14. The Environment

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Reader's Guide
Introduction

The environment raises many questions of normative political theory. Environmental phenomena such as climate change, biodiversity loss, natural resource use and depletion, air pollution, the disposal of plastics into oceans, and nuclear energy all raise important ethical questions with which citizens and politicians must grapple. They must decide whom they will hold responsible for preventing climate change, whether it is appropriate for them to use nuclear energy, and how to weigh the cost of losses of biodiversity involved in projects like building dams against the benefits like economic growth that they may produce.

When addressing such challenges, political activists and politicians often appeal to concepts like ‘sustainability’ and ‘sustainable development’, but what do these mean, and what implications do they have? For example, do they, as some suggest, call for abandoning economic growth as an overriding policy objective? Some even argue that tackling global environmental problems calls for policies to reduce world population size. Is this permissible?

Finally, we might ask what implications protecting the environment has for existing political institutions. Some, for example, think that modern democratic systems are unable to cope with the challenges posed by environmental degradation.

This chapter aims to explore some of these issues. Before we consider the normative issues, however, we need to complete two preliminary tasks.

The environment and its relationship to humanity
First, we need to clarify what should be included under the heading of the ‘environment’. One helpful account is given by the distinguished environmental historian, J. R. McNeill. In his influential work, *Something New Under the Sun: An Environmental History of the Twentieth-Century* (2000), McNeill treats all of the following as features of the earth’s environment:

- the ‘lithosphere’ (the earth’s crust) and the ‘pedosphere’ (the earth’s soil and the natural resources it contains);
- the ‘atmosphere’ (the air that surrounds the earth, and which includes gases such as nitrogen and oxygen);
- the ‘hydrosphere’ (the earth’s water—which is located in aquifers underneath the earth’s surface, in ice and glaciers, and in oceans, rivers, seas, and lakes); and
- the ‘biosphere’ (by which McNeill means ‘the space inhabited by living things, from the ocean depths to the mountaintops’ (McNeill 2000, 192)), including agriculture and forests (and, for McNeill, nonhuman animals, although I will set that aside here).

Environmental issues then may be quite varied. We might, for example, be concerned about the pedosphere (consider, for example, soil erosion and desertification) or the state of the atmosphere (consider air pollution in cities or the depletion of the ozone layer). We might be concerned about the hydrosphere (for example, water shortages, or marine pollution) or the biosphere (for example, the extinction of plant species and the loss of biological diversity). Note that although we can distinguish between different features of the environment—such as the biosphere and atmosphere—this does not mean that they do not affect each other. On the contrary, they are deeply interrelated and many environmental problems affect a number of the separate features mentioned above.

With this definition in mind we can now turn to the second preliminary issue. Since this chapter explores the normative political questions that are raised by humanity’s relationship to the environment, it is essential to provide an empirical overview of this relationship to help frame the arguments that follow. In particular, it is necessary to introduce two key points since they lie at the heart of most environmental problems.

The first point is simply that human beings have many significant and long-lasting impacts on the natural world (let us call this the *environmental impacts claim*), and the second is that much of what we value has environmental preconditions (let us call this the *environmental preconditions claim*). The main environmental problems arise because people often have impacts on the natural world that destroy part of what we value in the natural world and they undermine the environmental preconditions for enjoying the standard of living to which people are entitled. This is obviously a problem.
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The two claims introduced above are rather abstract. To see what is at stake we now need to consider each in turn and illustrate them with concrete examples. Consider first the environmental impacts.

**Claim 1: Humanity’s environmental impacts.**

As a species, we affect the environment in very many ways. Consider, for example, the use of fossil fuels. Humanity is currently highly dependent on fossil fuels like coal and oil. We use them to generate energy—energy needed for most aspects of our lives, whether it is cooking, heating, cooling, lighting, transportation, using computers, construction, and manufacturing. However, burning fossil fuels emits carbon dioxide, and a higher concentration of carbon dioxide in the atmosphere contributes to climate change. The use of fossil fuels is, of course, not the only relevant factor. Our agricultural practices also play a significant role. In particular, the use of fertilizer emits nitrous oxide and livestock emits methane—both very powerful greenhouse gases. An additional way in which humans affect the climate system is through deforestation. Forests contribute to mitigating climate change because they absorb carbon dioxide. However, many societies have engaged in deforestation and thus have increased the volume of greenhouse gases in the atmosphere.

Climate change is far from being the only example of ways in which human activity affects the environment. Another example is the use of chlorofluorocarbons (CFCs). These were often used in fridges and air-conditioning. However, they—and other gases—contribute to the depletion of the earth’s ozone layer. Recognition of this led to the Montreal Protocol on Substances that deplete the Ozone Layer (1987).

For another example consider the emission of chemicals into the atmosphere. Many factories release sulphur dioxide and nitrogen oxide into the atmosphere, thereby creating ‘acid rain’, often affecting places hundreds of miles away including in other countries. (McNeill, 2000, 99–102).

Humans also exert a considerable influence on the biosphere. A massive increase in agriculture, bringing with it a loss of grasslands and extensive deforestation has destroyed habitats and thus reduced biodiversity (McNeill and Engelke, 2014, 88–91). In addition to this, the construction of dams and the release of pollution in rivers and lakes have reduced aquatic biodiversity (McNeill and Engelke, 2014, 91–7). The use of fertilizer has resulted in high nitrogen levels in rivers and lakes which has brought about the formation of algal blooms which, in turn, has led to the death of marine life (Ellis, 2018, 63; McNeill and Engelke, 2014, 91–2).

In addition to the above, humanity affects the natural world in many other ways—including the use of non-renewable resources; the competition to use resources from the ocean sea-bed; the creation of nuclear waste; and the widespread use of plastics (which now results in plastics affecting the seas and oceans, and wildlife).
The magnitude of humanity’s impact on the natural world has recently led some to say that we have now entered a new phase in the world’s history and a new unit of geological time, what they term the ‘Anthropocene’ (Crutzen, 2002; Steffen et al., 2011, 2015). In 2009 a Working Group of the Anthropocene was set up by the Sub-commission of the Quaternary Stratigraphy to evaluate these claims. It has yet to report formally. However, a majority of the members of the Working Group decided in 2016 that we had begun a new epoch and that the Anthropocene can be dated to 1950 (Zalasiewicz et al., 2017). Much controversy still surrounds the precise meaning of the term Anthropocene and when it can be said to have begun (Ellis, 2018). However, few doubt the claim that humanity has a deep and long-lasting effect on the planet.

In short, then, while the above list is not exhaustive, it gives a sense of the ways in which humanity is affecting the natural world.

Claim 2. Environmental Preconditions.

Let us turn now to the second claim—the environmental preconditions claim. As we shall see, while theories of justice differ in their account of exactly why the environment matters, one point that emerges is that most (if not all) of them do hold that the state of the environment considerably affects the extent to which people can enjoy their just entitlements.

To see why many will be concerned about the state of the environment it is helpful to consider several contemporary environmental issues. Consider, for example, the ozone layer. This protects people from ultraviolet light and its erosion can lead to skin cancer and eye cataracts.

We might also consider climate change (which will be discussed more fully in the case study at the end of this chapter). The increased temperatures, severe weather events and rising sea levels that are associated with climatic change will severely harm many aspects of human (and non-human) life. Climate change will, for example, lead to an increase in diseases and thereby threaten the health of many. In addition to this it will result in death from heat stress and severe weather events like storm surges. Temperature increases will also result in desertification and crop failure and thus contribute to hunger, malnutrition and poverty. In light of these (and other effects), it is widely argued that humanity must reduce its emission of greenhouse gases and move to a zero-carbon world (Barros et al., 2014; Edenhofer et al., 2014; Field et al., 2014).

Alternatively, we could consider biodiversity loss. As noted, many environmental scientists have expressed grave concern about threats to the biosphere and the very high rates of biodiversity loss. One reason they do so is that biodiversity enables the provision of food. It contributes to people’s health (it often enables the discovery of new medicines), it helps the regulation of weeds and insects, and it provides materials that are valuable for making products as well as for industry more generally (Gaston and Spicer, 2004, 92–6). More generally, it contributes in
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‘indirect’ ways, enabling ecosystems to function by providing fertile soil, an inhabitable atmosphere and essential water services (Gaston and Spicer, 2004, 98–103). Environmental scientists maintain that biodiversity promotes what they term ‘provisioning services’, by which they mean that it promotes crop yield, timber, fodder and fish yield, and that it provides ‘regulating processes and services’, which includes protecting plants from invasion and infections, enhancing their capacity to store carbon, and increasing soil organic matter (Cardinale et al., 2012, 62).

In addition, the emission of aerosols into the atmosphere is very harmful to human health. For example, air pollution in towns and cities causes premature deaths, and the air pollution from cooking biomass and coal indoors can lead to respiratory infections, tuberculosis, and cancer among other things (Wilkinson, Smith, Joffe, and Haines, 2007, 967).

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Key points:

• The environment includes the earth’s crust, soil and natural resources; the atmosphere; all the earth’s water; and the biosphere.

• Human activity has a profound impact on the environment. Many of the activities that we engage in (activities which often serve important human interests and goals) result in environmental degradation.

• Persons depend on the environment in many ways (for their food, health, and for many of their goals in life).

• We face a problem when we impact on the environment to such an extent that it undercuts people’s capacity to enjoy the standard of living to which they are entitled.

Justice, value, and the environment

Having prepared the ground we can now examine four sets of questions. The first set concern why the environment matters. It might seem obvious that the environment matters, but it is worth exploring why it matters and what is wrong with environmental degradation. As we will see, people disagree about what kind of environmental change matters, and thus about what measures can and should be taken.

Some think that many of the environmental phenomena mentioned above—climate change, ozone depletion, acid rain, pollution—are cases of injustice. In what sense, however, are they? To answer this we need to explore the relationship between our understanding of justice, on the one hand, and the environment on the other. An example helps illustrate the
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Martha Nussbaum (2006) and Amartya Sen (2009, Part III) have argued that justice requires the protection of what they term ‘capabilities’. Sen does not give a detailed account of the content of these capabilities. Nussbaum, however, does. She argues that justice requires the protection of the following: ‘life’, ‘bodily health’, ‘bodily integrity’, ‘senses, imagination, and thought’, ‘emotions’, ‘practical reason’, ‘affiliation’, ‘other species’, ‘play,’ and ‘control over one’s environment’ (Nussbaum, 2006, 76–8).

Now if we connect this with the environment, Nussbaum’s view would entail that people are entitled to the kind of environment needed to enjoy these kinds of capabilities (Schlosberg, 2012). This would include ensuring an environment that can sustain capabilities such as ‘life’, ‘bodily health’ and thus food. In addition to this, the environment does not simply affect fundamental necessities that are needed for basic survival, such as food and water. It also affects people’s capabilities to exercise their ‘imagination’, their ‘emotions’ and their capacity for ‘play’.

As Schlosberg notes, environmental changes (such as habitat loss or rising sea-levels) will compel some to leave their traditional homelands and this enforced dislocation can undermine their capabilities for mental health and emotional attachments and loyalties (Schlosberg, 2012). Drawing on this line of reasoning, some conclude that climate change should be seen as a ‘cultural injustice’ (Heyward, 2014). In addition to the above, externally imposed environmental change—especially rapid, unpredictable, and dramatic change—also clearly undermines what Nussbaum terms ‘control over one’s environment’.

Some, of course, may be unpersuaded by the capabilities approach. Many thinkers, including Rawls and Dworkin among many others, do not endorse it (See Chapter 6). It is worth then noting other values. Consider, for example, the concept of human rights (See Chapter 11). This is a key moral value and can be endorsed by adherents to a wide variety of different philosophical perspectives. Someone who adopts a human rights perspective might then argue that the environment matters at least in part because environmental degradation undermines core human rights to food and water, to health and to life. Climate change, for example, threatens each of these (Caney, 2010b). So too does biodiversity loss for, as noted above, biological diversity is needed for ensuring that people have enough food and for protecting health.

A critic might ask whether this is true of all human rights theories. What about libertarian approaches like Nozick’s (1974), which emphasize negative rights of non-interference (See Chapter 2 and Chapter 6)? In reply, it is worth noting that some environmental phenomena impact on core libertarian commitments such as the right to private property and the right to physical integrity. Both of these are jeopardized by climate change (Davidson, 2008, 20–4, 42–3, 132–3). Rising sea levels and severe weather events will, for example, destroy many people’s property.
Climate change will also lead to loss of life. Think of severe weather events involving flooding or death from heat stress. Or consider acid rain. This harms people’s property and their health. Furthermore, these harms are occurring because of other humans’ behaviour. A libertarian would think that there is no injustice if the harms wholly arose from natural phenomena and were not caused by humans. But that is not the case for the environmental phenomena we are discussing, like climate change, biodiversity loss, or acid rain.

At this point someone might note that these harms arise from the behaviour of very many people interacting together. However, it is not clear why that should entail that those whose property is destroyed or whose life is taken are not being treated unjustly. Should it make a difference whether my land is submerged because of one person (say, a neighbour who diverts water onto my land) or whether my land is submerged because of the actions of thousands (say, through their greenhouse gas emissions)? The relevant points here—from a libertarian point of view—seem to be that my land has been destroyed and that others did it to me. So libertarians, the argument would go, have reason to be concerned about environmental degradation and phenomena like climate change.

Three further points should be noted. First, the theories mentioned so far have all emphasized the importance of the environment. One important question that remains is: Can we replace environmental losses with other goods? Are environmental goods, such as natural resources, in some way, substitutable? Our answer to this question will make a considerable practical difference for if they are substitutable then we can use up more natural resources as long as we provide satisfactory substitutes in the form of capital, technology or knowledge. This is the kind of view taken by many economists. Others will argue that some kinds of loss simply cannot be made up for by providing other goods. The debate is about different kinds of sustainability. Proponents of what has been termed ‘weak sustainability’ allow that there are substitutes for the loss of natural resources, whereas proponents of what has been termed ‘strong sustainability’ deny this in at least some cases (Beckerman and Pasek, 2001: Ch 5, esp 74–6; Neumayer, 2003). The two kinds yield different accounts of ‘sustainable development’. If we use the weak account, ‘sustainable development’ will refer to economic development

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Key concept 14.1 Environmental Sustainability

The root idea of ‘environmental sustainability’ is of ensuring the continued existence of the environment in the future. It is a widely accepted ideal (few would say that they are against environmental sustainability) but, perhaps for that reason, it is also one that it is
interpreted in very different ways. In his comprehensive analysis of environmental sustainability, Andrew Dobson (1998) notes that exactly how people define environmental sustainability will include several components. First, an account of environmental sustainability will (i) specify what features of the environment should be sustained. (For example, should it be defined in terms of sustaining what Dobson terms ‘critical natural capital’ by which he means the environmental preconditions of human functioning (Dobson 1998, 43)? Or should it be concerned with sustaining those aspects of the environment whose loss is ‘irreversible’ (Dobson 1998, 47)? Or something else?) Our notion of environmental sustainability will also include (ii) an account of why it is good to preserve the environment and (iii) specify our primary motivation (is it because the natural world has intrinsic value or because of its benefits to people or both or something else?). In addition to this, accounts of environmental sustainability will also state (iv) what kinds of actions or policies are compatible with this conception of sustainability, and (v) whether it is possible and/or permissible to substitute the loss of natural resources by creating substitutes (Dobson, 1998, 39ff).

that allows the use or destruction of natural resources if and because people create adequate substitutes. And if we use the strong account, ‘sustainable development’ will refer to development that does not permit the destruction of certain kinds of natural resource on the grounds that they are non-substitutable. (For a more complex framework see Dobson (1998).)

A second point to note is that the emphasis so far has been entirely on how the environment is valuable for human beings. We should, however, ask whether this focus is too narrow. Some, for example, will argue that other animals have moral status and thus the impact of environmental degradation on their interests should be taken into account (Cripps, 2013: Ch). Vegetarians and vegans, for example, will obviously think that the interests of nonhuman animals should be included. Note, however, that even those who do not think it wrong to eat meat might still think it wrong to act in ways that cause harm to non-human animals when that harm is avoidable and unnecessary. They might thus object to causing desertification or flooding that results in the unnecessary and painful death of animals.²

Emphasizing the importance of the interests of animals draws in a wider range of considerations than concentrating on human interests. However, our focus can be expanded even further. Some others will argue that the natural world has value in itself and will thus deny that its value is reducible to the effects it has on human (or even sentient) life.

To evaluate these views about non-human animals and about the intrinsic value of the natural world it is worth considering an example. Consider,
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the spread of plastics into oceans. Each year, it is reported, humans add between 4.4 and 12.7 million metric tons of plastic into the oceans (Borrelle et al., 2017). As a result the oceans are full of microplastics, fish and sea life digest plastics, there are enormous collections of plastic swirling around in the world’s oceans, and islands across the world have beaches strewn with plastic as well as other human debris. This is avoidable because we can reduce our use of plastics and because we can recycle them or use biodegradable materials. To focus the mind, consider the case of Henderson Island in the South Pacific Ocean. It is uninhabited and far from human civilization. The nearest major industrialized centre is 5,000 km away. Two scientists reported that there were at least 37,661,395 plastic items on this small island (of 5x7km) and that this was a very conservative estimate because it excluded all the very small items and items buried more than 10cm beneath the surface (Lavers and Bond, 2017).

Suppose we consider this marine pollution and ask what is wrong with it. One response would be to appeal to its effects on human beings. It has been argued that the massive amounts of microplastics that now exist in the world’s oceans jeopardize human health (because people eat seafood that has ingested the microplastics) (Borrelle et al., 2017). This gives us a reason to curb the practice of dumping plastics into the oceans. However, it is worth asking whether this fully explains why people find the description of Henderson Island and ocean plastics more generally disturbing.

A second response might be to argue that at least part of the reason many people now strongly oppose dumping plastics in the world’s oceans stems from a belief that these human practices treat nonhuman animals—our fellow creatures on the planet—in unacceptable ways. A huge proportion of fish and seabirds, for example, have swallowed plastic, leading in many cases to death. When we reflect on the plight of these animals we might think that we have duties not to engage in such harmful practices.

Third, some might think that neither of the first two responses completely explains what is troubling about all the plastic in the oceans and islands like Henderson Island. They might think that it is just intrinsically wrong to despoil the environment in this way—especially if it is gratuitous and avoidable. That is, it is wrong independently of its effects on humans and other animals. This third point of view condemns the attitude to the natural world expressed by a ‘throw away’ culture that treats the world’s oceans like a gigantic rubbish bin.

In short, we might have three distinct kinds of reasons for caring about the natural world. Our concern might be grounded in a commitment to people’s rights, a commitment to the interests and rights of nonhuman animals, or a commitment to the intrinsic value of the natural world.
At this point, however, we need to introduce a third point. Our focus has been on reasons to be concerned about the protection of the environment. However, we also need to look at the activities that cause environmental degradation. It might be tempting to say that people should simply stop acting in ways which impact on the environment, but this is too quick. Many of the activities that have environmental impacts serve important human interests. For this reason, we need to strike a balance between, on the one hand, the use of the environment to maintain the rights we think that people are entitled to enjoy, and, on the other hand, limits on that use.

Consider, in this context, the plight of the global poor. A large proportion of the world’s population live in severe poverty and many lack access to electricity. They surely have a right to develop and to lift themselves out of poverty. Indeed, they might point out that the very reasons that people give for protecting the environment (it is needed for food, health and to enjoy a decent standard of living) are also reasons for them to develop (See Chapter 10). If this is right then the onus seems to fall on the more affluent members of the world to dramatically reduce their environmental footprint and to enable the world’s least advantaged to develop in sustainable ways—that is ways which do not undermine the environmental preconditions needed for others to enjoy the standard of living to which they are entitled.

Key points

- There are three distinct sorts of reasons for valuing the environment.
- On many theories of justice, the environment has value because it is a precondition of people’s capacity to enjoy their rights and the standard of living to which they are entitled as a matter of justice.
- Some argue that the environment has value because of its effects on nonhuman animals.
- Some argue that the environment has intrinsic value and thus that environmental degradation is wrong independently of its effects on people and animals.
- A just account of the environment will take into account both (a) the fact that people have legitimate interests which involve using the environment and (b) the fact that there must be limits on people’s environmental impacts.
Responsibilities to the future

So far, we have considered why protecting the environment might matter, and the extent to which protecting the environment is required by justice. A comprehensive answer to the question of whether justice requires the protection of the environment also requires us to consider a second set of questions—namely what responsibilities do we have to the future?

Many environmental problems have impacts that reach into the far future. A good example of this is climate change. The environmental scientist David Archer reports that if we burn one ton of coal at one point in time ‘[t]he CO₂ coming from a quarter of that ton will still be affecting the climate one thousand years from now’ and ‘[a]bout 10% of the CO₂ from coal will still be affecting the climate in one hundred thousand years’ (2009, 1). A second illustration of the ways in which human activities can have long-term effects is nuclear energy. This can result in waste that needs to be kept safe for 10,000 years (Archer 2009, 11).

We, thus, face the question of what responsibilities those alive at any one time owe to future generations (see Key Concept 14.2). To answer this we need first to consider a methodological question. How can we derive an account of responsibilities to future generations? One helpful suggestion to this was made by Brian Barry. Barry writes that we should start with our account of what we owe to those currently alive today. We should start, that is, with what we might call our account of intra-generational justice. Then, he argues, we should examine the ways in which the inter-generational context is different and ask whether the differences make a moral difference (Barry 1999, 93–4 and 96–100).

For example, some argue that people can only have moral rights if they are alive and so future people cannot have rights. Given this, they argue, we cannot call for environmental protection on the grounds that it is needed to protect the rights of future people (Beckerman and Pasek, 2001, 15–16 and 19). Many philosophers are unpersuaded by this argument. One widely endorsed response is given by Robert Elliot who says that even if future people do not have rights now (something that he thinks could be contested) they will have these rights in the future, and that gives contemporaries duties now (Elliot, 1989, 162: see also Meyer, 2016, Section 2.1 and Tremmel, 2009, 49). On this view, given that future people will have rights to clean water and food and to health, it follows that earlier generations have duties not to act in

Key concept 14.2 Justice to future generations

This concept refers to what members of one generation owe as a matter of justice to those who come after them. There are different kinds of justice. Many argue that those alive at one point in time owe
duties of *distributive justice* to future people. A full account of intergenerational distributive justice will include several elements. First, it will propose a *principle* of distributive justice (or set of principles) that should govern the relations between current generations and future ones (for example, each generation should leave future people above a certain threshold standard of living). Second, it will specify *to whom* these duties of intergenerational justice are owed. (For example, are they owed to the next generation, or to all future people, or to something in between?) And, third, they will specify *what is distributed*. (For example, is intergenerational justice concerned with the accumulation of wealth, or happiness or capabilities or something else?) Fourth, it will specify *who* exactly bears duties of intergenerational distributive justice. (Is it all those who are alive at one point? Or those with the greatest power or wealth? Or another group?) Note there are other kinds of duty of justice that we might owe to future people. For example, one widely shared view (found in Thomas Jefferson and Thomas Paine) maintains that earlier generations should not bind or constrain later generations.

ways that threaten those rights. So, they ought not destroy the biosphere because it is vital to ensuring that people’s rights to food and health are respected, and they ought not to trigger dangerous climate change for similar reasons.

At this point a critic might introduce a second challenge. In his influential book, *Reasons and Persons*, Derek Parfit draws attention to what he terms the ‘Non-Identity Problem’ (1984, Ch 16). The problem is this: one feature of our relationship to the future is that who gets born in the future depends heavily on events now. Consider a particular person, Sanjay. He is born because his parents mated at a specific time. Suppose that the society in which his parents live had adopted different policies. Then his parents might never have met. Even if they had met they might not have decided to have sex. Or they might not have had the sex that resulted in Sanjay’s birth. Had things been different, then, Sanjay might never have been born. To see why this matters consider an example that Parfit gives. He describes a society that is considering either to deplete its stock of natural resources (Depletion) or to conserve them (Conservation) (Parfit, 1984, 361–4). Suppose that the society decides to deplete. As a result, the standard of living in the future is much lower than it would have been if it had adopted Conservation. Depletion is surely highly morally questionable. Note, though, that if a society depletes then—for the reasons given above—the people who will be born in the future will be *different* to those who would have been born had Conservation been implemented. As a result, once we look far into the future no one can say that they have been made worse off by Depletion (Parfit, 1984, 363).
This last bit is the crucial point. Most people will think that Depletion is wrong, and yet it might not leave any one worse off than they would have been had Conservation been adopted. This is puzzling because much ethical thought condemns actions when and because it makes someone worse off, but Depletion does not do that.

What should we think of this? One response is to decide that if policies like Depletion really do not make anyone worse off than those people would have been then we should just accept that it is not wrong. This, though, seems a very implausible response. After all it produces a world in which the standard of living is much lower than it would be if Conservation had been adopted.

Another response is to reject the idea that a policy like Depletion could only be wrong if it makes some people worse than they would otherwise be. One version of this response is given by Jeffrey Reiman. He distinguishes between focusing on the general ‘properties’ of people (the fact that people need drinkable water, food, protection from disease, and so on) and the ‘particulars’ of people (their own individual personality and character) (Reiman 2007, especially 83–86 and 88–92). Furthermore, in line with a Rawlsian approach to thinking about justice, he suggests that justice is concerned with the former. That is, it is concerned with protecting and advancing the core interests of human beings as such: its concern is not with particular people.

Now if we think about the question of whether to deplete resources or not in these terms it provides a way of avoiding the Non-Identity Problem. It does so because its focus when making decisions about the future will be on the standard of living of those alive in the future whoever they may be, and irrespective of which particular persons exist. Justice to future generations, it says, requires acting in such a way that whoever lives in the future enjoys a fair share of burdens and benefits. Thus, from this point of view it does not matter whether mitigating climate change does not make the lives of particular people in the future go better than they would have otherwise have gone. What matters is whether those who live in the future (whoever they are) enjoy a just standard of living, and in particular whether they enjoy one free from the ravages of dangerous climate change, depletion, or biodiversity loss. This approach focuses—plausibly—on the standard of living that people can enjoy, but it does so without running into the Non-Identity Problem.

This is not the only response to the Non-Identity Problem (for a review and critique of many proposed solutions see Boonin, 2014). However, it offers one way of avoiding the Non-Identity Problem.

One final comment. It is important to recognize that Parfit himself does not think that the Non-Identity Problem shows that we do not have duties to future people. He thinks that we have equally strong reasons to protect future people whether our actions affect their identities or not (1984, 366–9). His point is that certain very common ways of thinking about
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Responsibilities (‘Do not make people worse off than they would otherwise be!’) produce unacceptable answers to the Non-Identity Problem for they cannot tell us what would be wrong with policies like Depletion.

Other challenges to thinking about what we may owe to future people remain. For example, some might argue that we lack knowledge of the future. We do not know what developments will occur. Perhaps, for example, we will be able to develop cheap ways of capturing carbon dioxide from the atmosphere (what is known as ‘carbon capture and storage’) and thus prevent climate change. Consider people living 300 years ago and suppose that we ask what they could have been expected to know about life today. If we then compare it to what actually occurred we get a sense of just how limited our understanding of the future might be. They could not have foreseen phenomena like air flight, trains, nuclear weapons, computers, mobile phones, the internet, and anthropogenic climate change and much else besides. What might we not be able to see?

This raises a good point. The important question is what follows from this. For example, our ignorance does not show that future people do not matter or that we do not have responsibilities to them. So the question then has to be not ‘Do we have responsibilities to future people?’ but rather ‘What is the nature of our responsibility to future people given risk and uncertainty?’ We need, that is, to consider what we owe others in a very uncertain world. Ultimately, we have to act on the best available standard of information available to us, whether it is on the effects of nuclear waste, or ocean acidification, or ozone layer depletion. For some, this means trying to work out the probability and value of all possible outcomes, deriving from this the expected value of each choice we have and then choosing that policy with the best expected value. Others appeal to some version of what has come to be known as the ‘precautionary principle’. One version of this is in the Rio Declaration on Environment and Development, article 15 of which states that

Where there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation.

However, there are other interpretations of what precautionary action should be taken and when it is triggered (UNFCCC Article 3.3; McKinnamon, 2012, Ch3).

Key points

- To derive principles of justice to future generations it makes sense to start with the principles that apply among contemporaries.
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Policies to protect the environment

Suppose that someone has reflected on the questions raised so far and decided that it is important to protect the environment. Suppose, for example, that they think that this is owed to future generations and to their contemporaries. As a result, they decide that we should put policies in place to protect the environment. At this point they will then face a third set of normative questions because policies to protect the environment themselves often raise ethical questions. Two kinds, in particular, are worth mentioning.

First, one important question is: How should the burdens involved in protecting the environment be distributed? What is a fair share of the burden? To give an example: if humanity must reduce its use of nitrogen (because the run-off results in dead zones), who should have to bear that sacrifice? The question of distributive justice so central to many debates in contemporary political theory applies here, for we need to know what would be the fair distribution of any sacrifice involved. I will return to this question in the case study and different principles of justice will be considered there.

A second set of issues arises when we consider the causes of environmental degradation. Some argue that one of the main drivers of environmental change is the increase in the world’s population. This has grown from 2 billion just after World War I to 7 billion in 2012 (Livi-Bacci, 2017, 225). The more people there are, then, other things being equal (as we will see this is an important qualification), the more greenhouse gas emissions, the more land that needs to be used for agriculture, the greater the demand for scarce resources, the more waste that is produced, and so on. With this in mind some have argued that ensuring environmental sustainability requires limiting world population size. Sarah Conly (2016), for example, argues that couples may only have one child.

What should we make of these claims? To evaluate them it is useful to begin by examining the determinants of environmental sustainability. The most common framework for analysing these employs the so-called IPAT formula. This maintains that environmental impact (I) is a function of the

(the intra-generational context) and then explore whether the inter-generational context is different in a morally relevant way.

- Some argue that the very fact that future people do not exist bars them from having rights.
- Accounts of intergenerational justice need to have a response to Parfit’s Non-Identity Problem.
- Accounts of our responsibility to the future need to be able to deal with our lack of knowledge of the future.
size of the population (P), how affluent the people are (A), by which is meant how much they consume, and the kind of technology (T) available (Commoner, 1972; Ehrlich and Holdren, 1972). These collectively determine the environmental impact. Population clearly matters, but then so too do the levels of consumption (levels which vary enormously within and between countries) and the extent to which people have access to clean technology (which again varies considerably).

Given this, it follows that an adequate response should consider all of the determinants of environmental sustainability and not just one in isolation. And with this in mind, one plausible approach would be what might be termed Ecological Liberalism. This holds (a) that agents (where this might refer to individuals or societies) must live within ecological limits (this is the ecological part), but, (b) that they have some choice as to how they do so (this is the liberal part). Some, for example, might wish to reduce their consumption of material resources and invest in clean technology, but have more children than others. Others, by contrast, might prefer to have fewer children but enjoy lives with more consumption (Caney, 2019).

Such an approach has several virtues. First, it results in environmental sustainability. Second, it respects choice for it gives people some discretion as to how they discharge their duties, rather than prescribing a uniform one-size fits all approach. Third, because it is flexible, it is more politically realistic than one that stipulates that a single way to reduce environmental impact.

If this is right, and if we use the IPAT formula, it is not clear why we should accept Conly’s claim that each couple has a right to one child but not more (Conly, 2016). For example, we cannot determine whether this is sufficient to ensure environmental sustainability without knowing what levels of consumption and what kinds of technology are available. We need an empirically informed account of what is needed to achieve sustainability and whether her proposal is necessary for that. It also seems unlikely that the same limit would apply to all since some have a much higher environmental impact than others. Conly would need to explain why we should insist on equal limits to procreation when some might have more children and yet have a lower environmental impact than others because they reduce consumption and increase energy efficiency.

At this point it is worth introducing another perspective. For some will put the emphasis on consumption. On their view, it is important to call into question the assumption that we should seek unlimited economic growth. From a certain green perspective the pursuit of economic growth and a higher GDP is misconceived both as an account of what matters in life and because it is ecologically disastrous. Taking the environment seriously, then, requires a deep transformation of the economy and
changing its assumed priorities (Jackson, 2017; Meadows et al., 1972; Shiva, 2016: see Key Thinker 14.1 and Key Text 14.1).

Key thinker 14.1 Vandana Shiva

Vandana Shiva (1952–) is an influential environmental thinker and activist. She was initially trained in physics. However, she has devoted most of her life to writing and campaigning on environmental issues. She is a critic of modern approaches to agriculture and the use of technologies such as genetically modified crops. She is also a critic of the power of major corporations in contemporary capitalism and the pursuit of unlimited economic growth. She defends traditional agricultural practices and the role of small communities. She is a prolific author: Her books include Biopiracy: The Plunder of Nature and Knowledge (1997), Soil, Not Oil: Climate Change, Peak Oil and Food Insecurity (2008), and Earth Democracy: Justice, Sustainability and Peace (2016).

Clearly, when assessing these competing perspectives, it is crucial to have a well-grounded grasp of the facts. We need to know whether clean technology and reducing unnecessary consumption are enough; and citizens, policy makers and political theorists need to take these on board before making any decision. However, the empirics are not enough. At stake are also fundamentally ethical questions—questions about people’s individual rights to procreate, the claims of others and how we can balance these, and what kind of society we want.

Key points

- Policies to protect the environment will themselves raises ethical questions.
- One set of questions concerns what is the fairest way of sharing any burden involved.
- A second set of questions arises when we bear in mind the importance of population change as a driver of environmental degradation.
- One approach calls for couples to have rights to only one child.
- A second approach—ecological liberalism—insists that a commitment to sustainability requires people limit their environmental impact but it allows different individuals and societies some choice as to how they do so.
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Who makes the decisions? Democracy and governance

We turn now, finally, to a fourth set of questions. What political system is best? Some, for example, question whether democracy is well-suited to protecting the environment (on democracy ➜ See Chapter 4). Why might democracy fail to protect the environment? One common argument is that democracy is focused unduly on the short-term. Governments concentrate on short-term economic objectives and, as a result, ignore long-term problems like protecting the environment.

Democracies might focus on the short-term for several reasons (Caney, 2018, 489–90). The first concerns human psychology: we suffer from various motivational limitations. For example, we tend to be moved to act when we witness and experience people suffering in the here and now, but find it harder to be motivated by abstract projections about people in the distant future (Weber, 2006: also Leopold, 1968; 1949, 214). As a result, we may not be motivated to take the necessary steps to prevent long-term environmental degradation. More generally, we are often short-sighted.

Second, governments in democracies have an incentive to tailor their policies to win the next election and thus have an incentive to produce short-term gains even if they result in long-term losses. In addition to this, as Hans Jonas points out, future people cannot make their voices heard (Jonas, 1984, 22). One attractive feature of a democracy is that those affected by policies can express their views and campaign against ones that harm their interests. Those who are yet to be born lack this accountability mechanism.

Third, it is quite hard for governments to implement long-term plans because whatever they put in place might be undone by their successors. A government committed to preventing climate change may implement aggressive mitigation policies, but their successors may simply reverse those policies.

What should be done to address these concerns? One response might be to create constitutional limits. Countries with a written constitution might entrench rights (including environmental rights) for future generations into their constitution, and empower the judiciary to strike down legislation that jeopardizes these rights (Hayward, 2005). Some might object to imposing limits on the decision-making capacities of the legislature, but the limits are being imposed to protect others’ rights—and in particular, others who cannot use the political process to defend their rights. Why, it might be asked, should we allow some to violate the rights of others?

Another approach is to focus on the selection of representatives. Some argue that the national legislature should include both conventional representatives and representatives for future generations. (For different
versions of this approach see Dobson (1996) and Ekeli (2005). These proposals will face practical problems (how many representatives should there be?). We might also ask why we should assume that anyone appointed to this role would necessarily promote the long-term. If voters are myopic why will they not choose representatives for the future who share their own (myopic) goals?

Perhaps the most promising approach is to start by considering the drivers of short-termism and then thinking of ways to address those. We could, for example, design the policy-making process to try to mitigate some of the cognitive and motivational biases that encourage short-term thinking. We might design the educational system to educate people about future challenges and seek to teach duties of environmental stewardship as well as more traditional civic ideals. Given our tendency to procrastinate and focus only on the problems visible to us now, we might try to institute mechanisms that make the future visible now and induce us to think about the long term. We might, for example, require governments and opposition parties to issue their plans for dealing with long-term challenges and then set aside time in the parliamentary calendar each year to debate them. We might create a Committee for the Future whose role is to monitor legislation for its long-term effects (Caney, 2016). As Dennis Thompson has argued, we might require politicians to conduct ‘posterity impact statements’, which assess the long-term implications of government policies and we could use these to draw attention to the long-term impacts on the environment (Thompson, 2010, 32–3).

Some conclude that democracies cannot address long-term challenges and propose non-democratic solutions. For example, the contemporary Confucian thinker, Jian Qing, argues that democracies will focus exclusively on people’s short-term desires and this will result in ecological disaster (Qing, 2013, 33–6 and 92). On this basis he proposes a tricameral Parliament with a democratic assembly and two non-democratic assemblies (Qing 2013, Ch 1 esp 41–2).

Critics of democracy assume that if politicians are not accountable to the people they will lack the incentive to produce short-term gains to win elections and so can take the long view. This might be true, but then again just because an unelected official can take steps to protect the environment does not mean that they will or are likely to. Why assume that they will care about the long-term interests of their citizens and others? More generally, it is worth bearing in mind the following important methodological principle here:

For any reform it is problematic:

(a) to assume that people suffer from some shortcomings (for example, they are short-sighted and indifferent to the long-term),

and yet also
(b) propose a solution which assumes an enlightened and well-motivated agent who does not suffer from any of these shortcomings, without
(c) providing a compelling explanation as to why the agents charged with addressing a problem will not be vulnerable to the same biases and limitations ascribed to others.  

Before concluding, one further point about governance should be noted—namely that many environmental problems are transnational (e.g. cross-border pollution) and some (e.g. climate change) are global. This, of course, raises a new set of normative questions, such as ‘What does democratic decision-making require in a world in which the politicians in one country make decisions (say about fossil fuel use or nuclear energy or the use of rivers and seas) which affect the environmental conditions faced by people in other countries?’ (Goodin, 2008, esp 135ff; Held, 1995; Stevenson and Dryzek, 2014).

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Key text 14.1 Shiva, V. (2016) *Earth Democracy: Justice, Sustainability and Peace*

This book, as the title suggests, organized around the ideal of ‘earth democracy’. *Earth democracy* takes as its starting point a belief that all sentient life and the planet are inherently interconnected, and it argues for thinking of the world as a ‘commons’, where land and resources are shared for the benefit of all and protected through small local economies. Shiva is highly critical of contemporary capitalism, which, she argues, leads to land and resources being owned privately by a few and puts profit before sustainability. The majority are unjustly excluded from the commons, which both denies them their right to an adequate standard of living and, also, results in ecological unsustainability. Shiva is also highly critical of modern agricultural techniques, such as genetically modified crops, and defends traditional forms of agriculture.

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Key points:

- Some argue that democratic systems are overly focused on the short term and as a result do not give sufficient protection to the environment.
- One response to this is to impose constitutional limits on democratic decision making.
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- A second response proposes representatives for future generations.
- A third response focuses on how decisions are made and suggests ways of designing the decision-making process in ways which make the future more visible and salient.
- In addition to this, many environmental problems cross borders and so we also face the question of what democratic decision-making involves in an ecologically-interconnected world.

Conclusion

Environmental problems are not new. The ancient Greek thinker, Plato, refers to soil erosion in Attica in his Critias (2008, 110e–111e). The ancient Chinese philosophers Mo Zi (2013, Ch.5) and Xunzi (2014, Ch.10) both worried (in contrasting ways) about storing grain and the unpredictability of harvests. In the Social Contract Jean Jacques Rousseau emphasizes the importance of the climate and healthy soil for the functioning of a political community, and he argues that citizens in hot climates need to be frugal (1762; 1968, Book III, Ch 8).

Nonetheless, we now face particularly acute problems. As a result of population growth and economic growth our collective ecological impacts are so much greater than ever before. This, recall, has led some to say that we have now entered the age of the Anthropocene. This chapter has explored some of the ethical questions that these environmental problems raise. Why exactly is the environment valuable? What implications does it have for realizing distributive justice? What kind of world should we leave behind for future generations? What kinds of policies should be enacted to protect the environment? Who decides?

To pose these questions reveals another important point, namely that the environment is not, as it were, a separate topic that can be treated on its own. To answer the questions posed above requires us to reflect on the nature of distributive justice, on what rights and liberties people have, on the impact on global poverty, and on the role of democracy.

Furthermore, if governments fail to protect the environment we then face questions of civil disobedience. Since our health, well-being, and our vision of the good society depend on the environment it should not come as a surprise that the environment bears on many aspects of our political life.

Case study

Climate change
Climate change receives considerable attention. Since 1992 and the formation of the United Nations Framework Convention on Climate Change, there have been annual international negotiations to create an international climate regime with the stated aim of ‘protect[ing] the climate system for the benefit of present and future generations of humankind, on the basis of equity’ (UNFCCC, Article 3(1)). What though would it mean for a climate treaty to be equitable or just (I use the two interchangeably)?

One condition is that the climate treaty gives adequate protection to the potential victims of climate change. To protect people from dangerous climate change will require what climate scientists call ‘mitigation’ (that is, policies that limit greenhouse gas emissions and create and sustain greenhouse gas sinks and so reduce the extent to which the climate changes) and ‘adaptation’ (that is, policies that protect people from the climate changes that do take place).

One important ethical question then is, How much protection are people entitled to? Consider the goal of mitigating climate change. Climate change is not a binary phenomenon: it is a continuum. We thus need to decide where on the continuum we should aim for. What would be a fair temperature target? The Paris Agreement states the target as requiring ‘Holding the increase in the global average temperature to well below 2°C above pre-industrial levels and pursuing efforts to limit the temperature increase to 1.5°C above pre-industrial levels’ (Paris Agreement, Article 2(1a)).

We might ask though: Why should it be ‘well below 2°C’? Why not 1°C or 2.5°C? The answer will, of course, depend in part on complex scientific and social scientific facts and projections. However, how you answer this will also vary depending on your theory of justice and takes us back to the issues examined in this chapter. And it will be based on your view about what we owe future generations and your views about how we should deal with risk, both of which we examined in Section 4. Some, for example, would appeal to the idea of human rights. On this view, a just climate treaty is one that ensures that people’s human rights are not compromised by climate change. Others might be guided by other values, like maximizing welfare or equality.

We now have one condition of a just climate treaty. This, on its own, is not enough, for a just climate treaty would also be concerned to ensure that any burdens involved in combating climate change are shared fairly. Engaging in mitigation and funding adaptation often involve considerable costs. This then raises the question, What would be the fairest way of sharing the costs of combating climate change? Consider two proposals.
The Polluter Pays Principle

One principle commonly put forward holds that those who have caused the problem should bear the burden of combating climate change. The underlying principle—the Polluter Pays Principle—has considerable appeal. It is worth noting in this context that there is a complete ‘mismatch’ between, on the one hand, those who suffer the consequences of climate change, and, on the other hand, those who are causally responsible for the problem (Althor, Watson, and Fuller, 2016). Many of the activities causing environmental harm stem from the activities of the affluent and the harms fall disproportionally on the most vulnerable.

Although it has a lot of plausibility, the claim that the burden should be borne by those who have caused climate change has to address some challenges. In the first place, some of those who have emitted high levels of greenhouse gases are no longer alive. Who then should pay for the emissions of past generations? If the ‘polluter’ is no longer alive we need to supplement the Polluter Pays Principle. Second, some argue that up until recently people were excusably ignorant of the fact that using fossil fuels caused changes in the climate system. Consider the emission of greenhouse gases in the period prior to the establishment of the Intergovernmental Panel on Climate Change in 1988. Is it fair to make someone pay for emissions when they could not reasonably be expected to have known of their harmful effects? Then there is a third issue: some emissions result from the very poor and are needed to attain a minimum standard of living. Is it fair to make them pay when doing so would push them into greater poverty? (For discussion of these issues see Caney, 2005, 2010a; Gossseries, 2004; Shue, 2014, see Key Thinker 14.2.)

Key thinker 14.2 Henry Shue

Henry Shue (1940–) is a leading philosopher on human rights, poverty, war, and climate change. He is currently a Senior Research Fellow at Merton College, Oxford, and has previously taught at Cornell University. He was one of the first philosophers to write on the ethical dimensions of climate change and has written a number of important and influential papers on this topic. Many of these were published in his book *Climate Justice: Vulnerability and Protection* (2014). He has also written influential papers on war and torture. His *Basic Rights: Subsistence, Affluence, and U.S. Foreign Policy* (2nd edition 1996) is a seminal discussion of global justice.
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The ability to pay principle

A second principle of distributive justice that one might appeal to holds that the burdens of combating climate change should be distributed according to people’s ability to pay. Why adopt this approach? Some might defend it on the grounds that it follows from a commitment to equality. If we are committed to bringing about a more equal world then (other things being equal) there is a reason to allocate the burdens to those with the greatest ability and not to the poorest. Some might also appeal to utilitarian considerations, arguing that imposing a burden on a wealthy person results in a much smaller loss of well-being than imposing the same burden on the poor.

The adherent of such an approach might also argue that the Ability to Pay Principle can avoid the objections levelled against the Polluter Pays Principle. Since it does not accord responsibility to past events it sidesteps the objections about past generations and excusable ignorance. Furthermore, it is much more sensitive to the condition of the least advantaged than a pure Polluter Pays Principle.

This said it will run into other objections, the most obvious of which being the complaint ‘Why should I pay if I did not contribute to the problem?’ Can we simply disregard the past? (For discussion of these issues see Caney 2005, 2010a; Gosseries, 2004; Shue, 2014; see Key Text 14.2.)


Shue’s volume collects seventeen of his papers on the ethical dimensions of climate change. Shue addresses many of the core questions posed by climate change, analysing how rights to emit should be distributed, how the burdens of tackling climate change should be shared, and what we owe future generations (among many other questions). Shue argues that in the transition to a zero-carbon world, justice requires protecting the ability of the global poor to meet their needs and to develop; and he ascribes the primary responsibility to the wealthiest countries, such as the USA. This conclusion, he argues, is not reliant on any one single argument and is instead supported by a number of distinct lines of reasoning.

Before we conclude, we should note a further question that arises in the context of mitigating climate change. There is a fixed amount of greenhouses gases that can be emitted. The question then arises as to what is the fair way of sharing the remaining budget of greenhouse gas emissions.
One answer, put forward by Henry Shue, emphasizes that people should be guaranteed the emissions they needed to achieve a certain standard of living. In a pioneering article published in 1992 he argued for protecting ‘subsistence emissions’ and targeting ‘luxury emissions’ (Shue, 2014, Ch2). This way of putting it suggests that the key distributive principle is sufficientarian: emissions should be distributed so that all have enough.

Some go further and argue that rights to emit greenhouse gases should be distributed equally. For example, Anil Agarwal and Sunita Narain start from the assumption that the Earth’s atmosphere is a ‘global common’ and, argue that ‘this vital global common should be shared equally on a per capita basis’ (Agarwal and Narain, 1991, 9).

One challenge to this would ask why we should distribute emissions equally if people have unequal needs. However, we can go one step further and ask whether it is right to focus on the distribution of ‘rights to emit greenhouse emissions’. If we think about greenhouse gas emissions we see that what we really care about is achieving certain goods. These in turn require energy and food; producing these in carbon-based economies results in the emission of greenhouse gases. But the key point is that the greenhouse gas emissions are not what matter to people: they are a by-product of what does matter. What matters are certain goods (for some, capabilities, for others welfare and so on). Now it is possible to provide these goods in other ways (using, for example, renewable energy sources). From this point of view, then, there is no such thing as a fair distribution of greenhouse gas emissions, and therefore it is a mistake to try to identify a fair distribution of greenhouse gas emissions. Rather, we should focus on the fair protection of people’s fundamental interests and do so in ways that ensure that we do not exceed a safe level of emissions (Caney, 2012, Hayward, 2007).

Questions

1. Does the environment have value over and above its contribution to the interests of humans and non-human animals?
2. Under what circumstances is environmental degradation a case of injustice?
3. Does harm to the environment violate human rights?
4. What responsibilities, if any, do members of one generation have to future people?
5. What implications, if any, does Parfit’s Non-Identity Problem have for our responsibilities to future generations?
6. Evaluate the claim that a concern for the environment requires people to have only one child per couple?
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7. Evaluate the claim that justice requires that all people have a right to emit an equal amount of greenhouse gases.

8. What are the strengths and weaknesses of the Polluter Pays Principle as an account of who should bear the burdens of climate change?

9. What are the strengths and weaknesses of the Ability to Pay Principle as an account of who should bear the burdens of climate change?

10. Is democracy up to the challenges posed by long-term environmental degradation?

Further reading


A key environmental text which criticizes the widespread use of pesticides and which played a critical role in the development of the environmental movement.


A pioneering analysis of environmental sustainability and its relationship to ideals of justice.


An excellent account of different perspectives (‘discourses’) on a series of key environmental issues.


An influential wide-ranging analysis of a variety of competing approaches to the environment.


A collection of papers on very many different aspects of environmental political theory.


A collection of influential papers on the ethical issues surrounding climate change.
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A comprehensive account of why climate change is an ethical issue and why it has proved so hard to address.


A novel defence of why the environment has value and exploration of the relationship between green political values and the green theory of social and political change.


Leopold’s powerful statement of what he terms the ‘land ethic’—an ideal which calls for preserving ‘the integrity, stability, and beauty of the biotic community’ (224–5).

Web links

- [http://www.ipcc.ch/](http://www.ipcc.ch/). The website of the Intergovernmental Panel on Climate Change. Its assessment reports can be found online there.
- [http://trillionthtonne.org/](http://trillionthtonne.org/). A continuously updated website with estimates of the cumulative emissions resulting from burning fossil fuels, producing cement and from land-use change since the industrial revolution.
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Notes:

1 Some, like Nussbaum, conceive of rights as protecting capabilities (Nussbaum, 2006, 284–91). However, many would accept the idea of human rights without appealing to the capability approach.

2 The current and ongoing loss of animal species is so dramatic that many environmental scientists now refer to it as the ‘sixth mass extinction’ (Ceballos et al., 2015).

3 For a related principle see Brennan and Buchanan (2000 [1985], 56–7).

4 In addition to this, a failure to mitigate climate change enough and a failure to provide sufficient adaptation then raises the question of climate compensation.

5 It should be noted that sometimes they also produce additional benefits too. Reducing emissions from motor vehicles will not only help mitigate climate change: it will also improve air quality and thus directly reduce harms to human health (Edenhofer et al., 2014, 61–3).

6 Note another question that applies to both principles is: What kind of agent do the principles apply to? Consider, for example, the Polluter Pays Principle. Should we apply this to countries? Should we, for example, seek to identify the volume of greenhouse gas emissions that a country (such as Britain, for example) has emitted? People’s emissions within a country can vary enormously. Should we therefore seek to apply it to individuals? Would that be fairer? There are other candidates too. Should it apply to corporations? Should it apply to transnational bodies (like the European Union)?

7 I am grateful to Rob Jubb, Patrick Tomlin, and two anonymous referees for their helpful comments and suggestions. (p. 306)