

The Climate Wars Myth

The first decade of the 21st century was the hottest since the beginning of the Industrial Revolution. Global warming is real and, if present trends continue, its possible effects worry publics and governments around the world. Could it foster armed conflict for resources such as food and water? Will Western armies be increasingly called upon to mitigate the effects of natural catastrophes, humanitarian disasters, and floods of refugees?

Think tanks have enthusiastically embraced this new field of research, and militaries around the world are now actively studying the possible impact of a warming planet on global security. Books with titles such as *Climate Wars* predict a bleak future.¹ A well-known French consultant claims that a five degree Celsius increase in average global temperature would generate no less than a “bloodbath.”² Former World Bank economist Lord Nicholas Stern—the author of the 2006 “Stern Report” on the possible economic impact of climate change—even declares that failing to deal with climate change decisively would lead to “an extended world war.”³

However, there is every reason to be more than circumspect regarding such dire predictions. History shows that “warm” periods are more peaceful than “cold” ones. In the modern era, the evolution of the climate is not an essential factor to explain collective violence. Nothing indicates that “water wars” or floods of “climate refugees” are on the horizon. And to claim that climate change may have an impact on security is to state the obvious—but it does not make it meaningful for defense planning.

Dr. Bruno Tertrais is a Senior Research Fellow at the Fondation pour la recherche stratégique (Foundation for Strategic Research), and a *TWQ* editorial board member. He may be reached at b.tertrais@frstrategie.org.

Copyright © 2011 Center for Strategic and International Studies
The Washington Quarterly • 34:3 pp. 17–29
DOI: 10.1080/0163660X.2011.587951

What History Teaches Us

Since the dawn of civilization, warmer eras have meant fewer wars. The reason is simple: all things being equal, a colder climate meant reduced crops, more famine and instability.⁴ Research by climate historians shows a clear correlation between increased warfare and cold periods.⁵ They are particularly clear in Asia and Europe, as well as in Africa.⁶ Interestingly, the correlation has been diminishing since the beginning of the Industrial Revolution: as societies modernize, they become less dependent on local agricultural output.⁷

Moreover, if there was any significant link between warfare and warming, the number of conflicts should have been rising in the past two decades. It has not—quite the contrary. Since the end of the Cold War, the total number of wars, after having steadily increased since 1945, has diminished. Statistics published by the Stockholm International Peace Research Institute (SIPRI), which come from work done at the Uppsala University, clearly show such a decrease. Today, there are half as many wars as two decades ago (17 in 2009 versus 35 in 1989).⁸ This result is mainly due to the rapid decrease in the number of internal conflicts.⁹ As with the number of interstate conflicts, civil wars began to decline from the end of the 1970s onwards. Classic international war has, statistically speaking, disappeared from the modern world. According to the SIPRI/Uppsala University data, in 2009, for the sixth year in a row, there was no ongoing interstate war. (Iraq and Afghanistan do not belong to that category.) Such conflicts represented, in the 2000s, three out of a total of 30 wars, thus 10 percent of the total—in a world where the number of states has tripled since the end of the Second World War.

There is even a reverse correlation. The average global temperature diminished between 1940 and 1975: during that period, the total number of conflicts was on the rise. Correlation is not causation. (It may be tempting to argue that the modernization of societies leads to two separate, parallel outcomes: global warming *and* global peace.) But the existence of these data points should contribute to extreme caution about the hypothetical equation according to which a warmer world would be a war-prone world.

In 2007, the Nobel Peace Prize was attributed jointly to the Intergovernmental Panel on Climate Change (IPCC) and to former U.S. Vice President Al Gore. Rarely was the attribution of a Nobel Peace Prize so blatantly out of sync with geopolitical realities.

A Flawed Concept

Of course, some local changes of the climate can have an impact on the stability of societies, and thus increase the propensity to collective violence, generally in

a marginal way and mostly in developing countries. Such is the case, for instance, for droughts in countries which are heavily dependent on rain-fed agriculture.¹⁰ But drawing deterministic conclusions from this observation would be a stretch. There are examples the other way round. At the border of Kenya and Somalia, conflicts are more numerous when the resource (pastures) is abundant.¹¹ This fits with a well-known pattern. Resource-rich countries are more likely to be involved in conflict: oil, minerals, or timber attract predators, and revenues from their exploitation fuel civil war.

Darfur is the poster child of “climate conflict.” It is appropriate to consider that local variations of climate and the natural environment in western Sudan were part of the conditions that led to collective violence in the region. But they were not a key reason or root cause.¹² For if that were the case, how would one explain that conflict erupted nearly 30 years after the current period of drought began? Moreover, the conflicts that took place in the Sahel region in the 1970s clearly show that political and human factors are the key to understanding most if not all wars. In that region, the two preceding decades (the 1950s and 1960s) had seen abundant precipitations; local governments had then deliberately encouraged the development of agriculture in steppes, something which moved cattle-raising toward the north. When rain decreased, cattle-raisers sought to reclaim their lands, but faced farmers who were battling the drought. These tensions happened against the background of a traditional rivalry between nomads and settlers, which was frequently instrumentalized by local or national governments. And in northern Mali, the Tuareg rebellion would probably not have happened without the radicalization of young Malians who had emigrated to Algeria or Libya because of the drought.¹³ Human and political factors trump climate and environmental ones.

Variations of the climate were not a root cause of conflict in Darfur.

In seeking to demonstrate that climate change will lead to more instability, experts sometimes stretch causality chains to the breaking point. A good example is the recent attempt by two researchers of the International Institute for Strategic Studies to show that climate change played a significant role in the Arab Spring of 2011.¹⁴ According to them, extreme weather events of 2010—record rainfall in Canada, droughts in the former Soviet Union, a cyclone in Australia—led to an increase in food prices, which in turn fueled discontent in the Middle East. But there are three problems with their proposition. First, there is no evidence that the 2010 events deviated so much from traditional weather patterns in these regions that they had to be attributed to climate change. Second, as the authors themselves acknowledge, other factors were at play

behind the spike in food prices, such as speculation or the demand for biofuels. Third and most importantly, while food prices may have played a role in the Arab discontent, the authors offer no evidence for their contention that they played a “necessary” role.

Most experts of the links between the environment and conflict refrain from adhering to dire predictions about impending climate wars. They show extreme caution about what the historical record shows regarding those links, which are deemed to be at best “highly speculative.”¹⁵ A careful review of the issue concludes that “the concept of environmentally induced conflict is itself fundamentally flawed.”¹⁶ More precisely, as explained by two researchers, “the suggested causal chains from climate change to social consequences like conflict are long and fraught with uncertainties. One could ask whether it is indeed conceptually fruitful to be talking about climate change and conflict at all.”¹⁷

Talking about “climate wars” is not only unsubstantiated—it may be harmful. When United Nations Secretary-General Ban Ki-moon, along with others, claims that climate change is probably one of the key causes of the Darfur conflict, those who perpetrated the massacres should applaud, for it partly absolves them of their own responsibilities. Environmental security expert Geoffrey Dabelko argues “Characterizing climate change as producing a new type of conflict is both wrong and counterproductive. For instance, simply labeling the genocide in Darfur a ‘climate war’ ignores political and economic motivations for the fighting—and unintentionally could let the criminal regime in Khartoum off the hook.”¹⁸

Beware of Catastrophic Scenarios

Some of the most catastrophic scenarios of climate change-induced conflict just do not stand up to scrutiny. To study the possible political consequences of changes in the geography of the Arctic region due to climate change is one thing. To imagine this could lead to armed clashes between Russia and the North Atlantic Treaty Organization (NATO) is another. First, the diminution of the maximum extent of summer sea ice will not transform the North-Western Passage and the Northern Maritime Route into vital maritime trade arteries: they will be open only a few weeks or a few months a year. Second, the real quantity of hydrocarbon resources in the region is still very much open to debate; and such resources are, for the most part, located within national maritime areas. Third, the attitude of all neighboring states regarding this region, including Russia, reflects a clear preference for settling possible disputes in accordance with accepted international law. Fourth, the scope of these disputes is not increasing—rather the opposite: in April 2010, Norway and Russia settled their

decades-long dispute on the delimitation of their respective maritime areas in the Barents Sea.

The interruption of the North Atlantic Conveyor Belt (“Gulf Stream”) due to global warming is a favorite of thrillers and science-fiction writers. The study of its consequences by a consulting firm at the request of the U.S. Department of Defense’s Office of Net Assessment a few years ago was widely noted.¹⁹ The problem is that the credibility of this scenario is close to nil. Recent scientific research has shown that the Gulf Stream is animated much less by thermohaline circulation (differences in the temperature and salinity of water) than by the winds. Moreover, its role in shaping and regulating the climate of Northern Atlantic regions has been seriously put in doubt.²⁰

Finally, the argument according to which global warming will lead to an increase in the number of natural catastrophes, with grave humanitarian consequences, should be taken with a heavy pinch of (marine) salt. The only available evidence that global warming will lead to more extreme weather events relies on modeling. Data do not really sustain this hypothesis so far. There has not been any increase in global precipitation in recent decades.²¹ Neither have droughts become more frequent or severe.²² Hurricane activity is not stronger, and its variation remains within the range of natural variation.²³ The number of hurricane events has tended to evolve downwards since 1970; in accumulated intensity, 2010 was its lowest in 30 years.²⁴

The Emergency Events Database (EM-DAT) maintained at the Leuven University in Belgium—one of the most widely used databases for natural disasters—shows a clear rise in the number of weather-related catastrophes over the last 30 years. However, this rise can easily be explained by demographic, economic, sociological, and political factors. EM-DAT only takes into account events that have caused a significant number of victims (which is rising due to population increase and the growing number of humans living on exposed areas), for which a state of emergency has been declared, and a call to international help has been made (the frequency of which is rising for political and media reasons).²⁵ Furthermore, the number of reported catastrophes has also increased—as compared to what it was say, a century ago—due to improved detection and attention. There is every reason to believe that the human, social, and economic consequences of natural catastrophes will be increasingly severe, but this has little to do with climate change.

It should also be noted that natural disasters do not necessarily have only negative consequences on national and international security. Quite the

Talking about “climate wars” is not only unsubstantiated—it may be harmful.

contrary: disasters appear to *prevent* rather than promote civil conflict.²⁶ A case in point is the 2004 Asian tsunami, which indirectly contributed to the stabilization of the decades-old secessionist conflict in the Indonesian province of Aceh (a peace agreement was signed in August 2005).

No Wars Over Water

An avatar of the notion of climate war is that of future wars over water. Such wars have been forewarned since the late 1980s, but the theme has gained popularity since the end of the Cold War.²⁷ If some commentators are to be believed, “the lines of battle are already being drawn for the water wars of the future.”²⁸ It is true that the map of predicted water stress at the 2025–2030 horizon reveals a close match with the map of major geopolitical risks: the Arabian Peninsula and Central Asia are among the regions which are most likely to be affected.

Warming will not change anything about the global availability of water resources, but will probably induce changes in the geographical distribution of precipitation. However, this will not necessarily be for the worse: in many

Climate change has only a small responsibility for water crises; population increase is the main cause.

regions, the resource for agriculture will increase.²⁹ Other regions will see more droughts. However, recent studies have shown that climate change—whatever its origin—has only a small part of responsibility for water crises: population increase is by far the main cause.³⁰

Will the melting of Himalayan glaciers lead to a severe water crisis in South Asia, one of the most dangerous parts of the world? On this point, the IPCC included a serious error in its 2007 report, due to a series of confusions. The text claims that these glaciers could be

reduced by 80 percent in 2035. The date came from a 2005 report by the World Wildlife Fund (WWF), for which primary sources were press articles and unpublished communications. (The WWF report now includes a correction retracting its claims.)³¹ As to the proportion of glaciers which could disappear by that time, it came from a 1996 UNESCO Report, which mentioned a possible 80 percent reduction of the global total of non-polar ice (not just Himalayan glaciers), but by the year 2350, not 2035.³² Resorting to non-peer-reviewed publications is also what led the IPCC to wrongly claim, based on an unsubstantiated assertion included in the Stern Report, that water availability in South Asia was highly dependent on glacier melt.³³ But recent studies have shown that Himalayan glacier melt accounts for only three to 25 percent of the

volume of rivers in South Asia: monsoons and local seasonal snow melt are by far their main sources.³⁴

And water crises do not mean water wars. The issue of access to water resources is undoubtedly a major dimension of numerous regional crises, in particular in the Greater Middle East, as testified by decades-old disputes between Turkey and Syria, or Egypt and Sudan. The value of strategic locations such as the Golan Heights or Kashmir is not a small part of tensions between Syria and Israel, or India and Pakistan. And water sharing can be the cause of local disputes sometimes degenerating into small-scale collective violence in Africa or Asia. However, experts from the University of Oregon, who maintain the most complete database on this topic, state that there has never been a “war over water” (that is, large-scale collective violence for the sake of a water resource) in the past 4,500 years.³⁵ The last war over water opposed two Sumerian cities in the middle of the third millennium B.C.E., about sharing the waters of the Tigris and Euphrates. There are good reasons for such a scant record. Any country seeking to control the upstream of a river would need to ensure complete and permanent domination over it, which would be an ambitious goal. In the modern era, resorting to arms over water (like resorting to arms over oil) is just not worth the cost. Especially for those whose geographical location and budget can afford to build desalination plants—which is the case for some of the most water-stressed countries, those located on the Arabian Peninsula.

One should therefore not be surprised that access to water has always generated more cooperation than conflict. Since antiquity, thousands of agreements and treaties have been signed for water-sharing. And cooperation between adversaries has stood the test of wartime, as was seen during the 20th century in the Middle East, South Asia, or Southeast Asia.

Climate Barbarians at the Gates?

What about “climate refugees”? Dire evaluations already existed in the middle of the 1990s: British environmentalist Norman Myers claimed at the time that such refugees already numbered 25 million, and that their number might double 15 years later, to reach perhaps 200 million by the middle of the century. This number has been used by many publications since then.³⁶ Another widely-quoted prevision—which claims to be an update of Myers’ own—is that of the non-governmental organization Christian Aid, which foresees 250 million climate refugees between 2007 and 2050 (out of a total of one billion environmental refugees).³⁷ Lord Stern himself reportedly stated that a five degree Celsius rise in average global temperature would lead to “billions” having to move.³⁸

Waves of refugees triggered by climate change does not square well with the reality of migration.

But the idea of massive waves of refugees triggered by climate change does not square well with the reality of migration. There is no doubt that environmental change can lead to massive displacements of populations. Such displacements have always existed, including in industrialized countries. Remember the Dust Bowl, which led to the migration of two to three million from the Great Plains to the West in the United States. But such movements are slow (we are more accurately

talking about migrants as opposed to refugees), very much dependent on economic opportunities existing elsewhere (the “pull” factor is as important as the “push”), and generally of a limited geographical scope (most people want to stay in the same country or region).³⁹ They are sometimes due to non-climate related factors: desertification or degradation of the soils is often due to urbanization or intensive agriculture.

The same reasoning can be applied to the rise in sea levels. First, the hypothesis of a future constant rise in average sea levels due to global warming is not the likeliest one and is being seriously challenged.⁴⁰ Second, even if one accepts the scenario of a constant rise, is it inconceivable that mankind would be able to adjust and adapt to a rise of a few millimeters per year, as it has done for many decades? Catastrophist analyses evoking massive floods of refugees do not square well with an average rise of two to six millimeters a year (the range of IPCC scenarios). And given such a slow pace, some countries will balance the rise of sea level mass by sedimentation. Take the example of Bangladesh, a poster child of the possible consequences of climate change. The idea that the densely populated coastal regions of that country could be flooded by the rise in sea levels does not take into account the parallel accumulation of sediments brought by the great South Asian rivers, which amount to about one billion metric tons a year.⁴¹

Such are the reasons why experts of environmental migrations generally agree that climate change in itself is rarely a root cause of migration.⁴² Major population displacements due to environmental and/or climatic factors will remain exceptional except in the case of a sudden natural disaster.⁴³ And most importantly for the sake of this analysis, they are rarely a cause of violent conflict.⁴⁴

It is not even certain that the very concept of “climate refugees” is relevant.⁴⁵ Atmospheric or hydrological catastrophes can create massive—and most of the time temporary—population displacements. But such catastrophes have always existed. Why then attempt to create a separate category for their victims, which

would distinguish them from those of geological catastrophes (earthquakes, tsunamis, volcanic eruptions) for which human activities bear no responsibility? The concept of climate refugees says more about Western fears of “barbarians at the gates” than it does about the foreseeable reality of the consequences of climate change.⁴⁶

Is Climate Change Even Relevant to Defense Planning?

So much for “climate wars.” But the idea according to which climate change is nevertheless a new, important factor to be taken into account in defense and security planning is itself questionable. Of course, nothing precludes us from including it in the growing list of non-military issues that may have a bearing on global security. But this has to be done in a realistic way. It is not unreasonable to state that climate change may be a “threat multiplier,” for instance.⁴⁷ However, stating this says nothing about the probability of increased violence or instability either at the global level or for a given crisis, or about the likelihood of state failure. Such consequences depend primarily on the reaction of governments and societies—a factor which is impossible to calculate in advance.

There are no data to support the vague idea that climate change can have a key role in triggering collective violence—that is, be the proverbial straw that breaks the camel’s back, as argued by an alarmist study (citing once again the example of Darfur).⁴⁸ Climate is “one of myriad factors in a complex causal web underlying conflict,” and the environment is just “one of manifold and non-essential causal factors” which may lead to war.⁴⁹ The main causes of contemporary conflict are societal, not natural (in the broadest sense of the term, i.e., including man-made).⁵⁰ Conflicts are borne out of human choices and mistakes.

Could regional previsions of the impact of climate change at least inform policymakers and planners about the areas of the world which are more likely—all things being equal—to suffer from them? The answer is no. Regional effects are extremely difficult to predict with the degree of probability which can be useful for planning.⁵¹ The IPCC itself underscores that current models do not have the ability to deliver useful previsions at a higher scale than the continental one.⁵² Nobody knows, for instance, whether African monsoons will move northwards (with positive effects on agriculture) or southwards (with negative effects). Here, as noted by a contributor to the IPCC, “there is complete disagreement between the various models.”⁵³ And when the IPCC attempts to give regional previsions on the evolution of agricultural output, for instance, it is in a way which does not buttress the case for alarmism. Its 2007 report mentions a possible reduction by 50 percent of rain-fed agricultural output in some African countries in 2020. But the sole source it cites to support this

claim is a report produced for a Canadian non-governmental organization in which it is mentioned that (unpublished) studies evoke this scenario for three Maghreb countries.⁵⁴

There are indeed, it seems, some causal links between climate and warfare. But they are of a seasonal nature: “nations address seasonal climate change in terms of where they fight, rather than through when or whether disputes occur. . . . Fighting moves to higher latitudes in the summer, and lower latitudes during the cooler months of the year.”⁵⁵

The stakes of climate change are important—and that is why this area should not be the object of intellectual fantasies or fashions. It is appropriate for defense and security planners to monitor the evolution of the scientific and political debate on its possible consequences. But there is no objective reason today to list climate change as a key issue for defense and security planning.

Notes

1. Gwynne Dyer, *Climate Wars* (Toronto: Random House, 2008); Harald Welzer, *Klimakriege: Wofür im 21. Jahrhundert getötet wird* (Frankfurt: S. Fischer Verlag, 2008).
2. Jean-Marc Jancovici quoted in Antoine Robitaille, “Les changements climatiques: vers la guerre?” *Le Devoir*, November 19, 2009.
3. Quoted in Charles J. Hanley, “Lord Nicholas Stern Paints Dire Climate Change Scenario: Mass Migrations, Extended World War,” *The Huffington Post*, February 21, 2009, http://www.huffingtonpost.com/2009/02/21/lord-nicholas-stern-paint_n_168865.html.
4. Richard S.J. Tol and Sebastian Wagner, “Climate change and violent conflict in Europe over the last millennium,” *Climatic Change* 99 (2010): pp. 65–79, <http://metapress.com/content/e78581pv740rx500/fulltext.pdf>
5. David D. Zhang et al., “Global climate change, war, and population decline in recent human history,” *Proceedings of the National Academy of Sciences* 104, no. 49 (2007), <http://www.pnas.org/content/104/49/19214.full.pdf+html>.
6. David D. Zhang et al., “Climatic change, wars and dynastic cycles in China over the last millennium,” *Climatic Change* 76 (2006), pp. 459–477; Zhibin Zhang et al., “Periodic climate cooling enhanced natural disasters and wars in China during AD 10–1900,” *Proceedings of the Royal Society—Biological Sciences* 277 (2010): pp. 3745–3753, <http://rspb.royalsocietypublishing.org/content/277/1701/3745.full.pdf+html>; Halvard Buhaug, “Climate not to blame for African civil wars,” *Proceedings of the National Academy of Sciences* 107, no. 38 (2010), <http://www.pnas.org/content/107/38/16477.full.pdf+html>.
7. Tol and Wagner, “Climate change and violent conflict in Europe over the last millennium.”
8. Stockholm International Peace Research Institute (SIPRI), *SIPRI Yearbook 1989–2009*.
9. Stathis N. Kalyvas and Laia Balcells, “International System and Technologies of Rebellion: How the Cold War Shaped Internal Conflict,” *American Political Science*

- Review* 104, no. 3 (August 2010), http://stathis.research.yale.edu/documents/Kalyvas_Balcells_APSR.pdf.
10. Edward Miguel et al., "Economic Shocks and Civil Conflict: An Instrumental Variables Approach," *Journal of Political Economy* 112, no. 4 (2004), http://www.econ.berkeley.edu/~emiguel/pdfs/miguel_conflict.pdf.
 11. "Climate Wars," *The Economist*, July 8, 2010.
 12. Michael Kevane and Leslie Gray, "Darfur: Rainfall and Conflict," *Environmental Research Letters* 3, no. 3 (July–September 2008), <http://iopscience.iop.org/1748-9326/3/3/034006/fulltext>.
 13. Tor A. Benjaminsen, "Does Supply-Induced Scarcity Drive Violent Conflicts in the African Sahel? The Case of the Tuareg Rebellion in Northern Mali," *Journal of Peace Research* 45, no. 6 (November 2008), <http://jpr.sagepub.com/content/45/6/819.abstract>.
 14. Sarah Johnstone and Jeffrey Mazo, "Global Warming and the Arab Spring," *Survival* 53, no. 2 (April–May 2011).
 15. Clionadh Raleigh and Henrik Urdal, "Climate Change, Environmental Degradation and Armed Conflict," *Political Geography* 26, no. 6 (2007): pp. 7–8.
 16. Tobias Hagmann, "Confronting the Concept of Environmentally-Induced Conflict," *Peace, Conflict and Development* 6, no. 6 (January 2005): p. 4.
 17. Ragnhild Nordås and Nils Petter Gleditsch, "Climate Conflict: Common Sense or Nonsense?" Human Security and Climate Change Workshop, Oslo, June 21–23, 2005, p. 24, http://waterwiki.net/images/d/d8/Nordas_Gleditsch.pdf.
 18. Geoffrey D. Dabelko, "Avoid hyperbole, oversimplification when climate and security meet," *Bulletin of the Atomic Scientists*, August 24, 2009, <http://www.thebulletin.org/web-edition/op-eds/avoid-hyperbole-oversimplification-when-climate-and-security-meet>.
 19. Peter Schwartz and Doug Randall, "An Abrupt Climate Change and Its Consequences for United States National Security," Global Business Network, October 2003, <http://www.gbn.com/articles/pdfs/Abrupt%20Climate%20Change%20February%202004.pdf>.
 20. Richard Seager et al., "Is the Gulf Stream responsible for Europe's mild winters?" *Quarterly Journal of the Royal Meteorological Society* 128, no. 586 (October 2002), http://www.ldeo.columbia.edu/res/div/ocp/gs/pubs/Seager_etal_QJ_2002.pdf; Richard Seager, "The source of Europe's mild climate," *American Scientist* 94, no. 4 (July–August 2006).
 21. Thomas M. Smith et al., "Variations in annual global precipitation (1979–2004), based on the Global Precipitation Climatology Project 2.5 analysis," *Geophysical Research Letters* 33 (March 18, 2006).
 22. Justin Sheffield et al., "Global and Continental Drought in the Second Half of the Twentieth Century: Severity-Area-Duration Analysis and Temporal Variability of Large-Scale Events," *Journal of Climate* 22, no. 8 (April 2009): pp. 1962–1981.
 23. Thomas R. Knutson et al., "Tropical cyclones and climate change," *Nature Geoscience* 3 (February 21, 2010): pp. 157–163.
 24. Ryan N. Maue, "Global Tropical Cyclone Activity," Center for Ocean-Atmospheric Prediction Studies, Florida State University, <http://www.coaps.fsu.edu/~maue/tropical/>.
 25. See <http://www.emdat.be/>.
 26. Rune Slettebak and Indra de Soysa, "High Temps, High Tempers? Weather-Related Natural Disasters & Civil Conflict," Draft Paper for the Conference on Climate Change and Security, Conference of the Royal Norwegian Society of Sciences and Letters, Trondheim, June 21–24, 2010, <http://climsec.prio.no/papers/Slettebak%20and%20de%20Soysa%20-%20Temp%20and%20Temper.pdf>.
 27. Joyce R. Starr, "Water Wars," *Foreign Policy* 82 (Spring 1991): pp. 17–36, <http://www.ciesin.org/docs/006-304/006-304.html>.

28. Colin Mason, *A Short History of the Future: Surviving the 2030 Spike* (London: Earthscan, 2006), p. 62.
29. Nigel W. Arnell et al., "Climate change and global water resources: SRES emissions and socio-economic scenarios," *Global Environmental Change* 14, no. 1 (April 2004): pp. 31–52.
30. Matti Kummu et al., "Is physical water scarcity a new phenomenon? Global assessment of water shortage over the last two millennia," *Environment Research Letters* 5, no. 3 (July–September 2010).
31. World Wildlife Fund (WWF) Nepal Program, "An Overview of Glaciers, Glacial Retreat and Subsequent Impacts in Nepal, India and China," March 2005 [with correction], http://www.panda.org/downloads/climate_change/glacierssummary.pdf.
32. Vladimir M. Kotlyakov, ed., "Variations of Snow and Ice in the past and at present on a Global and Regional Scale," UNESCO, 1996, <http://unesdoc.unesco.org/images/0010/001065/106523e.pdf>.
33. Intergovernmental Panel on Climate Change (IPCC), "Climate Change 2007: Impacts, Adaptation and Vulnerability," Chapter 10, "Asia," <http://www.ipcc.ch/pdf/assessment-report/ar4/wg2/ar4-wg2-chapter10.pdf>.
34. Pallava Bagla, "No Sign Yet of Himalayan Meltdown," *Science* 326, no. 5955 (November 13, 2009): pp. 924–925; Walter W. Immerzeel et al., "Climate Change Will Affect the Asian Water Towers," *Science* 328, no. 5984 (June 11, 2010): pp. 1382–1385.
35. Jerome Delli Priscoli and Aaron T. Wolf, *Managing and Transforming Water Conflicts* (New York: Cambridge University Press, 2009).
36. Norman Myers, "Environmental refugees in a globally warmed world," *BioScience* 43, no. 11 (December 1993): pp. 752–761; *Ibid.*, "Environmental Refugees," *Population and Environment* 19, no. 2 (November 1997): pp. 167–182.
37. Christian Aid, "Human Tide: The Real Migration Crisis," May 2007, <http://www.christianaid.org.uk/Images/human-tide.pdf>.
38. Quoted in Hanley, "Lord Nicholas Stern Paints Dire Climate Change Scenario: Mass Migrations, Extended World War."
39. Cecilia Tacoli, "Not only climate change: mobility, vulnerability and socio-economic transformations in environmentally fragile areas in Bolivia, Senegal and Tanzania," International Institute for Environment and Development, February 2011, <http://pubs.iied.org/10590IIED.html>.
40. Paleo Sea Level Working Group, "The sea-level conundrum: case studies from palaeo-archives," *Journal of Quaternary Science* 25, no. 1 (January 2010): pp. 19–25.
41. "Bangladesh gaining land, not losing: scientists," Agence France-Presse, July 30, 2008, http://www.terraily.com/reports/Bangladesh_gaining_land_not_losing_scientists_999.html.
42. Elisabeth Meze-Hausken, "Migration Caused by Climate Change: How Vulnerable Are People In Dryland Areas?" *Mitigation and Adaptation Strategies for Global Change* 5, no. 4 (2000): pp. 379–406.
43. Clionadh Raleigh et al., "Assessing the Impact of Climate Change on Migration and Conflict," The Social Development Department, World Bank, undated, http://siteresources.worldbank.org/EXTSOCIALDEVELOPMENT/Resources/SDCCWorkingPaper_MigrationandConflict.pdf.
44. *Ibid.*
45. Richard Black, "Environmental refugees: myth or reality?" New Issues in Refugee Research, Working Paper no. 34, United Nations High Commissioner for Refugees, March 2001, <http://www.unhcr.org/research/RESEARCH/3ae6a0d00.pdf>.

46. Cecilia Tacoli, "Crisis or adaptation? Migration and climate change in a context of high mobility," Prepared for Expert Group Meeting on Population Dynamics and Climate Change, UNFPA/International Institute for Environment and Development, June 24–25, 2009, <http://www.unfpa.org/webdav/site/global/users/schensul/public/CCPD/papers/Tacoli%20Paper.pdf>.
47. Kurt M. Campbell et al., "The Age of Consequences: The Foreign Policy and National Security Implications of Global Climate Change," Center for Strategic and International Studies / Center for a New American Security, November 2007, http://csis.org/files/media/csis/pubs/071105_ageofconsequences.pdf.
48. "National Security and the Threat of Climate Change," CNA Corporation, 2007, <http://securityandclimate.cna.org/report/National%20Security%20and%20the%20Threat%20of%20Climate%20Change.pdf>.
49. Jeffrey Mazo, "Climate Conflict: How global warming threatens security and what to do about it," International Institute for Strategic Studies, Adelphi Paper no. 409, March 2010, p. 40, p. 12, p. 40.
50. Raleigh and Urdal, "Climate Change, Environmental Degradation and Armed Conflict."
51. Demetris Koutsoyiannis et al., "On the credibility of climate predictions," *Hydrological Sciences Journal* 53, no. 4 (August 2008).
52. IPCC, "Climate Change 2007: Synthesis Report—Summary for Policymakers," p. 10, http://www.ipcc.ch/pdf/assessment-report/ar4/syr/ar4_syr_spm.pdf.
53. Quoted in Sylvestre Huet, "Des temps incertains," *Libération*, November 13, 2007.
54. Ali Agoumi, "Vulnerability of North African Countries to Climatic Change: Adaptation and Implementation Strategies for Climate Change," International Institute for Sustainable Development, 2003, http://www.iisd.org/cckn/pdf/north_africa.pdf.
55. Erik Gartzke, "Does Climate Change Whether, When or Where Nations Fight?" Paper prepared for the Climate Change and Security Conference, Royal Norwegian Society of Sciences and Letters, Trondheim, June 21–24, 2010, p. 1, p. 28, http://climsec.prio.no/papers/climate_for_conflict_06202010.pdf.