CHAPTER 20

Environmental issues

OWEN GREENE

- Introduction: international environmental issues-452
- Environmental issues on the international agenda: a historical outline-453
- Issues and challenges in international environmental politics -457
- The development and implementation of environmental regimes -462
- The Rio Conference and its outcomes -468
- Conclusion -475

READER'S GUIDE

Environmental issues emerged in the late twentieth century as a major focus of international concern and activity. Understanding the causes and impacts of global environmental change is an urgent task. So too is improving knowledge of how to develop effective responses. Approaches and concepts developed within International Relations can contribute substantially to such understanding. At the same time, international environmental issues pose important challenges for International Relations theory. This chapter introduces these issues, and discusses some key characteristics of the causes and risks of global environmental change and responses to it. It outlines the historical development of international environmental politics and agreements, and then examines issues and phases in the development of environmental regimes (particularly the ozone regime), and the Earth Summit agreements and their outcomes.

452

Introduction: international environmental issues

By the early twenty-first century, environmental issues had been high on the international agenda for a whole generation of political leaders, government officials, scientists, industrialists, and concerned citizens. Since the late 1960s, awareness of the risks and implications of a wide range of international environmental problems has increased greatly, and justifiably so.

Since that time, it has become clear that most of the world's seas and oceans are over-fished. Soil is being degraded and eroded on a large scale throughout the world. Natural habitats are being destroyed: for example the area of tropical rainforest has reduced by over 50 per cent since 1950, and the process continues largely unabated. As a result, tens of thousands of species of plants and animals are probably becoming extinct each year. The dumping of waste products into the sea, air, and land means that pollution problems are ubiquitous. Huge quantities of waste, including hazardous chemicals, heavy metals, and radioactive materials, have been dumped at sea, either directly or carried by rivers. Together with sewage and oil spills, these have profoundly damaged sea environments, with lakes and semi-enclosed seas proving particularly vulnerable. Billions of
people suffer daily air pollution. Acid rain, stratospheric ozone depletion, and climate change are major regional or global problems arising from atmospheric pollution.

Environmental problems are not new. Human societies have long had a major impact on their environment. Their tendency to exploit it as if it were an inexhaustible resource has repeatedly led to disaster, sometimes leading to the loss of entire human communities. Over much of human history, however, the environmental impacts of over-exploitation or pollution have typically been quite local. Communities could often escape the consequences of such activities by moving on to relatively unspoilt areas. Even if they could not, the local impoverishment did not necessarily affect the continued well-being of neighbouring societies. Widespread industrialization and rapid population growth changed this situation. Severe environmental damage and unsustainable exploitation occurred over whole regions of the world. By the late twentieth century, the impacts had become truly global.

This chapter examines the politics of global environmental issues. However, there are several senses in which the environment can be said to have become a global issue. First, some environmental problems are inherently global. CFCs (chlorofluoro-carbons) released into the atmosphere contribute to the global problem of stratospheric ozone depletion irrespective of where they are emitted, just as carbon dioxide emissions contribute to global climate change. The effects are global, and the problems can only be tackled through cooperation on a global scale.

Second, some problems relate to the exploitation of global commons: resources shared by all members of the international community, such as the oceans, deep-sea bed, atmosphere, and outer space. Many argue that the world's genetic resources are a global resource, which should be preserved in the common interest.

Third, many environmental problems are intrinsically transnational, in that by their nature they cross state boundaries, even if they are not entirely global. For example, emissions of sulphur dioxide by one state will be carried by winds and deposited as acid rain on downwind countries. Wastes dumped into an enclosed or semi-enclosed sea affect all littoral states. Such transnational or regional problems exist in many parts of the world, and pose similar technical and political challenges to those of truly global problems. Moreover, states or non-state actors from outside the region may contribute to the problems or to efforts to tackle them.

Fourth, and following on from this, many processes of over-exploitation or environmental degradation are relatively local or national in scale, and yet they are experienced in such a large number of localities around the world that they can be considered to be global problems. Examples include unsustainable agricultural practices, soil degradation and erosion, deforestation, river pollution, and the many environmental problems associated with urbanization and industrial practices.

Finally, the processes leading to over-exploitation and environmental degradation are intimately linked to broader political and socio-economic processes, which themselves are part of a global political economy. Thus it is widely recognized that the causes of most environmental problems
are closely related to the generation and distribution of wealth, knowledge, and power, and to patterns of energy consumption, industrialization, population growth, affluence, and poverty. In this respect, the processes of globalization and interdependence in the economic and other spheres of life, as discussed in Chapter 1, increasingly give all environmental issues a global dimension.

Thus, the phrase 'global environmental issues' encompasses a wide range of types of problems and issues, posing different challenges to those who wish to develop effective responses. Although they share some common characteristics, each issue is specific and needs to be analysed in its own right.

Key points

- International environmental issues emerged as a major focus for international politics and concern in the last three decades of the twentieth century.
- Although environmental problems are not new in themselves, industrialization and rapid population growth have greatly increased the scale and intensity of the over-exploitation of natural resources and environmental degradation, generating a wide range of urgent international and global problems.
- Environmental issues have become international and global in several senses. Many environmental problems are intrinsically transnational or global, or relate to global commons. Other local or national problems are experienced widely across the Earth.
- Finally, the processes generating most environmental problems are closely related to broader political or socio-economic processes, which are themselves part of an increasingly global system.
- Global environmental issues exist in many different forms, and though they share some common characteristics, each needs specific examination in its own right.

Environmental issues on the international agenda: a historical outline

The early years

Environmental issues first emerged as a focus for international politics in the nineteenth century in the context of international agreements to manage resources. For example, the River Commissions for the Rhine and the Danube, which are now deeply involved with environmental policy, began life as arrangements to facilitate economic use of the rivers as waterways. The International Maritime Organization (IMO) was formed in 1948, more or less as a 'shipowners' club' to facilitate international shipping and navigation and promote safety. But in 1954 the IMO was given responsibility for implementing a landmark treaty on marine pollution: the Convention for the Prevention of Pollution of the Sea by Oil.

The first international treaty on flora, signed in Berne in 1889, was primarily concerned with preventing the spread of a disease (Phylloxera) which threatened to destroy European vineyards. This was followed by a series of global and regional agreements on flora in the 1920s and 1950s,
which were all similarly concerned with maintaining healthy stocks of cultivated plants or preventing disease. Likewise, the first agreement on fauna was the 1902 Convention for the Protection of Birds useful to Agriculture. In 1911 the USA, Canada, and Russia agreed a Convention for the Protection of Fur Seals, which were being unsustainably culled. In 1945, the UN Food and Agriculture Organization (FAO) was set up, with the conservation of natural resources included in its mandate. The 1946 International Whaling Convention essentially established a club of whaling nations to manage the 'harvesting' of whales.

Even at that time, however, there was emerging concern to protect wildlife for its own sake as well as an economic resource. Conventions were signed to protect birds, in large part due to public pressures mobilized by groups such as the Royal Society for the Protection of Birds. The first international efforts to establish wildlife parks and reserves began as early as 1900 (among the colonial powers in Africa), and were further advanced through a series of Conventions from the 1930s onwards.

It was in the 1960s, however, that international concern about pollution and the preservation of the natural environment began to develop rapidly, particularly in developed countries. Rachel Carson's book Silent Spring not only stimulated intense concern about the widespread use of DDT and other pesticides, but also helped to launch the modern environmental movement (Carson 1962). Wide awareness of the health risks posed by radioactive fall-out contributed to the pressures to conclude the ban on nuclear warhead tests in the atmosphere, agreed in 1963. Concern about sea pollution grew, stimulated by disasters such as the spill from the Torrey Canyon oil tanker in 1967, and the IMO became increasingly engaged with preventing oil pollution at sea. The problem of transboundary air pollution, and 'acid rain', attracted increasing attention, particularly in Scandinavia and Canada where damage to vulnerable forest and lake ecosystems was becoming manifest. In the mid-1960s, informal discussions began on the development of a new Law of the Sea to govern access to, and use of, the international seas and the seabed: the old regime was collapsing as unilateral claims were being made on transit rights and for economic control of waters up to 200 miles from coasts.

The Stockholm Conference

The 1972 UN Conference on the Human Environment was organized in response to this dramatic increase in international environmental concern in the 1960s. The aim was to establish an international framework to promote a more coordinated approach to pollution and other environmental problems. The conference, which was held in Stockholm, marked a turning point in the development of international environmental politics. Some of the principles that were agreed, and the institutions and programmes that were established, had an enduring effect (see Box 20.1). Just as significantly, the debates at the conference established themes and practices that would remain central to international environmental politics for the next thirty years and beyond.

The importance of international environmental issues as a focus for international concern became institutionalized, along with the principle that states have a responsibility to cooperate with
efforts to manage the global commons and reduce trans-boundary pollution. Developing countries insisted that they had less historical responsibility for global pollution and resource depletion than industrialized countries, and that actions to protect the environment had to be linked to efforts to promote their economic and social development—arguments that developed states accepted in principle. That is, the general relationship between environment and development in the context of North-South relations was for the first time formally elaborated at an intergovernmental meeting. At the same time, environmental non-governmental organizations (NGOs) from many countries gathered to monitor the entire proceedings of the Conference, to exert political pressure on the participants, and to network, thus establishing a practice that has continued ever since.

**From Stockholm to Rio**

In the 1970s and 1980s, dozens of international environmental agreements and programmes were established. For example, a series of conventions was set up to protect the environment of the Mediterranean, North Sea, Baltic Sea, and other regional seas, with UNEP playing an important leadership role. The 1972 London Dumping Convention established a framework for restricting the dumping of toxic wastes (including nuclear wastes) at sea. In 1973, an international convention was agreed to prevent intentional oil pollution from ships (the MARPOL Convention) which was further strengthened in 1978, after further public outcry about continuing oil spills.

In 1979, European and North American countries set up the Long Range Trans-boundary Air Pollution (LRTAP) agreement to limit emissions of sulphur dioxide and other pollutants causing air pollution and acid rain. In 1985 the Vienna Convention for the Protection of the Ozone Layer was signed, followed two years later by the Montreal Protocol which imposed substantial limits on the use of CFCs and other ozone-depleting substances.

Box 20.1- The Stockholm Conference and its legacy- The UN Conference on the Human Environment, held in Stockholm in 1972, was the UN's first major conference on international environmental issues. The Stockholm Conference attracted wide publicity, and many of the participants and observers no doubt learned a lot from the discussions of a wide range of specific environmental issues. The meeting agreed upon: a Declaration containing 26 principles concerning the environment and development; an Action Plan with 109 recommendations spanning six broad areas (human settlements, natural resource management, pollution, educational and social aspects of the environment, development and the environment, and international organizations); and a Resolution on various institutional and financial arrangements. In the following years dozens of international environmental agreements were achieved. However, apart from galvanizing public concern and educating governments, the most enduring specific contributions of the Stockholm Conference are widely believed to be the following. First, some of the agreed principles significantly strengthened the framework for future environmental cooperation They did not immediately command universal acceptance, not least because Soviet bloc countries boycotted the Stockholm Conference for broader foreign policy reasons. But over time they gained substantial international stature, and provided a basis
for much subsequent environmental diplomacy. Principle 21 had particular significance, for example. It acknowledged states' sovereignty over their natural resources but stipulated that states have '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'. Other principles established that: the international community should determine limits on the use and abuse of 'global commons'; resources identified as the 'Common Heritage of Mankind' (such as the deep-sea bed) should be collectively managed, preserved, or used to common benefit; measures to prevent pollution and protect the natural environment should be balanced against the economic and social goals; and international agreements should take into account the different circumstances and responsibilities of developed and developing states.

Second, the Stockholm Conference led to the establishment of global and regional environmental monitoring networks, which have improved monitoring of environmental problems, such as marine pollution and ozone depletion, and have indirectly stimulated action to tackle them.

Third, the Conference led to the creation of the UN Environment Programme (UNEP), which was given the task of coordinating the environment-related activities of other UN agencies and promoting the integration of environmental considerations into their work. In practice, UNEP subsequently played a key role in: raising political awareness of environmental problems; helping with the formation of scientific consensus on problems and responses to them; facilitating negotiations (particularly for the protection of regional seas and the ozone layer); and improving countries' environmental management capacities. Further, UNEP provided institutional frameworks through which broader agenda-setting activities could develop. For example, since the 1980s UNEP provided an important forum for raising awareness of the linkages between environmental degradation and women's lives, developing agendas to promote gender awareness in environmental projects and specific engagement in environment and development institutions through the 1990s. Overall, the broader institutionalization of international environmental politics after the Stockholm Conference meant that the process acquired momentum to continue through periods when public and political concerns about the environment waned. Finally, the Conference stimulated broader political and institutional changes. For example, many governments subsequently created Ministries for the Environment and national agencies for environmental monitoring or regulation. The development of international networks of environmental NGOs was stimulated. Moreover environmental NGOs, which at that time were primarily based in Europe or North America, began to engage more systematically with development issues and developing-country groups.

Largely as a result of sustained pressure by environmental NGOs, the Ramsar Convention to preserve wetland habitats of waterfowl was established in 1971, followed by the Convention on International Trade in Endangered Species (CITES) a year later. These were followed by a series of agreements to conserve habitats and animals including seals and polar bears. Furthermore, well-established resource-management regimes, such as the Antarctica Treaty and the International Whaling Convention were transformed into environmental protection agreements. Moratoriums on whaling and on the exploitation of Antarctic resources were established—marking a considerable departure from the original aims and priorities of these regimes.

It increasingly became the norm that nongovernmental groups should have wide access to intergovernmental meetings on the environment, to an extent that would have shocked earlier
generations of diplomats and is still unknown in some other spheres of international activity. Moreover, in many areas environmental NGOs came to command sufficient expertise and resources that they became substantial forces in international politics in their own right. Delegations from organizations such as Greenpeace, World Wildlife Fund, or Friends of the Earth at international meetings were frequently larger and more expert than those of all but the largest states, and through their access to the media and their expertise were able to shape international agendas. Industrial associations representing interested groups in the business community likewise became directly involved in seeking to shape international environmental regimes, rather than simply working through their governments.

However, the development agendas included in the Action Plan and Declaration of Principles agreed at Stockholm were never seriously followed up. Most of the international agreements listed above focused on environmental protection or pollution, without seriously integrating development concerns. Moreover, UNEP lacked the institutional weight seriously to coordinate other UN agencies, which typically vigorously protect their 'turf, and thus largely failed to achieve integration of environmental and development agendas in the UN system. This caused increasing international concern, particularly amongst developing countries.

The UN established a World Commission on Environment and Development, chaired by the then Prime Minister of Norway, Gro Harlem Brundtland, to propose ways forward. The 1987 Brundtland Report argued for priority to be given to achieving 'sustainable development', and received wide international support (World Commission on Environment and Development, 1987). Though the Report discussed a variety of issues and institutional reforms, the exact meaning of the concept of 'sustainable development' remained contested or unclear. Nevertheless, it was important because it developed an agenda which could attract strong support from a variety of important constituencies. As a result, the UN General Assembly decided in December 1989 to convene an 'Earth Summit' as a twenty-year follow-up to the Stockholm Meeting, so that the international community could carry the sustainable development agenda forward. A UN Conference on Environment and Development (UNCED) was fixed to take place in Rio de Janeiro in June 1992.

**Key points**

- Environmental issues first emerged on the international agenda in the late nineteenth century.
- Environmental awareness and concern developed strongly after the 1960s, particularly in relation to pollution problems.
- The 1972 Stockholm Conference established a number of principles, institutions, and programmes which helped to provide a framework promoting the further development of international responses to transnational environmental problems.
- In the 1970s and 1980s, international environmental politics developed and matured. Green movements, environmental and industrial NGOs, and international organizations established themselves as key actors in international environmental politics alongside states.
- The Brundtland Commission promoted the concept of 'sustainable development', and preparations began for a 1992 UN Conference on Environment and Development.
Box 20.2 - Sustainable development - The concept of 'sustainable development' was crystallized and popularized in the 1987 report of the UN World Commission on Environment and Development (the Brundtland Commission), which drew upon long established lines of thought that had developed substantially over the previous 20 years. The Brundtland Commission's shorthand characterization of 'sustainable development' is development that meets the needs of the present without compromising the ability of future generations to meet their own needs. The prominence given to 'needs' reflects a concern to eradicate poverty and meet human basic needs, broadly understood. The concept of sustainable development focused attention on finding strategies to promote economic and social development in ways that avoided environmental degradation, over-exploitation, or pollution, and sidelined less productive debates about whether to prioritize development or the environment. A variety of important constituencies could support this concept. The emphasis on 'development' could be widely endorsed, and was particularly welcomed by developing-country representatives, development agencies, and groups primarily concerned about poverty and social deprivation. The link with 'sustainability' satisfied a variety of environmental constituencies. It addressed those who were concerned that present patterns of economic and population growth would have to change because humankind was reaching the limits of the Earth's finite natural resources and 'carrying capacity', first popularized by the Club of Rome in the early 1970s (Meadows et al. 1972, 1992). It could also be welcomed by those who doubted this, and were more concerned about problems such as pollution, climate change, and threats to habitats and biodiversity.

Issues and challenges in international environmental politics

Some challenges for International Relations

As International Relations scholars came to study international environmental politics, they not surprisingly brought their established theoretical perspectives and prejudices with them. Such is the variety and complexity of the environmental issue-area that advocates of each such perspective can find plenty of evidence that seems to support their case, be it Realist, neo-realist, Liberal, Liberal Institutionalist, Marxist, Social Constructivist or feminist. Moreover, each perspective provides important insights into aspects of global environmental change or international environmental politics.

However, it is perhaps more interesting and important to note at the outset that international environmental issues pose particular challenges for some of the dominant approaches in International Relations. Theories and simplifying assumptions developed through other areas of study, such as security studies (Ch.13) or international political economy (Ch.14), should not be assumed to apply equally well to this area without careful examination of the evidence. In practice, they often require significant revision to take proper account of the particular characteristics of environmental issues.

One example relates to the significance and role of states. The dominant tradition within International Relations is state-centric, centred around concepts of state sovereignty and the belief that states are the primary actors in international affairs and that international politics is largely driven by states pursuing their interests (see Ch.7). However, transnational environmental
problems pose real problems for established notions about the nature and limits of state sovereignty. Moreover, international environmental problems are rarely caused by deliberate acts of national policy, but are rather unintended side-effects of broader socio-economic processes. A wide range and large number of non-state actors—including companies, local authorities, financial institutions, social groups, and individuals—are typically at least as important as states as actors in these processes.

458

It is true, however, that states retain a relatively privileged position in the international politics of responding to global environmental problems. Whereas states and their central governments do not generally directly control the economic, social, and environmental activities of concern, they do have sovereign authority to legislate within their territories and thus must play a central role in developing and implementing any environmental regulations. Thus, while the rise of environmental problems has brought state power and sovereignty into question, the responses to these problems may often extend and strengthen aspects of state authority and involvement in society. Moreover, to the extent that international agreements are important for cooperative responses to environmental problems, interstate diplomacy must come to the fore and states will be the legal parties to any treaties.

But, as already illustrated, even in relation to the politics of responding to international environmental problems, non-state actors typically also play a primary role. Supranational organizations such as the EU play a key international role alongside states, as well as being able to regulate activities within their member states. The EU is itself a party to several international environmental treaties. International organizations, international financial institutions, transnational organizations (such as industrial associations or environmental nongovernmental organizations (NGOs)), social movements, womens groups, consumer groups, and scientists can all play a key role. Even in relation to international environmental negotiations and agreements, there are numerous examples of non-state actors playing central roles. Moreover, as states become enmeshed in international institutions or regimes established to tackle environmental problems, the policy process often acquires an important transnational or international dimension which in practice can substantially limit national autonomy.

Finally, implementing international environmental commitments typically has to involve a mixture of international institutions, states, and transnational and domestic organizations. Limiting atmospheric or sea pollution, for example, can rarely be directly carried out by government decision, like dismantling a missile or withdrawing a tank division in arms control. It involves a complex process of changing a variety of often well-established industrial or social activities, involving a wide range of non-governmental groups, local authorities, and individuals.

Just as studies of international environmental politics oblige us to take full account of a range of non-state actors, and to review the significance and role of states, they also raise questions about the relationship between the 'international' and 'domestic' spheres of political activity. Several strands of International Relations theory have been developed on the basis of there being a radical distinction between these two spheres. However, global environmental issues involve a range of connections between local, national, and international processes that raise questions...
about such distinctions. This is true not only for patterns of causation and impacts of environmental problems in an interdependent world, but also for responses to such problems. Transnational organizations and networks—for example, environmental NGOs, multinational companies, financial institutions, scientists—typically play a relatively important role, and these by definition cut across international/domestic boundaries. International organizations are sometimes directly involved in local projects with only nominal involvement of the national authorities. The relationship between international organizations and institutions, states, and non-state actors within countries is normally complex in this context, and particularly when it comes to implementing international programmes for environmental protection.

A third issue for International Relations raised particularly by studies of international environmental issues is the relationship between knowledge, power, and interests. Scientific or expert knowledge often plays an especially important role in environmental politics. Careful scientific monitoring and modelling of the environment is usually needed to identify and assess problems and to frame debates about possible responses. 'Knowledge' helps to set agendas, affects patterns of influence and power, and shapes assessments by key actors of their priorities and interests. Typically, there is considerable scientific uncertainty—about the problems, impacts, and effective responses.

Nevertheless, communities of scientists and experts can exert substantial influence. International environmental issues therefore provide an important area for exploring the ways in which power relations, patterns of interests, knowledge and learning processes, and values interact in determining outcomes. Attempts to explain the outcomes of international policy debates on environmental issues in terms of just one or two of these factors have normally failed.

The 'tragedy of the commons': an instructive parable

In 1968 Garrett Hardin proposed a particularly influential model to explain why communities may over-exploit shared environmental resources even where they know that they are doing so and are aware that it is against their long-term interests (Hardin 1968). This is known as the 'tragedy of the commons'.

The notion of the 'tragedy of the commons' can be explained using a hypothetical example—or 'parable'—of the use of common fish resources (see Box 20.3). In brief, the notion shows how it is possible that 'rational' individual actions can lead to 'irrational' collective practices resulting in catastrophic over-exploitation of common resources. Where access to a common resource is open and unregulated, each user continues to have an individual interest in exploiting it to the maximum. Each user gains the full extra benefit of further resource extraction, while the cost of over-exploitation is shared by all of the communities that use the resource.

The 'tragedy of the commons' is that this depletion of 'open access' common resources can continue remorselessly to its destructive conclusion, even if each user involved is well intentioned, well informed, and exercising only its traditional and legal rights. Unilateral acts of public-spirited restraint are insufficient to tackle the problem. If the rest of the user community
continues in its old ways, the public-spirited suffer along with the selfish without even having benefited from the 'good times' in the meantime.

Box 20.3- The 'tragedy of the commons': a parable- Consider a sea or large lake on which many local fishing communities depend as a source of food and income. Each fisher has an immediate interest in making as large a catch of fish as s/he can sell or eat, in order to improve his or her standard of living. For centuries, this arrangement has worked satisfactorily. Human populations were sufficiently low, and fishing technologies were sufficiently primitive, that there was no over-fishing. Gradually, however, living conditions improved and human populations grew, increasing the number of people fishing and also the demand for fish. At the same time, fishing technologies improved. In recent years, the sea or lake has been fished at unsustainable levels, and the total fish stock is falling. In spite of this, each individual fisher continues to have an interest in maintaining or improving their catch. Each fisher gains the full extra benefit of catching additional fish, but bears only a small part of the extra cost of fishing a depleted fish stock because this cost is shared throughout the whole community. Even concerned and environmentally aware fishers may be sorely tempted to continue to make large catches: they know that even if they desist, others are likely to continue to maximize their own catches while they can. The 'tragedy of the commons', in this parable, is that this process continues until the fish stock is destroyed along with the fishing communities that depended on it.

Many environmental problems of industrial society appear to have a similar structure. The owners of a factory have an interest in continuing to produce goods in the cheapest way, even if that involves dispersing untreated pollutants into the rivers or atmosphere. They gain most of the benefits of cheap production, while the pollution costs are uncertain and in any case shared by the whole 'downstream' community and other species of life. That is, the costs of pollution are externalized, since the polluter does not have to include them in its production costs. In this way some governments have been relatively tolerant of sulphur emissions from power stations in their territory, since the resulting acid rain was dispersed over a number of downwind states. Moreover, the damage caused by acid rain to buildings and forests typically does not appear in power-generation budgets, whereas the costs of cleaning the emissions would do so.

Preventing the over-exploitation of the commons

The notion of the 'tragedy of the commons' demonstrates the vulnerability of open access resources to over-exploitation. In principle, a range of types of responses to such over-exploitation are available. One traditional response is to 'exploit and move on'. This has been the approach taken by 'slash and burn' agricultural communities in the tropical forests, cattle herdsmen in regions of Africa, and many international timber companies. Increasingly, however, this is no longer an option. The environment cannot recover (or is given insufficient time and space in which to do so), and there are fewer places to move on to.

Another type of response is 'privatization'. Hardin himself drew the conclusion that the solution to the 'tragedy of the commons' was a change in property rights, arguing that the problem of the commons is that they are 'owned' by everyone and that no one in particular had the authority or
interest in managing them sustainably. Thus, in relation to the over-grazing of common land, for example, if ownership of the common grazing land were divided amongst the herd-keepers, each of these would have a direct interest in maintaining the value of his or her own land by grazing it at sustainable levels. Each would bear the full costs of any unsustainable practices, and each would have the ability to control how his or her land was managed.

In principle, the 'privatization' approach could play a significant role in improving resource management of the global commons. For example, the new UN Convention on the Law of the Sea, agreed in 1982, transferred effective ownership of much of the world's ocean resources to coastal states, with a broad obligation on these states to manage sustainably their Exclusive Economic Zones (EEZ) which stretched 200 miles from their coasts. However, in general, in order for this approach to be effective the new 'owners' would need to have a clear interest in the long-term conservation and management of the resources under their control, and have the capacity and knowledge necessary for effectively carrying out their management role. In practice, such conditions would often not be met. For example, without regulation, it is not clear that owners of 'privatized' forest could be relied on to manage their forests sustainably rather than sell the timber and invest the proceeds in other businesses. Moreover, the approach would be difficult to apply to tackle resources or problems which by their nature do not respect artificial 'property' boundaries, such as atmospheric or sea pollution or migratory fish.

The third type of approach to promoting environmental conservation and sustainable management of the commons is to establish systems of governance to prevent unsustainable or damaging practices. This approach tackles the problem by regulating access to shared resources rather than by changing patterns of ownership.

This third approach is in principle applicable to the widest range of problems. But it is clear that establishing any system of norms, rules, regulations, or taxes to tackle environmental problems is bound to be controversial, particularly when traditional rules of access have to be made more restrictive. Experience with attempts to prevent over-fishing, for example, has shown that some fishers can be expected to deny that there is an over-fishing problem. Others might dispute the maximum sustainable yield. Moreover, the ways in which fishing quotas or the burdens of implementing taxes or regulations are distributed amongst the community are also sure to be controversial. The benefits or costs of any environmental policy or regulation are bound to be distributed unevenly, leading to disputes about which regulations or policies to adopt and also to possible compliance problems in the future.

Such disputes and challenges are characteristic of all attempts to tackle environmental problems or to manage common resources. Nevertheless, the prospects for overcoming them and establishing effective management could be expected to be greatly improved if there is a strong hierarchical authority capable of taking decisions and enforcing them on dissenting groups. Thus most would agree that state regulation and control is a potentially effective approach to managing local or national resources within a well-developed state.

However, there is no world government with the power or authority to impose rules on the use of global commons. Authority for legislation and enforcement is dispersed amongst some 190 sovereign states, none of which can legally be obliged to obey an international law to which they
do not subscribe. In this context, Hardin and many others have been deeply sceptical about the prospects for developing effective systems for collective governance of the global commons.

This focuses attention on the extent to which effective collective management systems can be developed and maintained. Such systems involve the development of collective institutions—in the form of sets of agreed principles, norms, rules, common understandings, organizations, consultation processes, and suchlike—governing or shaping uses of the shared environmental resources. Ostrom and others examined the conditions for the successful formation of such institutions amongst local or regional communities in the absence of a central authority (Ostrom 1990). Perhaps unsurprisingly, they found them to be similar in character to the conditions conducive to the establishment of international regimes, particularly those identified by Liberal Institutionalists, as discussed in Chapters 9 and 16.

In practice, much of the international politics of responding to global environmental problems has been focused around the development, implementation, and effectiveness of international environmental regimes. In this context, an international environmental regime is an international agreement or social institution with (more or less) agreed-upon principles, norms, rules, decisionmaking procedures and programmes that govern the activities and shape the expectations of actors in a specific environmental issue-area.

Understandings of how international environmental regimes develop and operate, and what determines their effectiveness, remain contested. As discussed in Chapter 16, for example, Realists and Liberal Institutionalists generally agree on the importance of the development of international rule-based behaviour, but differ between and among themselves on how to understand it. Realists tend to regard international regimes, including environmental regimes, as agreements that reflect particular patterns of power and interests of states, which are quite vulnerable to changes in such patterns. However, they accept that regimes may prove robust where participating states have strong interest in coordination, and where the regime enables them to operate on the so-called Pareto frontier of optimal coordination. Liberal Institutionalists tend to see wider scope for developing robust environmental regimes, and emphasize their potential role in establishing collective environmental governance to tackle problems like the 'tragedy of the commons', involving collaboration among states that fear 'free-riding' or defection by competitors. Since the early 1990s, many analysts from the liberal tradition have emphasized the importance of seeing environmental regimes as international social institutions, through which rules-based behaviour is induced not only through rational calculations of interest but also through the absorption of norms and values and through processes of social learning. In this way, environmental and other regimes may shape and transform governments' perceptions of state interests.

It is important to note that the above working definition of an environmental regime deliberately does not prejudge any of the above debates. It provides scope for environmental regimes to be an important focus not only for Realist or Liberal Institutionalist investigations, but also for others including reflectivists and Social Constructivists (see Ch.12). Environmental regimes, from this
perspective, can provide an important framework for the interactions between a wide variety of international and domestic actors, and between power, interests, knowledge, and values.

An environmental regime provides a focus for the formulation and implementation of policies to tackle a particular international environmental problem, including the organization of relevant resource transfers and capacity-building activities. For many, however, regimes provide too restrictive and 'reformist' a framework for examining responses to global environmental change. Insufficient attention may be devoted to the activities and struggles of local groups around the world that do not explicitly engage with the regime politics or focus on particular environmental 'issue-areas'. Similarly, environmental regimes have naturally tended to develop in issue-areas where influential international actors perceive international cooperation to be most useful or essential.

462

Nevertheless, as international environmental regimes and institutions have developed, and become interlinked, their forums and programmes have provided a focus for international efforts to promote awareness of such local issues, and also of broader concerns such as the importance of gender awareness in environmental programmes and the specific roles that women might play.

Finally, regimes are typically developed to shape and restrict the activities of relevant actors in order to tackle specific environmental problems, not to challenge or transform the socio-economic or political structures and processes that generate the global patterns of development, resource distribution, and environmental degradation. Thus an emphasis on regimes can be criticized by those who focus on 'world-system' approaches or those for whom anything other than clearly transformatory agendas are inadequate. However, the scope of such agendas soon extends far beyond specifically environmental political issues.

Key points

- Each of the main approaches within International Relations theory provides important insights into international environmental politics. At the same time, environmental issues pose major challenges, particularly relating to: the role and significance of states and the notion of sovereignty; the relationship between international and domestic spheres of political activity; and the relationship between knowledge, values, power, and interests in determining outcomes in international processes.
- The notion of the 'tragedy of the commons' provides an instructive model of how common resources can become over-exploited.
- The collective management of global commons in principle is more widely applicable than approaches focusing on 'privatization', though the development of international collective management regimes poses particular challenges.
- Much international environmental politics can be said to focus around the development and implementation of international environmental regimes.
The development and implementation of environmental regimes

By the year 2000, there were over 130 multilateral environmental agreements (and hundreds of bilateral ones). As indicated in Chapter 16, some of these must be regarded as 'dead letters'. Others are symbolic or weak, and have probably had little or no independent effect on the behaviour of relevant actors, or on the problem which they address. Nevertheless, case studies have shown that numerous environmental regimes have really been effective, in that they have changed behaviour in line with their aims and have at least helped to tackle the problems for which they were established (Haas et al. 1993; Levy et al. 1995). The Montreal Protocol for the Protection of the Ozone Layer is a prime example. Such effective regimes are dynamic: they tend to develop and change over time, according to changing needs and opportunities and as the international context develops.

In this section we first outline the characteristic phases in the development of environmental regimes, and then illustrate some key issues through a short case study of the regimes to protect the ozone layer. The processes of regime development can, in principle, be divided into several phases: agenda formation; negotiation and decisionmaking; implementation; and further development. In practice, these phases often overlap and interact—particularly as a dynamic regime becomes established.

The agenda-formation stage includes the processes by which the problem becomes recognized, emerges on to the political stage, is framed consideration and debate by the relevant policy communities, and rises high enough on the international political agenda to initiate negotiations and decisionmaking processes. For environmental issues, it can often be difficult even to secure recognition that there is a problem. Without careful scientific monitoring and assessment, problems such as pollution, depletion of fish stocks, decline in biodiversity, and climate change, may emerge slowly and not become clear until it is too late to prevent major impacts or even disaster. This is a major reason why science and 'knowledge-production' processes are particularly important in environmental politics, as discussed above.

Such scientific findings are used in attempts to place the issue on the political agenda and to frame the debates about possible responses. However this process is by no means straightforward. The science enters a political arena with competing interest groups, and is in any case often uncertain. NGOs have typically been particularly important in agenda setting, often in implicit coalitions with concerned scientific bodies, international secretariats, and sympathetic governments.

Vivid or dramatic events or discoveries have played an important role in mobilizing public concern and capturing political attention. Measures against oil pollution at sea were stimulated by oil tanker disasters, even though routine spillage had been posing at least as wide an environmental threat. Similarly, public concern in the UK about North Sea pollution was only mobilized sufficiently to persuade the government to support more stringent international action
when it was linked to an epidemic among the (photogenic) seal population. In the 1970s, UNEP felt obliged to present the problem of desertification in terms of (scientifically dubious) images of desert sand-dunes advancing on farming areas in order stimulate international action. The stage of negotiating and agreeing commitments takes a political process on an issue from the point where it becomes a priority item on the agenda of relevant policymaking or negotiating for to the point where international decisions are made about which policies and rules will be adopted to address the issue. It is at this stage that choices are made about commitments, policies, and measures.

In principle, there are normally a number of possible ways to respond to a given environmental problem. The ways in which the main policy response options are actually framed, considered, and assessed are a key part of environmental politics, and constitute another important dimension to the relationship between policy, science, and 'knowledge'. Some approaches may be assessed to be more effective in tackling the problem than others. In this context, transnational 'knowledge-based' communities of experts with shared understanding of the problem and preferred policy responses (i.e. 'epistemic communities') have proved particularly influential.

Moreover, policies also differ in the ways they distribute the costs and benefits among different social groups and actors, and this also has a profound effect on the policymaking process and on final decisions. The problems of achieving agreement typically multiply as the number of participants and the variety of their interests increase.

Equity issues are generally central to the negotiation process. To be negotiable and have legitimacy, commitments generally need to be perceived to be reasonably fair and equitable. Sometimes it is possible to achieve agreement on a single principle to guide 'fair' distributions of burdens, such as the 'polluter pays' principle. In practice, however, many notions of equity are typically in play, including: equal quotas; equal percentage changes from the status quo; equality of burden in implementing commitments; burdens distributed according to historic responsibility for the problem, or according to capacity to pay; 'first come, first served'; historic ("grandfathered") rights; and many others. Application of different principles would have very different implications for the distribution of costs and benefits from the agreement. Particularly in global negotiations, agreement on basic equity principles often cannot be achieved. In such cases, parties have to find ways to define commitments so that they at least appear "arguably" equitable from a number of basic standpoints.

Successfully negotiating an effective environmental agreement typically requires leadership. When powerful states or groups of states, such as the United States or the EU, adopt a leading role, the prospects for achieving an agreement improve greatly. For example, US leadership in achieving a whaling moratorium in the IWC was critical.

In any set of negotiations it is normally possible to identify 'leaders' that want an agreement and work hard to get one through a combination of active diplomacy promoting the production and dissemination of relevant knowledge, or (informal or formal) sanctions or 'side payments'. In this way 'laggards'— states that are reluctant to achieve agreement or to agree to effective
commitments—may be persuaded to sign. Further, coordination and persuasion can be achieved of the (often large number) of states that are willing in principle to join an agreement provided it is not too costly, but are not going to work hard to achieve one.

Naturally leader states aim to shape the commitments in line with their interests. But they usually have to compromise to get an agreement. Moreover, in any given issue-area, there are likely to be ‘veto states’, without whose agreement and participation an effective regime cannot be established.

The implementation phase includes all of the activities involved in implementing the decisions and policies adopted in response to the problem. This can include: the incorporation of international commitments into domestic law; the development and operationalization of agreed programmes; and all other measures aimed at appropriately changing government, social, and economic practices in line with agreed rules and norms.

This stage is typically no less complex than the other two. On the contrary, experience shows that it is one thing to agree to international obligations, and quite another to bring them into operation and to achieve the desired effects on the behaviour of relevant actors. Those charged with implementing the decisions may lack necessary commitment or resources, and will typically interpret the decisions in their own ways. In practice, some countries tend to take legal obligations very seriously, whereas others tend to regard them as symbols of general intentions and a stage in an ongoing negotiation process, not to be interpreted too literally. Actors whose interests are substantially affected by the changes in policy can be expected to continue to try to influence the policy and the ways it is implemented. Compliance may leave much to be desired. In any case, the actual effects of decisions and rules can be very different from the expected ones.

Whether or not international agreements are implemented can depend greatly on the nature of the commitments themselves. Governments may not try hard to implement if they believe themselves to have been coerced into an unfair agreement, which is a reason why it is important that agreements should be regarded as legitimate and reasonably fair or in each participant's overall interest. This highlights the importance of equity and legitimacy for the implementation and effectiveness of regimes as well as for their negotiation.

The will to implement may be weak if parties suspect that others may not be complying, and attempting to 'free-ride'. Thus whether or not the implementation and compliance of commitments can be monitored or verified may be an important factor. Similarly, international systems to review countries' progress in implementation can help, by increasing awareness of obligations and by identifying and facilitating timely responses to any emerging problems. Further, mechanisms to provide international aid can both increase countries' capacity to implement their commitments and increase their interest in doing so.

Finally, regimes usually need to further develop once they have been established in order to maintain or improve their effectiveness. Institutions and commitments may be strengthened and revised to adapt to changing circumstances, such as improved understandings of the problems and policy responses, or new political or economic challenges or opportunities. As outlined
above and below, 'framework' conventions are explicitly designed to facilitate further
development. More broadly, at least since the 1980s, such capacity to adapt has been widely
regarded as a critical characteristic of effective agreements.

The development and implementation of the ozone regime

The Montreal Protocol, signed in 1987 (see Bo 20.4), stands at the centre of the regime to
prevent the depletion of the ozone layer. It is widely regarded as one of the success stories in
international environmental regimes. Before it was signed, global consumption and production of
the main ozone-depleting substances (ODS) was increasing rapidly.

465
Box 20.4- Ozone depletion and the Montreal Protocol- Ozone is a molecule consisting of three
oxygen atoms. It is relatively unstable and quite rare in the atmosphere. Most of it is found in the
'stratosphere' between 10 and 50 kilometres above the Earth's surface—the 'ozone layer'. There it
absorbs nearly all of the high-energy ultraviolet radiation (UV-B) from the sun, protecting plants
and animals from its damaging effects. The ozone layer is highly vulnerable to destruction by
chlorine, fluorine, and bromine, which are highly reactive chemicals. However, until recently, it
was relatively safe from these chemicals. Precisely because they were so reactive, their
atmospheric lifetimes were too short for emissions from the Earth's surface to have time to drift
up as high as the ozone layer. Unfortunately, when humankind manufactured CFCs and halons,
they created highly stable compounds containing chlorine, fluorine, or bromine. Indeed, they
were so stable that they did not react in the lower atmosphere, allowing a proportion of them to
drift gradually up to the ozone layer. There they were broken apart by the incoming ultraviolet
radiation, releasing the chlorine and other chemicals to act as catalysts in destroying the ozone.
Each atom of chlorine, for example, can destroy an average of about 100,000 ozone molecules
before it is removed from the stratosphere. For complex reasons, the losses of ozone are worst
in the spring. By 1995, stratospheric ozone levels over Europe and North America, for example,
were about 10 per cent lower than in the 1970s, and in places 20-50 per cent lower. Over the
Antarctic, a particularly deep 'ozone hole' appeared annually, virtually wiping out all ozone in
thick bands of the ozone layer. This led to substantial increases in the intensity of UV-B
radiation at the Earth's surface. UV-B depresses immune systems, causes cataracts and skin
cancers, damages the development of crops, and reduces the productivity of phytoplankton in the
sea—undermining the marine food chain. As awareness of the risks of ozone depletion grew in
the 1970s, the USA, Canada, Sweden, and Norway unilaterally banned non-essential uses of
CFCs. However it was not until 1985 that an international agreement was achieved: the Vienna
Convention. This was a framework convention, which did not oblige parties to reduce their
consumption of CFCs or other ODS. In 1987, the Montreal Protocol was agreed by 24 mainly
industrialized states and the European Community. Parties to this protocol were obliged to cut
their consumption of five types of CFCs by 50 per cent by 1999 and to freeze consumption of
three halons. Between 1987 and 2000, the Montreal Protocol was progressively strengthened:
The 1990 London Amendment committed developed countries to phase out an extended range of
ODS (including the halons, methyl chloroform, carbon tetrachloride, and a longer list of 15
CFCs) by 2000. Developing countries were committed to phase out by 2010, with assistance
from a new Multilateral Fund (MLF), created for the purpose. In 1992, the phase out dates for
developed states were brought forward to 1995, and new controls were agreed to phase out HCFCs by 2030—which had been introduced as a less destructive substitute for CFCs—and to freeze use of methy bromide. In 1995, developing countries also accepted some controls on HCFCs and methyl bromide. In 1997, more ozone-depleting chemicals were added to the list of restricted substances, and more stringent limits on methyl bromide and HCFCs were agreed. By 1999, 95 ozone-depleting chemicals were controlled under the Protocol, and worldwide CFC consumption had reduced from 1.1 million tonnes in 1986 to less than 150,000 tonnes per year. Moreover, the Montreal Protocol had become truly global, with over 160 parties.

By the mid-1990s, this trend had been halted and reversed, and most developed countries had virtually phased out consumption of CFCs and halons (the most important ODS). Natural time-lags mean that the depletion of the ozone layer will nevertheless continue to get worse until after the first decade of the twenty-first century, but thereafter it is expected gradually to recover—returning to its pre-1970 levels by about 2060.

The agenda-formation phase of the regime began in the early 1970s. In 1974, Rowland and Molina—two US-based scientists—published an analysis arguing that CFCs emitted into the atmosphere could lead to the destruction of stratospheric ozone (Molina and Rowland 1974). Coming at a time of intense debates in the United States about the risks that emissions from high-flying supersonic aircraft might pose to the upper atmosphere, this hypothesis immediately attracted public attention. CFCs were invented in 1928, as a coolant for refrigeration, but since the 1960s production had increased rapidly as further uses were found in: air-conditioners; expanded foams for cushions and insulation; solvents to clean electronics; sterilants; and aerosol propellants. Halons—related chemicals including bromine—were also increasingly used as fire extinguishers and suppressants.

Environmental movements and the US Environmental Protection Agency (EPA) argued that at least non-essential uses of CFCs, as in aerosols, should be banned as a precautionary measure. DuPont and the other major chemical companies producing CFCs strongly disputed this, arguing that strong scientific evidence that the problem was real and serious should be required before any restrictions were introduced. The so-called 'spray can war' raged in the USA through the mid-1970s. After a US National Academy of Science report in 1976 judged that the risks were sufficiently large that precautionary measures would be justified, the balance of influence shifted towards the environmentalists and the EPA, and domestic legislation restricting CFC uses followed in 1978. These unilateral US actions had the effect of temporarily decreasing global CFC production, since the USA accounted for some 50 per cent of world consumption in the mid-1970s.

Internationally, the North American and Scandinavian countries became leaders in supporting UNEP's efforts to establish international restrictions on ozone-depleting chemicals. However, initially the countries of the EU and Japan—the other major producers and consumers of CFCs at the time—were 'laggards': sceptical about the threat and supportive of their major chemical companies.
Thus began the international process of negotiating and decisionmaking. In the first half of the 1980s, progress was extremely slow. During the first Reagan administration, the USA joined the sceptics and showed little enthusiasm for pressuring the EU and Japan on ozone issues. Under the charismatic leadership of Mostapha Tolba, UNEP played a key brokering role. In March 1985 the Vienna Convention for the Protection of the Ozone Layer was signed. However, this was a framework convention which obliged its signatories to do little more than to establish the principle that international action should be taken as necessary, carry out further research, exchange information, and periodically meet to review the adequacy of commitments.

Within two months, however, the discovery of a deep 'ozone hole' over the Antarctic was announced by scientists from the British Antarctic Survey. The political impact of this discovery provided a key illustration of the galvanizing effect of vivid or dramatic events in regime politics. The image of being exposed to UV radiation from space was already one that resonated with the general public. However, a surprise 'ozone hole' had much greater political impact than possible average depletion of 1-2 per cent per year, particularly when reinforced by NASA satellite images. Moreover, experiments in 1987 definitively showed the link between ozone depletion and the presence of chlorine: changes in chlorine and ozone concentrations were measured while an aircraft was flown across the edge of the ozone hole.

After this, DuPont, ICI, and other major CFC producers recognized that tough international restrictions on CFCs or other ODS had become virtually inevitable. Instead of continuing to oppose them, they focused on influencing any international agreement. In particular, they realized that stringent international controls on CFCs would create a market for substitutes, which they were in a better position to produce than their less sophisticated or wealthy competitors. By this time, green parties and environmental movements were becoming powerful in most West European countries. In this context, governments that had previously vetoed stringent international controls had every interest in reversing their position. For example, the UK Prime Minister Mrs Thatcher removed her objections and declared her government to be a world leader in efforts to ban CFCs. The 1987 Montreal Protocol committed parties to cut their CFC consumption by 50 per cent by 1999, and within two years a consensus was emerging among developed Western countries in favour of adopting a complete ban.

However, before a phase-out of CFCs and other ODS could be agreed, it was important to extend membership of the regime beyond developed Western states to include the Soviet bloc countries (as they were then) and developing countries. By the late 1980s production and consumption of CFCs in these countries were increasing rapidly, although still in much smaller quantities than in OECD states, and it was clear that countries like Russia, India, and China would have to join the regime if it was to be successful in the long term.

467

The Soviet Union and its allies were persuaded to join (with some transitional concessions) at the end of the 1980s. However, developing countries refused to accept any commitments to phase out CFCs and halons unless industrialized countries paid the 'incremental' costs they incurred in implementation. After much haggling, this was agreed in 1990. A Multilateral Fund (MLF) was
established for this purpose, and developing countries agreed to phase out consumption of CFCs and halons by 2010.

From that stage, the processes of implementing and further developing the Montreal Protocol proceeded in tandem. Experience with implementing the Protocol's commitments, though complex, turned out to be easier and cheaper than many had feared. The chemical producers had a strong commercial incentive to develop substitutes quickly and also to monitor compliance amongst competitors. The Technology and Economic Assessment Panel (TEAP), established to advise on the availability and effectiveness of substitutes or alternatives for controlled substances, proved very effective in identifying opportunities and persuading users to accept them. Meanwhile the international Scientific Assessment Panel and the Environmental Impacts Panel produced authoritative reports on the need for ever more stringent commitments. UNEP continued to play a key role in brokering stringent agreements, supported by sympathetic states and environmental NGOs. In 1992, 1995, and 1997, the range of ODS controlled by the Montreal Protocol was widened, and phase-out dates for CFCs and halons were brought forward to 1995 and 1994 respectively for industrialized countries.

Implementation of these phase-outs proceeded on time and reasonably effectively in Western developed states, though there were continuing problems with black-market trading of illicit CFCs in the mid-1990s. The process turned out to be much more difficult in the 'countries with economies in transition' (the former Soviet bloc countries). The profound social and economic transitions in these countries meant that several of them neglected their Montreal Protocol commitments. The ozone regime's systems for reporting and reviewing implementation picked this up in 1995, and coordinated international responses aimed at bringing the 'culprits' (primarily Russia, Ukraine, Belarus, and Bulgaria) into compliance as quickly as possible. This was done through a mixture of 'carrots and sticks', including conditional offers of international aid. Thus a crisis that could have substantially weakened the regime was averted, and the institutions of the regime played a key role in achieving this. As far as developing countries are concerned, the operation of the MLF was a continuing source of friction between them and donor countries. Nevertheless, after initial problems, many projects to phase out controlled substances in developing countries were under way by the mid-1990s, and in many cases these countries were on track to phase out significantly before their legal deadline. By 1999, over $900 million had been disbursed by the MLF. Moreover, procedures for reviewing implementation of MLF-funded projects were developed in the mid-1990s to verify that such phase-outs actually took place. However, the ozone regime continues to adapt and develop, with major reviews every two to three years, and will probably have to do so for decades to come.

Key points

- The development of international environmental regimes can roughly be divided into four phases: agenda formation; negotiation and decisionmaking; implementation; and further development.
- The regime developed to limit and reverse ozone layer depletion illustrates each of these phases, and is justifiably regarded as an important and effective environmental regime.