



Environment

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Environment

Introduction

Tens of thousands of people descended on Seattle, Washington in December 1999 to protest a World Trade Organization (WTO) meeting of trade ministers from 130 countries around the world that was intended to launch a new, multi-year set of trade liberalization negotiations. At what became known as the "**Battle in Seattle**," some protestors challenged, in violent street demonstrations, the underlying premise of free trade—namely that the benefits of free trade can be shared by all participants. Some protestors made their point by dressing up as turtles.

A 1998 WTO decision overturning a U.S. law intended to protect sea turtles had become a flash point for concern about the effect that open trade and globalization have on the environment. The decision, known as the "shrimp-turtle case," declared a U.S. import ban on shrimp caught without "turtle excluder devices" was in violation of international trade law. Although the shrimp import ban was intended to protect the environment, most of the affected imports were from Southeast Asian countries that could not afford the turtle excluder devices. Those countries claimed that the United States' ban was therefore protecting the environment by harming their development, since their economies depended on shrimp exports.

The case thus highlighted important and interrelated questions about the place of environmental protection in a globalized economy. First, what is the proper balance between environmental protection and economic development? Second, how can nations cooperate to protect the environment when their interests diverge? Third, what is the role of international organizations deciding the balance between environmental measures and free trade? Fourth, should international agreements on trade and other issues contain explicit measures to protect the environment? And finally, what are the responsibilities of richer nations to help poorer nations develop environment-friendly policies?

Globalization and the Environment

These questions have arisen mainly as a result of increased economic integration, but globalization has also meant an important conceptual change in the way we think about the environment. Many of us now see environmental problems as being of international concern, not just national interest—such as protection of the oceans and the atmosphere from pollution. The environment is now considered the "common heritage of mankind," and environmental problems are increasingly the subject of international efforts because of their cross-border effects and the impossibility that just one or a few nations can solve these problems on their own.

Legions of public international and private non-governmental organizations therefore seek solutions for environmental issues, such as the **United Nations Environmental Program** and **Greenpeace** and the **Worldwatch Institute**. A **multitude of treaties** have been concluded to harmonize governmental policy on environmental protection. Some environmentalists have even proposed the creation of a "world environmental organization" to coordinate international environmental policies.

Others have questioned the need for rigorous environmental protection, however, on **scientific**, **economic**, and **sovereignty** grounds. Critics of environmental protection argue that alleged dangers, such as global warming, have been exaggerated and the economic harm from regulation of natural resources has been minimized, in pursuit of a radical, anti-capitalist agenda. They argue that too much regulation is both unnecessary and ultimately harmful because it keeps people poor by preventing the competitive use of their resources. In contrast,



advocates of environmental protection say that unregulated economic activity has led to environmental destruction and must be slowed, and they say that their critics are **uninformed and pursuing their own agenda** of unfettered capitalist expansion.

Environmental protection can entail a drag on economic growth in the short-term. Industries that have to adjust to environmental regulations face disruption and higher costs, harming their competitive position. The question is what to make of this. Some argue that it may be worth slower economic growth in order to protect the environment. Others say that the free market and technological advances are the best tools to solve environmental problems and lift people out of poverty, rather than greater regulation.

The link between the environment and economic development may be more complex than that, however. In fact, in many ways, protecting the environment and promoting economic growth are complementary goals. Poverty in developing countries is a leading cause of environmental degradation. For instance, "slash-and-burn" land-clearing by subsistence farmers has been a major cause of depletion of the Amazon rainforest. Boosting economic growth may then be an effective tool to promote protection of the environment. This is the idea behind the sustainable development movement, which seeks to advance economic opportunities for poorer nations in environmentally friendly ways.

This Issue Brief examines the critical environmental challenges facing the earth within this framework—that environmental problems are now recognized as global issues requiring solutions coordinated among many nations, but disagreements about how to proceed, particularly over the trade-off between environmental protection and economic development, have hampered these efforts. First, we will look at some specific disputes involving the environment and free trade as a means to illustrate the difficulty of balancing these concerns and to see how the international trading system has approached the problem. Second, we will examine environmental problems in the larger context of international politics and discuss multilateral efforts to solve environmental problems. In conclusion, we will look at the idea of sustainable development to see if it can produce the balance between economic growth and environmental health that its supporters hope to achieve.

Are International Trade and Protection of the Environment Enemies?

Introduction

As demonstrated by the protestors in Seattle, the effect of international trade on the environment has been one of the most contentious elements in the world-wide debate about globalization. Opponents of globalization fear that uncontrolled economic growth, fuelled by free trade, harms the environment by causing more pollution and exhaustion of natural resources. Furthermore, they suspect that environmental protection laws are weakened under the guise of promoting free trade by corporations and governments unconcerned about the negative environmental effects of commerce. In contrast, many corporations, governments, and citizens in developing countries (and some in developed countries as well) are willing to accept a certain level of environmental damage in exchange for economic well-being. They fear that environmental protection laws are really ways for developed countries to prevent their goods from competing fairly.

These concerns, however, are relatively recent. When the first General Agreement on Tariffs and Trade (GATT 1947) came into force, there was no such explicit acknowledgement of any broad linkages between trade and the environment. The only mention of the environment came in Article XX, which contained exceptions to the basic rules of the treaty that allowed countries to impose measures "necessary to protect human, animal or plant life or health" or "relating to the



conservation of exhaustible natural resources" so long as those measures did not amount to unfair discrimination against foreign products or operate as disguised restrictions on trade. For decades, no further exploration of the trade-environment linkages was made within the GATT framework.

In the early 1970s, however, when the environmental movement was gaining strength internationally, the members of the GATT were invited to submit comments for consideration at the UN Convention on the Human Environment, held in Stockholm, Sweden in 1972. The secretariat of the GATT prepared a study on the impact on international trade of various measures proposed to deal with pollution, but the study did not address the larger issue of the balance between economic development and environmental protection. The GATT also set up the Group on Environmental Measures and International Trade (EMIT) to provide advice to GATT members on trade policy and pollution issues. EMIT, however, was never called upon for advice until 1991, when governments began preparing for the UN Conference on Environment and Development, to be held in Rio de Janeiro, Brazil, in 1992. EMIT held two years of meetings on the relationship between trade and the environment, eventually producing a report that said there was no inherent contradiction between environmental protection by individual countries or through multilateral treaties and the GATT trading system. Nevertheless, the report also said that the GATT was not the forum to review national environmental laws or develop international environmental standards. The role of environmental concerns in international trade was thus not spelled out, the importance of the GATT's orientation toward free trade was emphasized, and the issue was not addressed.

Meanwhile, trade disputes involving environmental protection that would demonstrate the conflicting positions were rare until the 1990s. With minor exceptions, the GATT dispute resolution system never addressed the conflict between the free trade principles of the treaty and environmental protection under the Article XX provisions. That changed in 1990 when Mexico and Venezuela challenged a U.S. law intended to prevent dolphins from being killed in the tuna-fishing process. The case was the first in a series of disputes in the 1990s whose outcome in GATT dispute resolution panel reports seemed to prioritize free trade over the environment and galvanized opposition to free trade among environmentalists.

The Tuna-Dolphin Case

The origin of what became known as the "tuna-dolphin" case was the United States' Marine Mammal Protection Act (the MMPA), which imposed a ban on imports of tuna from countries that did not have a conservation program designed to protect dolphins in the tuna-fishing process. Tuna, it turns out, are often found swimming in schools underneath dolphins. In order to catch the tuna, fishermen used to drag large nets through the water and then pull them up under the tuna. Dolphins swimming above the tuna would be caught at the same time and die in the nets along with the tuna. The MMPA therefore required American tuna fishermen to adjust their fishing practices to avoid such deaths and banned tuna from countries in which dolphin deaths from tuna fishing exceeded deaths from U.S. tuna fishing by more than 25 percent. As a result, tuna from Mexico, Venezuela, Panama, Ecuador, and the tiny Pacific island of Vanuatu were banned in 1990.

Mexico and Venezuela challenged the U.S. action in the dispute resolution system of the GATT and won their cases in 1991 and 1992. The decision in the Mexico case is considered a key turning point in jurisprudence of the world trade system, even though it was not officially adopted as a binding decision by the members of the GATT.* (Mexico and the United States later settled the dispute through negotiations.) The dispute resolution panel decided that the United States could not justify the MMPA's ban on Mexican tuna imports for several reasons. First, the panel said that Article XX's exceptions must be interpreted narrowly so that any one country cannot undermine the multilateral trade rules. Second, the panel said that the United States had not



proved that the tuna ban was "necessary," i.e., that it was the least-trade restrictive way to protect dolphins, in contrast to, for example, negotiating dolphin-protection agreements with other countries. Third, the panel said that the percentage link to U.S. dolphin deaths made it difficult for Mexican authorities to predict in advance the acceptable level of Mexican dolphin deaths. Finally, the panel said that the United States could not use the Article XX exceptions to regulate natural resources outside their borders.

The case thus laid out some of the issues that have continued to frame the debate over the environment and trade. The panel approached the dispute with a distinct pro-trade bias, analyzing each of the contested points from the perspective of the effect of the MMPA on free trade. Furthermore, the panel viewed preserving the multilateral free trade system as more important than any one country's evaluation of the need to protect the environment. These results should not be too surprising, however. After all, the GATT panel's mandate was to interpret the GATT—a trade treaty. The panel evidently could not find any authority for placing environmental concerns on a par with the thrust of the GATT to promote free trade.

In addition, the decision explicitly limited the right of a country to protect environmental resources extraterritorially. The panel could not find authority within the language of the Agreement to allow one country to affect the environmental resources in another. This should not be surprising either, since the prospect of one country taking actions to interfere with the resources of another country could be abused and lead to innumerable disputes. Even now, ten years later, the idea that one country can impose its view of the need for environmental protection on another country's resources is highly controversial. (In fact, a second dispute arose out of the tuna-dolphin case because the MMPA also banned tuna and tuna products from third countries that imported tuna from other countries that did not comply with the MMPA. The GATT overturned this ban, as well.)

Finally, another key issue from this case that continues to affect the debate over environmental protection in a globalized economy is the contrast between the wealthy United States and its ability to have sophisticated fishing techniques with the limited resources of the developing countries and related constraints on the affordability of environmental protection tools.

After the GATT decision, the tuna-dolphin dispute was resolved by agreements negotiated between the United States and the affected countries that called for dolphin protection measures and through a multilateral declaration on the importance of dolphin conservation. The U.S. Congress later called for a binding agreement to implement the declaration, and the International Dolphin Conservation Program was set up. Environmentalists, nevertheless, are skeptical that anything practically beneficial will come of the program.

Was the tuna-dolphin case a victory or a defeat, then, for the environmental movement? On the one hand, the GATT dispute resolution panel gave priority to free trade over environmental protection (on sound grounds when viewed in the context of Article XX). On the other hand, the U.S. loss before the panel gave impetus to an internationally agreed-upon action program. In fact, the International Dolphin Conservation Program could be more effective than a unilateral U.S. law. Yet, we still do not know how effective that program may turn out to be.

In any event, the tuna-dolphin case dramatically raised the stakes in the debate over the relationship between international trade and the environment because it came at the same time that two major sets of trade negotiations were in high gear—those to create the North American Free Trade Area (NAFTA) and to finish the Uruguay Round in the GATT and create the World Trade Organization. The tuna-dolphin case therefore became ammunition for both environmentalists and strict believers in American sovereignty.

* Prior to reforms of the Dispute Settlement Process in the Uruguay Round of trade negotiations, adoption of a dispute panel report by the GATT could be blocked by the country found to be in violation of GATT rules. Thus, many findings never took effect. The Uruguay Round reforms reversed this—now, all panel reports are binding unless a consensus of all WTO members blocks adoption.



The Environment and NAFTA

Environmental issues (as well as protection of labor rights) therefore became a focal point for opposition to the United States' plan to join NAFTA. Although NAFTA had been negotiated primarily during the administration of President George H.W. Bush, his successor, Bill Clinton, and the Clinton administration strongly supported integration of the U.S., Canadian, and Mexican economies as a means to promote economic development in all three countries. Some members of Congress, however, were wary of approving the agreement and pressure from them and environmental interest groups resulted in the Clinton administration negotiating a special "side agreement" on the environment (as well as one on labor issues).

The side agreement, called the **North American Agreement on Environmental Cooperation (NAAEC)** committed the three governments to studying environment problems, developing scientific research and technology to improve environmental protection, and educating their publics about the environment. The governments also pledged to enforce strictly their own environmental laws and to ensure that private citizens had access to their national court systems to promote environmental protection. It also said that the governments should "consider" implementing environmental protections measures suggested by a new trilateral group called the **Commission for Environmental Cooperation (CEC)**. The Agreement was criticized, therefore, for not actually making the governments responsible for new obligations. Instead, environmental activists pointed out, the Agreement only requires that the governments live up to commitments already made under domestic law. If those laws are not effective, the CEC cannot impose new obligations. The CEC also is supposed to rule on disputes if one country believes that another is not enforcing its environmental laws effectively. The procedures for doing so, however, are complex, and the consequences of a negative decision by an arbitral panel are minimal, with development of an "action plan" to resolve the non-enforcement and only symbolically significant fines against the offending government. So far, no cases have been brought.

Again, some of the key issues in the debate over international environmental protection repeated themselves in the NAFTA side agreement negotiations—the sensitivity to international review of national laws, barriers to enforcement of environmental standards, the differences in environmental protection between rich and poor countries, and the priority given to trade over environmental concerns.

What was the practical effect of the side agreement, then? It probably did not sway many votes in favor of the agreement in Congress, which was approved by only 18 votes in the House of Representatives. Senators were more in favor of the agreement with, 61 votes in favor and 38 opposed. (In a controversial move, NAFTA was approved not as a treaty, which would have required a two-thirds majority of the Senate alone to become law, but as an "executive-congressional agreement," requiring only a majority of each chamber in favor.) The side agreement did, however, provide political cover to some Congressmen and Senators who wanted to vote for NAFTA but also wanted to assure their constituents that they supported environmental protection.

On a less-pessimistic note, however, it is worth pointing to the extensive activities of the CEC to support scientific research and promote public education about environmental issues. The CEC, through the **North American Fund for Environmental Cooperation**, created in 1995, also provides grants for local, community-based non-governmental organizations to solve environmental problems. The side agreement and CEC are not simply window-dressing, then, but nevertheless they did not satisfy environmental groups.



The environmentalists had more success in the GATT multilateral trade negotiations (MTN) of the Uruguay Round that were being conducted at the same time. The negotiators were working on a major revision of the GATT that would create an enhanced system for dispute resolution and enforcement, as well as changes in the text and scope of the GATT. Adopted in April 1994 at a summit in Marrakesh, Morocco, the new GATT, which created the World Trade Organization, stated in its preamble that the parties to the Agreement recognized that

their relations in the field of trade and economic endeavor 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...(emphasis added)

The trade ministers at the summit also adopted a special resolution called the **Decision on Trade and Environment** creating a Committee on Trade and the Environment as part of the permanent WTO structure to study the relationship between the two. Later that year, they adopted the **Decision on Trade in Services and the Environment**, authorizing the CTE to examine environmental issues related to trade in services. Nevertheless, the mandate of the CTE was limited by the recognition that the WTO is not an environmental agency and that the committee always had to work to uphold the trade-liberalizing principles of the WTO.

The Shrimp-Turtle Case in the New WTO Context

With that in mind, the first major test of how the newly created WTO would deal with environmental issues came in the 1998 shrimp-turtle case mentioned in the Introduction to this Issue Brief. The United States had implemented a ban on shrimp from countries whose fishing fleets did not have special "turtle excluder devices," to prevent endangered sea turtles from being killed in the shrimping process. India, Malaysia, Thailand, and Pakistan claimed that the law was a disguised restriction on free trade and challenged the measure in the WTO's dispute resolution process. The United States argued, as it had in the tuna-dolphin case, that the exceptions in Article XX of the GATT allowed for the ban. And, as in the tuna-dolphin case, the United States lost, for virtually the same reasons. The dispute resolution panel deciding the case said that the shrimp ban was not justified under the Article XX exceptions because environmental protection measures could not be used to undermine the overall multilateral trading system.

The United States appealed the decision, however, under the new appeal procedure that had been created by the revision of the GATT in the Uruguay Round. The WTO Appellate Body again ruled against the United States, but with a significant difference from the rationale of the initial dispute resolution panel. The Appellate Body said that the panel had read Article XX too narrowly within the context of the overall goal of maintaining free trade. Article XX, the Appellate Body said, was meant only to prevent abuse of environmental protection laws to undermine the multilateral trading system. Furthermore, the Appellate Body said, the new language in the preamble of the GATT, quoted above, established that the WTO members agreed that sustainable economic development was a goal of the trading system and should be taken into account as "color, texture, and shading" in interpreting the Agreement. The Appellate Body went on to say that the way the United States implemented its shrimp ban, however, was discriminatory, and ordered the United States to end the ban. Still, it emphasized that:

In reaching these conclusions, we wish to underscore what we have *not* decided in this appeal. We have *not* decided that the protection and preservation of the environment is



of no significance to the WTO. Clearly, it is. We have *not* decided that sovereign nations that are members of the WTO cannot adopt effective measures to protect endangered species, such as sea turtles. Clearly, they can and should. And we have *not* decided that sovereign states should *not* act together bilaterally, plurilaterally or multilaterally, either within the WTO or in other international fora, to protect endangered species or to otherwise protect the environment. Clearly, they should and do. (Emphasis in the original)

Despite these reassuring words from the WTO, environmentalists and other members of the American and international public focused on the result of the case and what it seemed to mean. That is, an international tribunal had overturned a democratically enacted law for the protection of an endangered species. Like the tuna-dolphin case, therefore, the shrimp-turtle case galvanized opposition to globalization that appeared to be running roughshod over the environment for the benefit of free trade.

The Doha Mandate on the Environment

Aware of the public outcry over the shrimp-turtle case and growing opposition to free trade in many countries—indeed, the summit of trade officials in Seattle in 1999 failed to launch a new round of global trade negotiations—world governments recognized that they had to acknowledge the importance of the environment. When an agreement was reached among all WTO trade ministers to start a new round of global trade negotiations at a summit in Doha, Qatar in November 2001, therefore, it included a limited mandate to open negotiations on the relationship between trade and environment in the context of the GATT and the 20 multilateral environmental agreements (MEAs) governing environmental protection that have provisions affecting international trade. This was a significant step because it raised the level of concern for the environment from that of merely studies by the CTE to the level of the full negotiations among the members of the WTO, with the results to be included in the final, legally binding decision to come at the end of the Doha Round.

Nevertheless, the results remain to be seen, and skeptics as to the value of the negotiations exist on both sides. Developing world countries are concerned that the negotiations may be a means to discriminate against their goods. To try to forestall this problem, the CTE was also given a further mandate to study the impact of environmental protection measures on access to markets for products from the developing world. At the same time, environmentalists are concerned that the WTO will still be too focused on free trade. The WTO reaffirmed in the Doha Declaration that its competency is in trade and that the proper forum for solving environmental problems is through MEAs, not the GATT. Environmentalists hope, perhaps too optimistically, that the new round of negotiations will enable them to insert more concern for the environment in the international trading system, what has been called "greening the GATT." This is particularly important for the environmental movement since there is, as of yet, no international organization to coordinate global environmental policy.

The negotiating process will, at the least, open up these issues to wider and more public airing. All of the themes that have wended their way through the development of concerns in the international trade system will be vigorously debated—sovereignty over natural resources versus international control, the role of environmental concerns in trade treaties, and, most importantly, the balance between development and environmental protection.



International Environmental Problems and Efforts to Solve Them

The trade disputes described in the previous section of this Issue Brief dramatize the trade-offs inherent in thinking about the relationship between globalization and the environment. These trade-offs are also apparent in the larger context of international economic and political relations, as the environment has become a key area of international concern and has been addressed in many multilateral forums and treaties. Below, we examine six specific environmental issues—threats to wildlife, loss of biodiversity, ecosystem degradation, global warming, ozone depletion, and pollution—that display the same themes as those disputes, as well as others: international cooperation versus sovereign control, differing cultural evaluations of the need for environmental protection, the role of scientific evidence in policy-making, and, of course, environmental concerns versus economic development.

Wildlife

As exemplified in the tuna-dolphin and shrimp-turtle cases described above, the most visible—and sympathetic—victims of environmental problems caused by globalization are animals. Animals are faced with a host of threats from human economic activities, including the degradation of their ecosystems as a whole and the direct extinction of tens of thousands of species. In this section, we describe two threats related most closely to international trade, while the larger threats are covered in detail in following sections.

Trade in Wildlife

Trade in animals is a large and lucrative industry worldwide. According to **TRAFFIC**, an international monitor of wildlife trade created by the WWF and World Conservation Union in 1976, the legitimate wildlife industry has annual sales of many billions of dollars and involves hundreds of millions of individual animal specimens. At the same time, a significant portion of trade in wildlife is illegal. Rare and endangered animals and plants are often transferred from wild habitats in poor countries to buyers in rich countries by well organized smuggling rings for use as medicines, furs, food, pets, ornaments, and collector's items. Worldwide, animal trafficking is the world's third largest cross-border criminal activity, annually yielding \$10-20 billion in global sales. A report by Brazil's National Network Against the Trafficking of Wild Animals (RENCTAS) found that 38 million animals are stolen from Brazilian forests every year, generating revenues of \$1 billion. In the United States, for example, animal traders can fetch \$20,000 for a Brazilian jaguar skin and \$60,000 for a rare Lear's Macaw parrot.

The international community has responded to the need to regulate trade in wildlife by establishing the **Convention on International Trade in Endangered Species (CITES)** in 1973. This Convention accords protection to a regularly updated list of over 30,000 species so that international trade in wildlife does not imperil their survival. More than 150 countries are now parties to CITES. Species covered by CITES are safeguarded under an international system of trade controls based on their placement in one of two protected categories. Appendix I of the Convention contains a list of the world's most endangered species—apes, leopards, tigers, sea turtles, and others—which are near extinction and are not likely to survive if used in trade. For this Appendix I group, no trade permits are issued by CITES countries, barring exceptional circumstances. Appendix II lists species at serious risk of becoming endangered if involved in international trade. This group includes dolphins, crocodiles, otters, orchids, and many others. International trade of an Appendix II species requires a permit issued by the government of the exporting country. In addition, countries are allowed to exceed the levels of protection required by CITES, to the point of banning wildlife trade completely for Appendix II species.



CITES and TRAFFIC encompass only international trade in wildlife, however. Domestic trade must be regulated at the national level. In the United States, such regulation takes the form of the robust **Endangered Species Act**, but other countries such as Thailand, Indonesia, and India are faulted by environmental groups for weak internal regulation. For instance, according to the **International Primate Protection League**, in Indonesia, the law states that trade or possession of endangered species is punishable by up to 5 years in prison or a \$10,000 fine, yet many government officials, military leaders, and celebrities own endangered animals as pets. Some environmentalists advocate going further than CITES, therefore, and establishing international controls for protection of animals within countries. Nations have resisted such an idea, however, because of the perceived invasion of their sovereignty such controls would represent.

Trade in wildlife has caused a counter-reaction by animal rights groups that itself displays some interesting features of environmental consciousness in a globalized international society. Environmental activists have mounted prominent public efforts to protect various species from commercial exploitation, such as the "fur is murder," "save the dolphins," and "save the whales" campaigns in order to change demand for goods derived from wildlife. The "fur is murder" movement incites public outrage against the killing of animals for their skins by boycotting department stores and luxury goods retailers that sell fur. Activists spray-paint fur products, place stickers on car bumpers and stop signs, stage public rallies, and promote alternative clothing fashions. The **"save the dolphins" campaign** urges consumers to purchase only tuna cans that are labeled as "dolphin-safe," because some methods of tuna fishing have the side effect of killing dolphins (discussed in more detail below). Greenpeace has led the **"save the whales" campaign** since 1975, raising public awareness about threats to whales, pushing for international whaling restrictions, and actively obstructing whaling ships.

These campaigns are perhaps most notable not because they are effective responses to a major problem, but because of their statements about political pressures and attitudes in a globalized society. The ability of environmentalists to organize activists across the world-particularly using the Internet to spread their message-and to influence policy on a national and international level is, in itself, a feature of globalization. This ability has affected policy in important ways, with, for example, protection of dolphins leading to "dolphin friendly" labeling of cans of processed tuna in the United States and national environmental protection laws that ran afoul of international trade rules. As noted in the introduction, the protection of sea turtles mobilized thousands of protesters at the WTO negotiations in Seattle in 1999. The "save the whales" movement drew widespread international support and helped lead to a ban on commercial whaling. Because such campaigns address sensitive lifestyle issues, however, they have run into opposition. For instance, as described in the "Wildlife Protection and Cultural Right" section in our **Issue Brief on Culture**, whaling is a tradition in places such as Japan and Norway and among some Eskimos tribes in the United States, leading to struggles against restrictions on it.

Spread of Invasive Species

Invasive species (also referred to as exotic, alien, or non-native species) are defined by the **U.S. Fish & Wildlife Service** as "infiltrators that invade ecosystems beyond their historic range." When introduced to a new habitat where they happen to be particularly fit for survival, invasive species quickly dominate the naturally occurring wildlife and throw the ecosystem out of balance. For instance, **zebra mussels** have invaded waterways around the United States and clogged up pipes that deliver water to municipalities, farms, and factories, costing billions of dollars in economic disruption. Trout populations in the Great Lakes have declined precipitously after sea lamprey arrived and began feeding heavily on them. Since its discovery in a Washington, D.C. pond in 1942, an aquatic plant called Eurasian water milfoil has spread all over the country and pushed out native vegetation, thus impeding water flow and denying many waterfowl of a proper



diet. Most recently, the July 2002 discovery in Maryland of snakefish, a voracious family of fish species that can survive out of water for three days, reproduce quickly, and eat nearly any small animal they come across, has sparked great environmental concern and an effort to eradicate snakefish. *New Scientist* magazine reports that in the United States invasive plant species already cover 99 million acres and are moving into nearly 3 million more every year. Of the 1200 domestic plant species recognized as weeds by the Weed Science Society of America, 65% are non-native to the United States. The U.S. Department of Agriculture (USDA) says that invasive plants force farmers to spend billions on pesticides and cause an annual \$7.4 billion loss in American agricultural productivity. According to UNEP, the total annual cost of invasive species to the U.S. economy is an estimated \$123 billion.

The spread of invasive species has occurred for hundreds of years as a consequence of human activity, both intentional and unintentional. As noted above, however, this spread is emerging as a pressing problem now because in a globalized world where more people and goods travel all over the planet, it is common for wildlife species to be transported with them. For instance, corn rootworm, the major pest to corn in the United States, was accidentally introduced to the Balkans through American military transport during the Bosnia conflict. Likewise, insects, rodents, and fish get trapped in cargo containers and are carried to new ecosystems. Sometimes, owners of aquariums dump non-native fish in a local pond or owners of exotic pets release them into the wild.

A program does not yet exist to combat the invasive species problem, but the World Conservation Union and parties to the **Convention on Biological Diversity** have recently begun working on a global initiative for that purpose. To date, the invasive species phenomenon has been addressed most attentively at the national level. In the United States, the **Lacey Act** restricts the importation, acquisition, transportation, and possession of wildlife deemed injurious to human activity and wildlife resources. The **National Invasive Species Act (NISA)**, passed in 1996, established a comprehensive framework to research, regulate, and combat the spread of aquatic nuisance species (ANS), in particular the zebra mussel. In 1999, President Clinton signed an executive order creating the **Invasive Species Council** to oversee all efforts nationally. Invasive species are likely to be a persistent and escalating problem in the future all over the world, with UNEP describing this issue as the second-most important threat facing wildlife, after loss of habitats.

The problems faced by animals in a globalized economy exemplify themes that arise repeatedly throughout this Issue Brief. In the case of international trade in animals, governments have agreed on an international treaty to cover legal trade in animals, but the illegal trade remains lucrative, and domestic protection of animals within countries' borders has so far escaped international concern. Meanwhile, international non-governmental organizations have rallied private citizens to oppose trade in wildlife. In the case of invasive species, governmental efforts to protect animals have so far proceeded only domestically, with, for example, U.S. laws to prevent their spread, but have not yet produced any international strategy. As with other environmental problems, the balance between international concern and domestic sovereignty, coordinated government action versus inter-government disputes, environmental concern and economic interest on the one hand and cultural values on the other, has yet to be clearly drawn.

Loss of Biodiversity

The concept of "biodiversity" is the "big picture" view of the flora and fauna of the Earth. Biodiversity is defined by **UNEP** as "the variability among living organisms for all sources, including terrestrial, marine, and other aquatic ecosystems, and the ecological complexes of which they are part." In other words, biodiversity covers plants and animals themselves, the way they interact with each other, and the way they interact with the natural environment in which they live.



Biodiversity loss is occurring on two levels. First, plant and animal species are becoming extinct at an unprecedented rate that far exceeds the natural historical rate (although there is some uncertainty because only 1.75 million out of an estimated 14 million species have been scientifically described). Second, entire ecosystems in coastal and marine areas, inland watersheds, forests, and dry lands (i.e. deserts, grasslands, and savannahs) are being destroyed by pollution, land conversion, and climate change. In total, the **Living Planet Index (LPI)**, developed by the **World Wildlife Fund** based on population trends for hundreds of species, has found that biodiversity declined by about 35 percent from 1970-2000. (Ecosystem loss is described in more detail in the following section of this Issue Brief.)

This loss is important for numerous reasons. First, living organisms provide irreplaceable environmental services upon which humanity is critically dependent, such as keeping soil fertile, absorbing pollution, breaking down waste, and pollinating crops. One study estimates that the value of 17 such natural services is between \$16 and 54 trillion per year. Comparatively, world GDP in 2000 was \$31.5 trillion. Second, biodiversity supports human health through facilitating the development of medicines. According to UNEP, 10 of the world's 25 top-selling drugs in 1997 had natural origins, and such nature-based pharmaceuticals are estimated to have a global market value between \$75 and 150 billion annually. The **World Health Organization (WHO)** estimates that plants provide the primary healthcare for over 60 percent of the world's population. Third, biodiversity offers genetic resources for food and agriculture. The unique and lucrative human ability to domesticate and breed more productive animals and crops-for instance, hens that lay more eggs and corn that resists drought - depends upon the genetic diversity within these species. UNEP's **Global Biodiversity Outlook (2001)** states, "Biological diversity provides the goods and services that make life on earth possible and satisfy the needs of human societies."

Furthermore, many people support biodiversity for ethical and spiritual reasons. John Muir, founder of the Sierra Club, wrote in 1912, "Everybody needs beauty as well as bread, places to play in and pray in, where nature may heal and give strength to body and soul alike." The WWF, argues that it works to protect endangered animals and plants in part simply because they are "beautiful and rare" and that this mission is performed both "for people and for nature." Thus, for many people, preservation of nature is a worthy end in and of itself.

The primary international instrument to protect biodiversity is the **Convention on Biodiversity (CBD)**, one of many that developed out of the heightened environmental consciousness that led up to the **Rio Earth Summit** in June 1992. Signed in Rio and now boasting 182 parties, the CBD has three objectives: "the conservation of biological diversity, the sustainable use of its components, and fair and equitable sharing of the benefits arising out of the utilization of genetic resources." The CBD has three mechanisms for promoting biodiversity: an information clearing-house for technical and scientific cooperation, a process of national reporting on measures taken for biodiversity, and a financial provision that offers assistance to developing countries in this effort.

Nevertheless, the CBD is not an action plan but rather a commitment device; indeed, it lays out little in the way of specific procedures. "The Convention does not set any concrete targets, there are no lists, no annexes relating to sites or protected species, thus the responsibility of determining how most of its provisions are to be implemented at the national level falls to the individual Parties themselves," says the Global Biodiversity Outlook. Instead, the CBD advocates several guiding principles for countries to consider: the use of a holistic, multi-sectoral approach that involves cooperation among government, civil society, and business; the recognition of the value of local knowledge in promoting sustainable use of biological diversity; and an understanding that economic and institutional factors often underlie the loss of biodiversity.



The Secretariat of the CBD reports in the Global Biodiversity Outlook that despite being parties to the Convention, too many countries lag behind in creating, implementing, and managing their own coordinated national action plans so that real change happens. According to the Secretariat, many countries have failed to fully develop national biodiversity strategies or even to submit the national reports required under the CBD rules. In fact, the Secretariat itself admits that the CBD has failed in "conveying the message of the economic importance of biodiversity" and "engaging the private sector at the national and global levels." Finally, a global effort is complicated by the lack of any rigorous scientific standard for benchmarking biodiversity. Without such an indicator, it is too conceptually vague to assess the status of biodiversity and measure progress in supporting it. UNEP reports, "Overall, it appears that the drivers of biodiversity loss are so pervasive that conservation efforts have at best only slowed the rate of change at the global level."

The need to protect biodiversity is a political question as well as an economic one, because assessment of the benefits of protection depends heavily on the intrinsic and indefinable value one places on nature.

The United States, for example, has not become a party to the CBD. When the treaty was presented at the Rio Earth Summit in 1992, the elder President George H.W. Bush refused to sign it, citing concerns over protection of intellectual property rights, such as the right to patent certain plant and animal life, and terms of financial assistance to developing countries. The Clinton administration signed the treaty in 1993, but the Senate never ratified it because of protests **from the property rights, farm, and timber lobbies**. They objected to the idea that their economic interests, dependent on control over land, should be subjected to interference from outside the U.S. political system in which environmental concerns might override American determinations of economic development needs.

Loss of biodiversity, then, is an international problem that is being combated through international cooperation. But, there are disagreements among nations about how best to deal with the problem. Citizens of different countries have different philosophical beliefs about how much to value the environment versus economic development and personal freedom, and such differences must be respected for a cooperative response to work. Potential solutions must take into account the sovereignty and input of local people to gain political support. International agreements, like the CBD, are ineffective unless they create the necessary real-world political and economic incentives for people, organizations, and governments to take appropriate action.

Ecosystems

Ecosystems are the whole web of relationships among a particular environmental habitat and the plants, animals, and human beings who depend on it. Some of these ecosystems, such as the oceans, are not under the control of any one or number of nations, however. Who, then, should be responsible for protecting those areas? At the same time, some ecosystems are under the control of one nation, but that one nation may have neither the resources nor the inclination to protect them. Should other countries care about environmental damage in another country that has no clear cross-border affects? If so, how can those other nations reverse that damage without impinging on the first country's sovereignty?

Oceans

The oceans are a prime example of these problems. They are used for economic activity, recreation, and sustenance by people in many nations of the world. At the same time, they are also damaged by people in those nations. Belonging to no one nation, however, oceans can be considered the "common heritage of mankind." Yet, if no one nation owns them and is responsible for taking care of the oceans as a coherent ecosystem, how can they be protected? This is referred to as the "tragedy of the commons," that is, a resource that is owned by no one



but used by everyone will eventually become hopelessly damaged because no one will take responsibility for protecting it. Each user will assume that someone else will be responsible, and, thus, no one becomes responsible.

This is a tragedy, too, because of the reliance of all human beings on the oceans. Covering about 70% of the earth's surface, oceans play a vital role in the environment and economic activity throughout the world. According to the United Nations Atlas of the Oceans, "Oceans are a highly productive system which continuously recycles chemicals, nutrients and water through the 'hydrological cycle', which powers climate and weather, and which regulates global temperature by acting as a giant heat reservoir from the sun." Additionally, oceans are the basis for a wide variety of industrial, commercial, and recreational activities, such as fisheries, shipping, and sailing. Finally, livable coastal marine areas are important-as of 1994, 37% of the world's population resides within 37 miles (60km) of an ocean coast.

Various kinds of pollution make their way into oceans from many sources, including sewage, agricultural runoff, oil spills, chemical emissions, and non-biodegradable litter (that is, litter that will not degrade naturally). Unsustainable consumption of living marine resources (fishing) is another pressing problem. UNEP reports "an almost inexorable global trend towards increasingly intense exploitation and depletion of fisheries stocks, three-quarters of which are maximally exploited..." Also, through dredging to create ports, waste dumps, construction, and recreation, coastal areas have been significantly disturbed and reshaped for human purposes. Fully 58% of the world's coral reefs are threatened, with damage often attributable simply to direct physical destruction.

The tragedy of the commons has led to oceans being protected only through a hodgepodge of treaties, primarily the UN Convention on the Law of the Sea and fisheries agreements, including the UN Fish Stocks Agreement and Code of Conduct for Responsible Fisheries, as well as some anti-pollution measures such as the London Dumping Convention, Basel Convention, and the Global Programme of Action, that have provision on maritime issues. In 1999, however, the international community undertook a four-year fact-finding mission called the Global International Waters Assessment (GIWA). The goal of this initiative is to comprehensively clarify the environmental state of oceans, the sources of damage to oceans, and possible future scenarios for their protection.

Desertification

A slightly different problem occurs with land ecosystems. These tend to be within one country, but the international community is still concerned with trying to protect them, particularly because some of the world's poorest people live in areas threatened by rapid loss of productive capability through desertification, that is, the transformation of land areas into essentially uninhabitable deserts that cannot support human populations. This raises its own problems regarding a coordinated international strategy.

Dry land ecosystems such as grasslands and savannahs cover over one-third of the world's land area and are home to many of the world's poorest people, whose livelihoods depend critically on the land. Yet precisely because these ecosystems are not naturally lush, dry land areas are fragile and highly vulnerable to land degradation. Desertification is caused by a combination of climactic variations and human activities. Untouched dry lands suffer during periods of drought, but are generally able to recover on their own. However, when these areas are simultaneously exploited for human economic gain, the combined stress on the ecosystem can be too much. Thus, over-cultivation, over-grazing, deforestation, and poor irrigation by humans play a large role in the desertification problem.



The results of desertification can be disastrous. The key effect is the loss of the primary resources-fertile topsoil, vegetation, and crops-that sustain economic activity. In impoverished regions, such as sub-Saharan Africa, the ramifications are serious. If desertification progresses enough, the already marginalized people who depend on this land will find that the land can no longer provide enough food and water for survival. The result is famine that starves many people and animals, forces large displacements of populations, and entails massive economic disruption. Though the effects of desertification are most alarming in poor regions, resultant loss of productivity is damaging for developed areas as well. Indeed, Kofi Annan, Secretary General of the United Nations, warned that, "Drought and desertification threaten the livelihood of over 1 billion people in more than 110 countries around the world." UNEP estimates that \$42 billion in global income is lost annually directly because of desertification.

Recognizing the potentially catastrophic consequences of desertification, the international community created the United Nations Convention to Combat Desertification (UNCCD). Agreed upon in 1994, the Convention went into force in 1996 and 181 countries had joined it as of July 2002. Though the UNCCD addresses desertification in all parts of the world, the primary focus is on Africa, where it is a particularly pernicious problem.

Despite the Convention, desertification has not abated and may even be intensifying. The UNCCD seeks to prevent degradation through a combination of national action programs and participation of local communities in decision-making. However, the convention relies on individual countries to raise funds and form partnerships with other countries as necessary and as possible in order to provide the means to carry out its stated goal. Since, however, the problems caused by desertification are confined to individual countries, mainly poor ones to begin with, there has been no internationally coordinated effort to provide concrete financial help. Individual nations are affected within their own borders, making the problem seem to be the responsibility of each nation itself, rather than the international community as a whole. Even with the UNCCD, therefore, the nature of the problem has prevented the richer countries from committing to help the poorer countries with financial aid. By contrast, in the case of oceans, the impediment to collective international action is the fact that no one nation feels responsible for a problem that affects many nations. In the case of desertification, many nations do not feel responsible for a problem that affects only one or several other countries within their own borders.

Global Warming

Global warming-also called climate change-refers to the worldwide rise in temperatures that has been blamed for severe weather in many parts of the world. According to the **Intergovernmental Panel on Climate Change (IPCC)** a worldwide consortium of scientists set up in 1988 by the **United Nations Environment Program (UNEP)** and the **World Meteorological Organization (WMO)**, the world's average temperature has risen by 1.1° F (0.6° C) over the past century. The IPCC also predicts an increase in average temperature between 2.5° F (1.4° C) and 10.4° F (5.8° C) over the next century, a rate of warming unprecedented in the last 10,000 years.

This rise in temperature is blamed for a number of environmental problems, such as an increase in the worldwide sea level by 4 to 8 inches (10 to 20 centimeters) caused by melting ice glaciers that threatens to swamp coastal land areas and islands. Global warming may also cause higher precipitation levels and more frequent severe weather, such as **El Niño**.

The cause of global warming is human activity, including fossil fuel combustion associated with industrial development, the burning of forests by farmers in the developing world, and even biomass combustion-the burning of wood, coal, and dung for cooking and heat-by the poor. These activities have produced emissions of gases, such as carbon dioxide, methane, nitrous oxide, and chlorine, fluorine, and bromide (together called halogens), that are often described as



"greenhouse gases" because they warm the atmosphere by trapping heat from the sun and cause the **"greenhouse effect."**

To combat these problems, in 1992 the **UN Framework Convention on Climate Change (UNFCCC)** established a loose commitment "to achieve...stabilization of atmospheric concentrations of greenhouse gases at levels that would prevent dangerous anthropogenic (human-induced) interference with the climate system." Since then, 186 countries have joined the UNFCCC, and in 1997, 84 countries agreed on the **Kyoto Protocol**,* a more stringent and detailed procedure for execution of the UNFCCC goals. Under the Protocol, signatory nations are supposed to achieve a 5-7% reduction from 1990 levels in CO2 emissions by 2008-2012.

The Kyoto Protocol has yet to come into force, however, because not enough governments have formally ratified the agreement. At least 55 countries that account for a total of 55% or more of greenhouse gas emissions (at 1990 levels) must ratify the Protocol for it to take effect. Most importantly, despite being one of the 84 drafters of the Protocol in 1997, the United States has been an outspoken critic of the agreement since then, and as the producer of about 36% of greenhouse gases (at 1990 levels) U.S. refusal to ratify has almost single-handedly thwarted the effectiveness of the Protocol.

The United States and other countries, such as Australia, have voiced several concerns about the Protocol, focusing on its scientific basis, economic cost, feasibility and fairness.

First, critics of the Protocol question how serious global warming is. For example, the IPCC has never offered a specific figure for an acceptable concentration of greenhouse gases, and Thomas C. Schelling, a professor at the University of Maryland, estimated in the May/June 2002 issue of Foreign Affairs that an acceptable concentration ranges widely between 600 and 1200 parts per million. With this kind of uncertainty, say the Protocol's critics, the benefits of reducing emissions cannot be adequately compared to its disadvantages. Supporters of the Protocol, on the other hand, say that the prospect of better scientific knowledge in the future should not prevent action in the present.

Second, there will undoubtedly be an economic cost to reducing greenhouse emissions. For example, closing down cheap coal-fired electricity plants and replacing them with cleaner but more expensive natural-gas burning plants would increase energy prices. Likewise, forcing automobile manufacturers to produce more energy-efficient cars would be expensive. As a result, the economy as a whole would face slower growth and lost jobs, although the exact amount of such a reduction is subject to debate. Furthermore, there is a cultural divide over how concerned we should be about environmental risk versus economic development. For instance, Europeans are generally more willing than Americans to pay high fuel taxes and drive small cars in order to protect the environment.

Third, critics say that the prescribed timeframe for emissions cuts is unreasonable and unrealistic. For example, carbon dioxide emissions in the United States increased by 13% in the 1990s, so that meeting the Kyoto targets for reduction from 1990 levels would require the United States to cut emissions by about 30% from the levels they would otherwise be projected to reach by 2010. Instead, the United States wants reduction efforts to focus on "greenhouse gas intensity"-emissions per unit of Gross Domestic Product (GDP) -arguing that this measure considers emissions reductions within the context of economic growth. For example, according to the **U.S. Environmental Protection Agency (EPA)**, while absolute levels of U.S. greenhouse gas emissions grew 12% in the 1990s, greenhouse gas intensity actually declined 17%. Thus, economic growth produced extra pollution, but the economy as a whole was in fact becoming cleaner and more efficient.



Fourth, critics decry the Protocol's weaker restrictions on developing countries-particularly India and China-than on developed countries. While the UNFCCC provides a general mandate for all countries to reduce greenhouse gas emissions, the specific commitments entailed in the Kyoto Protocol apply only to a group of rich countries on the basis that rich countries are best economically positioned to adopt environmental protection measures. On the other hand, it is relatively easier for poor nations to upgrade outdated, dirty industrial processes by applying modern technology already available in wealthy countries. In fact, the Kyoto Protocol calls for rich countries to provide technological and capacity-building assistance to poor countries so that these "easy" emissions reductions can be made, with the simultaneous benefit of a badly needed boost to economic efficiency. Developing nations, however, argue that it is unfair to burden their current economic development with environmental regulations while the richer countries enjoyed unfettered development in decades past without environmental restrictions.

These differences between the United States and many other countries have delayed implementation of the Kyoto Protocol, but most of the international community seems determined to press ahead. Since 2002, the European Union, Japan, and Russia have ratified the Protocol, meeting the 55% threshold of global emissions and put the Protocol into effect. As of 15 April 2004, 84 Parties have signed and 122 Parties have ratified or acceded to the Kyoto Protocol. Nevertheless, the disputes over the balance between economic development and environmental protection and between the responsibilities of rich and poor countries will have to be settled before an internationally coordinated strategy on reducing greenhouses gases can gain the participation of the United States.

* A protocol is an addition to an agreement, often at a later date, expanding the scope of the initial agreement

Ozone Depletion

Like global warming, depletion of the ozone layer raises complex problems of cause and effect that have led to international disagreements over coordinated efforts to reverse the problem. Unlike global warming, however, ozone depletion has actually been successfully controlled by international cooperation, perhaps providing a model for other efforts at global environmental protection.

Ozone is an invisible, poisonous gas molecule (O₃) that exists in trace (minimal) amounts in the stratosphere (6-30 miles above the earth). It makes life on earth possible by shielding the planet from 95-99% of the sun's harmful ultra-violet (UV) rays, which can cause skin cancer, degenerative eye damage, and suppressed immune response. Rodents subjected to UV irradiation are more likely to die from viruses such as malaria, influenza, and herpes. In addition, increased UV radiation upsets the balance of ecosystems and disrupts many chemical and physical processes that occur in nature's cycle. For example, elevated UV levels have been shown to compromise the aquatic food chain, alter plant-insect interactions, change the growth patterns of fungi, and slightly reduce the productivity of agricultural plants. Basic natural cycles involving nitrogen, sulfur, carbon dioxide, and decomposition of biological matter are also affected. Also, increased UV radiation in the lower atmosphere, or troposphere, help cause photochemical smog. Finally, solar rays augment and interact with the global warming trend.

According to the **U.S. National Aeronautics & Space Administration (NASA)**, from 1978-1991 there was a net decrease in global ozone of 3% per decade, and "every 1% decrease in the earth's ozone shield is projected to increase the amount of UV light exposure to the lower atmosphere by 2%." **UNEP has reported** that since measurements started in the early 1980s, the ozone layer over Antarctica-the world's most vulnerable region because of the extreme cold and presence of polar stratospheric clouds-has steadily eroded. This resulted in "ozone holes" over land. The ozone hole in the South Pole grew to about 5 billion acres in the early 1990s and,



at times, increased to 7 billion acres. In 2001, the ozone layer had thinned up to 30% at the North Pole and 5-30% in Europe and other high latitudes.

The main cause of ozone depletion is emissions from man-made sources of halocarbons, most notably chlorofluorocarbons (CFCs). Discovered in the early twentieth century, these "wonder gases" were renowned for their industrial properties and used in a wide range of applications, including refrigerators, air conditioners, aerosol spray cans, solvents, foams, and fire extinguishers. The downside of these gases is that they linger in the atmosphere-50, 65, 100, or as long as 1700 years-and thus cause long-lasting environmental damage. The chlorine in CFC interacts chemically with ozone and breaks it up into constituent molecules of oxygen, reducing the capability of the ozone layer to block UV rays.

The international response to the ozone threat has been perhaps the most successful of all global environmental efforts. In 1985, The **Convention for the Protection of the Ozone Layer** (known as the Vienna Convention) committed countries to take "appropriate measures...to protect human health and the environment against adverse effects resulting or likely to result from human activities which modify or are likely to modify the Ozone Layer." At that point, scientific understanding of ozone depletion was still limited, so specific measures were not put in place, but countries were willing to recognize the problem and agree in principle to combat it.

As scientists developed precise knowledge of how ozone depletion occurs and started finding definitive proof of an ozone hole, the parties to the Vienna Convention were more inclined to take specific action and thus negotiated the **Montreal Protocol on Substances that Deplete the Ozone Layer**. Completed in 1987 and with 183 parties as of June 2002, the Montreal Protocol established tough guidelines for reducing usage of ozone-depleting substances while allowing leeway for the economic growth of developing countries and changes based on scientific advances. Under an amendment process, the Montreal Protocol can be updated to reflect better understanding of the ozone problem without having to re-negotiate the whole agreement, so that the agreement is flexible yet steadfast. This process has resulted in four subsequent Amendments: in **London** (1990), **Copenhagen** (1992), **Montreal** (1997), and **Beijing** (1999).

Like the effort to stop global warming, the drive to end ozone depletion was based on the principle that rich countries could better afford to implement environmental protection than poor countries. The Montreal Protocol therefore established separate phase-out schedules for the two groups, granting developing countries a grace period. Now, of the 96 ozone-depleting chemicals controlled by the protocol, developed countries have already phased out use of most of them and are far along in eliminating the rest. Developing countries are still in the primary process of phasing out CFCs and other gases called Halons, but are expected to make substantial progress on these and other substances in the next decade.

Klaus Topfer, Executive Director of UNEP, insists that continued leadership by the rich countries will be needed to eliminate ozone depletion permanently. Developed country parties to the Montreal Protocol are currently mulling a proposal to spend roughly \$600 million from 2003-2005 to help developing countries such as India, China, and Brazil cut back on their production and consumption of ozone-depleting substances. Since 1990, \$1.3 billion of technical assistance has gone to 134 developing countries, with resulting reductions of 52,570 tons in production and 161,610 tons in consumption. Topfer has commented that, "To maintain this momentum, the donor countries must continue supporting developing countries in their transition to ozone-friendly technologies... [T]he partnership between developed and developing countries must remain strong and effective." A decision on the 2003-05 round of funding, which would be followed by a further replenishment for 2006-2008, is due in November 2002.



So far, the Montreal Protocol has yielded impressive results. Between 1986 and 1999, annual worldwide consumption of CFCs declined from 1.1 million tons to 150,000 tons. UNEP projects that if not for the Montreal Protocol, by the year 2050 ozone depletion would have risen 50-70%, roughly 10 times worse than current levels. Instead, the ozone layer is expected to reach a low point in the next few years and gradually recover to its normal state by 2050.

This success in turning back ozone depletion may provide a model for other efforts to combat global environmental problems. The Vienna Convention and Montreal Protocol succeeded because rich countries first took the lead and made the effort credible, and only then asked less developed countries to follow suit. Also, governments were able to work with industry to develop alternative technologies and chemicals to replace CFCs and other ozone-depleting chemicals. Finally, countries embraced a "precautionary principle" of acting to protect the environment despite a lack of conclusive scientific evidence, and then tightened and modified their policies as further scientific research warranted. As we have seen with global warming, however, and will see with other environmental problems, consensus on finding solutions to environmental problems is not easy to find. The split between rich and poor nations and between economic development and environmental protection often cannot be bridged. Similarly, some nations are more supportive of the precautionary principle than others.

Pollution

The balance between economic development and environmental damage is also evident in the problem of pollution and waste products. Increased economic activities-especially in industrial countries-yield pollution from trash and litter, sewage, oil spills, gas and chemical emissions, and nuclear radiation. The Organization for Economic Cooperation and Development (OECD), representing the world's 30 richest countries, estimates that from 1980-1995 there was a 25% increase per person in waste each year, from 904 lbs. to 1146 lbs, among its member-countries. OECD says that, "a near doubling of OECD-wide municipal waste generation is conceivable within the next 20 years." Overall, total waste generation in OECD countries exceeded 4 billion tons in the mid-1990s. The United Nations Commission on Sustainable Development, meanwhile, predicts that by 2025 global waste generation may increase five-fold. Within developing countries, the UN commission expects that waste will double within the next ten years.

International trade made this problem particularly acute in the 1980s. "Toxic traders" in environmentally stricter industrialized countries were avoiding the increasingly high cost of disposing of hazardous waste domestically by shipping the waste to developing countries and Eastern Europe. To combat what many people perceived to be a contemptible and unfair arrangement, the Basel Convention on the Transboundary Movement of Hazardous Wastes was drafted in 1989. The Convention has three main objectives: 1) to reduce the generation of hazardous wastes, 2) to dispose of hazardous wastes close to their place of production, and 3) to reduce the movement of hazardous waste. International shipments of hazardous waste require approval of the governments to which the waste will be imported or across which it will transit. Export to certain countries is banned altogether. The Convention requires annual reporting by each party, offers legal and technical advice, and promotes financial assistance to developing countries. The Basel Convention came into force in 1992 and has 151 parties as of June 2002.

Similarly, the Stockholm Convention on Persistent Organic Pollutants (POPs), adopted in May 2001, places strict controls on production, trade, and disposal of 12 of the most dangerous POPs because these toxic substances-mainly industrial chemical by-products and pesticides-are highly injurious, spread easily, and become more concentrated-and thus more dangerous-as they move from organism to organism up the food chain. Most of the POPs regulated by the Convention have already been banned in industrialized countries under domestic law, so the primary purpose of the treaty is to provide financial and technical assistance to developing countries. Recognizing the value of international cooperation, President Bush in May 2002 advised the U.S. Senate to



ratify the convention, saying, "POPs chemicals, even when released abroad, can harm human health and environment in the United States." As of June 2002, however, only 11 nations have ratified the convention, and it needs 50 parties to enter into force.

Why were pollution problems dealt with more easily than global warming or biodiversity loss? Three factors account for the success of international anti-pollution measures. First, many of the scientific doubts that exist over global warming and biodiversity did not exist for pollution. Those whose economic interests might be harmed by tighter pollution regulations could not successfully argue that the science was too uncertain to be worth imposing restrictions on the use of pollution-causing chemical. Second, in a related development and as noted above regarding POPS, many of the most dangerous chemicals had already been banned through domestic regulations before international efforts. This made coordinating international strategy easier. Third, technology was developed to avoid use of hazardous chemicals, so that adapting to pollution regulations became relatively cost-efficient.

The availability of technology to control pollution holds two potentially contradictory lessons for the debate about global warming. On the one hand, supporters of strict controls on the causes of global warming can point to the development of such technology to show that corporations can adapt to be productive and environmentally friendly. On the other hand, opponents of strict controls can point to technological adaptation to show that whatever the environmental problems, the free market economy can develop fixes without being forced to do so by government regulation. The relative balance between the push by government for environmental protection versus an advanced economy's adaptation to environmental protection out of private concern poses a difficult issue for policy-makers.

Conclusion

This Issue Brief has described the effect of globalization on the environment both as a result of the increasing integration of the world's economies through international trade and in the context of multilateral, international efforts to combat the most pressing global environmental problems. As we have discussed, countries disagree over the nature and scope of the threats the environment faces and the way to deal with those threats, with scientific, cultural, and economic considerations all playing roles in these disagreements. The common themes running through these disagreements, though, are the trade-offs between economic development and environmental protection and between international cooperation and individual action.

Is Sustainable Development the Way Forward?

The movement for sustainable development is one way past these divisions that has become increasingly important both in international policy-making circles and on the ground. In 1987, the World Commission on Environment and Development (the Brundtland Commission) summarized many ideas that had been coalescing among environmentalists into the idea of sustainable development, which the Commission defined as "development that meets the needs of the present without compromising the ability of future generations to meet their own needs." This definition supported a comprehensive approach to development in all its aspects-social as well as economic-in ways that did not harm the environment or deplete natural resources so that they would still be available in the future.

The first major endorsement of sustainable development came at the 1992 Rio Conference mentioned earlier, which set forth the [Rio Declaration on the Environment and Development](#) and the [Agenda 21](#). The Declaration outlined the goals of sustainable development. It stated, "Human beings...are entitled to a healthy and productive life in harmony with nature," and that "environmental protection shall constitute an integral part of the development process and cannot be considered in isolation from it." States were enjoined to



"cooperate to eradicate poverty" and to "cooperate in a spirit of global partnership to conserve, protect and restore the health and integrity of the Earth's ecosystem." But the "differing responsibilities" of nations at differing levels of development was also emphasized, with rich nations supposed to provide scientific know-how, technology, and financial resources to poorer countries to help them develop and protect the environment. At the same time, the Declaration noted that states have "the sovereign right to exploit their own resources pursuant to their own environmental and developmental policies, and the responsibility to ensure that activities within their jurisdiction or control do not cause damage to the environment of other States or of areas beyond the limits of national jurisdiction." The Declaration thus tries to navigate a way through the tensions in the relationship between environmental protection and development, rich and poor nations, and international cooperation and national sovereignty.

Agenda 21 turned the Declarations principles into a comprehensive list of programs that the international community committed itself to implementing to achieve economic development and environmental protection in tandem and without conflict. Included in the agenda were items as diverse as ending poverty, promoting human health, fighting corruption, protecting the oceans, forests, and biological diversity, and creating environmentally friendly agricultural practices. All of these were to be accomplished in the framework of local, national, and international governmental and non-governmental initiatives that respected women's rights, workers rights, and the rights of indigenous peoples.

Following the summit, organizations were set up to help implement both the Declaration and Agenda 21, such as the **United Nations Commission on Sustainable Development and the U. S. President's Council on Sustainable Development**. More than 150 countries set up national councils to promote Agenda 21 and 1800 cities and towns drafted programs to implement Agenda 21 in their localities. Advocacy groups, such as Green peace and Oxfam, added sustainable development to their own agendas. Further support for sustainable development came in the WTO's 1994 Marrakesh Declaration and the 2001 Doha Declaration, which both affirmed the goal of liberalizing international trade within the context of sustainable development.

The idea of sustainable development has not, however, ended controversies over the relationship between economic growth and environmental protection. In fact, in many ways the **World Conference on Sustainable Development** in August 2002, intended to review progress since the Rio Summit, demonstrated the continuing divisions in the international community. For example, U.S. Secretary of State Colin Powell was booed and jeered by some in the audience at his speech to the summit, as he defended the record of the United States on both environmental development and environmental protection. Meanwhile, government leaders and citizen-protestors from many developing countries decried agricultural subsidies in developing countries, which, they said, prevent poor farmers from competing fairly on the international market. In the end, the summit was criticized both by those who had high hopes for its success, such as **Greenpeace**, and by those who had been **skeptical all along**, for not having achieved much. Although participants at the summit agreed on two key documents, a political declaration and an action plan, similar to the Rio documents, it remains to be seen whether the continuing disputes in the international community can be overcome to lead to real progress on eliminating poverty and simultaneously protecting the environment.

In the 30 years since the 1972 Stockholm Conference, then, dozens of international conferences, national laws, local initiatives, government programs and non-governmental campaigns have not resolved the fundamental tensions that underlie the relationship between globalization and the environment. Instead, all these efforts have challenged countries to manage those tensions in ways that are politically feasible within their domestic political context and their financial resources. The results of this process for the environment and for human development are still unfolding.