

# Does Climate Change Worsen Resource Scarcity and Cause Violent Ethnic Conflict?

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## Abstract

Does climate change create conditions in which ethnic groups, particularly in developing countries, become more likely to struggle for scarce resources which can then spur ethnically motivated violence and serious atrocities? Or is the relation between climate change and atrocities, if there is one, far more complex and perhaps indirect? How should climate change be viewed as a risk factor for the onset of violent ethnic conflict? What practical relevance could climate change effects have on early warning and prevention of serious human rights violations including crimes against humanity and genocide? The author first considers whether climate change science warnings deserve to be taken seriously before reviewing empirical studies focussing on the supposed link between climate change and ethnic conflict. Second, he argues that it is valuable to treat climate change as a possible risk factor for ethnic conflict situations in which crimes against humanity or genocide might be perpetrated, and to reflect upon early warning and prevention in this connection. The author then sets out five considerations that research on the question of a causal link between climate change and ethnic conflict should take into account.

## Keywords

climate change – ethnic conflict – genocide – crimes against humanity – atrocities – resource scarcity

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## 1 Introduction

A number of United Nations (UN) bodies, the International Panel on Climate Change (IPCC), several governments, non-governmental organisations (NGOs) and academic scholars have contended that climate change causes resource scarcity, which increases the chances of violent ethnic conflict, and in extreme situations even crimes against humanity or genocide. Genocide and crimes against humanity in Rwanda, Darfur, the Democratic Republic of the Congo and the former Yugoslavia, and tenuous situations of ethnic violence in Ethiopia, Chad, Mali, Mozambique and Nigeria, often have been explained as the tragic consequences of the struggle over resources rendered scarcer from climate change induced stress on the environment. Does climate change create conditions in which ethnic groups, particularly in developing countries, become more likely to struggle for scarce resources which can then spur ethnic violence and serious atrocities? Or, is the relation between climate change and genocide, if there is one, far more complex and perhaps indirect? How should climate change be viewed as a risk factor for the onset of violent ethnic conflict? What practical relevance could climate change effects have on early warning and prevention of serious human rights violations including crimes against humanity and genocide?

To consider the possibility of a link between climate change and ethnic conflict, it is essential first to consider whether climate change science warnings deserve to be taken seriously in the first place because if they should not, then it becomes unnecessary to enquire further about its possible effects on causing or increasing the likelihood of ethnic conflict. Second, it is necessary to review empirical studies focusing on the supposed link between climate change and ethnic conflict, and for the purposes of the present article, 'ethnic conflict' denotes violent clashes or struggles, rather than mere inter-ethnic political or social tension. Finally, it is valuable to consider how to treat climate change as a possible risk factor for ethnic conflict situations in which crimes against humanity or genocide might be perpetrated, and to reflect upon early warning and prevention.

## 2 Should Climate Change Warnings Be Taken Seriously?

When first researching the present article in August 2012 in sunny Rome, Italy, I could not help noticing the record high temperatures and that a casual glance

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Director of Research and Policy of the International Development Law Organization in Rome, Italy, for her very valuable comments on the present article.

at current global climate conditions gave ample cause for alarm. The State of the Climate Global Analysis for June 2012 of the National Climatic Data Center of the US Department of Commerce's National Oceanic and Atmospheric Administration reported that:

- The average combined global land and ocean surface temperature for June 2012 was 0.63°C (1.13°F) above the 20<sup>th</sup> century average of 15.5°C (59.9°F). This is the fourth warmest June since records began in 1880.
- The Northern Hemisphere land and ocean average surface temperature for June 2012 was the all-time warmest June on record, at 1.30°C (2.34°F) above average.
- The globally-averaged land surface temperature for June 2012 was also the all-time warmest June on record, at 1.07°C (1.93°F) above average.
- ENSO-neutral conditions<sup>1</sup> continued in the eastern equatorial Pacific Ocean during June 2012 as sea surface temperature anomalies continued to rise. The June worldwide ocean surface temperatures ranked as the 10<sup>th</sup> warmest June on record.<sup>2</sup>

According to the report, Austria recorded its highest ever June temperature of 37.7°C (99.9°F) on 30 June in Vienna and the average monthly temperature across Austria ranked as the sixth warmest June since national records began around 250 years ago. On the other hand, Norway experienced its 25<sup>th</sup> coolest June since records began in 1900, at 1.2°C (2.2°F) below average. The “combined global land and ocean average surface temperature for January – June 2012 was the 11<sup>th</sup> warmest on record, at 0.52°C (0.94°F) above the 20<sup>th</sup> century average”.<sup>3</sup> The United Kingdom experienced its coolest June since 1991, and Australia remained cooler than average. In northwest India, in June 2012, the monsoon

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1 The term “ENSO-neutral conditions” refers to the El Niño Southern Oscillation. The US National Weather Service explains that: “El Niño and La Niña represent opposite extremes in the naturally occurring climate cycle referred to as the El Niño / Southern Oscillation (ENSO). They are associated with opposite extremes in sea-surface temperature departures across the central and east-central equatorial Pacific, and with opposite extremes in convective rainfall, surface air pressure, and atmospheric circulation, departures in the Tropics from Indonesia to South America (approximately ½ the distance around the globe).” See <[www.cpc.ncep.noaa.gov/products/analysis\\_monitoring/ensostuff/ensofaq.shtml#DIFFER](http://www.cpc.ncep.noaa.gov/products/analysis_monitoring/ensostuff/ensofaq.shtml#DIFFER)>, accessed on 15 August 2012.

2 See the US National Oceanic and Atmospheric Administration (NOAA) National Climatic Data Center, *State of the Climate: Global Analysis for June 2012*, published online July 2012, last accessed on 15 August 2012 from <[www.ncdc.noaa.gov/sotc/global/2012/6](http://www.ncdc.noaa.gov/sotc/global/2012/6)>.

3 *Ibid.*

was much lighter than usual with rainfall coming up to only 37 per cent of the average and across India to only 77 per cent of average.<sup>4</sup> CNN reported that July 2012 was estimated to have been the hottest month for the continental United States since record keeping began in 1895.<sup>5</sup>

Do the data represent short-term aberrations attributable mainly to naturally occurring variations in air, sea and land temperatures, which could be explained away as normal blips in decades-long cyclical weather patterns? Or do observed rises in average land and sea temperatures signal new and dangerous alterations in global climate from anthropogenic causes, chiefly the burning of fossil fuels and associated emissions of greenhouse gases which, combined with widespread deforestation, melt glaciers and polar ice-caps, raise sea levels, advance desertification and disrupt Earth's fragile ecological balance?

Already in 2007, the IPCC<sup>6</sup> warned that 11 of the preceding 12 years (1995–2006) counted among the 12 warmest years in terms of global surface temperature since 1850, that records since 1961 indicated that the global average ocean temperature had increased at least to a depth of 3000 metres and that the ocean had absorbed over 80 per cent of the increased heat around the globe, raising sea levels. It noted also that average snow cover and mountain glacier mass had declined in both northern and southern hemispheres and that reduction in Greenland and Antarctic ice sheets very likely had further augmented sea levels over the years 1993 to 2003. From 1961 to 2003, the global average sea level rose at an average rate of 1.8 mm per year, and between 1993 and 2003 the

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4 *Ibid.*

5 See 'Brutal July heat a new U.S. record', *CNN*, 8 August 2012, available at <[http://edition.cnn.com/2012/08/08/us/temperature-record/index.html?utm\\_source=feedburner&utm\\_medium=feed&utm\\_campaign=Feed%3A+rss%2F cnn\\_topstories+%28RSS%3A+Top+Stories%29](http://edition.cnn.com/2012/08/08/us/temperature-record/index.html?utm_source=feedburner&utm_medium=feed&utm_campaign=Feed%3A+rss%2F cnn_topstories+%28RSS%3A+Top+Stories%29)>, last accessed on 8 August 2012.

6 The Intergovernmental Panel on Climate Change (IPCC) was established in 1988 by the United Nations Environment Programme (UNEP) and the World Meteorological Organization (WMO) "to provide the world with a clear scientific view on the current state of knowledge in climate change and its potential environmental and socio-economic impacts". On 6 December 1988, the UN General Assembly endorsed the joint establishment of the IPCC "to provide internationally co-ordinated scientific assessments of the magnitude, timing and potential environmental and socio-economic impact of climate change and realistic response strategies, and expresses appreciation for the work already initiated by the Panel" in resolution 45/53, A/45/53 of 6 December 1988, at para. 5. See further *Climate Change 2013: The Physical Science Basis – Working Group I Contribution to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change – Summary for Policymakers*, October 2013, available at <[www.climatechange2013.org/images/uploads/WGI\\_AR5\\_SPM\\_brochure.pdf](http://www.climatechange2013.org/images/uploads/WGI_AR5_SPM_brochure.pdf)>.

rate of sea level rise increased to around 3.1 mm annually. The IPCC stated that over the same period, Arctic temperatures had increased at almost twice the global average rate than had been seen over the past 100 years and that satellite data since 1978 indicated that the annual average Arctic sea ice extent had shrunk by 2.7 per cent per decade. Between 1900 and 2005, precipitation had increased markedly over eastern areas of North and South America, northern Europe and northern and central Asia, while a drop in precipitation was observed in the Sahel, Mediterranean and southern African regions, as well as in areas of southern Asia. The IPCC underlined that stronger westerly winds have been measured in both hemispheres since the 1960s and that droughts have been more acute and have lasted longer over wider expanses, mainly in the tropics and subtropics since the 1970s. The report also presented a series of tables to show an increased occurrence of hot days and nights as well as heat waves and a reduced number of nights and days at cooler temperature extremes. On the basis of many other factors, data sets, and syntheses of scientific reports, the IPCC concluded that:

Most of the observed increase in global average temperatures since the mid-20th century is very likely due to the observed increase in anthropogenic greenhouse gas concentrations. ... Discernible human influences now extend to other aspects of climate, including ocean warming, continental-average temperatures, temperature extremes and wind patterns.<sup>7</sup>

In 2009 however the IPCC came under intense scrutiny in connection with the leaking of a series of embarrassing e-mails that seemed to show certain IPCC scientists intending to manipulate data, maximise scare-mongering and shy away from transparent and cooperative data sharing.<sup>8</sup> In 2010, the IPCC was forced to backtrack on its claims that Himalayan glaciers were melting at an increasing rate after the government of India produced clear evidence showing that certain of these glaciers were receding at a much slower rate and others

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<sup>7</sup> S. Solomon *et al.* (eds.), *Summary for Policymakers in Climate Change 2007: The Physical Science Basis. Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change* (2007), at p. 10. The IPCC's Fifth Assessment Reports, involving more than 800 authors, is scheduled to be published in 2013 and 2014.

<sup>8</sup> See C. Booker, 'Climate change: this is the worst scientific scandal of our generation – Our hopelessly compromised scientific establishment cannot be allowed to get away with the Climategate whitewash', *The Telegraph*, 28 November 2009, available at <[www.telegraph.co.uk/comment/columnists/christopherbooker/6679082/Climate-change-this-is-the-worst-scientific-scandal-of-our-generation.html#>](http://www.telegraph.co.uk/comment/columnists/christopherbooker/6679082/Climate-change-this-is-the-worst-scientific-scandal-of-our-generation.html#>), accessed on 1 August 2012.

were in fact increasing in mass.<sup>9</sup> The IPCC had to defend claims in its 2007 report that African crop yields would be halved by 2020,<sup>10</sup> that extreme weather events were linked to global warming,<sup>11</sup> and that Amazonian rainforests faced a probable 40 per cent reduction if there were to occur even a slight decrease in precipitation. The IPCC also suffered media attacks on the personal and professional integrity of its Chair, Rajendra K. Pachauri, with allegations of incompetence, dishonesty and conflict of interest.<sup>12</sup> Some of the criticisms seem to

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- 9 See V. K. Raina, Minister of Environment and Forests Discussion Paper: Himalayan Glaciers: A State-of-Art Review of Glacial Studies, Glacial Retreat and Climate Change, Ministry of Environment and Forests, Government of India / G.B. Pant Institute of Himalayan Environment and Development, of 2009 November 12 (60 pages). See also J. Leake and C. Hastings, 'World misled over Himalayan glacier meltdown', *The Sunday Times*, 17 January 2010: "... Himalayan glaciers are hundreds of feet thick and could not melt fast enough to vanish by 2035 unless there was a huge global temperature rise. The maximum rate of decline in thickness seen in glaciers at the moment is 2–3 feet a year and most are far lower". The IPCC issued a statement that: "It has, however, recently come to our attention that a paragraph in the 938-page Working Group II contribution to the underlying assessment<sup>2</sup> refers to poorly substantiated estimates of rate of recession and date for the disappearance of Himalayan glaciers. In drafting the paragraph in question, the clear and well-established standards of evidence, required by the IPCC procedures, were not applied properly." See 'IPCC statement on the melting of Himalayan glaciers', Press Statement of 20 January 2010 of the IPCC Secretariat, available at <[www.google.ca/url?sa=t&rct=j&q=ipcc%20statement%20on%20the%20melting%20of%20himalayan%20glaciers&source=web&cd=1&ved=0CFcQFjAA&url=http%3A%2F%2Fwww.ipcc.ch%2Fpdf%2Fpresentations%2Fhimalaya-statement-20january2010.pdf&ei=VlcNUM6KF4fKtAasu-CgCQ&usg=AFQjCNHGhNNflumkpgnJoooc9N831YUCxLg](http://www.google.ca/url?sa=t&rct=j&q=ipcc%20statement%20on%20the%20melting%20of%20himalayan%20glaciers&source=web&cd=1&ved=0CFcQFjAA&url=http%3A%2F%2Fwww.ipcc.ch%2Fpdf%2Fpresentations%2Fhimalaya-statement-20january2010.pdf&ei=VlcNUM6KF4fKtAasu-CgCQ&usg=AFQjCNHGhNNflumkpgnJoooc9N831YUCxLg)>, last accessed on 1 August 2012.
- 10 C. Booker, 'African crops yield another catastrophe for the IPCC: One more alarming claim in the IPCC's 2007 report is disintegrating under closer examination', *The Telegraph*, 13 February 2010, available at <[www.telegraph.co.uk/comment/columnists/christopherbooker/7231386/African-crops-yield-another-catastrophe-for-the-IPCC.html](http://www.telegraph.co.uk/comment/columnists/christopherbooker/7231386/African-crops-yield-another-catastrophe-for-the-IPCC.html)>, last accessed on 1 August 2012.
- 11 IPCC, 'Statement on Trends in Disaster Losses', 25 January 2010, available at <[www.ipcc.ch/pdf/presentations/statement\\_25\\_01\\_2010.pdf](http://www.ipcc.ch/pdf/presentations/statement_25_01_2010.pdf)>, last accessed on 1 August 2012.
- 12 See e.g. 'Editorial: Global Warming Snow Job – Record snowfall illustrates the obvious – The global warming fraud is without equal in modern science', *The Washington Times*, 11 February 2010 opined that: "Getting facts wrong and citing dubious sources isn't the worst of it. Rajendra K. Pachauri, the U.N.'s climate chief, remained silent when he knew information was false and denied he had been aware of the Himalayan glaciers error before the recent climate-change summit in Copenhagen, which made a big deal about this nonexistent crisis. He only grudgingly came partly clean when Pallava Bagla, a writer for the journal *Science*, pointed to e-mail correspondence from last autumn showing

have been well founded while others appeared driven by the self-interest of certain powerful multinational corporations such as Exxon Mobil, which was reported to have funded organisations that engaged in misleading attacks on the IPCC and other climate change research bodies.<sup>13</sup>

Away from all these distractions, a significant research effort called the Berkeley Earth Surface Temperature study, partly funded by organisations skeptical of global warming and climate change findings, adopted a broader and more refined methodology to weather and climate research and applied improved statistical interpretation of a wide range of available raw data sets. Drawing on 1.6 billion temperature reports from 16 pre-existing data archives, the Berkeley study incorporated data from 39,390 unique weather stations which was over five times the 7,280 stations which had hitherto been used for the Global Historical Climatology Network Monthly data set and that had provided the foundation for many climate studies. It concluded that “[d]espite issues raised by climate change skeptics, the Berkeley Earth Surface Temperature study finds reliable evidence of a rise in the average world land temperature of approximately 1°C since the mid-1950s”,<sup>14</sup> thus bolstering the IPCC’s findings as well as similar findings of other major research institutions, at least with regard to land temperatures.

So should the predictions of climate change science be taken seriously? On the one hand, first, if the climate change scientific community is currently settling on more standardised methodology for data collection and interpretation

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Mr. Pachauri already knew of the fraud.”, available at <[www.washingtontimes.com/news/2010/feb/11/global-warming-snow-job/?feat=article\\_topio\\_shared](http://www.washingtontimes.com/news/2010/feb/11/global-warming-snow-job/?feat=article_topio_shared)>, accessed on 1 August 2012. See further, ‘Save the Panel on Climate Change!’, *Der Spiegel Online International*, 25 January 2010, available at <[www.spiegel.de/international/world/opinion-save-the-panel-on-climate-change-a-673944.html](http://www.spiegel.de/international/world/opinion-save-the-panel-on-climate-change-a-673944.html)>, accessed on 1 August 2012.

13 See D. Adam, ‘ExxonMobil continuing to fund climate sceptic groups, records show: Records show ExxonMobil gave hundreds of thousands of pounds to lobby groups that have published “misleading and inaccurate information” about climate change’, *The Guardian*, 1 July 2009, available at <[www.guardian.co.uk/environment/2009/jul/01/exxon-mobil-climate-change-skeptics-funding](http://www.guardian.co.uk/environment/2009/jul/01/exxon-mobil-climate-change-skeptics-funding)>, 1st accessed on 1 August 2012.

14 See ‘Cooling the Warming Debate: Berkeley Earth Releases Global Land Warming Analysis’, Press Release of 20 October 2011, available at <<http://berkeleyearth.org/available-resources/>>. See also R. Black, ‘Global warming “confirmed” by independent study’, *BBC News*, 21 October 2011 at <[www.bbc.co.uk/news/science-environment-15373071](http://www.bbc.co.uk/news/science-environment-15373071)>, and M. Knight, ‘New climate study deals blow to skeptics’, *CNN*, 21 October 2011, available at <[http://articles.cnn.com/2011-10-21/americas/world\\_americas\\_climate\\_study-warming-real\\_1\\_berkeley-earth-surface-temperature-climate-scientists-climate-skeptics?\\_s=PM:AMERICAS](http://articles.cnn.com/2011-10-21/americas/world_americas_climate_study-warming-real_1_berkeley-earth-surface-temperature-climate-scientists-climate-skeptics?_s=PM:AMERICAS)>.

and the application of more refined algorithms, then it would seem all the more prudent not to overstate the scientific case for climate change with alarmist predictions that might not be well founded empirically. Second, it would augur in favour of adopting a less definite approach on possible implications and consequences that might flow from global warming, including those related to the risk of conflict and genocide, because determining: a) the *extent* of climate change itself is currently somewhat uncertain; b) the *effects* of climate change are also uncertain; and c) the level of risk that climate change effects could pose in terms of triggering ethnic conflict and even genocide cannot be presumed without empirical evidence to prove such a causal link. Third, particularly given the highly politicised character of current climate change debate, conjecturing too freely on consequences could expose an issue of legitimate concern to unfair and unbalanced overreaction, such as the kind already seen from certain media outlets, and corporations and politicians with vested interests. The back-and-forth between the IPCC and its critics, alluded to above, may already have worsened public skepticism over climate change as indicated for example in the June 2012 longitudinal attitude survey of Generation X<sup>15</sup> that shows a considerable drop in the level of concern of youth in the United States on the issue.<sup>16</sup>

On the other hand, it should be borne in mind that scientific hypotheses do not require 100 per cent certainty to be valid.<sup>17</sup> Scientific hypotheses, which

15 'Generation X' refers loosely to the part of the population group born anytime during the 1960s and 1970s. See e.g. Oxford Dictionaries online at <<http://oxforddictionaries.com/definition/english/Generation%20X>>; or Merriam-Webster Dictionary online at <[www.merriam-webster.com/dictionary/generation%20x](http://www.merriam-webster.com/dictionary/generation%20x)>; or Collins Dictionary online at <[www.collinsdictionary.com/submission/2714](http://www.collinsdictionary.com/submission/2714)>, all last accessed on 1 August 2012.

16 A University of Michigan longitudinal study of youth in the United States found that between 2009 and 2011 interest in climate change issues had waned considerably. See J. D. Miller, *Climate Change: Generation X Attitudes, Interest, and Understanding*, 1:3 *A Quarterly Research Report from the Longitudinal Study of American Youth* (Summer 2012) pp. 1–8. See J. West, 'Why Do Generation X Americans Not Care About Climate Change?', *The Atlantic*, 17 July 2012, available at <[www.theatlantic.com/technology/archive/2012/07/why-do-generationx-americans-not-care-about-climate-change/259955/](http://www.theatlantic.com/technology/archive/2012/07/why-do-generationx-americans-not-care-about-climate-change/259955/)>, accessed on 1 August 2012. The finding tallied with a June 2012 poll conducted by the Washington Post. See also J. Eilperin and P. M. Craighill, 'Global warming no longer Americans' top environmental concern, poll finds', *The Washington Post*, 3 July 2012.

17 See generally M. L. Taper and S. R. Lele (eds.), *The Nature of Scientific Evidence: Statistical, Philosophical, and Empirical Considerations* (University of Chicago Press, Chicago, 2004), p. 567; O. Gingerich (ed.), *The Nature of Scientific Discovery: A Symposium Commemorating the 500th Anniversary of the Birth of Nicolaus Copernicus* (Smithsonian Institution, Washington, DC, 1975) p. 616; and A. P. Sokolov *et al.*, 'Probabilistic Forecast for

must in principle be amenable to verification or falsification, have to be proved with greater or lesser certainty through experimentation, empirical observation, statistical analysis and other methods accepted in that particular discipline, and according to the standards of the scientific community at large. Given that scientific enquiry, theorisation and prediction always involve some level of inherent uncertainty, the question of climate change implies two related normative and policy considerations. First, what level of probability of climate change, its effects and consequences, should cause concern for policy makers? The answer to this question will always remain as indefinite as the myriad of factors that policy makers feel they should take into account, whether or not these factors match with scientific findings. Indeed, policy makers often seem to ignore scientific evidence altogether in favour of politically satisfying alternatives. A second question, related to the first, is whether and if so how should the 'precautionary principle',<sup>18</sup> which counsels that 'where potentially adverse effects on human health or environment of a particular activity are not fully understood, such activities should not proceed', be applied to the possible relation between climate change effects and ethnic conflict or genocide? This principle recommends that even if a causal relationship between climate change and ethnic conflict or genocide could not be proven to a high level of certainty, the likelihood or even possibility that such a cause-effect relationship might exist should be taken into account in terms of risk analysis and public policy<sup>19</sup> because the potential harm is so great.

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Twenty-First-Century Climate Based on Uncertainties in Emissions (without Policy) and Climate Parameters', 22:19 *Journal of Climate* (October 2009) pp. 5175–5204.

- 18 See the UN World Charter for Nature; where the General Assembly expressed its view that "[a]ctivities which are likely to pose a significant risk to nature shall be preceded by an exhaustive examination; their proponents shall demonstrate that expected benefits outweigh potential damage to nature, and where potential adverse effects are not fully understood, the activities should not proceed" (A/RES/37/17 of 28 October 1982 at para. 11(b)). See also the Wingspread Consensus Statement on the Precautionary Principle, developed by 35 scientists, policy makers, lawyers and environmentalists from the US, Europe and Canada elaborated in Wingspread, Wisconsin, in January 1998. See further Principle 15 of the Rio Declaration on Environment and Development, adopted at the 1992 United Nations Conference on Environment and Development, entitled 'Precautionary principle', which states that: "In order to protect the environment, the precautionary approach shall be widely applied by States according to their capabilities. 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."
- 19 One commentator has even advocated applying a 'post-cautionary principle' although this seems rather oxymoronic since caution is exercised to avoid risk not to address

In short, climate change science should be taken seriously and subjected to the same criteria that apply to other fields of scientific enquiry, namely, the degree to which its hypotheses tally with other fields of science, and whether its hypotheses, which must be verifiable, falsifiable and amenable to replicable experimentation and empirical observation, hold up to critical scrutiny. It would be as unreasonable to accept climate change hypotheses on faith as it would be to dismiss them entirely out of hand. The inherently tentative character of scientific hypotheses should be borne in mind in the discussion below as to whether climate change causes violent ethnic conflict.

### 3 Does Climate Change Worsen Resource Scarcity and Cause Violent Ethnic Conflict?

Understanding the dynamics of a possible causal link between climate change and an increased risk of ethnic conflict might help policy makers to develop strategies to reduce such risks. Little has been written about a link specifically to crimes against humanity or genocide *per se*, but there has been growing concern in the international community and academic literature over the effect that climate change could have in relation to violent conflict more generally, including violence with an ethnic dimension. It is therefore valuable to recall first the growing intergovernmental concern over a possible relationship between climate change and the kind of ethnic conflict that might eventually involve genocide, and second to review the available empirical research that could shed light on this question. Does such research support the hypothesis of a causal link between climate change and ethnic conflict? If so, how direct may be such a connection in practice? What other factors might also play a role?

Back in 1982, the UN General Assembly adopted the World Charter for Nature which declared that:

Competition for scarce resources creates conflicts, whereas the conservation of nature and natural resources contributes to justice and the maintenance of peace and cannot be achieved until mankind learns to live in peace and to forsake war and armaments.<sup>20</sup>

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something which has already occurred. See L. Heinzerling, 'Climate Change, Human Health, and the Post-Cautionary Principle', 96 *Georgetown Law Journal* (2007–2008) pp. 445–460.

20 See the UN World Charter for Nature, A/RES/37/7 of 28 October 1982, preamble.

In 1987, the Report of the World Commission on the Environment and Development, also known as ‘the Brundtland Report’, considered climate change as a source of conflict without identifying it as necessarily the only or even a main cause, in particular where “political processes are unable to handle the effects of environmental stress resulting, for example, from erosion and desertification”, that in some situations could create ‘environmental refugees’.<sup>21</sup> UN Secretary-General Kofi Annan warned in the Millennium Report that:

[W]e can see real risks that resource depletion, especially fresh water scarcities, as well as severe forms of environmental degradation, may increase social and political tensions in unpredictable but potentially dangerous ways.<sup>22</sup>

Secretary-General Ban Ki-Moon went further to link climate change more directly to the outbreak of armed conflict in Darfur, in his Washington Post editorial of 16 June 2007 entitled “A Climate Culprit in Darfur”:

It is no accident that the violence in Darfur erupted during the drought. Until then, Arab nomadic herders had lived amicably with settled farmers. ... But once the rains stopped, farmers fenced their land for fear it would be ruined by the passing herds. For the first time in memory, there was no longer enough food and water for all. Fighting broke out. By 2003, it evolved into the full-fledged tragedy we witness today.<sup>23</sup>

A week after the Secretary-General’s editorial piece in June 2007, the United Nations Environmental Program’s (UNEP) post-conflict environmental assessment for the Sudan<sup>24</sup> contended that climate change reduced supply and stiffened competition for oil and gas reserves, hardwood timber, access to the Nile waters, and grazing and agricultural land, and that this increased competition

21 See Report of the World Commission on Environment and Development, A/42/427 of 4 August 1987 at chapter 11, paras. 5 and 6. See further S. Martin, ‘Climate Change, Migration, and Governance’, 16 *Global Governance* (2010) pp. 397–414, on the effects of climate-induced migration.

22 Report of the Secretary-General, *We the Peoples: The Role of the United Nations in the 21st Century*, A/54/2000, at p. 32.

23 See B. Ki Moon, ‘A Climate Culprit in Darfur’, *Washington Post*, 16 June 2007 at <[www.washingtonpost.com/wp-dyn/content/article/2007/06/15/AR2007061501857.html](http://www.washingtonpost.com/wp-dyn/content/article/2007/06/15/AR2007061501857.html)>, last accessed 1 August 2012. But see L. S. Sunga, ‘Does Climate Change Kill People in Darfur?’, 21 *Journal of Human Rights and the Environment* (March 2011) pp. 64–85.

24 UNEP, *Sudan: Post-Conflict Environmental Assessment* (2007).

contributed to violent conflict.<sup>25</sup> UNEP argued that there was “a very strong link between land degradation, desertification and conflict in Darfur” where “exponential population growth and related environmental stress have created the conditions for conflicts to be triggered and sustained by political, tribal or ethnic differences”.<sup>26</sup>

The Stern Review on the Economics of Climate Change, commissioned by the Government of the United Kingdom, stated in its 2009 report that: “Climate-related shocks have sparked violent conflict in the past, and conflict is a serious risk in areas such as West Africa, the Nile Basin and Central Asia.” Certain NGOs and research institutes have also argued that climate change has contributed directly to ethnic armed conflict in Darfur, the Sahel and elsewhere,<sup>27</sup> some calling water a ‘source both of development and conflict’.<sup>28</sup> Professor Marshall Burke – an agricultural economist at the University of California, Berkeley – published a paper in the National Academy of Sciences which analysed sub-Saharan African conflicts between 1980 and 2002 and concluded that: “We find that civil wars were much more likely to happen in warmer-than-average years, with one degree Celsius warmer temperatures in a given year associated with a 50 percent higher likelihood of conflict in that year”, and that if average temperatures across the region increased by at least 1°C by 2030, “climate change could increase the incidences of African civil war by 55 percent by 2030, and this could result in about 390,000 additional battle deaths if future wars are as deadly as recent wars”.<sup>29</sup> In “The Coming Age of

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25 *Ibid.*, at pp. 77 *et seq.*

26 *Ibid.*, at p. 8.

27 *See e.g.* The International Crisis Group, Climate Change and Conflict web page which warned that: “The potential consequences of these changes and of the environmental degradation associated with them are grave. They include food and water shortages, population shifts and economic losses. These in turn may increase a range of risks to human security, including the risk of deadly conflict.”, available at <[www.crisisgroup.org/en/publication-type/key-issues/thematic/climate-change-and-conflict.aspx](http://www.crisisgroup.org/en/publication-type/key-issues/thematic/climate-change-and-conflict.aspx)>, last accessed on 1 August 2012. *See also* Global Witness declare its aim “to break the links between natural resources and conflict by carrying out in-depth investigations” to help build “an international trade system free from natural resource-related conflict and associated environmental and human rights abuses”, at <[www.globalwitness.org/campaigns/conflict](http://www.globalwitness.org/campaigns/conflict)>, last accessed on 1 August 2012. *See further* ACCORD’s report on climate change and conflict in 2 *Conflict Trends* (2011) at <[www.accord.org.za/downloads/ct/ct\\_2011\\_2.pdf](http://www.accord.org.za/downloads/ct/ct_2011_2.pdf)>, last accessed on 1 August 2012.

28 *See e.g.* Life and Peace Institute, *Water: A Source of Development and Conflict* (Uppsala, 2011).

29 D. Biello, ‘Can Climate Change Cause Conflict? Recent History Suggests So: A survey delving into the past 30 years in sub-Saharan Africa reveals that temperature changes match up with a significant increase in the likelihood of civil war’, *Scientific American*,

Slaughter”, published in *New Republic*, Timothy Snyder paints a damnable future tormented by resource-scarcity driven malevolence with the Peoples’ Republic of China as arch villain:

... Beijing is leading the charge to purchase crop land in Africa, thereby reducing its availability to Africans. One risk is that pressure from the outside will exacerbate tensions within Africa itself. In Darfur, desertification, brought on by climate change, intensified the competition for arable land and laid some of the groundwork for mass murder.

He continues:

There now seems to be a consensus among national security experts that we can expect more of the same in the years to come. A report by retired American generals on global warming and U.S. national security, published by the CNA Corporation, speaks of failed states, ungoverned spaces, and widespread war. A report by experts on science and national security, brought together by the Center for Strategic and International Studies and the Center for a New American Security, speaks of mass migration, resource wars, and “geopolitical reordering” – and that’s the best-case scenario. In the other scenarios, the authors forecast significantly increased risks of nuclear war and worldwide terrorism.<sup>30</sup>

These scholarly outpourings have been echoed in official governmental and UN assessments.

The UNDP’s 2011 report stated the point unreservedly, claiming that:

An estimated 40 percent of civil wars over the past 60 years are associated with natural resources, and since 1990 at least 18 violent conflicts have been fuelled by the exploitation of natural resources and other environmental factors. ... For example, greater variability in rainfall increases the risk of civil conflict, particularly in Sub-Saharan Africa, where a 1°C rise in temperature is associated with a greater than 10 percent increase in the likelihood of civil war the same year. Recent episodes support the link. Competition over land contributed to post-election violence in Kenya in

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23 November 2009, available at <[www.scientificamerican.com/article.cfm?id=can-climate-change-cause-conflict](http://www.scientificamerican.com/article.cfm?id=can-climate-change-cause-conflict)>.

30 See T. Snyder, ‘The Coming Age of Slaughter’, *New Republic*, 6 December 2010, available at <[www.newrepublic.com/article/environment-energy/magazine/78207/global-warming-genocide](http://www.newrepublic.com/article/environment-energy/magazine/78207/global-warming-genocide)>.

2008 and to tensions leading to the 1994 genocide in Rwanda. Water, land and desertification are major factors in the war in Darfur, Sudan. In Afghanistan conflict and the environment are caught up in a vicious cycle – environmental degradation fuels conflict, and conflict degrades the environment.<sup>31</sup>

The report goes on to identify resource scarcity as a key cause of conflict, citing “a well known early study [that] highlights the interplay between environmental degradation, population growth and unequal resource distributions in stirring up strife”. UNDP’s assertion that a 1°C rise in temperature causes a 10 per cent increase in the likelihood of civil conflict sounds confidently deterministic, mitigated only slightly by an acknowledgement that natural resource competition acts more as a ‘threat multiplier’ in combination with other risks.<sup>32</sup> The study upon which the UNDP 2011 Human Development Report based its claim of a resource scarcity-violent conflict causality was that of Thomas Homer-Dixon’s 1999 book entitled *Environment, Scarcities and Violent Conflict: Evidence from Cases*.<sup>33</sup>

At this juncture, it is worthwhile turning directly to the scholarly literature that has developed since the early 1990s on the question of a causal relation between climate change effects (such as water and food scarcity) and the outbreak of ethnic conflict because this body of research formed an important basis upon which the UNDP, the IPCC<sup>34</sup> and others have supported their statements on the issue. Reviewing the IPCC’s third and fourth assessment reports, Nordas and Gleditsch came to the conclusion that:

Claims about a causal link from climate change to conflict seem to often be cited more or less uncritically from one source to the next, with insufficient weeding of second and third-rate sources and without any real accumulation of knowledge. The overall impression from the IPCC reports of 2001 and 2007 is therefore that the link between climate change and conflict is ambiguous and when it is stated it is weakly substantiated.<sup>35</sup>

31 UNDP, *Human Development Report 2011*, at p. 59.

32 *Ibid.*, at p. 59.

33 T. F. Homer-Dixon, *Environment, scarcity, and violence* (2009).

34 See e.g. IPCC Working Group II’s report on “Vulnerability to Climate Change and Reasons for Concern: A Synthesis” (2007), table 19-6, at p. 950.

35 R. Nordås and N. Petter Gleditsch, ‘IPCC and the climate-conflict nexus: Paper Presented to the 50th Convention of the International Studies Association’, New York, 15–18 February 2009, available at <[www.humansecuritygateway.com/documents/IPRI\\_IPCCClimateConflictNexus.pdf](http://www.humansecuritygateway.com/documents/IPRI_IPCCClimateConflictNexus.pdf)>, last accessed on 1 August 2012.

A report for Swisspeace describes the debate as one between neo-Malthusians, including Homer-Dixon and others, who contended that the increasing global population is likely to result in intensified conflict over natural resources, and their critics, who doubt this hypothesis.<sup>36</sup> According to Percival and Homer-Dixon, for example:

Severe environmental scarcity causes groups to focus on narrow survival strategies, which reduces the interactions of civil society with the state. Society segments into groups, social interactions among groups decrease, and each group turns inwards to focus on its own concerns. Civil society retreats, and, as a result, society is less able to articulate effectively its demands on the state. This segmentation also reduces the density of “social capital” – the trust, norms, and networks generated by vigorous, crosscutting exchange among groups. Both of these changes provide greater opportunity for powerful groups to grab control of the state and use it for their own gain. The legitimacy of the state declines, as it is no longer representative of or responsive to society.<sup>37</sup>

This hypothesis led Percival and Homer-Dixon to conclude in 1998 when writing about South Africa that:

The election of Mandela may have boosted change, but, for most blacks, objective living conditions remain dismal. Blacks are not happier because their living conditions have changed; rather, they are happier because they think these conditions are going to change. If change is not forthcoming the regime will lose legitimacy, and linkages between state and society will once again weaken. Unfortunately, already severe environmental scarcity makes the process of positive change much harder. Social demands on local institutions continue to expand, and the potential for violence between the ANC and Inkatha remains high ... Nothing detracts from the accomplishments achieved thus far. But without careful attention to the environmental factors that contribute to

36 S. A. Mason *et al.*, *Linking Environment and Conflict Prevention: The Role of the United Nations* (2008), at pp. 16–17. Hauge and Ellingsen, writing in the *Journal of Peace Research*, listed many scholars who have concluded that access to natural resources has been a major cause of conflict. See W. Hauge and T. Ellingsen, ‘Beyond Environmental Scarcity: Causal Pathways to Conflict’, 35:3, *Journal of Peace Research* (1998) pp. 299–317.

37 V. Percival and T. Homer-Dixon, ‘Environmental Scarcity: The Case of South Africa’, 35:3 *Journal of Peace Research* (1998) pp. 279–298, at p. 281.

violence, South Africa may again be locked into a deadly spiral of conflict.<sup>38</sup>

If we reflect for a moment on South Africa, Homer-Dixon's 'resource scarcity causes conflict' explanation actually seems quite unconvincing. In South Africa, not only does the Constitution guarantee human dignity, the achievement of equality and the advancement of human rights and freedoms; non-racialism and non-sexism; supremacy of the Constitution and the rule of law; universal adult suffrage; a national common voters roll; regular elections and a multi-party system of democratic government,<sup>39</sup> but democracy actually functions there in practice. In addition to a well-respected judiciary, including a Constitutional Court empowered to rule on all constitutional issues including human rights, South Africa has an effective Human Rights Commission, a Commission for the Promotion and Protection of the Rights of the Cultural, Religious and Linguistic Communities, an independent Electoral Commission, a Public Protector Commission and a Commission for Gender Equality. In short, South Africans enjoy many effective democratic avenues through which to channel grievances over resource scarcity and other issues, rather than to resort to ethnic conflict, much less civil war which, at least at the time of writing, did not seem likely to break out in South Africa anytime soon. While democratic governance may not be a panacea for all environmental matters,<sup>40</sup> neither should it be ignored as an effective means by which to reduce ethnic tensions, whether related to climate change or other factors.

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38 *Ibid.*, at pp. 295–296.

39 See Article 1(c) of the Constitution of the Republic of South Africa, which entered into force on 11 October 1996.

40 Using multiple regression analyses, Midlarsky looked at the effects of democratic rule on deforestation, air quality, soil erosion by water, protected land area, freshwater availability and soil erosion by chemicals, and found that: "Instead of positive relationships between the extent of democracy and environmental protection, as much popular and recent scholarly writings have suggested, the associations found here are principally negative or non-existent." Moreover, Midlarsky points out that democracy comes in many forms and its impact on the environment is therefore not as straightforward as might be expected because: "[T]here are varying degrees of democracy worldwide, and many Third World, only partially developed, democratic polities have relatively large agrarian constituencies to satisfy, thus leading to significant degrees of deforestation, as for example in Brazil. To identify democracy entirely with Europe, North America and Japan is a mistake; there are other democracies with population needs different from those in the West." M. I. Midlarsky, 'Democracy and the Environmental Scarcity: An Empirical Assessment', 35:3 *Journal of Peace Research* (1998) pp. 341–361, at p. 358.

Gleditsch has criticised Homer-Dixon's research group not only for failing to take due account of democracy as an important factor in reducing the likelihood of conflict,<sup>41</sup> but on methodological grounds as well. With regard to Ethiopia, Sudan, Chad, Mozambique and Angola, which are cited often as examples where climate change has caused ethnic conflict, it seems that conflict in fact may well have contributed to resource scarcity and starvation, rather than the other way round.<sup>42</sup> Furthermore, as Gleditsch points out: "High (*sic*) developed (or even 'overdeveloped') countries also have environmental problems (traffic noise, industrial pollution, etc.) but there is no evidence that such environmental issues generate armed conflict, internally or externally."<sup>43</sup> Similarly, Dalby has pointed out that in the scholarly literature produced since the 1987 Brundtland Commission report linked climate change to conflict, there are very few actual examples of wars caused directly by climate change or its effects.<sup>44</sup>

At the same time, many other research scholars, for example Hauge and Ellingsen, have concluded that factors other than climate-change related environmental degradation and resource scarcity are more important in predicting non-international armed conflict such as economic and political aspects.<sup>45</sup> Even the concept of 'scarcity' itself depends as much on political and social factors as on supply and demand, as Bichsel has underlined.<sup>46</sup> Shiferaw makes a similar point with regard to access to water, namely that: "[S]carcity – and who suffers from it – is ultimately a socially defined structure of rights and entitlements rather than a scarcity of a resource as a physical entity."<sup>47</sup>

41 N. Petter Gleditsch, 'Armed Conflict and the Environment: A Critique of the Literature', 35:3 *Journal of Peace Research* (1998) pp. 381–400, at p. 389.

42 *Ibid.*, at p. 391.

43 *Ibid.*, at p. 396. *But see* D. M. Schwartz, T. Deligiannis and T. F. Homer-Dixon, 'The Environment and Violent Conflict: A Response to Gleditsch's Critique and Some Suggestions for Future Research', 6 *Environmental Change & Security Project Report* (Summer 2000).

44 S. Dalby, 'Peacebuilding and Environmental Security in the Anthropocene', in D. Péclard (ed.), *Environmental Peacebuilding: Managing Natural Resource Conflicts in a Changing World Swisspeace Annual Conference 2007* (2009) pp. 8–21, at p. 10.

45 They argue that resource scarcity "has only a small impact on the severity of a conflict, using battle-deaths as a share of total population as the dependent variable". *See* Hauge and Ellingsen, *supra* note 37, at p. 314.

46 C. Bichsel, 'It's about More Water: Natural Resource Conflicts in Central Asia', in D. Péclard (ed.), *Environmental Peacebuilding: Managing Natural Resource Conflicts in a Changing World Swisspeace Annual Conference 2007* (2009) pp. 32–40, at p. 34.

47 M. Shiferaw, 'Risks and Conflict Management Options of Water Property Rights Reforms. Empirical Evidences from Shared Systems for Irrigation Water in Ethiopia', in D. Péclard

Among the research on the causes of ethnic conflict,<sup>48</sup> a particularly comprehensive study of ethnic conflict in 115 countries around the globe from 1946 to 2005 charted the statistical probability of the outbreak of armed conflict,<sup>49</sup> and reported that ethnic conflict breaks out “when large segments of the population are excluded from access to government because of their ethnicity.”<sup>50</sup> Raleigh and Urdal’s research paper entitled “Climate Change, Environmental Degradation and Armed Conflict” shows that climate change constitutes at most a weak factor in causing ethnic conflict.<sup>51</sup>

Despite the paucity of empirical evidence to suggest any direct causal connection between climate change effects and violent ethnic conflict, civil war, much less inter-State war, Secretary-General Ban-ki Moon referred in his 2009 report on possible security implications to climate change as a key factor that drove “competition with other communities or groups over

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(ed.), *Environmental Peacebuilding: Managing Natural Resource Conflicts in a Changing World*, *Swisspeace Annual Conference 2007* (2009) pp. 41–62, at p. 42.

- 48 See e.g. D. W. Augsburg, *Conflict Mediation across Cultures: Pathways and Patterns* (1992); K. Avruch, P. W. Black and J. A. Scimecca, *Conflict Resolution: Cross-Cultural Perspectives* (1991); E. E. Azar, *The Management of Protracted Social Conflict: Theory and Cases* (1990); J. Coakley, *Paths towards Ethnic Conflict Resolution: The Comparative Dimension* (2010); K. Cordell and S. Wolff, *Ethnic Conflict: Causes, Consequences and Responses* (2009); T. R. Gurr and B. Harff, *Ethnic Conflict in World Politics* (1994); T. R. Gurr (ed.), *Minorities at Risk: A Global View of Ethnopolitical Conflict* (1993); T. R. Gurr and J. R. Scaritt, ‘Minorities Rights at Risk: A Global Survey’, 11:3 *Human Rights Quarterly* (1989) pp. 375–405; M. Rabie, *Conflict Resolution and Ethnicity* (1994); M. Howard Ross and J. Rothman (eds.), *Theory and Practice in Ethnic Conflict Management: Conceptualizing Success and Failure* (1999); V. Volcan, *Blood Lines: From Ethnic Pride to Ethnic Terrorism* (1997); V. Volcan, ‘A Psychoanalytic Perspective on Intergroup Hatred’, 3:1 *Journal for the Psychoanalysis of Culture and Society* (1998) pp. 78–80; and S. Wolff, *Ethnic Conflict: A Global Perspective* (2006).
- 49 A. Wimmer, L.-E. Cederman and Brian Min, ‘Ethnic Politics and Armed Conflict: A Configurational Analysis of a New Global Data Set’, 74:2 *American Sociological Review* (2009) pp. 316–337.
- 50 See M. Sullivan, *Study Explores Roots of Ethnic Violence*, UCLA International Institute, interview with Andreas Wimmer posted on 16 April 2009 at <[www.international.ucla.edu/print.asp?parentid=107085](http://www.international.ucla.edu/print.asp?parentid=107085)>, last accessed on 1 August 2012.
- 51 C. Raleigh and H. Urdal, ‘Climate Change, Environmental Degradation and Armed Conflict’, Paper presented to the 47th Annual Convention of the International Studies Association, San Diego, California, 22–25 March 2006, at pp. 22–23: “We find that overall, medium to high levels of land degradation are related to increased conflict, although the additional risk is quite small. Furthermore, estimates for very high land degradation, which we assume would have the strongest impact on conflict risk, are not robust.”

scarce resources” that could in turn trigger civil war and even international ‘resource wars.’<sup>52</sup>

Lack of empirical evidence to show a direct causal connection between climate change effects and ethnic conflict, much less atrocities, does not mean either that climate change effects do not exist or that they are not important. Nor does it rule out the *possibility* that climate related stress from desertification, global warming, skewed weather and rainfall patterns and strained access to food and water, increase the chances of violent conflict, including ethnic strife, which might bring about conditions in which crimes against humanity and genocide may be more likely to occur. It instead invites a more sophisticated analysis that should encompass other risk factors and consideration of more nuanced approaches to early warning and prevention strategies with respect to ethnically motivated atrocities.

#### 4 How Should Climate Change Be Considered as a Risk Factor for Ethnic Conflict and Genocide?

On the one hand, as discussed above, there is only very weak empirical evidence of any direct causal connection between climate change effects on the likelihood of ethnic conflict and genocide. On the other hand, the precautionary principle recommends that the possible effects of climate change in producing conditions conducive to ethnic conflict and atrocities, even if indirect, should not be ignored entirely because the potential harm is so great. Therefore, understanding climate change as a risk factor should focus on its possible less direct consequences in order to improve early warning and prevention strategies.

One of the indirect ways in which climate change could lead to conditions in which ethnic conflict is more likely is through degradation in the enjoyment of human rights, including economic, social and cultural rights, because exclusion from full human rights enjoyment could undermine political stability, democratic institutions and the rule of law in a particular country, as many of the studies discussed above indicate. The possible role of climate change in undermining the enjoyment of human rights has not gone unnoticed in key UN human rights bodies and in academic circles. For example, the UN Secretary-General’s representative on the human rights of internally displaced

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52 Report of the Secretary-General on Climate change and its Possible Security Implications, A/64/350 of 11 September 2009, at p. 16.

persons estimated that climate change could displace anywhere between 50 and 250 million people permanently or temporarily,<sup>53</sup> which in turn would worsen marginalisation, discrimination and access to humanitarian assistance.<sup>54</sup> Some scholars have contended that forced displacement from environmental degradation could pose an indirect threat to political stability in some countries<sup>55</sup> by causing refugee crises and by placing further strain on the humanitarian situation.<sup>56</sup> A few commentators have proposed that a multilateral convention should be developed to address the plight of 'climate change refugees',<sup>57</sup> or that an international court to settle environmental disputes in Africa should be set up to avoid escalation in political tension.<sup>58</sup>

A 2009 report of the Office of the United Nations High Commissioner for Human Rights indicated that climate change could increase hunger, malnutrition, disease and natural disasters, reduce access to food in areas affected by flood, desertification and diminished crop yields, and hinder access to water, thereby threatening the rights to life and health. Climate change could also encroach upon the rights to adequate housing, particularly in small island States and coastal areas affected by rising sea levels as well as the rights of indigenous peoples to their traditional sources of food and livelihood.<sup>59</sup> Doussa, Corkery and Chartres underlined that the survival of indigenous

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53 Report of the Representative of the Secretary-General on the human rights of internally displaced persons, Walter Kalin, A/HRC/13/21 of 5 January 2010, at para. 41.

54 *Ibid.*, at para. 43.

55 See e.g. I. Millar, 'There's No Place Like Home: Human Displacement and Climate Change', 14 *Australian International Law Journal* (2007) pp. 71–98; and S. Atapattu, 'Climate Change, Human Rights, and Forced Migration: Implications for International Law', 27 *Wisconsin International Law Journal* (Fall 2009) pp. 607–635.

56 See e.g. S. Albuja and I. C. Adarve, 'Protecting People Displaced by Disasters in the Context of Climate Change: Challenges from a Mixed Conflict / Disaster Context', 24 *Tulane Environmental Law Journal* (Summer 2011) pp. 239–252.

57 See B. Docherty and T. Giannini, 'Confronting a Rising Tide: A Proposal for a Convention on Climate Change Refugees', 33 *Harvard Environmental Law Review* (2009) pp. 349–403, but see J. McAdam, 'Swimming against the Tide: Why a Climate Change Displacement Is Not the Answer', 23 *International Journal of Refugee Law* (2011) pp. 2–27.

58 See Z. Ntozintle Jobodwana, 'Africa, Global Warming and Climate Change Environmental Court', 8 *US-China Law Review* (2011) pp. 217–240.

59 The Report of the Office of the United Nations High Commissioner for Human Rights on the Relationship between Climate Change and Human Rights, A/HRC/10/61 of 15 January 2009, at paras. 22–54.

populations were particularly affected by climate change which jeopardised their traditional lands, waters, flora and fauna.<sup>60</sup>

In the context of early warning, and strategies to prevent the kinds of ethnic conflict that could degenerate even to the point of crimes against humanity or genocide, several commentators have emphasised the importance of recognising and supporting customary and traditional conflict resolution and justice mechanisms, including rules governing marriage, inheritance and property. Hagmann has pointed out that: “In cases where violent conflict has become protracted, a reorientation of the institutional rules of resource use is often a precondition to allow pastoralists access to water points and rangelands.”<sup>61</sup> Similarly, in her interesting report on *Climate Change and Conflict: Lessons for Conflict Resolution from the Southern Sahel of Sudan*, Bronkhorst recommended that future research should focus on identification of points where traditional conflict resolution could support formal judicial frameworks in order to address environment related conflicts in Sudan and elsewhere.<sup>62</sup> Payne suggests that prevention strategies must be developed with the full participation of the countries concerned themselves, affected peoples and civil society.<sup>63</sup> In this regard, Aminzadeh provides an encouraging example:

In June 2005, communities from the Niger Delta filed a case in the Federal High Court of Nigeria against Shell, ExxonMobil, ChevronTexaco, the Nigerian National Petroleum Corporation, and the Nigerian government to stop gas flaring. Gas flaring is an environmentally destructive process used by oil refineries, oil wells, chemical plants, and landfills to burn off and vent unusable waste gas. This case focused on resultant air and water pollution, though Nigeria’s practice of gas flaring also causes more GHG [greenhouse gas] emissions than all other sources in sub-Saharan Africa

60 J. von Doussa, A. Corkery and R. Chartres, ‘Human Rights and Climate Change’, 14 *Australian International Law Journal* (2007) pp. 161–183, at p. 167.

61 T. Hagmann, ‘Fighting in the Desert? Conflict and Resource Management in East African Drylands’, in D. Péclard (ed.), *Environmental Peacebuilding: Managing Natural Resource Conflicts in a Changing World Swisspeace Annual Conference 2007* (2009) pp. 4–31, at p. 24.

62 S. Bronkhorst, *Climate Change and Conflict: Lessons for Conflict Resolution from the Southern Sahel of Sudan*, A report of the African Centre for the Constructive Resolution of Disputes (ACCORD) and the Swedish International Development Cooperation Agency (Sida) (2011) at p. 7.

63 R. A. Payne, ‘The Limits and Promise of Environmental Conflict Prevention: The Case of the GEF’, 35:3 *Journal of Peace Research* (1998) pp. 363–380, at p. 378.

combined. ... The Court ordered that gas flaring must stop in the Niger Delta community as it violates guaranteed constitutional rights to life and dignity. The Nigerian case is one of the first where a national court held that climate change, like other environmental issues, may implicate human rights.<sup>64</sup>

Many commentators have contended that the human rights framework could help articulate climate change issues in terms of rights and responsibilities and that litigation based on human rights might be more effective.<sup>65</sup> Some have argued that using regional or international human rights mechanisms to bring climate change and environment related cases could be easier and more effective than bringing cases before domestic courts,<sup>66</sup> while others have expressed their doubts about the efficacy of using litigation to drive climate change policy at all.<sup>67</sup> In an important study prepared for Swisspeace, the authors argue that the UN has both the legitimacy and expertise necessary in the fields of environment and conflict prevention to address the possible effects of climate

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- 64 S. C. Aminzadeh, 'A Moral Imperative: The Human Rights Implications of Climate Change', 30 *Hastings International and Comparative Law Review* (Winter 2007) pp. 231–264, at pp. 237–238.
- 65 See e.g. J. H. Knox, 'Climate Change and Human Rights Law', 50 *Virginia Journal of International Law* (Fall 2009) pp. 163–218; and S. McInerney-Lankford, 'Climate Change and Human Rights: An Introduction to Legal Issues', *Harvard Environmental Law Review* (2009) pp. 431–437. See also S. Kravchenko, 'Procedural Rights as a Crucial Tool to Combat Climate Change', *Georgia Journal of International and Comparative Law* (2010) pp. 613–648; S. L. Kass, 'Integrated Justice: Human Rights, Climate Change, and Poverty', 18 *Transnational Law & Contemporary Problems* (Winter 2009) pp. 115–138, which considers climate change to be an important driver of conflict. E. Cameron, 'Human Rights and Climate Change: Moving from an Intrinsic to an Instrumental Approach', 38 *Georgetown Journal of International and Comparative Law* (2009–2010) pp. 673–713. See also N. Roht-Arriaza, "'First, Do No Harm": Human Rights and Efforts to Combat Climate Change', 38 *Georgia Journal of International and Comparative Law* (2010) pp. 593–611; and P. Stephens, 'Applying Human Rights Norms to Climate Change: the Elusive Remedy', 21 *Colorado Journal of International Environmental Law and Policy* (Winter 2010) pp. 49–82.
- 66 See e.g. T. Koivurova, 'International Legal Avenues to Address the Plight of Victims of Climate Change: Problems and Prospects', 22 *Journal of Environmental Law & Litigation* (2007) pp. 267–299; and S. Tully, 'The Contribution of Human Rights as an Additional Perspective on Climate Change Impacts within the Pacific', 5 *New Zealand Journal of Public and International Law* (2007) pp. 169–200.
- 67 See e.g. E. A. Posner, 'Climate Change and International Human Rights Litigation: A Critical Appraisal', 155 *University of Pennsylvania Law Review* (2007) pp. 1925–1945.

change as an indirect factor exacerbating the risk of ethnic conflict, and that the issue should be mainstreamed throughout the UN.<sup>68</sup>

The precise cause, extent or severity of climate change may not be known for certain. However, the harmful effects of intensified desertification, increased land and sea temperatures, altered weather patterns and greater frequency of both drought in dry areas and flooding in coastal and delta areas, as well as the knock-on effects of increased crop failures, scarcer access to food and water, rampant disease and malnutrition and lowered health, cannot be denied, and many empirical studies have noted these impacts. While there seems to be scant evidence that these factors are linked to an increased likelihood of ethnic conflict in a directly linear causal sense, the harmful effects of ecological stress more generally on the enjoyment of human rights, democratic participation and human security have been well documented by both intergovernmental bodies and in academia, particularly with regard to marginalised sectors of the population such as women, children, the elderly, persons with disabilities, disadvantaged ethnic minorities, the poor and migrants. The precautionary principle reminds us that even if causal connections cannot be shown with much certainty, and perhaps even unsatisfactorily, it is still more prudent not to dismiss the possibility entirely where the potential harm is great, as it is for the onset of ethnic conflict, particularly in underdeveloped regions where many people live at subsistence level, such as in Darfur, Ethiopia, Rwanda, the Democratic Republic of Congo, Chad or Somalia. At the same time, climate change should not be put forward or accepted as an excuse to explain ethnic conflict as if it were somehow objectively inevitable and part of the natural course of human affairs. While climate change may be impossible for any single sovereign authority to control, sovereign States can take measures to safeguard the health of their own democratic governance and enjoyment of human rights and the rule of law (including accountability and criminal responsibility), which depend upon good governance, full participation of civil society, peaceful relations, international cooperation and sound decision making.

The above discussion implies that the UN and other intergovernmental bodies, governments, research bodies and NGOs should:

1. check the available research before accepting uncritically the 'resource scarcity causes ethnic conflict' argument and avoid making such unsupported claims unless and until they can be proven empirically;

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68 S. A. Mason *et al.*, *Linking Environment and Conflict Prevention: The Role of the United Nations* (2008), Executive Summary at p. 9.

2. encourage and take account of further research to discern how and the extent to which climate change burdens the lives of people, particularly indigenous and marginalised communities living at subsistence level;
3. consider resource scarcity not just in terms of supply and demand of a physical resource, but also according to rights of access and how these may be unequal in the particular political circumstances in a given territory;
4. adopt a more comprehensive research strategy to encompass indirect as well as direct effects on the wellbeing of ethnic groups, women and children, refugees and migrants, persons with disabilities, and other social groups that may face relative disadvantage with regard to access to resources, democratic participation, justice and customary and traditional avenues to vindicate breach of their rights, or who suffer from unequal social distribution of political power, income, wealth and opportunity; and
5. take full account of proximate military, political and economic factors in assessing the risk of ethnic conflict, and the eventual outbreak of crimes against humanity and genocide, while recognising that climate change could play some role as a background element in the broader picture.

In short, to claim that climate change actually *causes* ethnic conflict or genocide in a direct sense is at least an overstatement and may even be false, but there is considerable reason to be concerned about climate change and the harm it causes to the environment, human security, political stability and the enjoyment of human rights, all of which are essential to ensure that communities can live peaceably together in full respect and dignity.