CHAPTER **16**

Global Environmental Issues

There are no passengers on Spaceship Earth. We are all crew.'

MARSHALL MCLUHAN, *Understanding Media* (1964)

PREVIEW

The environment is often viewed as the archetypal example of a global issue. This is because environmental processes are no respecters of national borders; they have an intrinsically transnational character. As countries are peculiarly environmentally vulnerable to the activities that take place in other countries, meaningful progress on environmental issues can often only be made at the international or even global level. Nevertheless, international cooperation on such matters has sometimes been very difficult to bring about. This has occurred for a number of reasons. In the first place, the environment has been an arena of particular ideological and political debate. Disagreements have emerged about both the seriousness and nature of environmental problems and about how they can best be tackled, not least because environmental priorities tend to conflict with economic ones. Can environmental problems be dealt with within the existing socio-economic system, or is this system the source of those problems? Such debates have been especially passionate over what is clearly the central issue on the global environmental agenda, climate change. Despite sometimes catastrophic predictions about what will happen if the challenge of climate change is not addressed, concerted international action on the issue has been frustratingly slow to emerge. What have been the obstacles to international cooperation over climate change, and what would concerted international action on the issue involve? Finally, climate change is not the only issue on the global environmental agenda. Another issue of major concern is energy security, with some talking in terms of a new international energy order in which a country's ranking in the hierarchy of states is being increasingly determined by the vastness of its oil and natural gas reserves, or its ability to acquire them. To what extent has energy security reshaped global order, and are natural resources always a blessing?

KEY ISSUES

- How and why has the environment developed into a global issue?
- Do modern environmental problems require reformist or radical solutions?
- What are the causes and major consequences of climate change?
- How far has international action over climate change progressed?
- What obstacles stand in the way of international cooperation over climate change?
- How has energy security shaped conflict both between states and within states?

CONCEPT

Ecology

The term 'ecology' was coined by the German zoologist Ernst Haeckel in 1866. Derived from the Greek *oikos*, meaning household or habitat, he used it to refer to 'the investigations of the total relations of the animal both to its organic and its inorganic environment'. Ecology developed as a distinct branch of biology through a growing recognition that plants and animals are sustained by self-regulating natural systems – ecosystems – composed of both living and non-living elements. Simple examples of an ecosystem are a field, a forest or, as illustrated in Figure 16.1, a pond. All ecosystems tend towards a state of harmony or equilibrium through a system of self-regulation, referred to by biologists as homeostasis.

THE RISE OF GREEN POLITICS

The environment as a global issue

Although forms of environmental politics can be traced back to the industrialization of the nineteenth century, **ecologism** or green politics having always been, in a sense, a backlash against industrial society, the environment did not become a significant national or international issue until the 1960s and 1970s. This occurred through the emergence of an environmental movement that sought to highlight the environmental costs of increased growth and rising affluence, at least in the developed West, drawing attention also to a growing divide between humankind and nature. Influenced in particular by the idea of ecology (see Figure 16.1), the pioneering works of early green politics included Rachel Carson's *The Silent Spring* (1962), a critique of the damage done to wildlife and the human world by the increased use of pesticides and other agricultural chemicals, and Murray Bookchin's *Our Synthetic Environment* ([1962] 1975) which examined how pesticides, food additives and X-rays cause a range of human illnesses, including cancer. This period of the 1960s and 1970s also saw the birth of a new generation of activist NGOs (see p. 6) – ranging from Greenpeace and Friends of the Earth to animal liberation activists and so-called 'eco-warrior' groups – campaigning on issues such as the dangers of pollution, the dwindling reserves of **fossil fuels**, deforestation and animal experiments. From the 1980s onwards, environmental questions were kept high on the political agenda by green parties, which now exist in most industrialized countries, often modelling themselves on the pioneering efforts of the German Greens. The environmental movement addresses three general problems. These are:

- *Resource* problems – attempts to conserve natural materials through reducing the use of non-renewable resources (coal, oil, natural gas and so on), increasing the use of renewable resources (such as wind, wave and tidal power), and reducing population growth, thereby curtailing resource consumption.
- *Sink* problems – attempts to reduce the damage done by the waste products of economic activity, through, for example, reducing pollution levels, increasing recycling, and developing greener (less polluting) technologies.
- *Ethical* problems – attempts to restore the balance between humankind and nature through wildlife and wilderness conservation, respect for other species (animal rights and animal welfare), and changed agricultural practices (organic farming).

During the 1970s, environmental politics focused particularly on resource issues. This reflected a growing awareness that humankind lives in a world of 'global finiteness', an awareness reinforced by the oil crisis of 1973. A particularly influential metaphor for the environmental movement was the idea of 'spaceship Earth', because this emphasized the notion of limited and exhaustible wealth. Kenneth Boulding (1966) argued that human beings had traditionally acted as though they lived in a 'cowboy economy', an economy with unlimited opportunities, like the American West during the frontier period. However, as a space-

● **Ecologism**: A political ideology that is based on the belief that nature is an interconnected whole, embracing humans and non-humans, as well as the inanimate world.

● **Fossil fuels**: Fuels that are formed through the decomposition of buried dead organisms, making them rich in carbon; examples include oil, natural gas and coal.

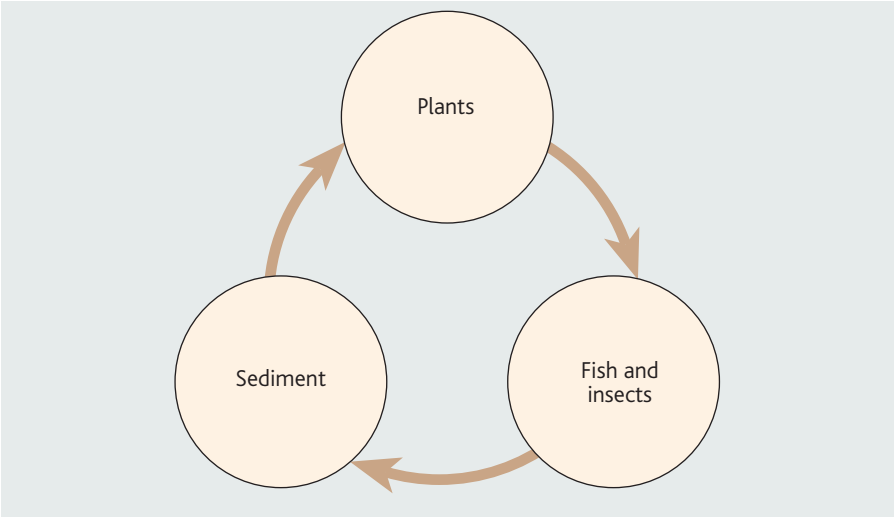


Figure 16.1 **A pond as an ecosystem**

ship is a capsule, it is a closed system and all closed systems tend to exhibit evidence of **entropy** in that they decay because they are not sustained by external inputs. Ultimately, however wisely and carefully human beings behave, the Earth, the sun and indeed all planets and stars are destined to be exhausted and die. Similar concerns about global finiteness were also highlighted by the unofficial UN report *Only One Earth* (Ward and Dubois 1972) and the report of the Club of Rome, *The Limits to Growth* (Meadows *et al.* 1972). The latter work had a stunning impact, in that it appeared to predict by extrapolating five variables – world population, industrialization, pollution, food production and resource depletion – that the world's oil supplies would run out by 1992. Although such predictions were subsequently revealed to be gross exaggerations, and despite widespread criticism of the methodology used, the idea of limits to growth dominated thinking about the environment for a decade or more.

Environmental issues also became an increasingly major focus of international concern. This reflected a growing awareness that environmental problems have an intrinsically transnational character: they are no respecters of borders. States are therefore environmentally vulnerable to the economic activities that take place in other states, a lesson that was reinforced during the 1970s by a growing concern about the regional impact of **acid rain** and by the truly global consequences of **ozone depletion** caused by emissions of man-made chemicals such as chlorofluorocarbons (CFCs) and halons. The first major international conference to be held on environmental issues was the 1972 UN Conference on the Human Environment (UNCHE) at Stockholm. The Stockholm conference also led to the establishment of the United Nations Environment Programme (UNEP), which is responsible for coordinating the environmental activities of states and international organizations to promote better regional and global environmental protection. However, the global recession of the 1970s and onset of the 'second Cold War' in the early 1980s subsequently pushed environmental issues down the international agenda. They were revived, in part, through the

● **Entropy**: A tendency towards decay or disintegration, a characteristic exhibited, sooner or later, by all closed systems.

● **Acid rain**: Rain that is contaminated by sulphuric, nitric and other acids that are released into the atmosphere by the burning of fossil fuels.

● **Ozone depletion**: A decline in the total amount of ozone in the Earth's stratosphere, particularly the development of a so-called 'ozone hole' over the Antarctic.

impact of environmental catastrophes such as the 1984 Bhopal chemical plant disaster and the 1986 Chernobyl nuclear disaster, but also by a growing recognition that environmental degradation was closely associated with the advance of globalization (see p. 9), encouraging many, particularly in the South, to link environmental and development issues. The 1987 Brundtland Commission Report, *Our Common Future*, exemplified this through its emphasis on 'sustainable development' (see p. 390), which subsequently provided the dominant mainstream framework for understanding and addressing environmental issues. The Brundtland Report prepared the way for the 1992 Rio 'Earth Summit' (see p. 153) (officially, the UN Conference on Environment and Development, or UNCED), which was held 20 years after the landmark Stockholm conference.

From the 1990s onwards, environmental debate increasingly focused on the issue of 'climate change' brought about through **global warming**. Initial concerns about climate change had focused on CFC emissions, but this shifted over time to the impact of so-called '**greenhouse gases**'. One of the consequences of the Earth Summit was the establishment of the UN Framework Convention on Climate Change (FCCC), the first attempt to stabilize greenhouse gas concentrations at a level that would prevent dangerous anthropogenic (human-induced) climate change. Responsibility for reporting on the implementation of the FCCC was invested in the International Panel on Climate Change (IPCC) (see p. 396), established in 1988. Nevertheless, it took until the 1997 Kyoto Protocol to the FCCC to agree measures to control emissions of greenhouse gases. Under the Kyoto Protocol, developed countries agreed to cut their emissions by an average of 5 per cent, usually against 1990 levels, during the 'commitment period', 2008–12. The 2009 Copenhagen Summit (see p. 403) was called to formulate a successor to Kyoto. However, in their different ways, Kyoto and Copenhagen both demonstrate the difficulty of achieving concerted and effective action on the issue of climate change. These difficulties relate, most basically, to the mismatch between state interests and the collective interests of the international community, as illustrated by the idea of the 'tragedy of the commons' (see p. 388). Potentially, this problem applies to all environmental issues.

Green politics: reformism or radicalism?

The environment is an arena of particular ideological and political debate. Disagreements about the seriousness and nature of environmental problems, and about how they can best be tackled, are rooted in deeper, often philosophical debates about the relationship between humankind and the natural world. Conventional political thought has subscribed to a human-centred approach to understanding, often called **anthropocentrism**. Moral priority has therefore been given to the achievement of human needs and ends, with nature being seen merely as a way of facilitating these needs and ends. In the words of the early liberal UK philosopher John Locke (1632–1704), human beings are 'the masters and possessors of nature'. Environmental thought, by contrast, is based on the principle of ecology, which stresses the network of relationships that sustain all forms of life including human life. However, green politics encompasses two broad traditions, which can be called reformist ecology and radical ecology.

● **Global warming**: An increase in the Earth's temperature, widely believed to be due to heat trapped by greenhouse gases, such as carbon dioxide.

● **Greenhouse gases**: Gases (such as carbon dioxide, water vapour, methane, nitrous oxide and ozone) that trap heat in the Earth's lower atmosphere (see The greenhouse effect, p. 397).

● **Anthropocentrism**: A belief that human needs and interests are of overriding moral and philosophical importance.

KEY EVENTS . . .

Major international initiatives on the environment

1946	International Convention for the Regulation of Whaling. This set up the International Whaling Commission (IWC) which attempts to preserve Great Whales by upholding an international moratorium on whaling.
1950	World Meteorological Organization (WMO) established as a specialized agency of the UN for meteorology (weather and climate) and related geophysical sciences.
1959	Antarctic Treaty, which set aside Antarctica, Earth's only continent without a native human population, as a scientific preserve.
1972	United Nations Conference on the Human Environment (UNCHE) in Stockholm, which laid the foundations for environmental action at an international level and prepared the way for the launch of the UN's Environmental Programme (UNEP).
1973	Convention on International Trade in Endangered Species (CITES), which aimed to ensure that international trade in wildlife and plants does not threaten their survival.
1982	UN Convention on the Law of the Sea, which defined the rights and responsibilities of countries in their use of the world's oceans and established guidelines for businesses, the environment and the management of marine natural resources (entered into force in 1994).
1985	Vienna Convention for the Protection of the Ozone Layer, which confirmed the existence of the Arctic 'ozone hole', and attempted to reduce the use of CFC gasses (entered into force in 1987).
1987	Brundtland Commission Report, which highlighted the idea of sustainable development.
1987	Montreal Protocol on Substances that Deplete the Ozone Layer, which provided for the phasing out of CFCs with the goal of the ozone layer having recovered by 2050.
1988	International Panel on Climate Change (IPCC) (see p. 396) established, which reports on the implementation of the UN Framework Convention on Climate Change (FCCC).
1992	UN Conference on Environment and Development (UNCED) held in Rio de Janeiro and commonly called the 'Earth Summit', which included conventions on climate change and biodiversity and established the Commission on Sustainable Development (CSD).
1997	Kyoto Protocol to the FCCC, which established a legally binding commitment by developed states to limit greenhouse gas emissions in a phased process. (Entered into force in 2005 with the first commitment period being 2008–12).
2009	The UN Climate Change Conference (see p. 403), commonly known as the Copenhagen Summit, convened to formulate a successor to the Kyoto Protocol.

Focus on . . .

The tragedy of the commons?

Will shared resources always be misused or overused? Does community ownership of land, forests and fisheries lead to inevitable ruin, and what does this imply about modern environmental problems? Garrett Hardin (see p. 404) used the idea of the 'tragedy of the commons' to draw parallels between global environmental degradation and the fate of common land before the introduction of enclosures. He argued that if pasture is open to all, each herder will try to keep as many cattle as possible on the commons. However, sooner or later, the inherent logic of the commons will remorselessly generate tragedy, as the number of cattle exceeds the **carrying capacity** of the land. Each herder calculates that the *positive* benefit of adding one more animal (in terms of the proceeds from its eventual sale) will always exceed the *negative* impact on the pasture, as this is relatively slight and, anyway, shared by all herders. As Hardin put it, 'Freedom in a commons brings ruin to all'. The idea of the 'tragedy of the commons' draws attention to the importance of the '**global commons**', sometimes seen as 'common pool resources', and of threats posed to these by overpopulation (a particular concern for Hardin), pollution, resource depletion, habitat destruction and over-fishing.

Is the 'tragedy of the commons' an unsolvable problem? Hardin himself agued in favour of strengthened political control, especially to restrict population growth, even showing sympathy for the idea of world government (see p. 457). Liberals, nevertheless, argue that the solution is, in effect, to abolish the commons by extending property rights, allowing the disciplines of the market (the price mechanism) to control resource usage. Although, as capitalism expanded, common land gradually became privately owned, it is more difficult to see how privatization could be applied to the global commons. Ostrom (1990) nevertheless argued that some societies have succeeded in managing common pool resources through developing diverse, and often bottom-up, institutional arrangements. However, others, particularly socialists and anarchists, reject the 'tragedy of the commons' altogether. Not only does historical evidence suggest that common land was usually successfully managed by communities (Cox 1985), as is borne out by examples such as the Aboriginal peoples of Australia, but the argument is also circular: its conclusions are implicit in the assumption that human nature is selfish and unchanging (Angus 2008). Indeed, ecosocialists would argue that selfishness, greed and the wanton use of resources are a consequence of the system of private ownership, not their cause. Community ownership, by contrast, engenders respect for the natural environment.

Reformist ecology

Reformist ecology seeks to reconcile the principle of ecology with the central features of capitalist modernity (individual self-seeking, materialism, economic growth and so on), which is why it sometimes called 'modernist' ecology. It is clearly a form of humanist or **'shallow' ecology**. The key feature of reformist ecology is that recognition that there are 'limits to growth', in that environmental degradation (in the form of, for instance, pollution or the use of non-renewable resources) ultimately threatens prosperity and economic performance. The watchword of this form of ecologism is sustainable development, especially what is called 'weak' sustainability. In economic terms, this means 'getting rich more slowly'. From the reformist perspective, damage to the environment is an **externality**, or 'social cost'. By taking account of such costs, modernist ecologists attempted to develop a balance between modernization and **sustainability**.

● **Carrying capacity**: The maximum population that an ecosystem can support, given the food, habitat, water and other necessities available.

● **Global commons**: Areas and natural resources that are unowned and so beyond national jurisdiction, examples including the atmosphere, the oceans and, arguably, Antarctica.

The chief ideological influence on reformist ecology is **utilitarianism**, which is based on classical liberal thinking. In that sense, reformist ecology practises what can be called 'enlightened' anthropocentrism, encouraging individuals to take account of long-term, not merely short-term, interests. The British utilitarian philosopher and politician John Stuart Mill (1806–73) thus justified a steady-state economy (one without economic growth) on the grounds that the contemplation of nature is a 'higher' pleasure. Peter Singer (1993) justified animal rights on the grounds that all species, and not just humans, have a right to avoid suffering. More generally, utilitarian thinking acknowledges the impact on the quality of human life of environmental degradation by recognizing the interests of future generations (see p. 391). The most straightforward case for conserving resources is therefore that it maximises the welfare or happiness of people, taking account of both the living and of people who have yet to be born. Finally, reformist ecology is defined by the means through which it would deal with environmental problems, as typified by the mainstream environmental movement. It tends to advocate three main solutions to environmental degradation:

- 'Market ecologism' or 'green capitalism'. This involves attempts to adjust markets to take account of the damage done to the environment, making externalities internal to the businesses or organizations that are responsible for them. Examples of this include **green taxes**.
- Human ingenuity and the development of green technologies (such as drought resistant crops, energy-efficient forms of transport and 'clean' coal). The capacity for invention and innovation that created industrial civilization in the first place can also be used to generate an environmentally-friendly version of industrialization.
- International regimes (see p. 67) and systems of transnational regulation. Global governance (see p. 455) offers the prospect that the impact of 'tragedy of the commons' can be reduced, even though it can never be removed.

Radical ecology

Radical ecology, by contrast, encompasses a range of green perspectives that call, in their various ways, for more far-reaching, and in some cases even revolutionary, change. Rather than seeking to reconcile the principle of ecology with the central features of capitalist modernity, these theories view capitalist modernity, and its values, structures and institutions, as the root cause environmental degradation. A variety of these perspectives can collectively be categorized as forms of **social ecology**, in that they each explain the balance between humankind and nature largely by reference to social structures. The advance of ecological principles therefore requires a process of radical social change. However, this social change is understood in at least three quite different ways:

- *Ecosocialism* advances an environmental critique of capitalism. For ecosocialists, capitalism's anti-ecological bias stems from the institution of private property and its tendency towards **'commodification'**. These reduce nature to mere resource and suggest that the only hope for ecological sustainability is the construction of a socialist society.

● **Shallow ecology**: A green ideological perspective that harnesses the lessons of ecology to human needs and ends, and is associated with values such as sustainability and conservation.

● **Externality**: A cost of an economic activity that has wider impact but does not feature on the balance sheet of a business or form part of the GDP of a country.

● **Sustainability**: The capacity of a system to maintain its health and continuing existence over a period of time.

● **Utilitarianism**: A moral philosophy that equates 'good' with pleasure or happiness, and 'evil' with pain or unhappiness, and aims to achieve 'the greatest happiness for the greatest number' (the principle of general utility).

● **Green taxes**: Taxes that penalize individuals or businesses for, for instance, the waste they generate, the pollution they cause, the emissions they generate or the finite resources they consume.

● **Social ecology**: The idea that ecological principles can and should be applied to social organization, a term originally used mainly by eco-anarchists.

● **Commodification**: Turning something into a commodity that can be bought and sold, having only an economic value.

Focus on . . .

Sustainable development: reconciling growth with ecology?

Can development be ecologically sustainable? Is there an inevitable tension between economic growth and protecting the environment? The idea of 'sustainable development' has dominated thinking on environmental and development issues since it was highlighted by the 1987 Brundtland Report. The Brundtland Report's highly influential definition of the term is: 'Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs. It contains two key concepts: (1) the concept of need, in particular the essential needs of the world's poor, to which overriding priority should be given, and (2) the concept of limitations imposed by the state of technology and social organization on the environment's ability to meet present and future needs.'

However, there is debate about what sustainable development means in practice, and about how growth and ecology can be reconciled. What is sometimes called 'weak' sustainability accepts that economic growth is desirable but simply recognizes that growth must limited to ensure that ecological costs do not threaten its long-term sustainability. This means, in effect, getting richer slower. Supporters of this view, moreover, argue that human capital can be substituted for natural capital, implying, for example, that better roads or a new airport could compensate for a loss of habitat or agricultural land. In this view, the key requirement of sustainability is that the net sum of natural and human capital available to future generations should not be less than that available to present generations. However, 'strong' sustainability, favoured by radical ecologists, rejects the pro-growth implications of weak sustainability. It focuses just on the need to preserve and sustain natural capital, seeing human capital as little more than a blight on nature. This is sometimes reflected in the belief that natural capital should be evaluated in terms of people's **ecological footprint**, an idea that has radically egalitarian implications.

● **Ecological footprint**: A measure of ecological capacity based on the hectares of biologically productive land that are needed to supply a given person's consumption of natural resources and absorb their waste.

● **Deep ecology**: A green ideological perspective that rejects anthropocentrism and gives priority to the maintenance of nature; it is associated with values such as bioequality, diversity and decentralization.

● **Ecocentrism**: A theoretical orientation that gives priority to the maintenance of ecological balance rather than the achievement of human ends.

- *Eco-anarchism* advances an environmental critique of hierarchy and authority. For eco-anarchists, domination over people leads to domination over nature. This implies that a balance between humankind and nature can only be restored through the abolition of the state and the establishment of decentralized, self-managing communities (Bookchin 1982).
- *Ecofeminism* advances an environmental critique of patriarchy (see p. 417). For ecofeminists, domination over women leads to domination over nature (Merchant 1983, 1992). As men are the enemy of nature because of their reliance on instrumental reason and their inclination to control or subjugate, respect for nature requires the creation of a post-patriarchal society.

While social ecology views radical social change as the key to ecological sustainability, so-called **'deep' ecology** goes further in emphasizing the need for paradigm change, a change in our core thinking and assumptions about the world. This involves rejecting all forms of anthropocentrism, and embracing **ecocentrism** instead. Deep ecology therefore advocates a radical holism that implies that the world should be understood strictly in terms of interconnectedness and interdependence (see p. 8). The human species is merely part of nature,

Focus on . . .

Obligations to future generations?

Do we have obligations towards future generations? In deciding how we should act, should we take account of the interest of people who have not yet been born? These questions are of relevance because it is in the nature of environmental matters that many of the consequences of our actions may not be felt for decades or even centuries. Industrialization, for instance, had advanced for some two hundred years before concerns were raised about the depletion of finite oils, gas or coal resources, or about greenhouse gas emissions. This has forced ecologists' ideas about intergenerational justice, suggesting that our obligations extend beyond the present generation to future generations, encompassing the living and the yet to be born.

Such 'futurity' has been justified in different ways. Care for and obligations towards future generations have sometimes been seen as a 'natural duty', an extension of a moral concern for our children and, by extension, their children, and so on. A concern for future generations has also been linked to the idea of 'ecological stewardship'. This is the notion that the present generation is merely the custodian of the wealth that has been generated by past generations and should conserve it for the benefit of future generations. However, the idea of cross-generational justice has also been criticized. Some argue that all rights depend on reciprocity (see p. 338) (rights are respected because of something that is done, or not done, in return), in which case it is absurd to endow people who have yet to be born with rights that impose duties on people who are currently alive. Moreover, in view of the potentially unlimited size of future generations, the burdens imposed by 'futurity' are, in practical terms, incalculable. Present generations may either be making sacrifices for the benefit of future generations that may prove to be much better off, or their sacrifices may be entirely inadequate to meet future needs.

no more important, nor more special, than any other part. Such ecocentric thinking has been constructed on a variety of bases, ranging from the new physics (particularly quantum mechanics) and systems theory to Eastern mysticism (especially Buddhism and Taoism) (Capra 1975, 1982, 1997) and pre-Christian spiritual ideas, notably ones that stress the notion of 'Mother Earth', as advanced in the so-called Gaia hypothesis (see p. 392). Deep ecologists have radically revised conventional ethical thinking, arguing that morality springs not from human beings, but from nature itself, and supporting the idea of **'biocentric equality'**. They are also fiercely critical of consumerism and materialism, believing that these distort the relationship between humankind and nature.

CLIMATE CHANGE

Climate change is not only the most prominent global environmental issue, but it is also, some argue, the most urgent and important challenge currently confronting the international community. However, the issue is bedevilled by controversies and disagreements. The most important of these are over:

- The *cause* of climate change: is climate change happening, and to what extent is it a result of human activity?

● **Biocentric equality**: The principle that all organisms and entities in the ecosphere are of equal moral worth, each being part of an interrelated whole.

Focus on . . .

The Gaia hypothesis: a living planet?

The Gaia hypothesis was developed by James Lovelock (1979, 1989 and 2006). It advances the idea that the Earth is best understood as a living entity that acts to maintain its own existence. At the suggestion of the novelist William Golding, Lovelock named the planet Gaia, after the Greek goddess of the Earth. The basis for the Gaia hypothesis is that the Earth's biosphere, atmosphere, oceans and soil exhibit precisely the same kind of self-regulating behaviour that characterizes other forms of life. Gaia has maintained 'homeostasis', a state of dynamic balance, despite major changes that have taken place in the solar system. The most dramatic evidence of this is the fact that although the sun has warmed up by more than 25 per cent since life began, the temperature on Earth and the composition of its atmosphere have remained virtually unchanged.

The idea of Gaia has developed into an ecological ideology that conveys the powerful message that human beings must respect the health of the planet, and act to conserve its beauty and resources. It also contains a revolutionary vision of the relationship between the animate and inanimate world. However, the Gaia philosophy has also been condemned as a form of 'misanthropic ecology'. This is because Gaia is non-human, and Gaia theory suggests that the health of the planet matters more than that of any individual species presently living on it. Lovelock has suggested that those species that have prospered have been ones that have helped Gaia to regulate its own existence, while any species that poses a threat to the delicate balance of Gaia, as humans currently do, is likely to be extinguished.

- The *significance* of climate change: how serious are the consequences of climate change likely to be?
- The *cures* for climate change: how can climate change best be tackled?

Causes of climate change

What is climate? Climate is different from weather: climate refers to the long-term or prevalent weather conditions of an area. As the US writer Mark Twain noted: 'Climate is what we expect; weather is what we get'. However, this certainly does not imply that the Earth's climate is stable and unchanging. Indeed, it has experienced wild swings throughout it 4.6 billion-year history. There have been numerous ice ages, interspersed with warmer interglacial periods. The last ice age occurred during the Pleistocene epoch, which ended about 10,000 years ago, during which glaciers on the North American continent reached as far south as the Great Lakes and an ice sheet spread over Northern Europe, leaving its remains as far south as Switzerland. By contrast, some 55 million years ago, at the end of the Palaeocene epoch and the beginning of the Eocene epoch, the planet heated up in one of the most extreme and rapid global warming events in geological history. Such changes resulted from a variety of developments: changes in the radiation output of the sun; changes in the Earth's attitude in relation to the sun (as the Earth's orbit alters from elliptical to circular and changes occur in its tilt and how it wobbles on its axis); variations in the composition of the Earth's atmosphere, and so forth. Over the past century, and particularly

APPROACHES TO . . .

NATURE

Realist view

Realism has traditionally paid little attention to environmental thinking and it would be highly questionable to suggest that realism can be associated with a particular conception of nature. Realism is certainly more concerned with survival than with sustainability. Nevertheless, it has addressed the issue of the relationship between humankind and the natural world in at least two senses. First, classical realists have often explained human behaviour and propensities in terms of those found in other animals and, indeed, in nature itself. Selfishness, greed and aggression have commonly been viewed as innate features of human nature, reflecting tendencies that are found in all species (Lorenz 1966). On a larger scale, the struggle and conflict that realists believe is an ineradicable feature of human existence has sometimes been traced back to the fact that nature itself is 'red in tooth and claw'. Conflict and war have thus been seen as a manifestation of 'the survival of the fittest', a kind of social Darwinism. Second, realists have acknowledged the importance of nature, in recognizing the role that scarcity, and therefore conflict over resources, often plays in generating international tensions. Such thinking has been particularly evident in the ideas of geopolitics (see p. 407), which is itself a form of environmentalism. It is also reflected in the idea that many, and perhaps most, wars are 'resource wars'.

Liberal view

In the liberal view, nature is viewed as a resource to satisfy human needs. This explains why liberals have rarely questioned human dominion over nature. Lacking value in itself, nature is invested with value only when it is transformed by human labour, or when it is harnessed to human ends. This is reflected in Locke's theory that property rights derived from the fact that nature has, in effect, been mixed with labour. Nature is thus 'commodified', assigned an economic value, and it is drawn into the processes of the market economy. Indeed, in emphasizing the virtues of free-market capitalism, classical liberals have endorsed self-interested materialism and economic growth, a position that many ecologists have linked to the rapacious exploitation of nature. The anti-nature or anti-ecological biases of liberalism can be seen to stem from two main sources. First, liberalism is strongly anthropocentric, by virtue of its belief in individualism (see p. 150). Second, liberals have a strong faith in scientific rationality and technology, encouraging them to adopt a problem-solving approach to nature and to place a heavy reliance on human ingenuity. Nevertheless, alternative traditions within liberalism reflect a more positive approach to nature. These include a modern liberal stress on human flourishing, which may be facilitated through the contemplation of nature, and a utilitarian emphasis on maximizing happiness and minimizing suffering, a stance that may be applied to other species or to future generations of humans (Singer 1993).

Critical views

The two critical theories that address the issue of nature most explicitly are feminism and green politics. Feminists generally hold nature to be creative and benign. This is a view that is most closely associated with ecofeminism. For most ecofeminists, there is an essential or natural bond between women and nature. The fact that women bear children and suckle babies means that they cannot live separated from natural rhythms and processes and this, in turn, means that traditional 'female' values (reciprocity, cooperation, nurturing and so on) have a 'soft' or ecological character. While women are creatures of nature, men are creatures of culture: their world is synthetic or man-made, a product of human ingenuity rather than natural creativity. Environmental degradation is therefore an inevitable consequence of patriarchal power. From the perspective of green politics, nature is an interconnected whole which embraces humans and non-humans as well as the inanimate world. Nature thus embodies the principles of harmony and wholeness, implying that human fulfilment comes from a closeness to nature, not from attempts to dominate it. This holistic view is embraced most radically by deep ecologists, for whom nature is the source or all value. Nature is thus an ethical community, meaning that human beings are nothing more than 'plain citizens' who have no more rights and are no more deserving of respect than any other member of the community (Leopold 1968).

during the last few decades, a new period of rapid climate change has been initiated, with temperatures climbing quickly from normal interglacial levels. This time, however, climate change has been largely, and perhaps entirely, the result of human activity.

During the 1990s, the issue of global warming due to climate change achieved a higher and higher profile on the international environmental agenda. This was due to the fact that environmental groups, such as Greenpeace and Friends of the Earth, increasingly made efforts to stop global warming the primary focus of their activities and because the establishment of the International Panel on Climate Change (IPCC) meant that there was, for the first time, a source of authoritative scientific statements on the issue. This latter development largely put paid to the first and most basic debate about climate change: is it actually happening? Until about 2004–05, a so-called 'denial lobby', sometimes funded by US oil companies, challenged the very idea of global warming, claiming that the data on temperature changes in the Earth's atmosphere was either inconclusive or contradictory. However, in 2005, a series of articles in the journal *Science* highlighted serious flaws in the data that had been used by 'denial lobbyists', helping to establish a new consensus: the world was getting hotter, and this was an incontrovertible fact. According to the IPCC's 2007 Fourth Assessment Report, eleven out of the twelve years between 1995 and 2006 ranked among the twelve warmest years since records began on global surface temperatures in 1850. The linear warming trend over the 50 years from 1956 to 2005 was nearly twice that for the 100 years from 1906 to 2005. However, while the fact of global warming was becoming more difficult to deny, the reasons for it remained a matter of sometimes passionate dispute.

Climate change 'sceptics' (as opposed to 'deniers') have called into question the link between global warming and human activity, specifically the emission of so-called greenhouse gases. They had done this by emphasizing that the Earth's climate is naturally variable even during an interglacial period. For example, during the so-called 'little ice age' which lasted until the second half of the nineteenth century, Europe and North America suffered from bitterly cold winters and Iceland was frequently ice-locked. Others attempted to establish links between temperatures on Earth and factors such as solar sun spot activity. In the USA, the Bush administration (2001–09), while not denying the fact of global warming or that a proportion of it was anthropogenic, skilfully exploited scientific disagreement over the exact relationship between greenhouse gases and climate change to cast doubt on the value of the larger project of tackling climate change. While climate change sceptics exploited uncertainty and scientific disagreement to justify political inertia, committed environmentalists did precisely the opposite in applying the **precautionary principle**. Nevertheless, over time, the relationship between the emission of greenhouse gases and climate change became more difficult to question. This occurred both as the science of climate change was better understood in terms of the 'greenhouse effect' (see p. 397) and because of an increasingly clear correlation between the rate of global warming and the level of greenhouse gas emissions. Whereas in its Third Assessment Report in 2001, the IPCC stated that it was '*likely*' that temperature increases were due to the observed increase in anthropogenic greenhouse gas concentrations, in its Fourth Assessment Report in 2007, it declared that such a causal link was '*very likely*', meaning that it was more than 90 per cent

● **Precautionary principle**: The presumption in favour of action in relation to major ecological and other issues over which there is scientific uncertainty, based on the fact that the costs of inaction vastly exceed the cost of (possibly unnecessary) action.

Deconstructing . . .

'CLIMATE CHANGE'

- The term 'climate change' has gradually replaced 'global warming' in official discussions about the phenomenon, at national and international levels. For instance, whereas UN reports had previously used both terms, by the establishment of the 1992 FCCC, only one reference was made to the idea of 'warming' and none to 'global warming'.

- Although there may be scientific reasons to prefer the term 'climate change' (for example, it allows for the possibility that temperatures may fall as well as rise), it is also a less frightening term than 'global warming'. The latter is more emotionally charged and has perhaps catastrophic connotations attached to it. The blander and seemingly neutral 'climate change' has thus been preferred by politicians and states reluctant to take urgent action on the issue.

- 'Climate change' has the advantage of being vague, specifically about its origins, in that it seems to cover both natural and human-induced changes to the climate. This vagueness, in turn, has tended to support the idea that there is uncertainty and controversy about the causes and consequences of the phenomenon. By contrast, 'warming' implies that there is an agent doing the warming, thus suggesting that human activity is the likely cause of the problem.

certain. Needless to say, the debate about the causes of climate change was politically vital because this affected not only whether the problem could be addressed, but also how this should be done.

Consequences of climate change

The prominence of the issue of climate change is linked to the idea that, if unaddressed, it will have catastrophic implications for human welfare and, possibly, for the future of humankind. How serious will the consequences of global warming be? What will be the impact of long-term climate change? The consequences of living on a warmer planet have, at times, been as keenly disputed as whether global warming is actually taking place and whether it is linked to human activity. This was particularly true in the early period of climate change research, when the impact of increased greenhouse gas emissions was thought to lie many decades into the future, the case for addressing the issue being linked

GLOBAL ACTORS . . .

INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE

Type: Intergovernmental organization • **Founded:** 1988 • **Location:** Geneva, Switzerland

The Intergovernmental Panel on Climate Change (IPCC) is an international panel of scientists and researchers that provide advice on climate change to the international community. The IPCC was established in 1988 by the World Meteorological Organization (WMO) and the United Nations Environment Programme (UNEP) to provide decision-makers and others interested in climate change with an objective source of information about an issue that had become increasingly complex and controversial. The IPCC does not conduct any research, nor does it monitor climate change-related data or parameters. Its role is to assess on a comprehensive, open and transparent basis the latest scientific, technical and socio-economic literature produced worldwide, with a view to better understanding (1) the risks of anthropocentric climate change, (2) its observed and projected impacts (3) and options for adaptation and mitigation.

Significance: The most significant work of the IPCC is in publishing reports, the most important being Assessment Reports. Hundreds of scientists all over the world contribute to these reports as authors and reviewers, drawing mainly on reviewed and published scientific literature. Four Assessment Reports have been produced to date, with a Fifth Assessment Report being developed for publication in 2014:

- *IPCC First Assessment Report: 1990*. This played a decisive role in leading to the FCCC, which was opened for signature at the Rio 'Earth Summit' in 1992.
- *IPCC Second Assessment Report: Climate Change 1995*. This provided key input for the negotiations that led to the Kyoto Protocol in 1997.
- *IPCC Third Assessment Report: Climate Change 2001*. This provided further information relevant to the development of the FCCC and the Kyoto Protocol.
- *IPCC Fourth Assessment Report: Climate Change 2007*. This provided more evidence of the link between climate change and anthropogenic greenhouse gas concentrations.

The wide membership of the IPCC, its reputation for objectivity and its reliance on worldwide scientific expertise gives the IPCC unrivalled influence in shaping how the international community understands, and responds to, the issue of climate change. In this respect, it has played the leading role in building a consensus amongst scientists and national politicians about the existence of climate change and the fact that it is a consequence of anthropogenic greenhouse gas emissions, and is therefore linked to the burning of fossil fuels. Its influence can thus be seen in the growing acceptance that climate change is an issue that demands the attention of the international community, making it increasingly difficult for countries such Russia, Australia, USA, China and India to remain outside the climate change regime. The IPCC was awarded the Nobel Peace Prize in 2006, together with Al Gore, the former US Vice President.

The IPCC has also attracted criticism, however. Some argue that its emphasis on already published scientific data and on exacting reviews (the Fourth Assessment Report took six years to produce) means that its judgements and conclusions are dangerously out of date, and therefore tend to underestimate the seriousness of the climate change challenge. The Summary for Policy Makers, the only bit of an Assessment Report that is read by most politicians and journalists, is a politically negotiated document that sometimes omits controversial judgements found in the larger report. Some scientists also challenge the basis on which IPCC projections and conclusions are developed; for example, IPCC projections about global warming are founded on assumptions about the capacity of the oceans to absorb carbon dioxide that many environmentalists dismiss as unsound. The IPCC has also been criticized for overstating its claims (not least the claim, found in the 2007 Report but retracted in 2010, that the Himalayan glaciers would disappear by 2035) and for sacrificing its reputation for scientific neutrality by being seen to campaign for radical cuts in emissions.

Focus on . . .

The greenhouse effect

The concepts behind the greenhouse effect were first discussed in the nineteenth century by scientists such as the British physicist John Tyndall (1820–93) and the Swedish chemist Svante Arrhenius (1859–1927). The sun is the only source of external heat for the Earth. Sunlight passes through the atmosphere during the day, heating up the surface of the Earth and releasing heat in the form of long-wave, infrared radiation. However, the presence in the atmosphere of greenhouse gases means that this radiation is absorbed and trapped in the lower atmosphere, thereby heating the Earth's surface (see Figure 16.2). In effect, our world is a natural greenhouse. The impact of the greenhouse effect can be demonstrated by comparing temperatures on the Earth to those on the moon, which does not have an atmosphere and on which night-time temperatures fall as low as -173˚C. By contrast, on Venus, which has a thick, carbon dioxide atmosphere, surface temperatures reach a blistering 483˚C.

Needless to say, the greenhouse effect is not necessarily a bad thing: were it not for heat-trapping gases such as carbon dioxide, solar radiation would be reflected straight back into space, leaving the world in the iron grip of frost. However, it is widely accepted that the increased emission of anthropogenic greenhouse gases – carbon dioxide, methane and nitrous oxide, the gases recognized in the Kyoto Protocol – is contributing to a significant trend of global warming. These gas emissions are a direct consequence of industrial activity and specifically the burning of fossil fuels. Atmospheric levels of carbon dioxide, the most important greenhouse gas, have risen from 280 parts per million (ppm) in pre-industrial times to 384 ppm in 2007.

more to our obligations towards future generations than to a concern about the present generation. However, the impact of climate change has occurred earlier and more dramatically than was anticipated, meaning that it can no longer be treated merely as a 'future generations' issue. Nevertheless, anxieties about climate change continue to have a marked future-looking character, as, even if robust action were to be taken shortly, its effects are certain to be felt more severely by today's children and their children.

In its 2007 Assessment Report, the IPCC noted a range of changes in weather events over the last 50 years, including the following:

- It is *very likely* (probability of at least 90 per cent) that cold days, cold nights and frosts have become less frequent over most land areas, while hot days and hot nights have become more frequent.
- It is *likely* (probability of at least 66 per cent) that heatwaves have become more frequent over most land areas.
- It is *likely* that the frequency of heavy precipitation events (or the proportion of total rainfall from heavy falls) has increased over most areas.
- It is *likely* that the incidence of extreme high sea levels has increased at a broad range of sites worldwide since 1975.

The human impact of climate change has been significant and is very likely to increase. Although more warmer days and nights and fewer colder days and

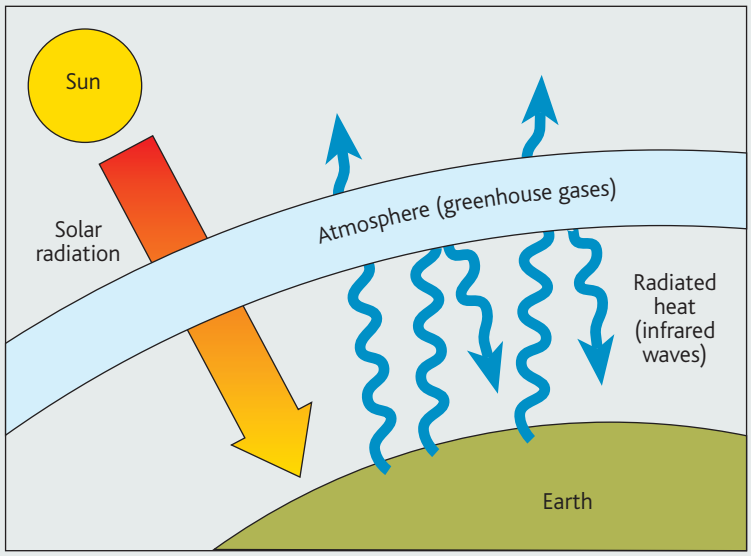


Figure 16.2 **The greenhouse effect**

nights over most land areas is likely to reduce human mortality from decreased cold exposure, most of the effects of climate change are negative. Increased tropical cyclone activity creates a greater risk of death and injury from flooding and from water- and food-borne diseases, and also leads to major displacement of populations. Since the mid-1990s, there has been a 40 per cent increase in Atlantic hurricane activities and, according to some scientists, the most powerful tropical cyclones now occur twice as often as they did 30 years ago. China has been particularly badly affected by flooding on the Yangtze, the Yellow River and on other rivers. The increased incidence of extreme high sea levels also causes a greater risk of death and injury by drowning, especially in the world's great river deltas, such as the Bengal delta in Bangladesh, the Mekong delta in Vietnam, the Nile delta in Egypt and the Yangtze delta in China. If current increases in sea level persist, one-sixth of the land area of Bangladesh could be lost to the sea by the middle of this century, if not earlier, leaving 13 per cent of the country's population with nowhere to live or farm. The prospects for people living in low-lying island groups, such as the Maldives, may be even bleaker, as these may disappear altogether. The greater incidence of drought and the advance of desertification will lead to an increased risk of food and water shortages, malnutrition and, once again, a greater risk of water- and food-borne diseases.

Climate change has affected all parts of the world, but it has not done so evenly. Africa and the Arctic (where sea-ice is shrinking by 2.7 per cent a decade) are likely to bear the brunt of climate impacts, along with low-lying small islands and the Asian river deltas. The IPCC estimates that by 2080, if current trends continue, anything from 1.2 to 3.2 billion people will be experiencing water scarcity, 200–600 million people will be malnourished or hungry and between two and seven million people a year will be subject to coastal flooding. However, the effects of climate change will be truly global, not least through its impact on migration trends and economic development. An estimated 200–850 million

people could be forced to move to more temperate zones by 2050 due to water shortages, sea level crises, deteriorating pasture land, conflict and famine, all linked to climate change. Together with widening gaps in birth rates and growing wealth-to-poverty ratios, climate change could therefore also lead to deepening ethnic and social tensions in developed societies. The economic consequences of climate change were highlighted by the Stern Review (2006), which pointed out that global warming could so disrupt economic and social activity that a failure to address it could mean global GDP being up to 20 per cent lower than it otherwise might be.

However, some environmentalists have painted still more dire images of the consequence of climate change, creating a number of 'catastrophe scenarios'. One of these is that the disappearance of the polar icecaps could result in an abrupt increase in temperature levels on Earth as white ice helps to keep the planet cool by reflecting back some 80 per cent of the sunlight that falls on it. Sea water, by contrast, absorbs sunlight and reflects back little. A second is that the melting of the planet's permafrost, the thick level of frozen soil covering much of the ground in the high latitudes of the northern hemisphere, could release trapped greenhouse gases, contributing to a major acceleration in global warming. A third is that the release of cold water through melting Artic ice could, in effect, 'turn off' the Gulf Stream, bringing freezing conditions to much of Northern Europe (the scenario highlighted in the 2004 Hollywood disaster movie *The Day After Tomorrow*). Others, however, have dismissed these catastrophe scenarios as scaremongering. The IPCC, for example, rates the likelihood of the Gulf Stream faltering during the twenty-first century as '*very unlikely*' (a probability of less than 10 per cent).

How should climate change be tackled?

The task of tackling climate change is notoriously difficult; some even fear that it may be impossible. It is instructive, in this respect, to compare efforts to deal with climate change with the response to the problem of ozone depletion. In the case of ozone depletion, there was little scientific disagreement about its cause (the emission of CFC gases from aerosols and other sources); there was general agreement that its consequences were negative and a recognition that they affected developed and developing states alike; and, most importantly, there was a straightforward solution available at an acceptable price – banning CFCs and switching to alternatives that could be developed economically. The Montreal Protocol of 1987 thus demonstrated how effective international cooperation on environmental matters can be. CFC emissions were reduced from the mid-1990s onwards, with a view to being completely phased out by 2030, allowing the ozone layer to recover completely by 2050. Climate change, by contrast, is profoundly difficult because its origins lie not in the use of particular substances or a specific productive process or set of commodities, but, arguably, in the process of industrialization itself. The burning of fossil fuels (coal, oil and natural gas) has not only been the basis for industrialization and thus the key to economic growth for the last 200 years or more, but it has also been the basis for greenhouse gas emissions that have resulted in global warming. Any serious attempt to address the problem of climate change must therefore either recast the nature of industrial society, providing an alternative to 'carbon industrialization', or make significant

sacrifices in terms of economic growth and therefore material prosperity. How far has international cooperation on climate change progressed, and what obstacles stand in the way of effective international action?

International cooperation over climate change

The Rio 'Earth Summit' of 1992 was the first international conference to give significant attention to the issue of climate change. It did so by establishing the FCCC as a 'framework convention', calling for greenhouse gases to be stabilized at safe levels on the basis of equity and in accordance with states' 'common but differentiated responsibilities and respective capabilities'. The clear implication was that developed states should take the lead, committing themselves to restoring 1990 levels of emissions by the year 2000. However, although it was accepted by 181 governments, the FCCC was no more than a framework for further action and it contains no legally binding targets. This was just as well for developed states, whose carbon emissions continued to rise during the 1990s. The exclusion of developing states in fact meant that the rate of increase got steeper, particularly due to the economic emergence of China and India.

The most significant international agreement on climate change was the Kyoto Protocol to the FCCC, negotiated in 1997. The significance of the Kyoto Protocol was that it set binding targets for developed states to limit or reduce their greenhouse gas emissions by 2012. The targets were designed to reduce total emissions from the developed world to at least 5.2 per cent below their 1990 levels. National targets varied, however, with the EU and the USA being set targets for reductions of 8 per cent and 7 per cent respectively, while other states, such as Australia, were allowed to exceed their 1990 levels. These targets were accompanied by 'flexibility mechanisms' that introduced a system of carbon trading that was designed to assist countries in meeting their targets. This established a 'cap and trade' approach to climate change, which has since become the dominant strategy for addressing the issue. Kyoto's strengths included that it introduced, for the first time, legally binding targets on greenhouse gas emissions, and by applying these targets to 41 developed states (so-called Annex 1 countries) it prepared the way for later participation of developing states, 137 of which ratified the Protocol. Furthermore, in providing a mechanism for **emissions trading**, it helped to promote the idea of carbon as a commodity and introduced a vital element of flexibility that made binding targets appear more acceptable. For example, emissions trading allows developed states to meet their targets in part through technology transfers and investment in the developing world, thereby, at least in theory, contributing to reducing their emissions levels. Critics of carbon trading nevertheless argue that it is a loophole that allows countries to exceed their targets and not take climate change sufficiently seriously, especially as the system is difficult to police and has given rise to many allegations of abuse.

However, the Kyoto Protocol also had significant limitations. In the first place, the targets set at Kyoto were, arguably, inadequate in terms of achieving the Protocol's goals of preventing 'dangerous anthropogenic interference with the climate system'. For example, the EU, which has taken a leading role in the campaign to address climate change, had called for greenhouse gas cuts of 15 per cent by 2010, almost three times greater than the Kyoto cuts and over a shorter

● **Emissions trading**: A mechanism that allows parties to the Kyoto Protocol to buy or sell emissions from or to other parties, while keeping within overall emissions targets.

time span. Second, the USA's failure to ratify the treaty, first through the Clinton administration's fear that the US Senate would not ratify the treaty and later through the Bush administration's outright opposition, dealt Kyoto a fatal blow and set the process of tackling climate change back for over a decade. This was not only because the USA, then the world's largest emitter, accounted for about 25 per cent of all greenhouse gas emissions, but also because US non-participation ensured that developing states, and especially China and India, would remain outside the Kyoto process. Third, the decision to restrict binding targets to developed states alone seriously compromised the Kyoto process from the outset. The USA consistently used the exclusion of China and India as a justification for its non-participation. Moreover, China's carbon emissions continued to rise steeply, and have exceeded those of the USA since 2008, meaning that climate change could no longer be seen merely as a developed world problem.

While the Kyoto Protocol was never going to be the solution to climate change, it provided a perhaps necessary first step along the road. Nevertheless, the faltering progress associated with Kyoto meant that, by 2005, global carbon dioxide emissions were rising four times faster than they were in the 1990s. One consequence of this has been a shift in emphasis away from '**mitigation**' towards 'mitigation and **adaptation**'. Key 'mitigation' technologies and practices identified in the 2007 IPCC Assessment Report include the following:

- Fuel switching from coal to gas
- The wider use of nuclear power
- The greater use of renewable heat and power (hydropower, solar, wind, geothermal and bio-energy)
- Early applications of carbon dioxide capture and storage (e.g. storage of CO_2 removed from natural gas)
- More fuel-efficient vehicles, such as hybrid and cleaner diesel vehicles
- Shifts from road transport to rail, public transport and non-motorized transport (cycling, walking)

The same report nevertheless highlights a range of 'adaptation' strategies, including the following:

- The relocation of settlements, especially coastal zones
- Improved sea walls and storm surge barriers
- Expanded rainwater harvesting and improved water storage and conservation techniques
- Adjustment of planting dates and crop varieties
- Crop relocation and improved land management (e.g. erosion control and soil protection through tree planting)
- Improved climate-sensitive disease surveillance and control

Nevertheless, there are signs that greater scientific agreement on the existence, causes and implications of climate change, together with shifting public attitudes, in part through the work of environmental NGOs, has strengthening international cooperation on the issue. Russia ratified the Kyoto Protocol in 2004, as did Australia in 2007. Most significantly, the election of Barack Obama in 2008, together with Democrat control of both houses of Congress (until

● **Mitigation**: Moderating or reducing the impact of something; in particular, reducing greenhouse gas emissions in order to limit climate change.

● **Adaptation**: Changing in the light of new circumstances; in particular, learning to live with climate change.

2011), appeared to mark a key shift in US policy, creating a willingness to participate in formulating a successor to the Kyoto Protocol, which runs out in 2012. What is more, despite China's unapologetic emphasis on largely coal-based industrial growth, the environmental costs of carbon industrialization have become increasingly apparent, through, for instance, heavily polluted cities (eight out of ten of the world's most polluted cities are in China), shrinking glaciers on the Tibet-Qinghai plateau and falling water tables across the country. This has created a growing likelihood that China and other developing countries would be more willing to address the issue of climate change and recognize that they have an interest in tackling it. This was the context in which the UN Climate Change Conference in Copenhagen took place in December 2009. However, the Copenhagen Summit has widely been seen as a severe disappointment, highlighting yet again the difficulties of achieving international agreement on the issue of climate change.

Why is international cooperation so difficult to achieve?

Effective international action to tackle climate change will only occur if solutions are found to a series of obstacles to international cooperation. The most significant of these obstacles are the following:

- Conflict between the collective good and national interests
- Tensions between developed and developing states
- Economic obstacles
- Ideological obstacles

The issue of climate change can be seen as a classic example of the 'tragedy of the commons'. What countries accept would be generally beneficial to all of them may not be the same as what benefits each of them individually. Clean air and a healthy atmosphere are therefore **collective goods**, key elements of the 'global commons'. However, tackling global warming imposes costs on individual states in terms of investment in sometimes expensive mitigation and adaptation strategies as well as accepting lower levels of economic growth. In such circumstances, states are encouraged to be 'free riders', enjoying the benefits of a healthier atmosphere without having to pay for them. It is entirely rational, therefore, for each actor to try to 'pay' as little as possible to overcome the problem of climate change. This creates a situation in which states are either unwilling to agree to binding targets, or if targets, binding or otherwise, are developed, these are likely to be set below the level needed to deal effectively with the problem. Moreover, the more economically developed a state is, the greater will be the costs incurred in tackling climate change, and the more reluctant such states will be to undertake concerted action. Democracy, in such a context, may create further problems, particularly as party competition tends to be orientated around rival claims about the ability to deliver growth and prosperity.

The second problem is that the issue of climate change exposes significant divisions between developed world and the developing world. Climate change, in other words, serves to widen the North–South divide (see p. 360). One source of tension is that current emissions levels arguably provide an unfair guide for

● **Collective good**: A general benefit from which individuals cannot be excluded and, as a result, for which beneficiaries have no incentive to pay.

GLOBAL POLITICS IN ACTION . . .

The UN Climate Change Conference in Copenhagen

Events: The UN Climate Change Conference, commonly known as the Copenhagen Summit was held during 7–18 December 2009. The purpose of the conference was to develop a successor to the Kyoto Protocol, which runs out in 2012. Some 163 countries participated in the Copenhagen Summit, with 101 of them being represented by heads of state and government, including President Obama and Chinese Premier Wen Jiabao. The key outcomes of the conference were outlined in the Copenhagen Accord, which was drafted by the USA, China, India, Brazil and South Africa in a process of sometimes frantic negotiations. The conference itself agreed merely to 'take note of' the Copenhagen Accord in its final plenary session. The Accord included the following:

- A pledge to prevent global temperature rises in the future of more than 2°C above pre-industrial levels.
- Developed countries will provide $30 billion for developing countries between 2010 and 2012 to help them cut emissions and adapt to climate change.
- By 2020, developing countries will be receiving $100 billion a year from developed countries, more than half of which will come from, as yet unspecified, private sources.
- Developed countries will submit plans for cutting emissions to the UN for inspection and monitoring.
- Developed countries, including emerging economies such as China and Brazil, will submit reports on their emissions which can be subjected to measurement and verification, although the mechanism for doing so was to be determined at a later date.

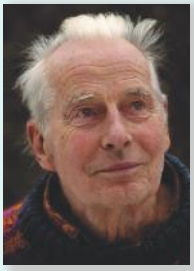
Significance: The Copenhagen conference has been seen by many within the environmental movement as a failure, perhaps of catastrophic proportions. Its key weakness is that it does not create any new legally binding obligations on any country to cut its emissions, nor does it contain any clear commitment to achieve these in the future. In this respect, Copenhagen was disappointing even by the standards of the admittedly flawed Kyoto process. The Copenhagen Accord did not even establish any non-legal targets for national or global emissions reductions. Furthermore, substantial vagueness surround the funds through which developed countries will supposedly support developing countries in reducing emissions, both in terms of where they will come from and how they will be used, and the verification processes that will apply to emissions reporting by developing countries. How can these failures be explained? The Copenhagen Conference has widely been viewed as a victim of both the reluctance of governments generally to take bold action on climate change in a context of a global recession, as well as of great power politics, with China, and to some extent other emerging economies, taking the opportunity to demonstrate their burgeoning influence in the light of the shifting balance of global power.

On the other hand, the Copenhagen Accord was judged to be a 'meaningful agreement' by the US government, and may have marked an advance over Kyoto in at least two ways. First, Copenhagen demonstrated the extent to which US policy has shifted. While the USA remained outside the Kyoto Protocol, at Copenhagen President Obama proposed to cut US emissions by 4 per cent on 1990 levels by 2020, signalling at least a conversion to the principle of legally binding targets. Similarly, while Kyoto imposed no obligations on developing countries to curb the growth of their emissions, at Copenhagen China and other emerging economies committed themselves to the goal of cutting emissions levels, even though this did not extend to establishing targets. In that sense, the Copenhagen Accord may be a step on the road to more concerted action on the issue of climate change. It should perhaps be judged in terms of preparing the ground for subsequent action, not in terms of its own specific achievements.

KEY THEORISTS IN GREEN POLITICS

Ernst Friedrich Schumacher (1911–77)

A German-born UK economist and environmental thinker, Schumacher championed the cause of human-scale production and advanced a 'Buddhist' economic philosophy (economics 'as if people mattered') that stresses the importance of morality and 'right livelihood'. His key work is *Small is Beautiful* (1973).


ARNE NAESS

Arne Naess (1912–2009)

A Norwegian philosopher who was influenced by the teachings of Spinoza, Gandhi and Buddha, Naess was the leading advocate of 'deep ecology', arguing that ecology should be concerned with every part of nature on an equal basis, because natural order has an intrinsic value. His writings include *Ecology, Community and Lifestyle* (1989).

Garrett Hardin (1915–2003)

A US ecologist and microbiologist, Hardin is best known for the idea of the 'tragedy of the commons' (1968). He developed an uncompromising form of ecologism that warned against the dangers of population growth and freedom. Hardin's chief works include *The Tragedy of the Commons* (1968) and *Lifeboat Ethics* (1974). .

Murray Bookchin (1921–2006)

A US libertarian socialist, Bookchin highlighted parallels between anarchism and ecology through the idea of 'social ecology', and was also strongly critical of the 'mystical' ideas of deep ecology, which he dubbed 'eco-la-la'. His major works in this field include *The Ecology of Freedom* ([1982]) and *Re-Enchanting Humanity* (1995).


MURRAY BOOKCHIN


CAROLYN MERCHANT

Carolyn Merchant (born 1936)

A US ecofeminist philosopher and historian of science, Merchant portrays female nature as the benevolent mother of all undermined by the 'dominion' model of nature that emerged out of the scientific revolution and the rise of market society. Her main works include *The Death of Nature* (1983) and *Radical Ecology* (1992).

Vandana Shiva (born 1952)

An Indian ecofeminist activist and nuclear physicist, Shiva is a trenchant critic of the biotechnology industry. She argues that the advance of globalization has threatened biodiversity and deepened poverty, particularly among women. Her writings include *Monocultures of the Mind* (1993) and *Stolen Harvest* (1999).


VANDANA SHIVA

See also James Lovelock (p. 77)

setting targets because of 'outsourcing'. The transfer of much of manufacturing industry to the developing world means that over a third of carbon dioxide emissions associated with the consumption of goods and services in many developed countries are actually emitted outside their borders. Deeper divisions nevertheless stem from rival approaches to the problem of burden-sharing in the area of climate change. From a Southern perspective, the developed world has a historic responsibility for the accumulated stock of carbon emitted since the beginning of the industrial age. In effect, developed countries have used up a large part of the safe carbon-absorbing capacity of the atmosphere, and made substantial gains in terms of economic growth and prosperity as a result. Developing countries, by contrast, are both disproportionately badly affected by climate change and have the fewest capabilities to tackle it, whether through mitigation or adaptation. This implies either that emissions targets should not be imposed on developing countries (as at Kyoto), or that any such targets should take account of historic responsibilities and be structured accordingly, imposing significantly heavier burdens on developed countries than on developing ones.

From a Northern perspective, however, countries cannot be held responsible for actions whose consequences were quite unknown at the time they were carried out, and, anyway, those who were responsible are largely dead and gone. In this view, targets should be set in line with *current* emission levels alone, in which case developed and developing countries would be treated alike. Apart from anything else, the growing importance of emerging economies such as China, India and Brazil means that unless the developing world plays a significant role in cutting emissions global targets will be impossible to meet. Nevertheless, tensions between developed and developing countries are even more acute if population size and per capita income are taken into account. For instance, although China has overtaken the USA as the world's foremost emitter, per capita emissions in the USA remain almost four times higher than in China (19.2 tons against 4.9 tons in 2010). Southern thinking on the matter tends to be rights-based, reflecting both the idea that each human being has an equal right to the world's remaining carbon space and the idea of a right to development (already exercised by the developed North). This suggests that emissions targets should clearly favour the developing world, where most of the world's people live, as well as most of the world's poor. Critics of the rights-based approach to tackling climate change nevertheless argue that it introduces egalitarian assumptions that do not apply to other aspects of life. For example, why should the use of the world's remaining carbon space be allocated equally when there is no agreement on the wider issue that natural resources should be equally shared?

Radical ecologists, including both social ecologists and deep ecologists, tend to argue that inadequate progress in responding to climate change has much deeper, and perhaps structural, roots. The problem is not simply a manifestation of the difficulty of bringing about international cooperation, but rather is about the underlying economic and ideological forces that have shaped capitalist modernity. As far as economic factors are concerned, criticism usually focuses on the anti-ecological tendencies of the capitalist system, at both national and global levels. In particular, profit-maximizing businesses will always be drawn towards the most easily available and cheapest source of energy: fossil fuels. Short-term profitability will dominate their thinking, rather than issues to do

Debating . . .

Can only radical action tackle the problem of climate change?

The divide in green politics between radicals and reformists is clearly reflected in competing approaches to tackling climate change. While some argue in favour of structural economic and ideological change, others champion less radical, and less painful, options.

YES

Dangerous delays. There is a wide and growing gap between the recognition of the problem of global warming and the introduction of effective international action. The failings of Rio, Kyoto and Copenhagen therefore mean that modest emissions cuts are no longer adequate. The general consensus is that global temperature rises of more than 2–3°C would mark the 'tipping point' in terms of dangerous human impact, while, according to the IPCC's 2007 prediction, these may increase by up to 6.4°C.

Myth of 'easy' solutions. Sadly, the strategies that are the least economically and politically problematical are also the least effective. Renewable energy sources are likely to make only a minor contribution to reducing the use of fossil fuels. Carbon trading has failed to produce significant emissions reductions. Technological 'fixes' for climate change, such as the use of so-called bio-fuels, carbon storing, 'clean' coal and nuclear power, have often proved to be expensive, ineffective or are associated with other environmental costs.

Economic restructuring. It is difficult to see how global warming can be addressed without changes being introduced to the economic system that has caused it. Market capitalism has proved to be a highly effective way of generating wealth, but it is, arguably, the enemy of ecological sustainability. Although ecosocialists' ideas have been increasingly derided, many environmentalists call for a radical restructuring of capitalism, in particular through the strengthening of state intervention to impose sustainable practices.

Post-material society. Economic restructuring is impossible if the values and appetites that sustain industrial society and 'growthism' go unchallenged. Concerted action on climate change thus has to have a cultural and psychological dimension. Materialism must be overthrown as the demand for 'more and more' is displaced by a steady-state economy based on 'enough'. Only if values and sensibilities alter will policy-makers at national and international levels have the political space to develop meaningful solutions to the problem.

NO

Exaggerated fears. Concern about climate change has been driven by a kind of environmental hysteria. Environmental NGOs try to grab public attention and shift attitudes by highlighting 'doomsday scenarios'. The mass media often conspire in this process to make the coverage of current affairs 'sexy' and attention-grabbing. Policy-makers may therefore adopt radical strategies, not so much to deal with the problem of climate change, but rather to allay public anxieties about the issue.

Adapt to change. Most environmentalists view global warming simply as something that must be stopped, based on the assumption that all of its impacts are negative. However, climate change may bring opportunities (new tourist destinations, improved plant viability and so on), as well as challenges. Moreover, the cost of stopping its negative impact may be unacceptably high. In these circumstances, it may be easier and more cost-effective to understand the implications of global warming and find ways of living with it.

Market solutions. Capitalism is resolutely not anti-green. Capitalism's environmental credentials are reflected in its responsiveness to more eco-sensitive consumer pressures, and the recognition that long-term corporate profitability can only be ensured in the context of sustainable development. Further, carbon usage is best discouraged not through strictures and prohibitions, but by market mechanisms that disincentivize carbon usage and incentivize the development of low-carbon or carbon-neutral technologies.

Human ingenuity. The capacity for innovation and creativity that lay behind carbon industrialization can surely be harnessed to build carbon-neutral businesses, industries and societies. Although investment in renewable energy sources is currently insufficient, its potential is enormous, especially if technology such as super-efficient wind turbines is utilized. Solar power plants, using solar cells, are becoming increasingly common in many parts of the world, and zero-carbon 'eco-cities' are being built in China, Abu Dhabi and elsewhere.

CONCEPT

Geopolitics

Geopolitics is an approach to foreign policy analysis that understands the actions, relationships and significance of states in terms of geographical factors, such as location, climate, natural resources, physical terrain and population. The field of geopolitics was significantly shaped by Alfred Mahan (1840–1914), who argued that the state that controls the seas would control world politics, and Halford Mackinder (1861–1947), who suggested, by contrast, that control of the land mass between Germany and central Siberia is the key to controlling world politics. Critics of geopolitics have usually objected to its geographical determinism, which appears to imply that in international politics 'geography is destiny'. The rise of globalization is sometimes seen to have made geopolitics obsolete.

with ecological sustainability. In this view, 'green capitalism' is merely a contradiction in terms. At an ideological level, countries' attachment to carbon industrialization may, in the final analysis, be a manifestation of the materialist values that dominate modern society, creating, deep ecologists argue, a profound disjuncture between humankind and nature. Materialism and consumerism mean that the economic and political systems are geared towards economic growth and the quest for rising living standards. From this perspective, the difficulties of tackling climate change stem not only from the problem of persuading people to forego at least a measure of their material prosperity, but, more challengingly, from the task of encouraging people to revise their values.

RESOURCE SECURITY

Although climate change has tended, since the late 1980s, to be the pre-eminent issue on the global environmental agenda, it is by no means the only important issue. Indeed, over very much the same period, non-renewable resources, and particularly energy resources, have come to be seen as having a growing bearing on matters such as security, development and conflict. In fact, in many ways, climate change and **resource security** have become counter-balancing priorities for states. For example, while climate change encourages states to reduce their use of fossil fuels, the quest for resource security encourages them to seek and to exploit new fossil fuel reserves. On the other hand, environmentalists have presented investment in renewable resources and non-carbon technologies as a 'green' road to resource security, although this only applies if such alternatives genuinely have the capacity to generate the same energy levels as fossil fuels. What is clear, though, is that concerns over the adequacy of natural resources to sustain human populations and ensure national power long predate concerns over climate change. They can be traced back to Thomas Malthus' (see p. 408) gloomy prediction that, due to the 'principle of population', living standards in any country would always return to subsistence levels. Although technological innovation and the discovery of new resources have tended to keep Malthusian pessimism at bay, history has been characterized by periods of anxiety, sometimes bordering on panic, over scarce resources. For example, in the nineteenth century the earliest industrial powers scrambled for control over sources of iron and coal, while after WWI the major European powers engaged in a desperate search for foreign sources of petroleum.

Anxieties about resources, nevertheless, subsided during the 1970s and 1980s, due both to the discovery of new, and seemingly abundant, fossil fuel supplies and because accelerated globalization appeared to have created larger and more responsive markets for energy and other resources. However, they have revived with particular force since the 1990s, moving the issue especially of energy security significantly up the international agenda. A growing number of wars, for example, appeared to be **resource wars** (Klare 2001). Geopolitics, once thought dead, had suddenly revived. Why did this happen? At least three developments help to explain it. First, the demand for energy, particularly oil, gas and coal, rose sharply through the arrival of new contenders on the global resources playing-field, notably China and India, but also, to a lesser extent, Brazil and other emerging economies. Second, the world's leading energy consumer, the USA, became increasingly concerned about its dwindling supplies of cheap domestic oil and its

● **Resource security:** Security understood in terms of access to energy and other resources sufficient to meet a state's economic and military needs.

● **Resource war**: A war that is fought to gain or retain control of resources which are important to economic development and political power.

Thomas Malthus (1766–1834)

A UK political economist and clergyman. Malthus was brought up according to the Enlightenment ideas of thinkers such as Jean-Jacques Rousseau (1712–78) and David Hume (1711–76). He became a Church of England minister in 1788. Malthus is best known for the views set out in his pamphlet, later expanded into a book in many editions, the *Essay on Population* (1798). Its key argument was that (unchecked) population growth will always exceed the growth of the means of subsistence, because population growth is exponential (or geometric) while the growth in the supply of food and other essentials is merely arithmetical. Population growth would therefore always result in famine, disease and war. While some have argued that Malthus' predictions were fundamentally flawed, as they took no account of improvements in agricultural and other technologies, others have suggested that his predictions have merely been postponed.

growing reliance on increasingly expensive, and less secure, foreign oil. Third, just as demand pressures intensified, anxieties concerns resurfaced. Fears grew generally that the world's stockpile of essential commodities had started to shrink, and these focused particularly on oil (Deffeyes 2005). Concern was raised not only by the seeming failure of new oil supplies to keep pace with burgeoning demand, but also, more alarmingly, by predictions (debunked by some) that the moment of **peak oil** may soon be reached. The world's oil may be running out, without any alternative energy source, renewable or non-renewable, appearing to be capable of replacing it. Such developments have both contributed to important shifts in global power as well as created turbulence and often conflict in countries 'blessed' by abundant supplies of oil and other resources.

Resources, power and prosperity

The link between resources and global power can be seen in the emergence of a new international energy order. In this, a state's ranking in the hierarchy of states may no longer be measured by conventional economic and military capabilities (see Elements of national power, p. 212), but by the vastness of its oil and gas reserves and its ability to mobilize other sources of wealth in order to purchase (or otherwise acquire) the resources of energy-rich countries (Klare 2008). This notion divides the world into energy-surplus and energy-deficit states, and further divides them on the basis of the level of their surplus and deficit. The key players in this international energy order are the USA, China and India, all energy-deficit countries, and Russia, an energy-surplus country. As far as the USA is concerned, a context of dwindling domestic reserves of oil and rising international prices has encouraged it to strengthen its geopolitical influence in the area with the most abundant oil supplies, the Gulf region. Many have thus argued that the 1991 Gulf War and the 2003 invasion of Iraq (see p. 131) were, in significant ways, motivated by such considerations about oil. One dimension of the 'war on terror' (see p. 223) may therefore have been the USA's concerns about energy security (Heinberg 2006).

● **Peak oil**: The point at which the maximum rate of petroleum extraction is reached.

Focus on . . .

The paradox of plenty: resources as a curse?

Are resources a blessing or a curse? Why are countries and areas that are richly endowed with natural resources often amongst the poorest and most troubled in the world? In the first place, natural resources can be seen to create a number of economic imbalances and difficulties. These include increased volatility in government revenues, which can lead to inflation and boom-and-bust cycles in government spending. Damage can be caused to other economic sectors as revenues from natural resource exports push up wages and the exchange rate (this is sometimes called the 'Dutch disease', from the fact that the discovery of natural gas in the Netherlands the 1960s led to declines in manufacturing industries). There can also be a dangerous lack of economic diversification, as other industries fail to develop because they cannot match the profitability levels of natural resources.

Second, natural resources can also have a damaging impact on the nature and quality of governance. This occurs both because huge flows of money from natural resources tend to fuel political corruption and because, as resource-rich countries have less need to raise revenue from the general public, they often pay little attention to popular pressures. There is therefore a link between abundant natural resources and authoritarianism. Third, natural resources can, and often do, breed conflict and civil strife. Conflict tends to occur over the control and exploitation of resources as well as over the allocation of their revenues, meaning that resource-rich societies are more prone to ethnic conflict, separatist uprisings and general warlordism. While 'diamond wars' have been common, if usually relatively brief, in Africa, oil-related conflicts, ranging from low-level secessionist struggles to full-blown civil wars, have occurred in countries as different as Algeria, Colombia, Sudan, Indonesia, Nigeria and Equatorial Guinea.

The economic emergence of China and India, sometimes collectively referred to in this context as 'Chindia', has transformed the world markets for oil, natural gas, coal, uranium and other primary sources of energy, as well as industrial commodities such as iron ore, copper, aluminium and tin. As far as China is concerned, the search for energy security has had implications for both domestic and foreign policy. Domestically, it has encouraged China to crack down on separatist movements and strengthen political control over western and south-western provinces such as Xinjiang and Tibet, which may provide access to central Asia and its rich supplies of oil and other resources. China's burgeoning external influence has focused on strengthening diplomatic ties with oil-rich countries such as Iran and, most clearly, undertaking massive investment in Africa, the home of the world's largest untapped energy and mineral supplies. China leads the modern 'scramble for resources' in Africa which, in some respects, resembles the late nineteenth-century 'scramble for colonies'. The new international energy order has particularly favoured Russia as the world's foremost energy-surplus state. Russia thus emerged from the collapse of communism and a decade of post-communist turmoil as an energy superpower. It now operates as a key power broker of Eurasian energy supplies, being able to exert substantial leverage through the growing dependency of EU and other states on Russian oil and natural gas. However, the quest for energy security has also encouraged Russia to strengthen its control over its 'near abroad' and especially

● **Resource curse**: The tendency for countries and regions with an abundance of natural resources to experience low growth, blocked development and, sometimes, civil strife.

over the oil-rich Caucasus region. This, for example, may have been one of the factors contributing to Russia's 2008 invasion of Georgia (see p. 232).

Natural resources, finally, are generally considered to be an unmixed blessing, widely being seen as one of the key components of national power. Energy, mineral and other resources provide a country not only with the basis for long-term economic development, but also with a means of gaining income from, and exercising influence over, other countries. Examples such as Saudi Arabia and other oil-rich Gulf states, Venezuela, Kazakhstan and, of course, Russia appear to bear this out. However, in practice, natural resources often bring as many problems as they bring blessings. This can be seen in the fact that many of the poorest and most troubled parts of the world are also characterized by abundant supplies of energy and minerals, with sub-Saharan Africa and the Middle East being obvious examples. This has lead to the idea of the '**resource curse**', sometimes called the 'paradox of plenty' (see p. 409).

SUMMARY

- The environment is often seen as the archetypal example of a global issue. The intrinsically transnational character of environmental processes means that countries are peculiarly environmentally vulnerable to the environmental activities that take place in other countries. Meaningful progress on environmental issues can therefore often only be made at the international or even global level.
- Disagreements about the seriousness and nature of environmental problems, and about how they can best be tackled, are rooted in deeper, often philosophical debates about the relationship between humankind and the natural world. Reformist and radical strategies are influenced by contrasting views about whether human needs (anthropocentrism) or larger ecological balances (ecocentrism) should take precedence.
- Climate change has dominated the international environmental agenda since the early 1990s. Although some disagreement persists, there has been a growing consensus that climate change is happening, and that it is the product of human activity, notably the emission, since the beginning of the industrial age, of greenhouse gases. However, substantial disagreement persists both about its consequences (and so the seriousness of the problem) and, most particularly, about how it should be tackled.
- Effective international action to tackle climate change is hampered by a variety of obstacles to international cooperation. The most significant of these are: (perhaps fundamental) conflict between national self-interest and the common good; tensions of various kinds between developed and developing states; biases within capitalism in favour of growth; and a deeply-rooted ethic of materialism and consumerism.
- Energy resources have come to be seen as having a growing bearing on matters such as security, development and conflict, particularly as access to oil, gas and coal has become a crucial factor in determining the shape of twenty-first century world order. However, it is by no means clear that natural resources are always a source of national power, in that resources may be a 'curse' when they, for instance, create economic imbalances and attract unwanted foreign interference.

Questions for discussion

- Why have environmental issues become an increasingly major focus of international concern?
- How does 'shallow' ecology differ from 'deep' ecology?
- What are the implications of the idea of sustainable development?
- Do we have obligations towards future generations, and if so, what does this imply?
- Can it any longer be doubted that climate change stems from human activity?
- Have the negative consequences of climate change been exaggerated?
- Should developed countries take primary responsibility for tackling climate change?
- Should greenhouse gas emissions targets be set on a per capita basis?
- Do concerns about resource security always conflict with those about climate change?
- To what extent are natural resources a 'curse'?

Further reading

Betsill, M., K. Hochstetler and D. Stevis (eds) *International Environmental Politics* (2006). An authoritative collection of essays that review the key debates in international environmental politics.

Dessler, A. and E. Parson *The Science and Politics of Global Climate Change* (2010). A clear and accessible introduction to the nature of global climate change and the challenges it poses.

Elliott, L. *The Global Politics of the Environment* (2004). A comprehensive and detailed examination of the nature and development of global environmental issues.

Laferrière, E. and P. Stoett *International Relations Theory and Ecological Thought: Towards a Synthesis* (1999). A stimulating examination of the overlaps between international relations theory and ecophilosophy.

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Companion Website

Links to relevant web resources can be found on the *Global Politics* website