

## Climate Change and Genocide:

### Will Anthropogenic Climate Change Increase the Risk of Genocide in Africa?

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#### Abstract

This review examines, using four papers of differing approaches, the hypothesised situation whereby for the current century, predicted climatic changes (IPCC<sup>1</sup>) will increase the amplitude and possibly frequency of a number of factors which are causally linked to conflict and genocide and whether this will increase the risk of genocide in Africa. It is a growing concern amongst policy makers, NGOs and academics that these IPCC projections have not been translated into the socio-economic and political realms. However, as this review will highlight, real progress is beginning to be made, as climate change progresses from being exclusively an environmental problem, to one encompassing of geo-politics and security.

This review will be split into distinct sections to assess the ability of the selected papers to answer the question posed in the title of this review. This paper will first seek to define what is meant by genocide, and what the state of knowledge is regarding climate predictions for Africa, before examining the papers and their results, and discussing them in the context outlined above.

#### Introduction

With a firm scientific and political consensus behind a quantitative human influence on recent climatic changes, increasing concern about the socio-political impacts of some of the IPCC's projections for the coming century. These projections vary enormously, as the level of CO<sub>2</sub> still to be committed still to the atmosphere depends on as yet to be resolved political frameworks, although, at the very least it seems we are committed to a 1.8-4.0°C (IPCC 2007a, p. 18) rise in global mean temperatures which will exert a number of different impacts upon the biosphere. One of the expected impacts is for there to be further strain on ecosystem services, particularly key resources such as food and water which are under stress in many areas.

Africa, during the twentieth century has experienced a number of aggressive internal conflicts, one of which (Rwanda in 1994) has been labelled as genocide by the UN, and one (Darfur, Sudan 2003-present<sup>2</sup>) which many organisations, and the USA, have labelled as genocide or 'ethnic cleansing'. These conflicts have been linked to the environment and climate change by several authors and organisations, with one UN report remarking that 'the causal relationship [between environmental degradation and ethnic conflict in Darfur] evidently exists' (University for Peace 2004, p. 94).

The latest report of the IPCC echoes this in saying that climate change 'may become a contributing factor to conflicts in the future' (IPCC 2007b, p. 442), with the UN Secretary General further remarking that the conflict in Darfur 'began as an ecological crisis, arising in part from climate change' (cited in Brown et al. 2007, p. 1144). As the post-Kyoto agreement debate rumbles on, it would appear that the nations of Africa 'are not the *intended audience* [italics from original]...they are part of the *evidence* [italics from original] being used to make it [the debate]' (Brown et al. 2007, p. 1145).

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1 UN body, Intergovernmental Panel on Climate Change

2 [Further information on the disputed genocide claims at <http://en.wikipedia.org/wiki/Darfur\\_conflict#Genocide\\_claims>](http://en.wikipedia.org/wiki/Darfur_conflict#Genocide_claims) accessed 02/01/08

A study of the selected papers will be made, to assert whether the different approaches used by them answer the question posed in the title satisfactorily, and to establish what gaps in the knowledge are present, if any. It is beyond the scope of this article to critique the papers in themselves, its remit is to analyse the comparative strengths and weaknesses of the approaches.

## Genocide

Genocide is a contemporary legal term defined in 1948 after a lengthy campaign by Raphael Lemkin<sup>3</sup>, in response to the atrocities of the twentieth century against groups of population bound by a defining characteristic, such as during the Holocaust. The distinction between genocide and conflict hinges around a party possessing demonstrable intent to destroy, in part or in whole, another social group (see Appendix 1 for further definition).

When looking for literature on genocide and possible relationships with climatic changes, a potential limiting factor on the quantity of research may be due to the very nature of this term (See Appendix 2 for further information). Many of the papers reviewed (eg Hendrix and Glaser 2007), reveal the extent of current research on the link between the environment, (particularly the degradation thereof), and conflict and/or violence. There is currently little explicit account of links between the climate and/or incidence of genocide in contemporary academic literature, but the volume of research has been growing since the turn of the millennium.

## IPCC projections for Africa

The key findings from Working Group I for the Fourth Assessment Report of the Intergovernmental Panel on Climate Change (2007c, p. 850) for Africa can be summarised as:

- Warming is *very likely*<sup>4</sup> to be greater than the global annual mean temperature, in all seasons.
- Warming will be greatest in the driest, subtropical, regions.
- Annual rainfall is *likely* to decrease in much of North Africa.
- East Africa is *likely* to have an increase in annual rainfall.
- Winter rainfall is *likely* to decrease in Southern Africa.
- There is still uncertainty for predicted rainfall changes in the Sahel and Southern Africa.

## Literature and Results

The four papers being examined in this study can be split into three categories; micro-historical perspective (Hendrix and Glaser 2007), macro-historical perspective (Zhang et al. 2007a,b) and political science (Brown et al. 2007).

### Micro-historical perspective

Hendrix and Glaser (2007) examine the relationship between the climate, and climate change, and conflict from two perspectives, during the period 1981-2002 in different countries within the Sub-Saharan region. The first estimates the impact of long-term climate trends ('operationalized' as whether Eurasian agriculture is possible, land degradation and freshwater availability per capita) and short-term triggers ('lagged percent change in annual rainfall') on the 'onset of civil conflict in Sub-Saharan Africa'. The second is an 'analysis of predicted changes in precipitation means and variability' (p. 696) as generated by a GCM (General Circulation Model). Controls for factors

3 Lemkin coined the term genocide to give the processes and situation described a simple, but definite and memorable legal and semantic meaning. The word genocide is a hybrid term that was formed from the combination of the 'Greek derivative *geno*...[and] the Latin derivative *cide*', and it means...to kill (*cide*) a race or tribe (*geno*) (Power 2003, p. 43).

4 For definitions of likelihood terms used by the IPCC, refer to Appendix 3.

normally cited as being triggers in conflicts are factored in, in their analysis.

Nine hypotheses were generated from a literature review, and tested numerically using different sources of data for correlations (between onset of conflict and factor in hypotheses) with the onset of conflict being the dependent variable.

A key finding from this paper is that long and short term climatic changes are significantly related to the onset of civil conflict in Sub-Saharan Africa. Interestingly, the authors find that those climates that are 'suitable for Eurasian agriculture' are less likely to be prone to conflict, whereas water scarcity remains a prominent issue in the cause of conflicts. They report that in Sub-Saharan Africa, a region known for its low levels of precipitation, 'freshwater resources per capita' are related to risk of conflict, and increased rainfall one year leads to a lower risk of conflict in the subsequent year (p. 695). The results from the second perspective suggest that interannual precipitation variability is 'unlikely to be affected dramatically by expected changes in climate'.

The paper highlights something often overlooked, and that is that not only can the absolute or relative changes in the climate be factors leading to conflict, but so can an increased instability and unpredictability in local climatic systems.

An important point for discussion is that in the agriculturally dependent areas, short-term climate variability can give rise to economic downturns that are felt most acutely by 'young men with low social status – those most likely to take up arms' (p. 700).

#### Macro-historical Perspective

The two papers by Zhang et al. (2007 a, b) aim to relate trends in war frequency to temperature trends exhibited in the Northern Hemisphere (largely). The first paper (a) relates war frequency to cold periods in China using detailed continuous war records with high resolution correlated against the reconstructed (paleo-climatic) mean Northern Hemisphere temperature and its oscillation. The second paper (b) builds on the initial paper, and tries to extend the approach to Europe, and to a lesser degree, the Southern Hemisphere, in the pre-industrial era. Their central hypothesis is that 'long term climate change has significant direct effects on land-carrying capacity', and that this is involved with other feedbacks in determining relative abundance of food per capita, with this a precursor to conflict (p. 19214). It examines in greater depth the role of other factors such as demographics, and assess some of the implications for the future as well as examining 'pathways for human adaptation' (p. 19218).

Zhang et al (2007a) suggests that all cold periods are strongly associated with higher frequencies of war (p. 407). There is also a strong association with greater rate of change of temperature. In terms of lag time between temperature change and onset of war, 10-30 years is the most significant time-scale. They identify that climate is a causal triggering factor of war (p. 413) It is suggested that cooling reduced agricultural production which 'interacted with population pressure' to lead to conflict (p. 403). A note of caution on their findings is that there is no analysis of how well regional temperature is correlated to the Northern Hemisphere mean temperature, which could undermine aspects of their findings. Further caution must be factored into the transferability of particular geography and political specifics of the region in the study.

Zhang et al (2007b) finds that 'the number of wars in each hemisphere is related only to its own temperature variation', and that 'warfare... is highly correlated with temperature anomalies', with arid areas having the highest coefficient for war frequency (p. 19216). Whilst it is not necessarily true that all their results can be extrapolated to Africa because there are not enough parallels in the respective climates and political systems and boundaries, they did find that that 'the fluctuations of

all of the components are the same in terms of macro-trends, turning points, and oscillation magnitude for both Europe and China at a time when both regions were detached, economically, politically, and geographically' (p. 19217), which suggests the trends identified may be more than regional, and should be considered in the case of Africa.

### Political Science Perspective

The paper by Brown et al. (2007) is essentially a state of affairs of environmental politics and overview of climate change as a security issue, with the focus being the implications for Africa. Much of the paper is given over to literature review and the chronicling of the 'securitization' of climate change, as exemplified by the promotion of the issue of climate change to the agenda of the UN Security Council, and to a central role in the foreign policy of the UK government since 2006 (p. 1142). Whilst the paper does take in a diverse and large number of references, it is hard to assess whether these were appropriate. As most of the findings stem from other works, directly or indirectly, it is hard to critique the paper, simply acknowledge that it covers the area with adequate depth and provides a useful introduction to the subject with some good points for consideration.

From their review of literature they ascertain that 'yields from rain-fed agriculture could fall by up to 50% between 2000 and 2020', and that climate change is likely to worsen 'existing water-related problems' (p. 1146). They surmise that climate change 'creates an alternative path to scarcity and collapse' (p. 1147), and that security is affected by climate change in four key ways:

- reshaping 'productive landscape' to exacerbate resource scarcity
- 'destabilizing, unregulated populated movements'
- extreme weather 'stretching the resources and coping capacity of developing countries'
- 'climate-related disasters' triggering major public health issues and endemic disease.

There are a number of important remarks worth repeating here. Firstly, that retrospective identification of an environmental or resource scarcity causality for a conflict is far easier than predicting a conflict based upon these factors, and the same will apply for genocide. Furthermore, the fallacy of reductionist arguments sometimes used with regards to African conflicts is highlighted in remarking that drought, citing the case of Sudan, cannot cause conflict 'without the active facilitation of violence by outside powers' (p. 1151). The point is underlined by the warning that merely heeding the IPCC's projections 'in isolation...is probably a poor way to predict future conflicts' (p. 1153).

### Discussion

Comparing the two historical approaches, it is clear both are needed to highlight different trends, with Zhang et al. (2007a,b) providing good evidence for historical linkages between war and hemispherical temperature mean, and Hendrix and Glaser (2007) providing analysis of the short term triggers which will be essential to policy makers. The use of macro-historical perspectives, as used by Zhang *et al.* (2007a, 2007b), offer new and unique evidence, rather than attempting causality based upon hearsay and conjecture, that war and violence is linked to climatic changes on a long-term and short-term scale, at least within the regions studied. The three approaches provide complementary evidence and findings which will help identify the link in the past, the triggers, and what mixture of other factors lead to genocide, and how best to start preventative planning and policy. This highlighted the growing need for more multidisciplinary research for the symbiotic relationship between humans and the climate. It is perhaps best summarised that the 'best guess about the future has to be based on our knowledge about the relationship between demography, environment and violent conflict in the past' (Raleigh and Urdal 2007, p. 674). Obvious weaknesses are in the available data for regions such as Africa, especially for macro-historical approaches, and with the difficulty in drawing projections with past-analogues to make this data employable. Certainly, the empirical historical perspectives have added weight to this topic,

providing clearer statistical links, rather than just hypotheses testable only within small localities in the short term.

A macro-historical perspective missing thus far in relation to the question posed in this paper, is the coupling of a colonially imposed nation-state boundary and climatic changes in relation to genocide. The arbitrary drawing of these boundaries has created mixtures of ethnicity and faith groups within states, which may present an extra trigger for conflict.

Returning to the original question, namely, 'Will anthropogenic climate change increase the risk of genocide in Africa?', it quickly becomes apparent that further multi-disciplinary research is needed to examine this issue more thoroughly. Taking the key findings, there are a number of points of concern for Africa, at least in terms of conflict, if not genocide. Firstly the projected climatic changes signify further decreases of rainfall in already arid areas, whilst experiencing an upturn in average temperature, which hasten to exacerbate ecological stress. It is in these regions, such as the Sahel and Sub-Saharan Africa, which are traditionally dependent on rainfall agriculture and possess the sort of demographic described by Hendrix and Glaser (2007), that there is real danger of future conflicts and genocide as they also incorporate different modes of settlement, faith and culture. Zhang et al. (2007b) identified arid areas as having the highest coefficient for war frequency, and that interruptions of agricultural production are a pathway to conflict.

Furthermore, many of these states are weak, some are already experiencing civil unrest and lack adaptive capacity to cope with the forthcoming climate changes. The increasing population in some of these areas raises neo-Malthusian concerns, with the prospects of the Millennium Development Goals looking bleak in such a scenario. Indeed as Brown et al. (2007) note, the predictions of the IPCC 'threaten to exacerbate existing drivers of conflict in such a way that could roll back development across many countries' (p. 1143).

There are some key recommendations in each of the papers. Hendrix and Glaser (2007) suggest that 'reducing dependence on rainwater for agriculture may mitigate conflict' (p. 697). Brown et al. (2007) infer, essentially, that to avoid conflict in Africa the first step is for coordinated efforts to build up the adaptive capacity of African states, but with a note of caution, as such strategies 'can either create or resolve conflicts' (p. 1152).

The papers point towards the climate being a macro-driver, both in temporal and spatio-ecological terms, of socio economic and agrarian factors which enter into a dynamic mixture with population (size and density), political structure, resource availability (absolute and relative) and national boundaries (and the impact upon migration this presents) which can culminate in violent conflict.

Ultimately, climate change can never be said to be the sole cause of genocide, all the papers have demonstrated the complexity of analysis of the causal chain and how hard predictions will be. It can be said though, as noted in one US security report, that climate change 'can act as a threat multiplier for instability in some of the most volatile regions of the world' (MAS 2007, p. 3). Africa, in particular the more arid regions, has an increased risk of genocide from anthropogenic climate changes based on the available evidence, but its accurate prediction may not follow.

These findings should add urgency to a post-Kyoto framework to reduce GHG emissions and therefore the risk of greater climatic changes, and for greater attention to be paid to the role of the environment in the short and long-term in the development sector, with special attention and funds being directed towards building in adaptive capacity. Further work in assessing divergent paths, stemming from climatic changes, for conflicts and genocide would help elucidate an answer more comprehensively to the question posed by this paper.

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## Appendix

1. Genocide definition, articles 1 and 2, UN Office of the High Commissioner of Human Rights. “Convention on the Prevention and Punishment of the Crime of Genocide”

### 'Article 1

The Contracting Parties confirm that genocide, whether committed in time of peace or in time of war, is a crime under international law which they undertake to prevent and to punish.

### Article 2

In the present Convention, genocide means any of the following acts committed with intent to destroy, in whole or in part, a national, ethnical, racial or religious group, as such:

- (a) Killing members of the group;
- (b) Causing serious bodily or mental harm to members of the group;
- (c) Deliberately inflicting on the group conditions of life calculated to bring about its physical destruction in whole or in part;
- (d) Imposing measures intended to prevent births within the group;
- (e) Forcibly transferring children of the group to another group.

Online, accessed 27/12/07 < [http://www.unhchr.ch/html/menu3/b/p\\_genoci.htm](http://www.unhchr.ch/html/menu3/b/p_genoci.htm) >

The term was defined to prevent a re-occurrence of such persecution as had been witnessed in Armenia and in war-time Europe, to identify the processes that lead to discrimination and prevent systematic abuses against identifiable groups of population from reaching anything like the levels witnessed during the Holocaust. His efforts culminated in the 1948 Convention on the Prevention and Punishment of the Crime of Genocide.

2. Reluctance for states and institutions to refer to conflicts as genocide.

Genocide is not merely a descriptive term, it is a legal term, and as such to proclaim an event, in the present, as genocide, compels signature holders of the convention to uphold a number of duties, but not necessarily intervene in the affected region (as is often thought, perhaps due to the reluctance of some states to acknowledge that Genocide is taking place). The convention sets out a 'moral obligation' <sup>5</sup>to act, and this may be enough for some states to be reluctant in defining an event as Genocide. Instead, particularly since events in the Balkans in the 1990s, some states have been using the careful language of diplomatic avoidance and introducing new terms such as 'ethnic cleansing' which currently have no legal definition, but are sometimes broadly defined in institutions in much the same way as genocide to avoid this compunction.

As such, links to genocide, in all temporal directions, in relation to climatic changes, may be fewer in quantity than the subject merits, but clues may be more broadly found to the strength of these links by taking into account papers which discuss climate change and violence/conflict/migration/internal aggression or other such terms which are in the causal chain of genocide in part or in whole.

3. Explanation of likelihood terms in IPCC summary

#### **Table 4. Likelihood Scale.**

##### **Terminology Likelihood of the occurrence/ outcome**

*Virtually certain* > 99% probability of occurrence

*Very likely* > 90% probability

*Likely* > 66% probability

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5 Genocide Watch 2007. Proving Genocide in Darfur: The Atrocities Documentation Project and Resistance to its Findings. Accessed 20/12/07 <<http://www.genocidewatch.org/aboutgenocide/stantonprovinggenindarfur.htm>>

*About as likely as not* 33 to 66% probability

*Unlikely* < 33% probability

*Very unlikely* < 10% probability

*Exceptionally unlikely* < 1% probability

Table extracted from 'Guidance Notes for Lead Authors of the IPCC Fourth Assessment Report on Addressing Uncertainties', IPCC WG1 AR4 Report , UN, 2007. accessed on 04/01/08 <[http://ipcc-wg1.ucar.edu/wg1/Report/AR4\\_UncertaintyGuidanceNote.pdf](http://ipcc-wg1.ucar.edu/wg1/Report/AR4_UncertaintyGuidanceNote.pdf)>