

## CONTENTS

- Introduction: Security and environment 312
- Armed conflict and environmental change 313
- Climate change and security 316
- Scenarios of doom 317
- Security planning and risk analysis 319
- Climate wars? 321

# Climate Change and Environmental Security

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## Abstract

In this chapter, students will learn about how climate change has emerged as a major issue in international politics in the last decade. If environmental changes cause people to either flee floods, droughts or starvation, or to fight over scarce resources then these are matters of security. But research has suggested that scarcities rarely actually cause wars. Neither is the military an institution that is an obvious choice to solve climate change problems. Nonetheless security agencies may have a significant role in alerting societies to coming disruptions, and in facilitating cooperative adaptations to the many political problems that may emerge in coming decades.

## Introduction: Security and environment

In the aftermath of the Cold War two decades ago numerous policy statements and academic analyses suggested that various forms of environmental change were threats to global security. This might happen, it was argued, because of major disruptions to essential human systems, wars due to struggles for scarce resources, or because of climate-induced migration in various places. Other authors suggested that security as understood during the Cold War was now no longer an appropriate conceptualization or a useful policy framework for the new circumstances where threats were from global changes rather than superpower rivalries. Empirical research in the 1990s made it clear that environmental scarcities usually didn't lead to armed conflict, contrary to earlier fears. Indeed it became clear that in many cases armed conflict was more likely in places where resources were abundant and economic options limited, than in places of scarcity. The combination of fears of disruptions, possible environmental changes causing conflict and the apparent necessity to rethink security after the Cold War gave rise to a wide-ranging debate about what has come to simply be called 'environmental security' (Dalby 2002).

Now, twenty years after the initial expressions of concern over environmental security, the discussion has been revived as numerous agencies, both military and political, raise the spectre of dangers and even possible wars as a consequence of climate change. Alarmist accounts about millions of climate refugees, food shortages and potential conflict caused by climate disruptions are now common in the media and in political discussion. In contrast, the much quoted Intergovernmental Panel on Climate Change (IPCC), the clearing-house for climate change science, has not dealt with the security dimensions of the issue in its first four assessment reports, the most recent one in 2007. Nonetheless the UN Secretary-General (2009) commissioned a report outlining the dangers of climate change in terms of possible security threats, and began a process of looking forward to possible policy innovations to head off coming disruptions. Numerous academic studies have weighed in with discussions of conflict possibilities, and think tanks and advisory committees have written a series of high profile reports.

While climate change is clearly a problem, the broader matter of global environmental change is the context within which societal adaptation will occur (Adger, Lorenzoni and O'Brien 2009). Globalization, with all the technological changes of late, and its huge use of resources, is changing both human and physical geography dramatically. As reports from the UN Environment Programme now increasingly emphasize, humanity has transformed most aspects of the biosphere in its rapid economic expansion, and our construction of an urban context for ourselves in the last few generations (UNEP 2007). The implications of this are profound; life is not a passive superficial part of the geological picture, but an active component in how our planet operates. Thus the new form of life on the planet, what might simply be called industrial humanity, has taken the future of the planet into its hands, even if it is only now beginning to realize that this is what is happening.

Discussions of environmental security require a clear analysis of how human actions are changing all aspects of the biosphere, and in the process making the world we inhabit an increasingly artificial place. According to the scientific literature on earth system science, the changes we have already made to the living part of the planet are of such a scale as to require the nomenclature of a new geological era, the ‘Anthropocene’ (Steffen *et al.* 2007). Not only are we changing the atmosphere, and as a result setting climate change in motion, but humanity is also changing other parts of the planet, building roads, ports and cities, clearing forests to grow crops and fishing numerous parts of the oceans to the stage where many species are endangered. These new, increasingly artificial circumstances are the world in which climate changes will render both people and states insecure in the near future (Dalby 2009).

Environmental security discussions are now changing into climate security discussions as the focus shifts to global warming and the effects it may have in coming decades. As the discussion unfolds it is important to remember the lessons learned from scholarly research in the decades since the end of the Cold War; there are reasons for cautious optimism in at least some regards, not least because the endless journalistic fears of such things as ‘water wars’ are usually greatly exaggerated. But if the lessons of the last couple of decades are forgotten, and the traditional military focus on national security is uncritically imposed on discussions of climate, things are likely to be made worse rather than better.

To demonstrate this argument the rest of the chapter looks first at those important discussions from the 1990s and then the more recent discussion of climate and how security agencies might be involved. Later sections examine both how security agencies have begun to think about climate change, and more recently apply risk analysis to thinking about future priorities. The crucial point in all this is that there is nothing inevitable about environmental change causing armed conflict, but, the chapter concludes, if modern societies don’t prepare for what we know is coming then we might indeed get conflict and insecurity if political elites try to violently re-impose control on a rapidly changing world.

## Armed conflict and environmental change

Fears of wars over scarce resources were a theme in the much discussed World Commission on Environment and Development Commission report of 1987 on ‘Our Common Future’ – the document that finally focused many decision-makers’ attention on the need for sustainable development. But empirical research in the 1990s that tried to tease out the causal connections between environmental scarcity and political violence had great difficulty validating the initial assumption that scarcities cause conflicts (Homer-Dixon 1999). The focus on local conflicts and matters of farmland water supplies often ignored matters of the larger-scale connections. Subsequent research suggested that violence was more often related to control over valuable sources of resources

in impoverished and badly governed areas than over environmental scarcities (Le Billon 2005). The perpetual scares of water wars have turned out to be journalistic fantasy rather than a matter of historical record.

Nonetheless, while small-scale violence and political strife are related to land and food issues, starving people rarely are capable of organizing major military actions. The truly destitute don't organize rebellions; usually they starve instead. Fears of wars between the global North and South over climate change or other environmental factors turned out to have no foundation in geopolitical reality, although they do undoubtedly make good headlines. That does not mean that military agencies might not be turned loose on hapless migrants seeking shelter from floods, droughts and hurricanes if they are portrayed in such a way that desperate refugees are presented as a threat to social order or national security. On the largest scale, considering the Anthropocene and climate change it is clear that the cause of the problem is not peripheral peoples threatening peaceful metropolises, but rather the consequences of metropolitan consumption that have many effects in those peripheries.

Looking at particular cases, recent scholarship has emphasized that even in cases of ecological 'collapse', which were much discussed in the debate about Jared Diamond's (2005) book of that name, societies that get into difficulties do not disappear as a result of simple indigenous scarcity phenomena, but as a result of complex social processes, frequently ones tied into larger economic disruptions (McAnany and Yoffee 2010). None of this is obviously a matter of 'national security' to Western states. On the other hand, threatened with inundation, for Bangladesh greenhouse gas emissions are obviously a grave threat to its national security, one that its military is powerless to do much about. The Indian government has built a fence around most of Bangladesh ostensibly to stop terrorists crossing the border, but many people worry that the gates might be closed if a major storm were to set millions of Bangladeshis in motion in search of shelter and sustenance.

The larger danger is that such tropes produce a policy environment where the rich and powerful use force to keep the poor and marginal away from their prosperous states (Smith 2007). Such scenarios are the stuff of contemporary science fiction novels and movies. The British rendition of all this in the movie *Children of Men* is noteworthy because its dystopian geographical representation of an island fortress using violence to exclude the poor is encapsulated in the designation of abject others in a generic category of the 'fugee'. The apocalyptic tone of this movie, as with larger cultural themes of our age is not helpful (see Zizek 2010). Coupled with the territorial strategies of national security thinking and political logics of disconnection it is a rendition of precisely what has to be resisted if ecological thinking is to inform discussions of either global security or forms of security that take the survival and wellbeing of the majority of humanity seriously (see Box 21.1).

Geopolitics has traditionally been mostly about how great power rivalries play out. Now in the new circumstances of the Anthropocene it is about writing the rules that bring us the future parameters of the planetary system.

## BOX 21.1 FORMS OF SECURITY THINKING

*National Security* focuses on the state, sovereignty and the military control of national territory, in many cases not the appropriate scale for thinking about climate changes that have global effects. Focusing on 'threats' from migration and using huge amounts of fuel to run military institutions suggests that such policies are part of the problem rather than the solution to climate issues.

*Human Security* focuses on vulnerable people and the provision of the essential needs for people to thrive in their particular places. As humanity increasingly lives in cities and requires commodities from all over the planet to supply the global economy that keeps us alive, infrastructure and trade become more important in providing this form of security.

*Ecological Security* is concerned with maintaining the integrity of natural systems on which humanity is dependent, an especially complicated and difficult matter now that humanity is effectively changing the planet's ecology in the Anthropocene. *Climate security*, insofar as it aims to keep the planet's temperature close to what civilization has so far known, is now obviously a key to ecological security.

*Global Security* has traditionally focused on avoiding major international and particularly nuclear wars which, given their immense destructive consequences, would render people and states everywhere insecure. Now the question is whether climate change is potentially an equally important 'global' consideration.

*Cooperative Security* focuses attention on how states, militaries and other institutions can work together for common benefit, on such things as shared rivers or waterways, but also on how such efforts and the habits of working together can prevent conflict occurring in crisis situations.

Adding this key point into traditional geopolitics is what considerations of world order for the next couple of decades require us to do. There is of course no guarantee that political elites will 'get it', nor that governance structures will evolve to deal with these issues, but it seems as though many trends are moving that way as activists and political entrepreneurs find new modes of changing things, modes frequently not subject to the central control of the putative great powers. But insofar as attempts to deal with climate change are being undertaken, it is now clear that, to a very substantial extent, efforts to create effective governance structures are escaping the traditional territorial control mechanisms of states (Newell and Paterson 2010). Traditional military modes of war fighting too are useless in the face of many complex humanitarian disasters; human security is not about military predominance, it is about

practical infrastructure provision, and adaptation to unpredictable patterns (Beebe and Kaldor 2010). Security in these terms is about connection, presence on the ground, and anticipation, not violent action after the fact.

## Climate change and security

Despite the refusal of the Bush administration in the United States to take climate change seriously, or facilitate strategic thinking on such matters in the early years of its 'war on terror', clearly climate change has now caught the attention of American military thinkers and it is now a matter of geopolitics, both in formal academic analysis and in popular literature (Dyer 2008). Militaries elsewhere have been thinking about the profound implications of climate change for some time, but it is only in the last few years, as the themes of Hurricane Katrina and the destruction of New Orleans in 2005 were echoed by scenarios of the future drawn from the science of climate change that the strategic implications garnered widespread attention.

Now with the practical matters of retreating glaciers in many mountain systems, especially in Greenland, getting attention people are starting to ponder the effects of such changes on how societies will work in the future. The disappearing Arctic sea ice in summer, with the much-discussed possibilities of new trade routes and resource conflicts, means that militaries are starting to pay attention. Foreign policy and strategic think tanks have focused on these themes in a series of high profile discussions, although ongoing negotiations about boundaries and large-scale undersea mapping suggest that deals will be worked out there in everyone's interest eventually (Fairhall 2010).

Some militaries play a major role in infrastructure building and maintenance; the US Army Corps of Engineers is noteworthy as the builder of dams, flood defences and other infrastructure. Militaries are also owners of huge land holdings, bases, airfields and other facilities that may be vulnerable to storms and, in particular, as sea levels rise, flooding in coastal areas. If hurricanes destroy airplane hangars or naval dockyards, military institutions may be directly affected too. So thinking about how to be ready to face such issues is increasingly part of the mandate of armed forces (Briggs 2010).

Disasters in many parts of the world have also killed many thousands of people in recent years, and set others in motion in search of sanctuary. In most cases of disaster the military is called upon to help with rescues and transportation of aid, food and supplies. The huge flood in 2010 in Pakistan, forest fires in Russia, the Haiti earthquake in 2010, the 2004 tsunami in Asia, and the 2011 one in Japan all involved military organizations in providing emergency help. Climate change science models are suggesting that as the climate changes, more severe events and unpredictable weather patterns may make such operations more frequent. If the climate system crosses some thresholds of temperature and suddenly changes into a new global pattern then numerous societies could be dramatically disrupted (Webersik 2010).

In these circumstances security in many guises will be called into question and the military may find themselves doing many things for which they are neither trained nor equipped.

Unless of course that is, they pay attention to the changing world and how new forms of insecurity may emerge in the decades ahead. However, military institutions also have a role in looking ahead and identifying dangers that their societies may face in the future. It is precisely by identifying dangers and raising the alarm that militaries may have an impact on changing the priorities of politicians and corporate decision-makers as to how to reduce the emissions of greenhouse gases and in turn reduce the likelihood of severe disruptions in the future. As Mabey (2007) argues, no other institution in contemporary society has the function of long-term thinking about threats to modern states. But clearly the military cannot solve the problem of climate change even if its forces may be used to try to deal with some of the symptoms.

The geography of threats has now changed, and the geopolitical analyses of climate change are beginning to recognize this. Climate change is only one of the potential catastrophes humanity faces (Smil 2008). But, given that burning carbon fuels to power the global economy is the cause of the changing composition of the atmosphere, it is one that is substantially of our own making; hence the recently heightened focus on these matters in the political arguments about climate change where much of the discussion is about who is endangered how and where, and who ought to respond to the increasingly obvious dangers we have unleashed upon ourselves. Unlike fears of big meteorites, or serious disease outbreaks, or even earthquakes that unleash tsunamis, the climate change situation is both of our own making and something about the consequences of which we have had plenty of warning.

But what should not be forgotten in all this is that it is the rich and powerful parts of the world that have generated the carbon dioxide and methane gases that are causing the planet to warm. This is not a traditional external military threat, even if its effects may set armed conflict in motion. As the discussion in the scholarly literature also makes clear, such conflicts do not have to happen if careful planning and cooperation among political elites make preparations for societies to adapt to the coming changes (Brauch *et al.* 2011). Here security institutions may have a role to play that is rather different from traditional war planning. In the new circumstances of the Anthropocene, new modes of security thinking and planning are clearly needed.

## Scenarios of doom

Popular concern about climate change is frequently tied into forecasts of doom and disaster if nothing is done, reprising themes that were articulated in the early 1990s in the aftermath of the end of the Cold War and the lead up to the 1992 Earth Summit in Rio de Janeiro, also, in slightly different vein, the 1980s discussions of the consequences of a nuclear winter and rapid climate change. Burning rainforests of the 1980s and the iconic pictures of blazing

oil wells in Kuwait in 1991 dominated the earlier discussions; more recently images of Hurricane Katrina and New Orleans in 2005 and later the floods in Pakistan and fires in Russia that happened in the summer of 2010, came to represent fears of climate change. These images link up with other concerns about influenza and diseases of various sorts that are also part of the wider discourse of geopolitical danger (see Chapter 22, this volume). In particular, fears of migration, whether linked to climate change or not, repeatedly reprise fears of other populations; climate change will supposedly set the poor in motion with all sorts of political instabilities as the result (see also Chapter 34, this volume).

In 2007 the National War College Strategic Studies Institute in the United States held a key conference on the subject of climate change, but it was framed in terms of US national security and the logic of the arguments was framed in terms of US military roles and possible future disruptions (Pumphrey 2008). A similar CNA analysis in 2007 discussed matters in terms of 'National Security and the Threat of Climate Change' while the Center for Strategic and International Security (CSIS) study of the same year focused on 'The Age of Consequences'. It also focused, as its subtitle suggests, on 'The Foreign and National Security Implications of Climate Change' (Campbell *et al.* 2007). The book based on this analysis, published the following year by the Brookings Institution, looks to the same formulations (Campbell 2008). All of these re-impose the national focus, looking at the impacts on the United States. While these may indeed raise alarm and undoubtedly fed into the discussion of the Climate Security Act in Congress in 2009, the initial focus of all these documents is national rather than a broader-scale examination of the global security implications (Moran 2011).

Once one looks at those scenarios which are the source of alarm, the interconnections between national and international security become obvious. So too do the difficulties of trying to deal with the multiple interconnected factors which will shape the human future (Dalby 2009). The complexity of the interconnections is crucial to understanding possible outcomes, although obviously these are impossible to predict clearly. It is also imperative to try to identify where likely disruptions may occur and their modalities in particular regions. The German Advisory Council's (2008) report attempts a much more comprehensive evaluation. The focus is on multiple conflict 'constellations' involving the degradation of freshwater resources, declining food production, flood and other storm disasters, and the much discussed matter of environmentally induced migration. These 'constellations' are likely to have security implications in various locations that span the globe. But, and this is the key point, disruptions occur in many modes in different environmental circumstances.

The German Advisory Council (2008) focuses on a list which includes polar ice cap melting leading to a rise in the global sea level; accelerated North African migration to Europe; and droughts in the Sahel and in Southern Africa which may increase food shortages. Disappearing glaciers in Central Asia make this region vulnerable to water shortages. Pakistan and India depend on glacial



melt-water flowing into their major rivers to feed hundreds of millions; they too may face serious difficulties with food production. China also depends on glacial melt-water and is vulnerable to sea level rise on its long coast. The Caribbean nations are especially endangered if hurricane frequency increases. The list goes on: glaciers are melting in the Andes too; deforestation in the Amazon may accelerate climate change in that region with droughts replacing tropical rainfall and hence further accelerating the destruction of rainforests. There was a serious drought in the Amazon region in 2010 which may have killed large numbers of trees there, ironically just before a major flooding event changed matters from too little rain to too much. Extreme events and global change are the world in which we live. Security planners need to take these matters seriously. To do so requires them to look to the sciences of climate change as well as to the social sciences that deal with risks and adaptations.

## Security planning and risk analysis

The British government in particular has been concerned about climate change as a security risk, and in early 2011 the environmental organization E3G published a major report that asked the basic question: what does climate change look like if viewed through the lens of military risk-planning? How is the risk to be understood, and if it is serious, how might the dangers be mitigated? It follows on from Nick Mabey's (2007) earlier argument about the role of military organizations in thinking about future threats. The overview of the issue in the early pages of the report is blunt:

Regional and global security is inextricably linked to climate change. Climate change will bring about a significantly different strategic security environment, a fact that few countries have yet absorbed and none are fully prepared for. However, there is growing momentum within the security community to tackle the threat of climate change. The reality of climate change will require fundamental readjustments in how international relations are conducted, and will alter much of the focus of international security policy. It will change strategic interests, alliances, borders, threats, economic relationships, comparative advantages and the nature of international cooperation, and will help determine the continued legitimacy of the United Nations in the eyes of much of the world.

(Mabey *et al.* 2011: 18)

All this matters greatly precisely because states have not yet taken the long-term risks seriously. Focusing on adaptation measures over the next couple of decades has been the primary preoccupation of policy-makers, but the long-term effects have not been a priority. Short-term adaptation will mostly not deal with the growing instabilities in the climate system that are likely to occur

if temperature continues to rise. Unless there is a dramatic reduction of greenhouse emissions soon, rising temperatures and all the climatic disruptions that will ensue will become inevitable. How we collectively build infrastructure and societies that are resilient, and hence able to adapt to rapid change, has become an important matter, although one that security studies is only just beginning to consider (Brauch *et al.* 2011).

The 'Degrees of Risk' authors suggest that risk analysis is the appropriate framework for thinking about climate in security terms, and note bluntly that focusing on the short term or the average of scenario predictions for coming decades is missing the more important matter of extreme perturbations to the climate system. In the long run, looking out to the end of the century, rather than just to the next couple of decades:

Estimates for projected average global temperature rise in 2100 range from 1.7°C to 7.2°C relative to preindustrial temperatures. Over half this range comes from scientific uncertainty over climate system behavior. But risks are not symmetrical. . . . Recent observations show that climate models have been underestimating the rate of important climatic changes – for example the rate of Arctic sea ice melt – suggesting that climate models may be systematically underestimating the rate at which large-scale changes in the climate system will proceed in the future.

(Mabey *et al.* 2011: 25)

Pointing out that the danger of crossing 'tipping points' increases greatly once a 3°C increase is reached, the document suggests that 'the "worst case scenarios" are not necessarily low probability events, even though analysts tend to assume that they are. Some major tipping points may be inevitable if current momentum economic behavior persists' (Mabey *et al.* 2011: 26). Added to this is the concern that the models used to predict climate response to greenhouse gas levels have, it seems, been systematically underestimating the speed of change. The surprise melting of the Arctic sea ice in 2007 has made it clear that some responses are coming decades faster than the models suggest, at least in part because the positive feedback mechanisms in the climate system are outweighing the negative ones.

In contrast to the German Advisory Committee (2008) report that listed five major systems in danger of rapid climate change, the 'Degrees of Risk' report suggests thirteen potential tipping systems in the climate system. This includes disruption of the Asian monsoon that is especially important as it directly relates to the food supply of a substantial part of humanity in south and southeast Asia. They add in disruption to the Boreal forests of the northern hemisphere that may turn from being places that absorb carbon to being sources of carbon from increasingly severe forest fires. Changes are not just a matter of disruptions to the poor states of the global South.

Risk management is about probabilities of outcomes and the severity of the consequences. Multiplied together they offer a template for management. 'In this formulation, two factors determine whether a risk is high or low: likelihood and severity. A high probability of an outcome with minor consequences causes only moderate concern. On the other hand, a low probability of an outcome with grave consequences may cause significant concern' (Mabey *et al.* 2011: 51). Grave concerns in security thinking about such possibilities as nuclear weapons getting into the hands of terrorists (something that the United States in particular has gone to very great lengths to try to prevent), suggest that this may be a low probability event, but the high consequences of it happening mean that preventive action has to be taken.

With the matter of climate change things are rather different. Climate change is, projecting present trends into the future, both a high probability outcome and one with grave consequences. Hence the logic in the 'Degrees of Risk' document is that it needs priority attention at least on the order of magnitude currently given to nuclear weapon threats and the policies for containment of fissile material. If we do not act we know we will indeed get dramatic disturbances to the ecological system that made human civilization possible in the first place. This is not a matter of probability and calculating the likelihood of things happening in the future if security agencies do not act. Rather, these developments are certain to happen and in a very big way too if these specialized agencies do not act along with society in general to start doing things very differently.

## Climate wars?

But will all this lead to war, the traditional focus of security studies? There are all sorts of ways that environmental change might lead to conflict, but as the research literature from the 1990s started to point out clearly, and as subsequent reworking of this material confirms, the most important point in predicting what circumstances might lead to armed conflict depends much more on political institutions and elite actions than it does on solely environmental factors (Kahl 2006). When this argument is taken seriously and applied to forecasts of climate change and related matters it becomes clear that analysis of the risks, such as those listed in the 'Degrees of Risk' report, points clearly to the need for international cooperation and planning that spells out appropriate responses to extreme events and fluctuations in such things as water supplies in key regions. Such action needs to be complemented by action to reduce the use of carbon fuels and hence slow climate change giving societies more time to adapt.

While neither the scenarios outlined in the CSIS analysis of 'The Age of Consequences', the German warnings about conflict constellations nor the 'Degrees of Risk' document focus on the extreme violence of a nuclear war, Gwynne Dyer's (2008) popular book on the possibility of climate wars does think through the possibilities of a nuclear war between India and Pakistan.

This might result from escalating tensions over water shortages when the Himalayan glaciers have finished melting a couple of decades in the future. While fluctuations in winter snowfall will probably contribute more to the uncertainty about river flows than disappearing glaciers, the point is that these events are predictable. Given that it is entirely predictable that water supplies will be especially short when there is no summer melt-water flowing into regional rivers, careful planning and cooperation can forestall the political tensions. Wars do not have to happen if cooperative security institutions are in place to deal with predictable environmental changes (Dabelko 2009). While concerns over climate change have become an increasingly important matter of international politics, agreements such as the one signed in Copenhagen late in 2009 are but very preliminary steps towards building a new security architecture to tackle the truly global issue of climate change.

While formulations of national security have frequently been the starting point for considerations of climate change, as the logic of the analyses unfold it becomes clear that a global perspective on the interconnected fate of humanity is necessary to grapple with the issue. Clearly, mapping threats in terms of borders and national territories somehow endangered by 'external' threats is simply inappropriate for dealing with the causes of disruptions set in motion by environmental change. This is about global security and inter-connections across borders, not a matter of national security, borders and territorial protection. Attempts to grapple with the coming changes by using national means alone are most likely to make adaptation more difficult by preventing cooperative efforts. At the beginning of the environmental security discussion Deudney (1990) warned that the military is not an institution designed to deal with environmental matters; indeed its mandate is very different, which makes it an unsuitable agency to implement most solutions to environmental change. Put very crudely, the military is designed to kill people and break things rather than clean up pollution or install solar panels. The American military in particular uses huge amounts of fuel, especially in its recent campaigns in Asia that involved long supply lines, making it a substantial contributor to climate change. While the Army Corps of Engineers undoubtedly has a future role in such projects as constructing coastal flood defences, and it might be reorganized to make windmills, it is hardly the appropriate institution to do what utilities and businesses are already well equipped to do.

Bearing in mind this misfit between the institution and environmental matters, and the simple but crucial fact that environmental matters in general and climate change in particular are international concerns, it is not at all clear that military agencies, focused primarily on national security and the protection of particular states from external threats, might have much to say about climate change. But if military organizations are engaged in cooperative efforts to anticipate the future, alerting decision-makers to the risks of climate change and coordinating practical responses to change while simultaneously working to build infrastructure not dependent on carbon fuels, they might yet prove to be of very considerable use in making climate security a reality in coming decades.

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## Further reading

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- Simon Dalby, *Security and Environmental Change* (Polity, 2009). An introduction to environmental security thinking for the Anthropocene epoch.
- Gwynne Dyer, *Climate Wars* (Random House, 2008). A lucid, popular introduction to military and climate science scenarios for the future.
- German Advisory Council on Global Change, *Climate Change as a Security Risk* (Earthscan, 2008). A comprehensive overview report of the global climate change issue within a broad perspective on security.
- Nick Mabey, Jay Gullede, Bernard Finel and Katherine Silverthorne, *Degrees of Risk: Defining a Risk Management Framework for Climate Security* (E3G, 2011). The key study on how to apply risk analysis to climate and security.
- Daniel Moran (ed.), *Climate Change and National Security: A Country-Level Analysis* (Georgetown University Press, 2011). A series of regional studies on how climate change might play out in various places.
- Cleo Pascal, *Global Warring: How Environmental, Economic and Political Crises will Redraw the World Map* (Key Porter, 2010). A popular account of the climate security issue with particularly useful emphasis on the key matter of infrastructure planning.

Climate Change and Sustainable Development Goals. Climate Change which is probably the biggest human-induced extinction threat to our world is a serious warning for all of us. Especially, today we are witnessing deeper and numerous environmental crises such as wildfires, hurricanes, tornados, droughts, and floods. These environmental degradations are increasingly threatening both in the security dimension of our states and in the living spaces of our communities. Additionally, environmental security issues are not only related to protests, it would also be a source, trigger or accelerator of conflicts as well. Especially, since the late 1980s and early 1990s, the literature assessing links between environment insecurity and conflict in particular has expanded rapidly. Climate-related security risks have far-reaching implications for the way the world manages peace and security. Climate security is a concept that summons the idea that climate-related change amplifies existing risks in society that endangers the security of humans, ecosystems, economy, infrastructure and societies. Also climate actions to adapt and mitigate impacts can have a negative effect on human security if mishandled. Climate change posed a threat to global food stocks, and to human security, the blockbuster report said. "Nobody on this planet is going to be untouched by the impacts of climate change," said Rajendra Pachauri, chair of the IPCC. Monday's report was the most sobering so far from the UN climate panel and, scientists said, the most definitive. The report also connected climate change to rising food prices and political instability, for instance the riots in Asia and Africa after food price shocks in 2008. "The impacts are already evident in many places in the world. It is not something that is [only] going to happen in the future," said David Lobell, a professor at Stanford University's centre for food security, who devised the models. The recognition of environmental degradation, climate change and climate-related security risks as some of the most pressing global concerns means this topic has climbed the political agenda. Indeed, the most eminent of international security arenas – the UN Security Council - has tabled climate change on multiple occasions since the start of the millennium. In the world, so in the council - sooner or later, at least. Climate change was first discussed by the council in 2007, when it was tabled by the UK. Consensus on its importance was absent, however, and the other members' interest wen