



^b
UNIVERSITÄT
BERN

MAKING SENSE OF CLIMATE CHANGE, NATURAL DISASTERS, AND DISPLACEMENT: A WORK IN PROGRESS

**LECTURE BY ELIZABETH FERRIS
SENIOR FELLOW AND CO-DIRECTOR
BROOKINGS-BERN PROJECT ON INTERNAL DISPLACEMENT**

**CALCUTTA RESEARCH GROUP WINTER COURSE
14 DECEMBER 2007**

There has been a lot of talk lately about climate change and displacement. Predictions have been made that millions of people – perhaps a billion people – will be displaced because of climate change in the coming years¹. The terms being used for those displaced by environmental factors vary. Some scholars and policy-makers refer to ‘environmental refugees’² which is in turn criticized by others (particularly by those coming from a refugee background.)³ Anke Strauss of the International Organization for Migration predicts that by 2010 – 3 years from now – we’ll see an additional 50 million ‘environmental migrants’ which she defines as “persons or groups of persons who, because of sudden or progressive changes in the environment affecting adversely their livelihoods, have to move from their habitual homes to temporary or durable new homes, either within their country or abroad.”⁴ The 2006 Stern Review by the UK government refers to permanently displaced “climate refugees” while the Intergovernmental Panel on Climate Change refers to ‘climate change refugees’ or just “refugees.” The issue of climate change and displacement has become a popular issue in the public debates with major conferences organized

¹ *Human tide: the real migration crisis*; Christian Aid report, May 2007, p. 5. Accessed online November 26, 2007; http://www.christianaid.org.uk/Images/human_tide3_tcm15-23335.pdf

² While the term was used in the 1970s by the World Watch Institute, it was first publicly used in 1985 by Essam El-Hinnawi, *Environmental Refugees*. UNEP: Nairobi. It is also frequently associated with Jodi Jacobson’s, *Environmental Refugees: a Yardstick of Habitability*. World Watch Paper, no. 86, Washington, DC: World Watch Institute, 1988.

³ See for example, Richard Black, “Environmental Refugees: myth or reality?” *New Issues in Refugee Research*, UNHCR, Working Paper no. 34, March 2001.

⁴ Anke Strauss, Address to the High Level Segment of the Fifteenth Session of the Commission on Sustainable Development, 5 September 2007.

on the issue, including this year's International Conference of the Red Cross and Red Crescent in November 2007.⁵ More will certainly be written about these connections in the coming years.

Many of those who are writing about climate change and displacement are not from the traditional humanitarian community where distinctions between refugees, internally displaced persons, and migrants are generally well-understood. Rather, many from the environmental community are raising the alarm about potential large-scale displacement due to climate change – perhaps as a way of drawing attention to the urgency of the situation and mobilizing governments to take action. Some of the articles about environmentally-induced displacement seem to add a security ‘scare factor’ – if Western governments don't control their emissions, they may be faced with hundreds of millions of migrants seeking entry to their territory. Or as Archbishop Desmond Tutu said, “In the long run, the problems of the poor will arrive at the doorstep of the wealthy, as the climate crisis gives way to despair, anger and collective security threats.”⁶

In my presentation today, I would like to do three things:

- briefly review what we know about climate change
- consider alternative ways that climate change relates to environmental factors which in turn influence displacement, and
- discuss some of the problems with the current debate on climate change's impact on displacement.

This is not a definitive study, but rather a work in progress. Your comments and suggestions are most welcome and indeed, most needed.

What we know about climate change

Climate change has, of course, been a part of our planet's history since its creation. However, since 1970, there has been growing scientific concern about global warming and climate change as a result of human action. Many studies have been carried out and a consensus has emerged in the scientific community that human-induced climate change is, in fact, underway. According to the Intergovernmental Panel of Climate Change's (IPCC) Fourth Assessment (released in April 2007), “most of the observed increase in the global average temperature since the mid-20th century is very likely due to the observed increase in anthropogenic greenhouse gas concentrations.”⁷ These results are based on more than 29,000 observational data series from the

⁵ [http://www.icrc.org/Web/eng/siteeng0.nsf/htmlall/30-international-conference-daily-bulletin-271107/\\$File/Bulletin-IC-EN-7_LR.pdf](http://www.icrc.org/Web/eng/siteeng0.nsf/htmlall/30-international-conference-daily-bulletin-271107/$File/Bulletin-IC-EN-7_LR.pdf) Also see for example, International Organization for Migration, *Environmentally-Induced Population Displacements and Environmental Impacts Resulting from Mass Migration*. International Symposium, Geneva, April 2006 organized by IOM, together with UNHCR and the Refugee Policy Group. See also the UN Development Program's *Human Development Report 2007/08 “Fighting Climate Change: Human Solidarity in a Divided World,”* New York: UNDP, 2007. http://hdr.undp.org/en/media/hdr_20072008_en_complete.pdf

⁶ <http://www.alertnet.org/thenews/newsdesk/N27495757.htm>

⁷ *Summary for Policymakers, Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change*; Intergovernmental Panel on Climate Change, Fourth Assessment,

75 studies used by the IPCC in their Fourth Assessment and show “significant change in many physical and biological systems, more than 89% are consistent with the direction of change expected as a response to warming.”⁸

The IPCC was established in 1988 by the World Meteorological Organisation (WMO) and United Nations Environment Programme (UNEP) to “assess on a comprehensive, objective, open and transparent basis the scientific, technical and socio-economic information relevant to understanding the scientific basis of risk of human-induced climate change, its potential impacts and options for adaptation and mitigation.”⁹ The IPCC is open to all members of the WMO and UNEP and meets annually at the plenary level of government representatives at sessions attended by officials and experts from relevant ministries, agencies and research institutions from member countries and from participating organizations. Its first Assessment, released in 1990, was the impetus for the creation of the United Nations Framework Convention on Climate Change (UNFCCC) in 1994, whose purpose is to serve as an overall framework for intergovernmental efforts to tackle the challenge posed by climate change.¹⁰ Two and a half years after the formation of the UNFCCC, its principal product, the Kyoto Protocol, was released. The purpose of the Kyoto Protocol was to bind signing nations together in an effort to cut greenhouse gas emissions below 1990 baselines. While the exact percentage of emissions that must be cut varies country by country, the average reduction is around 5% of 1990 emission levels by 2012, when the Kyoto Protocol expires. Most UNFCCC member states have ratified the Protocol, with Australia and the United States being two notable holdouts.¹¹ Both countries have been reluctant to accept the logic and necessity of the Kyoto Protocol for many reasons, not the least of which involves internal politics. Developing countries, such as India have signed on, granting them access to technology transfer and foreign investment, but are exempt from the emission reductions listed in the framework.¹²

Some tension exists between the developed and developing world on the politics of climate change. The richer developed countries are responsible for most of the buildup in emissions over the past century and the subsequent climate change that has occurred. However they are asking developing countries to adopt policies that are seen in some communities as limiting their development and the accrual of wealth. China has been particularly insistent about allowing for the “right to develop” within the confines of any climate change agreement.¹³ It believes that the responsibility for climate change lies with rich Western countries, not the developing world. While there is a “reluctance to accept binding emissions targets, asking that richer nations take action first, [developing countries] are undertaking efforts that have significantly reduced the growth of their own greenhouse gas emissions. In most cases, climate mitigation is not the goal,

April 2007, Cambridge University Press, Cambridge, UK, p. 9. Accessed online, 13 November 2007

<http://www.ipcc-wg2.org/index.html>

⁸ Ibid, p. 9

⁹ <http://www.ipcc.ch/about/princ.pdf>

¹⁰ http://unfccc.int/essential_background/convention/items/2627.php

¹¹ http://unfccc.int/kyoto_protocol/items/2830.php. The newly-elected Labor government in Australia has announced its intention to ratify the Kyoto protocol.

¹² http://unfccc.int/kyoto_protocol/background/items/2879.php

¹³ <http://news.bbc.co.uk/2/hi/asia-pacific/6717671.stm>

but rather an outgrowth of efforts driven by economic, security, or local environmental concerns.”¹⁴

Climate Change and Displacement of people: conceptual connections

Climate change in itself does not directly displace people. Rather climate change may produce environmental effects which make it difficult for people to survive where they are. On a conceptual level, there are several possible ways to model the impact of climate change on the displacement of people.

1. *Climate change causes an increase in the number and severity of sudden-onset natural disasters which in turn displace people.* Hurricanes, floods and volcanic eruptions, for example, occur suddenly, forcing people to leave their communities in order to escape the destruction. If they remained where they were, they would face an immediate risk of losing their lives.

As discussed below, this model seems to have the most empirical backing. Those displaced by sudden-onset natural disasters who remain within the borders of their own country are internally displaced persons (IDPs) while those who cross international borders as a direct result of natural disasters are considered to be migrants.

2. *Climate change has specific long-term environmental effects over time such as desertification and other changes in weather patterns (sometimes referred to as slow-onset disasters), which means that people’s livelihoods are no longer sustainable and they are forced to migrate to other places.* (e.g. Sahel)

Also as argued below, this model is the most difficult to assess because the relationship between environmental change, poverty, population growth and displacement is a complex one. People make decisions over time to leave their communities for a complex interplay of reasons and, it is difficult – actually so far, impossible -- to single out the impact of the environmental effects of climate change on these decisions. At the present time, those who leave because they cannot sustain their livelihoods are considered to be migrants (internal or international).

3. *Climate change has environmental effects which lead to increased conflict over resources which in turn displaces people.* (e.g. Darfur)

While this model makes intuitive sense, it is difficult to ascribe the particular contribution of environmental factors to conflicts which usually have causes that are more complex than simply competition for scarce resources. In any event, people fleeing conflict are considered as either IDPs or (usually) treated as refugees when they cross an international border in developing countries or often as international migrants when they seek entry into developed countries.

¹⁴ *Climate change mitigation in developing countries: Brazil, China, India, Mexico, South Africa, and Turkey*; Pew Center on Global Climate Change, October 2002 <http://www.pnl.gov/aisu/pubs/CCMitDevCo.pdf>

4. *Climate change causes environmental effects to which the government responds inappropriately, forcing people to leave their communities.* (e.g. Ethiopia 1984-85)

As the literature on famine illustrates, it is rare that an environmental change is solely responsible for famine.¹⁵ Rather famine usually results from an interplay of poor environmental conditions, inadequate governmental policies, and poverty, often exacerbated by existing social or ethnic conflict. People displaced by this combination of factors are either IDPs or often treated as refugees, though they may not have this legal status.

5. *Climate change causes negative, long-term environmental effects which the government/international community tries to alleviate by means of large-scale development projects. The construction of these projects in turn displaces people.*

While this also makes intuitive sense, further research would be needed in order to show a relationship between climate change and specific environmental effects which lead governments to embark on large-scale development projects which displace people. In particular, the relative impact of environmental effects and population growth needs assessment. Virtually all of those who are displaced by large-scale development projects are IDPs.

Climate Change and Displacement: the evidence

Most of those writing about climate change and displacement argue that climate change has effects on the environment which force people to leave their homes. But there is little consensus about the types of environmental effects caused by climate change which contribute to displacement. Jeffrey Sachs writes that:

Climate changes affect crop productivity through changes in temperature, rainfall, river flows and pest abundance. Droughts and floods are becoming more frequent. Tropical diseases such as malaria are experiencing a wider range of transmission. Extreme weather events such as high-intensity hurricanes in the Caribbean and typhoons in the Pacific are becoming more likely. Changes in river flow already threaten hydroelectric power, biodiversity, and large-scale irrigation. Rising sea levels in the coming decades may inundate coastal communities and drastically worsen storm surges.¹⁶

Thomas Homer-Dixon, writing 16 years ago, pointed to seven major environmental problems which may contribute to population displacement and which in turn may contribute to conflict: greenhouse warming, stratospheric ozone depletion, acid deposition, deforestation, degradation

¹⁵ See for example: Amartya Sen, 1983 "Development: Which Way Now?," *The Economic Journal*, Vol. 93, No. 372 (1983) pp. 745-762; Amartya Sen, "Food and Freedom," *World Development*, Vol. 17, No. 6 (1989), pp. 769-781. Also: Alex de Waal, "Famine crimes: Politics and the Disaster Relief Industry in Africa," Indiana University Press, 1997, pp. 7-8

¹⁶ Jeffrey Sachs, "The Climate Adaptation Challenge," Address to the Global Humanitarian Forum," Geneva, 11 October 2007, p. 1. http://www.ghf-geneva.org/documents/OP_ed_JS.pdf

of agricultural land, overuse and pollution of water supplies, and depletion of fish stocks.¹⁷ Lonergan suggests looking at environmental stressors as: natural disasters, cumulative changes or slow-onset changes, accidental disruptions or industrial accidents, development projects, conflict and warfare.¹⁸ Geisler and de Sousa argue that more attention needs to be given to Africa's 'other environmental refugees' – those displaced by the creation of national parks and protected areas without mitigation.¹⁹

While there is a consensus that climate change is real and that it produces environmental effects which can displace large numbers of people, different authors emphasize different environmental effects. Furthermore, predictions of how many people will be displaced over a particular time period vary tremendously. In fact, these predictions are all over the map – depending in part on assumptions that are made about which environmental changes are caused by climate change and in part on assumptions about how the international community will respond – or fail to respond.

There does seem to be a consensus that climate change is leading to increases in severe weather events, particularly hydrometeorological events.

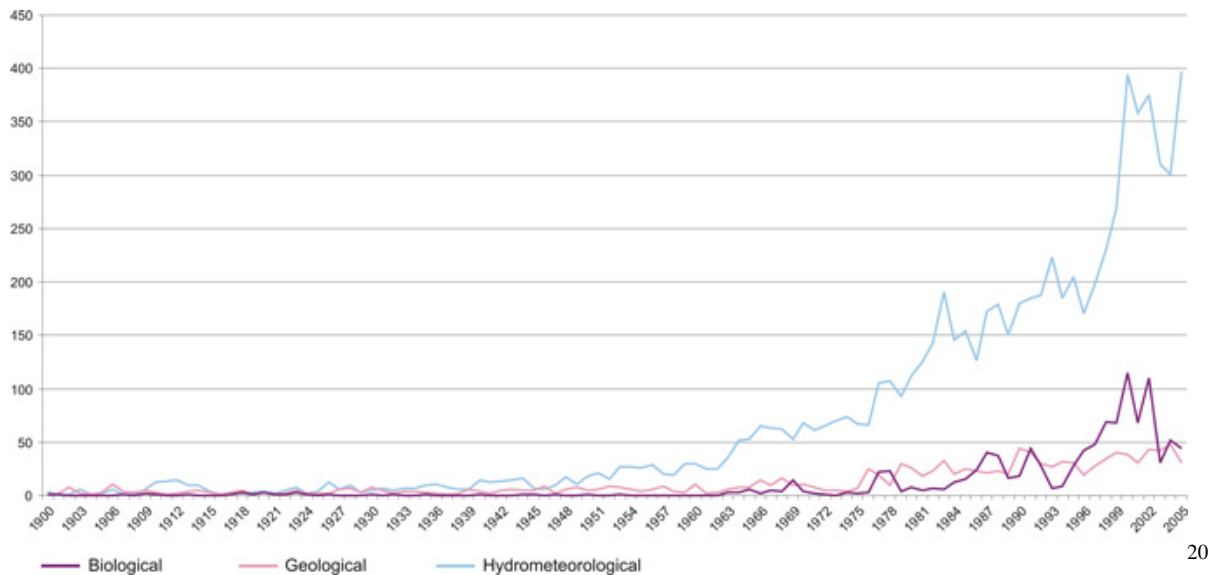
Severe weather events

The evidence seems to be fairly clear that the incidents of natural disasters are increasing and that within the category of natural disasters, hydrometeorological events are rising even faster, as evidenced in the two graphs below from the UN's International Strategy for Disaster Risk Reduction.

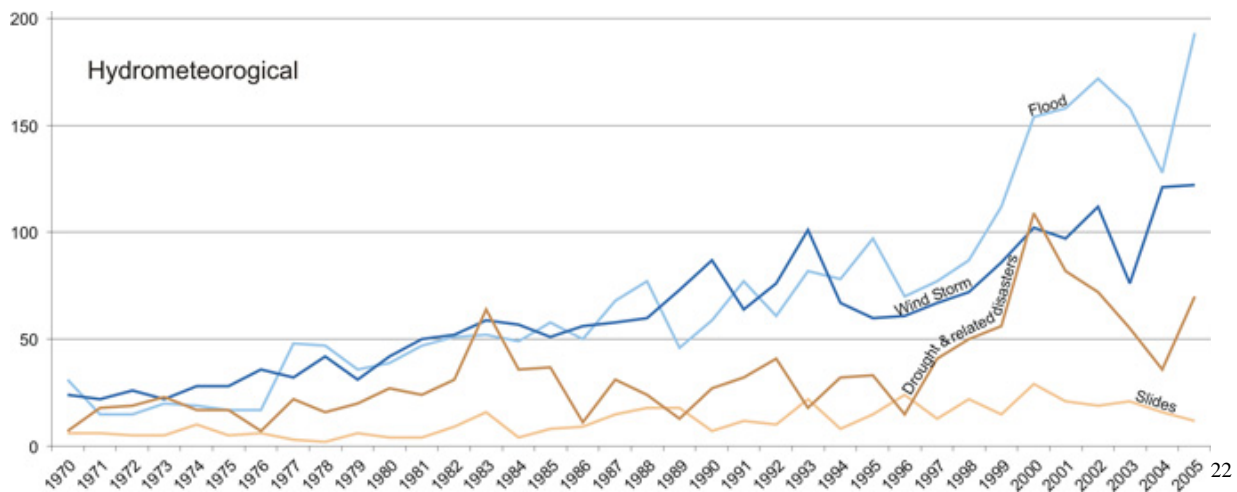
¹⁷ Thomas F. Homer-Dixon, "On the Threshold: Environmental Changes as Causes of Acute Conflict," *International Security*, vol. 16, no 2 (Autumn 1991), pp. 88-89.

¹⁸ Steve Lonergan, "The Role of Environmental Degradation in Population Displacement," *Environmental Change and Security Project Report*, issue 4 (Spring 1998), pp. 8-9.

¹⁹ Charles Geisler and Regendra de Sousa, "Africa's Other Environmental Refugees," *Africa Notes*, September 2000, p. 2.



The table above is taken from the Emergency Events Database (EM-DAT), which is maintained by the World Health Organization’s Collaborating Centre for Research on the Epidemiology of Disasters (CRED). For the purposes of this table, hydrometeorological disasters include floods and wave surges, storms, droughts and related disasters (extreme temperatures and forest/scrub fires), and landslides and avalanches.²¹



While some of the increase in the frequency of natural disasters is undoubtedly the result of better data collection (particularly in comparison with the earlier years of the twentieth century) there does seem to be evidence that the number and severity of hydrometeorological events are increasing. Some have argued, for example, that warmer water in the Atlantic is contributing to the ferocity of hurricanes in the Caribbean and North America while others have made similar

²⁰ <http://www.unisdr.org/disaster-statistics/occurrence-trends-century.htm>

²¹ <http://www.unisdr.org/disaster-statistics/introduction.htm>

²² <http://www.unisdr.org/disaster-statistics/occurrence-trends-period.htm>

arguments in the case of Pacific typhoons. The National Oceanic and Atmospheric Administration (NOAA) found that “those systems that do approach their upper-limit intensity are expected to be slightly stronger in the warmer climate due to the higher sea surface temperatures.”²³

The IPCC found observational evidence that intense tropical cyclone activity in the North Atlantic had increased since about 1970 and states that “it is likely that future tropical cyclones (typhoons and hurricanes) will become more intense, with larger peak wind speeds and more heavy precipitation associated with ongoing increases of tropical SSTs [sea surface temperatures].”²⁴

What seems strange in all this

In reviewing the literature on climate change and displacement, the lack of reference to natural disasters is striking. This is the natural point of connection for those working on humanitarian response, but it is rarely mentioned by those working on climate change. A natural disaster is defined by the UN as: “the consequences of events triggered by natural hazards that overwhelm local response capacity and seriously affect the social and economic development of a region.”²⁵ It should be noted that a burning debate in the humanitarian field is just how ‘natural’ are natural disasters – which raises interesting opportunities to relate to those working on human-induced climate change. For example, landslides are reportedly becoming more common in Nepal. This may be the result of climate change – as warmer temperatures are leading to melting of glaciers – but it may also be the result of deforestation which is an activity carried out by humans.

The evidence is fairly solid that the number of natural disasters is increasing. As Margareta Wahlström has pointed out, “over the past 30 years, disasters – storms, floods and droughts – have increased threefold according to the UN International Strategy for Disaster Reduction (ISDR). In 2006 alone, 134 million people suffered from natural hazards that cost \$35 billion in damages, including the devastating droughts in China and Africa, in addition to massive flooding throughout Asia and Africa.”²⁶

What we seem to know

It seems fairly certain that climate change has the potential to displace more people by increasing the frequency and severity of natural disasters, particularly hydrometeorological events. We don’t know how many people are likely to be displaced by these events, but their number will

²³ http://www.oar.noaa.gov/spotlite/archive/spot_gfdl.html

²⁴ *Summary for Policy Makers, from Working Group I report. Page 9.*

²⁵ IASC, *Operational Guidelines on Human Rights and Natural Disasters*, Washington: Brookings-Bern Project on Internal Displacement, June 2006. An alternative definition from the Centre for Research on the Epidemiology of Disasters (Belgium) used by the International Strategy on Disaster Risk Reduction is: “a situation or event, which overwhelms local capacity, necessitating a request to national or international level for external assistance; an unforeseen and often sudden event that causes great damage, destruction, and human suffering.

<http://www.unisdr.org/disaster-statistics/introduction.htm>

²⁶ Margareta Wahlström, “the Humanitarian Impact of Climate Change,” *UN Chronicle Online Edition*, www.un.org/Pubs/chronicle/2007/issue2/0207p30.htm#

likely rise.²⁷ It is also likely that most of those displaced by these types of events will remain within their country's borders²⁸ and the prevailing international normative standards would apply to them: they are internally displaced persons (IDPs).

“internally displaced persons are persons or groups of persons who have been forced or obliged to flee or to leave their homes or places of habitual residence, in particular as a result of or in order to avoid the effects of armed conflict, situations of generalized violence, violations of human rights or natural or human-made disasters, and who have not crossed an internationally recognized State border.”²⁹

Considerable work has been done in recent years – particularly since the 2004 tsunami – to improve systems of response to natural disasters. The Representative of the Secretary-General on the Human Rights of IDPs (RSG) has developed Operational Guidelines for Protecting the Human Rights of those affected by Natural Disasters³⁰ to ensure that the basic human rights of those affected by natural disasters, including IDPs, are upheld.

The legal status of those who are forced to leave their countries because of natural disasters is less clear. The 1951 Refugee Convention defines as refugees those who “owing to a well-founded fear of being persecuted for reasons of race, religion, nationality, membership of a particular social group or political opinion, is outside the country of his nationality and is unable or, owing to such fear, is unwilling to avail himself of the protection of that country.”³¹ Those who are forced to flee their countries solely because of natural disasters are not refugees under international law. In the case of the eruption of the volcano on Montserrat in 1995, which (unusually) permanently displaced about half of the country's inhabitants, the response to the displaced was developed by Caribbean and the UK governments.³² In other cases where people have crossed national borders because of natural disasters, such as those fleeing the Ethiopian famine in 1984-85, the humanitarian community has responded as if they were indeed refugees.³³

But there is no international legal definition for those who cross into another country because of natural disasters. The use of the term ‘environmental refugee’ is confusing and inaccurate because those forced to flee their countries because of natural disasters are not entitled to international protection and assistance under refugee law – unless of course they also have a well-founded fear of persecution. There is a danger that using the term “environmental refugees” will further weaken the international refugee regime.

²⁷ However, we should also note that while the number of people affected by these natural disasters may rise as a consequence of climate change, the number of people affected is also likely to increase because of growing population density in disaster-prone areas.

²⁸ With the exception, of course, of those inhabitants of small island states who find that their islands disappear as a result of rising sea levels.

²⁹ *UN Guiding Principles on Internal Displacement*, Introduction, Scope and Purpose. New York: OCHA, 1998.

³⁰ IASC, *Operational Guidelines*, *op.cit.*

³¹ 1951 Convention Relating to the Status of Refugees, Art. 1 A.2.

³² <http://www.paho.org/english/HIA1998/Montserrat.pdf>

³³ Note, however, that in many cases, the cause of famine is an interplay between natural disasters and governmental policies.

If natural disasters can be expected to increase, this would give rise to policy recommendations to strengthen both systems of mitigating the risk of natural disasters and to improving the systems of responding to natural disasters. And there is significant evidence that the risks of natural disasters can be diminished with planning, foresight and commitment of resources.³⁴ For example, the Bangladeshi government has made significant progress in protecting its population from the regular cyclones which affect that country by the construction of cyclone shelters.³⁵

What is much less certain

When we move into the area of changing long-term weather patterns, the relationship between climate change and displacement is less clear.

Rising sea levels

Perhaps the strongest relationship between climate change and displacement is that global warming will cause a rise in sea levels. The most recent IPCC report projects temperatures to increase by between 1.8 degrees C and 4 degrees C, resulting in sea levels rising by between .2 and .6 meters by 2100, with a greater rise a possibility. According to a World Bank study, sea levels rising a single meter would displace 56 million people in 84 developing countries.³⁶ Further, if rising temperature trends continue, widespread deglaciation of the Greenland and West Antarctic ice sheets would occur over an extended period of time. The complete melting of the Greenland ice sheet would raise sea levels 7 meters; the melting of the West Antarctic sheet would raise levels another 5 meters, drastically impacting the Earth's population centers.³⁷ While this projection comes from the IPCC, other scholars raise even more alarming scenarios and projections. A recent report by the International Peace Academy, for example, argues that in the worst-case scenario, the breakoff of the west Antarctic and Greenland ice sheets would raise sea levels by 15 meters. If the more stable east Antarctic ice sheet melts, sea levels could rise by 60 meters.³⁸

Countries most affected by rising sea levels are small island states, such as the Pacific islands, and countries with low-lying coastal areas. A recent study by Sugata Hazra found that during the last 30 years, roughly 80 square kilometers of the Sundarban islands in India have disappeared, displacing more than 600 families and submerging two islands. The Sundarban islands are among the world's largest collection of river delta islands with 4 million people living on them, on the Indian side of the border. While there is a natural process of islands shifting size and shape, the study concludes that there is little doubt that human-induced climate change has made them particularly vulnerable.³⁹ The small island country of Tuvalu has reportedly reached an

³⁴ See for example the many resources available at: www.unisdr.org.

³⁵ See for example, Margareta Wahlström, *op cit*.

³⁶ "Climate changes and impact on coastal countries"

<http://econ.worldbank.org/WBSITE/EXTERNAL/EXTDEC/EXTRESEARCH/0,,contentMDK:21215328~pagePK:64165401~piPK:64165026~theSitePK:469382,00.html>

³⁷ *Summary for Policymakers, Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change*, p. 17.

³⁸ Nils Peter Gleditsch, Ragnhild Nordas, and Idean Salehyan, "Climate Change and conflict: the Migration Link," International Peace Academy, Coping with Crisis Working Paper, May 2007, pp. 8-9.

³⁹ Somini Sengupta, "Living on the edge: Indians watch their islands wash away," *International Herald Tribune*, 10 April 2007. www.iht.com/articles/2007/04/10/asia/india.php.

agreement with the government of New Zealand that its citizens can resettle in New Zealand in the event that rising sea levels make continued residence on Tuvalu impossible.⁴⁰

Apart from rising sea levels, many have argued that climate change impacts the traditional weather patterns on which much of the developing world depends. The IPCC states that in Africa, by 2020, 75 to 250 million people will be impacted by water stress and rain-fed agriculture yields could be reduced by up to 50%. These changes would “further adversely affect food security and exacerbate malnutrition in the continent.”⁴¹ Some believe that an example of what looms in Africa’s future can be seen in Darfur. The UN Secretary-General, Ban Ki Moon wrote in a June 2007 editorial “[a]mid the diverse social and political causes, the Darfur conflict began as an ecological crisis, arising at least in part from climate change.”⁴² The drop in water levels is linked to the decline in rainfall, with some estimates saying rainfall has decreased nearly 40% over the past 50 years, forcing nomadic ethnically Arab herders and sedentary black farmers in to conflict over arable land and access to wells.⁴³ Secretary-General Moon warns that “violence in Somalia grows from a similarly volatile mix of food and water insecurity. So do the troubles in Ivory Coast and Burkina Faso.”⁴⁴

The forecasted impact of climate change on Asia is similarly drastic. The IPCC says that melting glaciers will result in increased flooding and rock avalanches in the Himalayas followed by decreased river flow over the next several decades. Further, freshwater availability in “Central, South, East and South-East Asia, particularly in large river basins, is projected to decrease which, along with population growth and increasing demand arising from higher standards of living, could adversely affect more than a billion people by the 2050s.”⁴⁵ Moreover, “endemic morbidity and mortality due to diarrhoeal disease associated with floods and droughts are expected to rise in East, South, and South-East Asia due to projected changes in the hydrological cycle...increases in coastal water temperature would exacerbate the abundance and/or toxicity of cholera in South Asia.”⁴⁶

Weather and displacement: lots of questions

While there is little doubt that changing weather patterns affect livelihoods, the relationship with displacement is much more complex. Norman Myers, for example, argues that “environmental refugees are people who can no longer gain a secure livelihood in their homelands because of drought, soil erosion, desertification, deforestation and other environmental problems, together

⁴⁰ <http://news.bbc.co.uk/2/hi/science/nature/1581457.stm>

⁴¹ *Summary for Policymakers, Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change*, p 13.

⁴² “A Climate Culprit in Darfur” Ban Ki Moon, *The Washington Post*, 16 June 2007, p. A15

<http://www.washingtonpost.com/wp-dyn/content/article/2007/06/15/AR2007061501857.html>

⁴³ “Climate change escalates Darfur crisis” Scott Baldauf, *The Christian Science Monitor*, 27 July 2007

<http://www.csmonitor.com/2007/0727/p01s04-woaf.htm>

⁴⁴ “A Climate Culprit in Darfur” Ban Ki Moon, *The Washington Post*, 16 June 2007, p. A15

<http://www.washingtonpost.com/wp-dyn/content/article/2007/06/15/AR2007061501857.html>

⁴⁵ *Summary for Policymakers, Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change*, p. 13.

⁴⁶ *Ibid.*

with associated problems of population pressures and profound poverty.”⁴⁷ Traditionally, people who have left their communities because they are poor or in search of other livelihoods are considered to be migrants: internal migrants for those who remain within the borders of their own country and international migrants for those who travel to other countries. Weather patterns clearly play a role in contributing to poverty, but are certainly not the only factor.

In fact, the interconnections between poverty and the environment need much more analysis. As Longeran argues, generalizations about the relationship between environmental degradation and population movement mask a great deal of the complexity which characterizes migration decision-making. Moreover, it is extremely difficult to isolate the specific contribution of environmental change in many forms of population movements.⁴⁸ McDowell and Morell argue that many situations commonly considered as environmental displacement should more accurately be considered as the impact of development.⁴⁹

We know that poor people are disproportionately affected by natural disasters. Twenty years ago, the World Commission on Environment and Development argued that “poverty is a major cause and effect of global environmental problems. It is therefore futile to attempt to deal with environmental problems without a broader perspective that encompasses the factors underlying world poverty and international equality.”⁵⁰ According to the IPCC, poverty is the factor that can most negatively affect a society’s vulnerability to climate change.⁵¹ However, most of those writing about climate change and displacement do not systematically consider the impact of poverty on displacement or the inter-relationship between poverty and environmental changes or the relationship between population growth, environmental pressures and displacement.

If we are to demonstrate a causal connection between environmental change and displacement, we need to demonstrate – as Richard Black argues -- that migration increases when environmental degradation gets worse and those studies simply don’t exist.⁵²

There are also conceptual difficulties. For example, some use the term ‘slow-onset disasters’ to refer to the impact of climate change on livelihoods. Strauss argues that the scale of migration resulting from gradual changes is likely to be far greater than the displacement resulting from individual catastrophic events. She also argues that long-term environmental changes are more likely to cause permanent migration than sudden catastrophes.⁵³ But the term ‘slow-onset’ cries out for further clarification: how slow is slow? Does it occur over years? Decades? Centuries?

⁴⁷ Norman Myers, “Environmental Refugees: An Emergent Security Issue,” Paper presented at the 13th Economic Forum, Prague, May 2005. He makes many of the same arguments in “Environmental refugees: a growing phenomenon of the 21st century,” *Phil. Trans. R. Soc. Lond. B* (2002) 357, 609-613.

⁴⁸ Lonergan, op cit., 1998, pp. 11-12. Note the contrast with Norman Myers who states “But those people who migrate because they suffer outright poverty are frequently driven also by root factors of environmental destitution. It is their environmental plight as much as any other factor that makes them economically impoverished.” 2005, op cit., p. 2.

⁴⁹ Christopher McDowell and Gareth Morrell, *Non-conflict displacement: a thematic literature and organizational review*, prepared for IDMC, 10 August 2007.

⁵⁰ World Commission on Environment and Development, *Our Common Future*. Oxford University Press, 1987, p. 13.

⁵¹ As cited by Gleditsch et al, 2007, p. 3

⁵² Black, op cit., p. 6.

⁵³ Strauss, op cit.

Millennia? All of the above? How does this term relate to concepts such as increasing poverty or environmental degradation or social marginalization and exclusion? How permanent is 'permanent migration'?

Finally,

I was intrigued by the argument made by Lisa Schipper and Mark Pelling that those working on climate change and on disaster risk reduction are often talking past each other. Schipper and Pelling argue that the Climate Change convention only mentions disasters in terms of countries that are the most vulnerable to climate change, including nations with disaster-prone areas. Those working on disaster management usually don't refer to climate change (perhaps because of the perception that there's nothing that can be done about it.) While climate change policy is almost exclusively discussed at the global level, disaster risk reduction (DRR) is guided by an international framework but requires national or sub-national action with a particular stress on building resilient communities.⁵⁴ Those working on natural disasters see disaster risk reduction as a way of mitigating the effects of disasters and for the past decade, considerable energy has been devoted to these DRR initiatives. Those working on climate change are beginning to talk not just about preventing further climate change but also about adaptation mechanisms by which communities can adapt to the changed environment. It would be interesting to systematically review the recommended actions by both DRR initiatives and adaptation to climate change to identify areas of common ground.

In conclusion, what we know is that:

1. Human-induced climate change is real. The scientific evidence is clear.
2. Climate change will displace people by increasing the intensity of tropical cyclones and other (sudden-onset) natural disasters.
3. The relationship between climate change and slow-onset disasters is more complex and further work is needed to explore the relationship between poverty, climate change, and displacement.
4. Similarly the relationship between environmental changes and both conflict and governmental decisions to implement large-scale development projects needs further research.
5. Arguments which may be useful in mobilizing a political response to prevent climate change are generally not very helpful in building bridges between the valuable work on climate change with the equally valuable work on disaster risk reduction.

⁵⁴ Lisa Schipper and Mark Pelling, "Disaster risk, climate change and international development: scope for, and challenges to, integration," *Disasters*, 30 (1) 2006, p. 32.