations, pre-commitment by governments to shared objectives through environmental agreements is highly desirable. For further disucssion of the legal dimension of this issue, we refer the reader to the annexes of this study.

D. Acid rain

As with global warming, acid rain has its roots in the burning of fossil fuels, especially low-quality coal and oil with a high sulphur content. Acid rain can be very costly to society, and not just in terms of its health effects. Its corrosive properties damage infrastructure and buildings, as well as cultural treasures. Moreover, the acidification of the soil reduces the productivity of agriculture and forests. If they receive extreme doses, forests may even die, as happened in the "black triangle" of Central Europe. Aquatic life is also threatened by acidification, although sensitivity to it varies a great deal among species.

Any source that burns fossil fuel is implicated in this process. As far as local problems of air pollution and acidification are concerned, the emissions from a huge number of small sources may be the dominant problem, including emissions from trucks and cars (especially those without catalytic converters) and home furnaces fuelled by coal, oil and kerosene. The megacities of the world are a case in point. Local emissions harm local residents foremost, since car exhausts and household chimneys are too low to diffuse the pollution over a larger area. More interesting from the point of view of trade are the large point sources with potential transboundary effects, such as electric utilities and energy-intensive processing industries, namely steel mills, aluminium mills, pulp and paper mills, and oil refineries. These "smokestack" industries may send the air pollution long distances, including over neighbouring countries in the downwind direction.[41]

The basic problem is again faulty economic incentives. Producers base their decisions on costs that they bear themselves, so pollution that harms third parties will not necessarily be accounted for unless the government steps in with corrective measures. The first-best policy would be to target the emissions directly, either by emissions standards or emission taxes. A second possibility would be to tax inputs that give rise to the emissions, such as oil and coal, or, better still, set differentiated taxes based on the sulphur content of fossil fuels. A third option would be to specify the particular abatement equipment that the polluters must install in order to receive permission to operate. While "command-and-control" instruments are still in frequent use, the drawback is that they reduce the flexibility of the industry to meet the specific reduction target, which in turn might result in higher abatement costs than necessary. Further down the list in terms of efficiency are production or consumption taxes that would force an industry to cut back on production and, indirectly, emissions.

Since air pollution and acid rain do not respect national borders, the question arises as to what victim countries can do to combat transboundary pollution, including trade barriers against upwind countries. A negotiated agreement between the governments concerned would of course be the preferred option. However, bilateral, regional or multilateral environmental agreements are sometimes difficult to forge because of free-riding or asymmetric incentives.

A case in point is the 1985 Helsinki Protocol on the Reduction of Sulphur Emissions or their Transboundary Fluxes by at least 30 per cent, negotiated among European countries under the auspices of the United Nations Economic Commission for Europe (UNECE). Calculations made by Mäler (1990), as reported in Pearce and Warford (1993), Table 13.2, suggest that the main ones to gain from this agreement are downwind countries in continental and northern Europe, while the United Kingdom and some other upwind countries would have to spend more on abatement than the agreement was worth to them in terms of domestic environmental benefits. Not surprisingly, perhaps, upwind countries, including the United Kingdom, failed to ratify this protocol.

Having said this, it should be stressed that the United Kingdom *did* ratify the Second Sulphur Protocol in 1996, which calls for an 80 per cent reduction in SO_2 emissions by 2010, and this in spite of vocal opposition from the domestic coal lobby. This shows that even asymmetric in-

41 The area of diffusion depends both on the wind conditions and on the height of the smokestack. This opens the way for beggar-thy-neighbour policies. For example, Joskow and Schmalensee (1997) report that at one stage some US states required electric utilities to build higher smokestacks in order to meet local ambient SO_2 standards, thereby transferring the problem to downwind states (p. 9).

terests can be overcome between good neighbours. Another example of a successful agreement is the Air Quality Agreement of 1991 between Canada and the United States, which mandates both parties to undertake coordinated reductions in emissions of SO_2 and nitrous oxides (NO_x). Moreover, each country is required to account for the transboundary environmental effects of new production activities before granting a go-ahead.[42]

But *what* if the cooperative route is closed because of free-riding or asymmetric interests—what options remains to victim countries? One conceivable option for downwind countries would be to pay for the abatement costs of upwind countries. This happens from time to time, and may be a rational solution. For example, if it costs $10 million to reduce pollution by tightening already strict emissions standards at home (marginal abatement costs tend to rise sharply as the technical limit is approached), or $5 million to get the same effect by paying for the abatement equipment of a foreign producer upwind, why not spend the money where the pay-off is the highest? For instance, the Scandinavian countries provide both funds and technical assistance to enable poorer countries around the Baltic Sea to reduce pollution, including upgrading the safety of nuclear power plants to reduce the risk of another accident like at Chernobyl. At the same time, these policies go against the principle that the polluters, not the victims, should be responsible for cleaning up (the Polluter Pays Principle), and may fall foul of domestic public opinion. Public pressure may then mount to use the stick instead, including targeted trade barriers against countries that are deemed to have insufficient domestic environmental standards.

How effective are trade barriers in combating transboundary pollution? From a theoretical point of view, it depends on the share of output that the domestic economy buys from a foreign smokestack industry. If the domestic economy absorbs just a fraction of the output, or none at all, one should not expect to make much of an impression. However, if the domestic economy is a large enough buyer, trade barriers against upwind producers may force the targeted firms to scale back export production and with it transboundary emissions, or, if that option is available, to install abatement equipment to escape trade sanctions. In short, it takes considerable economic muscle to use trade barriers as a means of reducing transboundary emissions.[43] This option is realistically only open to the world's largest countries, which raises some equity considerations. Large countries may get redress through unilateral actions against small countries, but not the other way round.[44]

E. Overfishing

After five decades of continuing expansion of global fishing, the total landing of fish from the oceans is now levelling off and may even start to decline in the coming years unless overfishing can be brought under control to give the stocks a chance to recover. In the 1950s and 1960s, marine fisheries production increased on average by 6 per cent a year, slowing down in the 1970s and 1980s as some oceans and fish species became overfished, to level off at some 85 million tonnes in recent years.[45] According to FAO (1999), two thirds of the fish stocks in the oceans are in urgent need of management to allow recovery of already overfished stocks or to prevent overfishing of those stocks that are balancing on maximum sustainable yields. Specifically, an estimated 44 per cent of the fish stocks are fully exploited and cannot sustain any further expansion of the catches; another 16 per cent are overfished, with declining yields; another 3 per cent are recovering slowly from previous overfishing; finally, a further 6 per cent are depleted or on the verge of depletion.

In analyzing the economic forces of overfishing, we must first understand the basic ecological dynamics of fish stocks, which depend on the availability of nutrition and how hard we tax them. If fish stocks were left to themselves, they would eventually reach an upper equilibrium defined by the availability of nutrition. At this upper equilibrium, there is no net growth in the stocks. When fishing starts, the stocks will decline at the same as the competition for food is eased, thereby easing a replenishment of the biomass. At some intermediate level of harvesting, the absolute growth in the biomass (in tonnes) will reach the biological maximum, referred to as "maximum sustainable yields" (MSY). Any fishing beyond this point is considered overfishing and will result in lower long-run yields. And should we uphold a higher level of harvest than what is biological feasible by gradually increasing the fishing efforts as the fish become scarcer, the stocks will eventually collapse.[46] This happened outside Newfoundland in the early 1990s under unsustainable pressure from Canadian and foreign trawlers venturing in the area—a situation that is possibly beyond the point of repair.[47]

The ecological dynamics of fish stocks suggest that the long-run or "steady-state" relationship between the fishing effort of the whole industry and collective yields (tonnes harvested) is hill-shaped, as is the long-run relationship between fishing efforts and fishing revenue. This is the first element of the Gordon (1954) fishery model which we will use in the analysis below. The second element is a cost relationship for the industry as a whole which is assumed to increase with the collective fishing efforts (tonnage and time at sea). The third element of the model is the assumption of unrestricted or open access. Specifically, there exist no entry restrictions, nor any indi-

42 "Each Party, shall, as appropriate and as required by its laws, regulations, and policies, assess those proposed actions, activities, and projects within the area under its jurisdiction that, if carried out, would be likely to cause significant transboundary air pollution." Source: US-Canada Air Quality Agreement Progress Report 1998, p. 8. (www.epa.gov/acidrain).

43 For a formal analysis, see, e.g., Markusen (1975), Ulph (1997) and Mæstad (1998).

44 This point is stressed by the World Bank (1999).

45 At the same time, because of increased aquaculture, total production (marine, inland, and aquaculture) has continued to grow slightly and amounts currently to some 120 million tonnes annually. FAO (1999).

46 A parallel would be to run down your savings rather than living on the interest payments or dividends.

47 See the case study in WWF (1998), page 68-77.

Figure 3: Growing demand and overfishing

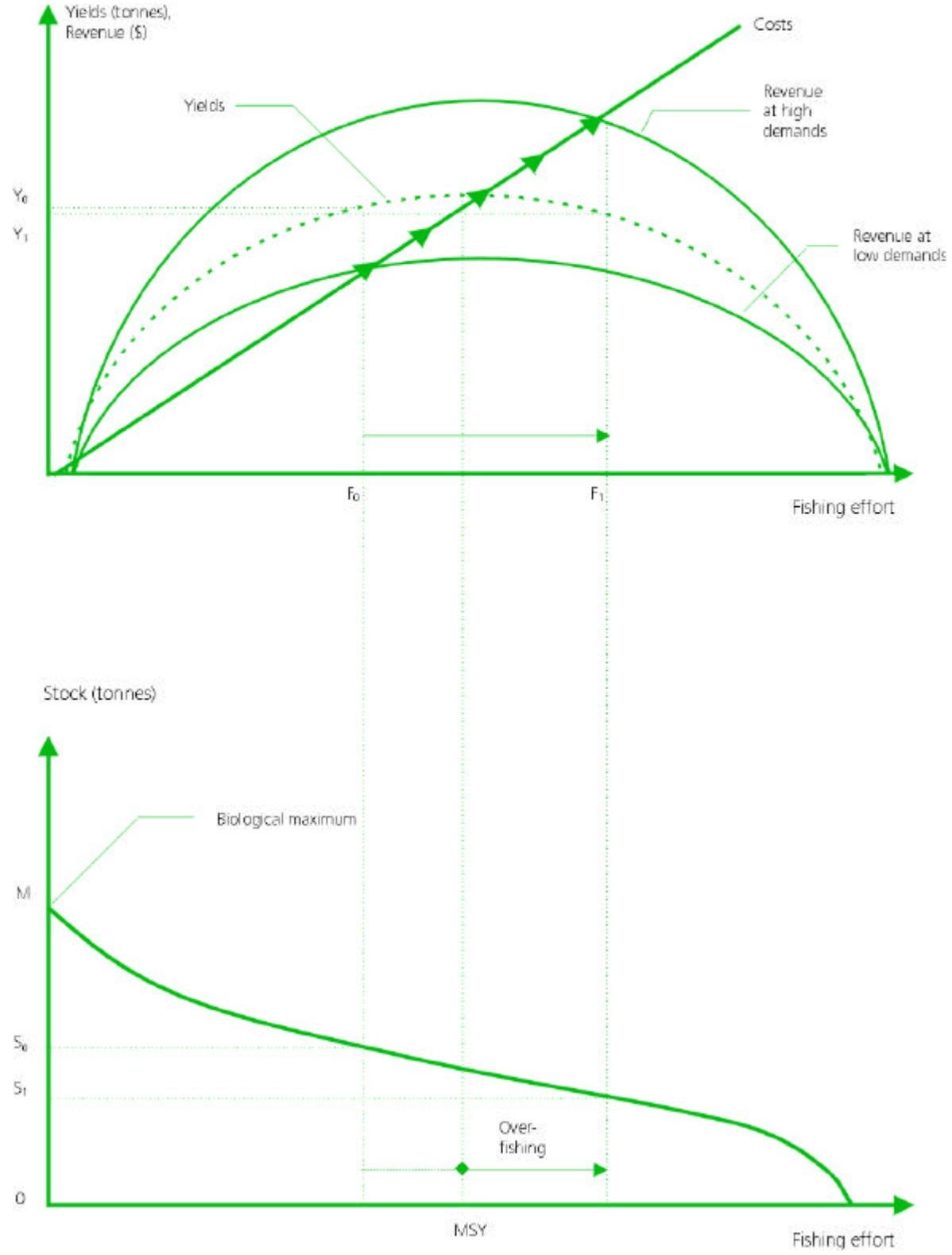


Table 3: Growing demand and overfishing

Fishing Area	Year of maximum harvest	Maximum harvest (thousand tonnes)	Recent harvest (thousand tonnes)
Atlantic, Northwest	1967	2,588	1,007
Antarctic	1971	189	28
Atlantic, Southeast	1972	962	312
Atlantic, Western Central	1974	181	162
Atlantic, Eastern Central	1974	481	320
Pacific, Eastern Central	1975	93	76
Atlantic, Northeast	1976	5,745	4,575
Pacific, Northwest	1987	6,940	5,661
Pacific, Northeast	1988	2,556	2,337
Atlantic, Southwest	1989	1,000	967
Pacific, Southwest	1990	498	498
Pacific, Southeast	1990	508	459
Mediterranean	1991	284	284
Indian Ocean, Western	1991	822	822
Indian Ocean, Eastern	1991	379	379
Pacific, Western Central	1991	833	833

Source: FAO (1997), page 36.

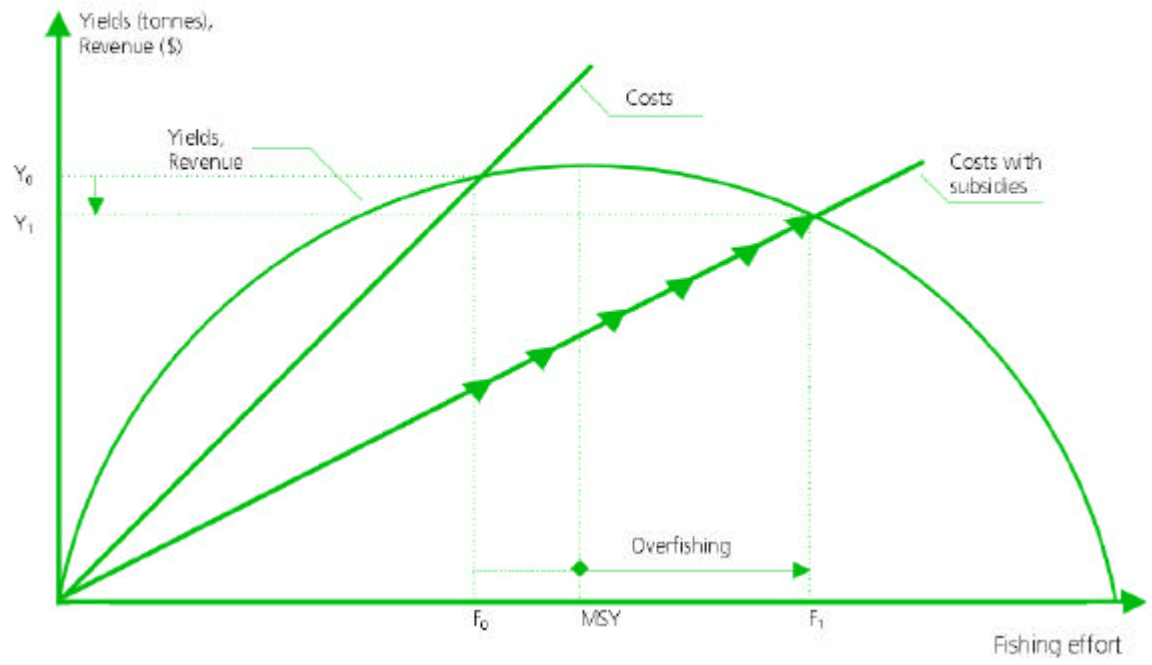
vidual or collective fishing quotas. The fourth and final element of the model is the assumption of perfect competition. That is, the industry consists of many small businesses without any individual market power, nor any individual incentives to conserve the resource base. Given these parameters, the industry will expand until the revenue just covers the costs.

In the first application of this model, we shall illustrate the link between overfishing and increasing demand, for example, due to population growth. The case is illustrated in Figure 3. At the outset, the industry is operating at the point where the industry cost function intersects the revenue function denoted "Revenue at low demand." At this point, revenue just equals costs and there is no tendency of either entry or exit from the industry. The fishing effort at this point is denoted $\mathbf{F_0}$, the associated yields $\mathbf{Y_0}$, and the fish stocks $\mathbf{S_0}$. As the figure is drawn, the initial market equilibrium is below the point of maximum sustainable yields ("MSY") so there is no problem of overfishing. This equilibrium represents the situation in the early 1950s when the oceans could easily sustain the demand of the world's population, which at that time stood at 2.5 billion.

When demand increases, the price of fish will go up for each level of harvest, which can be represented by an upward drift in the revenue function towards the uppermost hill-shaped function denoted "Revenue at high demand." In turn, this will induce an expansion of the fishing capacity (marked by the arrows along the cost curve) until the costs once again equal the revenue. The fishing effort at the new equilibrium is denoted $\mathbf{F_1}$, the associated yields $\mathbf{Y_1}$, and the stocks $\mathbf{S_1}$. We may think of the new equilibrium as the situation in the mid 1980s, when the world's population had grown to some 5 billion and fish stocks in the oceans had started to become overfished, with declining yields as a result. Another contributing factors would be progress in fishing technologies, such as deep-freezing and new fishing gears, which can be represented by a downward shift in the industry's cost function. Table 3 provides some data to illustrate the process of overfishing and declining yields, and how the problem has progressed from ocean to ocean since the mid 1960s.

The very same analysis can be used to illustrate the consequences of reduced import tariffs on fishery products. As for the case of population growth, reduced import tariffs on fisheries products in the world can be represented in the figure by an upward shift in the revenue function for the industry as a whole (but not necessarily for uncompetitive fishing fleets that benefited from a protected home market) followed by increased fishing efforts, and potentially overfishing in the end.

Figure 4: Subsidies and overfishing



It should be stressed, however, that in both cases, the analysis only applies to the situation when the resources of the seas are not properly managed (open access). If resources *were* properly managed to restrain harvest at the point of maximum sustainable yields (with some precautionary margins if there are scientific uncertainties of how much taxation the stocks can sustain), increased demand would translate into higher prices for fishery products rather than overfishing. At the same time, the temptation for individual fishermen to cheat on the quotas by underreporting harvests increases when prices go up. Moreover, while an individual nation may be able to control cheating by the domestic industry, it may not be able to control cheating by foreign fishermen. Thus, when several nations are fishing in the same waters, or in adjacent waters that are populated by migratory fish stocks, and when these nations have access to each others' market through a free trade agreement, it would take a rather elaborate management regime with far-reaching legal authority to ensure compliance with the quotas. Any suspicion that others are cheating without retribution may undermine the conservation regime.

In the analysis so far, we have pointed to the policy failure of unrestricted or open access that is at the core of the problem of overfishing and subsequent declining yields. We have also argued that the demand pressure from a growing population exacerbates this policy failure, and potentially also international trade that adds to the demand side of the equation. We shall now discuss another policy failure that drives overfishing, namely the prevalence of government subsidies to the fishing industry.

To make this point formally, consider the impact of subsidies that reduce the cost of fishing, whether in the form of investment grants, government credits (at below market rate), tax deductions, fuel tax exemptions, and so on. In figure 4, the subsidies lead to a downward shift in the fishing industry's long-run cost curve.[48] This will induce an expansion of fishing capacity and efforts until costs and revenues are once again equal. The expansion process is illustrated by the arrows along the cost function. If subsidies are sufficiently high, overfishing will result.

Fishing subsidies are common. However, the lack of transparency and the multitude of subsidies make quantification difficult. But according to a rough estimation by FAO (1993) on basis of the difference between revenue and estimated costs of fishing, global fishery subsidies must be in the order of $54 billion annually to make the industry break even.[49] Another estimation by Milazzo (1998) of the World Bank is more conservative, suggesting subsidies in the range of $14 to $20 billion annually, or 17 to 25 per cent of the industry's revenue. Another indication of the prevalence of subsidies is the overcapi-

48 If the subsidies take the form of a price support, it is rather the revenue function that will shift upward. However, as shown before, the results are just the same.

49 The FAO report estimated current total costs in world fisheries at $124 billion per year producing a gross revenue of around $70 billion per year, with subsidies presumed to cover the deficit.

Box 2. The Law of the Sea

The United Nations Convention on the Law of the Sea, opened for signature since 10 December 1982, entered into force 12 years after on 16 November 1994. As of 9 August 1999, 132 states are parties to the Convention. The key rights and obligations relating to fishing include:

— Coastal States have sovereign rights in a 200-nautical mile exclusive economic zone (EEZ) with respect to natural resources and certain economic activities, including fishing;

— Land-locked and geographically disadvantaged States have the right to participate on an equitable basis in exploitation of an appropriate part of the surplus of the living resources of the EEZ's of coastal States of the same region or sub-region;

— States bordering enclosed or semi-enclosed seas are expected to cooperate in managing living resources, environmental and research policies and activities;

— States are bound to prevent and control marine pollution and are liable for damage caused by violation of their international obligations to combat such pollution;

— All States enjoy the traditional freedoms of fishing on the high seas; they are obliged to adopt, or cooperate with other States in adopting, measures to manage and conserve living resources;

— Signatory states are obliged to settle by peaceful means their disputes concerning the interpretation or application of the Convention. Disputes can be submitted to the International Tribunal for the Law of the Sea established under the Convention, to the International Court of Justice, or to arbitration.

The United Nations Agreement for the Implementation of the Provisions of the United Nations Convention on the Law of the Sea of 10 December 1982 relating to the Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks was adopted on 4 August 1995 by some 60 nations. It will enter into force 30 days after the deposit of the 30th instrument of ratification or accession. As of 6 August 1999, only 23 states have ratified the Agreement so it is not yet effective. Among important fishing nations that are still missing include Chile, European Union, Japan, Mexico, Peru, Poland, Thailand and Vietnam. The 50-article Agreement legally binds countries to conserve and manage fish stocks based on the precautionary principle and to settle peacefully any disputes that arise over fishing on the high seas. Specifically, the Agreement:

— Establishes the basis for the sustainable management and conservation of the world's fisheries;

— Addresses the problem of inadequate data on fish stocks;

— Calls for the setting up of regional fishing organizations where none exist;

— Provides for the establishment of quotas of fish stock in danger of depletion and overfishing (to be administrated by regional fishing organizations);

— Tackles problems caused by the persistence of unauthorised fishing;

— Sets out procedures for ensuring compliance with its provisions, including the right to board and inspect vessels belonging to other States;

— Prescribes options for the compulsory and binding peaceful settlement of disputes between States.

Not covered by the Agreement:

— Fishing subsidies.

Source: UN Division for Ocean Affairs and the Law of Sea (www.un.org/Depts/los/losconv1.htm).

talization of the industry. According to some estimates, the gross tonnage that is trawling the seas is more than twice than what would actually be needed.[50] That is, there is an enormous overcapacity maintained by government subsidies. Thus, the removal of these subsidies would not just be to the benefit of the environment, but also to tax payers who foot the bill twice by higher taxes and less fish on their tables.[51]

Whatever the "true" subsidies may be, they are arguably part of the problem. It should be stressed, however, that it depends also on the kind of subsidies granted. Obviously, if subsidies are paid to retiring capacity rather than to expand it, subsidies may even ease the problem given the current overcapitalization of the industry. However, only a careful analysis of each subsidy program can reveal whether the effect is to expand or contract fishing capacity. A case in point is "buy-back" arrangements of worn-out fishing boats and gear that on the surface may look like a retirement scheme. However, it will only serve a conservation purpose if the retired boats and gears are not replaced by new and possibly more efficient equip-

50 See WWF (1998).

51 Recall that overfishing leads to permanently lower yields, and hence less fish on our tables in the long-run.

ment. If no such restrictions are imposed, the end result would only be to encourage further capacity investments by reducing the investment costs of the industry.

To conclude this case study, overfishing is related to difficulties associated with the management of a common resource. When everyone is free to tap a resource without restraint, resource degradation is almost inevitable. Individual efforts to conserve the resource base is deemed to fail in a regime with open access—the "tragedy of the commons." Whilst this problem may not be serious as long as demand is low relative to the resource base, increasing demand will eventually make it imperative to introduce proper management schemes. A failure to take political action to introduce and enforce such schemes would count as a policy failure.

Fortunately, most coastal nations have in the last decades introduced some form of management scheme within their respective exclusive economic zones (EEZs). Moreover, the EEZs have gradually expanded outward from the limit of territorial waters (12 nautical miles) in order to address the problems of foreign trawlers that are lurking just outside the EEZs (and sometimes within) to catch fish that are travelling between shallower waters and the high seas. Starting in the 1970s, when overfishing became a more general problem, the EEZs have expanded in steps from 12 to 200 nautical miles, a limit that since 1994 enjoys international recognition under the United Nations Convention on the Law of the Sea (see Box 2).

At the same time, the aforementioned Convention upholds the traditional freedom of fishing on the high seas. However, this right is not absolute. Countries are in principle obliged to take conservation measures and cooperate with other states in managing the resource base, for example, through regional fishing organizations. A further agreement relating to the Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks has been negotiated by some 60 nations, and it will become effective as soon as a critical mass of 30 nations have ratified or acceded to the agreement. As of 6 August 1999, 23 nations had completed the domestic ratification process. However, some of the major fishing nations are yet to ratify or accede to the agreement, including Chile, European Union, Japan, Mexico, Peru, Poland, Thailand and Viet Nam. Whilst this Agreement could be an important step in addressing the global problems of overfishing, provided that the free-riding incentives alluded to before can be controlled by general participation, the fact that fishing subsidies are not covered may present a difficult obstacle. And as the above analysis has shown, reducing subsidies would produce a double-dividend, benefiting both the economy and the environment. Indeed, fishing subsidies provide perhaps the most clear-cut example of a case where a reduction of trade-distorting measures could contribute to a better global management of natural resources.

Finally, let us recall that the current yields in many oceans are below the maximum sustainable yields owing to overfishing and declining stocks. A political failure to address these problems will ultimately lead to reduced nutritional status of the world's population. This problem will be most acute in poor countries which depend on fish as their major source of animal protein.

F. Concluding remarks

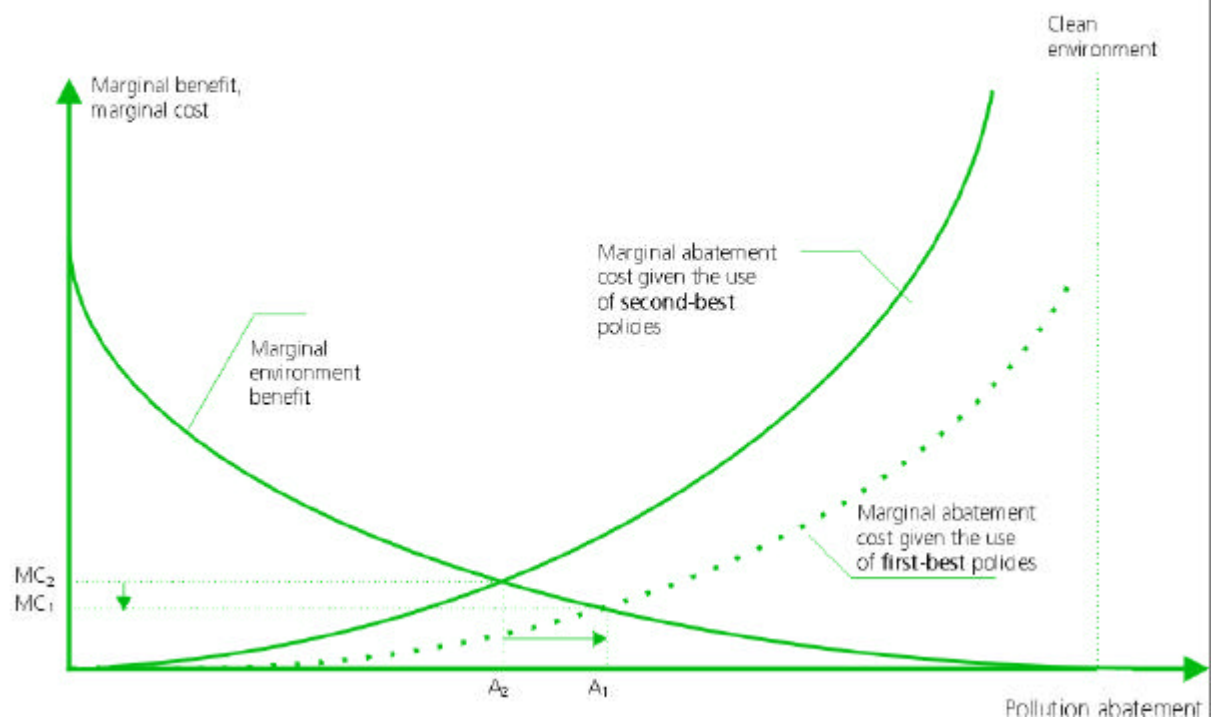
Let us conclude the case studies by drawing together some general themes that have been brought out in the analyses. Firstly, in all case studies, the roots of the environmental degradation were not caused by international trade as such, but various market and policy failures. For example, farmers do not necessarily account for nitrogen leakage and other runoffs from their fields unless incentives are set accordingly. Likewise, firms have no reason to install scrubbers to clean emissions from sulphur dioxide and nitrogen oxides unless provided with the right incentives. Nor do governments necessarily have the inclination to reduce emissions that transcend national borders or have a global reach, as carbon dioxide emissions. And as far as deforestation is concerned, the problem was rather missing markets for the global services provided by forests, such as carbon sinks and bio-diversity services. Likewise, the problem of overfishing is closely related to two policy failures; firstly, the failure to set up and enforce proper resource management schemes, and, secondly, government subsidies that encourage overcapitalization of the industry and in the end overfishing.

Having said this, international trade can sometimes exacerbate the effects of poor environmental polices. For example, the additional demand from the world market may induce farmers to increase the usage of agro-chemicals to boost production for exports. Likewise, the demand from the world market may encourage unsustainable fishing or logging in the absence of a proper management regime.

However, tackling environmental problems by targeting some indirect linkage, such as trade, may divert the attention from the underlying problems. What is more, there may even be certain circumstances where putative trade policy remedies exacerbate the problem. This may be the case, for example, with tropical forests, where lowering the price of the resource base through trade restrictions could lead to the clearing of forests in order to use the land in other more lucrative activities, such as agriculture and ranching. In any event, whenever we sidestep the first-best principles of addressing environmental problems, i.e., policies targeted at the source of the problem, we impose unnecessary costs on society. In fact, this would not just be poor economics but bad for the environment as shown in the example below.

Say, for example, that society could reduce the problem of acid rain by either taxing emissions directly, the "first-best" policy, or by taxing production, which would be a "second-best" and more costly policy option since the problem is not production per se, but emissions generated by a polluting process. Say that the marginal environmental benefit of each unit of reduction of SO_2 is falling and in the end approaching zero when virtually all emissions have been abated. Conversely, assume that the marginal abatement cost is increasing and becoming very large for the very last unit. At the same time, the first-best policy instrument is less costly at each level of abatement compared to the second-best instrument. Given these assumptions, which are standard in environmental economics, we can show that resort to second best-policy instruments is not just bad economics but bad for the environment. Put another way, efficient environmental polices are

Figure 5: The double-dividend of efficient environmental policies



associated with a "double-dividend," one for the economy and one for the environment.

The case is illustrated in Figure 5. If an environmental protection agency only had access to some inefficient second-best instrument, it would presumably act rationally within the given parameters and choose an abatement level equal to the point where the marginal environmental benefit equals the marginal abatement cost for that particular instrument, i.e., at point A2 in the figure. If the agency had access to a more efficient first-best instrument, it would be rational to choose a more ambitious abatement level, marked A1 in the figure. Thus, by replacing inefficient environmental policy instruments with efficient ones, the costs of pollution abatement will not just go down, but it is rational to extend abatement one step further. This simple, but fundamental principle, suggests that the search for efficient policy instruments to address environmental problems ought to be a priority for industry, for regulatory authorities, and for environmentalists alike.[52]

Of course, in order to identify the most efficient policy instrument, we must first identify what the source of the problem is. For example, in the deforestation analysis we pointed to the problems of missing market for carbon dioxide sinks provided by forests, which artificially depress the return of forests relative to, say, agriculture and ranching. The first-best solution follows, although we realize the political difficulties of setting up such markets. In any event, whenever we sidestep the first-best principles we impose unnecessary costs on society. This would not only be bad for the global economy, but potentially also for the global environment by making the costs of pollution abatement look higher than what they actually are if we would consistently use the most efficient instruments available.

It must be recognized, however, that while trade measures are rarely, if ever, the first-best policy for addressing environmental problems, governments have found trade measures a useful mechanism for enforcing multilateral environmental agreements in some instances, and for attempting to modify the behaviour of foreign governments in others. It must be stressed that the use of trade measures in this way is fraught with risks for the multilateral trading system, unless trade policy is used in this manner on the basis of prior commitments and agreements among governments as to their obligations in the field of environmental policy.

52 See Fullerton, Hong and Metcalf (1999) for a greater elaboration of this point, and supporting empirical evidence.

III. General Equilibrium Linkages Between Trade and the Environment

While a great deal can be learned about the roots of environmental degradation from a sector-by-sector analysis, this approach could overlook important interactions between the different sectors and countries, so-called general equilibrium effects. It is worth taking a closer look, therefore, at general equilibrium models of international trade in order to examine the broader effects of trade on the environment in a global context. While a few such studies date back to the mid-1970s,[53] we shall concentrate here on the recent literature since the revival of the trade and environment debate, prompted by the controversial 1991 tuna-dolphin dispute between Mexico and the United States and the environmental controversies surrounding the North American Free Trade Agreement (NAFTA). Reflecting the public debate, most of the recent academic literature has focused on the environmental consequences of trade between countries with different environmental standards, which in practice means trade between developed and developing countries, since differences in environmental standards tend to reflect differences in incomes.

A. Theoretical overview

Starting with Grossman and Krueger's (1991) study on NAFTA's environmental effects, it has become customary to decompose the environmental impact of trade into three interacting elements: a composition effect, a scale effect, and a technique effect.

The *composition effect* arises from trade-induced specialization in the world. That is, countries that used to produce a wide range of products to satisfy local demand will now specialize in a subset of the product range and import the other products. This gives economic benefits through increased efficiency and economies of scale in production. The net effect on the local environment will be positive if expanding export sectors are less polluting on average than contracting import-competing sectors, and negative if the opposite relation holds.[54] Since one country's exportables are another country's importables, all countries cannot specialize in the inherently cleaner industries. International trade will therefore redistribute local pollution problems in the world from countries that have a comparative advantage in industries that are inherently less polluting to countries that have a comparative advantage in industries that are inherently more polluting, whatever the basis for these comparative advantages may be.

Second is the *scale effect*. For given pollution coefficients and a given composition of production, enhanced economic activity will increase pollution. Economic growth at given production composition and given pollution coefficients is therefore always harmful for the environment.

The silver lining of the scale effect is the associated income growth that drives the demand for a cleaner environment in the world. The willingness to pay for goods produced according to stricter environmental standards increases with income. Stricter environmental standards and taxes that reduce pollution per unit of output can thus be expected to follow rising incomes, provided of course that the political process is not captured by polluting industries or compromised by unelected governments that are not held accountable for their actions, or lack of them. The income-induced reduction in pollution per unit of output is known as the *technique effect*.

What matters for the environment is the net result of the composition, scale and technique effects, not the individual components. Decomposition is still valuable, however, since it allows us to identify what drives the results. One of the first studies to bring the bits and pieces together into a coherent trade model was that of Copeland and Taylor (1994). They present a model with two sets of countries, North (developed) and South (developing), and a range of goods with inherently different pollution intensities. The pollution problems are assumed to be of a local nature, that is, there are no transboundary or global repercussions of domestic production. Both governments are assumed to control pollution by pollution taxes, with North choosing to set higher tax rates because of higher incomes.

As trade is liberalized between North and South, a complicated set of adjustments is set in motion. The first adjustment is a change in the industrial composition, whereby polluting industries contract in North and expand in South because of different environmental standards driven by different incomes.[55] The composition effect mitigates pollution in North and magnifies it in South. In addition, there is a scale effect that emanates from an overall expansion of economic activity, which is bad for the environment everywhere. At the same time, the associated income growth brings with it an increased willingness to pay for abatement costs. Pollution taxes will be raised (the governments in the model act in the interests of the population as a whole), which in turn induce firms to take additional abatement measures to avoid the tax. The pollution per unit of output will then decline (the technique effect).

The authors show that, if the demand for environmental quality increases more than proportionally with income, it is theoretically possible that the technique effect will neutralize the scale effect. However, the technique effect will not neutralize *both* the scale effect and the negative composition effect for South, which has a comparative advantage in polluting industries due to more lax environmental standards. The conclusion is therefore that trade liberalization will mitigate local environmental prob-

53 See, e.g., Markusen (1975), Pethig (1976), Siebert (1977), and McGuire (1982).

54 In cases where some environmental indicators improve and others decline, it may be difficult to reach a verdict on the net effect.

55 Other models that take into account classical factors of comparative advantages, i.e., capital and labour abundance, generate the opposite prediction. We shall return to this point further down.

lems in developed countries (North) and magnify the problems in developing countries (South).

Another interesting result from this model, which has a bearing on trade, is that balanced growth between North and South does not increase pollution in the world. The reason is that environmental standards in North and South will then rise in tandem and thereby keep the industrial composition unchanged. Should North grow faster than South, however, emission standards will diverge further, leading to the expansion of polluting industries in South and corresponding contractions in North. This would increase overall pollution, since the average pollution per unit of output will go up. Should South grow faster than North, the opposite pattern will emerge. South's emissions standards will converge upward towards the standards of North, thereby reducing overall pollution.[56] A corollary of this finding is that trade liberalization, to the extent it adds momentum to income convergence, may help solve the world's pollution problems. Indeed, since open economies grow faster than closed economies, and since trade barriers are generally higher in developing countries than in developed countries (with some notable exceptions, including agriculture, textiles and clothing), further trade liberalization may be beneficial to the global environment.

In a companion paper, Copeland and Taylor (1995) carry out a similar exercise, with the critical difference that pollution is no longer assumed to be local but global. An example would be global warming driven by CO_2 emissions. The authors assume that emissions are limited by self-imposed national quotas implemented with nationally tradable emissions permits. As trade is liberalized between North and South, the usual composition effect arises, with clean industries expanding in North and polluting industries in South. The market price of pollution permits will then fall in North (since less polluting industries do not have as much use for them) and rise in South. The second set of adjustments is that South will find it optimal to increase the number of emissions permits to accommodate the more polluting composition of the national output. North's best response is to call in some of the emissions permits at home in order to offset the effects on the global environment. However, unless the offset is 100 per cent, which is unlikely, the trade equilibrium will involve higher emissions in the world than before trade was liberalized.[57]

A related paper by Chichilnisky (1994) takes as its starting point the observation that property rights over natural resources are often ill-defined in the South (developing countries) in comparison with the North (developed countries). Specifically, natural resources are often managed as common property systems in the South, with open (free) access. As noted in the previous section, such policies are renowned for causing overexploitation, since nobody has an individual incentive to conserve the resource. A simple model is used to show that the "tragedy of the commons" is exacerbated by trade between the North and the South. What drives the result is essentially that South has an apparent (as opposed to genuine) comparative advantage in natural resource extraction because of ill-defined property rights. South will then specialize in resource-intensive goods to a greater extent than it would have done had the property rights been well defined and natural resources managed in a sustainable way. Again, the problem is not trade per se, but weak property rights regimes and associated overexploitation of natural resources, which become even worse as demand from the world market is added to domestic demand.[58]

The results reported above are based on the critical assumption that comparative advantages in the world are determined by differences in environmental standards and resource management. These differences are in turn related to differences in per capita incomes, whereby richer countries adopt stricter environmental standards and better resource management schemes. If this were the whole story, trade liberalization would reduce environmental degradation in developed countries, exacerbate the degradation in developing countries, and increase degradation as far as global environmental problems are concerned. The moral of the story is that trade liberalization needs to be accompanied by multilateral agreements to safeguard the global environment.[59]

However, the assumption that comparative advantages are driven solely by differences in environmental standards must be questioned. Even in the world's richest country, the United States, abatement costs are only a tiny fraction of production costs, or 1 per cent on average for the US industry, rising to roughly 5 per cent for the most polluting industries (see Section IV for details). Moreover, it is the absolute difference in regulatory stringency that matters for comparative advantages not the abatement cost in any individual country. If the regulations in developing countries are, say, half as stringent, the cost disadvantage would be limited to an average of 0.5 per cent of production costs, rising to 2.5 per cent for the most polluting industries. Other factors determining comparative advantage could easily dominate such small policy-induced cost differences.

The classical explanation of comparative advantage focuses on two factors: capital and labour. Other things being equal, countries with a capital-labour ratio that exceeds the world average have a comparative advantage in capital-intensive goods, and vice versa. Since developed countries tend to be capital abundant relative to develop-

56 These results are only proven under the somewhat special assumption that the technique effect just neutralizes the scale effect.

57 In the model, global emissions will remain at the pre-trade level only if trade between North and South eliminates all income differences between them. Not even the most enthusiastic trade advocate would argue that trade alone would achieve a full convergence of incomes, although it is possible in standard trade models under certain circumstances (such as when factor endowments are not too different).

58 Brander and Taylor (1997) qualify Chichilnisky's result in a long-term version of her model. They note that countries with open access regimes will tend to run down their natural resources even in the absence of trade, and if this process has already gone far enough before trade is opened up, trade may actually give the resources a breathing space. For example, a country that has overfished its coastal waters and opens up to imports of fish may drive some of the domestic fishermen out of business, which in turn will give the fish stocks a chance to regenerate. The paper also examines the underlying reasons for overexploitation of natural resources. Apart from ill-defined property rights, a large population in relation to the resources base is a key factor in overexploitation.

59 This is one reason for why some in the environmental community would argue that it is necessary to arrest further trade liberalization until environmental safeguards are put in place.

ing countries, the former have a comparative advantage in capital-intensive production and the latter in labour-intensive production. If we review the data on the sectors that face the highest abatement costs in the United States, which presumably are also the inherently most polluting industries, they include industrial sectors such as pulp and paper, non-ferrous metals, industrial and agricultural chemicals, iron and steel, and petroleum refining. These sectors are among the most capital-intensive sectors of all[60] and will hence have a natural tendency to conglomerate in capital-abundant countries according to standard trade theory. It is questionable, indeed, if a cost disadvantage of 1 or 2 per cent because of higher pollution-abatement costs in developed countries will turn comparative advantages 180 degrees around.

If the classical pattern of comparative advantage prevails, that is, is not reversed because of 1 or 2 per cent higher pollution-abatement costs, the previous results are turned on their head. As shown by Antweiler, Copeland, and Taylor (1998), trade between developed and developing countries will then rather increase pollution in developed countries (because of increased specialization in capital-intensive production), reduce pollution in developing countries (because of increased specialization in labour-intensive production), and reduce pollution overall in the world (because a large share of the polluting production will take place in developed countries with stricter environmental regulations).

To summarize, the above theoretical review has demonstrated that there is no simple one-to-one relationship between trade and the environment, and that the results are often sensitive to the assumptions adopted by individual models. The most robust result is that trade will mitigate local pollution problems in countries with a comparative advantage in industries that tend to be inherently cleaner and magnify local pollution problems elsewhere. This result is almost definitional. As trade is liberalized, global pollution problems will get worse *if* differences in environmental standards dominate classical factors of comparative advantage (capital abundance for developed countries and labour abundance for developing countries), and improve *if* classical factors of comparative advantage dominate differential environmental standards. We have argued that the second case is likely to hold sway because of the relatively tiny share of production costs that is attributable to pollution abatement. Ultimately, however, this is an empirical question.

Let us also stress that general equilibrium models of trade and environment are still in their infancy. The field started just a few years ago. It is possible that future models that account for other factors of production shaping comparative advantages, such as natural resources or the distinction between skilled and non-skilled labour, may arrive at a different set of conclusions. Thus, in wait for more elaborate theoretical models, we should be somewhat cautious in our conclusions.

B. Empirical overview

Turning now to the empirical side, let us start with the issue of whether differences in environmental standards can reverse the classical pattern of comparative advantage. Such tendencies would presumably be reflected in global trade patterns. As will be shown, very little evidence points in this direction.

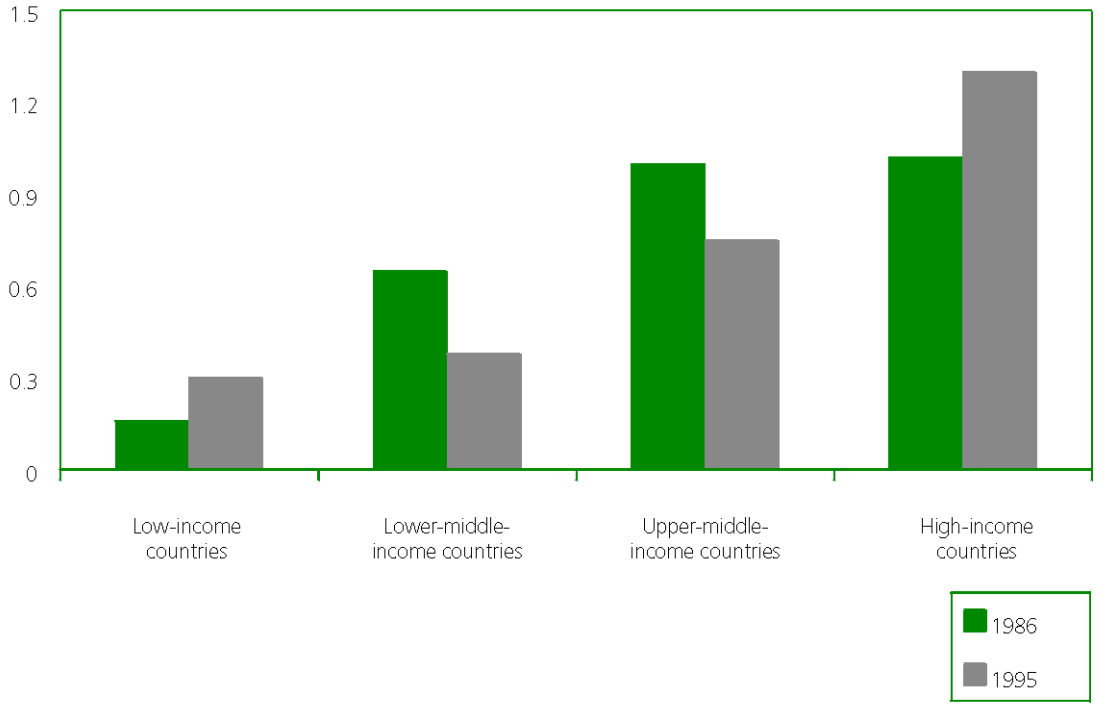
Tobey (1990) finds no evidence to suggest that differential environmental standards affect global trade patterns to any significant degree. Rather, trade patterns were found to be determined by standard factors of comparative advantages, such as capital, labour and natural resource endowments. Likewise, reviewing changes in international trade between 1970 and 1990, Sorsa (1994) finds that industrialized countries' share of manufacturing exports in the world has declined from 91 per cent to 81 per cent. However, most of this decline was recorded in labour-intensive sectors such as textiles, apparel, footwear and other light manufacturing, in which the comparative advantages have drifted to developing countries with lower labour costs. In contrast, developed countries' share of world trade in "environmentally sensitive sectors" (the politically correct terminology nowadays for goods produced by polluting industries), which are by nature relatively capital intensive, remained essentially unchanged (81.1 per cent in 1990 compared to 81.3 per cent in 1970). Likewise, Xu (1998) found no evidence that developing countries have gained a comparative advantage in polluting industries over the period 1965 to 1995.

The evidence presented by Low and Yeats (1992) seems, at least at first sight, to suggest otherwise. They analyze the secular development of the pollution-intensity of trade in developed and developing countries between 1965 and 1988, a period in which environmental standards were gradually upgraded in developed countries. Polluting industries are identified as those incurring the highest level of pollution abatement and control expenditures in the United States, including chemicals, non-ferrous metals, iron and steel, pulp and paper, petroleum products, and other raw-material processing. The study found that developing countries had increased their share of world trade in these industries from some 22 to 26 per cent, with a rising share of pollution-intensive exports in Eastern Europe, Latin America and Western Asia, and a falling share (since the mid-1980s) in South-East Asia. These figures suggest that comparative advantages in pollution-intensive production drifted somewhat towards developing countries during this period, although the authors are not able to pin down the role of environmental standards in this process. As they note, many of the polluting industries are those associated with the early stages of industrialization. And this industrialization would presumably have come about even without a cost advantage of 1 or 2 per cent over industrialized countries because of more lax environmental standards.

In any case, the tendency reported in Low and Yeats seems to have been reversed in the 1990s, according to the World Bank (1998). Chapter 3 of *World Development Indicators* presents data on net exports of pollution-inten-

60 According to Repetto (1995), "petroleum refining, chemicals manufacturing, pulp and paper, and primary metals—the environmentally sensitive industries in which pollution abatement costs represent a relative large fraction of output value—are all among the industries with the fewest employees per million dollars in shipment." (p. 22.)

Figure 6: Export-import ratio in pollution-intensive goods



Source: Reproduced from Figure 3b, World Bank (1998).

sive goods for different countries for 1986 and 1995 respectively. The results (Figure 3b, p. 113) are reproduced above. Contrary to the common perception, the results show that developing countries, with a few exceptions, do not specialize in highly polluting industries. Rather, they import more pollution-intensive goods than they export (the export-import ratio is less than one in these industries), while the opposite is true for developed countries. In addition, developed countries have strengthened their comparative advantages in polluting industries over the last decade, in spite of stricter environmental standards, as becomes evident when comparing the 1986 and 1995 data. As concluded in the World Bank report, pollution-intensive production increasingly takes place in countries with relatively stringent environmental regulations.

In summary, evidence based on the pollution-intensity of trade does not seem to support the perception that developing countries are gaining a comparative advantage in pollution-intensive production because of lax environmental regulations. The tendency, at least in the last decade, is rather that developed countries are strengthening their position in polluting industries, which suggests that classical factors of comparative advantages predominate over differential environmental standards. This is not surprising, since polluting industries tend to be very capital intensive, and since abatement costs, even in countries with the most stringent regulations, represent only a small percentage of production costs.

As explained earlier, if classical factors of comparative advantages predominate over differential environmental standards, as they seem to do, further trade liberalization will reduce average pollution per unit of output in the world because of a benign composition effect. In other words, trade liberalization will shift more pollution-intensive production to developed countries and thereby bring down the emissions per unit of output because of stricter regulations. However, total emissions may still increase if the scale effect overrides the technique effect, that is, if production expands faster than the reduction in the pollution per unit of output.

The study by Antweiler, Copeland, and Taylor (1998) referred to earlier suggests that total emissions could fall. The empirical evidence is based on the relationship between trade and ground level SO_2 concentration. The data cover 44 countries over the period 1971 to 1996. Decomposing the impact of trade into the usual composition, scale and technique effects, they found evidence that trade changes the composition of national output in a more polluting way for capital-abundant countries. This suggests that classical factors of comparative advantages are important, but *also* for the poorest countries, in which lax environmental regulations may have had an influence. In other words, SO_2-intensive production seems to be migrating from middle-income countries to both richer and poorer countries,[61] leaving the net composition effect on the environment undetermined. At the same time, the technique effect seems to dominate the scale effect. The authors find that, other things being equal, a 1 per cent increase in the scale of economic activity raises SO_2 concentration by 0.3 per cent, while the technique effect ac-

61 Note that this finding is consistent with Figure 6.

Table 4: The impact of the Uruguay Round on air pollution (percentage change)

	NO_2		SO_2		CO		SPM		CO_2	
	Comp. effect	Net effect	Comp. effect	Net effect	Comp. effect	Net effect	Comp. effect	Net effect	Comp. effect	Net effect
EU	0.1	0.2	0.3	-0.4	0.2	-0.3.	0.2	-0.3	..	0.4
USA	0.1	0.1	0.4	-0.7	0.1	-0.6	0.2	-0.8	..	0.3
Japan	0.3	0.1	2.0	2.0	0.3	-1.0	0.3	-0.5	..	0.4
China	-0.3	1.6	-1.8	2.1	-0.1	1.8	-0.9	2.0	..	1.4
East Asia	-0.1	2.0	-3.1	1.8	-1.9	1.9	-3.0	1.7	..	1.7
South Asia	-0.5	1.0	-0.6	1.3	-0.5	1.3	-0.4	1.4	..	1.7
Africa	0.2	2.0	-0.1	2.8	-0.1	2.4	0.0	2.7	..	1.8
Latin America	0.6	0.9	0.5	0.7	0.2	0.8	0.4	0.6	..	1.0
Eastern Europe	0.2	0.1	-0.1	0.0	0.1	0.2	0.1	0.0	..	0.1
Global	**0.04**	**0.5**	**-0.3**	**0.2**	**-0.05**	**0.1**	**-0.1**	**0.1**	**..**	**0.5**

companying higher incomes reduces pollution by 1.4 per cent, resulting in a net reduction of 1.1 per cent. For the average country, increased trade may therefore reduce SO_2 emissions, although capital-abundant and poor countries may see increased emissions as they absorb a larger share of air-polluting industries.

C. Applied models

Let us end this section by reviewing some applied models that try to simulate the environmental effects of trade liberalization. There exist off-the-shelf computable general equilibrium models of the world economy in which countries are linked through trade flows. The most notable efforts in this direction are the models developed by the Global Trade Analysis Project (GTAP), a consortium of national and international agencies based at Purdue University.[62] One problem with using these models for environmental assessments is the lack of industry-specific pollution data (pollution per unit of output) on a country-by-country basis. If such data were available, one could first simulate changes in production and consumption patterns that take place as trade is liberalized and then use these results to calculate the associated changes in pollution. Such an exercise would capture the composition and scale effects of trade but not income-induced changes in pollution coefficients. To account also for the technique effect, one would need to know how different governments respond to income growth in terms of upgrading their environmental standards. In short, while feasible in theory, data problems have prevented fully satisfactory applied analyses of how trade liberalization affects the environment. Nevertheless, there have been some initial attempts that are worth reporting.

Cole, Rayner, and Bates (1998) estimate the impact of the Uruguay Round on five air pollutants; nitrogen dioxide (NO_2), sulphur dioxide (SO_2), carbon monoxide (CO), suspended particulate matter (SPM), and carbon dioxide (CO_2). They start with the results of Francois, McDonald, and Nordström (1996) on the changes in production in various sectors and regions as a result of the Uruguay Round. They then combine these results with estimates of the pollution intensity of various sectors in the United States. Since they do not have sectoral pollution data for other countries, they use the US coefficients scaled upward or downward to make the total emissions consistent with the data. Finally, to account for the income-driven technique effect, they estimate the average relationship between per capita income and per capita emissions in the world, i.e., the environmental Kuznets curve (see Section V). The results are reproduced in Table 4, which shows the estimated changes in the emissions of the various air pollutants attributed to the Uruguay Round.

As far as the composition effect is concerned, the Uruguay Round is found to shift the composition of national output towards more air-pollution-intensive manufacturing in developed countries (the European Union, United States, and Japan) and in the other direction in developing countries (with the exception of Latin America). This is a reflection of developed countries' comparative advantage in capital-intensive production. However, in

62 This model was used by the WTO Secretariat in evaluating the economic effects of the Uruguay Round. For more information on the GTAP model and applications of this model, see the GTAP Website: www.agecon.purdue.edu/gtap.

spite of the composition effect, some air pollutants are projected to go down.[63] The reason for this is that the income-induced technique effect dominates both the scale and composition effects. The reverse is true for Asian developing countries, in which air pollution is projected to increase. This is because of the rapid expansion of economic activity, which is not moderated to the same extent as in developed countries by a positive technique effect (driven by stricter emissions regulations). In turn, this is a result of the non-linear relationship between income and pollution (see Section V for details). As far as developing countries in Africa, Latin America and Eastern Europe are concerned, air pollution is projected to go up, because of both a generally negative composition effect and a scale effect that is not completely counterbalanced by the technique effect. Finally, note that NO_2 emissions are projected to increase in all countries. The reason for this is that the turning point of the EKC (the per capita income level at which pollution starts to decrease) is much higher for NO_2 than for SO_2, SPM, and CO, respectively. Likewise, CO_2 emissions are projected to increase everywhere for the same reason (an even higher turning point).[64]

The projected increase in air pollution attributed to the Uruguay Round is estimated at between 0.1 and 0.5 per cent of base emissions. These increases should be weighted against the estimated income gain of between $200 to $500 billion. If the political will existed, a small fraction of this gain (a few percentage points according to the study) would suffice to pay for the additional abatement costs to redress the environmental impact.

Lee and Roland-Holst (1997) further demonstrate the point that income gains of trade could in principle pay for the additional abatement efforts to negate any repercussions on the environment, and still leave a positive economic benefit. Their case study is a three-region simulation model, comprising of Indonesia, Japan and the rest of the world. The base case is a unilateral removal of all trade barriers in Indonesia. This would lead to a profound structural change in Indonesia's industrial composition. Polluting and resource degradation sectors such as petroleum, lumber, mining, chemicals, and non-ferrous metals would expand, whereas other sectors that are less polluting would contract. At the same time, if trade liberalization is combined with stricter environmental regulations, the authors show that the harm to the environment can be undone and still give a net economic surplus.

One problem of environmental assessments of trade liberalization is the lack of environmental data for developing countries. A promising approach to overcome this problem is due to Dessus, Roland-Holst and van der Mensbrugghe (1994). On the basis of US data, they estimate that some 90 per cent of toxic emissions can be explained by less than 10 inputs, including fossil fuel, ferrous and non-ferrous ores, fertilizers, and various chemicals. Environmental appraisals of trade reforms can then be undertaken on the basis of simulated changes in the use of polluting intermediate inputs for which data is more readily available than emissions data.

The authors used this approach to study trade policy reforms in Mexico and, more recently, Chile.[65] For the first exercise, they based their analysis on a large-scale computable general equilibrium model of the Mexican economy.[66] The model assumes that there is some substitutability between different inputs. Another important element of the model is the vintage structure of capital. That is, new capital that becomes available as the economy grows and older capital depreciates offers greater substitutability between different inputs than current vintages that are designed for certain input composition. On the basis of these key assumptions, the authors simulate structural changes in the Mexican economy arising from labour growth and investments for given trade barriers over the period 1990 to 2010. They then use this base scenario to evaluate the environmental effects of NAFTA. The effects turn out to be relatively minor. The composition of the Mexican economy changes slightly towards more labour-intensive goods that use less polluting inputs. At the same time, because of the increased scale of economic activity, including expansion of some polluting sectors, such as oil, coal, and gas, the overall effect on the environment is negative for most categories of pollutants. The authors also simulate the effects of combining NAFTA with environmental reforms to speed up the substitution towards cleaner inputs. The experiment can be thought of as capturing the effects of the environmental side-agreement to NAFTA. The finding is encouraging—the environmental effects of increased trade can be negated without giving up much of the income gain, provided that governments use efficient (market-based) policies to combat environmental degradation.

D. Concluding remarks

Numerical models have confirmed the theoretical results that trade liberalization can harm the local environment in countries with a comparative advantage in polluting industries and improve the local environment elsewhere. At the same time, the simulations indicate that the income gains of trade could, in principle, pay for additional abatement costs in order to undo any negative repercussions on the environment and still leave a net surplus. In other words, by combining trade and environmental reforms one should be able to find ways to raise incomes without compromising the natural environment. In this sense, at least, there is no inherent conflict between trade and the environment. Rather, the conflict arises as a result of the failure of political institutions to address environmental problems, especially those of a global nature which require a concerted effort to solve. Of course, political shortcomings may in turn be related to the globalization of the world economy, which has made capital more mobile and hence more difficult to regulate for individual countries. This line of argument will be investigated in detail in the next section.

63 Note that the net effect for S02, CO, and SPM emissions is in the negative in the European Union, United States, and Japan.

64 If the Kyoto Agreement is successful, emissions will not grow as much as suggested in this exercise for developed countries. However, it is unclear whether this would reduce total emissions of CO_2 because of the lack of commitment from developing countries.

65 Beghin, Roland-Holst, and van der Mensbrugghe (1994) and Beghin, Bowland, Dessus, Roland-Holst, and van der Mensbrugghe (1998), respectively.

66 The name of the model is TEQUILA: Trade and Environment eQUILIbrium Analysis.

IV. Does Economic Integration Undermine Environmental Policies?

As observed by Levinson (1996a), "[F]or nearly a quarter century, since industrialized nations began legislating and enforcing environmental laws with substantial compliance costs, critics of those regulations have protested that stringent environmental regulations force manufacturers of pollution-intensive products overseas. Jargon such as 'eco-dumping', 'race to the bottom', and 'competition in laxity' has been used to describe a feared consequence of this phenomenon, that different jurisdictions competing to attract international businesses would create pollution havens by lowering their environmental standards below socially efficient levels." (p. 429)

The race-to-the-bottom hypothesis was initially developed in the context of local competition for investments and jobs within federal states with decentralized responsibilities for the environment. A case in point is the United States.[67] Before 1970, individual states were free to define their own standards as they saw fit. In principle, this should produce a desirable diversity of standards tailored to local conditions and willingness to pay for environmental amenities. What was right for California was not necessarily right for North Dakota, and so on, because of the huge differences in climate, ecological conditions, population density, and per capita incomes. There were essentially two reasons why the decentralized regime came under pressure. The first was the failure of the system to account for interjurisdictional pollution problems, i.e., pollution spilling over from one state to another. The second was the inability of governments to regulate mobile industries that could defeat the measures by relocating elsewhere in the country.[68] In fact, very little progress was made, and under growing pressure from the awakening environmental opinion, the US Congress concluded that a federal initiative was necessary to break the foot-dragging at the state and local levels. Starting in 1969, a series of laws was passed—among them the National Environmental Protection Act (1969), the Clean Air Act (1970), the Clean Water Act (1972) and the Endangered Species Act (1973)—which gradually shifted the initiative and regulatory authority from the local level to the federal level.

The very same arguments can and have been made with increasing frequency at the supranational level. Indeed, many pollution problems transcend national borders and some are truly global in scope, such as depletion of the ozone layer and global warming. Moreover, while capital was more mobile within countries in the past, and hence more susceptible to domestic variations in environmental standards, international mobility is gradually increasing. The average growth rate of foreign direct investment (FDI) in recent decades has been 12.5 per cent a year, roughly twice as fast as growth in world merchandise trade and five times faster than growth in world GDP.[69] The tremendous growth in FDI has been underpinned by the removal of investment barriers, especially since the mid-1980s. Virtually all developing countries today are open to FDI, and increasingly also the least-developed countries. The investment regimes of OECD countries were largely liberalized already in the 1950s and 1960s. The roll-back of investment barriers, in combination with reduced trade barriers, has increased the location options for multinational firms, which in turn has reduced, or at least, is *perceived* to have reduced the environmental policy autonomy of individual nations.

While international competition for investments and jobs can play out in many ways,[70] the particular concern of environmentalists is that governments will sell out their environment rather than offering, say, a tax break. Indeed, some evidence suggests that new regulations are occasionally defeated in the political arena on the grounds that they would harm national competitiveness.[71] Such defeats are fomented by the perception in industrialized countries that environmental regulations are costing domestic investment and jobs. For example, an astounding one third of the respondents to a 1990 poll by the Wall Street Journal thought it was somewhat or very likely that their own jobs were threatened by environmental regulations, compared to actual data that suggest that less than 0.1 per cent of the lay-offs (that is, one in a thousand) in the United States between 1987 and 1990 were related to stricter regulations.[72] Given such public perceptions, or misperceptions as they seem to be, governments may find it exceedingly difficult to upgrade environmental standards in the face of vocal criticism from affected industries and workers.

A competitiveness-driven "regulatory chill" may not just slow down the environmental agenda, but also the trade agenda. For example, NAFTA was opposed by the environmental community, who argued that it would lead to mounting pressure to reduce US and Canadian environmental standards to Mexican levels to keep investments and jobs at home. These concerns were echoed by the trade unions and their allies, notably the leader of the Reform Party of the United States, Ross Perot, who captured people's imagination by using the image of a "giant sucking sound" of jobs migrating south of the Rio Grande. Similar concerns were raised about the Multilateral Investment Agreement (MAI) negotiated under the auspices of the OECD. Opposition to the MAI was voiced on the grounds that it would give multinational firms too

67 Peltzman and Tideman (1972), Swire (1996) and Esty (1996).

68 Levinson (1996a) cites the following statement of Louisiana Governor Edwin Edwards to illustrate this point: "We did what we thought was best for the people and the economy of Louisiana. We accommodated industry where we thought we could in order to get the jobs and the development, and in some instances knowingly and advisedly accepted environmental trade-offs." (p. 443.)

69 See WTO (1998a), Annex C.

70 See UNCTAD (1996).

71 See Esty and Geradin (1998) for some recent examples.

72 See Goodstein (1995).

much leverage over host governments, a leverage that could potentially be used to challenge new environmental taxes and regulations.

Given the importance of these arguments both from a trade and an environmental perspective, it is worth reviewing carefully the evidence relating to this matter. Is it true, as many seem to believe, that stringent environmental regulations undermine the competitiveness of domestic industries? Do polluting industries relocate from developed to developing countries in order to take advantage of lax regulations? Are environmental standards bid down in accordance with the race-to-the-bottom hypothesis? Or, if not, has the globalization of the world economy been followed by increased political reluctance to address environmental problems as suggested by the regulatory chill hypothesis?

A. The competitive consequences of environmental regulations

Comparison of compliance costs with different national environmental regulations is seriously hampered by lack of data. Only the United States has regularly published data on compliance costs based on an annual survey of US industry. This survey was discontinued for budgetary reasons in the mid-1990s, however. Nor are we aware of any indexes that allow comparisons of the stringency of environmental regulations in different countries, except for an index produced by UNCTAD in the mid-1970s with doubtful relevance today.[73]

The US data, although a few years old, can at least give us an idea of the abatement costs incurred by various industries, and hence the potential cost savings of moving production offshore to a country with lower standards. As detailed in Table 5, based on the pollution-abatement costs and expenditures report of the Census Bureau (1996), the average industry in the United States spent some 0.6 per cent of its revenue (value of shipment) on pollution abatement, rising to between 1.5 and 2 per cent for the most polluting industries—petroleum and coal products, chemicals and allied products, primary metal industries, and paper and allied products.

While these figures may not seem that high, it should be stressed that the data refer to industry averages on the 2-digit Standard Industrial Classification (SIC) level, and that the pollution abatement cost (PAC) may be higher for certain industries within each industrial classification category. For example, an earlier compilation by Low (1992) at the 3-digit level found PAC of up to 3.2 per cent of the value of shipment. The extent to which these estimates apply to other OECD counties is unclear. However, according to an OECD (1997) study, "direct environmental costs are *believed* (emphasis added) to account for 1-5 per cent of production costs." (p. 7)[74]

While additional costs of 1 to 5 per cent could be high for an industry that is subject to stiff international competition, some observers have argued that the numbers look worse than they are. This argument is foremost associated with Professor Michael Porter of the Harvard Business School—the "Porter hypothesis".[75] The argument is essentially that regulatory pressure just like competitive pressure encourages industrial innovations that often result in new commercially valuable products or industrial processes. One example is DuPont's strategy to be in the forefront of the development of substitute products for ozone-depleting CFCs, which has apparently given the company an advantage in the international competition.[76] Another example can be attributed to US Vice President Albert Gore (1992), cited in Palmer et al. (1995, p. 342), who writes that "3M, in its Pollution Prevention Pays program, has reported significant profit improvement as a direct result of its increased attention to shutting off all the causes of pollution it could find."

The Porter hypothesis has been the subject of a great deal of empirical research. For example, Jaffe and Palmer (1997) examine the statistical relationship between pollution-control expenditures and innovative activity across US industries. The authors find that pollution-abatement expenditures do trigger additional R&D, but seemingly of a limited commercial value beyond helping firms comply with the regulations. Morgenstern et al. (1997) estimate the change in production costs associated with a change in reported pollution-control expenditures. Their preferred statistical specification suggests that an incremental dollar spent on pollution control is associated with 13 cents increase in production costs for the average industry, with a standard deviation of 69 cents. Berman and Bui (1998) examine the effects of US air-quality regulations on the productivity of oil refineries from 1977 to 1993, a period marked by a gradual tightening of standards. They found that oil refineries located in areas with stringent regulations, such as southern California, recorded faster productivity growth than oil refineries operating under less stringent regulations, presumably because the former were forced to advance their investment plans in new technologies.

Cohen and Fenn (1997) examine whether good environmental performance harms or helps a company's bottom line. The study is based on financial and environmental data of all 500 companies included in the Standard and Poors (S&P) index, divided into 85 industries. The authors compare the performance of two investment portfolios: one "green" portfolio, including only the environmental leaders in each industry (those with an environmental record better than the median of the industry), and one "brown" portfolio including only the environmental laggards. To check that the results are robust to different environmental and financial performance measures, they make a total of 54 portfolio comparisons on the basis of different combinations of nine environmental performance measures, three financial performance measures, and three time periods. In 80 per cent of the comparisons, the "green" portfolio outperformed the "brown" portfolio fi-

73 See Tobey (1990).

74 Note that the OECD study refers to PAC as a percentage of *production costs*, whereas the Bureau of Census data, reported in Table 5, refers to PAC as a percentage of the *value of shipment*. The two concepts are closely related, however, since market prices (the value of shipment) in the long run tend to be competed down to the unit production costs, including a "normal" return to capital.

75 See Porter (1991) and Porter and Van der Linde (1995).

76 See Porter (1991).

Table 5: Pollution abatement operating costs by US industry (1993)

SIC	Industry	Pollution abatement operating costs (million US$)	Value of shipment (million US$)	Abatement cost/ value of shipment (%)
29	Petroleum and coal products	2'793	144'715	1.93
28	Chemicals and allied products	4'802	314'744	1.53
33	Primary metal industries	2'144	142'384	1.51
26	Paper and allied products	1'948	133'486	1.46
32	Stone, clay and glass products	544	65'574	0.83
31	Leather and leather products	52	9'991	0.52
34	Fabricated metal products	742	175'137	0.42
22	Textile mills products	280	73'951	0.38
30	Rubber and miscellaneous plastic products	409	122'776	0.33
20	Food and kindred products	1'368	423'257	0.32
37	Transportation equipment	1'327	414'614	0.32
36	Electronic and other electric equipment	716	233'342	0.31
24	Lumber and wood products	279	94'547	0.30
25	Furniture and fixtures	137	47'349	0.29
38	Instruments and related products	383	136'916	0.28
39	Miscellaneous manufacturing industries	85	42'426	0.20
35	Industry machinery and equipment	488	277'957	0.18
27	Printing and publishing	266	172'737	0.15
21	Tobacco products	33	28'384	0.12
	Average of all industries	18'796	3'054'287	0.62

Note: Pollution abatement operating costs include capital depreciation of the abatement equipment; filters and another material, salaries and wages for operational personnel, etc.

nancially, although the differences were only statistically significant in 20 per cent of the cases. While the result is not strong enough to give unambiguous support to the Porter hypothesis, the authors conclude that there is at least no systematic evidence that a good environmental performance comes at the expense of reduced profitability. Repetto (1995) reaches the same conclusion using a similar methodology. Pairing data on the financial and environmental performance of thousands of large manufacturing plants in the United States, he concludes that "there is no overall tendency for plants with superior environmental performance to be less profitable."

While the evidence seems to be rather supportive of the Porter hypothesis, some leading environmental economists, including Palmer, Oates, and Portney (1995), caution us against drawing too-far-reaching conclusions. They agree with Porter that early estimates of the regulatory compliance costs may have been biased upward because of unforeseen technological advances in pollution control or because of the discovery of cost-saving or quality-improving innovations. They also point out that recent surveys of pollution-control expenditures carried out by the Census Bureau have tried to account for such "offsets" and find that they are quite small, in fact just a few percentage points of the overall costs of pollution control. Moreover, when interviewing the companies referred to by Porter and his colleagues, a somewhat less optimistic picture emerges. Palmer et al. write, "while each manager acknowledged that in certain instances a particular regulatory requirement may have cost less than had been expected, or perhaps even paid for itself, each also said quite emphatically that, on the whole, environmental regulation amounted to a significant *net* cost to his company." (p. 127) In other words, we should not have any illusion that environmental regulations will cost nothing.

They do cost, but they also bring significant benefits to society and to the quality of life.

In summary, competitiveness concerns seem to have been somewhat overstated in the public debate.[77] Abatement costs in the United States, while perhaps higher than in most other countries, still only account for a few percentage points of the production costs. That is, the overwhelming share of production costs, and hence any competitiveness problem, is determined by other factors, such as wages, payroll taxes, capital costs, import tariffs on intermediate inputs, corporate taxes, and so on.[78] Of course, this is not an argument for ignoring concerns about pollution-abatement costs. On the contrary, if the costs can be reduced without compromising the environmental objective by employing modern market-based instruments instead of traditional command-and-control regulations, so much the better.[79] A natural objective for regulators, one would imagine, is to minimize the costs of achieving the environmental targets defined by society. The reason why the Porter hypothesis may hold for some industries but not for others could simply be that some industries are regulated in a more efficient manner than others.[80] Finally, and perhaps most importantly, while the debate is on costs, studies that focus on the profitability of firms have not been able to detect that superior environmental performance comes at the expense of reduced profitability. One reason, which we shall return to later, is that a good environmental profile can be a valuable market asset that allows firms to recoup pollution-abatement expenditures in the market place.

B. Do environmental regulations induce the relocation of firms?

Another way of assessing the competitive consequences of environmental regulations is to study whether the regulations affect an industry's location decision. Again, such studies are hampered by the lack of data on the regulatory stringency in various countries. Before we investigate the meagre international evidence, let us begin with a review of the US experience, which is documented in many empirical studies, especially on the location effects of federal air quality standards.[81]

Air quality standards in the United States are regulated by the Clean Air Act of 1970 and subsequent amendments. Under the 1977 amendment, each county is officially classified as being either in or out of attainment, which in turn determines the regulatory stringency that applies to that county. According to Becker and Henderson (1997), the strictest pollution-abatement requirements apply, in descending order, to: (1) new plants in non-attainment areas; (2) existing plants in non-attainment areas, because of "grandfather" rights that allow greater emissions; (3) new and existing *big* plants in attainment areas, because larger plants are subject to closer scrutiny by the EPA; and (4) new and existing *small* plants in attainment areas. Overall, regulation and enforcement activities confer a regulatory advantage to plants located in attainment areas over non-attainment areas, to smaller plants over bigger plants, and to older plants over newer ones. If these differences are important, we should expect the following pattern to emerge in the data: (i) the birth of new polluting plants should be higher in attainment areas than in non-attainment areas; (ii) the size composition should shift from bigger to smaller plants; and (iii) the survival rate of older plants with grandfather rights should increase. In fact, all of these theoretical predictions *are* confirmed by Becker and Henderson in their unique data tracking individual plants in four polluting industries (organic chemicals, plastic products, metal containers, and wood furniture) from 1967 to 1992.

Henderson (1996) provides further evidence to that effect. He finds a significant reduction of polluting plants in counties that had switched into non-attainment status, and a significant increase in polluting plants in counties with a three-year record of attainment. As observed by Henderson, while the average air quality in the United States has improved very noticeably as a result of the national standards, part of the effect has been achieved through relocation of polluting plants from more polluted to less polluted areas, and not just (as perhaps was the intention) through an upgrading of pollution controls in general, and in non-attainment areas in particular. Kahn (1997) also corroborates this observation. Combining county data on air quality with manufacturing data, he estimates each industry's contribution to air pollution. Comparing estimates for different years, he finds that emissions per unit of manufacturing output have declined steadily over time, suggesting a positive impact of the national air quality standards. At the same time, part of the air quality improvements in polluted areas has been achieved by a relocation of polluting industries. Specifically, for the case of the US "rust belt", half of the improvement in air quality between 1977 and 1987 was attributable to a decline in polluting industrial activities that moved elsewhere.

While these studies seem to provide strong evidence of a relocation effect of environmental regulations, and hence that they do in fact matter for an industry's com-

77 The same conclusion was drawn in two more comprehensive surveys by Jaffe et al. (1995) and Levinson (1996a), respectively. Jaffe et al. conclude: "Overall, there is relatively little evidence to support the hypothesis that environmental regulations have had a largely adverse effect on competitiveness, however that elusive term is defined." (p. 157.) Likewise, Levinson concludes: "Whatever the reason, there remains a large gap between the popular perception that environmental regulations harm competitiveness and the lack of evidence to support this perception." (p. 453.)

78 To give one example, the production costs of steel in the United States are estimated at $513 per tonne, of which $15 can be attributed to pollution abatement. The cost of producing steel in Mexico is estimated at $415 per tonne. Thus, even if all environmental regulations were to be removed in the United States, the production costs would still exceed the Mexican level by $83. That is, whatever the roots of the competitiveness problems of the US steel industry, only a tiny fraction can be blamed on environmental regulations. OECD (1997).

79 For example, Palmer et al. (1995) report that tradable permits for SO_2 emissions are estimated to reduce the costs of the 1990 acid rain control programme by at least 50 per cent, when measured against the most likely command-and-control alternative. Given the huge potential cost savings, regulators have to assume *their* share of any competitiveness problems that may arise because of a reluctance to give up old-fashioned command-and-control regulations for modern market-based instruments.

80 See Repetto (1995), Section VI, for a useful discussion on this point.

81 The review is limited to the more recent evidence. For a comprehensive survey, including also older studies, see, e.g., Levinson (1996a) and Jaffe et al. (1995).

Table 6: Surveys of the importance of environmental regulations to plant locations in the United States

Survey	Sample	Result
Epping (1986)	Survey of manufactures (late 1970) that located facilities 1958-1977	"Favourable pollution laws" ranked 43rd to 47th, out of 84 location factors presented.
Schmenner (1982)	*Fortune* 500 branch plants opening 1972-78	Environmental concerns not among the top 6 items mentioned.
Fortune (1977)	*Fortune's* 1977 survey of 1,000 largest U.S. corporations	11% ranked state or local environmental regulations among the top 5 factors.
Wintner (1982)	68 urban manufacturing firms	29 (43%) mentioned environmental and pollution control regulations as a factor in location choice.
Stafford (1985)	162 branch plants built in the late 1970s and early 1980s	Environmental regulations were not a major factor, but more important than in the 1970s. When only self-described "less clean" plants were examined, environmental regulations were of "mid-level importance."
Lyne (1990)	*Site Selection* magazine's 1990 survey of corporate real estate executives	Asked to pick 3 of 12 factors affectong location choice, 42% included "state clean air legislation."
Alexander Grant and Company (various years)	Survey of industry associations	Environmental compliance cost given an average of 4%, though growing slightly over time.

Source: Reproduced from Table 3 in Levinson (1996).

petitiveness, a study by Gray (1997) cautions us that other factors might be inducing firms to move. Like others, Gray finds a significant negative correlation between plant birth rates and measures of regulatory stringency. However, contrary to what one *should* expect to find, there is no significant difference between the impact on highly polluting industries and industries in general. That is, clean industries shun non-attainment counties at the same rate as polluting industries, which suggests that there is something else about non-attainment areas that makes them less attractive to invest in. For example, polluted areas may not be particularly nice to live in, so when the population and purchasing power decline in those areas, industries may follow in the tracks of the people (workers) rather than vice versa.

Further doubt is cast by survey evidence (see Table 6) in which managers were asked to rank factors of importance for their location decisions, including environmental compliance costs. The general impression from these surveys, whatever their worth, is that environmental regulations are only of marginal importance, with the possible exception of self-declared "less clean" industries that tend to give environmental compliance costs a higher weighting in their location decisions.

In summary, the US experience suggests that compliance costs could have an impact on the location of polluting plants. However, there are some remaining questions that need to be addressed before making a definite assessment. As Gray (1997) points out, not only do polluting industries shun polluted areas with stricter regulations, but so do all kinds of businesses, including clean industries that are not directly affected by such regulations. This suggests that other factors are involved in a firm's location choice, including perhaps even the pollution itself. That is, industries may want to be located where the markets are, and polluted areas may represent shrinking markets. The intriguing policy conclusion would then be that strict environmental regulations, by attracting people that want to live in an unspoiled environment, may indirectly attract industries rather than driving them away.

C. International evidence

Turning now to the international dimension of the issue, do polluting industries migrate from countries with high environmental standards to those with low standards? Some indirect evidence with bearing on this issue has already been reported in Section III. Specifically, studies of trade patterns have not found much evidence that developing countries have taken over the dirty end of production.

Of course, trade data can only provide indirect evidence on the issue. However, studies on FDI flows do not seem to give a different answer. For example, analyzing

outward investment from the United States in 1992, Repetto (1995) noted that although developing and transitional economies received 45 per cent of outward FDI from the United States, their share of environmentally sensitive industries (petroleum and gas, chemicals and related problems, and primary or fabricated metals) is considerably smaller. Only 5 per cent of the investments received by developing and transitional economies went into these sectors, compared with 24 per cent of the investments received by developed countries. He concludes that, "to the extent that the developed countries are exporting their dirty industries, they seem to be exporting them to each other, not to the less developed economies." (p. 8)

This conclusion is corroborated by Albrecht (1998), who asks whether the outflow of FDI from the United States is concentrated in dirty industries and the inflow concentrated in clean industries. In fact, it is just the opposite. Outward FDI is growing faster in clean industries, while inward FDI is growing faster in dirty industries. In other words, the United States seems to be "importing" more dirty industries than it is "exporting". Likewise, Eskeland and Harrison (1997) investigates whether inward FDI in developing countries is concentrated in polluting industries. The study covers investments into Mexico, Venezuela, Côte d'Ivoire and Morocco during the 1980s, with the first two countries receiving most of their investments from the United States and the other two from France. No evidence was found to suggest that investments in these countries were biased towards polluting sectors. The authors cross-checked these findings by estimating the impact of pollution-abatement costs on outward FDI from the United States more generally. The found that US industries that face high pollution-abatement costs at home are no more likely to invest abroad than US industries on average.

There are some studies that reach the opposite conclusion, however. For example, Xing and Kolstad (1998) found some evidence that the location of the US chemical industry was affected by the laxity of the host country's environmental regulations, as approximated by the economy-wide SO_2 emissions,[82] while other less polluting industries were not. The estimated impact was relatively small, however. If a host country allows SO_2 emissions to be increased by 1 per cent, it may be able to attract $0.27 million of additional investment from the US chemical industry. For comparison, the total annual FDI by the US chemical industry is $4 billion. Bouman (1996) reached a similar conclusion while studying outward investments from Germany. Thus, we shouldn't rule out the possibility that environmental regulations could have an impact on foreign investment decisions at the margin, at least for the most polluting industries. The point is rather that the phenomenon is relatively minor, since it doesn't show up in aggregate trade and investment statistics.

To sum up, neither studies on trade flows nor on FDI flows suggest that environmental regulations are an important factor in international location decisions. At the same time, the evidence from intra-US investment flows suggests that the exact location in a host country may at least partly be determined by regional and local variations in environmental regulations. In other words, once a host country has been chosen on the basis of more fundamental location advantages, such as labour costs, market size, corporate taxes, etc., environmental regulations may influence just where in the country the investment will be located.

D. Restraining factors that prevent the migration of polluting industries

If there are some cost savings to be made, what holds firms back from exploiting these cost differences by moving polluting plants offshore? As noted earlier, pollution-abatement costs are believed to account for between 1 and 5 per cent of production costs in the OECD. While the figures may suggest that the industries in the upper range of the span could be candidates for relocation, what matters is how much of these costs can actually be saved by moving offshore. This we do not know, since no data exists on pollution-abatement costs outside the United States. However, there seems to be a general assumption that environmental regulations are more or less on a par in developed countries, so the savings cannot be very high by moving polluting industries from, say, the United States to Canada. Yet, some three quarters of all FDI in the world is directed to developed countries. The real savings are then presumably to be found by moving polluting activities to developing countries: this is at least the working assumption in the literature. However, even in this case the cost savings may not be realized for a number of reasons.

First, the absence of formal regulations does not necessarily mean that industries can pollute freely. As discussed in Pargal and Wheeler (1996), survey evidence from developing countries suggests that local communities can sometimes exert effective pressure on firms to clean up their act even without the backing of formal regulations and laws. However, it depends very much on the socio-economic structure of the community in which the plant is located, including educational and income levels. For the case of Indonesia, they found a significant difference in pollution intensity between plants in the same industry located in communities with relatively high educational and income levels and plants located in communities with low educational and income levels. The same pattern was observed by Hartman et al. (1997) on the pollution intensity of pulp and paper plants in Bangladesh, India, Indonesia, and Thailand. These findings suggest that affluent communities with a relatively educated population can exert effective pressure on industries to clean up, while poorer and uneducated communities find it more difficult to make firms behave in an environmentally responsible way. This is just another illustration of the close link between poverty and environmental degradation.

Second, even if no regulations are imposed, whether formally or informally, it may still be in the interests of firms to make at least a minimum of effort to control pol-

82 Xing and Kolstad (1998) use economy-wide SO_2 emissions as a proxy for environmental stringency for lack of more direct indexes. While not a perfect proxy, they point to the high correlation between SO_2 emissions and five other major air pollutants (NOx, volatile organic compounds, CO, total suspended particulates, and lead).

lution so as to safeguard their reputation, to avoid consumer boycotts in environmentally conscious (export) markets, and to reduce the risk of legal liabilities, should a major environmental accident occur, such as the Bhopal accident in India.[83] In fact, many multinational firms seem to be heading towards a policy of standardized technologies for all their production plants in the world, including with respect to pollution abatement. According to the US International Trade Commission (1995), "much research indicates that multinational firms tend to replicate the technologies employed in their home markets when operating in developing countries. Indeed, the ability to duplicate technology in a number of countries is deemed central to the competitive strategies of most multinationals." (p. 24) Moreover, as noted by Schot and Fischer (1993), cited in Levy (1995), by the end of the 1980s, most large firms had adopted written environmental policy statements, with the majority claiming that they go beyond the minimum standards required by local laws and regulations. Finally, as argued by Palmer et al. (1995), multinational firms base their technology decisions not only on the current regulatory framework, but on what they expect in the future. Rather than retrofitting abatement equipment at great expense at a later date, it makes commercial sense to install state-of-the-art technologies at the time the investment is made. Indeed, some empirical evidence, as in Eskeland and Harrison (1997), suggests that foreign-owned plants in developing countries tend to be less polluting than indigenous plants in the same industry, although this is not always the case.

Another indication of increasing readiness to assume greater environmental responsibilities is the rapid adoption of voluntary environmental management standards (ISO 14000) promulgated by the International Organization for Standardization (ISO). According to an ISO press release, dated January 7, 1999, some 5,000 certificates had been awarded in 55 countries by the end of 1997, an increase of 300 per cent in one year. The first standards were published in mid-1996. The ISO 14000 standards provide companies, regardless of size or type, with a common framework for analyzing and managing the environmental impact of products and processes, including performance evaluations, life-cycle assessments, environmental labelling, and auditing. Although implementation of ISO 14000 is voluntary, certification is increasingly becoming a commercial necessity. Some of the advantages noted by Lally (1998) include reduced costs of liability insurance and bank loans, less regulatory oversight, and increased access to international markets. For example, certified firms often require their suppliers to be certified as well. She concludes that ISO 14000 certification is becoming "the gateway to the global market place".

Likewise, the drive to qualify for eco-labelling seals suggest that eco-labels, or, more generally, a green profile, can be a very valuable marketing asset that outweighs the additional costs of meeting higher environmental standards.[84] In other words, the additional cost can often be recouped in the marketplace.

In addition to the market pressure exerted by the growing number of environmentally conscious consumers, the financial community has its own reasons for ensuring that the firms they bankroll or own do not have a poor environmental profile. As shown by Lanoie et al. (1997) and Dasgupta et al. (1998), share prices fall significantly when unfavourable environmental news is published, such as oil spills or violations of emissions levels. And capital markets tend to react positively to favourable environmental coverage, such as reports of investments in clean technologies or public rewards for environmental excellence. Let us also recall the studies by Repetto (1995) and Cohen and Fenn (1997), which concluded that superior environmental performance does not come at the expense of reduced profitability. On the contrary, firms with a superior environmental record tend to outperform environmental laggards in the marketplace. This suggests that poor environmental performance is associated with poor management in general, and such problems should be relatively short-lived if financial markets function properly. Moreover, the growing number of ecological funds that invest exclusively in companies with a good environmental record will most likely have a significant effect on firms' environmental performance in the future. The reason is that the investment of these funds, when they become large enough to matter, will give an extra boost to the share prices of qualifying firms, which will not go unnoticed by other firms and their owners.

The general impression is thus that multinational firms cannot escape their environmental obligations by moving polluting plants offshore. The absence of formal regulations has been substituted at least partly by informal regulations. Moreover, market forces nowadays reward good environmental performance rather than cost savings at any price. True, it has not always been this way, but the tide has arguably turned in recent years. One reason is the efforts of non-governmental organizations that have made consumers sensitive to the environmental profile of both products and producers. When consumers care, producers care. A good environmental profile is perhaps more of an asset than a liability in the international marketplace, notwithstanding somewhat higher production costs.

E. A race-to-the-bottom, a race-to-the-top, or no race?[85]

While the above review does not suggest that environmental regulations are of primary importance for competitiveness or location decisions, there has nevertheless been a heightened concern among environmentalists that the removal of trade and investment barriers will undermine national and international efforts to halt and reverse

83 The accidental release of poisonous gas from a pesticide factory resulted in thousands of dead and hundreds of thousands of injured people. It was followed by years of lawsuits and an eventual settlement with the victims that cost Union Carbide $470 million directly and perhaps even more in lost international reputation and consumer confidence. (Source: www.earthbase.org.)

84 Eco-labelling (or environmental labelling) is a guide for consumers (including procurement divisions of firms and governments) to choose products and services that cause less damage to the environment than other products in the same category. To give an indication of the growing interest in eco-labelling accreditation, the coverage of the German Blue Angel Environmental Label has grown from 45 products in 1979 to 4,500 products in 1997, according to Robins and Roberts (1998).

85 This heading is borrowed from a survey by Swire (1996). Another excellent survey is that by Wilson (1996)

the process of environmental degradation. The ability of investors to locate their capital freely wherever the returns are the highest is said to produce a "race-to-the-bottom", by which is meant a vicious circle of gradually slipping environmental regulations driven by the competition between countries for international mobile investments.

We shall now take a closer look at the theoretical foundations of the race-to-the-bottom hypothesis. We shall also discuss the counter-hypothesis of a "race-to-the-top", which holds that governments, if anything, are more likely to bid up standards in a race to *prevent* the worst polluters from locating in their territory - the "not-in-my-backyard" (NIMBY) phenomenon. We shall then review the empirical evidence to determine whether if any of these theories are supported by data, or if they are just fictions that haunt the public debate with increasing frequency.

The intellectual origin of the race-to-the-bottom theory can be found in the literature on local public finance. The early concerns of this literature were not so much with the consequences for public policies of capital mobility but of household mobility. The key result is due to Tiebout (1956), who showed that the ability of people to "vote with their feet" leads to an efficient provision of public goods, that is, a level of public services that equals what people are ready to pay for. The intuition is straightforward. If local policies fall short of residents' expectations, some will move out, and if local policies are better than the national average, some will move in. This process will continue until public services and taxes have found an appropriate balance. That is, interjurisdictional competition puts pressure on local governments to deliver a level of services that people are ready to pay for, including appropriate levels of environmental protection. In other words, if there is a "race" in any direction, the race is towards efficiency in public policy.

While this insight is fundamental and important, it does not necessarily transfer to the case where the mobility is on the producer side instead of on the household side, which arguably is a more relevant portrayal of mobility at the international level. The question, then, is the following: if labour migration is restricted, whereas capital is free to move, how does that affect public policies in general and environmental policies in particular?

Perhaps the most influential paper on this subject is due to Oates and Schwab (1988). While it was written in the context of local competition for mobile industries, the same logic applies to international competition for mobile investments. Given a long list of assumptions, including that pollution generated in one jurisdiction does not spill over into another, Oates and Schwab show that policy competition for mobile capital results in an efficient outcome, in keeping with the Tiebout model of household mobility. Each community grants emissions permits up to the point where the benefit of capital inflows in terms of increased local income is just balanced by the harm caused to the local environment. In other words, if there is a "race" in any direction, the race is in the right direction, evaluated at the preferences of the average local resident (which may not, of course, suit each and every one in the community).

However, this result is sensitive to the underlying assumptions. One critical, but arguably reasonable assumption is that governments can use alternative instruments for attracting capital, for example, reduced tax rates. In fact, to the extent that there is a race-to-the-bottom in this model, the race is played out in capital taxes that are bid down. However, should capital taxes be downward inflexible, perhaps because of equity considerations, or because no alternative taxes are available to finance public expenditures, or because the federal government has introduced a downward cap on the tax rates (a policy that is currently under consideration by the European Union to halt tax competition between member countries), environmental standards could come into play as a tool for luring investments. Indeed, with this restriction on the model, environmental standards are bid down to socially inefficient levels, if not all the way down to rock bottom.[86]

Another factor that may induce a race-to-the-bottom is a biased political process. A race-to-the-bottom may emerge if the industrial lobby gets the upper hand over the green lobby. Or if the green lobby has the upper hand, environmental standards would be bid up to levels that are higher than what the median voter is willing to pay for.[87] In other words, the best assurance of a reasonable outcome for most people is a democratic process in which all interested parties have equal access to the political process.

A recent paper by Kim and Wilson (1997) expands further on the possibility of a race-to-the-bottom. They show that a race-to-the-bottom may emerge even in cases where governments have access to targeted instruments for attracting capital. The critical assumption in this case is that governments have to finance a certain amount of public expenditures. If capital taxes are reduced to lure investments, labour taxes may have to be raised instead, which in turn raises the cost of production. Given this policy dilemma, governments may be tempted to relax environmental standards instead. The authors show that the equilibrium level of environmental standards will be lower than if governments could commit themselves to abstain from reducing environmental standards for the purpose of attracting capital, for example, by signing a binding multilateral environmental agreement to that effect. That is, the competition for mobile capital boils down to a standard prisoners' dilemma with a sub-optimal outcome for everyone.

Kanbur et al. (1995) study the link between increased capital mobility and environmental policies. They show that economic integration enhances the competition for FDI, which in turn puts downward pressure on environmental standards.[88] What is more, if countries are of unequal size, it may be difficult to forge a cooperative agree-

86 Wilson (1996) finds a similar result, elaborating on a tax competition model by Huang (1992). He shows that if governments have no alternative instrument to tackle unemployment, such as reduced labour taxes or more flexible labour market rules, a race-to-the-bottom may emerge as a desperate act to induce investments and associated jobs for the unemployed.

87 See Fredriksson (1999) for a formal analysis.

88 A similar result was derived by Rauscher (1991).

ment to break out of the downward spiral. They show that harmonization of standards will leave smaller countries worse off, irrespective of the level at which standards are harmonized. At the same time, a cooperative solution entailing higher standards for larger (richer) countries than for smaller (poorer) ones would be beneficial for all parties. These findings give some indirect support to the proposition of "common but differential responsibilities", which holds that developing countries should not be asked to undertake the same commitments as developed countries so as to provide room for economic development. In fact, the moral of this model is that the quest for absolute harmonization among countries may backfire, in that developing countries may not sign proposed multilateral environmental agreements.

The models referred to so far assume that all kinds of investments are equally polluting. Arguably, this is not the case. The pollution intensity varies considerably between industries, from very polluting, such as energy-intensive primary processing, to virtually clean activities such as banks and financing. This insight raises an important question: Why would governments compete for polluting industries at all if they have the option of specializing in clean industries and importing goods that are polluting to produce. This issue is studied by Markusen et al. (1993, 1995). They show that if the two alternatives generate equal income, governments would always try to attract the clean industry. The only "rational" reason to host polluting industries is if the income gain is large enough to offset the pollution costs, or if the government for some reason has no alternative than to compete for polluting industries.

Another branch of the race-to-the-bottom literature has focused not so much on competition for FDI but on the scramble for world market shares in oligopolistic industries with supernormal profits. This literature is essentially a recast of the "strategic trade policy" literature,[89] whereby the "normal" strategic instruments, i.e., export and production subsidies, are exchanged for lax environmental standards, with little explanation of why governments would resort to inefficient policy tools when they have other more direct instruments at their disposal. In any event, as shown by Kennedy (1994), there are two critical forces that determine the outcome in these models: a "rent-shifting" effect and a "pollution-shifting" effect. What governments would ideally like to do is to capture as large a stake as possible of a lucrative industry with supernormal profits, without paying the price in terms of increased domestic pollution. However, this is not possible using environmental standards alone. On the contrary, while allowing the domestic industry to capture a larger share of the world market, lax environmental standards will also increase domestic pollution. That is, both profits and pollution are shifted from abroad to home at the same time. The authors show that if pollution is *purely* local, the pollution-shifting disincentives counterbalance the profit-shifting incentives, thereby deterring governments from manipulating environmental standards for strategic industrial purposes. However, if a large enough fraction of the pollution dissipates with wind and water outside a country's own territory, the rent-shifting incentives will start to dominate, and pollution taxes will then be bid down to socially inefficient levels in the scramble for international market shares. And the less localized (more globalized) the pollution, the lower the bottom that will be reached and the greater the risk to environmental quality through international policy competition.[90]

A synthesis of the theoretical findings is presented in Table 7. To sum up the findings, there is no doubt that a race-to-the-bottom is a theoretical possibility, and that trade and investment liberalization could exacerbate such tendencies. At the same time, race-to-the-bottom models are based on assumptions that need to be investigated closely. First, as shown by Oates and Schwab (1988), if governments have more direct instruments to attract FDI, there will be no race-to-the-bottom in environmental standards. Thus, to make the case for a race-to-the-bottom, we have to explain why governments do not have, or do not use, "normal" instruments for attracting FDI and supporting domestic firms in global competition. One reason could be that the first-best instruments are circumscribed. For example, export and production subsidies may fall foul of the WTO subsidy codes. Moreover, governments may not be able to lower taxes or raise subsidies for budgetary reasons. At the same time, a review of the investment incentives used in real life—including tax holidays, tax rebates, investment grants, interest rate subsidies, duty drawbacks, government contracts, designated land at symbolic prices, subsidized public services, etc.—suggests that governments' hands are not tied to such an extent that they need to resort to environmental laxity in order to attract investments.[91]

This is not to deny that governments sometimes do resort to non-transparent or opaque policy instruments, as any (trade) economist can bear witness. As noted by Guisinger (1986), "since investors usually wish to avoid alerting competitors or the public to any special treatment which they receive, corporations are likely to prefer an opaque jumble of incentives and disincentives to transparent forms of public subsidy. Governments, too, have reasons to prefer a variety of incentives to a single incentive. An array of incentives and disincentives can divert the attention of taxpayers, who are suspicious that the government is granting preferential tax treatment for corporations." (p. 86). As emphasized by Wilson (1996), a priority of future research should be better models of the 'political market failures' that may cause governments to bypass efficient tax and subsidy policies in favour of inefficient environmental policies.[92]

89 For an introduction to the strategic trade policy literature, see Krugman (1986).

90 One problem with the strategic trade policy argument is that the results are extremely sensitive to the underlying assumptions. The question of whether there will be a race-to-the-bottom or a race-to-the-top depends on whether firms compete in quantities or prices. For more on the sensitivity of these models, see, e.g., Barrett (1994) and Ulph (1997).

91 The use of investment incentives in the competition for FDI is discussed in detail in a note by the WTO Secretariat (1998b) for the working group on trade and investment.

92 In the political economy literature, the preference for opaque and non-transparent policy instruments is known as the "theory of optimal obfuscation". In essence, the less transparent the policy, the better for the government and the favoured clients. See Magee, Brock and Young (1989).

Table 7: Race-to-the-bottom, race-to-the-top, or race-to-efficiency?

Model assumptions	Race to the bottom	Race to the top	Race to efficiency
Household mobility and localized pollution			X
Capital mobility, localized pollution and:			
access to non-distortionary taxes to finance public spending			X
access only to distortionary policy instruments and:			
high unemployment	X		
polluting industries more profitable than clean industries	X		
polluting and clean industries equally profitable		X	
Capital mobility and transboundary/global pollution	X		
Capital mobility and:			
industrial capture of the political process	X		
green capture of the political process		X	

Having said that, when pollution problems are of a local nature, governments may rather be inclined to deter the location of polluting plants in their own backyards, leading to a race-to-the-top in environmental standards. In other words, countries that are able to pick and choose between industries, may set their policies with a view to deterring polluting industries in favour of clean industries, thereby indirectly pushing the pollution problems into the backyard of countries that are in a less privileged position.

This reasoning suggests that the race-to-the-bottom hypothesis may have been misread in the public debate. If some countries dissuade the location of polluting industries in their own backyard, or possibly even trying to induce existing firms to migrate, other more passive countries will end up with the polluting end of production. These other countries often receive derogatory epithets, such as "pollution havens", although they may have done nothing to attract these industries. It is possible, therefore, that any pollution haven phenomenon is an indirect result of a NIMBY attitude on the part of richer countries, and not a conscious effort by poorer countries to become the pollution and dumping grounds of the world.[93] Thus, when analyzing data, we must not forget the general equilibrium nature of the world economy, where any given flow may reflect either a policy change at the supplying end (raised environmental standards) or a policy change at the receiving end (reduced environmental standards). Without data to discriminate between the two alternatives, we should be cautious in our conclusions.

Also, in order to keep this debate into perspective, recall that environmental economics do not suggest that environmental standards should necessarily be harmonized across countries, at least not as far as standards regarding local environmental problems are concerned. Rather, as elaborated in Section II, different standards can be expected for different countries just as standards often vary within countries. The appropriate level of environmental protection depends on the ecological conditions, such as climate, soil composition, vegetation, past pollution, and other factors that affect the carrying capacity of the region. Moreover, even if the ecological conditions were identical, international variations in standards may be desirable in order to reflect differences in income and ability to pay for environmental quality. After all, the opportunity cost of environmental polices in terms of forgone income may differ considerably among poorer and richer countries, and neither would be served well by setting the standards at the average.

F. Empirical evidence of regulatory races and chills

The empirical side of the issue is clearly lagging behind the theoretical developments. Most of the evidence that is available at this stage is of an anecdotal nature. As far

93 Indeed, one could argue that the whole issue of exports of domestically prohibited goods provides some indirect support for this view. After all, developing countries have for many years sought the collaboration of developed countries to ensure that they do not become the dumping grounds of goods that are prohibited domestically in developed countries on environmental and health grounds, such as hazardous pesticides, insecticides and unsafe pharmaceuticals. The reason why they seek this collaboration is that they themselves do not always have the expertise to assess the health and environmental risks of the products that are on offer.

as the evidence of a race-to-the-bottom is concerned, Esty and Geradin (1998) cite a 1997 study by the Canadian Institute for Environmental Law and Policy, which reports that the government of Ontario has relaxed some environmental statutes in recent years so as to accommodate the commercial interests of forestry, mining, homebuilding, and agribusiness. They also point to recent amendments of German conservation laws, which are said to "give the economy a clear priority over the environment". They further cite evidence of a potential race-to-the-bottom between the United States and the European Union. In a speech given in July 1995, EU Environment Commissioner Ritt Bjeregaard criticized what she perceived as Republican-led efforts in the US Congress to relax environmental standards, which would send a "dangerous signal" to the rest of the world (implying that the European Union may have to follow suit to level the playing field). They also point to the strong lobby that is pressuring the European Union to revise its legislative framework in the areas of waste and biotechnology so as to move from legally binding to voluntary agreements. Finally, they point to the European Community's December 1995 decision to approve a proposal to ease restrictions on the use of genetically modified organisms.[94]

While this evidence shows that there are some instances of backtracking, it is questionable if they prove that the world has entered into a new phase of gradually slipping environmental standards in keeping with the race-to-the-bottom hypothesis. More evidence is needed.

The milder "regulatory chill" version of the theory has a more familiar ring. Industries often appeal to competitiveness concerns when lobbing against environmental regulations, and sometimes with some success. To reiterate some examples cited by Esty and Geradin (1998),[95] they point to the failure of major industrialized countries (EU, US, Japan, and Australia) to adopt energy taxes for addressing climate change. In 1992, the European Commission put forward a proposal for taxing carbon dioxide and the energy content of products. This proposal was conditioned on the EU's major trading partners acting in tandem. However, initiatives to that affect in United States, Australia and Japan were defeated by the industrial lobby (arguing that it would harm their competitiveness), and in the end, the proposal was withdrawn. Another example is the UK coating industry's 1995 victory over legislation that would have forced them to reduce their emissions of volatile organic compounds (VOCs), a major contributor to city smog and respiratory health problems. The argument was again that the industry would lose out in international competition if faced with such regulations. Finally, as a general observation, Esty and Geradin claim that "in almost every political debate over environmental policy in the United States, competitiveness concerns are cited as a reason not to move to tougher standards." (p. 20).

Thus, the question, to our mind, is not whether we have a "regulatory chill" effect or not, but rather how serious is the problem? It would be serious indeed if competitiveness concerns prevent environmental standards to be raised to appropriate levels, or if governments would feel compelled to build in protectionist elements in the regulations to "compensate" the industry for the alleged competitive effects. However, the competitiveness concerns could at least potentially be turned into a positive force if governments, that find it difficult to act individually for political reasons, instead seek cooperative solutions to environmental problems. The growing numbers of multilateral environmental agreements (currently some 216, according to UNEP (1996)) may be one indication in that direction. The lasting effect of the regulatory chill may then be more procedural than substantial. That is, the initiative may have to be shifted from the national to the supranational level, just as we saw a shift from the local to the federal level in the 1970s to overcome the foot-dragging at the local level.

On the other side of the coin, there is some evidence of isolated instances of a race-to-the-top or, more accurately, policies that seem to reflect a NIMBY attitude. In a sequence of papers, Levinson (1996b, 1996c and 1997b) examines state policies in the United States with regard to hazardous waste. He documents the upward drift in hazardous waste disposal taxes from the mid-1980s onwards, a trend that seems to accord with the race-to-the-top theory. He demonstrates that tax rates are interdependent, and that the policies are designed to encourage export of waste outside the state line and deter import. A case in point is the use of two-tiered dumping fees. For example, Alabama charges (or used to charge) $40 per ton for the disposal of waste generated by local firms, and $112 per ton for imported waste. Other states have "retaliatory" tax rates to ensure that local firms are not discriminated against when dumping waste out-of-state. South Carolina, for example, charges imported waste the higher of $34 per ton or the rate charged by the exporting state for waste imported from South Carolina. In terms of the welfare implications of the race-to-the-top, Levinson cautions us against jumping to the conclusion that the policy competition has been beneficial on the whole. While the growth in waste generation may have been tempered, which is good, the reluctance to accept out-of-state waste has also led to increased decentralization of waste disposal in the United States. This may be harmful to the extent that there are economies of scale or safety in hazardous waste disposal. Moreover, when charges are bid up to deterrent levels, industries may be tempted to store waste at the industrial site or dump it illegally somewhere with potentially graver environmental consequences than if it were disposed of on grounds selected and prepared for that purpose.

Apart from hazardous waste disposal, which seems to be the showcase of the NIMBY phenomenon, we have not found other supporting evidence. Specifically, we haven't seen any empirical evidence suggesting that governments purposely try to deter inflows of foreign polluting industries and encourage outflows of domestic polluting industries. Of course, the lack of studies does not mean that such tendencies can be ruled out. It may only signify that the empirical literature is lagging behind, because of the severe shortage of data. In short, the jury is still out.

94 See Esty and Geradin (1998), pp. 17 and 18, for details and references.

95 See page 19 to 21 of Esty and Geradin (1998) for details and references.

G. Concluding remarks

While competitiveness concerns seem to have been somewhat overstated in the debate, and while data do not seem to support the hypothesis that investments are fleeing developed countries for developing countries with more lax standards, environmental initiatives are nevertheless defeated from time to time because of competitiveness concerns. This finding suggests that at least *perceived* regulatory autonomy has diminished alongside the removal of trade and investment barriers, which in turn underscores the need to seek cooperative solutions to common environmental problems in the world.

V. The Relationship Between Trade, Economic Growth and the Environment

While economic growth and per capita income are perhaps the most commonly used indicators of human advances, environmentalists have long been concerned by the consequences of growth on the natural environment. Since the end of the 1960s, numerous reports have questioned the sustainability of economic growth and the West's consuming lifestyle. The most influential report was perhaps *The Limits to Growth*, authored by the Club of Rome,[96] which predicted that key natural resources—in particular non-renewable resources such as fossil fuels—would become increasingly scarce over time and eventually exhausted if economic growth as we know it were to continue. The same report also warned that the environment's carrying capacity would become overstrained by different pollutants, and possibly collapse, unless human activities were held at bay. In short, economic growth and environmental quality were viewed as being on a collision course in which one or other would eventually have to surrender.

Three decades later, some of the earlier warnings—in particular those related to fossil fuel exhaustion—have been found to be somewhat premature. The discovery of new deposits of fossil fuels, in combination with less energy-demanding technologies, has so far kept pace with demand, and the current issue is rather whether we can afford to burn all the reserves because of the potentially disastrous consequences for the global climate. Moreover, relatively simple abatement technologies, such as catalytic converters on cars and flue gas desulphurization equipment on smokestacks (scrubbers), have proven effective in bringing down air pollution in countries were such equipment has become mandatory.

Yet, even if largely exaggerated, the early warnings served as the necessary catalyst for governments to pass environmental legislation without which some of the gloomy predictions could have come true. Moreover, the adoption of adequate environmental standards is still lagging in many places, and it is still true that economic growth without the necessary precautions is not sustainable in the longer term. One reason why environmental protection is slow to be implemented in many countries is because of low incomes. Some countries may simply not be able to afford to set aside resources for pollution abatement, nor may they think that they should sacrifice their growth prospects to help solve global pollution problems that in large part have been caused by the consuming lifestyle of richer countries.

In any event, *if* poverty is at the core of the problem, economic growth will be part of the solution to the extent that it allows countries to shift gear from more immediate concerns to long run sustainability issues. Indeed, at least *some* empirical evidence suggests that pollution increases at the early stages of development but decreases after a certain income level has been reached, an observation that has come to be known as the environmental Kuznets curve (EKC).[97] An illustration is provided in Figure 7.

However, while some evidence is in favour of the EKC hypothesis, others are not. The evidence suggests that the EKC hypothesis may be valid for some types of environmental indicators, and for different reasons, but equally invalid for other important indicators (Barbier, 1997). Those indicators that appear to demonstrate some characteristics of an inverted U-shaped pollution path are certain types of local, primarily urban, air pollution and, to a lesser extent, some types of freshwater pollutants. In contrast, pollutants of a more global nature do not seem to accord with the EKC hypothesis, notably CO_2 emissions. In essence, countries seem more prone to act on pollutants that affect their own backyard than those that degrade the global environment, although there are also some encouraging developments in this regard, such as the reduction in ozone-depleting substances (CFCs) rendered possible by international cooperation under the Montreal Protocol.

Before reviewing the EKC literature in more depth, it is worth noting why trade is an issue in this context. The most direct reason is that trade is one cylinder that propels the engine of growth. Of course, what ultimately drives economic growth are investments in physical capital, human capital, and technology. The domestic savings rate is very important in this regard, since most investments are still financed out of domestic savings, notwithstanding increasing international investment flows. The huge differences in domestic savings rates, ranging from less than 10 per cent of GDP in some of the poorest countries in the world to more than 40 per cent in some East Asian countries, is a key factor in cross-country variations in growth rates and per capita incomes. The availability of investment funds and, no less important, the quality of the investments hinge, in turn, on the economic policies pursued by a country. A number of factors are important in this regard, including financial sector development to mobilize savings and allocate funds efficiently, the rule of law, macroeconomic and monetary stability, adequate infrastructure, an educated work-force, and an open trade regime.[98]

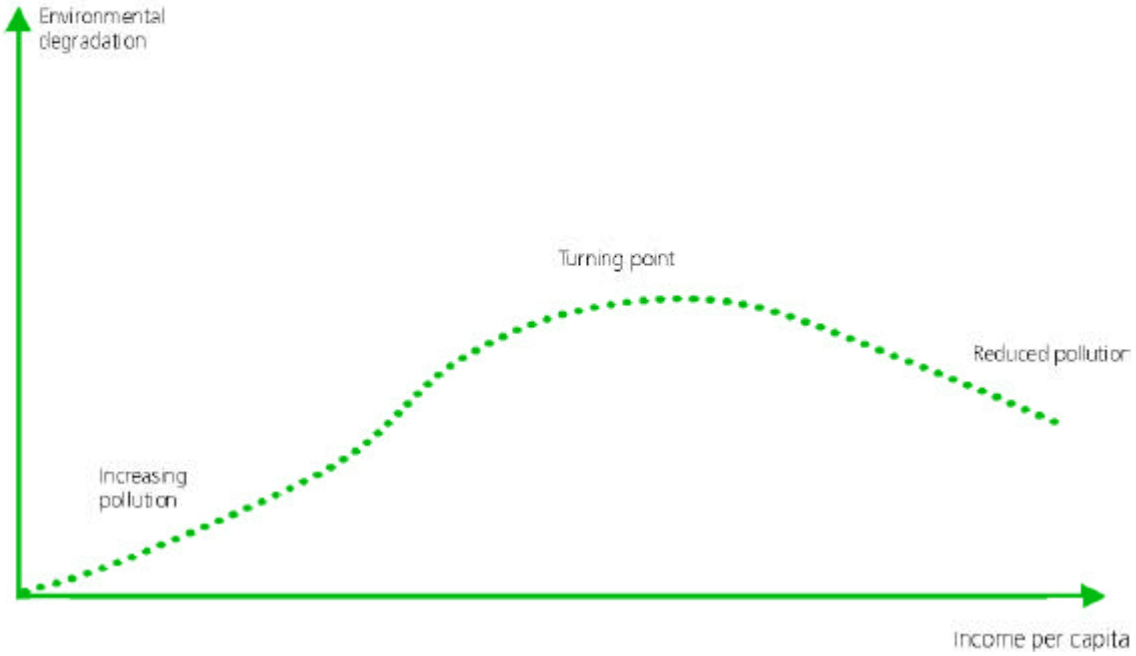
A far as the trade regime is concerned, the relationship with growth is mainly indirect and via two channels. First, trade barriers distort the price signals of an economy and thus also the allocation of scarce investment funds. Second, closed economies tend to fall behind in techno-

96 Meadows et al. (1972).

97 The hypothesis is named after Simon Kuznets (1955), who received the Nobel Prize for economics in 1971 for his work on the relationship between the level and inequality of incomes, which tend to follow an inverted U-shaped relationship. That is, income inequality tends to become worse as a country grows out of poverty, stabilizing at a middle-income level, and then gradually becoming more equal.

98 See Barro (1998) for a review of empirical growth studies.

Figure 7: The environmental Kuznets curve



logical development. Other things being equal, open economies tend to grow significantly faster than closed economies.[99]

Another reason why international trade figures prominently in this debate is that policy failures in the environmental arena are claimed to be caused or exacerbated by the pressure of international competition. Specifically, the ease with which firms can move nowadays when trade and investment barriers are at an all-time low is viewed as one important reason why governments may have become more reluctant to upgrade environmental standards. Growth driven by liberalization of the world economy may then defeat the EKC in that competitive pressure may prevent environmental standards from being upgraded to the extent necessary to turn the pollution path around. Indeed, growth *per se* does not reduce pollution; it requires that increased income be followed by tighter environmental standards.

A related argument is that economic integration may affect the shape and relevance of the EKC. It is at least conceivable that the turning point enjoyed by developed countries, if not yet in all environmental indicators, is partly a result of the migration of polluting industries to developing countries, although the evidence reported on earlier does not seem to support this assertion. In any event, if this is part of the explanation, it may become more difficult for the next generation of countries (higher-income developing countries) to pass the peak of the EKC, and harder still for the least-developed countries, since there will be no other countries left on which to pass the polluting industries. In short, the inverted U-shaped pollution path may not necessarily hold for lagging countries, nor for the world as a whole as far as global pollutants are concerned.

However, one can also make the opposite case. Developing countries may find it easier to pass the peak of the EKC because of new technologies that were not available at the time the developed countries were at the same stage of development. Thus, by facilitating the diffusion of technology, trade may rather lower the peak of the EKC.

As a final note of introduction, let us stress why the EKC hypothesis has generated such a fierce public debate. It is because of the profound policy implications were the hypothesis to be verified by data. It would turn previous warnings on their head. That is, improved environmental quality is contingent upon, or at least flows from, gains in per capita income, and not the other way round.[100] Policies would then be geared to securing economic growth, especially in developing countries, so as to speed up the

99 A detailed discussion of the linkages between trade and growth, including the empirical evidence, can be found in Chapter 4 of the WTO's 1998 Annual Report.

100 For example, Beckerman (1992) writes that "in the end the best—and probably the only—way to attain a decent environment in most countries is to become rich."

convergence of environmental standards, with a special emphasis on technology that preserves natural resources and reduces the pollution per unit of output.

A. Theoretical overview

A brief overview of the theory that underlies the EKC will help identify why it can assume the multiplicity of shapes that we observe in reality.

As mentioned before, the EKC draws its inspiration from the work of Simon Kuznets who observed that income inequality tend to become worse as a country grows out of poverty, stabilize at some middle income levels, and then gradually improve. The observation that environmental degradation may follow a similar income-dependent path was made by several economists at the beginning of the 1990s. Among them were Grossman and Krueger (1991), in a paper on the environmental consequences of NAFTA, Shafik and Bandyopadhyay (1992), in a background paper for the 1992 *World Development Report* on the link between development and the environment, and Panayotou (1993), in a paper for the International Labour Organization (ILO) on environmental degradation at different stages of economic development. The early studies were mainly empirical and it is only recently that attention has been given to the theoretical underpinnings of the EKC hypothesis.

There are several mechanisms that individually or in combination could generate an income-dependent path of pollution that eventually turns downward, including income-elastic demand for a clean environment, scale economies in pollution abatement, and structural economic changes inherent in the development process.

The most common explanation is perhaps that demand for environmental quality rises with income.[101] An inverted U-shaped pollution path is particularly likely to emerge if the demand for environmental quality rises faster with income than demand for other goods and services. This would be the case, for instance, if there exists a threshold income below which no resources are devoted to environmental protection. Indeed, countries living on, or close to, subsistence level may find it exceedingly difficult to set aside resources for environmental protection: day-to-day concerns, such as providing food and shelter, may simply predominate. Indeed, the very low saving rates in the least-developed countries, typically below 10 per cent of GDP and sometimes less than 5 per cent (which is not even enough to finance replacement investments of worn-out capital), suggest that such threshold effects may exist in reality.[102] When income grows, people presumably become both more able and more willing to sacrifice some consumption to protect the environment. Income-elastic demand for environmental quality is therefore one element that in itself or together with other supporting factors could generate a pollution path that eventually turns downward.

Evidence based on microeconomic studies suggests that demand for environmental quality indeed increases with income.[103] It should be stressed, however, that the willingness to pay for different categories of environmental amenities is not uniform, which is presumably one reason for the wide range of turning points that has been estimated for different categories of pollutants. Other things being equal, one would expect a turning point at lower incomes for pollutants that affect human health and quality of life in a very direct way, such as clean drinking water. The shape and form of the EKC may also reflect different possibilities of "defensive" action to escape pollution and associated health risks. For example, localized pollution, such as urban air pollution, can sometimes be escaped, at least by higher-income households, by moving to surrounding suburban communities. This may in turn reduce the political pressure from influential social groups to address the underlying problems.

If pollution harms production as well as people, the pollution trajectory will turn downward more rapidly.[104] A case in point is SO_2-emissions and associated acid rain which harm forestry, agriculture, and fishing. Failure to curb such emissions will harm growth itself, which is one reason why abatement measures will be introduced at relatively low income levels. (The turning point is estimated at between $4,000 and $5,000.)

The technology for pollution abatement is another factor that affects the EKC, as argued by Andreoni and Levinson (1998). To isolate the unique role of pollution-abatement technologies, they assume that the demand for environmental quality is independent of income. Given this assumption, it turns out that the EKC will take the classical inverted U-shape form *only if* abatement technologies exhibit *increasing* returns to scale, that is, if the unit cost of abatement falls with the scale of production. By contrast, with *decreasing* returns to scale, the EKC will be U-shaped, and with *constant* returns to scale, the EKC will be upward sloping over the whole income interval. In other words, for given preferences for environmental quality, the EKC hypothesis is more likely to hold sway if there are economies of scale in pollution abatement.

While no empirical evidence is put forward to support this argument, Andreoni and Levinson base their conclusions on standard microeconomic theory that scale economies in pollution abatement are likely just as for most other economic activities. Consider, for example, an abatement technology such as flue gas desulphurization equipment (scrubbers) on smokestacks to reduce SO_2 and NO_X emissions. This equipment may involve a substantial up-front investment, but may be rather inexpensive to operate once installed. The combination of high fixed costs and low operating costs suggests that the average cost per unit of abated pollution will fall as the volume of production rises. That is, there are economies of scale. If we accept this reasoning, it becomes obvious why pollution

101 See, e.g., Lopez (1994) and Selden and Song (1995).

102 Just to avoid misunderstanding on this point: it is not assumed that environmental quality is less appreciated by, or less important for, poor people. If anything, the contrary would apply, since their livelihood may depend more directly on nature's resources. The point is just that the costs in terms of forgone consumption may be prohibitively high for people living on subsistence incomes. For example, countries with a per capita income of less than $1,000 may find it considerably harder to set aside, say, 1-2 per cent of GDP for environmental protection than countries with a per capita income of $10,000 or more.

103 See, e.g., McConnell (1997) for a brief survey of microeconomic studies.

104 This point is elaborated by McConnell (1997).

may fall once a certain income level has been passed. The reason is that economic growth allows for more and more industries to reach the critical size at which the installation costs of abatement equipment can be borne with minimum impact on production costs and profits. After all, larger volumes allow fixed costs to be spread out more thinly.

Taking this reasoning a step further, we can establish a positive link between trade and pollution abatement. Since trade leads to increased specialization in the world, the size of the average production unit can be expected to increase, which in turn allows for economies of scale not just in production itself but also in pollution abatement. Put differently, without trade a country may never achieve the necessary scale economies in any production activity for it to be able to afford abatement equipment with high installation costs. Specialization and trade may therefore be part of a recipe to combat pollution.

Of course, each generation of abatement technologies has its own limitations. In other words, even if a given abatement technology exhibits increasing returns to scale, it may be necessary to install more sophisticated and presumably more costly equipment to reach an abatement target that goes beyond the limitations of the current technology. This opens up some interesting dynamic possibilities. As an economy grows out of poverty, pollution may first rise until it becomes profitable to install the most elementary and inexpensive types of abatement equipment, then fall as a result of these installations, then rise again as the scale of economic activity increases with growth until the next generation of abatement technologies becomes affordable, then fall again, and so on. Pollution may then follow a wave-like pattern in the race between increasing scales of economic activities and more advanced abatement technologies that become attainable with increasing scales. Indeed, the empirical review below will show, at least for some environmental indicators, that the EKC seems to follow an N-shaped pattern rather than the inverted U-shape. However, this may not be the end of the story. The next turn may be downward again, turning the N into an M, as the next generation of abatement equipment becomes attainable with higher production volumes and income.

Yet another factor that may explain the EKC is structural changes inherent in the development process.[105] Economic growth is a process of continuous transformation whereby certain sectors contract in relative terms (as a percentage of GDP), and possibly also in absolute terms, while others expand. A "stylized" development process may take place as follows.[106] Initially, the economy may be mainly agrarian. If the country is endowed with valuable natural resources, the next step may involve extraction of these resources combined with some basic processing. This first transitional stage is likely to be driven by demand from the world market and possibly facilitated by foreign investments (or, as in the past, colonization). The economy may then gradually move into basic manufacturing, such as textiles and clothing production on a more industrial scale, followed by more advanced manufacturing as experience and educational achievements increase. The "final" stage is presumably the post-industrialized society, with emphasis on high-technology production and services. Such a development process would gradually alter the pollution intensity and the composition of national output, so that some, but not all, environmental indicators would eventually improve.

The point is that what may appear as a relationship between income and pollution may have little to do with income *per se*, but may rather reflect underlying structural changes in the economy as the country grows richer. Take as an example the structural changes in the US economy between 1960 and 1994, as depicted in Figure 8.[107] Note the relative decline of primary production (agriculture and mining) and manufacturing as a share of GDP, counterbalanced by a relative increase in services, including public utilities and government services. These structural changes have presumably contributed to a drop in the overall pollution intensity of US output, although this assertion cannot be substantiated in figures. In contrast, other economies, such as the newly industrialized countries in Asia and Latin America, have moved in the opposite direction,[108] although this may only be a transient phenomenon. Indeed, Hettige et al. (1998) suggest that the manufacturing share of GDP typically rises until a country reaches middle-income status, peaking at some 25 per cent of GDP at a per capita income of about $5,000 to $6,000, to decline slowly thereafter to some 20 per cent of GDP at a per capita income of $20,000 or more.

Structural changes, in turn, are driven by many factors, including trade liberalization that induces specialization according to comparative advantages. As elaborated in Section III, trade liberalization changes the pattern of production in the world and so, indirectly, the pattern of pollution. From the point of view of an individual country, the local environment will benefit if expanding export sectors are less polluting on average than contracting import-competing sectors, and suffer otherwise.[109] And since one country's exportables are another country's importables, all countries cannot specialize in clean industries. International trade will therefore redistribute local pollution problems in the world from countries that have a comparative advantage in industries that are inherently less polluting to countries that have a comparative advantage in industries that are inherently more polluting. And even if an adverse composition effects may be counteracted by stricter environmental regulations induced by higher incomes, the technique effect is unlikely to neutralize both the scale and composition effects as argued by Copeland and Taylor (1994).

These arguments have some interesting implications. It is at least conceivable that the turning points that have

105 Panayotou (1993).

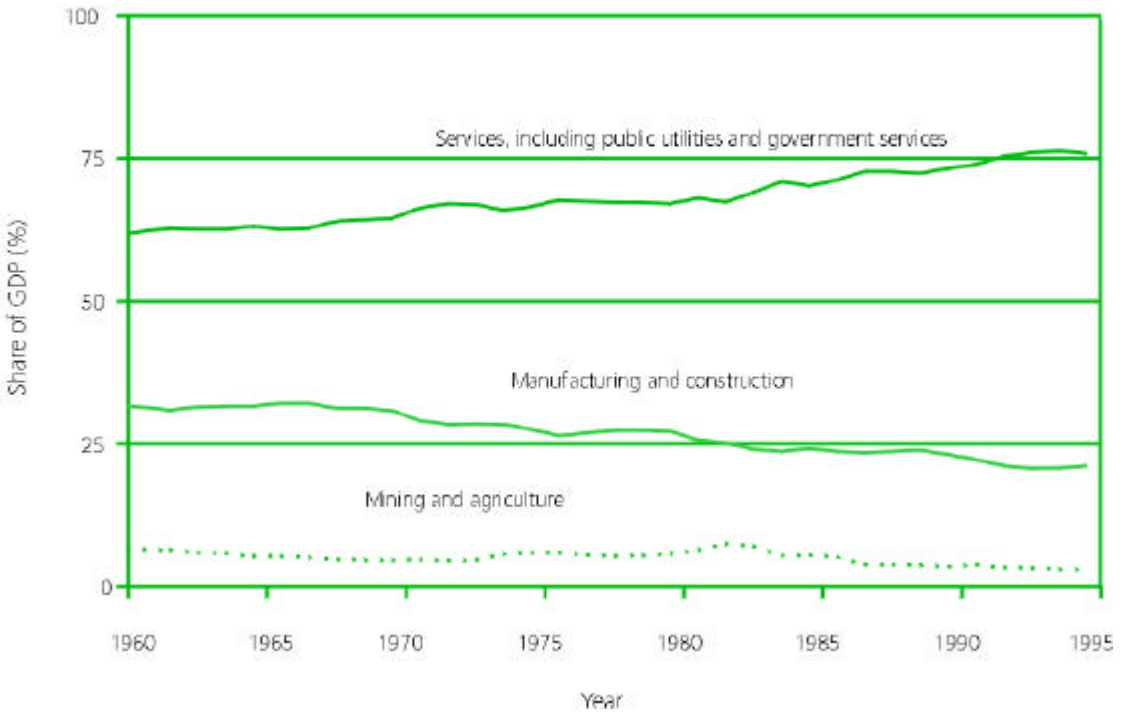
106 See, e.g., Syrquin (1989).

107 Data is taken from the Council of Economic Advisers, Economic Report of the President, February 1997.

108 Suri and Chapman (1998).

109 In practice, it may be difficult to evaluate if the environment actually benefited from the changing structure, since the composition of pollution also changes. What is the net benefit of, say, a 50 per cent reduction in SO_2 emissions and a 10 per cent increase in toxic waste?

Figure 8: Structural changes in the US economy, 1960-1994



been enjoyed by developed countries, if not yet in all environmental indicators, are partly a result of the contraction of polluting industries. It is not certain that the next generation of higher-income developing countries can benefit from the same structural changes that would help reduce pollution, not to mention the least-developed countries, which may be stuck with the most polluting end of production. In short, the inverted U-shaped pollution path may not necessarily hold for lagging countries or, alternatively, the turning point may come at higher-income levels because of a more polluting composition of national output.[110] Likewise, the EKC may not hold for the world as a whole because the composition effect of individual countries cannot be replicated at the global level. Someone has to produce the polluting goods as long as they are in demand, although the production location may shift from time to time as comparative advantage changes.

On the other hand, developing countries may find it easier to pass the peak of the EKC because of new technologies that were not available at the time the developed countries were at the same stage of development. The question is then if available technology will be used, and new technologies developed to fill the current gaps, which in turn puts the focus on the ability of the political process to deliver environmental policies that are up to the job.

B. Is economic growth sufficient to induce environmental improvements?

This brings us to the question of whether the EKC is an automatic process or dependent on certain policy actions. It is probably both. Part of the solution may emerge spontaneously through normal market mechanisms. For example, if the willingness to pay a premium for goods produced in an environmentally responsible way increases with income, producers may modify their technologies accordingly to tap the green market niche. However, only the most laissez-faire economists would argue that the process towards sustainable development can be left to the market alone. Most would claim that government intervention is needed to complement and steer market forces in a sustainable direction.

A good starting point for a discussion on the policy dimension of the EKC is the insightful but technically difficult paper by Jones and Manuelli (1995). They consider an economy that has at its disposal a wide range of production technologies that differ according to both their production costs and their environmental impact. The government can influence the choice of techniques by appropriate taxes or regulations that steer firms towards more environmentally friendly methods. However, there are certain costs associated with such policies, including slower growth because of lower after-tax returns on investments. What determines the pollution path in this model are the political institutions for collective decision-making. They contrast the pollution path chosen by a

110 Results along these lines can be found in the simulations undertaken by William (1999).

"benevolent social planner" (through the imposition of environmental taxes or regulations) with recurrent direct voting on environmental policies, whereby the preferences of the median voter effectively determine the outcome.

Interestingly, the policies chosen by the benevolent social planner generate a standard inverted U-shaped EKC. When a country is poor, growth considerations take precedence over environmental concerns. However, as the economy grows out of poverty, pollution taxes or regulations are introduced at some stage and start to bend the pollution trajectory. At a sufficiently high level of income, pollution taxes or regulations have become so stringent that they encourage investments in sufficiently clean production technologies to start reducing the overall level of pollution. In short, an inverted U-shaped pollution path occurs naturally if environmental policies are determined by an enlightened government that at each point in time makes an optimal trade-off between production of goods and environmental quality, and where this trade-off changes with the income level because of income-elastic demand for environmental quality.[111]

Recurring voting on environmental taxes generates a somewhat different pollution path. In this case, the pollution may first rise as the economy grows out of poverty, then decrease over a middle-income range, and then start to rise again at high levels of income. That is, the pollution path replicates the N-shape that has been observed in some empirical studies. It is not entirely clear what exactly in the direct voting mechanism generates this peculiar shape.[112]

The more important point is that political institutions matter. The pollution path will not turn downward automatically with increasing income. It requires that the broader interests of the population be reflected in the political decision-making process, which is not always the case because democratic institutions are lacking and/or excessive weight is given to producers over consumers. To be more precise, if governments are not held accountable for their actions or inaction in recurrent elections, or if they give more weight to the interests of the industry over the concerns of the broader population, pollution should not be expected to turn downward just because income is growing. That would be an overly naïve position, which has unfortunately been peddled somewhat uncritically in the past. The key is that the victims of pollution must be able to access the political process on equal terms in order to allow for appropriate environmental policies to be developed. While this may not be the case everywhere today, the good news is that democracy tends to be a positive function of income, and perhaps this is the ultimate explanation for the EKC, or the lack thereof.

Indeed, global pollution that lies beyond the influence of any individual country, with the possible exception of the largest countries (emitters) in the world, does not fit the hypothesized inverted U-shape all that well. As shown by Copeland and Taylor (1995), in a dynamic multi-country trade model with sovereign decision-making over environmental policies, global pollution problems will not be solved by income growth alone. It requires multilateral cooperation, which may be difficult to forge because of free-riding incentives, although not impossible as shown by the growing number of multilateral environmental agreements (MEAs) in recent decades. In any event, weak institutions for collective decision-making at the international level are presumably one reason, or perhaps *the* reason, why the turning points of global pollutants are estimated to be much higher than for more localized pollution.

C. Empirical evidence

After this brief theoretical introduction to the EKC, we shall now turn to the empirical evidence.[113] As noted earlier, among the first to forward and test the EKC hypothesis were Grossman and Krueger (1991) in the heated debate preceding NAFTA.[114] This agreement was opposed by many environmental groups, who argued that free-trade access for Mexico to the large markets in the North would serve as a magnet for polluting industries seeking to avoid more stringent regulations across the border. This conjecture was partly based on the poor environmental performance of Mexican export processing zones, so-called *maquiladoras*, which already enjoyed free-trade status. Besides adding to the pollution problem in the US-Mexican border region, it was feared that NAFTA would harm the environment in the United States and Canada more broadly by putting downward pressure on environmental regulations to counteract the expected outflow of investments and jobs.

In their analysis of the environmental consequences of NAFTA, Grossman and Krueger argue that environmental standards should not be viewed as given once and for all, but rather that they tend to reflect the current living standard. As countries grow richer, standards can be expected to improve. In that case, the impetus of NAFTA would speed up the rise in environmental standards by allowing Mexico to grow out of poverty. The long-term environmental impact of NAFTA would thus be positive rather than negative as feared by environmental groups.

In order to test this hypothesis, subsequently known as the EKC, they made use of data collected by the World Health Organization (WHO), in collaboration with the United Nations Environmental Programme (UNEP), on the concentration of air pollutants in a cross-section of urban areas in different countries. They found that the concentration of SO_2 and dark matter tends to increase up to a per capita income level of around $4,000 to $5,000 and thereafter gradually decline. That is, they found an inverted U-shaped relationship between air pollution and per

111 This is not to say that the inverted U-shaped pollution paths that we sometimes observe in reality are socially optimal. While the basic shape may correspond, the turning point chosen by real world governments may differ considerably from the enlightened government of the model world.

112 It may have something to do with the somewhat special utility function. Jones and Manuelli assume that the disutility of pollution is only experienced in the second part of life. As shown by Eriksson and Persson (1998) in a similar model, if all generations suffer equally from pollution, the EKC attains the standard inverted U-shape.

113 See also the surveys by Stern (1998) and Barbier (1997).

114 Their 1991 discussion paper was subsequently published in a book: Grossman and Krueger (1993).

Table 8: Estimated turning points for the environmental Kuznets curve (US$)

	Air Pollution					
	SO_2	SPM	NO_x	CO	CO_2	CFCs
Cole et al. (1997)	6'900	7'300	14'700	9'900		12'600
Grossman and Krueger (1993)	4'100					
Holtz-Ekin and Selden (1995)					35'400	
Moomaw and Unruh (1997)					12'800	
Panayotou (1995)	3'000	4'500	5'500			
Panayotou (1997)	5'000					
Selden and Song (1994)	10'700	9'600	21'800	19'100		
Shafik (1994)	3'700	3'300				

	Water pollution				
	Faecal coliform	BOD	COD	Arsenic	Nitrates
Cole et al. (1997)					15'600
Grossman and Krueger (1995)	7'800	7'600	7'900	4'900	

	Deforestation		
	Global	Latin America	Africa
Antle and Heidebrink (1995)	2'000		
Cropper and Griffiths (1994)		5'400	4'800
Panayotou (1995)	800		

	Others	
	Heavy metals	Toxic intensity
Hettige et al. (1992)		12'800
Rock (1996)	10'800	

Source: This table is based on Table 2 in Barbier (1997).

capita income. Their results also hinted at the possibility that the emissions may eventually turn upwards again at around $12,000 to $15,000. Since Mexico's per capita income just so happened to be at the estimated downward turning point, the additional growth impetus from NAFTA could conceivably push Mexico over the top and initiate a process of improved environmental performance.

This thought-provoking, not to say controversial, study has been followed by a huge number of empirical studies that have partly confirmed, partly contradicted, and partly qualified Grossman and Krueger's findings. One lesson from this literature is that the existence of an eventual turning point depends almost entirely on the type of emission reviewed, making any generalizations about the EKC hypothesis problematic. The turning points range from a couple of thousand dollars per capita to incomes that are yet to be seen anywhere in the world, as shown in Table 8.

Another finding is that pollution, after declining for a while at middle-income levels, may turn upward at higher incomes. For example, Kaufmann et al. (1997) note that after passing the $12,500 per capita GDP mark, SO_2 emissions may once again start to increase. Based on this and other studies, including the original study by Grossman and Krueger, several observers have noted that the inverted-U shaped curve more accurately resembles an "N"-shape for many environmental indicators. However, as argued in the theoretical review, this may not be the

end of the story. The next turn in the pollution path may be downward again, so that the N becomes an M as the next generation of abatement technologies becomes attainable with increased production and higher incomes. Essentially, there is no knowing if this process will eventually converge and, in that case, if the ensuing emissions will be within the bounds of the carrying capacity of local and global ecosystems.

A third insight of the empirical EKC literature is that the relationship between different environmental indicators and income does not fit into one convenient shape. For example, Shafik and Bandyopadhyay (1992), testing the EKC hypothesis on 10 different environmental indicators—lack of clean water, lack of urban sanitation, ambient levels of suspended particulate matter, ambient sulphur oxides, annual rates of deforestation, dissolved oxygen in rivers, faecal coliform in rivers, municipal waste per capita, and CO_2 emissions—found almost as many shapes of the EKC as there were environmental indicators.[115] Lack of clean water and urban sanitation was found to decline uniformly with increasing income. By contrast, municipal-waste generation and CO_2 emissions seemed to increase more or less uniformly with income. Only air-quality indicators conformed to the "standard" inverted U-shaped hypothesis. The same picture emerges when putting together a large number of empirical EKC studies, as nicely summarized in Table 1 of Barbier (1997), reproduced below.

Two comments are warranted to avoid any confusion. First, note that the "CJM" study—Carson et al. (1997)—finds a consistent pattern that different air pollution indicators tend to decline uniformly with income, in contrast to other studies that find either an inverted U-shaped or N-shaped EKC. This may have a simple technical explanation. The study is based on data for a single country: the United States. Although per capita incomes vary considerably across the 50 states, the lack of observations in the income interval below $10,000 may not allow the authors to capture the upward-sloping segment of the EKC at lower incomes. That is, the "true" relationship may still be a standard inverted U-shape; it is just that all 50 states have already passed the peak of the EKC.

Second, in the study denoted "V" for Vincent (1997), all indicators suggest that pollution increases uniformly with income. Again, this may have a simple technical explanation. The study covers data from a single country: Malaysia. While incomes across the 13 states of the Malaysian federation differ significantly, the lack of observation in the interval above $10,000 may prejudge the estimated shape of the EKC. It cannot be ruled out that the pollution path will turn downward once Malaysia reaches higher incomes. That is, the "true" relationship may still be an inverted U-shape; it is just that none of the 13 states had, at the time covered by the study (1987-91), reached the peak of the EKC that might have allowed a downward curve to emerge in the statistical analysis.

These comments are not intended to discredit the single-country approach. The only purpose is to shed light on why these two studies stand out from the others that use "traditional" cross-country regressions allowing estimations on a broader income range.

Having said this, the general impression left by the summary statistics presented in the previous tables is that the empirical evidence in support of an inverted U-shaped pollution path is somewhat mixed. Those indicators that appear to demonstrate some characteristics of an inverted U-shaped pollution path are certain types of local, primarily urban, air and water pollution. In contrast, pollutants of a more global nature do not seem to accord with the neat EKC hypothesis, notably CO_2 emissions.

The question then arises as to why the EKC hypothesis holds for some environmental indicators but not for others, and also why the turning points differ so much, an issue already touched on in the review of the theoretical literature. Rather than delve deeper into the empirical validity of each argument, let us focus on empirical EKC studies that include information on the linkages to trade, which is, after all, of the most immediate concern to the trade and environment debate.

D. International trade and the EKC

As noted several times earlier, international specialization and trade change the composition of production in a more polluting way in some countries and in a cleaner way in others. That much is clearly understood and indisputable. What complicates the long-term analysis is that comparative advantages are not static or given once and for all, but dynamic and constantly evolving. This means that the pollution composition of national output will change over time, independently of changes in domestic and international trade barriers. For example, a country that puts a lot of resources into education will change its comparative advantages from unskilled to skilled production, which in turn will alter the pollution intensity and composition of the national output independently of changes in the trade regime that may occur at the same time. Likewise, a country that saves 40 per cent of its GDP, compared to the world average of some 20 per cent, will over time move from labour-intensive to capital-intensive production, with a corresponding shift in pollution levels. Since trade is only one aspect shaping the development process, it is difficult to isolate its specific impact on the ensuing pollution path.

Natural sciences have an advantage over social sciences in that they can study the isolated effects of one variable at a time, by holding everything else constant in a controlled laboratory environment. In contrast, economists have to look at historical data, often of doubtful quality, in order to try to isolate the effects of individual variables in a constantly evolving dynamic system. The closest we could come to a controlled experiment on how trade affects the evolution of pollution would be to compare two countries that start out with the same natural resource endowments, population per square kilometre and technological know-how, but where one country embarks on a self-sufficient or inward-oriented development strategy and the other on an outward-oriented development strategy. While it may be difficult to identify a suitable pair of countries that satisfies these requisites for in-depth his-

[115] A similar catalogue of non-uniform results was found by Ekins (1997).

Table 9: The relationship between income and various environmental indicators

Environmental indicator	Inverted U-shape	Increasing	Decreasing	Constant	N-shape
Air pollution					
SO_2	CRB, GK1, GK2, S, SS, P1, P2		CJM		
SPM	CRB, P1, S, SS	V	CJM, GK1		
Heavy particles			GK2		
Smoke	GK2				
Dark matter	GK1				
NOx	CRB, P1, SS		CJM		
CO	CRB, SS		CJM		
CO_2	CRB, HS	S			MU
CFCs	CRB				
Greenhouse gases			CJM		
Air toxics			CJM		
VOC			CJM		
Water pollution					
Faecal coliform	GK2				S
BOD	GK2				
COD	GK2				
Total coliform					GK2
Lead			GK2		
Cadmium				GK2	
Arsenic	GK2				
Nitrates	CRB				
Ammoniacal nitrogen		V			
pH		V			
Deforestation					
Global	AH, P1				
Regional	CG				
Others					
Lack of clean water			S		
Lack of urban sanitation			S		
Municipal waste		CRB, S			
Heavy metals	R				
Toxic intensity	HLW				
Energy	CRB				
Traffic volumes	CRB				

Note: This table is based on Table 1 in Barbier (1997).

Key to studies: AH = Antle and Heidebrink (1995), CJM = Carson et al. (1997), CRB = Cole et al. (1997), CG = Cropper and Griffiths (1994), GK1 = Grossman and Krueger (1993), GK2 = Grossman and Krueger (1995), HLW = Hettige et al. (1192), HS = Holtz-Eakin and Selden (1995), MU = Moomaw and Unruh (1997), P1 = Panayotou (1995), P2 = Panayotou (1997), R = Rock (1996), S = Shafik (1994), SS = Selden and Song (1994), V = Vincent (1997).

torical case studies, certain candidates spring to mind, for example, North Korea and the Republic of Korea, East Germany and West Germany, or Eastern Europe and Western Europe more generally. Unfortunately, no such studies seem to be available. Rather, what most researchers have managed so far is to include an "openness" indicator in standard cross-country EKC regressions in order to say something about the impact on the pollution path of the trade policy stance followed by a country.

Earlier studies using this approach, including Grossman and Krueger (1991) and Shafik and Bandyopadhyay (1992), did not find much impact of the trade policy stance *per se*. The openness indicator was generally statistically insignificant, although not for all environmental indicators. For example, Grossman and Krueger found that the ambient SO_2 levels tend to be lower in cities located in countries conducting more trade, while the other air-quality indicators—suspended particle and dark matter pollution—did not seem to have any significant association with trade.

Another study by Lucas, Wheeler and Hettige (1992) found that the toxic (pollution) intensity of GDP had a positive correlation with Dollar's (1990) index of trade distortion.[116] Although this index does not say which sectors are protected, the fact that the toxic intensity of GDP is closely linked to the manufacturing share of GDP suggests that the Dollar's index is correlated with the protection of the manufacturing sector. The way we interpret this finding is not that protection *per se* is associated with a high degree of pollution, but rather that protection of the manufacturing sector is. This conjecture is also supported by the finding that the total emissions of toxic substances eventually decline with higher incomes, partly because the manufacturing share of GDP tends to decline as a country grows richer.

The study by Rock (1996) suggest that open economies are more polluting than closed economies, even when differences in the manufacturing share of GDP have been accounted for. That is, comparing countries with the same income level and the same manufacturing share of GDP, he finds that the more open economies tend to be more polluting. On the basis of this finding, the author argues that the recipe for economic development advocated by the World Bank and others (i.e., development based on trade and economic integration) has a high price in terms of environmental degradation, which even if it is not permanent, is at least transitional until developing countries have passed the peak of the EKC. Put another way, growth-promoting development strategies must include an environmental element to be sustainable in the long term.

Suri and Chapman (1998) analyze the impact of growth, international trade, and structural change on the turning point of the EKC for commercial energy consumption and so, indirectly, pollution related to energy consumption, including CO_2 emissions. They find that growing exports of manufactured goods are a key source of energy consumption in rapidly industrializing countries in East Asia and Latin America. The mirror image was observed in developed countries, where growing imports of manufactured goods has contributed to a slowing of the demand for energy. In short, trade has changed the composition of GDP in a more energy-intensive way in rapidly industrializing developing countries and in a less energy-intensive way in mature industrialized countries. Moreover, the authors argue that, as a result, the turning point of the EKC for energy has drifted upward in industrializing countries, and also in the world as a whole. The reason for this is that developing countries use less energy-efficient technologies, apply generally lower energy taxes and, in some cases, offer energy subsidies to spur industrialization.[117]

The study by Antweiler, Copeland, and Taylor (1998) is also relevant in this context, although they do not set out to estimate the EKC *per se*. Their objective is to quantify the underlying mechanism by which trade affects the environment, specifically, through the composition, scale and technique effects. The study focuses on the relationship between openness to trade and changes in ground level SO_2 concentration in a data set covering 44 countries from 1971 to 1996. They find that a 1 per cent increase in the share of trade in GDP reduces SO_2 concentration by some 0.7 per cent for the average country. At the same time, countries that are induced to specialize in SO_2-intensive production may still see higher emissions. Again, trade changes the location of production and thus indirectly also the distribution of pollution in the world.

In summary, empirical evidence suggests that the composition effect of trade can influence the shape and relevance of the EKC. Structural changes in the global economy in the last decades may have shifted some manufacturing industries from developed countries into rapidly industrializing developing countries, and this in turn has influenced the pollution path of both groups of countries.[118] Since traditional manufacturing industries are generally more polluting than high-technology and services production, the structural changes may have helped developed countries to pass the peak of the EKC, if not yet in all environmental indicators. At the same time, the upward-sloping segment of the EKC for industrializing developing countries may have become steeper and the peak possibly higher because of a more polluting composition of their national output. In short, while trade spurs economic growth, thereby possibly shortening the time before appropriate environmental policies are introduced, the composition effect of trade will make the transition over the EKC peak easier for some countries and more difficult for others.

Having said this, the composition effect should perhaps not be exaggerated. For example, a decomposition undertaken by de Bruyn (1997) of the reductions in industrial SO_2 emissions in West Germany and the Nether-

116 The Dollar's index is based on a comparison between domestic prices and world market prices. The larger the divergence of domestic and world market prices, the more distorted the domestic price structure. This index is supposed to capture the influence of trade barriers, although divergence of domestic prices could be attributed to many other factors, including non-uniform domestic taxes, varying degrees of competition, and so on.

117 In fact, a phase-out of energy subsidies in both developed and developing countries has been identified as a key factor in a successful global strategy for reducing energy consumption and associated environmental problems, including climate change. On this point, see, e.g. Anderson and McKibbin (1997).

118 For a recent descriptive study on the pollution patterns during the industrial transitions, see Auty (1997).

Table 10: Decomposition of commercial SO_2 emissions between 1980 and 1990

	West Germany	Netherlands
GDP	26.1%	28.2%
SO_2 emissions	- 73.6%	- 58.7%
Emissions/output ratio	- 79.0%	- 67.7%
technological change	- 74.9%	- 73.5%
structural change (the composition effect)	- 4.1%	5.7%

Source: This table is based on Table 1, de Bruyn (1997).

lands between 1980 and 1990 found that technological change driven by higher energy taxes and stricter regulations is the key to improved environmental performance. Structural changes in the composition of national output added some further reductions in air pollution in Germany and subtracted some potential reductions in the Netherlands (Table 10). Thus, when the dust has settled, environmental degradation is perhaps not so much about trade, but rather about misplaced economic incentives that allow producers and consumers to pollute without bearing the full social costs of their actions. These policy deficiencies are presumably not unique to open economies, but generic problems of the political decision-making process. At the same time, the globalization of the world economy may have reduced the regulatory autonomy of countries, thereby making it more difficult to upgrade environmental standards unless as part of a concerted effort among nations.

E. Concluding remarks

To conclude our discussion on the EKC, let us start by emphasizing that nothing in the relevant literature suggests that the pollution trajectory will turn downward with increasing income by compelling necessity. If the economic incentives facing producers and consumers do not change with higher incomes, pollution will continue to rise unchecked alongside the increasing scale of economic activity. Indeed, Grossman and Krueger, who set the stage for this literature, would be the first to reject simplistic arguments along the lines that income growth will in and by itself take care of the pollution problems of the world. As they note in their 1995 paper, "the strongest link between income and pollution is via an induced policy response... Richer countries, which tend to have relatively cleaner urban air and relatively cleaner river basins, also have relatively more stringent environmental standards and stricter enforcement of their environmental laws than middle-income and poorer countries." (p. 372)

In other words, income growth, while perhaps a necessary condition for changing the focus from more immediate economic and social concerns to longer-term sustainability issues, is not sufficient to reverse environmental degradation. Environmental policies must follow suit. The importance of democratic institutions cannot be underestimated in this regard. Governments that are not held accountable for their actions will not necessarily deliver the necessary modifications to environmental policies to turn the pollution path around. Torras and Boyce (1998) make the case convincingly. Comparing countries with similar per capita incomes, they show that pollution levels tend to be significantly higher in countries with a skewed income distribution, a high level of illiteracy, and few political and civil liberties. Moreover, the inclusion of these political-access variables in otherwise standard EKC regressions considerably weakens the relationship between per capita income and environmental quality, although the linkage does not disappear completely. This suggests that the EKC relationship is not so much dependent on income levels *per se* as on institutional and democratic reforms, which tend to go hand in hand with increased income and which are necessary for allowing ordinary citizens to articulate their preferences for environmental quality and influence the political decision-making process on equal terms.[119]

This conclusion is not limited just to the domestic but also to the international sphere. Remember, one of the disturbing conclusions of the empirical literature is that the turning points of global environmental problems, such as global warming driven by CO_2 emissions and other greenhouse gases, are estimated at considerably higher incomes than more localized problems. One interpretation of this is that people do not care much about global warming and climate change. They would rather accept the consequences than the costs of curbing the emissions. An alternative explanation for the political foot-dragging that has gone on until very recently (the Kyoto Protocol) is the strong free-riding incentive in combination with weak institutions for collective decision-making at the international level, including inadequate enforcement mechanisms. Indeed, one reason why the WTO seems to have become the focal point for environmental disputes—in spite of the fact that environmental issues, with the exception of trade-related aspects, are by and large outside its mandate—is presumably because the WTO, unlike many other international institutions, has an integrated adjudication mechanism backed by trade sanctions as the ultimate enforcement tool.

[119] A similar conclusion was reached by Panayotou (1997).

Having said this, it should be noted that global warming and depletion of the ozone layer are rather recent public concerns. It is at least conceivable, not to say plausible, that the varying turning points that have been estimated for different kinds of pollutants have a tendency to fall within the income range of the leading countries at the time the specific problems became an issue of intense public debate. For example, there may be nothing either special or natural about a turning point for CFCs at $12,000 to $18,000; it just happened to be the income range of the leading countries (which have also assumed the fastest phase-out commitments) at the time the Montreal Protocol was signed in 1987. Accordingly, although we find estimates of a turning point for CO_2 emissions of up to several hundred thousand dollars in per capita income,[120] reflecting the almost linear historical relationship between consumption of energy and income, the fact that global warming has now come to the forefront of public attention will presumably mean that emissions will be curbed at an earlier date, although this requires that countries go from words to action and honour the commitments made under the Kyoto Protocol. It also requires that the free-riding problem can be controlled by encouraging commitments also from developing countries, taking into account their justifiable development aspirations and the fact that developed countries have contributed the lion's share of the increasing concentration of greenhouse gases in the atmosphere during this century. In the end, the EKC may not have a "natural" turning point: it will turn whenever the political conditions are ripe for delivering the policies required to turn environmental degradation around.

The other point we would like to emphasize is that the EKC literature has so far focused mainly on the turning points for emissions, which can be somewhat misleading. The problem with this approach is that certain emissions, such as heavy metals and other inert toxic compounds that nature does not break down naturally, accumulate in ecological systems. Therefore, even if there is a turning point for emissions at some income level or the other, the cumulated harm inflicted during the transition up to the peak of the EKC may exceed the ecosystem's carrying capacity and may even be irreparable. The precautionary principle then advises us to take action well before the estimated limits of the ecosystems' carrying capacity have been reached, especially since the damage may occur abruptly and unexpectedly.[121]

A final point is that not all kinds of growth are equally benign for the environment. Economic growth requiring ever more inputs of natural resources is obviously not as harmless as economic growth driven by technological progress that saves inputs and reduces the emissions per unit of output. That kind of growth will not necessarily emerge spontaneously, but may require economic incentives that steer development in a sustainable direction. Trade could play a positive role in this process by facilitating the diffusion of environmentally friendly technology in the world.

Let us end this section with the authoritative conclusions of Arrow et al. (1995): "Economic growth is not a panacea for environmental quality; indeed, it is not even the main issue. What matters is the content of growth—the composition of inputs (including environmental resources) and outputs (including waste products). This content is determined by, among other things, the economic institutions within which human activities are conducted. These institutions need to be designed so that they provide the right incentives for protecting the resilience of ecological systems. Such measures will not only promote greater efficiency in the allocation of environmental resources at all income levels, but they would also assure a sustainable scale of economic activity within the ecological life-support system. Protecting the capacity of ecological systems to sustain welfare is of as much of importance to poor countries as it is to those that are rich."

120 Suri and Chapman (1998).

121 See Arrow et al. (1995) for a greater elaboration of this point.

VI. Concluding Remarks

One of the greatest challenges facing mankind at the inception of the 21st century is how to accommodate a growing population and material aspirations in developed and developing countries without compromising the natural environment. This challenge is compounded by the vast difference in living standards in the world, and hence differences in immediate policy priorities. It is also compounded by the fact that many environmental problems are transboundary or global in nature, and hence beyond the control of any individual nation.

The frustration in some quarters with the slowness of the political process in responding to these challenges has partly been blamed on the multilateral trading system. Part of the argument is that the legal provisions of the WTO circumscribe the tools available for environmental policy making, including trade measures to encourage participation in and enforcement of multilateral environmental agreements. The other part of the argument is that international trade, by increasing the mobility of industries, undermines the regulatory power of individual nations. Both of these arguments deserve to be taken seriously, although this study shows why trade measures are nearly always a poor policy response to environmental degradation.

The removal of economic borders imposes new demands for cooperation among governments on environmental issues. At the same time, countries would be interdependent in an ecological sense even if they did *not* trade. Ecological systems do not begin and end at the border, nor does pollution traveling with wind and water. The point is, rather, that the removal of economic borders and the associated increase in mobility of industries, has made cooperation more urgent by reducing the regulatory automony of individual nations. The perceived costs of acting alone in terms of lost investments and jobs often take the steam out of new regulatory initiatives.

But this need for cooperation goes far beyond what the WTO is capable of delivering by itself, especially since environmental problems and international trade are only indirectly linked. At the same time, the cooperative model of the WTO, based on legal rights and obligations, could potentially serve as a model for more structured environmental cooperation among nations. Today, international cooperation on the environment finds expression through a multitude of organizations and conventions, not always coherently linked together. Of course, to find the appropriate forms for a new global architecture of environmental cooperation may take some time, and will have to account for a broad spectrum of interests and opinions, including inputs from civil society.

Meanwhile, even with its current mandate, the WTO can do a few important things for the environment. The most obvious contribution would be to address the remaining trade barriers on environmentally-friendly production technologies and environmental services in order to reduce the cost of investing in clean production technologies and environmental management systems. Another potential contribution would be to seek reductions in subsidies that harm the environment, including energy, agricultural, and fishing subsidies.

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ANNEX I:
TRADE AND ENVIRONMENT IN THE GATT/WTO
Background Note by the Secretariat[1]

INTRODUCTION

1. At the start of the seventies, GATT contracting parties recognized the need to address in the GATT environmental issues as they relate to trade. The Group on Environmental Measures and International Trade, set up in 1971, was the first institutional framework created to that effect within the GATT. Some twenty years later a group of countries, considering that it was important for contracting parties to gain a better understanding of the interrelationship between environmental policies and GATT rules, requested the activation of the 1971 Group. The work programme of the GATT also included the issue of domestically prohibited goods, which had been raised by some developing countries at the beginning of the eighties.

2. At the end of the Uruguay Round, Trade Ministers adopted the Decision on Trade and Environment which anchored environment and sustainable development issues in WTO work. They set up the Committee on Trade and Environment and assigned to it a broad mandate, covering virtually all aspects of the trade and environment interface. Work in the Committee has contributed to build up communication between trade and environment experts at both the national and international levels.

3. The environment was not, as such, a subject of negotiations during the Uruguay Round. At the beginning of the eighties, the need to protect the environment was not as high on the political agenda of governments and no attempt was made to put this subject on the agenda of the Round. Environmental considerations were, nevertheless, not totally absent from the preoccupations of negotiators and are reflected in various WTO instruments. This Note also briefly summarizes trade disputes which concerned issues related to human or animal health, or the environment.

4. Over the past few years, steps have been taken to increase transparency of WTO activities. The derestriction of WTO documents has been facilitated and all derestricted documents are now readily available on the WTO homepage. Moreover, the Director-General and the Secretariat have taken various initiatives to improve the dialogue with civil society.

II. WORK IN THE GATT ON ENVIRONMENTAL ISSUES

A. GROUP ON ENVIRONMENTAL MEASURES AND INTERNATIONAL TRADE

1. Preparatory Work for the 1972 Stockholm Conference

5. During the preparatory work for the Conference on the Human Environment, which took place in 1972 in Stockholm, the GATT Secretariat was requested by the Secretary-General of the Conference to make a contribution. In response to this request, the Secretariat prepared on its own responsibility a study entitled "Industrial Pollution Control and International Trade".[2]

6. The study focused on the implications which the introduction of measures for control of industrial pollution might have for international trade. Recognizing the need for governments to act to protect and improve the environment while at the same time avoiding introducing new barriers to trade, it explored some of the problems that would have to be solved in evolving guidelines for action that would permit effective pollution control without damage to the structure of international trade.

2. Establishment of the Group on Environmental Measures and International Trade

7. In October 1971 the Director-General, Mr. Olivier Long, suggested that contracting parties should follow the problems that could be created for international trade by anti-pollution measures concerning industrial processes: "[i]n other words, to consider the implications of industrial pollution control on international trade, especially with regard to the application of the provisions of the General Agreement. Contracting parties carried a special responsibility in this area. They had to ensure that the efforts of governments to combat pollution did not result in the introduction of new barriers to trade or impede the removal of existing barriers. It was, therefore, perhaps worth considering whether it would not be useful for the CONTRACTING PARTIES to set up a flexible mechanism which could be used at the request of contracting parties if the need arose".[3]

8. In the discussion that followed, several representatives expressed agreement that the GATT had certain responsibilities in dealing with the implications of industrial pollution control on international trade. Many of them supported the idea of establishing a standing mechanism for the purpose. There was, however, some divergence of views on the nature and objectives of this mechanism and as to whether it should be set up in anticipation of the problems or whether one should await further developments. Some representatives suggested that a decision be made only after the Stockholm

[1] This Note was prepared to provide participants to the High Level Symposium on Trade and Environment, held at the WTO headquarters in March 1999, with an overview of the various environment-related activities in the GATT 1947, and in the World Trade Organization. It is reproduced here as a complement to the economic analysis in the main body of this study. Prepared under the Secretariat's own responsibility, this Note is not meant to reflect WTO Members' views, nor to interpret WTO agreements.

[2] Document L/3538.

[3] Document C/M/73.

Conference had taken place; others thought it best to take up work on this matter before the issues had been settled there. Some representatives considered that the GATT was sufficiently equipped to deal with the matter and doubted the need for the establishment of a new mechanism.[4]

9. At the November 1971 Council meeting, the Council agreed to the establishment of a Group on Environmental Measures and International Trade and gave it the following mandate:

> "1. to examine upon request any specific matters relevant to the trade policy aspects of measures to control pollution and protect the human environment especially with regard to the application of the provisions of the General Agreement taking into account the particular problems of developing countries;
>
> 2. to report on its activities to the Council."[5]

10. In introducing the terms of reference, the Director-General stated that:

> "[t]he functions of the proposed group would be limited to the consideration of specific matters that were relevant to the application of the provisions of the General Agreement. There was, thus, no danger of duplicating or encroaching on work going on in other bodies on this very large problem of environment. The Secretariat was not aware of any problem that could be placed before the group at present, were it established. One could, nevertheless, anticipate that concrete problems could well arise in this area. For this reason, it was better to equip oneself with the necessary machinery ahead of time rather than to wait until a particular problem had developed and then set up an appropriate organ, since its constitution would then be difficult and its nature strongly influenced by the particular case at hand."6

11. The Group was thus set up as a standby machinery which would be ready to act, at the request of a contracting party, when the need arose. It was agreed that Mr. Kaya (Japan) should be Chairman.[7] During nearly twenty years, however, no request was made to convene a meeting of the Group.

3. Activation of the Group on Environmental Measures and International Trade

12. At the Ministerial meeting in Brussels in December 1990, the countries from the European Free Trade Association (EFTA)[8] circulated a formal proposal for a statement on trade and environment to be made by Ministers. They declared that priority attention should be devoted to interlinkages between trade policy and environmental policy, and for that purpose required the CONTRACTING PARTIES to: (a) undertake a study on the relationships between environmental policies and the rules of the multilateral trading system; (b) consider the implications of preparatory work for the 1992 United Nations Conference on Environment and Development, and the possibility of submitting a GATT contribution to that Conference; (c) convene in 1991 the GATT Working Group on Environmental Measures and International Trade under an updated mandate, in order to provide contracting parties with a forum for these issues.[9] The Brussels Ministerial Meeting failed to conclude the Uruguay Round and no effect was given to the proposed statement.

13. The EFTA contracting parties followed this initiative by a statement at the 46th Session of the CONTRACTING PARTIES in which they indicated that they believed it was important and urgent for contracting parties to gain a better understanding of the interrelationship between environmental policies and GATT rules in order to establish coherent multilateral cooperation in this field.[10] In February 1991 they requested the Director-General, Mr. Arthur Dunkel, to convene, at the earliest appropriate date, the Group on Environmental Measures and International Trade. Among the reasons they gave for their request, they explained that

> "[t]he approach to environmental policy making varied considerably from country to country due to differing geographical settings, economic conditions, stages of development and environmental problems. Accordingly, governments' priorities on these problems differed as well. The important point here was that the resulting differences in actual policies could set the stage for trade disputes. The EFTA countries' prime concern was to ensure that GATT's framework of rules worked, provided clear guidance to both trade and environment policy makers and that its dispute settlement system was not faced with issues it was not equipped to tackle. ...
>
> "The EFTA countries were aware that one could not say with certainty exactly what the interlinkages between environmental and trade policies were. A great deal of technical work was therefore needed before drawing conclusions and beginning to strike a balance between different interests in this area. They believed that it was important to start studying the complex issues in this field soon, and had accordingly requested the Director-General to convene the 1971 Working Group at the earliest appropriate date. They considered the Group to be the appropriate forum to tackle the issues that have arisen and would arise in the context of environmental policies, so that the GATT can be maintained as a relevant body of rules in all respects. A careful study of the Group's mandate had led the EFTA countries to believe that it was sufficient in scope."

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[4] Document C/M/73.

[5] Document C/M/74.

[6] *Ibidem.*

[7] Document C/M/75.

[8] Austria, Finland, Iceland, Norway, Sweden, Switzerland.

[9] Doc. MTN.TNC/W/47, 3 December 1990.

[10] Doc. SR.46/2.

14. The EFTA countries also suggested that, like other international bodies, GATT might make a contribution to the 1992 United Nations Conference on Environment and Development (UNCED).[11]

15. Several delegations supported the proposal to convene the 1971 Group, considering the GATT could not remain outside the debate which had commenced, but had to be part of it. Other delegations were of the view that such an initiative was premature and that one should await the outcome of the UNCED. Some also considered that priority should be given to concluding the Uruguay Round. The appropriateness of the mandate of the 1971 Group was also raised. While some agreed that one should start pragmatically with the existing mandate, others considered that this mandate did not encompass the general issue of the interlinkages between trade and environment.

16. In view of the differences which existed on the proposal for the convening of the Group, the Council decided to request the Chairman of the CONTRACTING PARTIES, Ambassador R. Ricupero (Brazil), to conduct informal consultations, in particular to reflect upon whether the existing mandate of the group was the most appropriate.[12] In April 1991, Ambassador Ricupero reported that a consensus had emerged to hold a so-called "structured debate" on the subject of trade and environment at the following Council meeting. With respect to the proposal for reconvening the 1971 Group, informal consultations continued with the aim of solving the problem of the terms of reference and deciding which contribution the GATT might make to the UNCED process.[13]

17. To facilitate the structured debate, the Chairman went on to circulate an "outline of points" that could be used by delegations participating in the Council debate. According to this Note, "the purpose of such a debate would be to identify measures taken on environmental grounds which could affect trade and development in the light of the provisions in GATT and Tokyo Round instruments". This illustrative list of points was built around five broad themes: (i) relationship between environmental policies, trade policies and sustainable development, including further liberalization of trade, (ii) identification of measures taken on environmental grounds that directly or indirectly affect international trade, (iii) identification of sectors of particular interest to developing countries, taking into account their trade, financial and development needs, in which trade may be affected as a result of environmental policy measures, (iv) trade provisions in international environmental instruments; principles and concepts adopted or under discussion, (v) identification of GATT articles and Tokyo Round instruments relevant to trade measures taken for environmental purposes.[14]

18. Some thirty delegations participated in the structured debate.[15] A large number of issues were raised, ranging from: the need to ensure that GATT rules and environmental protection were mutually supportive; the relation between trade restrictions in international environmental instruments and GATT rules; the application of GATT rules and principles to trade-related environmental issues; the distinction to be made between legitimate environment-related measures and protectionist ones; the particular concerns of developing countries; poverty as the main source of environmental degradation in developing countries and economic growth brought by trade as a prerequisite for achieving sustainable development.

19. In the course of the debate, the ASEAN contracting parties proposed to request the GATT Secretariat to prepare a factual paper on trade and the environment. The ASEAN contracting parties suggested that the following elements be included: (i) historical background on circumstances which led to the establishment of the 1971 Working Party with its particular mandate; (ii) background information on any other GATT work in the past on environmental issues; (iii) describe how existing international arrangements on environmental protection, such as the Vienna Convention, Basel Convention, etc., affect GATT principles; (iv) listing of trade measures taken by countries for environmental protection, and environmental measures with trade implications. The proponents further specified that "the paper should not attempt an assessment of the broad question of the effects of environmental policies and measures on international trade".[16]

20. The structured debate, however, did not allow delegations to reach a consensus as to whether the 1971 Group should be activated and under which terms of reference. Consultations therefore continued and in July, Ambassador Ricupero had to note that "additional efforts were required to reach a consensus on how these issues should be dealt with in the GATT itself. ... [M]ore time was required to allow delegations to develop ideas which could lead to an understanding on this matter ... The best approach to develop the necessary mutual understanding and to allow a positive treatment of these issues in the GATT would be to identify specific issues which could properly be examined in the 1971 Group".[17]

21. Eventually, contracting parties agreed that the 1971 Group on Environmental Measures and International Trade ("EMIT Group", as it would be called from now on) be convened to examine the following three items:

(a) trade provisions contained in existing multilateral environmental agreements (e.g. the Montreal Protocol on Substances that Deplete the Ozone Layer, the Washington Convention on International Trade in Endangered Species and the Basle Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal) vis-à-vis GATT principles and provisions;

(b) multilateral transparency of national environmental regulations likely to have trade effects; and

(c) trade effects of new packaging and labelling requirements aimed at protecting the environment.

22. These three issues would be addressed within the Group's original mandate. The Group would be open-ended, i.e. open to any contracting party which wished to participate. Because of the burden on delegations arising from the Uruguay

[11] GATT Council meeting of 6 February 1991, doc. C/M/247. The issue was also on the agenda of the 12 March 1991 Council meeting, doc. C/M/248.

[12] GATT Council meeting of 6 February 1991, doc. C/M/247.

[13] Council meeting of 24 April 1991, doc. C/M/249, 22 May 1991.

[14] *Outline of Points for Structured Debate on Environmental Measures and Trade*. doc. Spec(91)21, 29 April 1991.

[15] The structured debate took place during the Council meeting of 29-30 May 1991. A summary of the interventions made during the meeting is contained in C/M/250. The statements have been issued *in extenso* in the series Spec (91) 27 to Spec (91) 56.

[16] Communication by Malaysia on behalf of the ASEAN contracting parties (Indonesia, Singapore, Thailand and the Philippines), doc. L/6859, 29 May 1991.

[17] Council meeting of 11 July 1991, doc. C/M/251.

Round, until January 1992 it would limit the number of its meetings as much as possible.[18] Consultations led to the designation of Ambassador H. Ukawa (Japan) as Chairman of the Group.[19]

23. The EMIT Group met from November 1991 to January 1994.[20] As noted by the Chairman in assessing the results of two years of work, discussions in the EMIT Group resulted in delegations being better informed of, and more comfortable with, the subject matter of trade and environment. The exercise permitted the building of confidence and a spirit of mutual trust and cooperation. The Group had not been established as a negotiating forum and there was a widely shared view that it was premature to adopt a prescriptive approach until the dimensions of any problems that might exist were more clearly identified, particularly with respect to the significance of the trade effects that were involved. The Group had viewed therefore its role as one of examining and analysing the issues covered by its agenda.

24. The Chairman noted that there was agreement on a number of points. Discussions should remain within the mandate of the Group and GATT's competence, namely the trade-related aspects of environment policies which could result in significant trade effects for GATT contracting parties. GATT was not equipped to become involved in the tasks of reviewing national environment priorities, setting environmental standards or developing global policies on the environment. For the Group, there was no policy contradiction between upholding the values of the multilateral trading system on the one hand, and acting individually or collectively for the protection of the environment and the acceleration of sustainable development on the other. If problems of policy coordination did occur, it was important to resolve them in a way that did not undermine internationally agreed rules and disciplines that governments reinforced through the Uruguay Round negotiations. The Chairman also stressed that it was important to ensure that the multilateral trade rules did not present an unjustified obstacle to environmental policy-making. An important point was the considerable extent to which the GATT rules already accommodated trade measures used to protect national environmental resources. He concluded that an open, secure and non-discriminatory trading system underwritten by the GATT rules and disciplines could facilitate environmental policy-making and environmental conservation and protection by helping to encourage more efficient resource allocation and to generate real income growth.[21]

4. GATT's Contribution to the UNCED and Follow-up to the UNCED

25. The issue of a GATT contribution to the Rio Conference had been addressed during the informal consultations held by the Chairman of the CONTRACTING PARTIES in the course of 1991. In September 1991, the GATT Secretariat circulated a Factual Note on Trade and Environment, which covered the elements outlined in the ASEAN proposal.[22] At the invitation of the Council, the Director-General sent this document, together with the section on trade and environment from the GATT Annual Report[23], as the Secretariat's contribution to the UNCED.

26. The second question arising in relation with the UNCED was that of the follow-up action GATT contracting parties should undertake with respect to the Rio Declaration and *Agenda 21*. At the July 1992 Council meeting, the Director-General noted that *Agenda 21* contained a number of recommendations directly relevant to the work of the GATT in the field of trade, environment and sustainable development. He suggested that contracting parties should consider how to proceed on these recommendations.[24]

27. Reporting on this subject to the 48th Session of the CONTRACTING PARTIES, Ambassador B.K. Zutshi (India), Chairman of the Council noted that

> "it was clear that contracting parties warmly welcomed the UNCED Declaration and the progress that had been made by the UNCED in fostering further multilateral cooperation, and were determined that GATT should play its full part in ensuring that policies in the fields of trade, the environment and sustainable development were compatible and mutually reinforcing. It was also clear that the GATT's competence was limited to trade policies and those trade-related aspects of environmental policies which might result in significant trade effects for GATT contracting parties. In respect neither of its vocation nor of its competence was the GATT equipped to become involved in the tasks of reviewing national environmental priorities, setting environmental standards or developing global policies on the environment. Nevertheless, the multilateral trading system did have a central rôle to play in supporting an open international economic system and fostering economic growth and sustainable development, especially in the developing countries, to help address the problems of environmental degradation and the over-exploitation of natural resources."
>
> "The importance attached by the UNCED to a successful outcome of the Uruguay Round negotiations had been welcomed, and remained the top priority for contracting parties. It held the key to the liberalization of trade and the maintenance of an open, non-discriminatory multilateral trading system, which were main elements of the framework for international cooperation that were being sought to protect the

[18] Council meeting of 8 October 1991, doc. C/M/252, 4 November 1991.

[19] Council meeting of 12 November 1991, doc. C/M/253.

[20] For an account of the debates held under each agenda item, see the reports of the meetings, contained in the series TRE/1 to TRE/14. See also the Report of the Chairman to the 48th and 49th Sessions of the CONTRACTING PARTIES, respectively contained in documents SR.48/2, point 6(b) (5 January 1993) and L/7402 (2 February 1994).

[21] *Report by Ambassador H. Ukawa (Japan), Chairman of the Group on Environmental Measures and International Trade, to the 49th Session of the CONTRACTING PARTIES*, L/7402 (2 February 1994). This document, contained in Annex I to this Note, provides a detailed summary of the debate under each of the three agenda items.

[22] *Trade and Environment*, Factual Note by the Secretariat, L/6896, 18 September 1991.

[23] GATT, *International Trade 90-91*, vol. I, p. 19-47.

[24] Council meeting of 14 July 1992, doc. C/M/258.

environment and to accelerate sustainable development in developing countries. Also, the special concerns that had been raised by the UNCED about the need to improve market access for developing countries' exports, particularly by reducing tariff and non-tariff impediments, including tariff escalation, and to improve the functioning of commodity markets were well recognized."[25]

28. The CONTRACTING PARTIES further invited the Committee on Trade and Development and the EMIT Group to focus on the relevant sections of *Agenda 21* and report to the Council on the progress they were making in that area.[26] The review took place in a special session of the Council in February 1994. Contracting parties generally considered the successful conclusion of the Uruguay Round to be an important step towards creating the conditions for sustainable development. They considered that trade liberalization and the maintenance of an open, non-discriminatory trading system were key elements of the follow-up to the UNCED. They noted that work that had already been undertaken in the GATT on trade and environment, both in the EMIT Group and the CTD, could be considered as follow-up to the UNCED. Contracting parties also agreed that further UNCED follow-up should await the decision of Ministers at their forthcoming meeting in Marrakesh on 12-15 April 1994 regarding the future work programme on trade and environment.[27]

B. THE ISSUE OF DOMESTICALLY PROHIBITED GOODS[28]

1. Historical background

29. The subject of exports of "domestically prohibited goods" ("DPGs") was included in the GATT's work programme at the 1982 Ministerial meeting as a result of concerns expressed by some developing countries regarding the export of products whose domestic sale was either prohibited or severely restricted in order to protect human health or safety, or the environment. The Ministerial Declaration adopted at the 38th Session of the CONTRACTING PARTIES held at Ministerial Level therefore encouraged contracting parties to notify GATT, "to the maximum extent feasible, of any goods produced and exported by them but banned by their national authorities for sale in their domestic markets on grounds of human health and safety".[29] Consultations held around that time with interested delegations made it possible in particular to shed light on the definition of "domestically prohibited" goods, or to identify DPG-related practices in exporting countries. They also pointed to the complexity of the issues involved and the practical problems of managing such trade.[30]

30. In 1986, as talks for launching the Uruguay Round were underway, the possible inclusion of the subject in the negotiations was raised. While several developing countries were in favour, others considered that work in this area should be carried out under the regular GATT activities. The latter view prevailed.[31] At the Montreal Ministerial meeting ("Mid-Term Review") in December 1988, some delegations again proposed to include the subject of DPGs in the Uruguay Round. In his concluding remarks, the Chairman of the Ministerial Meeting, Mr. R. Zerbino, Minister of Economy and Finance of Uruguay, noting that the subject was covered by GATT's regular work programme, suggested that "the GATT Council be requested to take an early, appropriate decision for the examination of the complementary action that might be necessary in GATT, having regard to the work that was being done by other international organizations".[32]

31. In July 1989, the Council decided to establish the Working Group on Export of Domestically Prohibited Goods (hereinafter the "Working Group").[33] Ambassador J. Sankey (United Kingdom) was nominated as Chairman.

2. The Working Group on the Export of Domestically Prohibited Goods and Other Hazardous Substances

32. The terms of reference of the Working Group were the following:

"...the Council agrees to establish a Working Group on the Export of Domestically Prohibited Goods and Other Hazardous Substances which, in the light of GATT obligations and principles and having regard to the work of other international organizations on these goods and substances, will examine trade-related aspects that may not be adequately addressed, and report to the Council.

The Working Group should take into account the specific characteristics of domestically prohibited goods and those of other hazardous substances, and the need to avoid duplicating the work of other international organizations.

The Working Group should complete its work by 30 September 1990, and submit a progress report to the Forty-Fifth Session of the CONTRACTING PARTIES in 1989."[34]

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[25] Forty-Eighth Session of the CONTRACTING PARTIES, 2 December 1992, SR.48/1. See also documents C/M/259 and C/M/260.

[26] Reports of the EMIT Group discussions on the UNCED follow-up can be found in TRE/12 (30 July 1993), TRE/13 (21 October 1993), TRE/14 (17 February 1994) + TRE/14/Corr. 1 and in the *Report by Ambassador H. Ukawa (Japan), Chairman of the Group on Environmental Measures and International Trade, to the 49th Session of the CONTRACTING PARTIES*, L/7402 (2 February 1994).

[27] Council meeting of 22 February 1994, doc. C/M/269.

[28] This section is based on two background notes by the Secretariat: *Trade and Environment*, L/6896 (18 September 1991), and *Exports of Domestically Prohibited Goods*, PC/SCTE/W/7 (22 December 1994).

[29] Ministerial Declaration, adopted 28 November 1982, BISD 29S/9.

[30] L/5907, 22 November 1985.

[31] Ministerial Declaration on the Uruguay Round, Declaration of 20 September 1986, BISD 33S/30.

[32] MTN.TNC/8(MIN), 17 January 1988, pp 11 - 12.

[33] L/6553 (21 July 1989).

[34] *Ibidem*.

33. The Working Group met between September 1989 and June 1991.[35] At the first meeting, the Working Group, noting the request to have regard to the work of other international organizations, agreed to invite, as observers to its meetings, representatives from UNEP, FAO, WHO, the UN Secretariat, the ILO, the UN Centre for Transnational Corporations, the OECD, the ITC, and the International Atomic Energy Agency. Throughout the work of the Working Group, these representatives provided technical expertise and advice to delegations, to the Chairman and to the Secretariat.

34. Several contracting parties submitted proposals to the Working Group.[36] The Chairman subsequently presented a working paper containing a Draft Decision on Trade in Banned or Severely Restricted Products and Other Hazardous Substances, which was based on the two proposals presented by Cameroon and Nigeria on one hand, and by the European Community on the other, and took into account comments by other delegations. This Draft Decision was the subject of discussion in the Working Group, both at the technical and drafting level and the text was revised to meet the requirements and advice of delegations and technical experts. Despite intensive efforts which continued into June 1991, a final version of the text could not be agreed.

35. At the July 1991 meeting of the Council, the Chairman of the Working Group submitted a report together with the text of a draft Decision on Products Banned or Severely Restricted in the Domestic Market, and explained that one country remained unable to accept it without amendments.[37] Although its mandate was extended, the Working Group never met again. At the end of the Uruguay Round, it was agreed in the Marrakesh Ministerial Decision on Trade and Environment to incorporate this issue into the work programme of the WTO Committee on Trade and Environment.

III. TRADE AND ENVIRONMENT IN THE WTO

A. THE COMMITTEE ON TRADE AND ENVIRONMENT

1. The Marrakesh Decision on Trade and Environment

36. Towards the end of the Uruguay Round, GATT contracting parties agreed that the Trade Negotiations Committee (TNC) should adopt a work programme on trade and environment and present it, together with recommendations on an institutional structure for its execution, at the Marrakesh Ministerial Conference.[38] This led to the adoption, on 14 April 1994, of the Decision on Trade and Environment (hereinafter the "Marrakesh Decision")[39] in which Trade Ministers noted that it should not be contradictory to safeguard the multilateral trading system on the one hand, and act for the protection of the environment and the promotion of sustainable development on the other hand. Ministers further noted their desire to coordinate policies in the field of trade and environment, "but without exceeding the competence of the multilateral trading system, which is limited to trade policies and those trade-related aspects of environmental policies which may result in significant trade effects".

37. The Marrakesh Decision directed the first meeting of the General Council of the WTO to establish a Committee on Trade and Environment (CTE), whose tasks are: "to identify the relationship between trade measures and environmental measures, in order to promote sustainable development; (b) to make appropriate recommendations on whether any modifications of the provisions of the multilateral trading system are required, compatible with the open, equitable and non-discriminatory nature of the system ...".[40] The Marrakesh Decision lists ten items, encompassing all areas of the multilateral trading system: goods, services and intellectual property. These items are commonly referred to in the following order:

> Item 1: "the relationship between the provisions of the multilateral trading system and trade measures for environmental purposes, including those pursuant to multilateral environmental agreements"
>
> Item 2: "the relationship between environmental policies relevant to trade and environmental measures with significant trade effects and the provisions of the multilateral trading system"
>
> Item 3: "the relationship between the provisions of the multilateral trading system and:
>
> (a) charges and taxes for environmental purposes
>
> (b) requirements for environmental purposes relating to products, including standards and technical regulations, packaging, labelling and recycling"
>
> Item 4: "the provisions of the multilateral trading system with respect to the transparency of trade measures used for environmental purposes and environmental measures and requirements which have significant trade effects"
>
> Item 5: "the relationship between the dispute settlement mechanisms in the multilateral trading system and those found in multilateral environmental agreements"
>
> Item 6: "the effect of environmental measures on market access, especially in relation to developing countries, in particular to the least developed among them, and environmental benefits of removing trade restrictions and distortions"

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[35] The minutes of the meetings of the Working Group are contained in documents Spec(89)48 and 52; Spec(90)3, 12,20,27,36, and 39; and Spec(91)3, 4, 23, 60, and 62.

[36] *Technical Note on Domestically Prohibited Goods*, Communication by Cameroon, Côte d'Ivoire, Nigeria, Sri Lanka and Zaire, MTN.GNG/W/18 (17 November 1998); *Outline of a Possible GATT Framework of rules in the Area of Domestically Prohibited Goods and Other Hazardous Substances*, Communication by Nigeria and Cameroon, DPG/W/8 (30 March 1990); *Understanding on Trade in Domestically Prohibited Goods and Other Hazardous Substances*, Communication by the European Community, DPG/W/9 (12 April 1990).

[37] L/8672 (2 July 1991).

[38] MTN.TNC/W/123, 13 December 1993.

[39] MTN.TNC/45(MIN) (6 May 1994).

[40] The text of the Decision is contained in Annex II to this Note.

Item 7: "the issue of exports of domestically prohibited goods"

Item 8: "TRIPs"

Item 9: "Services"

Item 10: "appropriate arrangements for relations with non-governmental organizations referred to in Article V of the WTO and transparency of documentation".

2. The Sub-Committee on Trade and Environment

38. Pending the establishment of the CTE, the Marrakesh Decision stipulated that work on trade and environment should be carried out by a Sub-Committee of the Preparatory Committee of the WTO. The Sub-Committee on Trade and Environment (SCTE) met in the course of 1994 under the chairmanship of Ambassador L. F. Lampreia (Brazil). It based its work on the terms of reference established by the Marrakesh Decision, while building on the work previously accomplished in GATT bodies, such as the EMIT Group or the Working Group on Domestically Prohibited Goods.[41]

39. With respect to its work programme, the SCTE focused on the first, third and sixth items, building whenever possible on the work of the EMIT Group. Under item 1, the Sub-Committee examined the use of trade measures for environmental purposes, particularly those applied in the context of multilateral environmental agreements and those applied specifically to non-parties to those agreements. Delegations began reviewing the potential advantages and disadvantages of *ex ante* and *ex post* approaches to establishing the relationship of these measures to the provisions of the multilateral trading system. With regard to item 3, delegations began reviewing the use of environmental taxes, in particular in the context of GATT disciplines on border tax adjustment, and examined further environmental regulations and standards, notably those related to eco-labelling, on the basis of the work that had already been undertaken on this subject by the EMIT Group. Under item 6 of the work programme delegations highlighted for further examination issues such as the effects of tariff escalation, non-tariff barriers and trade distorting subsidies on the environment, export diversification and its relationship to environmental protection, market opportunities for environmentally friendly products particularly from developing countries, and the importance of technology transfer, technical and financial assistance in pursuit of sustainable development.

40. The SCTE transmitted its working documents and reports to the WTO's Committee on Trade and Environment.

3. Work of the Committee on Trade and Environment

41. As stipulated in the Marrakesh Ministerial Decision on Trade and Environment, the General Council of the WTO established the Committee on Trade and Environment (CTE) at its first meeting, held on 31 January 1995. It was agreed that the CTE would be open to all Members of the WTO and would report to the first biennial WTO meeting of the Ministerial Conference, when its work and terms of reference would be reviewed, in the light of recommendations by the Committee itself. The General Council nominated Ambassador J. C. Sanchez Arnau (Argentina) as Chairman of the CTE.

(a) Work of the CTE until the Singapore Ministerial Meeting

42. The CTE held its first meeting on 16 February 1995. It adopted a programme of work whereby each meeting would focus on some of the ten agenda items. CTE Members also agreed that meetings would be organized such that, once discussion of the items constituting the focus of the meeting had been completed, delegations could address, if they wished, the item(s) that had been discussed at the previous meeting. The work of the CTE was assisted by background and analytical papers prepared by the Secretariat, as well as documents submitted by delegations.[42]

43. The CTE initially extended observer status to those inter-governmental organizations (IGOs) which had had observer status in the SCTE: the United Nations (UN), the United Nations Conference on Trade and Development (UNCTAD), the World Bank, the International Monetary Fund (IMF), the United Nations Environment Programme (UNEP), United Nations Development Programme (UNDP), Commission for Sustainable Development (CSD), the Food and Agriculture Organization (FAO), the International Trade Centre (ITC), the Organization for Economic Cooperation and Development (OECD), and the European Free Trade Association (EFTA).

44. Until May 1996, CTE Members completed two full rounds of analysis of each individual item of the agenda.[43] At the May 1996 stocktaking exercise, it was noted that

> "[i]n preparing for the Singapore Ministerial Conference, the CTE has held a general debate on all items of its agenda. Some agenda items have been disaggregated, some specific issues and problems have been identified. The general debate clarified and promoted understanding of some issues and also permitted the identification of divergences of view. In some cases more analytical work is required. As a result of this process, the CTE is now in a position to centre its attention on specific issues, including issues covered by proposals submitted or to be submitted by Members, keeping in mind the need for a balanced and focused approach to the whole agenda."[44]

45. The CTE then focused its activities on the preparation of its report to the first Ministerial Conference in Singapore. Members agreed that the report had to be comprehensive, balanced among the agenda items and among the different "schools of thought" and perceptions of the issues under debate. The document "would include conclusions and

[41] See docs. PC/SCTE/M/1 to PC/SCTE/M/5. See also doc. PC/R (31 December 1994).

[42] See Annex III to this Note.

[43] See document series WT/CTE/M/1 to 13.

[44] *Results of the Stocktaking Exercise*, Adopted at the 28-29 May 1996 Meeting, WT/CTE/W/33 (4 June 1996).

recommendations if any".[45] The CTE Report to the Singapore Ministerial Conference was adopted on 8 November 1996, with the understanding that it "did not modify the rights and obligations of any WTO Member under the WTO Agreements".[46] As noted by the Chairman, this statement made it possible for a number of delegations to join the consensus and approve the report.[47] The Report contains a brief introductory section which sketches the CTE's establishment and outlines its work programme; a second section presents the discussions and describes the documents submitted by delegations; the third section includes the conclusions and recommendations.[48]

46. At Singapore, Trade Ministers endorsed the Report and directed the CTE to continue its work under its current mandate:

> "The Committee on Trade and Environment has made an important contribution towards fulfilling its Work Programme. The Committee has been examining and will continue to examine, *inter alia*, the scope of the complementarities between trade liberalization, economic development and environmental protection. Full implementation of the WTO Agreements will make an important contribution to achieving the objectives of sustainable development. The work of the Committee has underlined the importance of policy coordination at the national level in the area of trade and environment. In this connection, the work of the Committee has been enriched by the participation of environmental as well as trade experts from Member governments and the further participation of such experts in the Committee's deliberations would be welcomed. The breadth and complexity of the issues covered by the Committee's Work Programme shows that further work needs to be undertaken on all items of its agenda, as contained in its report. We intend to build on the work accomplished thus far, and therefore direct the Committee to carry out its work, reporting to the General Council, under its existing terms of reference."[49]

(b) The Singapore Report

47. The Report recalls that the work of the CTE was guided by the consideration contained in the Ministerial Decision that there should not be nor needed to be any policy contradiction between upholding and safeguarding an open, equitable and non-discriminatory multilateral trading system on the one hand and acting for the protection of the environment on the other. These two areas of policy-making were both important and they should be mutually supportive in order to promote sustainable development. Discussions demonstrated that the multilateral trading system had the capacity to further integrate environmental considerations and enhance its contribution to the promotion of sustainable development without undermining its open, equitable and non-discriminatory character; implementation of the results of the Uruguay Round negotiations would represent already a significant contribution in that regard.

48. The CTE's discussions were also guided by the consideration that the competence of the multilateral trading system was limited to trade policies and those trade-related aspects of environmental policies which could result in significant trade effects for its Members. It was recognized that achieving the individual as well as the joint objectives of WTO Member governments in the areas of trade, environment and sustainable development required a coordinated approach that drew on interdisciplinary expertise. In that regard, policy coordination between trade and environment officials at the national level had an important role to play. Work in the CTE was helping to better equip trade officials to make their contribution in this area.

49. The Report states that WTO Member governments were committed not to introduce WTO-inconsistent or protectionist trade restrictions or countervailing measures in an attempt to offset any real or perceived adverse domestic economic or competitiveness effects of applying environmental policies; not only would this undermine the open, equitable and non-discriminatory nature of the multilateral trading system, it would also prove counterproductive to meeting environmental objectives and promoting sustainable development. Equally, and bearing in mind the fact that governments had the right to establish their national environmental standards in accordance with their respective environmental and developmental conditions, needs and priorities, WTO Members noted that it would be inappropriate for them to relax their existing national environmental standards or their enforcement in order to promote their trade. As noted by OECD Ministers in 1995, that there was no evidence of a systematic relationship between existing environmental policies and competitiveness impacts, nor of countries deliberately resorting to low environmental standards to gain competitive advantages.

50. The CTE worked intensively on the issue of the *relationship between trade measures in multilateral environmental agreements (MEAs) and the multilateral trading system* (items 1 and 5). It examined whether there was a need to clarify the scope that existed under WTO provisions to use such measures. Various proposals were made in that regard. However, the report concluded that there was no agreement for the time being to modify WTO provisions in order to provide increased accommodation in this area. Many delegations shared the view that WTO provisions already provided broad scope for trade measures to be applied pursuant to MEAs in a WTO-consistent manner.

51. In its conclusions and recommendations on this issue, the Report endorsed and supported multilateral solutions as the best and most effective way for governments to address global and transboundary environmental problems; it pointed to the clear complementarity that existed between this approach and the work of the WTO in seeking multilateral solutions to trade concerns. It acknowledged that trade measures could, in certain cases, play an important role, particularly where trade was a direct cause of the environmental problem; trade measures played an important role in some MEAs in the past, and they could be needed to play a similarly important role in the future. But, it also pointed out that trade restrictions were not

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[45] *Ibidem*.

[46] *Report of the Meetings Held on 30 October and 6-8 November 1996*, doc. WT/CTE/M/13 (22 November 1996).

[47] Meeting of the General Council held on 7, 8 and 13 November 1996, WT/GC/M/16 (6 December 1996).

[48] *Report (1996) of the Committee on Trade and Environment*, WT/CTE/1 (12 November 1996). Section III of the Report (Conclusions and Recommendations) is contained in Annex IV to this Note.

[49] *Singapore Ministerial Declaration*, adopted on 13 December 1996, WT/MIN(96)/DEC (18 December 1996), paragraph 16.

the only nor necessarily the most effective policy instrument to use in MEAs: adequate international cooperation provisions, including financial and technology transfers and capacity building, were often decisive elements of a policy package for an MEA.

52. The CTE also examined carefully some characteristics of the trade measures used in MEAs. It concluded in particular that problems were unlikely to arise in the WTO over trade measures agreed and applied among Parties to an MEA. However, concerns were expressed regarding measures applied to MEA non-signatories. The Report stated that, in the negotiations of a future MEA, particular care should be taken over how trade measures might be considered for application to non-parties.

53. Regarding the relationship between WTO dispute settlement procedures and those found in MEAs, the report recognized that WTO Members had the right to bring disputes over the use of a trade measures taken pursuant to MEAs to the WTO dispute settlement system. However, disputes arising over the use of a trade measure applied pursuant to an MEA between two WTO Members which were both signatory to an MEA should be resolved through the dispute settlement mechanism available under that MEA.

54. The CTE report stressed in several instances the importance of ensuring policy coordination between trade and environment experts. First and foremost, policy coordination had to take place at the national level, in order to prevent governments from entering into conflicting obligations in different treaties they were signatories to: this was best done at the negotiating and drafting stage. At the international level, the report encouraged cooperation between the WTO and relevant institutions.

55. The "unilateral" trade measures taken for environmental purposes were also under scrutiny. Most of the delegations which intervened in the CTE on this issue considered that GATT Article XX did not permit a Member to impose unilateral trade restrictions, that were otherwise inconsistent with its WTO obligations, for the purpose of protecting environmental resources that was outside its jurisdiction. Another opinion expressed in the CTE was that nothing in the text of Article XX indicated that it only applied to protection policies within the territory of the country invoking the provision.

56. A number *of trade-related environmental policies* not covered elsewhere in the work programme of the CTE were discussed under item 2. Property rights, tradeable emission permits, fiscal instruments, emission taxes, liability system, deposit-refund systems and environmental subsidies have been mentioned. Moreover, there was an exchange of views on the use by governments of environmental reviews of trade agreements, and of the relationship and compatibility of general trade and environmental policy-making principles.

57. The CTE undertook only a preliminary examination of *the relationship between WTO provisions and environmental taxes and charges* (item 3(a)). Various views were presented on the potential trade effects and general economic and environmental effectiveness of levying environmental taxes and charges. The application of WTO rules on border tax adjustment to environmental taxes and charges was also examined.

58. On *eco-labelling* (item 3(b)), discussions focused on voluntary eco-labelling programmes, including those based on life cycle approaches, and their relationship to the Agreement on Technical Barriers to Trade. CTE Members recognized that well-designed eco-labelling programmes could be effective instruments of environmental policy to develop environmental awareness of consumers, and assist them in making informed choices. But, at the same time, concerns were expressed about their possible trade effect: the multiplication of eco-labelling schemes with different criteria and requirements, or the fact that they could reflect the environmental conditions, preferences and priorities prevailing in the domestic market might have the effect of limiting market access for overseas suppliers.

59. CTE Members noted that increased transparency could help deal with trade concerns regarding eco-labelling schemes. It could also help to meet environmental objectives by providing accurate and comprehensive information to consumers. Transparency should be ensured in the preparation, adoption and application of the programme, and all interested parties from other countries had to be afforded an opportunity to participate in the preparation of the programme. The Report stressed the importance of WTO Members respecting the provisions of the TBT Agreements and its Code of Good Practice. Further discussion was needed, however, on how criteria based on non-product related processes and production methods should be treated under the TBT Agreement.

60. Regarding the *transparency of trade measures used for environmental purposes* (item 4), CTE Members concluded that no modifications to WTO rules were required for the time being. Transparency is not an end in itself and trade-related environmental measures should not be subject to more onerous transparency requirements than other measures that affected trade. In relation with measures notified under the WTO, the CTE suggested that WTO Members should supply information to other Members, especially developing countries, about market opportunities created by environmental measures. Finally, the Report mandated the WTO Secretariat to compile all notifications of trade-related environmental measures and collate them in a single database accessible to WTO Members.

61. The CTE discussed how the WTO could contribute to *making international trade and environmental policies mutually supportive for the promotion of sustainable development* (item 6). There was a concern that environmental measures could adversely affect the competitiveness and market access opportunities of small and medium-sized enterprises, especially in developing and least-developed countries. Among its conclusions, the CTE emphasized the importance of market access opportunities in assisting those countries to obtain the resources to implement adequate developmental and environmental policies, diversify their economies and provide income-generating activities. Improving market access opportunities and preservation of an open and non-discriminatory trading system was essential for supporting countries in their efforts to ensure sustainable management of their resources. At the same time, however, the CTE underlined the necessity for countries to implement appropriate environmental policies in order to ensure that trade-induced growth was sustainable.

62. The CTE also discussed whether and how the removal of trade restrictions and distortions, such as high tariffs, tariff escalation, export restrictions, subsidies and non-tariff measures, could benefit both the multilateral trading system and the

environment. The Committee had focused first on the agriculture sector, but it was agreed to extend this analysis to other sectors, such as tropical timber and natural resource-based products, textiles and clothing, fisheries, forest products, environmental services and non-ferrous metals, taking into account country-specific natural and socio-economic conditions.

63. *Domestically prohibited goods* (item 7) was an issue of serious concern to some developing and least-developing countries which considered that they did not have sufficient timely information about the characteristics of these products, nor the technical capacity to make informed decisions about importing them.

64. The CTE noted that a number of international instruments, dealing *inter alia* with the monitoring and control of trade in certain DPGs entered into force and others were under negotiation (reference was made to the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal, the preparation under the Amended London Guidelines of an internationally legally-binding instrument for the application of the prior-informed consent procedures for certain hazardous chemicals in international trade). WTO should consider to fully participate in the activities of other organizations which have the relevant expertise for providing technical assistance in this field.

65. The CTE stressed the important role that technical assistance and transfer of technology could play in this field, both in tackling environmental problems at their source and in helping to avoid unnecessary additional trade restrictions on the products involved. The CTE will continue to examine what contribution WTO could make in this area, bearing in mind the need not to duplicate work of other specialized agencies. In the meantime, the WTO Secretariat will survey the information already available in the WTO on trade in DPGs, and WTO Members are encouraged to submit to the Secretariat any additional information they have which could help drawing up a comprehensive picture of the situation throughout the WTO.

66. The CTE started work on the relationship of *the Agreement on Trade-Related Aspects of Intellectual Property Rights* (TRIPS) to the environment (item 8). It discussed the role of the TRIPS Agreement in the generation, access to and transfer of environmentally sound technology, and its relations with MEAs, in particular the Convention on Biological Diversity.

67. The Report noted that the TRIPs Agreement already played an essential role in facilitating access to and transfer of environmentally-sound technology and products. Positive measures, such as access to and transfer of technology, could be effective instruments to assist developing countries to meet MEAs' objectives. Delegations disagreed as to whether some provisions of the TRIPS Agreement needed to be amended in order to facilitate the international transfer of technology. It identified several areas on which it intended to focus its future work: (i) facilitating the generation environmentally sound technology and products; (ii) facilitating their access and transfer; (iii) the creation of incentives for the conservation of biological diversity, the sustainable use of its components, and the fair and equitable sharing of the benefits arising out of the use of genetic resources, which included the protection of knowledge, innovations and practices of indigenous and local communities.

68. Preliminary discussion took place on the work programme envisaged in the *Decision on Trade in Services and the Environment* (item 9). So far, it did not lead to the identification of any environmental measures that Members might need to apply to services trade which would not be covered adequately by the provisions of the GATS Agreement, in particular Article XIV(b).

69. The CTE recognized that there was a need to respond to public interest in WTO activities in the area of trade and environment. Regarding the *relationship with non-governmental organizations* (item 10), CTE Members considered that the primary responsibility for closer consultation and cooperation lay at the national level. Nevertheless, it recommended that the WTO Secretariat continue its interaction with NGOs, for example through the organization of informal meetings. The CTE took note and endorsed the Decisions of the General Council of 18 July 1996 on "Procedures for the circulation and derestriction of WTO documents" and on "Guidelines for arrangements on relations with non-governmental organizations". In order to improve public access to WTO documentation, it recommended that all CTE working documents which were still restricted be derestricted, and encouraged Members to agree to derestrict the papers and non-papers they submitted.

(c) Work of the CTE since the Singapore Ministerial Meeting

70. In 1997 and 1998, the CTE continued to work under the chairmanship of, respectively, Ambassador B. Ekblom (Finland) and Ambassador C. M. See (Singapore), with the mandate and terms of reference contained in the Marrakesh Decision. Since Singapore, CTE Members have adopted a thematic approach (the so-called "cluster approach"), which has allowed the items of the work programme to be addressed in a systematic and more focused manner. A full account of the debates can be found in the minutes of the meetings, and a summarized version is available in the *Trade and Environment Bulletins*.[50]

71. A first cluster regroups those items relevant to the theme of market access (i.e. items 2, 3, 4, and 6). Under *item 2*, Members had an initial exchange of views on the environmental review of trade agreements. With respect to *item 3(b)*, Members focused on the effects of eco-labelling programmes on market access and their relation with WTO rules, in particular the TBT Agreement; concrete examples of eco-labelling programmes, presented by delegations, were also discussed. Under the same item, the application of WTO rules to environmental taxes and charges was also raised. In order to fulfill the recommendations contained in the Singapore Report with respect to *item 4*, the CTE established a WTO Environmental Database (EDB) which compiles all environment-related notifications made under various WTO instruments; the EDB is regularly up-dated by the Secretariat.[51] A detailed examination of the potential economic and environmental benefits of removing trade restrictions and distortions took place under *item 6*. CTE Members examined the environmental and trade effects of various types of measures - tariff escalation, subsidies, non-tariff measures- in specific sectors - agriculture, energy, fisheries, forestry, non-ferrous metals, textiles and clothing, leather and environmental services. The

[50] WT/CTE/M/14 to WT/CTE/M/18 and PRESS/TE 018 to 027.

[51] WT/CTE/W77 (9 March 1998) and WT/CTE/78 (9 March 1998).

Secretariat contributed to the analysis by preparing a background paper, outlining for each sector the most prevalent trade restrictions and distortions, as well as the environmental benefits associated with their elimination.[52]

72. A second cluster contains the items related to the linkages between the multilateral environment agenda and the multilateral trade agenda (i.e. items 1, 5, 7 and 8). Discussions under *items 1 and 5* focused on the interaction between WTO rules and MEAs containing trade provisions, and various ways of accommodating the two sets of rules. In this respect, the CTE held two informal sessions with a number of Secretariats of multilateral environmental agreements relevant to its work, in order to inform WTO Members on the latest developments in these instruments and help them to better understand the relationship between the environmental agenda and the trade agenda. On *item 7*, discussions continued on the possible modalities of a notification scheme for DPGs. As to *item 8*, CTE Members examined the various aspects of the relationship between the Convention on Biological Diversity and the TRIPS Agreement; they also exchanged views on the effects of the TRIPS Agreement on technology transfer, in particular environmentally-sound technology.

73. With respect to *item 9*, Members exchanged views on the possible benefits for both trade and the environment of liberalizing environmental services. Options for increasing the transparency of the CTE's work and for improving relations with civil society were examined under *item 10*.

74. The CTE has currently granted observer status to twenty intergovernmental organizations, i.e. those which had been granted observer status at the first meeting, as well as: African, Caribbean and Pacific Group of States (ACP Group), Convention on Biological Diversity (CBD), Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), International Organization for Standardization (ISO), International Plant Genetic Resources Institute (IPGRI), Latin American Economic System (SELA), United Nations Industrial Development Organization (UNIDO), World Customs Organization (WCO), World Intellectual Property Organization (WIPO).[53]

75. In 1999, the first meeting of the CTE was held on 18 and 19 February and addressed the market access cluster. The next meetings will take place in June and October.

B. ENVIRONMENT-RELATED PROVISIONS IN WTO AGREEMENTS

76. The environment was not, as such, a subject of negotiations during the Uruguay Round. At the beginning of the eighties, the protection of the environment was not as high on the political agenda of governments and, except for the issue of domestically prohibited goods, no attempt was made to include the subject in the programme of negotiations. Environmental considerations were, nevertheless, not totally absent from the preoccupations of negotiators and are reflected in several WTO instruments. Environment is also proving to be a cross-cutting issue and questions related to environmental concerns have arisen in various WTO bodies, such as the General Council, the Committee on Technical Barriers to Trade, the Council for TRIPs and the Council for Trade in Services.

1. The Marrakesh Agreement Establishing the World Trade Organization

(a) The Preamble

77. The Agreement Establishing the World Trade Organization (the "WTO Agreement") envisages a single institutional framework for the multilateral trading system which encompasses the GATT 1947, as modified by the Uruguay Round, and other agreements and associated legal instruments resulting from the Uruguay Round. The first paragraph of the Preamble to the WTO Agreement includes, for the first time in the context of the multilateral trading system, reference to the objective of sustainable development and to the need to protect and preserve the environment. It states:

> "*Recognizing* that their relations in the field of trade and economic endeavour should be conducted with a view to raising standards of living, ensuring full employment and a large and steadily growing volume of real income and effective demand, and expanding the production of and trade in goods and services, while allowing for the optimal use of world's resources in accordance with the objective of sustainable development, seeking both to protect and preserve the environment and to enhance the means for doing so in a manner consistent with their respective needs and concerns at different levels of economic development, ..."

78. In the *Shrimp* case, the Appellate Body considered that the first preambular paragraph of the WTO Agreement is relevant for the interpretation of provisions contained in the various WTO agreements, such as GATT Article XX. By explicitly recognizing the "objective of sustainable development", the preamble shows that "the signatories to the Agreements were, in 1994, fully aware of the importance and legitimacy of environmental protection as a goal of national and international policy". The Appellate Body further noted that the language of the WTO preamble

> "demonstrates a recognition by WTO negotiators that optimal use of the world's resources should be made in accordance with the objective of sustainable development. As this preambular language reflects the intentions of negotiators of the *WTO Agreement*, we believe that it must add colour, texture and shading to our interpretation of the agreements annexed to the *WTO Agreement*, in this case the GATT 1994. ...".[54]

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[52] *Environmental Benefits of Removing Trade Restrictions and Distortions*, Note by the Secretariat, WT/CTE/W/67 (7 November 1997).

[53] Document WT/CTE/W/41/Rev.3 (2 December 1998).

[54] *United States - Import Prohibition of Certain Shrimp and Shrimp Products*, Appellate Body Report, WT/DS58/AB/R, circulated on 12 October 1998, in particular paragraphs 129 and 152.

(b) Arrangements With Non-Governmental Organizations (NGOs)

79. Article V:2 of the Marrakesh Agreement Establishing the World Trade Organization enables the General Council to "make appropriate arrangements for effective cooperation with other intergovernmental organizations that have responsibilities related to those of the WTO". Pursuant to this provision, the General Council adopted, on 18 July 1996, a decision entitled "Guidelines for arrangements on relations with non-governmental organizations", where Members recognize the rôle NGOs can play in increasing the awareness of the public in respect of WTO activities and agree to improve transparency and develop communication with NGOs. Members also agree to ensure that more information about WTO activities is made available, in particular by derestricting documents more promptly than in the past, and direct the Secretariat to play a more active rôle in its direct contacts with NGOs, for instance by organizing symposia on specific WTO-related issues. Pointing to the "special character of the WTO, which is both a legally binding intergovernmental treaty of rights and obligations among its Members and a forum for negotiations", the General Council states that "there is currently a broadly held view that it would not be possible for NGOs to be directly involved in the work of the WTO or its meetings" and notes that the primary responsibility for interacting with NGOs lies at the national level.[55]

80. At the same time, the General Council adopted new rules to facilitate the derestriction of WTO documents. It agreed that working documents, background notes by the Secretariat and minutes of meetings of all WTO bodies shall be considered for derestriction six months after the date of their circulation. Notwithstanding the six months rule, any Member may, at the time it submits any document for circulation to WTO Members, indicate to the Secretariat that the document be issued as unrestricted. Panel and Appellate Body reports are derestricted at the same time they are circulated to WTO Members.[56]

81. These decisions apply to all WTO bodies but are particularly relevant for the work of the CTE and other environment-related issues in the WTO, which have generally attracted most of the public attention.

2. The General Agreement on Tariffs and Trade

82. Article XX of the GATT allows a government to depart, under certain conditions, from its obligations under the Agreement. The relevant part of Article XX reads as follows:

> "Subject to the requirement that such measures are not applied in a manner which would constitute a means of arbitrary or unjustifiable discrimination between countries where the same conditions prevail, or a disguised restriction on international trade, nothing in this Agreement shall be construed to prevent the adoption or enforcement by any contracting party of measures:
>
> "*(b)* necessary to protect human, animal or plant life or health;
>
> "*(g)* relating to the conservation of exhaustible natural resources if such measures are made effective in conjunction with restrictions on domestic production of consumption; ..."

83. During the Uruguay Round, at the last formal meeting of the Negotiating Group on GATT Articles, Austria proposed that Article XX should be amended by adding the term "environment" in paragraph (b) in order to appropriately reflect the increasingly important relationship between trade and the environment. Austria noted that [t]he inclusion of the notion [of environment] in Article XX(b) might just be one possibility worth exploring" but recognized it was too late to start working on it in the Negotiating Group. No effect was given to this proposal.[57]

84. GATT/WTO panels and the Appellate Body have examined Article XX in various disputes which are presented in Section IV of this Note.[58]

3. The Agreement on Technical Barriers to Trade

(a) Main features of the Agreement

85. The WTO Agreement on Technical Barriers to Trade ("TBT Agreement"), which governs the preparation, adoption and application of product technical requirements, and of procedures used for the assessment of compliance with them, was finalized during the Uruguay Round. It builds upon and strengthens the 1979 Standards Code that was negotiated during the Tokyo Round. This Agreement is particularly relevant for the trade aspects of environmental policy-making.

86. The TBT Agreement divides product technical requirements into two categories, technical regulations and standards. The main distinction which the Agreement establishes between the two is that compliance with the former is mandatory, while compliance with latter is voluntary. The Agreement recognizes that countries should not be prevented from taking measures necessary to pursue various policy purposes, such as the protection of public health or the environment, and that each country has the right to set the level of protection it deems appropriate. Governments are, however, required to apply technical regulations and standards in a non-discriminatory way (which means meeting the requirements of the most-favoured-nation and national treatments). Governments must also ensure that technical regulations and standards do not create unnecessary obstacles to trade. This means that mandatory technical regulations must not be more trade-restrictive than necessary to fulfill a legitimate objective, taking into account the risks non-fulfilment of that legitimate objective would create. In an illustrative list of legitimate objectives, the Agreement mentions national

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[55] *Guidelines for Arrangements on Relations with Non-Governmental Organizations*, WT/L/162 (23 July 1996).

[56] *Procedure for the Circulation and Derestriction of WTO Documents*, WT/L/160/Rev.1 (26 July 1996).

[57] Paragraph (b) of Article XX, as amended by the Austrian proposal, would read: "necessary to protect the environment, human, animal or plant life or health". MTN.GNG/NG7/W/75 (1 November 1990).

[58] For a more detailed account of the dispute settlement practice which has built on this provision, see also document WT/CTE/W/53/Rev.1 (26 October 1998) + -Corr.1 (27 November 1998).

security requirements, the prevention of deceptive practices, the protection of human health or safety, animal or plant life or health, or the environment.

87. The Agreement encourages - but does not require- countries to use international standards whenever possible, in order to limit the proliferation of different domestic technical requirements. When a WTO Member considers that the relevant international standard would not appropriately fulfil the objective pursued, for instance because of fundamental climatic or geographical factors or fundamental technological problems, this Member can use the technical regulation or standard which suits its needs.

88. One of the key features of the TBT Agreement is that it provides a high degree of transparency, which allows economic operators to adjust to technical requirements in export markets. Notification obligations include, *inter alia*, notifying draft technical regulations, conformity assessment procedures and standards, and providing other Members with sufficient time to comment on them, and notifying more generally the domestic measures taken to implement the provisions of the TBT Agreement. Notification requirements are complemented by the establishment of national "enquiry points" which provide, on request, further information about technical regulations, standards and conformity assessment procedures. Regular meetings of the TBT Committee further contribute to ensuring the transparent implementation of the Agreement.

89. In the WTO, the majority of trade-related environmental measures have been notified under the TBT Agreement. Since the entry into force of the Agreement, on 1 January 1995, about 2300 notifications have been received, of which some 11 per cent are environment-related. In this category, we find measures for pollution abatement, waste management, energy conservation; standards and labelling (including eco-labels); handling requirements; economic instruments and regulations; measures for the preservation of natural resources, and measures taken for the implementation of multilateral environmental agreements.[59]

90. Finally, the TBT Agreement provides that a panel called to examine a dispute between Members may establish, at its own initiative or at the request of a party to the dispute, a technical expert group. Participation in such a group will include persons of professional standing and experience in the field of question.

(b) Eco-labelling in the TBT Committee

91. Eco-labelling is the main environment-related issue which has been raised in the TBT Committee where discussions took place in parallel with those held on the same subject in the CTE. The two Committees held a joint informal meeting on this subject matter.

92. The issues raised in the TBT Committee with respect to eco-labelling are generally similar to those discussed in the CTE.[60] They include the applicability of the TBT Code of Good Practice to voluntary eco-labelling programmes, the extent to which eco-labelling programmes based on non-product related processes and production methods (PPMs) are covered by the TBT agreement, the effects of eco-labelling programmes on international trade, and questions linked to the implementation and management of those programmes (selection of criteria, transparency, etc). As in the CTE, no conclusion has been reached on these issues, which are, therefore, still open.

93. At the first triennial review of the TBT Agreement, in 1997, the Committee agreed on some measures which should be taken to improve the transparency of, and compliance with the Code of Good Practice. Among those measures, it was agreed that "without prejudice to the views of Members concerning the coverage and application of the Agreement, the obligation to publish notices of draft standards containing voluntary labelling requirements under paragraph L of the Code is not dependent upon the kind of information provided on the label." [61] This statement is directly relevant to eco-labelling programmes.

4. The Agreement on Sanitary and Phytosanitary Measures

94. The Agreement on Sanitary and Phytosanitary Measures ("SPS Agreement") was negotiated during the Uruguay Round. Before its entry into force, national food safety, animal and plant health measures affecting trade were subject to GATT rules, such as Article I (most-favoured-nation treatment), Article III (national treatment) and Article XX (general exceptions). The 1979 Agreement on Technical Barriers to Trade also covered technical requirements resulting from food safety and animal and plant health measures. However, it was considered that these provisions did not adequately address the potential problems posed by SPS measures.

95. Governments enforce sanitary and phytosanitary measures to ensure that food is free from risks arising from additives, contaminants, toxins or disease-causing organisms, to prevent the spread of plant-, animal- or other disease-causing organisms; and to prevent or control pests. They are applied to domestically produced food or local animal and plant diseases, as well as to products coming from other countries. The SPS Agreement recognizes the legitimate right of governments to maintain the level of health protection they deem appropriate but ensures at the same time that this right is not abused and does not result in unnecessary barriers to international trade.

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[59] For more details on this subject, see *Item 4: Provisions of the Multilateral Trading System With Respect to the Transparency of Trade Measures Used for Environmental Purposes and Environmental Measures and Requirements Which Have Significant Trade Effects*, Note by the Secretariat, WT/CTE/W/77 (9 March 1998).

[60] *Communication from Canada*, G/TBT/W/9 (5 July 1995); *Negotiating History of the Coverage of the Agreement on Technical Barriers to Trade With Regard to Labelling Requirements, Voluntary Standards, and Processes and Production Methods Unrelated to Product Characteristics*, G/TBT/W/11-WT/CTE/W/10 (29 August 1995); *US Proposal Regarding Further Work on Transparency of Eco-Labelling*, G/TBT/W/29 (18 June 1996); *Draft Decision on Eco-Labelling*, G/TBT/W/30 - WT/CTE/W/38 (24 July 1996); *Environmental Labels and Market Access: Case Study on the Colombian Flower-Growing Industry - Document from Colombia*, G/TBT/W/60 (9 March 1998); *Forests: A National Experience - Contribution by Canada*, G/TBT/W/61 - WT/CTE/W/81 (11 March 1998). See also G/TBT/M/2 (4 October 1995), G/TBT/M/3 (5 January 1996), G/TBT/M/4 (10 June 1996), G/TBT/M/5 (19 September 1996), G/TBT/M/11 (27 May 1998).

[61] *First Triennial Review of the Operation and Implementation of the Agreement on Technical Barriers to Trade*, G/TBT/5 (19 November 1998).

96. Governments are encouraged to harmonize their SPS requirements, i.e. to base them on international standards, guidelines or recommendations developed by international organizations, such as the joint FAO/WHO Codex Alimentarius Commission, the International Office of Epizootics and the International Plant Protection Convention. Governments are, nevertheless, entitled to set more stringent national standards in case the relevant international norms do not suit their needs; however, the SPS measures must be based on a scientific justification or on an assessment of the risks to human, animal or plant life or health. The procedures and decisions used by a country in a risk assessment will be made available upon request by other countries. The Agreement explicitly recognizes the right of governments to take precautionary provisional measures when scientific evidence is lacking, while seeking further information.

97. SPS measures must be applied in a non-discriminatory manner, although adapted to the health situations of both the area from which a product comes and the area to which it is destined. When governments have at their disposal various alternative measures, which are economically and technically feasible, they should choose measures which are not more trade restrictive than necessary to achieve the desired level of protection.

98. In order to increase transparency of SPS measures, governments are required to notify other countries of those measures which restrict trade and to set up so-called "enquiry points" to respond to requests for more information. The SPS Committee provides WTO Members with a forum to exchange information on all aspects of the implementation of the SPS Agreement, review compliance with it and maintain cooperation with the appropriate technical organizations. When a trade dispute arising over the use of a SPS measure involves scientific or technical issues, the Agreement stipulates that the panel should seek advice from experts.

5. The Agreement on Agriculture

99. In general, reducing domestic supports and export subsidies should lead to less intensive and more sustainable production with reduced use of agricultural inputs like pesticides and fertilisers, leading to improvements in the environment.

100. The Agreement on Agriculture provides for the long-term reform of trade in agricultural products and domestic policies. It increases market orientation in agricultural trade by providing for commitments in the areas of market access, domestic support and export competition. A significant aspect of the Agreement is the commitment to reduce domestic support for agricultural production, particularly in the form of production-linked agricultural subsidies.

101. Protection of the environment is an integral part of the Agreement on Agriculture. The sixth paragraph of the preamble states that commitments made under the reform programme should have regard for the environment while Article 20 requires that the negotiations on the continuation of the reform programme take account of non-trade concerns, which includes the environment.

102. More specifically, Annex 2 of the Agreement, which lists the different types of subsidies which are not subject to reduction commitments, covers a number of different types of measures relevant to the environment. These include direct payments to producers and government service programmes for research and infrastructural works under environmental programmes. Eligibility for the direct payments must be based on clearly-defined government environmental or conservation programmes and the amount of payments are limited to the extra costs or loss of income involved in complying with the programme.

103. It should be noted that Members are free to introduce new, or amend existing, Annex 2 measures subject only to the general requirement that they have no, or at most minimal, trade-distorting effect and that they come under publicly funded government programmes.

6. The Agreement on Subsidies and Countervailing Measures

104. The Agreement on Subsidies and Countervailing Measures ("SCM Agreement") identifies three categories of subsidies, depending on their effect on international trade, and provides for different types of remedy for each category: (i) prohibited subsidies are subject to an accelerated dispute settlement procedure and a Member found to grant or maintain such a subsidy must withdraw it without delay; (ii) actionable subsidies, i.e. subsidies other than prohibited and non-actionable subsidies, can in principle be granted or maintained, but may be challenged in WTO dispute settlement or subject to countervailing action if they cause adverse effects to the interests of other Members; (iii) non-actionable subsidies (i.e. non-specific subsidies and defined specific subsidies) are not subject to countervailing action nor to dispute settlement challenge.

105. Subsidies to promote adaptation of existing facilities to new environmental requirements fall into the third category. Subject to certain conditions, up to 20 per cent of the cost of adaptation would be considered a non-actionable subsidy.

7. The Agreement on Trade-Related Aspects of Intellectual Property Rights

106. The Agreement on Trade-Related Aspects of Intellectual Property Rights ("TRIPS Agreement") provides a common set of rules for the protection and enforcement of intellectual property rights. Article 27 of the TRIPS Agreement defines "patentable subject matter". Specific reference to the environment is made in Article 27.2 which allows Members to exclude from patentability inventions, the prevention of whose commercial exploitation within their territory is necessary to protect, *inter alia*, human, animal or plant life or health or to avoid serious prejudice to the environment. Paragraph 3 of Article 27 further provides that Members may exclude from patentability plants and animals other than micro-organisms, as well as essentially biological processes, other than microbiological processes, for the production of plants or animals. Members must, however, provide for the protection of plant varieties either by patents or by an effective *sui generis* system or by a combination thereof.

107. Article 27.3(b) of the TRIPS Agreement will be reviewed in 1999. In this context, the TRIPS Council agreed, at its December 1998 meeting, that, in order to initiate the review, those Members which are already under an obligation to apply

Article 27.3[62] shall provide, by 1 February 1999, information on how the matters addressed in this provision are presently treated in their national law; other Members are invited to provide this information on a best endeavour basis. An illustrative list of questions to be drawn up by the Secretariat will help Members in preparing their contributions. The Secretariat will also contact the FAO, the Secretariat of the Convention on Biological Diversity and UPOV to request factual information on their activities of relevance.

8. The General Agreement on Trade in Services

(a) Article XIV of the GATS

108. The General Agreement on Trade in Services ("GATS") contains in Article XIV a general exceptions clause which is modelled on Article XX of the GATT. The chapeau of that provision is basically identical to that of GATT Article XX and environmental concerns are addressed in a paragraph (b) which is similar to paragraph (b) of Article XX.

109. Anticipating interpretative questions regarding the scope of Article XIV of the GATS, the Council for Trade in Services adopted at its first meeting a Ministerial Decision on Trade in Services. The Decision acknowledges that measures necessary to protect the environment may conflict with the provisions of the Agreement and notes that it is not clear that there is a need to provide for more than is contained in Article XIV(b). In order to determine whether any modification of Article XIV of the Agreement is required to take account of such measures, the Council for Trade in Services consequently decided to request the Committee on Trade and Environment "to examine and report, with recommendations if any, on the relationship between services trade and the environment including the issue of sustainable development. The Committee shall also examine the relevance of inter-governmental agreements on the environment and their relationship to the Agreement. ...".[63]

110. Discussion to date in the CTE on this item has not led to the identification of any environmental measure applied to services trade that would not be covered adequately by GATS provisions, in particular Article XIV(b). This item remains under examination in the CTE and WTO Members are invited to submit any relevant information in that regard.[64]

(b) Environmental Services[65]

111. The Services Sectoral Classification List annexed to the GATS was developed during the Uruguay Round[66] and was largely based on the United Nations Central Product Classification (CPC) system. The environmental services sector contained in the List includes four categories:

A. Sewage services (CPC 9401)

B. Refuse disposal services (CPC 9402)

C. Sanitation and similar services (CPC 9403)

D. Other

112. The fourth category ("other") can be understood to include the environmental services of the CPC which are not specifically referred to in the List, i.e. cleaning of exhaust gases (CPC 9404); noise abatement services (CPC 9405); nature and landscape protection services (COC 9406) and other environmental protection services (9409). In discussing environmental services in GATS Council, some WTO Members suggested that it may be necessary to rethink the existing classification contained in the Services Sectoral Classification List.[67]

113. So far, some fifty WTO Members (counting the EC Member States individually) have made commitments under at least one of the four sub-sectors. The number of commitments is nearly equal for each of the individual four sub-sectors. Limitations on market access and national treatment with respect to the four modes of supply must however be kept in mind in order to assess the liberalizing content of those commitments. It must also be kept in mind that other services sectors may be directly relevant for the environment (research, engineering, construction, etc.).

114. In 1998, the Council for Trade in Services initiated an exchange of information exercise on various services sectors, the purpose of which was to facilitate the access of all Members, in particular developing country Members, to information regarding laws, regulations and administrative guidelines and policies affecting trade in services. The sectoral discussions focussed in particular on the manner in which the services in question are traded and regulated, in order to enable Members to identify negotiating issues and priorities, in preparation for the further negotiations foreseen in Article XIX (Negotiation of Specific Commitments) of the GATS.

115. In discussing trade liberalization in environmental services, delegations noted that the environmental industry was playing a significant role in their economies and that trade in the area was growing from previously low levels; however, only a limited number of Members had made commitments in this sector. Members also described their own regimes, stressing liberalizing trends. Nevertheless, public sector production and public procurement remain important in this sector. They also pointed to different types of market access restrictions, such as discriminatory taxes, subsidies and non-recognition of foreign qualification, restrictions on trade in complementary sectors like construction, inadequate protection of intellectual property

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[62] These are developed countries other than some with economies in transition, as well as developing and transition economy countries which joined the WTO after 1 January 1995.

[63] S/L/4 (4 April 1995).

[64] See *Report (1996) of the Committee on Trade and Environment*, WT/CTE/1 (12 November 1996), paragraphs 210-211.

[65] For more details, see *Environmental Benefits of Removing Trade Restrictions and Distortions*, Note by the Secretariat, WT/CTE/W/67/Add.1 (13 March 1998) and *Environmental Services*, Background Note by the Secretariat, S/C/W/46 (6 July 1998).

[66] MTN.GNS/W/120.

[67] Council for Trade in Services, *Report of the Meeting Held on 22 and 23 July 1998*, Note by the Secretariat, S/C/M/29 (24 August 1998).

rights, restrictions on investment and movement of natural persons. The characteristics of regulatory mechanisms, including environmental regulations, and their effects on trade in environmental services were also addressed.[68]

9. The Understanding on Rules and Procedures Governing the Settlement of Disputes

(a) Expert advice and public disclosure of submissions

116. The Understanding on Rules and Procedures Governing the Settlement of Disputes ("DSU") lays down detailed procedures WTO Members have to follow to settle trade disputes arising out of the implementation of any WTO agreement.

117. The DSU provides that, in its examination of the case, a panel may seek information and technical advice from any individual or body which it deems appropriate. Panels may seek information from any relevant source and may consult individual experts, or a group of experts, on certain aspects of the matter under dispute. This possibility was used, for instance, by the panel in the *Shrimp* case to consult biologists and fishery experts on certain questions related to sea turtle biology and conservation.[69]

118. Documents submitted to a panel in the course of dispute settlement proceedings are in principle confidential. Nothing in the DSU, however, precludes a party to a dispute from disclosing statements of its own position to the public. Moreover, in order to increase transparency, a party to a dispute which submits a confidential submission to the panel must, upon request of another Member to the dispute, provide a non-confidential summary of this text that could be disclosed to the public.

(b) Panel proceedings and non-requested information

119. In the *Shrimp* case, the Appellate Body had to decide whether the right to seek information under Article 13 of the DSU included the right for a panel to accept non-requested information from non-governmental sources. In the first instance, the Panel, which had received two *amicus briefs* from two non-governmental organizations, had considered that accepting non-requested information from non-governmental sources would be incompatible with the provisions of the DSU as currently applied.[70] The Panel, however, gave the parties to the dispute the opportunity to endorse the *amicus briefs*, or part of them, as part of their own submissions.

120. The Appellate Body disagreed with the interpretation given by the Panel to Article 13. It considered that the DSU accords a panel "ample and extensive authority to undertake and to control the process by which it informs itself both of the relevant facts of the dispute and of the legal norms and principles applicable to such facts." The Appellate Body reproached the Panel for reading the word "seek" in too literal a manner, and specified

> "[i]n the present context, authority to *seek* information is not properly equated with a *prohibition* on accepting information which has been submitted without having been requested by a panel. A panel has the discretionary authority either to accept and consider or to reject information and advice submitted to it, *whether requested by a panel or not*. The fact that a panel may *motu proprio* have initiated the request for information does not, by itself, bind the panel to accept and consider the information which is actually submitted. The amplitude of the authority vested in panels to shape the processes of fact-finding and legal interpretation make clear that a panel will *not* be deluged, as it were, with non-requested material, *unless that panel allows itself to be so deluged*."[71]

121. The Appellate Body nevertheless considered that the actual disposition of the briefs by the panel in this case (i.e. giving the parties to the dispute the possibility to endorse them as part of their own submissions) did not constitute either legal error or abuse of the Panel's discretionary authority.[72]

IV. DISPUTES IN THE GATT 1947 AND IN THE WTO

122. From 1947 to 1995, of the 115 panel reports issued under the GATT 1947 and the Tokyo Round agreements, 6 concerned issues related to human and animal health or the environment. Since the entry into force of the WTO, on 1 January 1995, 6 such cases can be identified among the 38 panels which have been established so far.[73] This Section presents a brief summary of these cases.

United States - Prohibition of Imports of Tuna and Tuna Products From Canada,
adopted on 22 February 1982, BISD 29S/91

123. An import prohibition was introduced by the United States after Canada had seized 19 fishing vessels and arrested US fishermen fishing for albacore tuna, without authorization from the Canadian government, in waters considered by Canada to be under its jurisdiction. The United States did not recognize this jurisdiction and introduced an import prohibition as a retaliation under the Fishery Conservation and Management Act.

124. The Panel found that the import prohibition was contrary to Article XI:1, and not justified under either Article XI:2 or Article XX(g) of the General Agreement.

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[68] Council for Trade in Services, *Report of the Meeting Held on 22 and 23 July 1998*, Note by the Secretariat, S/C/M/29 (24 August 1998).

[69] Panel Report on *United States - Import Prohibition of Certain Shrimp and Shrimp Products*, WT/DS58/R, circulated on 15 May 1998.

[70] *Ibidem*, paragraph 7.8.

[71] Appellate Body Report on *United States - Import Prohibition of Certain Shrimp and Shrimp Products*, WT/DS58/AB/R, circulated on 12 October 1998, paragraphs 106-107 (emphasis in the text).

[72] *Ibidem*, paragraph 109.

[73] As of 31 December 1998.

Canada - Measures Affecting Exports of Unprocessed Herring and Salmon,
adopted on 22 March 1988, BISD 35S/98

125. Under the 1976 Canadian Fisheries Act, Canada maintained regulations prohibiting the exportation or sale for export of certain unprocessed herring and salmon. The United States complained that these measures were inconsistent with GATT Article XI. Canada argued that these export restrictions were part of a system of fishery resource management destined at preserving fish stocks, and therefore were justified under Article XX(g).

126. The Panel found that the measures maintained by Canada were contrary to GATT Article XI:1 and not justified under either Article XI:2(b) or Article XX(g).

Thailand - Restrictions on Importation of and Internal Taxes on Cigarettes,
adopted on 7 November 1990, BISD 37S/200

127. Under the 1966 Tobacco Act, Thailand prohibited the importation of cigarettes and other tobacco preparations, but authorized the sale of domestic cigarettes; moreover, cigarettes were subject to an excise tax, a business tax and a municipal tax. The United States complained that the import restrictions were inconsistent with GATT Article XI:1, and considered that they were not justified by Article XI:2(c), nor by Article XX(b). The United States also requested the Panel to find that the internal taxes were inconsistent with GATT Article III:2. Thailand argued, *inter alia*, that the import restrictions were justified under Article XX(b) because the government had adopted measures which could only be effective if cigarettes imports were prohibited and because chemicals and other additives contained in US cigarettes might make them more harmful than Thai cigarettes.

128. The Panel found that the import restrictions were inconsistent with Article XI:1 and not justified under Article X1:2(c). It further concluded that the import restrictions were not "necessary" within the meaning of Article XX(b). The internal taxes were found to be consistent with Article III:2.

United States - Restrictions on Imports of Tuna,
not adopted, circulated on 3 September 1991, BISD 39S/155

129. The Marine Mammal Protection Act (MMPA) required a general prohibition of "taking" (harassment, hunting, capture, killing or attempt thereof) and importation into the United States of marine mammals, except with explicit authorization. It governed in particular the taking of marine mammals incidental to harvesting yellowfin tuna in the Eastern Tropical Pacific Ocean (ETP), an area where dolphins are known to swim above schools of tuna. Under the MMPA, the importation of commercial fish or products from fish which have been caught with commercial fishing technology which results in the incidental killing or incidental serious injury of ocean mammals in excess of US standards were prohibited. In particular, the importation of yellowfin tuna harvested with purse-seine nets in the ETP was prohibited (*primary nation embargo*), unless the competent US authorities establish that (i) the government of the harvesting country has a programme regulating taking of marine mammals that is comparable to that of the United States, and (ii) the average rate of incidental taking of marine mammals by vessels of the harvesting nation is comparable to the average rate of such taking by US vessels. The average incidental taking rate (in terms of dolphins killed each time the purse-seine nets are set) for that country's tuna fleet must not exceed 1.25 times the average taking rate of United States vessels in the same period. Imports of tuna from countries purchasing tuna from a country subject to the primary nation embargo are also prohibited (*intermediary nation embargo*).

130. Mexico claimed that the import prohibition on yellowfin tuna and tuna products was inconsistent with Articles XI, XIII and III of GATT. The United States requested the Panel to find that the *direct embargo* was consistent with Article III and, in the alternative, was covered by Articles XX(b) and XX(g). The United States also argued that the *intermediary nation* embargo was consistent with Article III and, in the alternative, was justified by Article XX, paragraphs (b), (d) and (g).

131. The Panel found that the import prohibition under the *direct* and the *intermediary* embargoes did not constitute internal regulations within the meaning of Article III, was inconsistent with Article XI:1 and was not justified by Article XX paragraphs (b) and (g). Moreover, the *intermediary* embargo was not justified under Article XX(d).

United States - Restrictions on Imports of Tuna,
not adopted, circulated on 16 June 1994, DS29/R

132. The European Communities ("EEC") and Netherlands complained that both the *primary* and the *intermediary* nation embargoes, enforced pursuant to the MMPA, did not fall under Article III, were inconsistent with Article XI:1 and were not covered by any of the exceptions of Article XX. The United States considered that the *intermediary* nation embargo was consistent with GATT since it was covered by Article XX, paragraphs (g), (b) and (d), and that the *primary* nation embargo did not nullify or impair any benefits accruing to the EC or the Netherlands since it did not apply to these countries.

133. The Panel found that neither the *primary* nor the *intermediary* nation embargo was covered under Article III, that both were contrary to Article XI:1 and not covered by the exceptions in Article XX (b), (g) or (d) of the GATT.

United States - Taxes on Automobiles,
not adopted, circulated on 11 October 1994, DS31/R

134. Three US measures on automobiles were under examination: the luxury tax on automobiles ("luxury tax"), the gas guzzler tax on automobiles ("gas guzzler"), and the Corporate Average Fuel Economy regulation ("CAFE"). The EEC complained that these measures were inconsistent with GATT Article III and could not be justified under Article XX(g) or (d). The United States considered that these measures were consistent with the General Agreement.

135. The Panel found that both the luxury tax -which applied to cars sold for over $30,000 - and the gas guzzler tax - which applied to the sale of automobiles attaining less than 22.5 miles per gallon (mpg) - were consistent with Article III:2 of GATT.

136. The CAFE regulation required the average fuel economy for passenger cars manufactured in the United States or sold by any importer not to fall below 27.5 mpg. Companies that are both importers and domestic manufacturers must calculate average fuel economy separately for imported passenger automobiles and for those manufactured domestically. The Panel found the CAFE regulation to be inconsistent with GATT Article III:4 because the separate foreign fleet accounting discriminated against foreign cars and the fleet averaging differentiated between imported and domestic cars on the basis of factors relating to control or ownership of producers or importers, rather than on the basis of factors directly related to the products as such. Similarly, the Panel found that the separate foreign fleet accounting was not justified under Article XX(g); it did not make a finding on the consistency of the fleet averaging method with Article XX(g). The Panel found that the CAFE regulation could not be justified under Article XX(d).

United States - Standards for Reformulated and Conventional Gasoline,
adopted on 20 May 1996, WT/DS2/9 (Appellate Body and Panel Reports)

137. Following a 1990 amendment to the Clean Air Act, the Environmental Protection Agency (EPA) promulgated the Gasoline Rule on the composition and emissions effects of gasoline, in order to reduce air pollution in the United States. From 1 January 1995, the Gasoline Rule permitted only gasoline of a specified cleanliness ("reformulated gasoline") to be sold to consumers in the most polluted areas of the country. In the rest of the country, only gasoline no dirtier than that sold in the base year of 1990 ("conventional gasoline") could be sold. The Gasoline Rule applied to all US refiners, blenders and importers of gasoline. It required any domestic refiner which was in operation for at least 6 months in 1990, to establish an individual refinery baseline, which represented the quality of gasoline produced by that refiner in 1990. EPA also established a statutory baseline, intended to reflect average US 1990 gasoline quality. The statutory baseline was assigned to those refiners who were not in operation for at least six months in 1990, and to importers and blenders of gasoline. Compliance with the baselines was measured on an average annual basis.

138. Venezuela and Brazil claimed that the Gasoline Rule was inconsistent, *inter alia*, with GATT Article III, and was not covered by Article XX. The United States argued that the Gasoline Rule was consistent with Article III, and, in any event, was justified under the exceptions contained in GATT Article XX, paragraphs (b), (g) and (d).

139. The Panel found that the Gasoline Rule was inconsistent with Article III, and could not be justified under paragraphs (b), (d) or (g). On appeal of the Panel's findings on Article XX(g), the Appellate Body found that the baseline establishment rules contained in the Gasoline Rule fell within the terms of Article XX(g), but failed to meet the requirements of the chapeau of Article XX.

European Communities - Measures Affecting Meat and Meat Products,
adopted on 13 February 1998, WT/DS26/AB/R and WT/DS48/AB/R (Appellate Body) and WT/DS26/R/USA and WT/DS48/R/CAN (Panel)

140. The United States and Canada complained against a prohibition by the European Communities to import meat and meat product from cattle which had been treated with certain hormones for growth promotion purposes.

141. The Panels found that the EEC violated Article 3.1 of the SPS Agreement because the import ban was not based on existing international standards and was imposed without scientific justification. The Panels further found that the EEC violated Article 5.1 of the SPS Agreement because its ban was not based on a "risk assessment", i.e. an evaluation of the potential for adverse effects on human health arising from the presence of certain hormones in meat. Thirdly, the EEC was found to violate Article 5.5 by adopting arbitrary or unjustifiable distinctions in its levels of sanitary protection in different situations, distinctions which, according to the Panels, resulted in discrimination or a disguised restriction on international trade.

142. The EEC appealed the Panels' findings on the interpretation of the SPS Agreement and on some procedural areas. The Appellate Body reversed the Panels' findings that the EEC had violated Article 3.1 by maintaining, without justification under Article 3.3, SPS measures which are not based on existing international standards. The Appellate Body objected to the Panels' view of a supposed "general rule-exception" relationship between Articles 3.1 and 3.3. The Appellate Body insisted that pursuant to Article 3.3, WTO Members have the autonomous right to establish a higher level of protection than the prevailing international standards in matters relating to human health, in the event there is scientific justification to do so.

143. Secondly, the Appellate Body upheld the Panels' findings that the EEC import prohibition was inconsistent with Article 5.1 of the SPS Agreement because it was not based on a risk assessment. In so doing, the Appellate Body clarified that for an SPS measure to be "based on" a risk assessment within the meaning of Article 5.1, there had to be a "rational" or "objective" relationship between the measure and the risk assessment. The Appellate Body further clarified that the risk that is to be evaluated in a risk assessment under Article 5.1 is not only risk ascertainable in a science laboratory operating under strict controlled conditions, but also risk in human societies as they actually exist. Therefore, risks resulting from the abusive use of hormones and the difficulty of controlling the use of hormones were also relevant to a risk assessment under Article 5.1. Thirdly, the Appellate Body reversed the Panels' finding that the EEC import prohibition was inconsistent with Article 5.5 of the SPS Agreement. In particular, the Appellate Body found that in all but one situation the differences in the levels of protection were not arbitrary of unjustifiable. In that one situation, the difference in the level of protection did not result in discrimination or a disguised restriction on international trade.

144. On the general and procedural issues, the Appellate Body upheld most of the findings and conclusions of the Panels, but it disagreed with the Panels' ruling that the SPS Agreement allocates the "evidentiary burden" to the Member imposing an SPS measure. Rather, the Appellate Body considered it was up to the complainants to establish a *prima facie* case of the inconsistency of an SPS measure with the SPS Agreement.

United States - Import Prohibition of Certain Shrimp and Shrimp Products,
adopted on 6 November 1998, WT/DS58/AB/R (Appellate Body) and WT/DS58/R (Panel)

145. Seven species of sea turtles are currently recognized. Most of them are distributed around the globe, in subtropical and tropical areas. They spend their lives at sea, where they migrate between their foraging and their nesting grounds. Sea turtles have been adversely affected by human activity, either directly (exploitation of their meat, shells and eggs), or indirectly (incidental capture in fisheries, destruction of their habitats, pollution of the oceans).

146. The US Endangered Species Act of 1973 ("ESA") lists as endangered or threatened the five species of sea turtles occurring in US waters and prohibits their take within the United States, within the US territorial sea and the high seas. Pursuant to the ESA, the United States requires that US shrimp trawlers use "turtle excluder devices"[74] (TEDs) in their nets when fishing in areas where there is a significant likelihood of encountering sea turtles. Section 609 of Public law 101-102, enacted in 1989 by the United States, provides, *inter alia*, that shrimp harvested with technology that may adversely affect certain sea turtles may not be imported into the United States, unless the harvesting nation is certified to have a regulatory programme and an incidental take rate comparable to that of the United States, or that the particular fishing environment of the harvesting nation does not pose a threat to sea turtles. In practice, countries having any of the five species of sea turtles within their jurisdiction and harvesting shrimp with mechanical means must impose on their fishermen requirements comparable to those borne by US shrimpers, essentially the use of TEDs at all times, if they want to be certified and export shrimp products to the United States.

147. India, Malaysia, Pakistan and Thailand complained that the prohibition imposed by the United States on the importation certain shrimp and shrimp products was contrary to Articles I, III, and XI of the GATT. The Panel found that the US measure at stake was inconsistent with GATT Article XI (General elimination of quantitative restrictions) and could not be justified under GATT Article XX (General exceptions) because it constituted "unjustifiable discrimination between countries where the same conditions prevailed". The Appellate Body found that the measure at stake qualified for provisional justification under Article XX(g), but failed to meet the requirements of the chapeau of Article XX, and, therefore, was not justified under Article XX of GATT 1994.

Australia - Measures Affecting Importation of Salmon,
Adopted on 6 November 1998, WT/DS18/AB/R (Appellate Body) and WT/DS18/R (Panel)

148. On 10 April 1997, a Panel was established to consider Canada's complaint regarding Australia's prohibition of certain salmon imports. Canada alleged that the prohibition, based on a quarantine regulation which dated back to 1975, was inconsistent with Articles XI and XIII of GATT, and Articles 2 and 5 of the SPS Agreement. According to the Panel, the issue was whether Australia could justify its ban on the basis of the available scientific evidence, as required by the SPS Agreement. The Panel ruled in the negative on this question. Given that it had found violations of the SPS Agreement, the Panel did not consider it necessary to examine Canada's claim under the GATT.

149. The Appellate Body reversed the Panel's findings on a number of legal issues but upheld the Panel's conclusions that Australia had acted inconsistently with the SPS Agreement.

Japan - Measures Affecting Agricultural Products
Panel report circulated to WTO Members on 27 October 1998 (WT/DS76/R)

150. A Panel was established on 18 November 1997 to consider a complaint by the United States with respect to the prohibition by Japan, under quarantine measures, to import agricultural products. The complainant alleged that Japan prohibited the importation of each variety of a product requiring quarantine treatment until that treatment had been tested for that variety, even if the treatment had proved to be effective for other varieties of the same product. The United States claimed, *inter alia,* violations Articles 2, 5 and 8 of the SPS Agreement, Article XI of the GATT and Article 4 of the Agreement. The Panel found that Japan acted inconsistently with Articles 2.2 and 5.6 of the SPS Agreement. On 24 November 1998, Japan notified the DSB of its intention to appeal certain issues of law and legal interpretation developed by the Panel. The Appellate Body Report is expected for the end of February 1999.

European Communities - Measures Affecting Asbestos and Products Containing Asbestos,
Complaint by Canada (WT/DS135)

151. On 28 May 1998 (WT/DS135/1), Canada alleged *inter alia* that measures imposed by France with respect to the prohibition of asbestos and products containing asbestos, including a ban on imports of such goods violate Articles 2, 3 and 5 of the SPS Agreement, Article 2 of the TBT Agreement, and Articles II, XI and XIII of GATT 1994. Consultations held on this subject between Canada and the EEC did not lead to a mutually satisfactory solution. On 8 October 1998, Canada requested the establishment of a panel (WT/DS135/3), which was established by the DSB on 25 November 1998.

V. SECRETARIAT'S ACTIVITIES

A. TRADE AND ENVIRONMENT BULLETINS

152. Since April 1993, the Secretariat regularly issues the *Trade and Environment Bulletin*. So far, more than thirty bulletins have kept readers regularly informed about the work of the EMIT Group, the SCTE and the CTE. The Bulletins have also provided information on GATT/WTO's follow-up to the UN Conference on Environment and Development, environmental issues emerging from the Uruguay Round, environment-related trade disputes and any other relevant news. These publications aim at facilitating public understanding and awareness of the trade and environment policy agenda.

[74] A TED is a grid trapdoor installed inside a trawling net which allows shrimp to pass to the back of the net while directing sea turtles and other unintentionally caught large objects out of the net.

153. The *Trade and Environment Bulletin* is available on request at the Information and Media Relations Division of the WTO, or can be consulted on the WTO homepage at http://www.wto.org.

B. SYMPOSIA WITH NON-GOVERNMENTAL ORGANIZATIONS

154. Since 1994, the WTO Secretariat has organized yearly (with the exception of 1995) a Symposium on Trade, Environment and Sustainable Development. These symposia, which are held under the Secretariat's own responsibility, are generally attended by participants representing environment, development, consumer NGOs, industry interests, academics, as well as WTO Member governments. Voluntary financial assistance provided by some WTO Member countries or by private institutions has facilitated the participation of developing country NGOs.

155. The main objectives of the symposia are to keep civil society informed of the work underway in GATT/WTO on trade and environment, and to allow experts in the field to examine and debate the inter-linkages between trade, environment and sustainable development. The symposia were all organized on the same pattern: presentations from invited panellists on specific topics were followed by an informal debate among all participants. Various themes, covering the different facets of the trade and environment relationship, were on the agenda of each symposium, for instance, the synergies between trade liberalization and the environment, the relationship between multilateral environmental instruments and the WTO, the work of the CTE, WTO relations with civil society, etc. No attempt was made to summarize views or to identify consensus positions.

C. NEW INITIATIVES TAKEN BY THE DIRECTOR-GENERAL

156. The WTO Secretariat receives every day a large number of requests for information from NGOs, including environmental organizations, which are promptly responded to. Moreover, the Secretariat staff meets with NGOs on a regular basis - both individually or as part of organized events.

157. During the General Council on 15 July 1998, the Director-General informed Members of certain new steps he was taking to enhance the transparency of the WTO and improve the dialogue with civil society. These initiatives were implemented by October 1998. They include (i) regular briefings by the Secretariat on WTO activities, along the lines of the briefings already offered to the media, but tailored to the particular interests and perspectives of the NGO community; (ii) the creation of a NGO section on the WTO web site, containing information of particular interest to civil society;[75] (iii) a monthly list of NGO position papers received by the Secretariat is circulated for the information of Members who can receive them upon request; (iv) the Director-General has initiated a process of regular informal meetings with different NGO representatives, with the goal of improving and enhancing mutual understanding.

D. TRADE AND ENVIRONMENT REGIONAL SEMINARS

158. In 1998 and early 1999, the Secretariat held six regional seminars on trade and environment for government officials from developing and least-developed countries, and economies in transition. These seminars were organized in the Asia/Pacific region, the Caribbean, South America, Central Europe and Central Asia, and Africa (French-speaking and English Speaking). A seventh seminar will be held for the Middle East in the spring.

159. The objective of those seminars is to raise awareness on the links between trade, environment and sustainable development, and to enhance the dialogue between trade and environment policymakers. Participating countries were represented by officials from Ministries of either Trade or Foreign Affairs (whichever is responsible for WTO matters) and from Ministries of Environment.

160. Presentations made by WTO Secretariat officials during three days addressed the various aspects of the trade and environment interrelationship, the relevant rules of the WTO, as well as specific concerns arising in each region.

161. These seminars were funded by the governments of Hong Kong, China; the Netherlands and Norway.

[75] This section is at < http://www.wto.org/wto/ngo/contact.htm>

ANNEX II

General Agreement on Tariffs and Trade, L/7402, 2 February 1994

Report by Ambassador H. Ukawa (Japan), Chairman of the Group on Environmental Measures and International Trade, to the 49th Session of the Contracting Parties

1. This is the second report I submit under my own responsibility as Chairman of the Group on Environmental Measures and International Trade. It updates my report to the 48th Session of the CONTRACTING PARTIES in December 1992, and takes account of work accomplished by the Group last year.

2. A Chairman's report presented under my own responsibility allows me to attempt to reflect the remarkably constructive and cooperative spirit and open mindedness that has developed and continued this year in the Group despite the divergence of views and perspectives relating to some of the basic elements of the sensitive issues with which it has been dealing. Such divergence reflects the real world and has, in my judgement, enhanced the value of the work in this Group. In preparing my report, I have relied on guidance given by delegations, at my request, in particular at the last meeting of the Group. What follows is an account of the main developments and issues dealt with in the Group. I have taken the liberty to highlight some points I felt were of importance even though these may not coincide with the emphasis or importance placed by different delegations.

Introduction

3. The Group has met formally twelve times since it was activated in November 1991, when it adopted, for the present, a three-point work agenda … . In July 1993, in accordance with the Decision adopted by the CONTRACTING PARTIES at their 48th Session, the Group extended the scope of its discussions to cover matters raised in Agenda 21 of the UN Conference on Environment and Development (UNCED) with respect to making trade and environment policies mutually supportive … .

4. In 1993 the Group met five times formally, at intervals judged by delegations to afford them time for reflection as well as to maintain a certain pace of progress. Discussions were facilitated and advanced by many informal meetings, particularly early in the summer before the Group held its first substantive debate on the work assigned to it in relation to GATT follow-up on the UNCED recommendations. Examination of the matters covered by the third agenda item (trade effects of new packaging and labelling requirements aimed at protecting the environment) was assisted by presentations made at a meeting in May by experts from the International Trade Centre and the International Organisation for Standardisation. I would like, on behalf of the Group, to thank both organisations for their useful contributions.

5. The Group originally planned another formal meeting in 1993 to discuss UNCED follow-up and prepare for the GATT Council session on that subject. Due to the urgency placed by delegations on completing the Uruguay Round by its agreed deadline of December 15, these meetings were postponed by unanimous decision. Finishing the Round was by far the most significant and immediate contribution that governments could make through GATT to improving the climate for better environmental conservation and protection policies at both national and international levels, as was recognized by the UNCED. It was also felt that distracting attention from the negotiations at such a critical juncture would not have served the interests of the Uruguay Round nor ensured a focused and constructive debate on UNCED follow-up.

6. In spite of this foreshortening of the Group's work programme, its discussions over the past two years have resulted in delegations being better informed of, and more comfortable with, the subject matter they are covering. That has made easier my own task of moving the debate along, and it has meant that an increasing number of delegations have been able to participate actively in the Group's work, with more confidence and in a spirit of mutual trust and cooperation.

7. The GATT Council, at the Group's request, has decided to de-restrict working documents prepared by the GATT secretariat, and these are now available to the public. These documents were prepared as background papers at the Group's request on a variety of issues that have arisen in the course of its discussions.[1] … It is hoped that these papers will help to inform public debate on trade and environment issues and help to correct misconceptions about GATT's role. They should help also to indicate the complexity of the matters under examination and the scope of the Group's work.

8. The Group was not established as a negotiating forum. It has been a widely shared view that it would be premature to adopt a prescriptive approach until the dimensions of any problems that might exist have been more clearly identified, particularly with respect to the significance of the trade effects that are involved. The Group has therefore viewed its role as one of examining and analysing the issues covered by its agenda.

9. On the basis of work to date in the Group there is, it appears to me, wide acceptance and agreement on a number of points. The Group has been careful to ensure that the scope of its discussions remained well within its mandate and GATT's competence, namely the trade-related aspects of environment policies which may result in significant trade effects for GATT contracting parties. The GATT is not equipped to become involved in the tasks of reviewing national environmental priorities, setting environmental standards or developing global policies on the environment.

10. The work undertaken this year has strengthened further the conviction that there need not be, nor should be, any policy contradiction between upholding the values of the multilateral trading system on the one hand and acting individually or collectively for the protection of the environment and the acceleration of sustainable development on the other. If

[1] The GATT Secretariat has a tradition of reserved caution, rightly, on documentation where interpretation of existing GATT or prospective WTO rules and disciplines are concerned as this is regarded as the prerogative of the contracting parties. I wish to place on record that the secretariat in the listed documents was encouraged, in order to contribute to debate in the Group, to err on the side of boldness rather than caution. It should not be presumed, therefore, that all members of the Group agree necessarily with all of the views expressed by the Secretariat in these documents.

problems of policy coordination do occur, it is important to ensure that they are resolved in a way that does not undermine internationally agreed trade rules and disciplines that governments have spent the past seven years reinforcing through the Uruguay Round negotiations.

11. It is clearly important to ensure that the multilateral trade rules do not present an unjustified obstacle to environmental policy-making. An important point is the considerable extent to which the GATT rules already accommodate trade measures used in conjunction with environmental policies to protect national environmental resources. A review of the extensive use that is being made of trade-related environmental measures by contracting parties to protect their domestic environmental resources gives testimony to that fact. Furthermore, an open, secure and non-discriminatory trading system underwritten by the GATT rules and disciplines can facilitate environmental policy-making and environmental conservation and protection by helping to encourage more efficient resource allocation and to generate real income growth.

12. In what follows, I report on the Group's discussions on each of its agenda items and on UNCED follow-up.

Agenda Item 1: Trade provisions contained in existing multilateral environmental agreements vis-à-vis GATT principles and provisions.

13. There is concern that trade measures taken pursuant to multilateral environmental agreements (MEAs) can conceivably conflict with GATT provisions. There is also concern that the GATT provisions could work to inhibit if not prevent a desirable conclusion of a future MEA. While such concern, in the view of some in the Group more familiar with the tradition and practices of the GATT and its provisions, may be based at least in part on misunderstandings, it nevertheless exists.

14. This was part of the background to discussions under this agenda item which have been based on an examination of the use of trade provisions in existing MEAs. It has been noted that few of the more than 150 MEAs negotiated to date contain any trade provisions. This has led many delegations to view the use of trade provisions in MEAs as somewhat unusual and not a widespread phenomenon. Nevertheless, the Group has been mindful of the fact that the negotiation of MEAs will continue to be an active area of international environmental policy-making. Governments' efforts to seek co-operative, multilateral solutions to environmental problems of a transboundary or a global nature are very much welcomed by GATT contracting parties, for there are clear grounds for believing that this approach will prove more effective and durable than *ad hoc* resort to unilateral trade measures to try to deal with such problems.

15. Although at the outset reference was made in general terms to a possible hierarchy of international agreements under principles of international law, namely that if two agreements have the same membership on the same subject, the later and/or more specific one would take precedence, this approach was not pursued. As noted earlier, no challenge has been brought under the dispute settlement provisions of the GATT against trade measures applied in the context of an MEA. The Group was not requested nor designed to conduct an examination of the GATT consistency of trade provisions contained in existing MEAs. Rather, a forward-looking perspective has been adopted and work has proceeded on a generic basis, which has helped to ensure progress on this agenda item.

16. Possibilities of conflicts arising in the future over the trade provisions contained in MEAs will be minimised through better coordination between trade and environment officials in national capitals. That remains a *sine qua non* for cooperative action at the multilateral level. A process of enhanced policy coordination is underway already in many countries; it will certainly contribute to reducing unnecessary tensions in this area.

17. There is wide agreement in the Group that GATT does not prevent any contracting party from adopting appropriate domestic environmental policies by providing countries with very considerable scope to use trade-related policies to protect national environmental resources without calling into question their GATT obligations. As long as the policies are applied without discrimination to domestically produced and imported products (national treatment rule) and do not discriminate against imports from different sources (most favoured nation rule), they are very unlikely to face a challenge under the GATT. Where it is felt necessary to use trade measures in MEAs, many delegations have expressed the view that most often their design and implementation need not involve action which extends beyond that available to contracting parties under the GATT.

18. In addition, recourse can be taken to the provisions of Article XX of the GATT in exceptional circumstances. These provisions permit a contracting party to apply trade measures which could otherwise be considered inconsistent with its GATT obligations but which are felt to be necessary to protect human, animal or plant life or health or which relate to the conservation of exhaustible natural resources. However, such measures must not constitute a means of arbitrary or unjustifiable discrimination between countries where the same conditions prevail nor create a disguised restriction on international trade. Checks and balances such as these are needed as essential safeguards against protectionist abuse, which would be as detrimental to the environmental agenda as to trade, and to avoid unduly disturbing the balance of rights and obligations accruing to contracting parties from the GATT system.

19. Discussions in the Group have focused on two areas of possible conflict where the most challenging questions were raised. They relate to the use of trade measures to help protect environmental resources that do not fall within the national jurisdiction of any one or more contracting parties nor necessarily affect solely or directly their own environments, and on trade provisions of MEAs that apply separately to non-parties (i.e. countries not signatories to an MEA who for legitimate or other reasons have decided not to join). In this context, several delegations stressed the need for caution to be exercised in the negotiation of MEAs before including such trade provisions at all, and feel most particularly that it is generally undesirable and should not normally be necessary for contracting parties to use discriminatory trade restrictions against non-parties to an MEA. These delegations stress also that while trade measures may appear to be an attractive means of enforcing provisions of MEAs which relate directly to environmental resource management and conservation, their effectiveness is not always beyond doubt and the full costs of using them in this context, for example upon international resource allocation and the conditions of competition, can be high and need to be carefully taken into account.

20. The spirit of mutual confidence and cooperation which has prevailed in the discussions has enabled the Group to move forward in line with the dictum of not rejecting any notion out-of-hand, nor taking any concept at face value. While the Group clearly continued to focus on an analysis of the underlying issues, a number of delegations expressed views on different approaches for addressing a possible conflict.

21. It has been noted that it is already possible to consider in GATT the treatment of trade provisions contained in MEAs on a case-by-case basis, notably through the waiver provisions contained in Article XXV. This builds on the view that the GATT already provides considerable scope for using trade measures for environmental purposes, and reflects doubts that trade measures which would exceed the limitations of existing provisions are likely to prove efficient or effective policy tools for use in MEAs as well as concerns about disturbing the balance of rights and obligations conferred by the GATT on its contracting parties. Where doubts exist about the probable compatibility of trade measures in MEAs with the provisions of the GATT, or where it proved necessary to move deliberately outside those limits, recourse could be taken to the waiver provisions of Article XXV.

22. The merit of this approach has been described in several ways. One is that the scale of the remedy fits the problem. There has not, to date, been any challenge under the GATT to the trade provisions of an MEA, and having recourse to a waiver would provide a measured, case-by-case response to any problems that might arise in the future. Under this approach, multilateral consensus would be established on the merits of each case; it could be presumed that if an MEA reflected a genuine multilateral consensus it would find broad support among GATT contracting parties and there need be little, if any, uncertainty about the chances of securing a waiver for it. The waiver approach would avoid the need for GATT contracting parties to elaborate and agree upon general criteria to apply to the use of trade provisions in any future MEA. It would not focus on an MEA but on the trade measures included in it. Finally, the onus to demonstrate and convince others of their case would remain the responsibility of those who were seeking the waiver. In the view of some delegations, therefore, this would be a response, in line with the time-honoured GATT tradition of flexibility, which through a combination of tolerance and safeguards would enable other objectives to be effectively realised without compromising the balance of rights and obligations accruing to contracting parties from the GATT system. The value of the GATT to contracting parties would not be reduced because they would play a positive role in determining the waiver.

23. A number of doubts have been raised about this approach. One is that it is a case-by-case approach, which might fail to provide negotiators of MEAs with the necessary degree of predictability or security that there would not be a GATT challenge if they felt the need to include trade provisions in an MEA. Some delegations feel it is desirable to provide clear guidelines to negotiators of MEAs so that they could know in advance what tools they have at their disposal, and that obtaining a waiver could be time-consuming and possibly cumbersome. Under the existing provisions, GATT waivers are also time-limited, as is made explicit in the Uruguay Round Final Act, whereas environmental problems are increasingly recognized as requiring long-term and global solutions. Also, in the absence of a clear hierarchy among different, self-standing international agreements, could not a formal denial of a waiver create an untenable conflict of international obligations for contracting party governments? Finally, it has been noted that Article XXV is meant to address exceptional circumstances and it is not clear that GATT would wish to treat MEAs as exceptions.

24. A second approach that has been suggested by some delegations is to define conditions for the use of trade measures in the context of an MEA to address transboundary and global environmental problems which, as long as they were met, would ensure that the GATT would accommodate the measures. This approach has been described as creating an "environmental window" in the GATT. One formulation of it would involve a collective interpretation by GATT contracting parties of the applicability of the provisions of Article XX of the GATT in circumstances where trade measures are applied separately in an MEA to non-parties to the MEA (…one of the GATT secretariat background papers that has just been derestricted - TRE/W/17/Rev.1 - provides additional information on Article XX(h)).

25. This "environmental window" approach has been described in terms of its *ex ante* nature, and the predictability and security it would bring for the negotiation of MEAs dealing with transboundary and global environmental problems, and of clarifying the relationship between the trade provisions contained in MEAs and GATT principles and provisions. Some delegations feel it would avoid the need to tackle explicitly the issue of extra-jurisdictional action, yet in the view of some delegations it would allow it to be made clear that the current provisions of the GATT, and notably those of Article XX, do not permit unilateral action to address extra-jurisdictional environmental problems.

26. Doubts have been raised about this approach as well. At a general level there are doubts about the need at all to go beyond existing GATT provisions, including its exceptions, and to make special provision in GATT to accommodate trade provisions taken in the context of MEAs. A more specific concern is that this approach could upset the existing balance of GATT rights and obligations. GATT contracting parties, non-parties to an MEA, may wish to use their GATT rights if they believe they are suffering from unfair or unnecessary discrimination; the provisions of an MEA, or the judgement of parties to an MEA, should not be allowed to override those rights, especially without there being an obligation to explain the case for trade discrimination if there were to be a challenge under the GATT. Another basic doubt, of a more practical nature, is whether it would prove possible to find a single formula for implementing this approach that would, on the one hand, be general enough to encompass all legitimate requirements, present and future, for the use of trade measures in the context of MEAs and, on the other, would neither over-stretch the basic concept of an exception clause which underlies this approach nor open the door to protectionist abuse. Also, some fear it might be difficult to establish criteria for implementing this approach without stepping outside the competence of the GATT and entering into an examination of the environmental justification for the use of trade provisions in an MEA. Would it not be more prudent to consider the individual merits of each case as it arose rather than pursuing concepts of general application, especially if they carry other problems with them?

27. The constructive atmosphere that has prevailed in the Group's work has permitted discussion to proceed on some of the details of this second, *ex ante*, approach. It is seen as critical even by those who favour it that if it is to gain a wide measure of support it should be based on carefully defined, pre-established criteria. They view the challenge as being able to strike the right balance between setting criteria that are sufficiently general to cover a broad range of, as yet unknown,

circumstances that may arise in the negotiation of future MEAs while limiting the risk that trade measures in an MEA would be misused for protectionist purposes. A number of questions have been identified as being of particular importance, and these have been the subject of preliminary discussion.

28. One issue is what defines an MEA. Two factors have been mentioned in this regard. One is the need for a clear understanding of the meaning and coverage of the term "environment" in this context (which is yet to be pursued in depth). The other is what constitutes a genuine "multilateral" consensus in an MEA. This is important since a broad enough consensus is likely to produce a well-balanced multilateral agreement and a robust outcome. Although there may be no simple formula that can be applied to every case, preliminary discussions on this point have indicated that negotiation of and participation in an MEA should be open on equitable terms to all countries, and that the participation of interested countries should be numerous and broad in geographical terms and in terms of countries at varying levels of development. It has been suggested that consideration might also be given to adequate representation of consumer and producer nations of the products covered by an MEA among an MEA's signatories, or ensuring, as in commodity arrangements, that the bulk of international trade was represented by signatories.

29. Within this same context, and in the event that the MEA includes discriminatory trade measures against non-parties, another consideration that has been raised is the reasons why a non-party to an MEA would have taken the decision not to join the MEA, including the question of who judges the merits of that country's decision to opt out. It has been noted that there may be many reasons why a country decides not to join in multilateral action to address an environmental problem (it may find the scientific evidence is not persuasive, it may not be able to afford to join, or it may consider there are more pressing problems that deserve higher priority), and in this regard mention has been made of the reference in Principle 7 of the Rio Declaration to "common but differentiated responsibility" of states in resolving environmental problems of a global nature. Emphasis has been placed by several delegations on the importance of looking at whether the environmental conduct of non-parties could be detrimental to the achievement of the environmental objectives of an MEA, and mention has been made in that regard of the need to develop a common understanding of the language in the headnote to Article XX of the GATT requiring that trade measures should not be applied "in a manner which would constitute a means of arbitrary or unjustifiable discrimination between countries where the same conditions prevail".

30. Another question that has been discussed is whether and to what extent a trade measure must be specified in an MEA if it is to be cleared under this approach. It has been pointed out that few MEAs to date include mandatory obligations for the use of specific trade measures. Even those that do, for example by directing signatories to use quantitative restrictions or import or export licensing schemes, still permit a wide range of individual discretion. In other words, should a "carte blanche" general exception be available in GATT for the use of trade measures in the context of an MEA when a contracting party asserts that the trade measure is linked to and is necessary for it to meet the objectives of the MEA, or should the measures be specifically mandated in the MEA, and if so to what extent?

31. The value of "specificity" lies in being able to predict how governments might use trade measures in the context of an MEA. Not being specific enough might risk giving excessive liberty without adequate safeguards under the GATT for using trade measures in this context. Demanding too high a degree of specificity, at the same time, might not be desirable or possible since in practice the trade measures contained in an MEA may have to be tailored by individual signatories to particular circumstances, and the conditions influencing their use of trade measures may change over the relatively long period of time that the MEA may need to be in effect.

32. Another element that has been raised is the "necessity" of using trade measures in an MEA. It should be emphasised that this does *not* refer to whether an MEA itself is necessary, but to the necessity of using trade measures to achieve the objectives of an MEA, in particular discriminatory trade measures. A general rule would seem to be that trade measures might be considered as an accompaniment to environmental policy measures only if the latter do not suffice to realise a specific environmental objective. Beyond that, for some, "necessity" is related to the use of the least trade-restrictive or distorting measure available, or the proportionality of the measure to the need for trade restriction to ensure the environmental objective is met. It has been pointed out that these concepts are relatively new in the GATT and they would need to be further elaborated. Others have emphasised the importance of these concepts, noting that they have been incorporated and endorsed in the Rio Declaration.

33. Safeguards against the protectionist abuse of trade measures taken in the context of an MEA are seen as being of critical importance. In this respect it would be necessary to clarify among other things what would constitute "a disguised restriction on international trade" within the meaning of Article XX of the GATT.

34. Transparency is also considered to be a highly important element. This has been the focus of discussions under Agenda Item 2. With regard to trade measures taken in the context of an MEA, the general view is that these should not escape the transparency provisions of the GATT. It would appear that contracting parties bear an individual rather than a collective responsibility to meet GATT obligations on transparency, and obligations to notify measures that might affect the operation of the General Agreement are not materially altered by the context in which such measures are taken. While attention has been drawn to the possibility that measures might not need to be notified if they fall within the meaning of "international standards" in the Agreement on Technical Barriers to Trade, this point requires further examination. The issue of transparency is also linked to the degree of "specificity" with which an MEA provides for the use of trade measures. While it has been suggested that the importance of ensuring transparency in GATT might vary inversely with the extent to which a trade measure is openly negotiated and clearly specified in an MEA, it has been pointed out that a high degree of transparency is desirable in all cases and would assist in minimising unintended trade effects and reducing the possibility of protectionist abuse.

35. A related institutional issue that has begun to be discussed but on which the Group has not yet properly focused is dispute settlement. It has been suggested that disputes involving GATT contracting parties could, in theory, be envisaged over the trade provisions contained in an MEA, either between two signatories to the MEA or between a signatory and a non-signatory. In the former case, the dispute could normally be settled under the provisions of the MEA, but the possibility

has been raised that one party to the dispute might nevertheless seek recourse to GATT dispute settlement, particularly over the administration or implementation of trade measures which were not specified clearly in the MEA; evidently, if both parties agree to seek recourse to GATT dispute settlement, the provisions of Articles XXII and XXIII are available to them. In the second case involving a non-party to an MEA which could not have access to the dispute settlement mechanism of the MEA, the dispute would have to be raised in GATT.

36. The issue of regional environmental agreements, and the possible applicability to them of the two approaches described above, has been raised in the course of discussions but not yet discussed in a focused way. Some have suggested, nevertheless, that even greater care should be taken to ensure that regional agreements do not inadvertently provide a means for trade protectionism.

37. The majority of delegations have yet to elaborate their positions over what, if anything, needs to be done. Most have not yet come out in favour one way or another or taken a firm position, and even those that have indicated their preference have emphasised that they are still open to examining alternative propositions. Many questions remain, and further work needs to be done in analysing the underlying issues before well-informed judgements can be made. Those issues would appear to be broadly similar whatever approach is taken, and no delegation should consider its position would be compromised by further issues-based analytical work.

Agenda Item 2: Multilateral transparency of national environmental regulations likely to have trade effects.

38. Much has been accomplished in the analytical work of the Group under this agenda item, and there appears to be broad agreement on several issues.

39. One is that current GATT provisions (notably Article X, the 1979 Understanding Regarding Notification, Consultation, Dispute Settlement and Surveillance, and the transparency provisions of various Tokyo Round Agreements, particularly the Agreement on Technical Barriers to Trade), especially once they have been supplemented by the new Uruguay Round provisions, create a broad basis for ensuring multilateral transparency. These provisions represent a negotiated result, and it is recognized that the GATT transparency mechanism should be administratively manageable to avoid creating compliance problems. The GATT regime by and large goes a long way to satisfying the concerns and/or issues raised under this agenda item in respect of measures with significant trade effects, which is what the Group is concerned with.

40. Nevertheless, some delegations have drawn attention to certain specific environmental measures which they feel may not be covered adequately by these provisions. A preliminary list of such measures has been compiled, and the list is to be updated, as necessary (see, in this regard, the GATT secretariat background document TRE/W/7). Of the measures contained in the current list, some delegations have concerns over the adequacy of transparency of economic instruments, measures taken by sub-federal government authorities and by the private sector, and voluntary measures.

41. Some other delegations consider that few, if any, of the measures on the list represent gaps in coverage under existing or prospective transparency provisions. They have pointed out the broad scope of Article X of the GATT, and cautioned against excessive ambition at a detailed level in this area, and particularly against over-extending notification requirements.

42. Effective compliance with the transparency provisions in the GATT is an essential aspect of ensuring transparency in practice, not only with respect to trade-related environmental measures but to all trade and trade-related measures, for the benefit of the trading system in general. The new Trade Policies Review Mechanism, which was agreed to in the Uruguay Round negotiations and which involves periodic reviews of the trade policies of each GATT contracting party, is already assisting in drawing attention to areas where compliance could be further improved.

43. There appears to be general agreement in the Group that transparency requirements in the area of environmental measures should not be more onerous than those in other areas of policy-making that affect trade.

44. Transparency, it has been stressed, is not an end in itself. It is a means to build confidence in and provide security and stability to the multilateral trading system, to minimise trade restriction and distortion, to assist private sector operators to adjust to changing trade policies, and to prevent trade disputes from arising.

45. *Ex-ante* notification (before adoption and implementation of trade-related measures), such as that required under the terms of the Agreement on Technical Barriers to Trade, could offer the opportunity for other interested Parties to provide input at the stage of development of new legislation and time for affected producers to adapt to new regulations. At the same time, *ex post* notification, which is the norm in GATT, when properly complied with, can go a long way towards meeting the objectives described above.

46. There has been considerable discussion regarding the suggestion that governments might consider establishing enquiry points (such as those established under the Agreement on Technical Barriers to Trade) open to all interested parties, public and private, to provide information on trade-related environmental measures, including those not subject to formal notification requirements under the GATT, and on changes in national environmental legislation. It has been suggested that such a system could also assist in increasing the transparency of private schemes (notably environmental labelling) and local and state government programmes.

47. However, some doubts about the practical aspects of implementing enquiry points have been expressed. One is the need to avoid raising problems of official responsibility within the particular circumstances of each contracting party. An official pledge of assistance to help find information upon request might prove equally valuable. This idea of enquiry points will clearly require further consideration.

48. Discussions under this agenda item have evolved from the scope of existing and future transparency provisions in GATT to the trade effects of different kinds of trade-related environmental measures on a case-by-case basis, and the Group has begun examining the potential trade effects of various types of measures. The potential for a measure to have significant

trade effects has been described as one of several "filters" through which the adequacy of existing transparency obligations might be examined. Further analytical work is needed in this area before the issues can be brought fully into focus in the Group.

Agenda Item 3: Trade effects of new packaging and labelling requirements aimed at protecting the environment.

49. Discussions in the Group on this agenda item have been enriched by the provision by delegations on an individual and goodwill basis of information that reflects their own national experiences with these measures, both in terms of the environmental objectives that are being pursued and the trade effects that some countries are experiencing. Given the technical nature of the subject matter under this agenda item, the information has been particularly valuable. A co-operative approach to the sharing of information between governments on their environmental objectives and the development of their policies in this area can help to prevent trade problems from arising.

50. The environmental objectives or advantages of the measures involved have been described during the course of discussions in order that the Group should benefit from a full overview of the trade and environment interface in this area. A number of questions about the environmental impact of some forms of packaging and labelling requirements have been raised, in particular those based on processes and production methods which are not reflected in the characteristics of a product.

51. To assist the Group in its discussions, presentations were made by representatives of the International Trade Centre and the International Organisation for Standardisation. They were most informative and highly appreciated.

52. New packaging and labelling requirements aimed at protecting the environment are rapidly evolving in the real world and are being used by an increasing number of countries. Discussions in the Group have concentrated on trying to identify the trade effects of these measures and to analyse to what extent they might differ from the trade-related technical regulations and standards that are more familiar to GATT contracting parties.

53. GATT contracting parties have had considerable experience with the Agreement on Technical Barriers to Trade (TBT), which is designed to ensure that technical regulations and standards, including packaging and labelling requirements, do not create unnecessary obstacles to trade. The operation of the TBT Agreement points to the key importance of the disciplines of non-discrimination (both MFN and national treatment) and a high degree of transparency in the design and preparation stage of a measure, including providing real opportunities for taking into account the trade interests of foreign suppliers, as well as in its implementation and administration stage. They point also to the significant role that can be played by international standardisation or harmonisation and mutual recognition (acceptance that another country's standards are equivalent even though they are not the same) in reducing technical barriers to trade and tackling the market fragmentation that can result from a great diversity of national standards. They make clear the importance attached to the right to maintain product regulations and standards of national choice when international standards are found to be unsuitable, but also to the obligation to ensure that these do not create unnecessary barriers to trade. Attention has been drawn also to the provision of the TBT Agreement which states that regulations and requirements should be specified, wherever appropriate, in terms of performance rather than of design or descriptive characteristics; this may have particular application in ensuring that requirements designed with domestic environmental conditions primarily in view do not unnecessarily disrupt market access for overseas suppliers.

54. Many references have been made in the course of discussions welcoming the improvements to the TBT Agreement that have been made in the Uruguay Round negotiations, and in particular the introduction of the principle of "no more trade restrictive than necessary" and the new Code of Good Practice for the Preparation, Adoption and Application of Standards, which aims to ensure that voluntary standards (such as voluntary packaging and labelling requirements aimed at the environment) do not create unnecessary obstacles to international trade. More generally, it has been observed that the rules and disciplines of the TBT Agreement, even in the new Uruguay Round Agreement, apply less strictly to voluntary standards that have little or no government involvement than to mandatory technical regulations.

55. In the case of packaging and labelling requirements that incorporate criteria based on a product's processes and production methods (PPMs), it has also been suggested that applying the requirement of national treatment in a narrowly defined sense may not be sufficient to ensure that unnecessary obstacles to trade are avoided; applying the same PPM standards to products will not necessarily result in imported products being treated no less favourably than domestically produced products if the PPM in question is not suitable to the conditions (including the environmental conditions) that prevail in the imported product's country of origin.

56. The Group has begun to identify generic issues for further analysis, many of which are common to both packaging and labelling requirements. They include: the practical distinction between voluntary and mandatory measures and their implications for trade; approaches to the setting of criteria and threshold levels in the design of the measures; the scope for standardisation or harmonisation and mutual recognition; complications that can arise for trade through the setting of requirements in terms of product PPMs rather than product characteristics; and special difficulties and costs that may face small-size foreign suppliers, in particular from developing countries. Discussions have moved further on some of these issues than on others, but overall they have moved ahead constructively and in a way that has helped considerably to improve understanding of the often complex trade effects that are involved.

57. Some delegations have identified, in a preliminary way, a number of filters, such as the significance of the trade effects involved and whether they might be termed unnecessary or unjustifiably discriminatory, which can help to focus further discussions under this agenda item. These filters will also need refinement as work proceeds.

Packaging requirements

58. Discussions have focused on the trade effects of two types of packaging requirements: those that stipulate what kinds of packaging can (or cannot) be used in a particular market, and those that prescribe the recovery, re-use, recycling or disposal of packaging once it has served its original purpose.

59. GATT is relatively familiar with the first type. Many technical regulations lay down product characteristics that must be fulfilled if a product is to be assured of market access, and experience with them gained through the operation of the TBT Agreement has permitted a relatively thorough understanding of their potential trade effects. Particular attention has been paid in the Group to recycled content requirements for packaging. Several delegations have expressed concern over their potential for restricting trade in both packaged goods and packaging material from countries where recycled material is not readily available or is costly, and questioned whether these measures need also be applied to imports, in view of their limited effectiveness in achieving the stated environmental objectives of reducing pressure on waste disposal facilities in the countries imposing them. Doubts have also been expressed by some delegations about using trade measures to reduce the resource-intensity of packaging, both because of questions this raises about one country imposing its environmental standards on another, and the danger of presuming that the same resource endowments and constraints apply to all countries.

60. GATT is less familiar with the second type of packaging requirement. These are applied not only through technical regulations and standards but also through economic measures such as deposit refund schemes, taxes, charges, and fees for accessing waste handling systems in the country of destination.

61. A number of recurring themes have arisen in the discussions on these measures. One is whether, *a priori*, conclusions of general application can be drawn about the likely trade effects of different categories of measures, such as market-based instruments or command-and-control regulations. It has been suggested that some generalisations might be possible, for example in terms of whether the measures impact primarily on market access or on the conditions of competition within a market. However, it would appear that the particular market circumstances in which the measures operate, the precise way in which they are applied, and other factors too can influence their trade effects to a considerable extent; in that respect, further case-by-case examination of different measures and their trade effects would seem to be indicated as the most effective way for the Group to move forward with its analysis.

62. A second theme relates to the observation that since domestically produced goods usually generate the most important proportion of local packaging waste, it is natural for packaging requirements to be chosen and formulated with the most common forms of domestically generated packaging waste and with domestic waste disposal facilities and priorities in mind. Domestic industry has in some cases been assigned a key role in standard setting and in implementing recycling schemes. At the same time, in many cases it is foreign suppliers, facing the longest transport distances to markets, who need to use the most packaging per unit of product supplied. Some of the most significant trade effects can therefore occur where appropriate disposal facilities are not available, or are available only at high cost, for the kinds of packaging favoured (among other things, use of natural products on environmental grounds over artificially manufactured products) by foreign suppliers, especially small suppliers and those from developing countries for whom the costs of adapting to diverse packaging requirements in their overseas markets can be the most burdensome. In such cases, market access opportunities can be very seriously impaired.

63. Requiring suppliers to recover their packaging waste from overseas markets is not considered in most instances a commercially viable option and it could lead to economic inefficiency. In his presentation to the Group, the ITC representative cited several examples of developing country exports being affected by recycling schemes in developed countries which did not accept the packaging they used. Exports may be affected because smaller industries cannot afford the costs associated with take-back requirements or with the necessary adjustments in the packaging materials. Possible harmonisation of the characteristics of packaging among countries has been discussed, and it has been noted that this might be valuable, particularly if operated within a system of mutual recognition, in reducing the trade effects caused by the diversity of different packaging requirements in different overseas markets. However, this is not seen as a panacea for all the potential trade problems in this area.

64. The trade effects arising from waste recycling and final disposal schemes have also been discussed. It has been suggested that the trade effects of these schemes may be influenced, in particular, by: the extent to which responsibility for defining the criteria governing the schemes is delegated to domestic industry groups and tailored to domestic industry preferences; effective access for foreign suppliers to ensure their trade concerns are taken into account at the stage of design and preparation of the schemes; the extent to which packaging favoured by overseas suppliers is accepted by the schemes; costs of participation in the schemes; the availability of adequate information for foreign suppliers on schemes in effect; and the provision of adequate advance notification to foreign suppliers of new schemes or changes in existing ones.

65. A point that has been the subject of preliminary discussions is whether and how these types of packaging requirements might be covered by existing GATT provisions. Certain doubts have been expressed by some delegations about whether recovery, re-use or recycling requirements fall within the definition of measures covered by the TBT Agreement, and questions have been raised about how deposit refund schemes and disposal taxes, charges and fees might be treated in GATT terms. A suggestion has also been made that discussions might in the future take up from a GATT perspective the trade impact of environmental taxes in general, not only in the context of packaging requirements.

Labelling requirements

66. UNCED recognized the potential usefulness of labelling requirements aimed at protecting the environment (eco-labelling) in terms of them providing information that can assist consumers to make environmentally-sound purchasing decisions.

67. The majority of the eco-labelling schemes examined in the Group, on the basis of information provided by individual delegations, are voluntary in nature. While not mandatory, since they are designed to differentiate products on the basis of their environmental characteristics they can have a major influence on conditions of competition in a market.

68. As in the case of packaging requirements, many delegations have emphasised the importance of the transparency of eco-labelling schemes for overseas suppliers (the desirability of *ex ante* transparency has been stressed) and of adequate time allowed for foreign suppliers to adjust.

69. An unlabelled product, whether tested or not, may face a market disadvantage by conveying the impression that it has environmental shortcomings. Attention in the discussions has therefore focused on effective access for foreign suppliers to domestic labelling schemes, namely having the opportunity to participate and raise their trade concerns, as necessary, in the process through which product criteria and threshold levels for awarding eco-labels are decided, and their products having access to certification systems and the awarding of labels on the same terms as domestically produced goods.

70. The choice of products to be labelled and the criteria that a product must meet to obtain an eco-label are viewed as generally being the most critical aspects of a labelling programme. It has been noted that both tend normally to reflect local environmental conditions, such as resource constraints and local preferences for specific environmental product attributes, which may prove difficult for foreign producers to meet or result in overlooking positive environmental qualities of imported products. Local industry influence in the choice of products or criteria should not result in inadvertent protective consequences, and the importance of basing the criteria on sound scientific evidence has been stressed. Some saw a need for a greater role for public authorities in certain aspects of the process of developing and granting eco-labels.

71. Life-cycle analysis of a product's environmental qualities are increasingly being used in eco-labelling schemes, although in practice these may tend to highlight only a few of a product's environmental attributes. The choice made will inevitably involve value judgements and can have an important influence on the trade effects of the measures. For this reason, the desirability of providing foreign suppliers access at the design stage of the scheme to allow their trade concerns to be taken into account was stressed.

72. Eco-labelling criteria based on processes and production methods (PPMs) which are put in place using a single formula may prove particularly difficult, and even environmentally inappropriate, for overseas suppliers to meet. PPM problems can vary from one country to another, and they raise a number of complex issues in respect of the trade effects of eco-labels.

73. Foreign suppliers' access to an eco-label may be restricted if their own preferred PPMs do not coincide with those required in the overseas market, or if establishing that they meet the process standard involves substantial additional cost. Criteria based on PPMs may also require that confidential business information be disclosed in order to gain an eco-label. Although not discussed in any detail, concerns have been registered that specifying trade restrictions in terms of PPMs can amount to exporting domestic environmental standards (and raise, in the view of some, issues of extraterritorial application). However, in the view of some delegations if an eco-label is awarded on the basis of life-cycle analysis of the environmental impact of a product - which they consider is often the case - it seems inevitable to them that it will need to take the environmental impact of the PPMs used into account, no matter where they have their environmental effect.

74. Attention has also been called to the special problems that developing countries may face. In particular, it has been suggested that they may use very different PPMs from those considered acceptable in their main markets for gaining an eco-label, and they may lack the capital and the technology to adapt their PPMs accordingly.

75. Diversity of eco-labelling schemes in different markets, and the problems that this can cause for all multi-market suppliers, especially those of relatively small size, were raised. Doubts were expressed as to whether standardisation has an effective role in reducing this diversity: it is probably neither desirable nor possible to try to standardise differences in environmental conditions, tastes and priorities in different countries. More potential was seen for harmonisation and mutual recognition of criteria used to award eco-labels and of the eco-labels themselves.

UNCED Follow-up

76. As noted in the introduction to this report, the CONTRACTING PARTIES at their 48th Session in December 1992 asked the Group to cover matters raised in Agenda 21 of UNCED with respect to making trade and environmental policies mutually supportive. … . The Group has formally discussed substantively UNCED follow-up in two of its sessions pursuant to preparations in earlier informal meetings.

77. The Group has been informed of the results of the discussions on UNCED follow-up that took place in the UNCTAD Trade and Development Board last autumn (see GATT Secretariat background document L/6892/Add.3). It has also kept abreast of work underway in other international organisations on the topic raised in Chapter 2B of Agenda 21 of making trade and environment policies mutually supportive.

78. As was also noted earlier in this report, the Group's intention of holding further discussions on UNCED follow-up last year were not realised. Further work is thus required before a more comprehensive assessment can be made of progress in the Group's task in this respect, but some general observations based on an emerging meeting of minds in the Group appears to be in order.

79. First, as noted earlier, many references have been made in the Group to the basic compatibility of UNCED guiding principles with the underlying philosophy of the GATT. Section B of Chapter 2 of Agenda 21 states "An open, multilateral trading system makes possible a more efficient allocation and use of resources and thereby contributes to an increase in production and incomes and to lessening demands on the environment". It was also noted that UNCED results were agreed by international consensus at the highest level and the principles and recommendations should be taken as a common basis and point of departure for the work of this Group. There was an overwhelming endorsement of UNCED recommendations

in the Group that successfully concluding the Uruguay Round negotiations represented the single, most important and immediate contribution that governments can make through GATT to the achievement of sustainable development.

80. Similarly, paragraph 22(i) of Chapter 2 of Agenda 21 states that: "Domestic measures targeted to achieve certain environmental objectives may need trade measures to rended them effective. Should trade policy measures be found necessary for the enforcement of environmental policies, certain principles and rules should apply. These could include, *inter alia*, the principle of non-discrimination; the principle that the trade measure chosen should be the least trade-restrictive necessary to achieve the objectives; an obligation to ensure transparency in the use of trade measures related to the environment and to provide adequate notification of national regulations; and the need to give consideration to the special conditions and developmental requirements of developing countries as they move towards internationally-agreed environmental objectives."

81. The invitation in paragraph 2.1 for States to overcome confrontation and foster a climate of genuine cooperation and solidarity is not new to GATT traditions nor foreign at all to the workings of this Group that have been characterised by consensus building and open mindedness.

82. Many delegations have emphasised, and it appears to be a widely shared view, that the Group's original, three-point agenda and its work under that agenda anticipated many points of international concern in relation to the trade and environment interface which are included in the UNCED results. These points cover a significant portion, as delegations have observed, of the detailed recommendations from UNCED, for example paragraphs 2.22(c), relating to transparency: "In those cases when trade measures related to environment are used, ensure transparency and compatibility with international obligations."; 2.22(f), relating to environmental regulations or standards such as packaging and labelling requirements: "Ensure that environment-related regulations or standards, including those related to health and safety standards, do not constitute a means of arbitrary or unjustifiable discrimination or a disguised restriction on trade."; and 2.22(j), relating to the relationship between GATT provisions and multilateral environmental agreements: "Develop more precision, where necessary, and clarify the relationship between GATT provisions and some of the multilateral measures adopted in the environment area."

83. There are also other areas where many delegations have pointed out the overlap that exists between the UNCED recommendations and the work already underway in the Group. As has been stressed by many delegations, past deliberations and work by the Group can be considered as efforts already made by GATT as a contribution to UNCED follow-up activities.

84. Clearly, there is still work to do on the original agenda which can be regarded as the basis for the Group's contribution to UNCED follow-up. Discussion pointed to some of the elements warranting further attention, such as 2.21(b), relating to dispute settlement: "To clarify the role of GATT, UNCTAD and other international organisations in dealing with trade and environment-related issues, including, where relevant, conciliation procedure and dispute settlement."; 2.22(e) relating to the avoidance of using trade restrictions to offset differences in cost arising from differences in environmental standards: "Seek to avoid the use of trade restrictions or distortions as a means to offset differences in cost arising from differences in environmental standards and regulations since their application could lead to trade distortions and increase protectionist tendencies."; 2.22(g) relating to the special factors affecting environment and trade policies in developing countries: "Ensure that special factors affecting environment and trade policies in the developing countries are borne in mind in the application of environmental standards, as well as in the use of any trade measures. It is worth noting that standards that are valid in the most advanced countries may be inappropriate and of unwarranted social cost for the developing countries." and 2.22(i) which has been referred to in part above but which also states: "Avoid unilateral actions to deal with environmental challenges outside the jurisdiction of the importing country. Environmental measures addressing transborder or global environmental problems should, as far as possible, be based on an international consensus." Most delegations have stated that they wholeheartedly endorse this proposition and that they consider that unilateral action of this nature is not allowed under the GATT rules.

85. It has been noted by several delegations that Paragraph 2.22(e) covers a particularly delicate subject warranting careful attention since the use of trade measures to counter notions of "eco-dumping", if legitimised and put into practice, could undermine the very foundations of the international trading system.

86. Other suggestions that have been made by some delegations for further work that needs to be undertaken in the context of this agenda item include clarifying the trade effects of PPM-based environmental measures and exploring their link to the GATT concept of "like product", examining the potential trade effects of economic instruments such as environmental taxes and subsidies, and the impact of environmental protection on competitiveness.

87. Several references have been made to other UNCED concepts and principles and the importance these might have for issues that the Group has been asked to address. Most particularly, it has been suggested that the concepts of sustainable development and the need to address specifically the problems of developing countries, where the prescription for achieving sustainable development may be different from that of other countries, should be an important part of the Group's work.

88. Work in some of the areas described above is not necessarily viewed as a priority by all delegations. Some have suggested that the Group should first confirm basic principles and recommendations contained in Agenda 21, such as, in their view, the rejection of extraterritoriality and unilateralism, as the common basis and point of departure for further work in the Group. It has been stated in this respect that there is an obligation on those delegations proposing the addition of new items to the Group's work programme to state the problem and to explain more clearly what they are seeking from a discussion of them.

89. Some delegations consider that attention needs also to be paid to ensuring that the GATT more generally will support effectively the objectives and implementation of Agenda 21.

90. The work of the Group has been characterised by the shared view of delegations regarding the importance of making trade and environment mutually supportive. The new task assigned it - to examine the principles and propositions enumerated in Section B of Chapter 2 of Agenda 21 in accordance with its mandate and competence as part of an international effort and to give them appropriate operational effectiveness - will require more dedicated work by contracting parties and continued imaginative input by delegations.

91. In an attempt to present as complete a picture as possible of GATT activities on environment, while outside the competence of this Group, I have taken the liberty to attach the recent TNC Decision to draw up a work programme on environment adopted at the time of conclusion of the Uruguay Round … .

92. In presenting this account of the Group's work in 1993, I wish to take this occasion to thank delegations and members of the secretariat for their patience and support.

ANNEX III

World Trade Organization, WT/CTE/1, 12 November 1996

REPORT (1996) OF THE COMMITTEE ON TRADE AND ENVIRONMENT

I. INTRODUCTION

...

II. BACKGROUND, ANALYSIS, DISCUSSIONS AND PROPOSALS

..

III. CONCLUSIONS AND RECOMMENDATIONS

166. The WTO Committee on Trade and Environment (CTE) has initiated work on all Items of its work programme set out in the Marrakesh Ministerial Decision on Trade and Environment. The CTE's discussions were enriched by the work undertaken previously by the GATT Group on Environmental Measures and International Trade and in the WTO Preparatory Committee. Discussions have demonstrated the comprehensive and complex nature of the issues covered by the Ministerial work programme, which reflects the WTO's interest in building a constructive relationship between trade and environmental concerns.

167. The CTE's discussions have been guided by the consideration contained in the Ministerial Decision that there should not be nor need be any policy contradiction between upholding and safeguarding an open, equitable and non-discriminatory multilateral trading system on the one hand and acting for the protection of the environment on the other. These two areas of policy-making are both important and they should be mutually supportive in order to promote sustainable development. Discussions have demonstrated that the multilateral trading system has the capacity to further integrate environmental considerations and enhance its contribution to the promotion of sustainable development without undermining its open, equitable and non-discriminatory character; implementation of the results of the Uruguay Round negotiations would represent already a significant contribution in that regard.

168. The CTE's discussions have been guided also by the consideration that the competence of the multilateral trading system is limited to trade policies and those trade-related aspects of environmental policies which may result in significant trade effects for its Members. It is recognized that achieving the individual as well as the joint objectives of WTO Member governments in the areas of trade, environment and sustainable development requires a coordinated approach that draws on interdisciplinary expertise. In that regard, policy coordination between trade and environment officials at the national level has an important role to play. Work in the CTE is helping to better equip trade officials to make their contribution in this area.

169. WTO Member governments are committed not to introduce WTO-inconsistent or protectionist trade restrictions or countervailing measures in an attempt to offset any real or perceived adverse domestic economic or competitiveness effects of applying environmental policies; not only would this undermine the open, equitable and non-discriminatory nature of the multilateral trading system, it would also prove counterproductive to meeting environmental objectives and promoting sustainable development. Equally, and bearing in mind the fact that governments have the right to establish their national environmental standards in accordance with their respective environmental and developmental conditions, needs and priorities, WTO Members note that it would be inappropriate for them to relax their existing national environmental standards or their enforcement in order to promote their trade. The CTE notes the statement in the 1995 Report on Trade and Environment to the OECD Council at Ministerial Level that there has been no evidence of a systematic relationship between existing environmental policies and competitiveness impacts, nor of countries deliberately resorting to low environmental standards to gain competitive advantages. The CTE welcomes similar policy statements made in other inter-governmental fora.

ITEM 1: The relationship between the provisions of the multilateral trading system and trade measures for environmental purposes, including those pursuant to multilateral environmental agreements

ITEM 5: The relationship between the dispute settlement mechanisms in the multilateral trading system and those found in multilateral environmental agreements

170. These two Items have proved to be closely linked. The CTE has discussed them together and drawn conclusions and recommendations on them jointly.

171. The CTE notes that governments have endorsed in the results of the 1992 U.N. Conference on Environment and Development their commitment to Principle 12 of the *Rio Declaration* that "Unilateral actions to deal with environmental challenges outside the jurisdiction of the importing country should be avoided. Environmental measures addressing transboundary or global problems should, as far as possible, be based on an international consensus." There is a clear complementarity between this approach and the work of the WTO in seeking cooperative multilateral solutions to trade concerns. The CTE endorses and supports multilateral solutions based on international cooperation and consensus as the best and most effective way for governments to tackle environmental problems of a transboundary or global nature. WTO Agreements and multilateral environmental agreements (MEAs) are representative of efforts of the international community

to pursue shared goals, and in the development of a mutually supportive relationship between them due respect must be afforded to both.

172. The relationship between the provisions of the multilateral trading system and trade measures for environmental purposes taken pursuant to multilateral environmental agreements is multifaceted. Finding the right balance to describe and address this relationship in the CTE has proved to be a very demanding task, particularly given the varying nature of the issues involved in each MEA.

173. Adequate international cooperation provisions, including among them financial and technological transfers and capacity building, as part of a policy package in MEAs are important and can be indispensable elements to facilitate the ability of governments, particularly of developing countries, to become Parties to an MEA and provide resources and assistance to help them tackle the environmental problems which the MEA is seeking to resolve and thus to implement the provisions of the MEA effectively, in keeping with the principle of common but differentiated responsibility. Trade measures based on specifically agreed-upon provisions can also be needed in certain cases to achieve the environmental objectives of an MEA, particularly where trade is related directly to the source of an environmental problem. They have played an important role in some MEAs in the past, and they may be needed to play a similarly important role in certain cases in the future.

174. The CTE recognizes that the evolving relationship between MEAs and the multilateral trading system is complex and that different questions may emerge. In this respect, the following points have been noted in the course of discussions in the CTE:

(i) Trade measures have been included in a relatively small number of MEAs. There is no clear indication for the time being of when or how they may be needed or used in the future. Up to now, there has been no GATT or WTO dispute concerning trade measures applied pursuant to an MEA.

(ii) A range of provisions in the WTO can accommodate the use of trade-related measures needed for environmental purposes, including measures taken pursuant to MEAs. That includes the defined scope provided by the relevant criteria of the "General Exceptions" provisions of GATT Article XX. This accommodation is valuable and it is important that it be preserved by all.

(iii) In the context of the consideration of the inclusion of specifically agreed-upon trade provisions in MEAs, mutual respect should be paid to technical and policy expertise in both the trade and environment areas.

(iv) In practice, in cases where there is a consensus among Parties to an MEA to apply among themselves specifically mandated trade measures, disputes between them over the use of such measures are unlikely to occur in the WTO.

(v) In the negotiation of a future MEA, particular care should be taken over how trade measures may be considered for application to non-parties.

(vi) Policy coordination between trade and environment policy officials at the national level plays an important role in ensuring that WTO Members are able to respect the commitments they have made in the separate fora of the WTO and MEAs and in reducing the possibility of legal inconsistencies arising.

175. In order to enhance understanding of the relationship between trade and environmental policies, co-operation between the WTO and relevant MEAs institutions is valuable and should be encouraged. The CTE recommends that the WTO Secretariat continue to play a constructive role through its cooperative efforts with the Secretariats of MEAs and provide information to WTO Members on trade-related work in MEAs. As noted in the CTE's conclusions under Item 10 of its work programme, observer status for relevant MEAs in WTO bodies, as appropriate, can play a positive role in creating clearer appreciation of the mutually supportive role of trade and environmental policies. Requests from the appropriate bodies of MEAs for observer status should be considered in this light. The CTE should also consider extending invitations to appropriate MEA institutions to attend relevant discussions of the CTE.

176. As described in Section II of this Report, views differed on whether any modifications to the provisions of the multilateral trading system are required under this Item of the work programme. This matter should be kept under review and further work under this Item should be carried out drawing on the work undertaken to date.

177. The CTE notes that both the WTO and MEA dispute settlement mechanisms emphasize the avoidance of disputes, including through parties seeking mutually satisfactory solutions.

178. The CTE recognizes that WTO Members have not resorted to WTO dispute settlement with a view to undermining the obligations they accepted by becoming Parties to an MEA, and the CTE considers that this will remain the case. While WTO Members have the right to bring disputes to the WTO dispute settlement mechanism, if a dispute arises between WTO Members, Parties to an MEA, over the use of trade measures they are applying between themselves pursuant to the MEA, they should consider trying to resolve it through the dispute settlement mechanisms available under the MEA. Improved compliance mechanisms and dispute settlement mechanisms available in MEAs would encourage resolution of any such disputes within the MEA.

179. The CTE recognizes the benefit of having all relevant expertise available to WTO panels in cases involving trade-related environmental measures, including trade measures taken pursuant to MEAs. Article 13 and Appendix 4 of the DSU provide the means for a panel to seek information and technical advice from any individual or body which it deems appropriate and to consult experts, including by establishing expert review groups.

ITEM 2: The relationship between environmental policies relevant to trade and environmental measures with significant trade effects and the provisions of the multilateral trading system

180. A number of trade-related environmental policies and measures not covered elsewhere in the work programme have been discussed in a preliminary way under this Item. Further examination and analysis of these policies and measures in the CTE will be required, including analysis of their effects on trade.

181. There has also been some discussion of the use by governments at the national level of environmental reviews of trade agreements, and of the relationship and compatibility of general trade and environmental policy-making principles. No conclusions have been drawn so far on either of these issues. Further work will be required on this Item in the CTE.

ITEM 3(A): The relationship between the provisions of the multilateral trading system and charges and taxes for environmental purposes

182. Scope exists under WTO provisions for Member governments to apply environmental charges and taxes. The CTE has undertaken so far a preliminary examination of some of these issues under this Item. Further work on this Item is needed.

ITEM 3(B): The relationship between the provisions of the multilateral trading system and requirements for environmental purposes relating to products, including standards and technical regulations, packaging, labelling and recycling

183. The major part of the CTE's work so far under this Item has involved examination and analysis of voluntary eco-labelling schemes/programmes, including those based on life cycle approaches, and their relationship to WTO provisions and to the Agreement on Technical Barriers to Trade (TBT) in particular. Well-designed eco-labelling schemes/programmes can be effective instruments of environmental policy to encourage the development of an environmentally-conscious consumer public. The CTE noted that Chapter IV of *Agenda 21* encouraged the expansion of environmental labelling and other environmentally-related product information programmes designed to assist consumers in making informed purchasing decisions. The CTE also noted that eco-labelling schemes/programmes have raised, in certain cases, significant concerns about their possible trade effects.

184. Increased transparency can help deal with trade concerns regarding eco-labelling schemes/programmes while it can also help to meet environmental objectives by providing accurate and comprehensive information to consumers. The CTE felt that an important starting point for WTO Members to address some of the trade concerns raised over eco-labelling schemes/programmes is by discussing how to ensure adequate transparency in their preparation, adoption and application, including affording opportunities for participation in their preparation by interested parties from other countries. The transparency provisions contained in the TBT Agreement, including the Code of Good Practice for standardizing bodies contained in Annex 3 of the Agreement provide a reference point to the further work of the CTE in enhancing transparency of eco-labelling schemes/programmes.

185. As stated above, the CTE's discussion on eco-labelling has focused primarily on voluntary eco-labelling schemes/programmes and in particular on the transparency of such schemes/programmes. Without prejudice to the views of WTO Members concerning the coverage and application of the TBT Agreement to certain aspects of such voluntary eco-labelling schemes/programmes and criteria, i.e. those aspects concerning non-product-related PPMs, and therefore to the obligations of Members under this Agreement regarding those aspects, the CTE stresses the importance of WTO Members following the provisions of the TBT Agreement and its Code of Good Practice, including those on transparency. In this context, the CTE underlines the particular importance of ensuring fair access of foreign producers to eco-labelling schemes/programmes.

186. The CTE will conduct further work on all issues contained under this Item, including with respect to developing countries and least developed countries. Such further work could involve cooperation with the Committee on TBT and take into account the work of other international fora, for instance UNEP, UNCTAD, OECD, ITC and ISO, as appropriate.

ITEM 4: The provisions of the multilateral trading system with respect to the transparency of trade measures used for environmental purposes and environmental measures and requirements which have significant trade effects

187. WTO transparency provisions and mechanisms are not an end in themselves. However, they fulfil an important role in ensuring the proper functioning of the multilateral trading system, in helping to prevent unnecessary trade restriction and distortion from occurring, in providing information about market opportunities and in helping to avoid trade disputes from arising. They can also provide a valuable first step in ensuring that trade and environment polices are developed and implemented in a mutually supportive way. The CTE considers transparency to be an important aspect of all Items of its work programme where the relationship of WTO provisions to specific trade-related environmental measures is receiving attention.

188. The CTE recognizes that trade-related environmental measures should not be required to meet more onerous transparency requirements than other measures that affect trade.

189. The CTE concludes that no modifications to WTO rules are required to ensure adequate transparency for existing trade-related environmental measures. Nevertheless, the CTE should keep under review the adequacy of existing transparency provisions with respect to trade-related environmental measures, including the results of the work of the Working Group on Notification Obligations and Procedures and whether the Committees and Councils dedicated to individual WTO Agreements consider there is any need to review the transparency provisions of those Agreements in particular instances and whether compliance with the provisions is viewed as satisfactory.

190. The CTE notes that some WTO Members are dealing with some notifications differently, both in terms of their understanding of which types of environmental measures require notification, and under which WTO provisions. Such a situation needs to be improved through joint efforts by Members to clarify the understanding of the notification requirements concerned.

191. The CTE suggests that Members consider requests for additional information on measures notified under the WTO, or more generally supply information to Members, especially developing country Members, about market opportunities created by environmental measures.

192. In the meantime, the CTE recommends that the WTO Secretariat compile from the Central Registry of Notifications all notifications of trade-related environmental measures and collate these in a single database which can be accessed by WTO Members. The database could contain information where available for each notified measure: its nature/title; objective(s); product coverage; relevant WTO provisions and MEA provisions; and a description of how it operates. This database should be kept updated.

193. The CTE welcomes the efforts of other inter-governmental organizations, in particular the UNCTAD and ITC, to collect and disseminate additional information on the use of trade-related environmental measures, and recommends the WTO Secretariat cooperate with those organizations to ensure duplication is avoided.

194. The possibility of information on trade-related environmental measures being made available voluntarily by Members in their Trade Policy Reviews and of the Secretariat including such information in its TPR Reports was noted as a possible issue to be explored in consultation with the TPR Body.

ITEM 6: The effect of environmental measures on market access, especially in relation to developing countries, in particular to the least developed among them, and environmental benefits of removing trade restrictions and distortions

195. It is under this Item that the CTE has discussed how the WTO can contribute to making international trade and environmental policies mutually supportive through trade liberalization and appropriate development and environmental policies determined at the national level for the promotion of sustainable development.

196. The CTE acknowledges that an open, equitable and non-discriminatory multilateral trading system and environmental protection are essential to promote sustainable development and that there is a close linkage between poverty and environmental degradation. Emphasis has been placed on the importance of cooperation in the essential task of alleviating and eradicating poverty in order to achieve sustainable development and the important role that increased trade and market access opportunities can make in this regard. It was noted that many countries remain marginal participants in world trade. In this respect, the CTE could contribute to the identification of trade policy actions which can enhance the participation in world trade of developing countries, and in particular the least developed among them, and promote environmental protection in the interest of sustainable development.

197. The possible effects of environmental measures on market access, especially in relation to developing countries, in particular to the least developed among them, have been discussed. There is concern that environmental measures and requirements may adversely affect the competitiveness and market access opportunities of small and medium-sized enterprises especially in developing countries. The environmental benefits of trade liberalization, including the removal of trade restrictions and distortions, has been addressed at both a general and sectoral level and in relation to specific trade restrictions. The CTE emphasizes the importance of market access opportunities in assisting developing countries obtain the resources to implement adequate developmental and environmental policies determined at the national level, diversify their economies and provide income-generating activities for the poor. Consequently, improving market access opportunities and preservation of the open, equitable and non-discriminatory nature of the multilateral trading system is essential for supporting countries in their efforts to ensure sustainable management of their resources. It has been recognized that trade liberalization including the elimination of trade restrictions and distortions can yield developmental and environmental benefits by facilitating a more efficient allocation and use of resources. At the same time, however, the CTE underlines that implementing appropriate environmental policies determined at the national level as part of sustainable development strategies is needed in order to ensure that these benefits are realized and that trade-induced growth will be sustainable. From this perspective, it has been recognized that the prompt and full implementation of the commitments made in the Uruguay Round will constitute an important contribution in this regard.

198. Discussions have taken place on whether and how the removal of trade restrictions and distortions, in particular high tariffs, tariff escalation, export restrictions, subsidies and non-tariff measures, has the potential to yield benefits for both the multilateral trading system and the environment. Up to now discussions have been centred on the agriculture sector, and a proposal on the energy sector has been tabled. Nevertheless, the Committee agrees that it should broaden and deepen its analysis also to other sectors, such as tropical and natural resource-based products, textiles and clothing, fisheries, forest products, environmental services and non-ferrous metals. Further work on this Item should be based on analytical work and empirical evidence and should take into account different country-specific natural and socio-economic conditions and the specificity of the sectors and measures involved.

199. Further work should also focus on the environmental benefits that may arise from enhancing existing market access opportunities for developing countries, and in particular the least developed among them, and the contribution that improved market access opportunities could make in assisting developing countries in implementing adequate environmental policies determined at the national level. In this context, particular attention should be devoted to the environmental benefits of initiatives that could enhance the trade performance of countries which remain only marginal participants in world trade, including low income commodity-dependent countries. Environmentally-friendly products from developing countries should also be considered in this regard. This work should take particular account of the needs of small and medium-sized enterprises. Further work is needed to ensure that the implementation of environmental measures does not

result in disguised restrictions on trade, particularly those that have adverse effects on existing market access opportunities of developing countries.

ITEM 7: The issue of the export of domestically prohibited goods

200. The CTE recognizes that serious concerns have been expressed by some developing and least-developed country Members about the export to them of products whose domestic sale or use is banned or severely restricted because they pose a threat to human, animal or plant life or health or the environment. These Members consider that they do not have sufficient timely information about the characteristics of these products nor the technical or technological capacity to make informed decisions about importing them.

201. At the same time, progress continues to be made in other inter-governmental organizations in addressing problems created by trade in potentially hazardous or harmful products. The CTE recommends that WTO Members also consider participating in the activities of other organizations which have the relevant expertise for providing technical assistance in this field.

202. The CTE needs to continue to concentrate on what contribution could be made in this area by the WTO, bearing in mind the need for this work neither to duplicate nor to deflect attention from the work of other specialized inter-governmental fora.

203. In the meantime, the CTE: (a) recommends that the WTO Secretariat determine what information is already available in the WTO on trade-related environmental measures which relate to trade in domestically prohibited goods, including on restrictions or bans on domestic sales or use of products which are or may be exported; (b) encourages WTO Members to submit to the Secretariat any additional information they have which they feel could help it in drawing up a comprehensive picture of the situation throughout the WTO system.

204. This database can assist the further work of the CTE in this area, as well as potentially provide valuable information to individual WTO Members. The information should be installed in the database of trade-related environmental measures referred to under Item 4.

205. The CTE recognizes the important role that technical assistance and transfer of technology, on mutually agreed terms and conditions, related to domestically-prohibited goods where trade is allowed by the international community can play in this field, both in tackling environmental problems at their source and in helping to avoid unnecessary additional trade restrictions on the products involved. WTO Members should be encouraged to provide technical assistance to other Members, especially developing country Members, particularly the least-developed among them, either bilaterally or through appropriate inter-governmental organizations, to assist these countries in strengthening their technical capacity to monitor and, where necessary, control imports of domestically prohibited goods.

ITEM 8: The relevant provisions of the Agreement on Trade-related Aspects of Intellectual Property Rights

206. The CTE has discussed a wide variety of issues related to the generation, access to and transfer of environmentally sound technology and products (EST&Ps), including in the relevant provisions of some MEAs, as related to the TRIPs Agreement. The CTE recalls the reference in the preamble to the TRIPs Agreement to the need to promote the effective and adequate protection of intellectual property rights and the objectives of the TRIPs Agreement that the protection and enforcement of intellectual property rights should contribute to the promotion of technological innovation and to the transfer and dissemination of technology, to the mutual advantage of producers and users of technological knowledge and in a manner conducive to social and economic welfare and to a balance of rights and obligations.

207. The CTE noted the statement in Paragraph 34.7 of Agenda 21 that ". . . access to and transfer of environmentally-sound technology are essential requirements for sustainable development." The CTE also noted that the TRIPs Agreement has an essential role in facilitating such access and transfer. Positive measures, such as access to and transfer of technology both according to the terms and conditions stipulated in the covered MEAs and without prejudice to the requirements of the TRIPs Agreement can be effective instruments to assist developing countries to meet multilaterally-agreed targets in some MEAs and in keeping with the principle of common but differentiated responsibilities in the Rio Declaration.

208. Further work is required to help develop a common appreciation of the relationship of the relevant provisions of the TRIPs Agreement to the protection of the environment and the promotion of sustainable development, and whether and how, in comparison to other factors, these provisions relate, in particular, to the following issues: (a) facilitating the generation of EST&Ps; (b) facilitating the access to and transfer and dissemination of EST&Ps; (c) environmentally-unsound technologies and products; and (d) the creation of incentives for the conservation of biological diversity, the sustainable use of its components, and the fair and equitable sharing of the benefits arising out of the utilization of genetic resources including the protection of knowledge, innovations and practices of indigenous and local communities embodying traditional lifestyles relevant to the conservation and sustainable use of biodiversity.

209. Some issues are under consideration by the Parties to the Convention on Biological Diversity who are also looking at the synergies and relationship between its objectives and the TRIPs Agreement. Information has been shared by the CTE regarding its work in response to requests by the Secretariat of the Convention on Biodiversity. The exchange of information between the CTE and the Convention on Biodiversity might be pursued further, as appropriate.

ITEM 9: The work programme envisaged in the Decision on Trade in Services and the Environment

210. The GATS is a new agreement which is still evolving and includes concepts which are not contained in the GATT. Preliminary discussion in the CTE to date on this Item has not led to the identification of any measures that Members feel may need to be applied for environmental purposes to services trade which would not be covered adequately by GATS

provisions, in particular Article XIV(b). An invitation by the CTE to Members to submit any further information in this regard remains open.

211. Further work in the CTE on this Item is necessary before it could be in a position to draw any conclusions on the relationship between services trade and the environment, or on the relevance of inter-governmental agreements on the environment and their relationship to the GATS in the context of sustainable development.

ITEM 10: Input to the relevant bodies in respect of appropriate arrangements for relations with intergovernmental and non-governmental organizations referred to in Article V of the WTO

212. It is recognized in the CTE that there is a need to respond to public interest in WTO activities in the area of trade and environment and to build support for the contribution that can be made through the WTO towards mutually supportive trade and environment policies and the promotion of sustainable development.

213. The CTE considers that closer consultation and cooperation with NGOs can also be met constructively through appropriate processes at the national level where primary responsibility lies for taking into account the different elements of public interest which are brought to bear on trade policy-making.

214. In the Decisions of the General Council of 18 July 1996 on "Procedures for the circulation and derestriction of WTO documents" and on "Guidelines for arrangements on relations with non-governmental organizations", WTO Members have agreed to improve public access to WTO documentation and to develop communication with NGOs.

215. The adoption of WTO procedures for the derestriction of documentation will provide public access to the CTE's working documents and the records of its meetings. In this regard, it is noted that the Decision on Procedures for the Circulation and Derestriction of WTO Documents, *inter alia*, affords WTO bodies substantial freedom to make their documents available to the public in order to increase transparency. The CTE has taken decisions already to derestrict a number of the working documents prepared for it by the Secretariat. It recommends that all remaining working documents prepared during these first two years of its operations be derestricted. The CTE encourages all Members that have submitted papers and non-papers that have not already been derestricted to agree that these be derestricted along with this Report.

216. The WTO Secretariat has laid the foundations for providing timely public access to the proceedings of the CTE through issuing periodically its *Trade and Environment Bulletin* and for enhancing its contacts with NGOs concerned with matters related to those of the CTE, *inter alia* through the organization of informal meetings with NGOs. The CTE recommends that the Secretariat continue its interaction with NGOs which will contribute to the accuracy and richness of the public debate on trade and environment.

217. Following the Decision of the General Council of 18 July 1996 on "Guidelines for observer status for international intergovernmental organizations in the WTO", the CTE has agreed to extend observer status on a permanent basis to those intergovernmental organizations which previously participated as observers on an *ad hoc* basis at CTE meetings. The CTE has extended observer status to all those intergovernmental organizations which have so requested, and the possibility exists on the basis of the General Council's Decision to consider future requests from other relevant intergovernmental organizations, including MEAs. Observer status of relevant MEAs in WTO bodies, as appropriate, can play a positive role in creating clearer appreciation of the mutually supportive role of trade and environmental policies. Requests from the appropriate bodies of MEAs for observer status should be considered in this light.

218. The CTE will continue to keep these issues under review.

Future of the CTE

219. Work in the WTO on contributing to build a constructive policy relationship between trade, environment and sustainable development needs to continue. Therefore, the CTE recommends that it continue to work, reporting to the General Council, with the mandate and terms of reference contained in the Ministerial Decision on Trade and Environment of April 1994. Its rules of procedure shall be adopted by consensus.

ANNEX IV

COMMITTEE ON TRADE AND ENVIRONMENT

1995, 1996, 1997, 1998, mid 1999

DOCUMENT	SUBJECT/TITLE OF DOCUMENT
WT/CTE/W/1	Environmental benefits of removing trade restrictions and distortions - Note by the Secretariat
WT/CTE/W/2	Communication from Chile
WT/CTE/W/3	Communication from the Secretariat - WTO report to third session of the Commission on Sustainable Development on 11-28 April 1995
WT/CTE/W/4	Approaches to the relationship between the provisions of the multilateral trading system and trade measures pursuant to multilateral environmental agreements - Note by the Secretariat
WT/CTE/W/4/Corr.1	Corrigendum - paragraph 20
WT/CTE/W/5	Item 4: The provisions of the multilateral trading system with respect to the transparency of trade measures used for environmental purposes and environmental measures and requirements which have significant trade effects - Note by the Secretariat
WT/CTE/W/6	A description of International agreements and instruments dealing with trade in domestically prohibited goods and other hazardous substances - Note by the Secretariat
WT/CTE/W/7	UNCED follow-up: Results of the third session of the Commission on Sustainable Development - Note by the Secretariat
WT/CTE/W/8	Environment and TRIPs
WT/CTE/W/8/Corr.1	Corrigendum - page 37
WT/CTE/W/9	Environment and Services
WT/CTE/W/10-G/TBT/W/11	Negotiating History of the coverage of the agreement on technical barriers to trade with regard to labelling requirements, voluntary standards, and processes and production methods unrelated to product characteristics - Note by the Secretariat
WT/CTE/W/11	Communication from the delegations of Nigeria and Senegal - DPG
WT/CTE/W/12	Trade measures for environmental purposes taken pursuant to multilateral environmental agreements: recent developments - Note by the Secretariat
WT/CTE/W/13	Draft rules of procedure for the meetings of the Committee on Trade and Environment - Note by the Secretariat
WT/CTE/W/13/Rev.1	Draft rules of procedure for meetings of the Committee on Trade and Environment - Note by the Secretariat
WT/CTE/W/14	Domestically prohibited goods - Proposal by Nigeria
WT/CTE/W/15	Trade measures for environmental purposes taken pursuant to multilateral environmental agreements: recent developments - Note by the Secretariat - FAO Code of conduct for responsible fisheries
WT/CTE/W/15/Corr.1	Corrigendum – paragraph 2
WT/CTE/W/16	Negotiating history of footnote 61 of the agreement on subsidies and countervailing measures - Note by the Secretariat
WT/CTE/W/17	Summary of activities of the Committee on Trade and Environment (1995) presented by the Chairman of the Committee
WT/CTE/W/18	Convention on biological diversity: recent developments - Note by the Secretariat
WT/CTE/W/19	Trade measures for environmental purposes taken pursuant to multilateral environmental agreements: recent developments - Seventh meeting of the Parties to the Montreal Protocol - Note by the Secretariat
WT/CTE/W/20	Item 1: The relationship between the provisions of the multilateral trading system and trade measures for environmental purposes, including those pursuant to multilateral environmental agreements (MEAs) - Submission by New Zealand
WT/CTE/W/21-G/TBT/W/21	Communication from Canada - Elements of a possible understanding to the TBT Agreement
WT/CTE/W/22	Factors affecting transfer of environmentally-sound technology - Note by the Secretariat
WT/CTE/W/23-G/TBT/W/23	Eco-labelling programmes - Canada, Chile, Czech Republic, European Communities, Norway and US

DOCUMENT	SUBJECT/TITLE OF DOCUMENT
WT/CTE/W/24	Communication from Argentina on Item 6 of the Committee's work programme - The environmental benefits of removing trade restrictions and distortions, including tariff escalation, subsidies, state trading, and excessively high tariffs
WT/CTE/W/24/Corr.1	Corrigendum - Para.23(a)
WT/CTE/W/25	Item 6: The effects of environmental measures on market access, especially in relation to developing countries, in particular to the least developed among them, and environmental benefits of removing trade restrictions and distortions - Note by the Secretariat - Tariff escalation
WT/CTE/W/26	The effects of environmental measures on market access, especially in relation to developing countries, in particular to the least developed among them - Note by the Secretariat
WT/CTE/W/27	US proposal regarding further work on transparency of eco-labelling
WT/CTE/W/28	Item 4: The provisions of the multilateral trading system with respect to the transparency of trade measures used for environmental purposes and environmental measures and requirements which have significant trade effects - Note by the Secretariat
WT/CTE/W/29	Item 7: Domestically prohibited goods - Assessment of the product coverage in specific international instruments - Note by the Secretariat
WT/CTE/W/30	Results of the fourth session of the Commission on Sustainable Development - Note by the Secretariat
WT/CTE/W/31	The relationship between trade measures pursuant to MEAs and the WTO Agreement
WT/CTE/W/32	Domestically prohibited goods - Proposal by Nigeria
WT/CTE/W/33	Results of the stocktaking exercise - adopted at the 28-29 May 1996 meeting
WT/CTE/W/34	Item 4: the provisions of the multilateral trading system with respect to the transparency of trade measures used for environmental purposes and environmental measures and requirements which have significant trade effect - CRN note
WT/CTE/W/35	Trade liberalization and the environment - a contribution by the United States
WT/CTE/W/36	Trade liberalization, the environment and sustainable development - submission by Australia
WT/CTE/W/37	Environmental review of trade agreements at the national level - communication from the United States
WT/CTE/W/38-G/TBT/W/30	Draft decision on eco-labelling programmes - communication from Canada
WT/CTE/W/39	The relationship between the provisions of the multilateral trading system and trade measures for environmental purposes, including those pursuant to multilateral environmental agreements (MEAs)
WT/CTE/W/40	Report (196) of the Committee on Trade and Environment
WT/CTE/W/41	Int. Intergovernmental Organizations Requests for Observer Status in the CTE
WT/CTE/W/41/Rev.1	Int. Intergovernmental Organizations Requests for Observer Status in the CTE - Revision
WT/CTE/W/41/Rev.2	Int. Intergovernmental Organizations Requests for Observer Status in the CTE – Revision
WT/CTE/W/41/Rev.3	Int. Intergovernmental Organizations Requests for Observer Status in the CTE – Revision
WT/CTE/W/41/Rev.4	Int. Intergovernmental Organizations Requests for Observer Status in the CTE – Revision
WT/CTE/W/42	UNCED follow-up work in GATT/WTO -Note prepared by the WTO secretariat for submission to the 5th session of the UNCED
WT/CTE/W/43	A review of the information available in the WTO on the export of DPGs - It. 7
WT/CTE/W/44	Multilateral environmental agreements: recent developments - It. 1
WT/CTE/W/45	Eco-labelling: overview of current work in various international fora - It. 3b
WT/CTE/W/46	Provisions of the multilateral trading system with respect to transparency of trade measures used for environmental purposes and environmental measures and requirements which have significant trade effects - It. 4
WT/CTE/W/47	Taxes and charges for environmental purposes - border tax adjustment - It. 3a
WT/CTE/W/48	Results of the ad hoc intergovernmental panel on forests - It. 1
WT/CTE/W/49	Selected bibliography on trade and environment
WT/CTE/W/50	The convention on biological diversity and the Agreement on trade-related aspects of intellectual property rights - It. 8
WT/CTE/W/51	Environmental and trade benefits of removing subsidies in the fisheries sector - Submission by the United States - It. 6

DOCUMENT	SUBJECT/TITLE OF DOCUMENT
WT/CTE/W/52	Item 6: the fisheries sector - Submission by New Zealand
WT/CTE/W/53	GATT/WTO dispute settlement practice relating to Article XX, paragraphs (b), (d) and (g) of GATT
WT/CTE/W/54- WT/COMTD/W/30	Statement by Prime Minister Goh Chok Tong of the Rep. of Singapore at the 19th Special Session of the UN Gen. Assembly on Tuesday 24 June 1997 - Communication by Singapore
WT/CTE/W/55	Recent trade-related developments in the Basel Convention - Communication from the Basel Convention Secretariat
WT/CTE/W/56	Results of the UN General Assembly Special Session to review the implementation of Agenda 21
WT/CTE/W/57	The Montreal Protocol and trade measures - Communication from the Secretariat for the Vienna Convention for the protection of the ozone layer and the Montreal Protocol on substances that deplete the ozone layer
WT/CTE/W/58	Nature and extent of GEF projects in assisting in the implementation of multilateral environmental agreements - Communication from the GEF Secretariat
WT/CTE/W/59	The proposed Prior Informed Consent (PIC) and persistent organic pollutants (POPS) conventions - Communication from UNEP Chemicals
WT/CTE/W/60	Nature and extent of projects supported by the Multilateral Fund - Communication from the Multilateral Fund for the implementation of the Montreal Protocol
WT/CTE/W/61	The United Nations Framework Convention on Climate Change - Communication from the UNFCCC
WT/CTE/W/62	The 1994 Agreement relating to the implementation of part XI of the 1982 UN Convention on the Law of the Sea...
WT/CTE/W/63	The Convention on International Trade in Endangered Species of Wild Fauna and Flora - Communication from the CITES Secretariat
WT/CTE/W/64	The Convention on Biological Diversity and its relation to trade - Communication from the Executive Secretary of the CBD
WT/CTE/W/65	Item 8: the relationship between the TRIPS Agreement and the Convention on Biodiversity - Communication from India
WT/CTE/W/66	Cluster on market access - Item 8: the relationship of the TRIPS Agreement to the development, access and transfer of environmentally-sound technologies and products (EST&Ps) - Input from India
WT/CTE/W/67	Environmental benefits of removing trade restrictions and distortions
WT/CTE/W/67/Add.1	Addendum on Environmental Services
WT/CTE/W/68	The Montreal Protocol on substances that deplete the ozone layer - recent developments
WT/CTE/W/69	Draft report (1997) of the Committee on Trade and Environment
WT/CTE/W/70	Liberalization of trade in environmental services and the environment - Contribution by the United States
WT/CTE/W/71	Convention on international trade in endangered species of wild fauna and flora
WT/CTE/72	Methodologies for environmental valuation: a selected bibliography
WT/CTE/W/73	The product coverage of different international instruments dealing with trade in domestically prohibited goods and other hazardous substances
WT/CTE/W/74	United Nations Framework Convention on Climate Change
WT/CTE/W/75	Eco-packaging: overview of recent work in other international fora
WT/CTE/W/76-G/TBT/W/60	Sellos ecologicos y acceso a los mercados: estudio de caso del sector floricultor colombiano - Documento de Colombia
WT/CTE/W/77	Item 4: provisions of the multilateral trading system with respect to the transparency of trade measures and requirements which have significant trade effects
WT/CTE/W/77/Corr.1	Idem - paragraph 2
WT/CTE/W/78	Item 4: ... Proposal for the environmental database
WT/CTE/W/79	Market access impact of eco-labelling requirements
WT/CTE/W/79/Corr.1	Market access impact of eco-labelling requirements - paras. 30-38
WT/CTE/W/80	GATT/WTO rules on subsidies and aids granted in the fishing industry
WT/CTE/W/81-G/TBT/W/61	Forests: a national experience - Contribution by Canada
WT/CTE/W/82	Cluster on market access - Statement by India

DOCUMENT	SUBJECT/TITLE OF DOCUMENT
WT/CTE/W/83	EC comments on WT/CTE/W/67 – Note by the European Community
WT/CTE/W/84	Communication from the Secretariat of the Intergovernmental Forum on Forests (IFF)
WT/CTE/W/85	Cluster on MEAs - It. 8 - Response of India to comments by US on WT/CTE/W/65
WT/CTE/W/86	Recent developments in multilateral environmental agreements (MEAs)
WT/CTE/W/87	Communication from the Secretariat of the International Commission for the Conservation of Tunas (ICCAT)
WT/CTE/W/88	Communication from the Secretariat of UN/ECE Convention on Long-Range Transboundary Air on POPs
WT/CTE/W/89	Communication from the Secretariat of the International Tropical Timber Organization
WT/CTE/W/90	Communication from the Secretariat of the Basel Convention on the Control of …
WT/CTE/W/91	Communication from the Secretariat of UNEP Chemicals (IRPTC)
WT/CTE/W/92	Communication from the Secretariat of the Convention on Biological Diversity (CBD)
WT/CTE/W/93	Industrial Principles for Sustainable Development - Communication from Brazil
WT/CTE/W/94	Statement by the UNEP to the WTO CTE - Communication from the Secretariat of UNEP
WT/CTE/W/95	The International Commission for the Conservation of Atlantic Tunas (ICCAT) - Communication from Brazil
WT/CTE/W/96	UNCTAD expert meeting on strengthening capacities in developing countries to develop their environmental services sector, Geneva, 20-22 July 1998 - Communication from UNCTAD
WT/CTE/W/97	Non-trade concerns in the next agricultural negotiations - Submission by Argentina
WT/CTE/W/98	The energy sector: the case of alcohol fuel (ethanol) - Submission by Brazil
WT/CTE/W/99	Comments by the EC on the document of the secretariat of the CTE (W/80) on subsidies & aids granted in the fishing industry.
WT/CTE/W/100	Environment effects of trade liberalization in the agricultural sector - Submission by Norway
WT/CTE/W/101-G/TBT/W/103	Technical barriers to the market access of developing countries - Note by the Secretariat
WT/CTE/W/102	Item 4 - the environmental database: interim review of the glossary of search words
WT/CTE/W/102/Corr.1	*Idem*
WT/CTE/W/103	The Icelandic fisheries management system: a market-driven sustainable fisheries regime - Submission by Iceland
WT/CTE/W/103/Corr.1	*Idem*
WT/CTE/W/104	The Montreal Protocol on the substances that deplete the ozone layer - recent developments
WT/CTE/W/105	Trade liberalization and the environment: a positive agenda for trade reforms - Submission by Australia
WT/CTE/W/106	Agriculture and the environment - the case of export subsidies - Submission by Argentina, Australia, Brazil, Canada, Chile, Colombia, Indonesia, Malaysia, New Zealand, Paraguay, Philippines, Thailand, United States, Uruguay
WT/CTE/W/107	Environmental effects of trade liberalization on agriculture - Submission by Japan
WT/CTE/W/108	Environmental certification for leather and forestry products (Item 3b) - Submission by Brazil
WT/CTE/W/109	The agriculture sector-environmental benefits of trade liberalization (Item 6) - Submission by Brazil
WT/CTE/W/110	Statement by the Minister of mines, environment and tourism of Zimbabwe to the WTO regional seminar on trade and environment for Sub-Saharan Africa, Harare, Zimbabwe, 8-10 Feb. 99 - Submission by Zimbabwe
WT/CTE/W/111	On the environmental impact of fisheries subsidies - A short report by the Icelandic Ministry of Fisheries, 1 February 1999 - Submission by Iceland
WT/CTE/W/112	Draft International Legally Binding Instrument for Implementing International Action on Certain Persistent Organic Pollutants (POPS)
WT/CTE/W/113	The Commission for the Conservation of Atlantic Marine Living Resources Communication from the Commission
WT/CTE/W/113/ Corr.1	The Commission for the Conservation of Atlantic Marine Living Resources Note by the Secretariat

DOCUMENT	SUBJECT/TITLE OF DOCUMENT
W/CTE/W/114	Internationally Agreed Definitions of Environmental Labelling within the International Organization for Standardization (ISO) and Related Work
WT/CTE/W/115	Communication from the Secretariat for the Vienna Convention and the Montreal Protocol, UNEP
WT/CTE/W/116	Communication from the Secretariat of the Convention on Biological Diversity
WT/CTE/W/117	Convention on Biological Diversity (CBD), Draft Protocol on Biosafety, Recent Developments
WT/CTE/W/118	Item 4: Provisions of the Multilateral Trading System with Respect to the Transparency of Trade Measures Used for Environmental Purposes and Environmental Measures and Requirements, which have Significant Trade Effects
WT/CTE/W/119	Communication from the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES)
	Communication from the CITES Secretariat
WT/CTE/W/120	Communication from the Secretariat of the International Tropical Timber Organization (ITTO)
WT/CTE/W/121	Benefits of Eliminating Trade Distorting and Environmentally Damaging Subsidies in the Fisheries Sector
WT/CTE/W/122	Communication from the Secretariat of the Intergovernmental Forum on Forests (IFF)
WT/CTE/W/123	Communication from the Secretariat of the United Nations Framework Convention on Climate Change
WT/CTE/W/124	Convention on Biological Diversity (CBD) – Draft Protocol on Biosafety
WT/CTE/W/125	The Relationship between the Convention on Biological Diversity (CBD) and the Agreement on the Trade-Related Aspects of Intellectual Property Rights (TRIPS); with a focus on Article 27.3 (B): background Note by the Secretariat
WT/CTE/W/126	The FAO International Plan of Action for the Management of Fishing Capacity and Related Initiatives for Sustainable Fisheries

ANNEX V
World Trade Organization
Trade and Environment
Decision of 14 April 1994[1]

Ministers, meeting on the occasion of signing the Final Act embodying the results of the Uruguay Round of Multilateral Trade Negotiations at Marrakesh on 15 April 1994,

Recalling the preamble of the Agreement establishing the World Trade Organization (WTO), which states that members' "relations in the field of trade and economic endeavour should be conducted with a view to raising standards of living, ensuring full employment and a large and steadily growing volume of real income and effective demand, and expanding the production of and trade in goods and services, while allowing for the optimal use of the world's resources in accordance with the objective of sustainable development, seeking both to protect and preserve the environment and to enhance the means for doing so in a manner consistent with their respective needs and concerns at different levels of economic development,"

Noting:

— the Rio Declaration on Environment and Development, Agenda 21, and its follow-up in GATT, as reflected in the statement of the Chairman of the Council of Representatives to the CONTRACTING PARTIES at their 48th Session in December 1992, as well as the work of the Group on Environmental Measures and International Trade, the Committee on Trade and Development, and the Council of Representatives;

— the work programme envisaged in the Decision on Trade in Services and the Environment; and

— the relevant provisions of the Agreement on Trade-Related Aspects of Intellectual Property Rights,

Considering that there should not be, nor need be, any policy contradiction between upholding and safeguarding an open, non-discriminatory and equitable multilateral trading system on the one hand, and acting for the protection of the environment, and the promotion of sustainable development on the other,

Desiring to coordinate the policies in the field of trade and environment, and this without exceeding the competence of the multilateral trading system, which is limited to trade policies and those trade-related aspects of environmental policies which may result in significant trade effects for its members,

Decide:

— to direct the first meeting of the General Council of the WTO to establish a Committee on Trade and Environment open to all members of the WTO to report to the first biennial meeting of the Ministerial Conference after the entry into force of the WTO when the work and terms of reference of the Committee will be reviewed, in the light of recommendations of the Committee,

— that the TNC Decision of 15 December 1993 which reads, in part, as follows:

"(a) to identify the relationship between trade measures and environmental measures, in order to promote sustainable development;

(b) to make appropriate recommendations on whether any modifications of the provisions of the multilateral trading system are required, compatible with the open, equitable and non-discriminatory nature of the system, as regards, in particular:

— the need for rules to enhance positive interaction between trade and environmental measures, for the promotion of sustainable development, with special consideration to the needs of developing countries, in particular those of the least developed among them; and

— the avoidance of protectionist trade measures, and the adherence to effective multilateral disciplines to ensure responsiveness of the multilateral trading system to environmental objectives set forth in Agenda 21 and the Rio Declaration, in particular Principle 12; and

— surveillance of trade measures used for environmental purposes, of trade-related aspects of environmental measures which have significant trade effects, and of effective implementation of the multilateral disciplines governing those measures;"

constitutes, along with the preambular language above, the terms of reference of the Committee on Trade and Environment,

— that, within these terms of reference, and with the aim of making international trade and environmental policies mutually supportive, the Committee will initially address the following matters, in relation to which any relevant issue may be raised:

— the relationship between the provisions of the multilateral trading system and trade measures for environmental purposes, including those pursuant to multilateral environmental agreements;

— the relationship between environmental policies relevant to trade and environmental measures with significant trade effects and the provisions of the multilateral trading system;

— the relationship between the provisions of the multilateral trading system and:

[1] Source: MTN/TNC/45(MIN)

(a) charges and taxes for environmental purposes

(b) requirements for environmental purposes relating to products, including standards and technical regulations, packaging, labelling and recycling;

— the provisions of the multilateral trading system with respect to the transparency of trade measures used for environmental purposes and environmental measures and requirements which have significant trade effects;

— the relationship between the dispute settlement mechanisms in the multilateral trading system and those found in multilateral environmental agreements;

— the effect of environmental measures on market access, especially in relation to developing countries, in particular to the least developed among them, and environmental benefits of removing trade restrictions and distortions;

— the issue of exports of domestically prohibited goods,

— that the Committee on Trade and Environment will consider the work programme envisaged in the Decision on Trade in Services and the Environment and the relevant provisions of the Agreement on Trade-Related Aspects of Intellectual Property Rights as an integral part of its work, within the above terms of reference,

— that, pending the first meeting of the General Council of the WTO, the work of the Committee on Trade and Environment should be carried out by a Sub-Committee of the Preparatory Committee of the World Trade Organization (PCWTO), open to all members of the PCWTO,

— to invite the Sub-Committee of the Preparatory Committee, and the Committee on Trade and Environment when it is established, to provide input to the relevant bodies in respect of appropriate arrangements for relations with inter-governmental and non-governmental organizations referred to in Article V of the WTO.