

Climate Change: Addressing the Impact on Human Security

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Hellenic Foundation for European and Foreign Policy (ELIAMEP)
and Hellenic Ministry of Foreign Affairs
May, 2008

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Hellenic Foundation for European and Foreign Policy
ISBN 978-960-8356-24-5

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Foreword

Climate change is a grim reality. Scientists tell us that the world is getting warmer by the day. Extreme weather phenomena such as floods, droughts, heat waves and cyclones, experienced in different parts of our globe, are among the far reaching consequences of climate change, giving us a bitter foretaste of what worse may come in the near future. The link between climate change and human security is now as clear as ever.

Dramatic environmental change undeniably places the infrastructure of all countries to the test. But it also poses an even greater threat to developing countries that lack the means, the know-how and the capacity to effectively deal with this phenomena. Add to this the soaring food and oil prices, and the future for millions of people across the globe, particularly those living on the edge struck by poverty or ravaged by war, is ominous.

It is precisely this interplay between climate change and human security that Greece has strategically opted to highlight, as Chair of the Human Security Network.

We are systematically contributing to the international dialogue with relevant research, analysis and concrete policy proposals regarding the impact of climate change on the human security. We turned our focus on three vulnerable population groups in the developing world such as children, women and persons fleeing their homes due to climate change. To this end, in collaboration with prominent Greek and International Research Centers, we prepared four policy papers: one for each vulnerable group as well as a fourth policy paper on Development Cooperation and the Impact of Climate Change on Human Security.

The main findings and policy proposals of these papers are compiled and presented in this edition which, we think will be a useful tool for scientists, journalists, members of the academia and civil society, policy-makers and citizens.

At the same time, in cooperation with and within the framework of international and regional organizations, Greece is funding adaptation initiatives in Least Developed Countries and in Small Island Developing States.

Dora Bakoyannis
Minister for Foreign Affairs of the Hellenic Republic

Climate Change and Human Security

Theodore Skylakakis

Secretary General of the Greek Ministry of Foreign Affairs, and Special Representative of the Ministry for Climate Change

Climate change is one of the greatest and most complex challenges the international community has to deal with today and in the years to come. Greece, and the Greek Ministry of Foreign Affairs apart from its active participation in the climate change dialogue currently taking place in various international fora, is also taking concrete initiatives to facilitate policy responses of the international community to this challenge. The adoption of the issue of the impact of climate change on the human security of vulnerable population groups in the developing world as the main priority of this year's Greek Human Security Network chairmanship, responds to this objective.

This initiative reflects what we believe to be a crucial moral responsibility of the international community towards the least developed countries and the small island developing states, which are the least responsible for the creation of the problem and are the first to be affected by it.

In our effort we had the valuable contribution of a number of international partners:

The outline of the program of the Greek Chairmanship and its priority has been presented in a launching event in Athens, organized in cooperation with **UNEP/MAP**. This was followed by a series of events in Bali, New York, Geneva and Vienna, the first two in cooperation with **UNICEF**, and the others with **IOM** and the **Austrian MFA** respectively.

In collaboration with prominent Greek and International Research Centers, the Chair also prepared four policy papers which are presented in this edition and at the International Conference on Human Security and Climate Change and the Ministerial Meeting, that ends the Greek chairmanship of HSN. In particular, the policy paper on climate change impact on children was drafted in collaboration with **UNICEF**, the policy paper on women in collaboration with the leading international NGO **Women's Environment and Development Organization (WEDO)**, the policy paper on persons fleeing their homes due to climate change, in collaboration with the **United Nations University** and the policy paper on Development Cooperation & the Impact of Climate Change on Human Security in cooperation with the well known **International Institute for Environment and Development (IIED)**.

The Greek Foreign Ministry expresses its gratitude to all the above partners in this effort and to **ELIAMEP**, that had a coordinating role in this work, and hopes that this edition will be useful to policy makers and researchers, who are preparing the international response to this particular challenge.

Climate Change: Addressing the Impact on Human Security

Dr. Thanos Dokos,
Director-General, Hellenic Foundation for European & Foreign Policy (ELIAMEP)

For quite some time the medium - and long - term global implications of continuous environmental degradation have been a cause for concern for officials, experts and laymen alike. Environmental problems will increasingly affect economic, social and political developments throughout the world. The impact of climate change will be even more acute in vulnerable regions and groups that face multiple stresses at the same time -- pre-existing conflict, poverty and unequal access to resources, weak institutions, food insecurity and incidence of diseases.

As pointed out in the paper prepared by the International Institute for Environment and Development (IIED), "Climate change will most severely impact upon vulnerable regions and vulnerable groups because of its effect as a threat multiplier and because of the inherent vulnerability to any addition risks by people whose human security is not assured. Conditions of pre-existing conflict, poverty, weak institutions, food insecurity and spreading diseases will leave communities unable to meet the challenges of adapting to climate change impacts and will exacerbate existing problems."

Climate change is particularly complex and it affects many aspects of international politics, economics, migration, human rights, development, trade, health and environmental systems and can act as a stressor making situations of instability, conflict, and humanitarian crises more likely and severe. However, it is important to note exactly how climate change will influence security.¹ There is still uncertainty about the exact magnitude, rate and geographical impact of climate change.²

A number of studies on the impact of climate change for international and national security have recently been published, and some of their conclusions will be briefly presented below. What is generally missing from the related bibliography is an assessment of the possible impact of climate change for human security and this is the intended contribution and added value of this policy paper.

Several threats to international stability and security have been identified, including the following:

- i) Conflict over resources. Reduction of arable land, widespread shortage of water, diminishing food and fish stocks, increased flooding and prolonged droughts;
- ii) Economic damage and risk to coastal cities and critical infrastructure;
- iii) Loss of territory and border disputes. Receding coastlines and submergence of large areas could result in loss of territory, including entire countries such as small

¹ *HSN: Climate Change and Human Security* – Canadian views on potential areas of focus for 2007-2008, 6 July 2007.

² UK Parliamentary Office of Science and Technology, *Adapting to climate change in developing countries*, October 2006, p.2.

island states. More disputes over land and maritime borders and other territorial rights are likely;

iv) Environmentally-induced migration (the IPCC estimates that the number could reach 50 million by the end of the decade and up to 200 million by 2050);

v) Disrupted access to and intensified competition over energy supplies;

vi) Situations of fragility and radicalization. Climate change may significantly increase instability in weak or failing states by over-stretching the already limited capacity of governments to respond effectively to the challenges they face;

vii) Pressure on international governance. The multilateral system is at risk if the international community fails to address the threats outlined above. Climate change impacts will fuel the politics of resentment between those most responsible for climate change and those most affected by it;

viii) Risks for global economic development;

ix) Risks of growing international distributional conflicts between the main drivers of climate change and those most affected.³

Every one of the threats to international stability and security outlined above is itself hard to manage. The interaction between these threats intensifies the challenges for international politics and could cause a 'chain reaction' with unpredictable consequences. Against the backdrop of globalization, unabated climate change is likely to overstretch the capacities of a still insufficient global governance system.⁴ According to the GTZ study, 'climate change can heighten existing social and political tensions or can lead to new ones. State institutions already overstretched will come under additional pressure, and will find it increasingly difficult to perform elementary state tasks. Combined with growing environmental stress, this will impact the adaptive capacity of societies adversely and will thus also limit their capacity to engage in peaceful conflict resolution. This is amplified further by an array of other global trends, notably rising levels of resource consumption due to economic development, population growth and urbanisation, which will make the adverse effects of climate change all the more manifest.'⁵

According to a recent EU paper, 'climate change is best viewed as a threat multiplier which exacerbates existing trends, tensions and instability. The core challenge is that climate change threatens to overburden states and regions which are already fragile and conflict prone. It is important to recognise that the risks are not just of a humanitarian nature; they also include political and security risks that directly affect European interests. Moreover, in line with the concept of human security, it is clear that many issues related to the impact of climate change on international security are interlinked requiring comprehensive policy responses. For example, the attainment of the Millennium

³ *Climate Change and International Security*, Paper from the High Representative and the European Commission to the European Council (S113/08), 14 March 2008, pp. 3-5; German Advisory Council on Global Change, *World in Transition: Climate Change as a Security Risk*, Berlin, 2007, pp. 9-10; Peter Swartz & Doug Randall, *An Abrupt Climate Change Scenario and Its Implications for US National Security*, October 2003, p. 2; Joshua W. Busby, *Climate Change and National Security: An Agenda for Action*, CSR No. 32, Council on Foreign Relations, New, York, November 2007, pp. 4-6.

⁴ German Advisory Council on Global Change, *World in Transition*, p. 10.

⁵ Deutsche Gesellschaft für Technische Zusammenarbeit (GTZ), *Climate Change and Security Challenges for German Development Cooperation*, Eschborn, April 2008, p. 7.

Development Goals would be at considerable risk because climate change, if unmitigated, may well wipe out years of development efforts.”⁶

Even under the best-case scenario (with an average global temperature increase of 1.3°C by 2040), national security implications may include: heightened internal and cross-border tensions caused by large-scale migrations; conflict sparked by resource scarcity, particularly in the weak and failing states of Africa; increased disease proliferation, which will have economic consequences; and some geopolitical reordering as nations adjust to shifts in resources and prevalence of disease. In the case of *severe* climate change, corresponding to an average increase in global temperature of 2.6°C by 2040, massive nonlinear events in the global environment give rise to massive nonlinear societal events. The internal cohesion of nations will be under great stress, both as a result of a dramatic rise in migration and changes in agricultural patterns and water availability.⁷ According to an EU document, “unmitigated climate change beyond 2°C will lead to unprecedented security scenarios as it is likely to trigger a number of tipping points that would lead to further accelerated, irreversible and largely unpredictable climate changes.”⁸

The geopolitical consequences of climate change are determined by local political, social, and economic factors as much as by the magnitude of the climatic shift itself. As a rule, wealthier countries and individuals will be better able to adapt to the impacts of climate change.⁹ Even though the IPCC projects that temperature increases at higher latitudes will be approximately twice the global average, it will be the developing nations in the earth’s low latitudinal bands, as well as sub-Saharan African countries, that will be most adversely affected by climate change. In the developing world, even a relatively small climatic shift can trigger or exacerbate food shortages, water scarcity, destructive weather events, the spread of disease, human migration and natural resource competition. These crises are all the more dangerous because they are interwoven and self-perpetuating.¹⁰

The regions most heavily affected cover most of the globe: the Middle East, North Africa, the Sahel zone, Southern Africa, Central Asia, Asia (major deltas, Bangladesh, Pakistan, India, and China) and the Pacific, Latin America (especially the Andean region and Amazonia) and the Caribbean, the Gulf of Mexico, and the Arctic region.¹¹

⁶ *Climate Change and International Security*, p. 2.

⁷ Kurt M. Campbell, Jay Gullledge, J.R. McNeill, John Podesta, Peter Ogden, Leon Fuerth, R. James Woolsey, Alexander T.J. Lennon, Julianne Smith, Richard Weitz, and Derek Mix, *The Age of Consequences: The Foreign Policy and National Security Implications of Global Climate Change*, Center for Strategic & International Studies, November 2007, pp. 6-9.

⁸ *Climate Change and International Security*, p. 1.

⁹ John Podesta & Peter Ogden, The Security Implications of Climate Change, *The Washington Quarterly*, 31:1, Winter 2007/08, pp. 115-6.

¹⁰ Water shortages can lead to food shortages, which can lead to conflict over remaining resources, which can drive human migration, which can create new food shortages in new regions. (Podesta & Ogden, pp. 116)

¹¹ German Advisory Council on Global Change, *World in Transition*, p. 7; GTZ, *Climate Change and Security Challenges for German Development Cooperation*, p. 7; *Climate Change and International Security*, pp. 6-8.

The impact of climate change on human security

Human security refers to an emerging paradigm for understanding global vulnerabilities whose proponents challenge the traditional notion of national security by arguing that the proper referent for security should be the individual rather than the state. Human security holds that a people-centered view of security is necessary for national, regional and global stability.¹²

According to the study prepared by UNICEF's Innocenti Centre, children are central to the climate change and human security agenda. They are amongst the most vulnerable populations to climate change, and may be the greatest victims of its impacts. At the same time, they are powerful protagonists for change and can contribute significantly to the collective effort to mitigate climate change and its effects.

There is a strong institutional basis for considering children's issues in the international climate regime. Despite this, there is yet no strong institutional framework for championing children's issues. For example, National Adaptation Programmes of Action (NAPAs) and other adaptation plans rarely, if ever, address the unique vulnerabilities and needs of children. Similarly, they fail to draw on the unique knowledge, insights and capacity for meaningful change that children can and do offer.

A human rights based approach necessitates inclusion of children's issues in all international and national efforts, most notably in the post-Bali climate change regime and in NAPAs and Poverty Reduction Strategies. The complexities inherent in the climate change challenge demand an integrated response. International capacity-building efforts should include young people as a priority group and should be coordinated across all sectors and at all levels.

The Women's Environment and Development Organization (WEDO) argues that climate change is increasingly recognized as a major human security issue that poses serious global threats. Although climate change affects everyone regardless of race, caste, ethnicity, sex and level of income, its impacts are more heavily felt by poor nations, communities and people, and climate change magnifies existing inequalities. For the world's poor the impact will be most severe, disproportionately affecting their livelihoods and security. Women comprise 70% of those living below the poverty line. As a result, they are most likely to bear the heaviest burdens when natural disasters strike. At the same time, women are often overlooked as potential contributors to climate change solutions, and thus to the security of all human beings.

According to the United Nations University (UNU), migration—whether permanent or temporary, whether national, regional or international—has always been a possible coping strategy for people facing environmental changes such as sudden disasters or cyclical climate conditions. Pre-history and history are marked by (episodic and localised) human movement from one climate zone to another, as people have sought out environments that would support both survival as well as aspirations to a more stable existence. Migration in the past may have been accompanied by some sense of despair

¹² Human security as a term can be understood to encompass the concepts of conflict prevention, crisis management and civil-military coordination, but it takes them further. It draws on the debates [on]...responsibility to protect, effective multilateralism, and human development'. (Janne Haaland Matlary, 'Much ado about little: the EU and Human Security', *International Affairs* 84:1, 2008, p. 141); See also, *A Human Security Doctrine for Europe*, The Barcelona Report of the Study Group on Europe's Security Capabilities, Barcelona, September 2004.

that familiar landscapes no longer provided safe or supporting habitats for people. Today, environmental change, including climate change, presents a new threat to human security and a new situation for migration. By 2050 when human population is projected to peak, Earth will host some 9 billion people, the majority of whom will live in urban areas with crushing environmental footprints. Many of these cities are located in areas prone to sea level rise, while people remaining in rural areas may struggle with increasingly frequent and violent hazards like flooding or drought, or with more gradual but similarly intense changes in regional climates that make livelihoods much more difficult. Faced with an unprecedented scale of environmental change, migration may be an adjustment mechanism of first resort, or a survival mechanism of last resort.

Environmentally induced migration has the potential to become a phenomenon of unprecedented scale and scope. Its effects on the global economy, international development, and national budgets could be profound, with significant implications for almost all dimensions of human security, in addition to political and state security. Yet, amid these challenges, there is also opportunity. Today, economic migrants are a powerful force driving international development.

The UNU study explores the dimensions of human security and the challenges posed by climate change and environmentally induced migration. Presenting three country case studies, the paper looks at current patterns of environmental degradation and migration in: Egypt (desertification and sea level rise), Mozambique (government - sponsored resettlement and humanitarian responses) and Vietnam (complex flooding and displacement).

According to the IIED, the environmental security aspect of human security arises out of our own damage to our local environments and to our planet. To be truly secure we must maintain a healthy environment, particularly in regions of the world where livelihoods are most dependent upon the natural environment and resources. Worldwide development has been thus far highly polluting and resource intensive, and has dramatically impacted upon the quality of the air, water and land locally and contributed to anthropogenic climate change globally. As a global problem, climate change will not just threaten the environmental security of the polluting countries, its impacts will not respect national borders nor be restricted to the physical environment; its reach will be global and its impacts will be felt hardest by those whose human security is not assured.

The developing world will suffer disproportionately to the developed, not because climate change isn't global in its reach, but because of the lack of development and associated human security leaves the population vulnerable to additional risks, be they from extreme climate events; year-on-year changes to the region's climate system; or from political unrest, reduced access to global markets, violent conflict, or economic fluctuations.

When looking at the impacts of climate change on different regions it is therefore important to look at the interaction of other factors in the region from a human security perspective. Just as violent conflict is rarely induced by a single cause, human insecurity is usually the result of interacting factors, not least the myriad factors of underdevelopment. Therefore although climate change will adversely effect many populations it is useful to view it as another agent impacting on the current socio-political and economic situation. As such climate change has been described as a 'threat

multiplier'¹³; the 'double vulnerability' (poverty compounded by climate change); and *one of the greatest threats to development*'.

Policy recommendations

As explained in the German Advisory Council on Global Change study, 'without resolute counteraction, climate change will overstretch many societies' adaptive capacities within the coming decades. This could result in destabilization and violence, jeopardizing national and international security to a new degree. However, climate change could also unite the international community, provided that it recognizes climate change as a threat to humankind and soon sets the course for the avoidance of dangerous anthropogenic climate change by adopting a dynamic and globally coordinated climate policy. If it fails to do so, climate change will draw ever-deeper lines of division and conflict in international relations.'¹⁴

The four studies, whose main points are presented in this policy paper, contain a large number of policy recommendations, including the need to upgrade climate-related development cooperation, to support adaptation strategies for developing countries, to define regional priorities and for countries and international organizations to join forces and agree to a division of labour as the nature and scale of these problems is such that only an international/global approach can be effective. Furthermore:

- The various conflict and security analysis and risk assessment tools must take account of climate change impacts. A principal aim in this regard is to identify, in an anticipatory manner, countries highly vulnerable to climate-induced conflicts and/or disasters.¹⁵
- The key challenge is to take resolute climate policy action within the next 10–15 years, in order to avert the socioeconomic distortions and implications for international security that will otherwise intensify in subsequent decades.¹⁶
- According to the IEED study, international cooperation should be two pronged; adaptation to the now unavoidable climate change, as well as concerted and far-reaching mitigation against further climate change. The focus of international cooperating strategies in response to climate change has to date been primarily in mitigation and as a response to economic concerns, nationally and in the global economy. international community must do more to curb emissions to prevent further harm.

¹³ Geoff Dabelko, Director of the Environmental Change and Security Program at the Woodrow Wilson Institute in Washington, quoted in *Global warming may heat up conflicts, too* <http://www.csmonitor.com/2007/1206/p13s02-wogi.html>, 6th December 2007.

¹⁴ German Advisory Council on Global Change, *World in Transition*, p. 5.

¹⁵ GTZ, *Climate Change and Security Challenges for German Development Cooperation*, p. 10; Swartz and Randall propose the creation of vulnerability metrics to anticipate which countries are most vulnerable to climate change.

¹⁶ German Advisory Council on Global Change, *World in Transition*, p. 10.

- In light of this, a high priority in the international response is to not simply focus on those strategies, programmes and processes which are climate specific, but to ensure that all international strategies are climate sensitive, from development assistance programmes, to peacebuilding activities, there needs to be an active engagement with the growing regional data on climatic impacts that feeds into these processes, and ensures that operations are sustainable or at least don't run counter to the additional burden of climate change induced insecurity. The aim should be to raise political awareness on the human security impact of climate change on vulnerable groups, including less known consequences on these population groups, as well as at promoting international synergies to find path-breaking solutions.

In addition to the moral responsibility of Europe and the rest of the developed world to actively contribute to the mitigation of the consequences of climate change on the basis of humanitarian reasons, it is also in the EU's self-interest to avoid great-scale destabilization of Europe's wider periphery (concern about migration, failing states, etc). Javier Solana rightly argues that the EU is in a unique position to respond to the impacts of climate change on international security, given its leading role in development, global climate policy and the wide array of tools and instruments at its disposal. Moreover, the security challenge plays to Europe's strengths, with its comprehensive approach to conflict prevention, crisis management and post-conflict reconstruction, and as a key proponent of effective multilateralism. He argues in favour of, among other:

- Enhanced capacities at the EU level and further integration of adaptation and resilience to climate change into EU regional strategies;
- Enhanced support for climate change mitigation and adaptation, good governance, natural resource management, technology transfer, trans-boundary environmental cooperation (inter alia water and land), institutional strengthening and capacity building for crisis management.¹⁷

In closing this brief introduction, one should observe that there is an urgent need for new analytical approaches and models, policy instruments, and most important, an innovative way of thinking regarding climate change. Finally, time is a luxury we probably do not have. In the words of David McTaggart, founder of Greenpeace, "*The dinosaurs might have been as intelligent as ourselves, and decided like ourselves to set up sub-committees, which would set up working groups to submit reports on the possibility of examining the situation further.*" Hopefully, we can -and must- do better than that.

¹⁷ *Climate Change and International Security*, pp. 2 & 11.

1. Climate Change and Children: A Human Security Challenge

UNICEF Innocenti Research Centre
Florence, Italy¹⁸

This is the moral challenge of our generation. Not only are the eyes of the world upon us. More importantly, succeeding generations depend on us. We cannot rob our children of their future.

– United Nations Secretary General, Ban Ki-Moon
Address to the High-Level segment of the UN COP13 negotiations in Bali, 12 December
2007

Introduction

This paper examines the existing and potential impacts of climate change on the world's children. It summarizes a full policy review paper, "Climate Change and Children: A human security challenge." The full paper is a contribution to a major initiative by the Government of Greece as Chair of the Human Security Network and ELIAMEP. The aim is to directly address the concerns of ***vulnerability, risk and responsive/protective mechanisms*** underlying the human security perspective¹⁹ in volatile regions and on vulnerable groups.

Evidence presented in this review confirms the centrality of children, and their unique vulnerabilities, to the discussion of climate change, and to its human security implications. To date, however, children's issues have not been well recognized or addressed within existing or emerging international and national level policy frameworks and debates on climate change.

Consideration of children's issues on the climate change agenda is imperative. The Convention on the Rights of the Child (CRC), signed in 1989 and ratified by 192 countries, together with "A World Fit for Children" (WFFC), protects the right of every child to a safe, healthy environment in which to develop and grow. The WFFC declaration, which was a consensus outcome from the United Nations General Assembly

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¹⁹ www.humansecuritynetwork.org

Special Session on Children held in 1992, clearly articulates the commitment of States “to give every assistance to protect children and minimize the impact of natural disasters and environmental degradation on them.” These commitments are of the greatest relevance for addressing the myriad threats that climate change raises for the world’s children.

Protecting the environment and providing for the health, education and development of children are mutually inclusive goals. Almost any action taken to enhance environmental quality also helps to meet the basic needs of children.²⁰ It is therefore important not to separate climate change from other priorities, but rather to integrate comprehensive actions to address and manage climate risk into development planning, programmes and projects.²¹

A key challenge is to develop the evidence required to effectively influence advocacy, policy and programme development, to ensure that children are protected from the effects of climate change and have the opportunity to develop to their full potential. Thus, the major messages of this paper are that:

- **the complexity of the challenges posed by the changing global environment calls for an integrated approach.** Challenges of providing access to clean household energy, water, sanitation and education, are compounded by the increasing prevalence and severity of natural disasters, and are often simultaneous;²²
- **a human rights based approach necessitates inclusion of children’s issues** in all international and national efforts, most notably **the post-Bali climate change regime, NAPAs and Poverty Reduction Strategies;**
- **inter-sectoral coordination and collaboration between line Ministries** (including: Education, Health, Environment, Youth and Finance) should be encouraged and supported to pay special attention to the needs and vulnerabilities of children of different ages;²³
- **increased efforts to meet the Millennium Development Goals (MDGs) will reduce risk** caused by many of the social and economic factors shown to exacerbate and increase impacts of climate change, thereby increasing the resilience of the most vulnerable children;
- **participatory approaches to community development**, including water and energy stewardship, environmental education, disaster risk reduction and preparedness, will create economic opportunity, reduce vulnerability and

²⁰ UNICEF, *Climate Change and Children*, December 2007.

²¹ World Bank, “*Climate Risk Management - Integrating Adaptation into World Bank Group Operations*”, 2006.

²² The Gleneagles Communiqué from the 2005 G8 Summit begins “1. We face serious and linked challenges in tackling climate change... (d) Reducing pollution protects public health and ecosystems. This is particularly true in the developing world. There is a need to improve air and water quality in order to alleviate suffering from respiratory disease, reduce public health costs and prolong lives.”+ http://www.fco.gov.uk/Files/kfile/PostG8_Gleneagles_Communique.0.pdf, accessed 18 March 2008.

²³ For example, Sudan’s National Adaptation Programme of Action does not address children’s issues.

- empower the most marginalized citizens toward creating a sustainable society;
- **empowered children are dynamic and ultimately powerful protagonists for protecting and improving the environment.** Today’s children and future generations bear the brunt of the climate change impacts, but they are also great forces for change. As such, they have a right to be involved not only locally, but also in the current international negotiation process.

Two one - page case study summaries, one from Morocco and one from southern Sudan, are included as an annex to this summary paper. Together, they describe specific climate change risks and issues for children in two locales, and illustrate the gap that exists between the climate change agenda and the children’s agenda. It is this gap which this summary paper and the full policy review paper are intended to help redress.

Climate change and human security

In its Fourth Assessment Report (AR4), issued in 2007, the Intergovernmental Panel on Climate Change (IPCC), presented its most confident and convincing assessment yet on the science of climate change and its implications for humankind. Some of the most significant changes predicted are summarized in Table 1 below, together with the likelihood of their occurrence.

Table 1: IPCC Assumptions of Climate Change, 2007

Phenomena and direction of trend	Likelihood
Over most land areas, warmer and fewer cold days and nights, warmer and more frequent hot days and nights	Virtually certain
Warm spells/heat waves. Frequency increased over most land areas	Very likely
Heavy precipitation events. Frequency increases over most areas	Very likely
Area affected by drought increases	Likely
Intense tropical cyclone activity increases	Likely
Increased incidence of extreme high sea level (excludes tsunamis)	Likely

Source: IPCC Fourth Assessment Report, 2007

Climate change is expected to increase risks of large-scale disasters as well as contribute to more gradual systemic changes. Human security risks from factors such as political instability, economic weakness, water scarcity, food insecurity and large-scale migration will be compounded by climate change.

Developing countries are most vulnerable to climate variability and change, due to the multiple stresses they face and their low adaptive capacity. As a consequence, they are at risk of the greatest impacts. For example:

- In **Africa**, by 2020, between 75 million and 250 million people are projected to be exposed to increased water stress. Agricultural production, including access to food, in many countries is projected to be severely compromised by climate variability and change.
- In **Asia**, by 2050, decreasing fresh water availability in most areas could put more than a billion people at risk. Increased deaths and illness are expected

from diarrhoeal diseases, associated with increased flooding and drought, and from cholera, resulting from higher sea temperatures.

- In **Small Island Developing States**, rising sea level and increased storm surges will threaten the homes and livelihoods of communities, and will force displacement and permanent migration.

There is a serious risk that climate change will exacerbate violent conflict in volatile regions. In a vicious circle, conflict will in turn leave communities poorer, less resilient and less able to cope with the consequences of climate change. It is estimated that there are 46 countries – home to 2.7 billion people – in which the effects of climate change interacting with economic, social and political problems will create a high risk of violent conflict. There is a second group of 56 countries – home to 1.2 billion – in which the outbreak of violence represents a distinct possibility in the longer term.²⁴

In summary, the 2007 Human Development Report notes that “climate change confronts us with the threat of a twin catastrophe. The first is an immediate threat to human development. Climate change affects all people in all countries. However, the world’s poorest people are on the front line. They stand most directly in harm’s way—and they have the least resources to cope. This first catastrophe is not a distant future scenario. It is unfolding today, slowing progress towards the Millennium Development Goals (MDGs) and deepening inequalities within and across countries. Left unattended, it will lead to human development reversals throughout the 21st Century. The second catastrophe is located in the future. Climate change poses risks not just for the world’s poor, but also for the entire planet – and for future generations. Our current path offers a one-way route to ecological disaster.”²⁵

Why children?

For a variety of reasons, children are particularly vulnerable to climate change. Although climate change will impact all people around the world, children will be amongst the hardest hit, particularly in developing countries.²⁶ The reasons include the following:

- **The world’s population is young.** More than a fifth of it is under nine years of age, and more than a third is under 18. About 85 per cent of the world’s youth live in developing countries, and 87 per cent live in countries affected by poverty, hunger, disease and violence.
- There is increasingly convincing evidence that **many of the main killers of children (malaria, diarrhoea and undernutrition) are highly sensitive to climatic conditions.** These are expected to worsen as a result of climate change.^{27, 28}

²⁴ Smith, D. and J. Vivekananda, International Alert, *A Climate of Conflict: the links between climate change, peace and war*, November 2007, page 3.

²⁵ UNDP, Human Development Report, 2007-2008, page 21.

²⁶ See also UNICEF UK, *Our climate, our children, our responsibility: The implications of climate change for the world’s children*, April 2008.

²⁷ For example, the World Health Organization lists climate change as one of the causes of increasing malaria burden in Africa. WHO. *Africa Malaria Report*, 2003.

- **Young children are more susceptible to adverse effects of environmental degradation** compared to adults, due to their physical, cognitive and physiological immaturity. Accordingly, they are more vulnerable to adverse environmental conditions, such as poor air quality²⁹ and contaminated water. Similarly, children are psychologically more sensitive to sudden disruptions of their lives caused by natural disasters.
- **Children are the primary victims of armed conflict.** They are the targets and increasingly the instruments of conflict. Their suffering bears many faces, in the midst of armed conflict and its aftermath. Children are killed or maimed, made orphans, abducted, deprived of education and health care, and left with deep emotional scars and trauma.³⁰ Many of the world's poorest countries and communities will increasingly face a double-edged challenge of climate change alongside violent conflict.³¹

The circumstances and experiences of children today set the stage for human security in the future. Scientific findings increasingly point to the critical imprints that childhood health and nutrition leave on adult health and well-being. Impacts from climate change and other environmental exposures early in the lives of children will have long-lasting effects on their future and ability to contribute to society.

Yet while children are amongst the most vulnerable to climate change, they are also key agents for social change, economic development and technological innovation. They can, and should, be partners in understanding and acting on climate change. They are likely to learn to utilize environmental resources in fundamentally new ways. They have an inherent curiosity about the environment and struggle to understand their place in the world from an early age. The knowledge and capacities of children can be invaluable to the development of realistic and practicable adaptation plans.

It is important not to generalize the vulnerabilities and impacts of climate change across all children, but to attempt to account for the distinct situations related to children's age, sex and culture. The CRC defines children as anyone under the age of 18, yet there are major physical, physiological and cognitive differences between younger and older children and also of adolescents. Gender is a distinguishing attribute, since in many places, boys and girls have different responsibilities. Young girls, for example, often assist with domestic tasks like fetching water and cooking, whereas boys may assist with herding cattle or working in the market to supplement family income. Indigenous children are often the most affected by climate change due to their intimate relationship with the environment.

²⁸ Campbell-Lendrum, D. & R. Woodruff, "Climate change: Quantifying the health impact at national and local levels," *Environmental Burden of Disease Series*, No. 14. WHO, 2007.

²⁹ Mathieu-Nolf, M. (2002). "Poisons in the air: A cause of chronic disease in children." *Journal of Toxicology - Clinical Toxicology* 40(4): 483.

³⁰ Office of the Special Representative for Children and Armed Conflict, www.un.org/children/conflict/english/issues.html

³¹ Smith, D. and J. Vivekananda, op.cit, page 3.

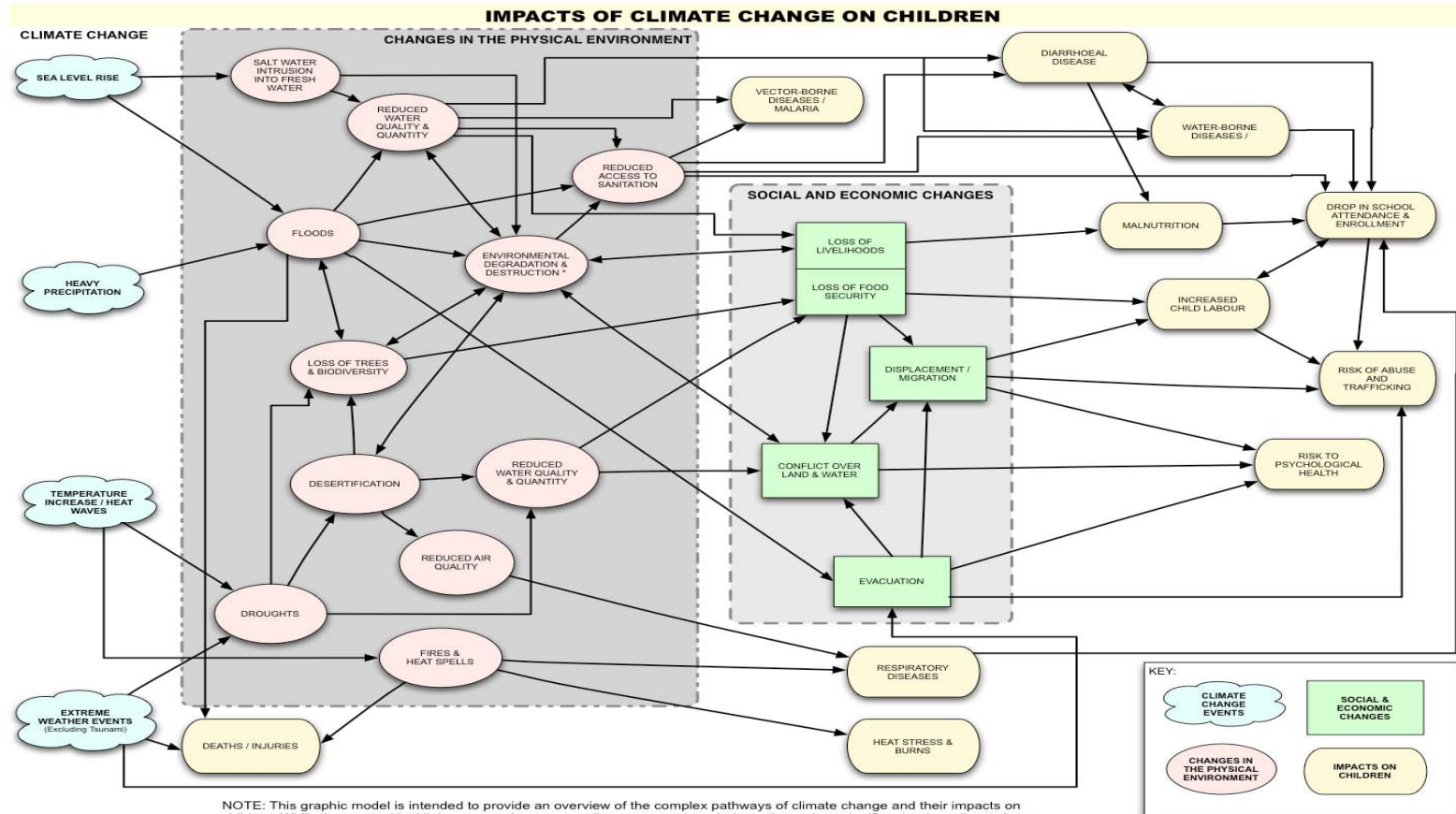
Unfortunately, the lack of epidemiological data for different groups of children and young people leaves a major gap in our understanding. Better knowledge in this area would further validate efforts to actively involve them in mitigation and adaptation activities.

Impacts of climate change on children

Children are exposed to a barrage of environmental threats to their health and well-being. These threats exist in all environments – in developing and industrialized countries, in rural and urban areas, and everywhere that children live, study and play.

Climate change will only intensify these combined threats. Many of the main causes of child deaths and illness such as malaria, diarrhoea and undernutrition are epidemiologically linked to climate change, and their impacts are as a result expected to become more severe. Climate change is also likely to accelerate certain **large-scale environmental changes**, including desertification, widespread droughts, and biodiversity loss, which have far-reaching effects on child health and well-being. Figure 1 presents a graphic depiction of these and other linkages between climate change and children's health, which are summarised below:

Figure 1: Direct and indirect impacts of climate change on children



NOTE: This graphic model is intended to provide an overview of the complex pathways of climate change and their impacts on children. While the most critical linkages are shown, according to current knowledge, others - less significant or less direct - have been omitted with a view to readability.

Undernutrition is the underlying cause of at least 3.5 million deaths annually, and more than one-third of deaths in children under five years of age.³² It contributes to children's vulnerability to a number of other diseases and illnesses. Undernutrition may be exacerbated by more frequent or severe extreme weather events caused by climate change, resulting in losses in biodiversity, desertification and deforestation³³.

Chronic droughts, floods, and diversion of grains for biofuel production are diminishing food production, causing **loss of livelihoods** for millions of families.³⁴ The IPCC Fourth Assessment Report predicts that food production could decline by as much as 50 per cent by 2020, causing widespread child undernutrition.³⁵ **Loss of food security**, as manifested recently in increasing food prices and scarcity of staple foods such as grains and rice, will grow for many groups, particularly the poor. Today's food crisis is already exacerbating undernutrition of children. Research clearly shows that children who are undernourished are more susceptible to disease, and their learning ability suffers.³⁶

Water-borne diseases and diarrhoea are expected to increase with climate change. As the temperatures rise, the replication of the pathogens that water carries (protozoa, bacteria and viruses) will also increase.³⁷ Children have much more frequent contact with water than adults (for example, from playing outside), and their metabolism is more sensitive.

Diarrhoeal disease is one of the greatest killers of children. It causes nearly 2 million deaths per year³⁸, mostly in young children, of which some 80 per cent are attributable to unsafe water and lack of basic sanitation. The relationship between climate change and diarrhoeal disease is well demonstrated. It is mediated by the quality of water and sanitation coverage.³⁹ As temperatures rise and other changes occur, cases of diarrhoeal disease are expected to increase.⁴⁰ Infants and children are especially vulnerable.

Malaria causes an estimated one million deaths each year – around 80 per cent of which are amongst children under five.⁴¹ In sub-Saharan Africa alone, more than 2,000 children under five die each day from malaria.⁴² Warmer temperatures and changing rainfall patterns are causing the spread of malaria into previously unaffected areas and into areas where the disease was previously eliminated. For example, after 50 years, there is evidence that climate change has improved conditions for malaria transmission in the East African highlands.⁴³

More than 2 million children younger than five years die from **acute respiratory illnesses** worldwide each year. As global energy use increases, air quality will likely decline in many areas, including in rural areas, where people use biomass fuels in the home. Children are more vulnerable to air pollution than adults, as their bodies are growing and their lungs are developing. They breathe at a faster rate than adults, and they spend more time outdoors playing and running, exposing themselves to air pollution at a higher degree.

Physiologically, **children are more sensitive to extreme heat**, and hence, are more vulnerable to the health effects of heat waves. In poor countries, where indoor space is limited and not suitable for play, children often spend long periods of time outdoors under the sun with no protective clothing. This makes them more susceptible to the negative effects of intense and harmful UV radiation. Extreme high temperatures are also a significant risk factor for fever and gastroenteritis.

³² Black, R.E., et al., *Maternal and Child Undernutrition Study Group*. 2008. "Maternal and child undernutrition: global and regional exposures and health consequences", *The Lancet* 371: 243-60.

³³ Akachi Y. et al. (forthcoming), *Global Climate Change and Child Health. A review of the literature*. UNICEF Innocenti Research Centre, 2008.

³⁴ *Ibid*, p. 58, p. 83.

³⁵ IPCC Fourth Assessment Report, 2007.

³⁶ UNDP, Human Development Report. Op. cit. p.79, p.89.

³⁷ Woodruff, R. and T. McMichael (2004). "Climate Change and Human Health: All Affected, but Some More than Others", *Social Alternatives* 23(4): 17-22.

³⁸ UNICEF, *The State of the World's Children, 2008: Child Survival*, page 15

³⁹ Campbell-Lendrum, D. & R. Woodruff, "Climate change: Quantifying the health impact at national and local levels", *Environmental Burden of Disease Series*, No. 14. WHO, 2007.

⁴⁰ For example see: Shea, K. M. and the Committee on Environmental Health, "Global Climate Change and Children's Health", *Pediatrics*. Vol. 120 No. 5 November 2007, pp. e1359-e1367 (doi:10.1542/peds.2007-2646)

⁴¹ UNICEF, *Progress for Children: A World Fit for Children* statistical review, Number 6, 2007, p. 36.

⁴² UNICEF and Roll Back Malaria Partnership, 'Malaria and Children: Progress in intervention coverage, 2007', p. 1, 7.

⁴³ Pascual, M., J.A. Ahumada et. al. (2006). Malaria resurgence in the East African highlands: temperature trends revisited. *Proc. Natl. Acad. Sci. USA* 103 (15): 5829-34.

Shrinking glaciers and rising sea levels will pose new risks for human security. The retreat of glaciers will threaten short-term flooding and long-term declines in water availability across Asia, Latin America and parts of East Africa.⁴⁴ Rising sea levels will reduce the availability of fresh water, affecting millions of people in low-lying countries and river deltas.⁴⁵ The IPCC estimates that these changes will put hundreds of millions of people at risk of water shortages.

The land area affected by **drought** is expected to increase and water resources in affected areas could decline as much as 30 per cent by mid-century. Droughts exacerbate desertification, which is already happening across one-third of Earth's landmass. Desertification is associated with food and water insecurity, undernutrition and elevated infant mortality.

Extreme weather events such as cyclones, floods and droughts are among the well-established consequences of climate change. The scale of these events is enormous. Over the last 30 years, 2,156 floods were recorded, causing 206,303 human deaths and impacting some 2.6 billion people worldwide. From the statistics, the disproportional vulnerability of children to climate events is evident. Overall 25 per cent of deaths in the population at large can be attributed to environmental factors. Among children under 14, however, this rises to 36 per cent.⁴⁶

More frequent or severe floods, heat waves and other extreme weather events will impact on children both directly and indirectly. In Bangladesh, flooding and high sea levels are a major risk to children. **Drowning** is a leading cause of death amongst children aged 1-17.⁴⁷ Compared to adults, children are especially vulnerable because they are less likely to be able to swim. In poor urban areas, floods can create severe and widespread unsanitary conditions. Thousands, including many children, died as a result of the 2005 floods Mumbai, India, and the inadequate drainage and sewer network was largely blamed.

"Climate change will increasingly drive **biodiversity loss**, affecting both individual species and their ecosystems."⁴⁸ One of the biggest impacts of the loss of biodiversity will be on food production and livelihoods. Similarly, the loss of biodiversity in the coral reefs of the Philippines is estimated to impact fishing communities and to contribute to household poverty and child undernutrition.⁴⁹

Deforestation is a key contributor of greenhouse gases in the atmosphere and a major threat to sustainable development. An estimated 1.6 billion people depend on forests for their livelihoods. Forests also offer climatic and water resource conservation benefits that impact directly on health, as they are a store of medicinal resources and are critical to child health and development.

A very clear consequence of climate change is **displacement and migration** of families. Displacement, migration and emergency situations almost always have a negative impact on children. They increase the possibility of child abuse and trafficking. Increased child labour is another outcome when families start to struggle economically after a disaster. Children may be pulled from school and put to work. Their education and health suffer accordingly. Long-term negative effects of extended periods of labour may be irreversible for many children.⁵⁰

A child's **access to education** is closely linked to the breakdown of social and economic structures. One very common reason for non-attendance is deteriorating health and nutritional status of the children. For example, research points out the strong effect of childhood undernutrition on primary school enrolment in Ghana.⁵¹ Loss of livelihoods and food security also prevent access to education for many children. In the coastal communities of Azerbaijan, for example, rising sea level of the Caspian Sea resulted in a very significant drop in school

⁴⁴ Briscoe, J. 2005, *World Water Assessment Programme 2006*.

⁴⁵ UNDP, *Human Development Report 2006*, "Beyond Scarcity: Power, poverty and the global water crisis", 159.

⁴⁶ Pruss-Ustun, A. and C. Corvalan, *Preventing Disease Through Healthy Environments: Towards an Estimate of the Environmental Burden of Disease*. World Health Organization, Geneva, 2006.

⁴⁷ Linnan, M. et al., "Child Mortality and Injury in Asia: Survey Results and Evidence. Innocenti Working Papers 2007-06, Special Series on Child Injury No. 3, October 2007. Florence, UNICEF Innocenti Research Centre.

⁴⁸ UNEP-WCMC website. <http://www.unep-wcmc.org/climate/impacts.aspx>. Last visited Feb. 18, 2008.

⁴⁹ Gjertsen, H. (2005). "Can Habitat Protection Lead to Improvements in Human Well-Being? Evidence from Marine Protected Areas in the Philippines." *World Development* 33(2): 199-217.

⁵⁰ Huebler, F. Child labor and school attendance in Bolivia. *International Education Statistics*. <http://huebler.blogspot.com/2006/06/child-labor-and-school-attendance-in.html>

⁵¹ Glewwe, P. and H. Jacoby (1995), An Economic Analysis of Delayed Primary School Enrollment and Childhood Undernutrition in a Low Income Country, *Review of Economics and Statistics*, 77(1), pp. 156-69.

attendance. Focus groups conducted with residents indicated that relocation of the schools due to sea level rise, together with deteriorating health of the children, fleeing of the teachers due to economic reasons and financial problems of the family, were the primary reasons for the drop in school attendance.⁵²

General Principles, Institutional Frameworks and Objectives Guiding the Response to Climate Change

The **Convention on the Rights of the Child (CRC)** is an important point of reference for considering a climate change and human security agenda. The CRC is in force in virtually every country of the world and provides a strong system of State accountability for children in areas of decisive relevance to the climate change agenda – including in the context of the right of the child to health and to nutritious food and drinking water, in the prevention of accidents and the risks of environmental pollution, and in the promotion of education designed to develop respect for the natural environment.

Notably, the CRC specifies general principles that guide considerations of any children’s rights issues, including in regard to climate change. These include:

- the **protection of children from any form of discrimination** and the need to provide a priority attention to the most vulnerable groups of children and to the reduction of existing disparities; this dimension will also call on us to consider the situation of children in different age groups as well as gender dimensions (*Article 2*);
- the **best interests of the child**, expected to be a guiding concern in all decisions that may have an impact on children – including when laws are enacted and enforced, policies are shaped and implemented, resources are mobilized and allocated (*Article 3*);
- the **promotion of the child’s right to life, survival and development** to the maximum extent possible (*Article 6*);
- the **respect of the views of the child** and the involvement of children decisions affecting their lives (*Article 12*).

Agenda 21 and the **Rio Declaration on Environment and Development** were adopted by more than 178 governments at the United Nations Conference on Environment and Development (UNCED) held in Rio de Janeiro, Brazil, in 1992. Principle 10, which states that “environmental issues are best handled with participation of all concerned citizens, at the relevant level,” has played an important role in fostering connections between human rights and environmental agendas at the national level.

Three international treaties came out of UNCED in Rio: the **Framework Convention on Climate Change (UNFCCC)**, the Convention on Biological Diversity (CBD), and the United Nations Convention to Combat Desertification (UNCCD). Collectively, these are known as the **Rio Conventions**. The Secretariat of UNFCCC and of the UNCBD and UNCCD support member states (Parties to the Convention) to form and implement national policies to address these environmental threats and risks to human security.

Following on the CRC and Rio Conventions, a number of international and regional treaties and instruments have emerged that are relevant to issues related to climate change and children.

The **Johannesburg World Summit on Sustainable Development (2002)** underpinned the need to integrate sustainable development into education systems at all levels to promote education as a key agent for change, and recommended the adoption by the United Nations General Assembly of the UN Decade of Education for Sustainable Development (UN-DESD 2005-2014). Education for Sustainable Development (ESD) demands a reorientation away from focusing entirely on providing knowledge in a specific domain, towards dealing with interlinked problems and promoting action competencies for complex issues. Environmental education should therefore not be an independent activity, but incorporated into mainstream curricula or carried out through informal channels that focus on sustainable development through the acquisition of life skills in a number of behaviour-related areas.

In Europe, the **Aarhus Convention on Access to Information, Public Participation and Access to Justice in Environmental Matters** explicitly links human and environmental rights, furthers the concept of

⁵² Kudat, A., A. Musayev and B. Ozbilgin, Social Assessment of the Azerbaijan National Environmental Action Plan: A Focus on Community Responses to the Caspian Sea Environmental Disaster. *Social Development Papers*. Paper Number 32. July 1999.

intergenerational justice, and establishes that sustainable development can only be achieved through the engagement of all stakeholders. Under the Convention's "three pillars", the public is entitled to access to information, participation in decision-making, and access to justice (enforcement). Therefore, it is not only an environmental agreement, it is also a convention about government accountability, transparency and responsiveness – all important elements of the integrated approach needed for the institutional response to the effects of climate change on children.

Article 6 of the UNFCCC addresses education, training, public awareness, public participation and access to information in relation to climate change. Its prescriptions are key in engaging all stakeholders and major groups. The **New Delhi Work Programme**, which was adopted at COP-8, aimed at integrating Article 6 activities into existing sustainable development and climate change strategies. This mandate for education and public awareness is crucial to the role of children in addressing climate change. What children learn today will shape the world tomorrow, and an education that enhances capabilities for decision-making and action is therefore strategically important for ensuring sustainable development – the survival strategy of humankind.

The **Nairobi Work Programme (NWP)** was developed in 2006 at the **UNFCCC COP12** summit. It identifies areas of work that assist countries to assess their climate change impacts, vulnerability, and adaptation, and to be able to make informed decisions to respond. Examination of the nine areas of the NWP through the lens of the CRC is indicated.

Disaster risk reduction is a key strategy in the response to climate change. The **Hyogo Framework for Action** presents a 10-year plan to make the world safer from natural hazards, and was accepted by 168 governments in January 2005. Based on the premise that disasters affect everyone and are therefore everybody's business, the Hyogo Framework has the goal of substantially reducing disaster losses by 2015 – in lives, and in the social, economic and environmental assets of communities and countries.

Together, these many institutions provide a strong basis for action to protect the health and well-being of children from climate change.

Failure to protect children from the effects of climate change will hinder the world's progress toward the **Millennium Development Goals (MDGs)**. According to the Human Development Report 2007-2008, climate change is already slowing progress towards the MDGs and increasing inequalities within and across countries. Unless addressed, this trend will cause reversals to sustainable human development in the years ahead.⁵³ This has major implications for children. Not only are all of the MDGs critically important and relevant to the lives of children today, but their achievement is crucial to the world we leave to tomorrow's adults and to future generations. The call is thus strongly justified for the concerted engagement of children and young people in efforts to meet and exceed the MDGs. Table 2 summarizes linkages between climate change and the MDGs, as well as proposed child- and youth-centred actions intended to reduce risk and contribute concretely to meeting the goals.

⁵³ UNDP, *Human Development Report, 2007-2008*, page 21

Table 2: Climate change and the MDGs

Millennium Development Goal	Climate change link	Adaptation solutions related to children
Goal 1: Eradicate extreme poverty and hunger	<ul style="list-style-type: none"> Climate change is projected to reduce poor people's livelihood assets, for example, health, access to water, homes, and infrastructure. Climate change is expected to alter the path and rate of economic growth due to changes in natural systems and resources, infrastructure, and labor productivity. A reduction in economic growth directly impacts poverty through reduced income opportunities. In particular in Africa, food security is expected to worsen. 	<ul style="list-style-type: none"> Promote alternative livelihood and small-scale entrepreneurship Vocational training for out-of-school youth and women, related to renewable energy technologies, rainwater catchment, groundwater recharge, small-scale irrigation environmental cleanup/repairation Community projects such as canal excavation, reducing water logging, raising of embankments
Goal 2: Achieve universal primary education	<ul style="list-style-type: none"> Links to climate change are less direct, but loss of livelihood assets (social, natural, physical, human, and financial capital) may reduce opportunities for full-time education in numerous ways. Natural disasters reduce children's available time, while displacement and migration can reduce access to education. 	<ul style="list-style-type: none"> Environmental education Youth-led community mapping of risks and disaster preparedness School-based early warning Awareness and advocacy School gardening programs initiated to support nutrition
Goal 3: Promote gender equality and empower women.	<ul style="list-style-type: none"> Climate change is expected to exacerbate current gender inequalities. Depletion of natural resources and decreasing agricultural productivity may place additional burdens on women and girls' health and reduce time available to participate in decision-making processes and income-generating activities. Climate related disasters have been found to impact more severely on female-headed households. 	<ul style="list-style-type: none"> Local community-based water management programs Community gardens Disaster preparedness and risk reduction Community action to eliminate conflict-inducing environments
Goal 4: Reduce child mortality	<ul style="list-style-type: none"> Direct effects of climate change include increases in heat-related mortality and illness associated with heat waves Climate change will likely result in declining quantity and quality of drinking water, which is a prerequisite for good health, and exacerbate undernutrition – by reducing natural resource productivity and threatening food security. 	<ul style="list-style-type: none"> Access to health services Household water treatment and Oral Rehydration Salts (ORS) Improved access to sanitation and hygiene education
Goal 5: Improve maternal health	<ul style="list-style-type: none"> Children and pregnant women are particularly susceptible to vector and waterborne diseases. 	<ul style="list-style-type: none"> Strengthening of health services and distribution of malaria pills through schools
Goal 6: Combat HIV/AIDS, malaria and other diseases	<ul style="list-style-type: none"> Climate change may increase the prevalence of some vector-borne diseases and vulnerability to water, food, or person-to-person borne diseases 	<ul style="list-style-type: none"> Increased vector control and response to waterborne diseases Provision of bednets Cleaning of stagnant water
Goal 7: Ensure environmental sustainability	<ul style="list-style-type: none"> Climate change will alter the quality and productivity of natural resources and ecosystems, some of which may be irreversibly damaged, and these changes may also decrease biological diversity and compound existing environmental degradation. 	<ul style="list-style-type: none"> Increased access to water and sanitation Tree-planting campaigns School and community gardens Mapping of water sources and sanitation promotion Demand-led approaches to school WASH
Goal 8: Develop a global partnership for development	<ul style="list-style-type: none"> Global climate change is a global issue and response requires global cooperation, especially to help developing countries to adapt to the adverse impacts of climate change. 	<ul style="list-style-type: none"> Better information exchange between governments and NGOs Building civil society alliances Initiating discussions on CRC and climate change at all levels

Source: Adapted and expanded from UNDP, UNEP, World Bank, ADB, AfDB, GTZ, DFID, OECD, EC, "Poverty and Climate Change: Reducing Vulnerability of the Poor through Adaptation", launched on 10 June 2003 at the 18th Session of the Subsidiary Bodies of the UNFCCC in Bonn, Germany, p.12

Adaptation and Mitigation: Complementary Strategies

It is absolutely clear that the changing global environment will impede development efforts, increase risks to public health, frustrate poverty alleviation programmes and exacerbate migrations from water-logged or water-stressed regions. The human security risks will be greater for the most vulnerable populations. Children are first and foremost amongst these.

Both climate change mitigation and adaptation are needed to significantly reduce risk and increase resilience of the world's most vulnerable citizens. Mitigation means taking action to reduce greenhouse gas emissions that are causing climate change. It is about transforming the way that individuals, governments and industry produce and use energy, changing activities to reduce or eliminate emissions, and developing clean and efficient energy infrastructure where it does not currently exist. It is the ultimate preventive measure.

In parallel to mitigation efforts, adaptation to climate change is essential and integral dimension of climate policy. This has been repeatedly affirmed, including in the IPCC Fourth Assessment Report and the Stern Review on the Economics of Climate Change⁵⁴ and is reflected in the intergovernmental negotiation process. Adaptations are changes to natural and human systems to reduce risks from climate change to people's lives and livelihoods. We need to take incremental interventions now to mainstream climate concerns in development so that these impacts on poor people and poor countries are significantly reduced in the years to come. There is a large role for official development assistance (ODA) in financing adaptation measures, including human and institutional capacity building, and in reducing vulnerability,⁵⁵ paying the price later.^{56, 57} This recognition has led many governments, civil society groups and international organizations to begin to pay more attention to the issues of climate change adaptation.⁵⁸ For example, the economic benefits resulting from achieving Millennium Development Goal 7, Target 10, to reduce by half the proportion of people without sustainable access to safe drinking water and adequate sanitation include:

- an estimated \$7.3 billion per year from avoided illnesses;
- almost \$750 million per year from lower morbidity and mortality;
- an estimated \$64 billion per year from increased production, higher school attendance and more leisure time, all related to having water supplies closer to homes and toilets nearby.

⁵⁴ Stern, N. (ed.) 2006. *The Economics of Climate Change: The Stern Review* (Cambridge Univ. Press, Cambridge, 2006).

⁵⁵ Global Leadership for Climate Action, *Framework for a Post-2012 Agreement on Climate Change*, 2007, page 13.

⁵⁶ Stern, N. *The Economics of Climate Change: Stern Review*, 2007

⁵⁷ UNDP, UNEP, World Bank, ADB, AfDB, GTZ, DFID, OECD, EC, Netherlands Development Cooperation, "*Poverty and Climate Change: Reducing Vulnerability of the Poor through Adaptation*", launched on 10 June 2003 at the 18th Session of the Subsidiary Bodies of the UNFCCC in Bonn, Germany.

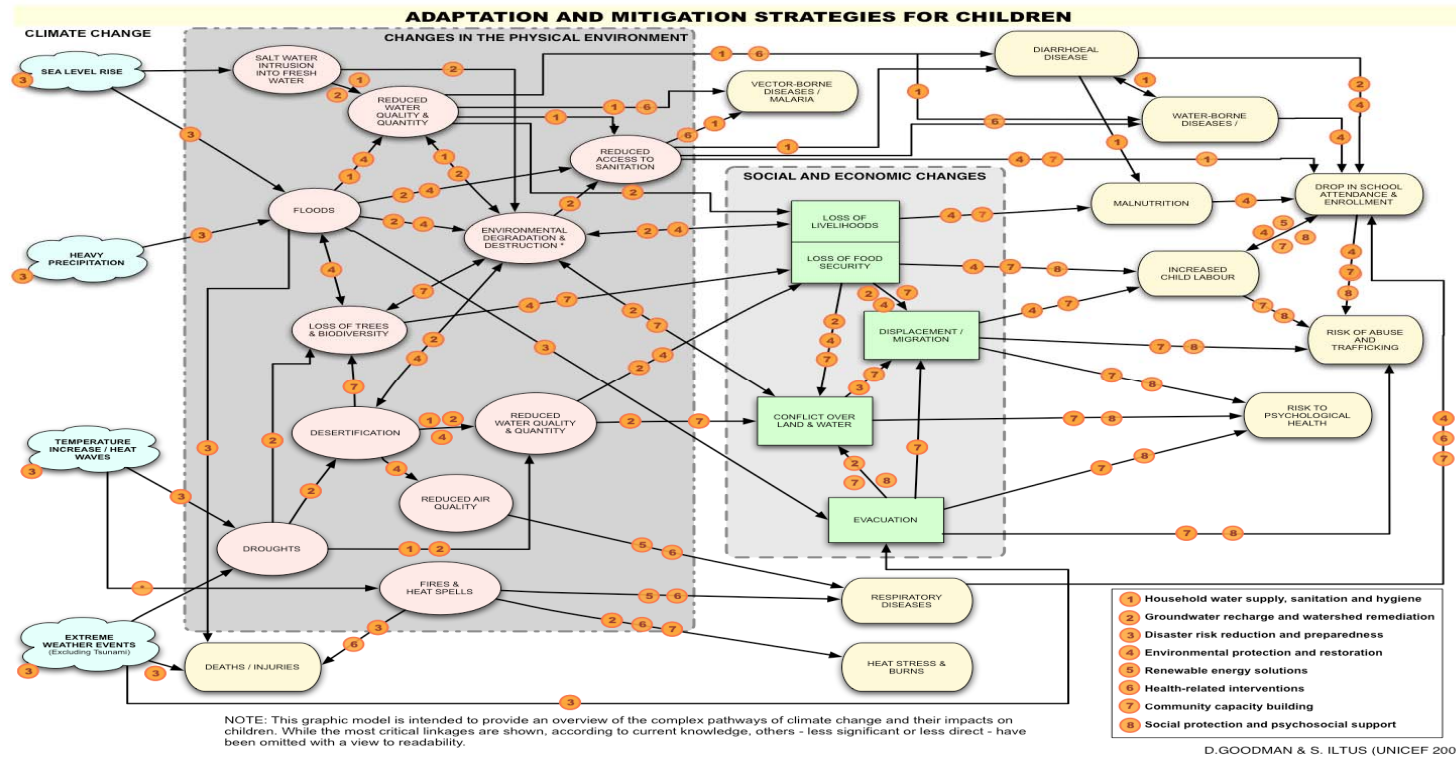
⁵⁸ Ibid.

Eight key interventions may be identified that will contribute to reductions in human security risks to children:

1. **Household water supply, sanitation and hygiene (WASH)** – including water treatment, oral rehydration solution (ORS), hygiene education, sanitation;
2. **Groundwater recharge and watershed remediation** – including rainwater harvesting, runoff catchments, watershed cleanups, tree planting, restoration of biodiversity;
3. **Disaster risk reduction and preparedness** – including risk mapping, evacuation plans;
4. **Environmental protection and restoration** – such as school and community gardens, tree planting, clean-up of stagnant water and solid waste;
5. **Renewable energy solutions** – including clean energy for homes, schools, solar and wind water pumps; clean and efficient household solutions for cooking and heating;
6. **Health-related interventions** – including improvements to basic public health infrastructure, environmental health surveillance, bednets, malaria prophylaxis and treatment;
7. **Community capacity building** – including environmental education for child-friendly schools and spaces, micro-enterprise for women, education for sustainable development, participatory local actions, vocational training/job creation;
8. **Social protection and psycho-social support** – including life skills and conflict resolution, education and other programmes to support livelihoods and community functioning, ‘safety net’ interventions to help prevent dislocation and exploitation of children, and interventions to address family and individual stress and trauma.

The relationship between these interventions and the many climate change impacts on child health and development are presented in Figure 2. In the figure, principal strategic points are noted for application of these different interventions, by number.

Figure 2: Key interventions to reduce impact of climate change on children



In order for the adaptation strategies to work, they must lead to change at the local level. A key indicator of successful adaptation at local level is an increase in the coping capabilities of families. Local communities and municipalities unfortunately face large challenges in the development of local adaptation plans. The municipalities and localities most at risk are also frequently the poorest ones. Poor people in these communities are often barely surviving and are hardly in a position to implement comprehensive adaptation plans. Yet, it should be noted that these people are also very resourceful when it comes to responding to disasters and extreme climatic events. It would be a big mistake to label them as victims. Primarily, they are “survivors” who manage to survive and raise their families in very challenging conditions, both economically and environmentally. The strength and creativity of these communities is a major asset for development and implementation of local, community-based adaptation plans.

Children, especially in developing countries, are usually in better touch with their physical environment compared to adults. In most communities, they have a wide range of access: they play along riverbeds, in empty lots, in isolated areas and have a strong grasp of what is safe and what is not. This kind of knowledge is essential in order to develop realistic adaptation plans.

The capacities of children as researchers and as active agents to implement adaptation strategies are usually underestimated. There are many excellent examples of children getting involved in local research that would otherwise be impossible to conduct. For example, in Tajikistan, children in hundreds of schools collected data on the quality of water in their school and neighborhood, using very cheap testing kits. As a result, a comprehensive map of water quality was developed to be used as a basis for policy decisions.

An interagency initiative is currently underway, coordinated by UNICEF, to develop a gender-sensitive environmental education resource pack for use in child-friendly schools and spaces. The resource pack integrates environmentally sustainable facilities based solutions (renewable energy, rainwater harvesting, ecological sanitation, gardens, reforestation) with a child-centred and rights based participatory learning approach. It will offer stakeholders tools to analyze their situation, assessing the environmental threats to human security and offering both hardware and software solutions to address these challenges.

Preparedness for climate change can be seen as a strategy for empowering children, providing them with critical thinking skills and tools to address rapidly changing environments. Providing education in emergencies has been a powerful first response in terms of facilitating access to education for children affected by armed conflict and natural disasters. To this end, youth-led activities, such as community risk mapping can go a long way to increase resilience at the community level. In educating children, several shifts need to occur. Chief among these is a shift from a prescriptive expert-driven approach, to one of helping communities developing new solutions of their own and new social practices in support of common goals.

National capacity building efforts that are designed to bridge previously sectoral focused line ministries of education, health and environment can be integrated into National Adaptation Programmes of Action (NAPAs) and into the coordinated system-wide response from the United Nations family.

Recommendations for policy and practice

Evidence presented in this review confirms the centrality of children to the discussion of climate change and to any reflection on its human security implications. However, children's issues are not yet well recognized and a part of the human security and climate change agenda. Thus, a major message is that the child's face needs urgently to be brought to all efforts to address climate change and its human security aspects.

Yet while it is absolutely true that children are amongst the most vulnerable to climate change, they can also be key agents for social change, economic development and technological innovation. Empowered children are dynamic and ultimately powerful protagonists for protecting and improving the environment.⁵⁹ Children can, and should, be partners in understanding and acting on climate change.

The lack of accurate age-specific data on children fosters confusion and disparity among policymakers and planners at national and international levels. The tendency to group all children 0-18 in one category omits or overlooks critically important factors relevant to different ages, especially information related to adolescents, which is almost completely missing in current data. Efforts are needed to identify and fill this and other remaining knowledge gaps regarding climate change and children, and to create pathways of communication and action on this subject involving a wide range of partners.

Much of the health risk posed by climate change is avoidable or curable through the scale-up of existing health programs and interventions. The health concern that climate change poses is at this stage not thought to be primarily a question of new diseases but the alternation of incidence, range, intensity, and seasonality of many of the existing health disorders.⁶⁰ Concerted action to strengthen key features of health systems and to promote sustainable and healthy development choices can enhance the current health condition as well as reduce vulnerability to future climate change.⁶¹

If we are to avoid risks from climate change to child health and development, then we must take an integrated approach across sectors and at all levels. As this paper clearly points out, one of the biggest priorities should be to employ a human rights-based approach and to align NAPAs and other planning tools with Core Commitments for Children, in coordination with all relevant national and local authorities. We must also recognize and attend to the distinct needs and vulnerabilities of children of different ages. This should be reflected in all NAPAs and other regional and local adaptation plans.

This summary paper, together with the full policy review paper, the case studies and other contributions that are emerging, will help the international community to better understanding the implications of climate change for children. This understanding is critical to the collective effort required to safeguard children's rights in the context of climate change. In turn, this will help to consolidate our human security efforts at all levels.

⁵⁹ UNICEF, *Climate Change and Children*, 2007.

⁶⁰ McMichael et al 2008.

⁶¹ <http://www.who.int/globalchange/climate/en/> Accessed March 7, 2008.

Annex: Case study summaries

Southern Sudan

The southern region of Sudan is home to approximately 10 million people, most of whom survive from subsistence agriculture. The population is very young - the average age is only 16 – and with one of the highest population growth rates in the world, it is only going to get younger. Social and economic systems are extremely fragile, and vulnerabilities to climate change are extremely high. Persistent and widespread drought is a recurrent feature of Sudan's climate. It has contributed to severe hardship, poverty, hunger, dislocation and famine. In three of the most food insecure states, more than 40% of households have poor or borderline consumption patterns. Childhood undernutrition rates range from 15%-30% across the region.

As a result of climate change, the region is projected to experience warmer temperatures and less rainfall. These changes will undermine the viability of traditional rain-fed agriculture. For example, shorgum, which is a staple food grown by 84% of families, is expected to decline by more than 50% in the next 30 years. Unless effective adaptation strategies are implemented, this would mean widespread undernutrition and death for large numbers of children.

Climate change is likely to have many other deleterious effects on children in the region, including through higher malaria risk, higher rates of acute respiratory infections, less access to clean water, less access to education, increased child labour, and a suite of impacts from forced migration and displacement.

Sudan completed its National Adaptation Programme of Action (NAPA) in July 2007. It included a priority adaptation project for the south, focused on drought-induced water shortages. The project is foreseen to deliver major benefits for children, including reduced seasonal migration, increased school attendance, and lowered incidence of waterborne diseases and chronic undernutrition.

However, despite the clear benefits, there is practically no attention to children and youth in climate change projects in Sudan (as is the case in many other countries). Sudan's NAPA makes only a single reference to children. A comprehensive review of internationally-funded projects in Sudan clearly indicates the disconnect – none of the 14 child-centred projects address issues related to climate change. Similarly, climate change projects mainly engage or target adults. Children and youth are largely omitted.

Child and youth participation in adaptation planning and implementation is virtually nonexistent in Sudan. A focus on children is lacking at all levels – national, regional, and local. This is a missed opportunity, since it is frequently demonstrated that children and youth frequently possess the knowledge and capacities to participate together with adults in projects that matter for their lives. By involving children in local climate change adaptation projects, Sudan will only strengthen its course in making life better for all its citizens.

Morocco

In Morocco, even the most basic data from the last three decades reveals significant and alarming changes in climate patterns. This makes Morocco's climatic vulnerabilities - drought, desertification, food security, disasters, sea level rise – all the more pressing.

Morocco has highlighted its vulnerabilities to climate change in two key and closely related sectors: water resources and agriculture. Half of the country's agricultural land is located in low rainfall zones. Climate projections indicate, by 2020, a 4% drop in rainfall compared to 2000, with a 10-15% reduction in water resources countrywide and drops in cereal production of 10% in a normal year and 50% in a dry year. These numbers are significant, since basic food staples, such as wheat flour, sugar, and semolina, supply nearly 90 percent of the calories in the average Moroccan diet.

Although Morocco has one of the lowest rates of undernutrition when compared to other countries in north Africa and the Middle East, food insecurity persists, largely a result of water scarcity and problems in agricultural production. This continues to hinder healthy child development – undernourishment persists amongst children under five, 23% of children in the country are stunted and 10% are underweight. These challenges are worse in the country's rural areas, where about half of the country's 30 million inhabitants live.

Climate change will impact on child health and well-being in Morocco through its impacts on food security and in other ways. In the past, dramatic increases in food prices have led to violence and social unrest. From this perspective, droughts clearly present a human security issue. Climate change will tend to increase child labour for farm work or livestock herding, to the detriment of children's education. Declining water resources will also affect children's health more directly – water scarcity is strongly correlated with diarrhea. Insufficient water quality and quantity is considered amongst the major causes of death for children under four. Other climate change impacts on Morocco's children are presumed. However, there is a dearth of knowledge on climate change and children in Morocco – a survey of all literature on climate change and health in the Eastern Mediterranean Region revealed a total of 74 sources. Only five of these focused on Morocco; none related to children.

Morocco has developed 12 adaptation projects, most of which address the water and agriculture sectors. The only mention of children and youth in these projects is in respect to awareness-raising; otherwise, children's issues and child and youth participation do not figure prominently on the broader adaptation agenda.

However, child participation can be critical to successful adaptation. For example, an adaptation project in a rural community introduced a simple feed block technology to alleviate feed resources and overgrazing. Child and youth participation were essential for understanding livestock grazing patterns. The feed blocks are manufactured at the farm level, using family labour and youth participation.

Vulnerable children should be a top priority for national and local adaptation projects. Currently, adaptation efforts largely follow a sectoral approach. This approach needs to be supplemented by research and local adaptation projects that identify and target children that are most likely to suffer due to climate change. While child participation is a necessary component of climate change adaptation, it is not a panacea. Children's issues need to be considered at all levels of policy and programming.

2. Gender, Climate Change and Human Security

Women's Environment and Development Organization (WEDO)⁶²

Climate Change is increasingly recognized as a major human security issue that poses serious global threats. Although climate change affects everyone regardless of race, caste, ethnicity, sex and level of income, its impacts are more heavily felt by poor nations, communities and people, and climate change magnifies existing inequalities. For the world's poor the impact will be most severe, disproportionately affecting their livelihoods and security. Women comprise 70% of those living below the poverty line. As a result, they are most likely to bear the heaviest burdens when natural disasters strike. At the same time, women are often overlooked as potential contributors to climate change solutions, and thus to the security of all human beings.

The Hyogo Framework for Action that emerged from the United Nation's 2005 World Conference on Disaster Reduction states that "a gender perspective should be integrated into all disaster risk management policies, plans and decision-making processes, including those related to risk assessment, early warning, information management, and education and training" (ISDR, 2005:4). It is, therefore, imperative that governments and other stakeholders build into their policies and programs strong links between gender, human security and climate change.

The consequences of climate change are closely related to the context in which individuals or groups experience the changes (O'Brien, 2007). Therefore, a vulnerability approach to climate change is advocated for by authors such as Wisner et al. (2004), Lambrou and Piana (2005) and Oswald Spring (2007).

The WEDO study presents a gendered analysis of how climate change impacts on human security. It also assesses whether adequate scope exists for women to participate in improved human security in a scenario of changing climate. Based on this analysis, recommendations are given for enhancing the integration of a gender perspective in climate change and human security policies and programs.

Gender aspects of (natural) disasters

Many of the implications of natural disasters on women and men are documented in existing literature. The Gender and Disaster Network presents lessons learned from the field on their website (www.gdnonline.org). In many societies, vulnerability to (natural) disasters differs for women and men. Women are often more vulnerable to disasters than men through their socially constructed roles and responsibilities, and because they are more poor (Pan American Health Organization, 1998; Mitchell et al., 2007).

In general, women have less access to resources that are essential in disaster preparedness, mitigation and rehabilitation. Gendered divisions of labor often result in the over-representation of women in agricultural and informal sectors, which are more vulnerable to disasters. Women, in general, are also responsible for reproductive tasks such as food

⁶² This policy paper (by Rebecca Pearl and Irene Dankelman) is excerpted from the complete WEDO study on gender, climate change, and human security, including case studies by ABANTU for Development (Ghana), ActionAid (Bangladesh) and ENDA (Senegal). Authors: Irene Dankelman, Wahida Bashir Ahmed, Khurshid Alam, Yacine Diagne Gueye, Naureen Fatema, and Rose Mensah-Kutin. Editors: Anna Grossman and Cate Owren. WEDO: www.wedo.org

collection and energy supply for the household as well as many care-giving tasks, such as care for the children, sick, elderly, the home and assets (Enarson, 2000).

Water, sanitation and health challenges put an extra burden on women, adding to the double burden of productive and reproductive labor when there is a disaster and a collapse of livelihood (Patt et al., 2007). In many societies, socio-cultural norms and care giving responsibilities prevent women from migrating to look for shelter and work when a disaster hits. Self-sacrifice even hampers women's own rescue efforts in any type of disaster.

Women also face indirect problems when natural disasters strike. They are often less mobile, more likely to be confined to the house and have less decision-making power. All of which contributes to their lack of participation, and lack of access to information regarding potential hazards and possible coping strategies. Besides diminishing their visibility, these realities deprive women of opportunities to look for alternative sources of income, adversely affecting their bargaining power in the household and community.

In a recent study by the London School of Economics, the University of Essex and the Max-Planck Institute of Economics a sample of 141 countries in which natural disasters occurred during the period 1981-2002 was analyzed (Neumayer and Plümer 2007). The main findings are that: (a) natural disasters lower the life expectancy of women more than that of men; (b) the stronger the disaster, the stronger this effect on the gender gap in life expectancy⁶³, (c) the higher women's socio-economic status, the weaker this effect on the gender gap in life expectancy. The conclusion is that it is the socially constructed gender-specific vulnerability of women built into everyday socio-economic patterns that leads to the relatively higher female disaster mortality rates compared to those of men. For example, the 1991 cyclone in Bangladesh killed 138,000 people, many of which were women older than 40 years (Bern et al., 1993).

The disadvantaged position of women means greater difficulty in coping with disasters. For example, in a country like Bangladesh where women are more calorie-deficient than men, women have more problems recovering from the negative effects that flooding has on their health (Cannon, 2002). An increase in the number of female-headed households (because of male out-migration) also amplifies women's responsibilities and vulnerabilities during natural disasters. After a disaster hits there are often inadequate facilities available for women to cope with their household tasks or to get shelter. Disaster relief efforts pay insufficient attention to women's reproductive and sexual health, and as a result women's health suffers disproportionately.

In the aftermath of disasters an increase in domestic and sexual violence often occurs. During or after disasters, such as long periods of drought, more girls drop out of school to reduce household expenses by saving on school fees, or to assist in the household with tasks such as fetching water, or as a result of pregnancy and early marriage (Eldridge, 2002). A study in Malawi (2001) showed that girl-children are married off early in times of drought, usually to older men with numerous sexual partners. They were even forced to sell sex for gifts or money, which resulted in the accelerated spread of HIV/AIDS in the country (Malawi Government, 2001).

⁶³ Generally women's life expectancy is higher for women than it is for men; if the gender gaps in life expectancy lowers due to an event it means that relatively more women die, or they die at an earlier age.

Lower levels of education reduce the ability of women and girls to access information—including early warning mechanisms—and resources, or to make their voices heard. This is an extra challenge when women want to innovate their livelihood strategies.

Empirical studies reveal that women and men make decisions differently. Whereas men are more risk-taking, women tend to be more risk averse. Men are more overconfident, thinking that they can predict and handle the future themselves, whereas women are more willing to adapt their strategies and behavior. Women usually listen to external advice, but men will not easily ask for directions. In general, women contribute more to a common good than do men and they are more aware of social bonds, showing greater reciprocity and altruism. However, when social bonds are weak, men can be observed to be more cooperative than women. These findings have major implications for disaster management and could form important underlying motives for women's and men's reactions to hazards (Brown-Kruse, 1993; Patt et al., 2007).

This also indicates that gender-differentiated roles don't always result in higher losses for women. For example immediate mortality caused by hurricane Mitch in Central America was higher for men, not only because they were engaged in outdoor activities when the disaster struck, but also because they tend to be more overconfident in their behavior toward risk (Bradshaw, 2004).

Women and climate change

Although climate change affects everyone, it is not gender neutral. Climate change magnifies existing inequalities, reinforcing the disparity between women and men in their vulnerability to and capability to cope with climate change (UNDP, 2007; Mitchell et al., 2007).

Women, as the majority of the world's poor, are the most vulnerable to the effects of climate change (WEDO, 2007). Not only are poor women more likely to become direct victims (mortalities and injuries) of climate change disasters, such as hurricanes and flooding (see Neumayer and Plümper, 2007), during natural disasters, often more women die than men because they are not warned, cannot swim or cannot leave the house alone (UNFCCC COP, 2005). When poor women lose their livelihoods, they slip deeper into poverty and the inequality and marginalization they suffer from because of their gender increases. Therefore, climate change presents a very specific threat to their security.

Women made up 55-70% of the Banda Aceh (Indonesia) tsunami deaths, and in the worst affected village Kuala Cangko, in the North Aceh district, 80% of the deaths were women (UNIFEM, 2005; Oxfam Briefing Note, 2005). According to BBC News online, of the 2003 French heat wave toll of 15,000, about 70% were women. And in the U.S., Hurricane Katrina entrenched poor African-American women, who were already the most impoverished group in the nation, in deeper levels of poverty (WEDO, 2007).

Women's responsibilities in the family make them more vulnerable to environmental change, which is exacerbated by the impacts of climate change. They are being affected in their multiple roles as food producers and providers, as guardians of health, care givers, and economic actors. As access to basic needs and natural resources, such as shelter, food, fertile land, water and fuel, becomes hampered, women's workload increases. Also poor families, under which many female-headed households occur (e.g. 15% in Bangladesh, 10% in Nepal and 35% in rural India) (Mitchell et al., 2007) often live in more precarious situations, on low lands, along dangerous riverbanks, or on steep slopes.

Drought, deforestation and erratic rainfall cause women to work harder to secure (natural) resources and livelihoods. In such situations, women have less time to earn income, get an education or training, or to participate in governing bodies. Girls regularly drop out of school to help their mothers to gather wood and water. “Loss of livelihood assets, displacement and migration may lead to reduced access to education opportunities, thus hampering the realization of MDG2 [United Nations Millennium Development Goal 2]. Depletion of natural resources and decreasing agricultural productivity may place additional burdens on women’s health and reduce time for decision-making processes and income-generating activities, worsening gender equality and women’s empowerment (MDG3)...” (UNDP-2, 2007:1).

Conflict that arises from a shortage of natural resources amplifies existing gender inequalities, while the relocation of people has severe impacts on social support networks and family ties—mechanisms that have a crucial value for women, and in their coping capacity (Patt et al., 2007).

Women’s coping strategies: strengthening security

Too often women are primarily perceived as the main victims of climate change and not as positive agents of change and contributors to livelihood adaptation strategies. As highlighted by Enarson (2000) and O’Brien (2007), natural disasters could also provide women with a unique opportunity to challenge and change their gendered status in society. Women have been willing and able to take an active role in what are traditionally considered ‘male’ tasks in responding to disasters, e.g. following hurricane Mitch in Guatemala and Honduras in 1998 (Schrader and Delaney, 2000).

In general, women have proved effective in mobilizing the community to respond to disasters, and in disaster preparedness and mitigation. For example, after Mitch struck the NGO Puntos de Encuentro in Nicaragua organized an information campaign “Violence against women is one disaster that men can prevent”. The campaign proved effective in changing men’s attitudes towards violence against women. (Pan-American Health Organization, 1998)

Women usually have fewer assets than men to recover from natural disasters, and usually don’t own land that can be sold to secure income in an emergency. Among the problems women identify when having to adapt to climate change, include lack of safe land and shelter, lack of other assets and resources, limited access to material and financial resources, lack of relevant skills and knowledge, high prices of agricultural inputs and other materials, and cultural barriers limiting women’s access to services (Mitchell et al., 2007).

However, worldwide women are starting to adapt to a changing climate and can articulate what they need to secure and sustain their livelihoods more effectively. Local strategies for adapting to climate change provide valuable lessons.

Women often have a clear sense of what they need to adapt better. In several studies (Mitchell et al., 2007; Oxfam, 2005) women have voiced their priorities in times of disaster:

- safety: a safe place to live for their families and themselves; including relocation to safe areas, shelters, and adaptation *in situ* by the construction of solid houses; the storage of their harvest and livestock;
- adaptation in agricultural practices, including crop diversification;
- better access to information;

- access to services such as doctors and pharmacists, and agricultural extension;
- development of their capacities, through training and information (incl. through exposure and exchange visits about adaptation strategies and livelihood alternatives);
- access to resources, including climate-related finances (Skutsch, 2004), improved access to credits and markets, to implement effective strategies and overcome constraints;
- ecological restoration.

Women's Capacity to Adapt

1. In the midst of a drought in the Federated States of Micronesia women used their experience working the land to dig into the ground and create a new well filled with drinkable freshwater. But planners and decision-makers had not considered their possible contributions (WEDO, 2007).
2. In November 2006, the Kenyan women's organization the Green Belt Movement and the World Bank's Community Development Carbon Fund Project signed an Emission Reductions Purchase Agreement (ERPA) to reforest 2,000 hectares on two mountain areas in Kenya with thousands of indigenous trees (Green Belt Movement, 2006).
3. In a CARE project in Bangladesh, women tended to prioritize adaptation strategies that could be implemented close to home, such as homestead gardening and duck rearing. In the project, that recruited female field officers, women comprised 58% of total project participants (Patt et al., 2007).

The framework below shows that if we define human security as security of survival (mortality/injury, health), security of livelihood (food, water, energy, environmental, shelter, and economic security), and dignity (basic human rights, capacity, participation), climate change has different effects on these respective security aspects and show gender specific characteristics. Women have developed specific adaptive strategies to cope with these problems. There are a wide range of (policy) opportunities in which adaptive measures can be taken to address women's priorities in times of climate change that threaten their security.

Framework on Gender, Climate Change, and Human Security (Irene Dankelman, 2008)

Human Security	Security Aspect	Climate Change	Gender aspects	Adaptive strategies women	Opportunities (policy etc)
Security of survival	Mortality/injury	* Mortality through different extreme weather events	* More women than men die, c.q. injured.	* Looking for safe shelter; improving homes and houses. * Disaster risk reduction.	* Disaster preparedness. * Early warning systems. * Gender-specific (women's participation and access/control).
	Health	* Increase infectious diseases vectors * Physical and mental stress	* Women bear the brunt of taking care of the sick, disabled. * HIV/AIDS increases due to early marriage, forces prostitution etc. * Women lack access to (reproductive) health services. * Loss of medicinal plants/biodiversity.	* Medicinal plants and application other preventive or alternative methods. * Increase in caring tasks.	* Access to health facilities and services (for women). * Monitoring health situation. * Reproductive health facilities.
Security of Livelihood	Food security	* Agricultural production changes. * Fishery stocks decrease	* More time and energy needed for food production. * Increased work-burden. * Calorie-deficiency/hunger. * Budgetary problems.	* Adapting the agricultural practices: switching to other crops, animals, or to other methods. * Saving food, seeds and animals. * Adaptation diets. * Buying food.	* Agricultural extension in adaptive strategies, e.g. mixed cropping, better adapted crops/livestock. * Affordable and ecologically-sound agricultural inputs. * Nutritious extension. * Land rights for women. * Marketing facilities.
	Water security	* Lack of water. * Pollution and salination water. * Flooding.	* More time and energy needed for water provision (household/agriculture). * Increased work-burden. * Health problems.	* Water-saving practices, incl. rainwater harvesting. * Purchasing water from water-vendors.	* Safeguarding of affordable drinking water. * Safe sanitation facilities. * Preservation wetlands.

	Energy security	* Lack of biomass fuel * Malfunctioning hydropower	* More time and energy needed for fuel collection. * Increased work-burden. * Inferior energy-sources: indoor pollution.	* Switching to other energy-sources. * Use of energy saving devices. * Advocacy	* Provision of fuel sources. * Provision of (and training in) energy-saving devices. * Ecological regeneration.
	Environmental Security	*Environmental processes and services jeopardized	* Poorest women living in insecure environments most affected.	* Building more secure houses. * Cleaning up the environment. * Regenerating the environment.	* Ecological restoration. * Safe shelter areas.
	Shelter security	* Housing, infrastructure and services damaged.	* Limited land rights. * Not included in land planning. * Male out-migration.	* Building more secure housing. * Seeking shelter: migration.	* Safe shelters and solid housing.
	Economic security	* Decrease of income generating (+credit facilities) opportunities.	* Women working in informal sector most affected. * Costs for household budget increase (e.g. buying water). * Male out-migration: increase female headed households.	* Saving on expenses or money for lean time. * Selling of assets and services. * Alternative income generating activities	* Affordable credit and financial facilities for women. * Provision of alternative livelihood options.
Dignity	Basic human rights	* Triggers violation of basic human rights: stress factor increases.	* Violence against women: at household level in conflicts.	* Organization of women. * Social networks.	* Supporting facilities (incl. counseling, CBOs). * Defense of women's rights.
	Capacity	* Lack of opportunity: education and income generation	* Drop out of schools by girls. * No time left for education, training, income generation.	* Self-training, support groups and networks	* Education. * Skills training.
	Participation	* No/limited part in decision-making; lack of information.	* Lack of women's participation in CC. * Priorities neglected.	* Organization. * Advocacy. * Participation.	* Access to information. * Ensure women's participation (in planning and decision-making). * Involve men in gender training.

International policy framework on gender equality, human security, climate change, sustainable development

Human rights and human security

Universal Declaration on Human Rights (1948)
International Covenant on Civil and Political Rights (1966)
International Covenant on Economic, Social and Cultural Rights (1966)
Geneva Conventions.
World Conference on Human Rights (1993)
Human Rights Council, Resolution on Human Rights and Climate Change (2008)

Gender equality policies and agreements

Convention on the Elimination of all Forms of Discrimination against Women (1979)
Beijing Platform of Action, 4th World Conference on Women (1995)

Sustainable development and environmental agreements

Agenda 21, UN Conference on Environment and Development (1992)
World Summit on Sustainable Development (2002)
Convention to Combat Desertification (1994)
Convention on Biodiversity (1992)
UN Framework Convention on Climate Change (1992)
Secretary-General's High-Level Event on Climate Change (2007)
Millennium Declaration (2000)
hYOGO Framework for Action, World Conference on Disaster Reduction (2005)

Recommendations

The following recommendations are based on the outcomes of the study on gender, climate change and human security and the three country specific case studies:

Climate change and human security

- Identify, research and integrate climate change as a human security issue into human rights frameworks, mechanisms and legislation, including the Hyogo Framework for Action.
- Apply a human security framework to climate change at all policy levels.
- Conduct a vulnerability analysis of climate change mitigation and adaptation and promote an integrated human and environmental security approach that is proactive and inclusive and combines top-down measures (e.g. institutional consolidation, laws, norms and policies) with bottom-up participation and resilience-building for exposed communities.

Gender aspects of climate change: ensuring human security

- Include a gender perspective in global and national climate change policies, documents, programs and budgets.
- Guarantee women's participation in climate change decisions, and amplify women's voices in global, national and regional institutions, as well as in open dialogue at the community level.

- Acknowledge across sectors that women are among the most affected by climate change because of their social and economic situations and because of their role in the family.
- Enhance institutional capacity to mainstream gender in global and national climate change and Disaster Risk Reduction (DRR) policies and operations through the development of gender policies, gender awareness, internal and external gender capacity and expertise, and the development and application of relevant mechanisms and tools.
- Conduct gender-specific vulnerability assessments, and apply a gender analysis to global climate change policies and institutional mechanisms.
- Develop gender-sensitive indicators for use by governments in national reports to UNFCCC and related policies and mechanisms.
- Create gender-specific disaster reduction policies to address the effects of climate change in disaster-prone areas, as well as pragmatic national and international interventions to ensure food, energy and water security, economic resilience and security of place/habitat, particularly for poor and migrating women and their families.
- Promote women's empowerment through capacity-building before, during and after climate-related disasters, as well as their active involvement in disaster anticipation, early warning and prevention as part of their resilience building.
- Guarantee women's rights in climate change mitigation and adaptation, including their rights to knowledge, skills, land ownership, participation in decision-making and access to services.
- Construct a legal regime that safeguards the security of women affected by climate change, including mechanisms to review land-use planning and infrastructure work (Alam et al., 2008).
- Incorporate climate change in discussions on women's rights and related interventions, which often focus on political, social and economic empowerment and protection in a non-disaster context (Alam et al. 2008).
- Ensure that government policies and programs on human rights, women's rights and climate change are coherent and reinforce each other.
- Encourage the women's movement to take full responsibility and ownership of the gender and climate change discourse to ensure that implementation of UNFCCC and Kyoto Protocol (and post-KP) measures take their specific concerns into account (Mensah-Kutin, 2008).

Adaptive capacity: strengthening human security

- Build on and strengthen women's experiences, knowledge and coping capacity adaptation policies and ensure that women's needs are considered in livelihood adaptation strategies.
- Integrate a gender approach and enhance women's human security in all National Adaptation Programmes of Action (NAPAs).
- Foster women's direct involvement in both policy and project planning in NAPA preparation.
- Create an environment in which women's engagement in adaptation discussions and governance structures is fully supported—in order to do so, existing coping strategies and constraints to adaptation should be studied.
- Empower women as agents of adaptation, and provide women with opportunities to control greater percentages of resources (including land) and services and to make independent decisions.
- Prevent cultural practices from hindering women's capacity to adapt.

- Support and promote practical solutions to enhance women’s adaptive capacity and livelihoods including alternative agricultural practices, equitable employment opportunities, access to credit, labor-saving technologies and equipment, safe shelter and facilities, energy and water supply and services (Diagne Gueye, 2008).
- Assist women and their coalitions and networks at community, national and international levels to ensure that recovery and adaptation measures respond to women’s needs and concerns.
- Provide training to women’s organizations, networks and support groups and opportunities to share experiences—women and their organizations should demonstrate exemplary leadership and serve as gender advocates and credible ambassadors on climate change (Mensah-Kutin, 2008).
- Acknowledge women’s social, economic, physical and psychological vulnerabilities in community-based preparedness and response plans in order to reduce the impact of disasters on women.
- Recognize women’s abilities and incorporate them into disaster relief efforts with the goal of changing gendered roles and perception of rights.
- Endeavor to ensure that activities are appropriate for women, and that they receive positive encouragement and support for participation.

Financing mechanisms

- Integrate human security for women into climate change funding mechanisms, to ensure that poor women get a fair share of funds—practical tools such as accountability mechanisms would support gender equality’s incorporation into climate change initiatives, including the Clean Development Mechanism (CDM).
- Consider developing a mechanism for the CDM to fund projects that make renewable energy technologies available to women. For example, NAPAs should target women as important actors in adaptation activities.
- Set up adaptation funds, according to principles of democratic governance and civil society participation to play a key role in promoting women’s rights and to prioritize poor women’s needs.
- Ensure women’s engagement in adaptation financing mechanisms (Alam et al., 2008).
- Create adaptation finance mechanisms that support livelihood adaptation priorities of poor women, and include gender-disaggregated indicators in adaptation funds for targeting and monitoring the benefits to poor women.

Further research⁶⁴

- Conduct a gender-based approach to the study and analysis of climate change and natural disasters and collect more research, particularly supported by sex-disaggregated data.
- Apply lessons from the Global Environmental Change and Human Security (GEHS) program (one of the science programs of the International Human

⁶⁴ Gender-specific research on climate change is not an end in itself, but a means of developing comprehensive solutions with regard to climate change, and to enhance gender equality in climate change adaptation and mitigation.

Dimension Program) to climate change research, and use participatory research tools to study the impacts of climate change on women's livelihoods.

- Promote women's equal participation in climate change science and research.

Capacity building and networking

- Invest in strengthening the capacity of women and gender activists on climate change issues and apply affirmative action principles to draw women into climate change institutional structures and policy-making arenas.
- Enhance cooperation with women climate change organizations, including the Global Gender and Climate Alliance, WEDO, IUCN ENERGIA, genderCC Network - Women for Climate Justice, Gender and Disaster Network, and national partners.

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3. Human Security, Climate Change, and Environmentally Induced Migration

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Security
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1. Introduction

Migration —whether permanent or temporary, whether national, regional or international— has always been a possible coping strategy for people facing environmental changes such as sudden disasters or cyclical climate conditions. Pre-history and history are marked by (episodic and localised) human movement from one climate zone to another, as people have sought out environments that would support both survival as well as aspirations to a more stable existence. Migration in the past may have been accompanied by some sense of despair that familiar landscapes no longer provided safe or supporting habitats for people. Today, environmental change, including climate change, presents a new threat to human security and a new situation for migration. By 2050 when human population is projected to peak, Earth will host some 9 billion people, the majority of whom will live in urban areas with crushing environmental footprints. Many of these cities are located in areas prone to sea level rise, while people remaining in rural areas may struggle with increasingly frequent and violent hazards like flooding or drought, or with more gradual but similarly intense changes in regional climates that make livelihoods much more difficult. Faced with an unprecedented scale of environmental change, migration may be an adjustment mechanism of first resort, or a survival mechanism of last resort.

Environmentally induced migration has the potential to become a phenomenon of unprecedented scale and scope. Its effects on the global economy, international development, and national budgets could be profound, with significant implications for almost all dimensions of human security, in addition to political and state security. Yet, amid these challenges, there is also opportunity. Today, economic migrants are a powerful force driving international development.

⁶⁵ This summary has been prepared by Dr. Koko Warner, Dr. Tamer Afifi, Olivia Dun, Marc Stal, Sophia Schmidl, Social Vulnerability and Environmental Migration Section, UNU-EHS with Prof. Janos Bogardi, Director of UNU-EHS and Vice Rector in Europe, a.i.

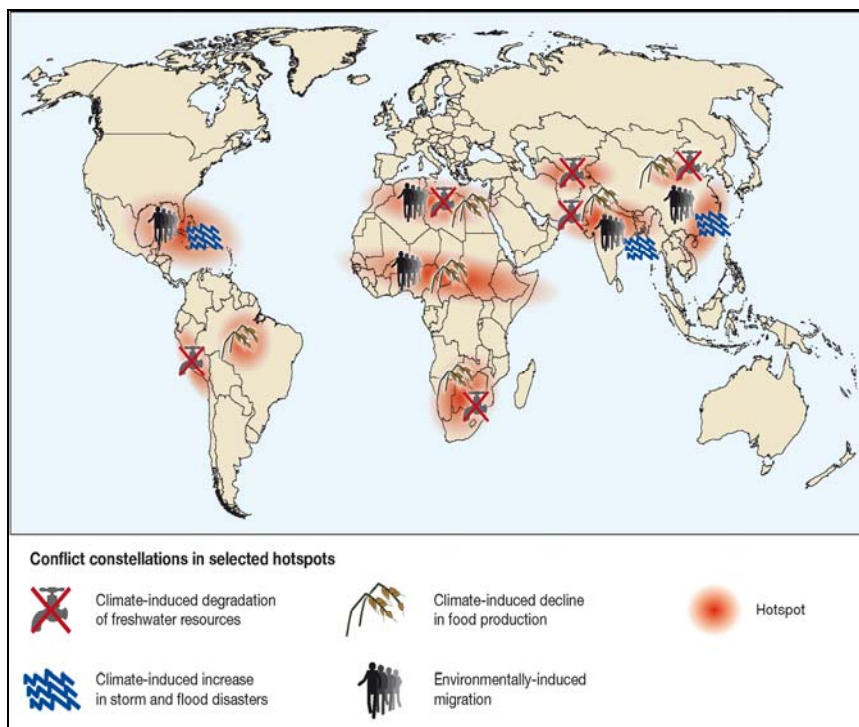


Figure 1: Environmental hotspots and migration

Their remittances dwarf official development assistance and currently approach 300 billion dollars per annum (Ratha and Xu, 2008). In the future, people facing the threat of environmental change and those who have become migrants because of it may help shape effective adaptation to climate change. This policy paper briefly explores some of the main issues related to migration and climate change, and points towards policy alternatives to address environmentally induced migration.

Beyond these preliminary indications of the magnitude and patterns of environmentally induced migration, this paper explores the effects of climate change in greater depth as it relates to migration and human security. The paper first makes the linkages between human security and environmentally induced migration. Next, the paper provides a conceptual framework for thinking about environmentally induced migration. In the third section, the paper introduces the project Environmental Change and Forced Migration Scenarios (EACH-FOR) as well as the methodology used in the frame of the project and the main findings of a selection of field research visits run for that purpose. The fourth section presents a five-pronged approach to move forward thinking and action on environmentally induced migration related to climate change, hereby highlighting issues with policy relevance. Finally, the paper draws conclusions about the links between climate change, migration, and human security.

2. Human Security: A paradigm shift

Environmental issues have been seen in the broader context of human security since the end of the Cold War. This marked the end of both the political bipolarity and the narrow, mainly military notion of security concepts and perceptions which dominated the security discourse at that time (Brauch, 2005). A number of United Nations' Conventions directly and specifically address environmental issues that have great bearing on societies worldwide and contribute indirectly to improving several of the dimensions of human security.

Environmentally induced migration has emerged as a policy-relevant research area, due in part to improved understanding and public dialogue about the effects of climate change, as well as ever-widening economic and social gaps between already-developed and less developed countries. As signals of environmental degradation, natural hazards, migration, and a wide spectrum of other stressors have increased, experts have sought a new concept of human security and development to guide policy. Policy discussions of human welfare have become closely linked to discussions of environmental quality since the seventies and eighties of the 20th century. Nascent within this concept was the idea of vulnerability, reflected in early publications by ecologists and social scientists (Holling, 1973; Timmerman, 1981).

By the beginning of the 21st century, climate change and harrowing effects of natural hazards like extended drought or extreme hurricanes (Hoeppe and Pielke, 2006; IPCC, 2007), crushing economic inequality, disease, lack of resources and resulting migration have all shaped a new reality for the human security paradigm.

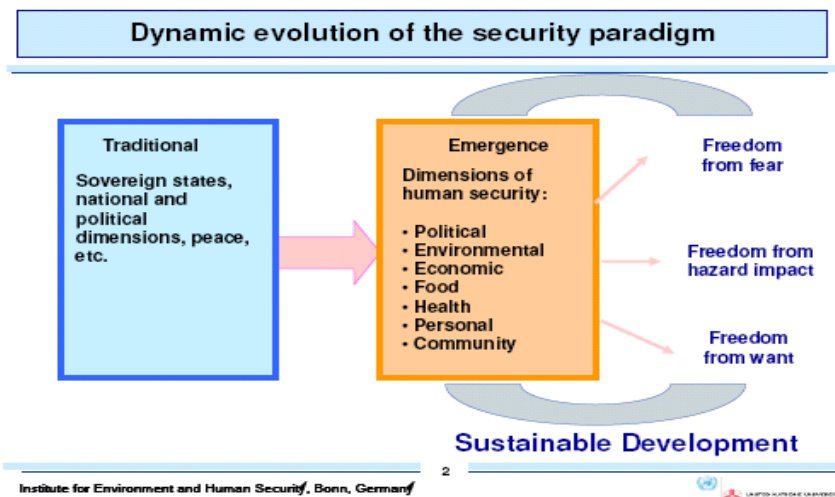


Figure 2: Evolution of the security paradigm (Source: Warner 2007)

The paradigm inseparably links humans, their social systems, and their environments and strives to achieve freedom and fear, freedom from hazard impact (Brauch, 2005), and freedom from want (Holzamann and Jorgenson, 2000; UNDP, 2004; Annan, 2005). The paradigm has been shaped in part by a recognition of the need to achieve greater societal resilience and improved environmental conditions among the world's most vulnerable people (UN, 2006).

2.1 Does environmentally induced migration threaten human security?

The paradigm shift emphasizes the well-being of individuals and the societies in which they live, but does not address the consequences of failure to ensure human security. The notable efforts to redefine security have achieved greater international awareness of the importance of development - including an intact environment and the ability of all people to enjoy health and decent work - for all people. However, to date these initiatives and others that attempt to deal with environmental problems in order to limit their socio-economic consequences have not succeeded in stopping or slowing the ongoing overall degradation of the world's ecosystems (Millennium Ecosystem Assessment (MA), 2005). As a result, migration may increasingly emerge as a coping capacity or adaptation mechanism in response to worsening environmental conditions. Several scholars expect the number of "environmental migrants" to swell (e.g. Myers, 2005).

Commonly, security policies focus on international issues, including migration, as security threats, whereas environmental migration/displacement is often -at least at the beginning- internal. These internal movements could lead to instabilities as well. For example, although land degradation on its own could lead to conflicts, the latter could easily escalate and become a starting point of political and even military conflicts, if they are superimposed by migratory movements in first place.

While it is important to understand the root causes of international migration, it is also necessary to understand the root causes of internal migration. This is because firstly, internal migration can sometimes be an intermediary step leading to international migration and secondly, because the poorest may not often have the means to migrate internationally. Moreover, it is thought that many of those displaced by environmental factors would often be displaced or migrate within the boundaries of their own country rather than migrating abroad.

3. Climate change and human movement - Framing the issue

Climate-related stressors combined with ecosystem change - such as sea level rise - and rapid-onset events - such as flooding - have the potential to drive migration or prompt national governments to plan for the relocation and resettlement of affected populations. Further, as some environments become inhospitable to people, these people are pushed to move elsewhere where their locally specific knowledge may no longer apply to the places where they migrate. Displaced people may not always receive the support they need in places of destination. For those displaced to locations where adequate infrastructure is not available and where they are directly dependent on the environment for survival, there can be an over-exploitation of natural resources leading to a lack of potable water, soil

degradation, cutting of trees and clearing of land, but also to pollution and potential epidemics. Under such circumstances, a range of maladaptive activities can drive migrants to further stress ecosystems, and may unleash a number of secondary environmental catastrophes.

3.1 How many environmentally induced migrants?

Estimates of the number of environmentally displaced people range widely and under academic debate. The United Nations High Commissioner for Refugees (UNHCR, 2002:12 and 2005) estimates that today there are approximately 24 million people worldwide who have fled because of floods, famine and other environmental factors. These figures vary if particular phenomena are taken into account: for example, 17 million people may be migrating due to desertification alone (Leighton, 2006) and the 1994 *Almeria Statement* that 135 million people could be at risk of being displaced as a consequence of severe desertification. In a 2002 paper by a *Green Party member of the European Parliament*, it was estimated that 30 million people were displaced by climate change in China alone (Lambert, 2002).

By 2010 Myers estimated that 50 million people will migrate due to environmental change (Myers 2002 and 2005). Organizations including the International Organization for Migration (IOM) estimate that 200 million people may become environmentally induced migrants by 2050. After 2050 if environment-related development displacement (i.e. building dams) could drive the number up to almost 700 million people, or almost one in every ten people living on Earth after 2050 (Christian Aid, 2007).

3.2 Slow- and rapid-onset change increasingly drive migration

Over time, slow onset change will give environmental push factors an increasingly important position in the migration “decision.” Current projections of temperature and sea level rises and increased intensity of droughts and storms suggest that population displacement at significant scales will take place within the next 30-50 years, particularly for populations in coastal zones. Although constituting only 2 percent of the total land surface of the earth, these regions contain 10 percent of the current world population and 13 percent of the urban population. Additionally, about 75 percent of all the people residing in low-lying areas are in Asia, and the most vulnerable are the poor. One of the world’s poorest countries, Bangladesh may lose up to one fifth of its surface area due to rising sea level; this scenario is likely to occur, if the sea level rises by one metre and no dyke enforcement measures are taken (GermanWatch, 2007). Migration is anticipated as a consequence of these trends.

Rapid onset change is linked with environmentally induced displacement and migration. Temporary displacement from natural catastrophes can lead to permanent migration, as illustrated by the 2004 Indian Ocean tsunami and the 2005 Hurricane Katrina. The Indian Ocean Tsunami in late 2004, displaced 2,089,883 people, many of whom are still living in refugee camps in the region (AidWatch, 2006). The *U.N. Office of the Special Envoy for Tsunami Recovery* estimates that 1.5 million people lost their livelihoods in the aftermath of the tsunami, further complicating resettlement of migrants (ibid). In the Gulf of Mexico

in 2005, Hurricane Katrina resulted in the largest displacement of Americans in the country's history, dwarfing the impacts of the Dust Bowl—another case of environmental degradation and migration—in a period of about 14 days. Hurricane Katrina ultimately caused about 1.5 million people to be displaced temporarily, and an estimated 500,000 people permanently (Grier, 2005).

4. Current research on environmental change and migration

Academic research has addressed environmentally induced migration since at least the early 1990s (IOM 1994), but has received particular attention more recently. Notably, the Environmental Change and Forced Migration Scenarios (EACH-FOR) project is a systematic attempt to detect the degree to which and the pathways through which environmental stressors affect migration. The European Commission's Sixth Framework Program funds this two-year scoping project. The project was designed to assess the impact of environmental change on migration at local, national, regional and international level.

The project aims at promoting a new policy oriented scheme in research of migration and environment, advancing data collection and cross-cutting approaches by identifying key questions and finding innovative research methods and themes, compare perspectives on migration, environment and social vulnerability, create momentum among core research expert-networks to carry research strategies forward, contributing to policy learning by promoting the dissemination of the research results and data based on these approaches to data collection and research, and finally, giving assistance to governments in managing likely effects of environmental change on migration and in developing long-term strategic policy concerning environmental change and migration.

4.1 Research methods

The EACH-FOR project conducted fieldwork in 24 areas highlighted in the map below to address the following eight research questions:

1. To find out **who** has been migrating away from situations of environmental degradation/change
2. To find out **where** migrants are coming from and where are they going to,
3. To find out **why** people have migrated
4. To find out **how** environmental degradation interplays with other social, economic and political factors in making migration decisions
5. **Obstacles that prevent migration.** To find out what might have prevented people from migrating in the first place (i.e. what assistance was needed, what was lacking?)
6. **Coping capacity/adaptation** To find out why people who remained in areas of environmental degradation/ change remained in their location while others migrated (Why did some remain?)
7. To find out **how the migration activities occurred** (choice of destination, what networks were used to facilitate migration?)
8. To identify the **perception** of environmental degradation that triggers people to move. NOTE: Originally the wording included "level of environmental

damage,” which indicates thresholds or sensitivity—that is different from perception so we excluded it.

Figure 3 shows the areas where EACH-FOR fieldwork is conducted. The United Nations University – Institute for Environment and Human Security (UNU-EHS) is one out of seven partners of the project. EACH-FOR covers the regions Europe and Russia, Newly Industrialized States (NIS) and Central Asia, Asia and Pacific Region, Middle East and Northern Africa, Sub-Saharan Africa, and Latin America, where selected 24 countries are the case studies of the project (Newer Version inserted)

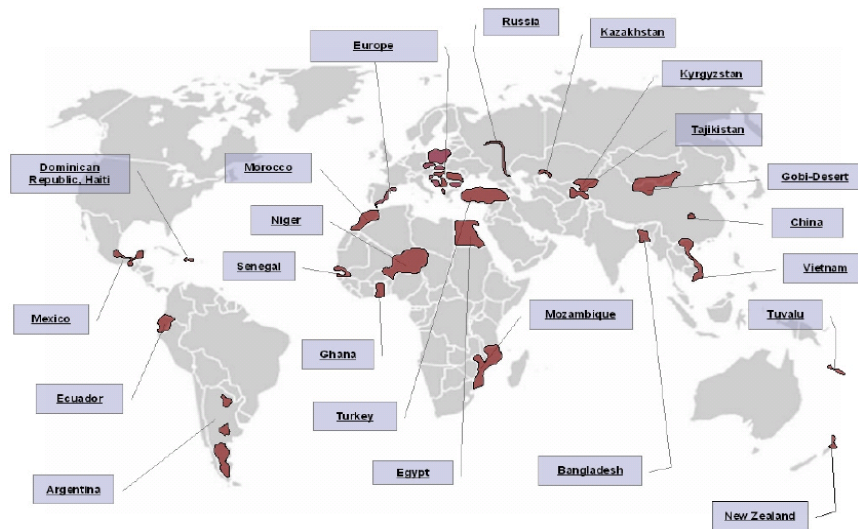


Figure 3: EACH-FOR project case study research locations

The methodology used in the field is based on

1. Questionnaires with migrants and non-migrants in the 24 countries of interest.
2. Expert interviews on the issue in the 24 countries of interest.
3. Econometric regression model to detect the statistical significance of the impact of environmental problems on migration globally.

UNU-EHS was responsible for conducting four case studies, in cooperation with the field offices of the International Organization for Migration (IOM): Egypt (Middle East and

North Africa), Mozambique and Niger (Sub-Saharan Africa) and Vietnam (Asia - Pacific).^{66,67}

4.2 Desertification in Egypt

As much as the Nile River has been a generous water resource, the Egyptians are suffering from water shortage, due to the limited quota from the Nile - according to its agreement with the 10 Nile Basin countries - as well as the continuous increase in population at high rates. Taking the expression 'water shortage' more broadly, it would encompass the access to clean water that is suitable for drinking and irrigation; unfortunately, Egypt has been notorious for water pollution, since the Nile and its canals have been subject to industry, agricultural and individual wastes for the past decades. Poor water management due to inefficiency of the traditional gravity irrigation system, inadequate maintenance of irrigation and drainage networks as well as over abstraction of groundwater, especially in the newly reclaimed desert areas, are all factors that magnified the problem. Another natural factor that diminishes the available fresh water is the water salinity, a phenomenon that largely exists in the newly reclaimed desert lands that rely on groundwater.

Egypt is a country of vast arid areas, and a narrow neck of very fertile land around the Nile River and Delta. Figure 4 shows clearly the distribution of arid and fertile lands and provides a graphic illustration of the bottleneck effect which further environmental degradation could cause in the region. Environmental degradation pushes Egypt's population into more and more concentrated areas. About 30 percent of the irrigated farmlands in Egypt suffer from salinity.

⁶⁶ The six other partners are ATLAS Innoglobe Ltd. (Hungary) – [coordinator], Bielefeld University, Centre on Migration, Citizenship and Development (Germany), Erasmus University Rotterdam – European Research Centre on Migration and Ethnic Relations (The Netherlands), Sustainable Europe Research Institute (Austria), Université de Liège – Centre for Ethnic and Migration Studies (Belgium) and Universidad de País Vasco / Euskal Herriko Unibertsitatea (Spain)

⁶⁷ At the time of writing, the Niger case study is still under development and therefore it is excluded from the current analysis.

Of the Northern cultivated land and both Middle and Southern Delta regions, 60 percent and 20 percent, respectively, are considered salt-affected soils. Wind erosion affects about 90 percent of the total country area.

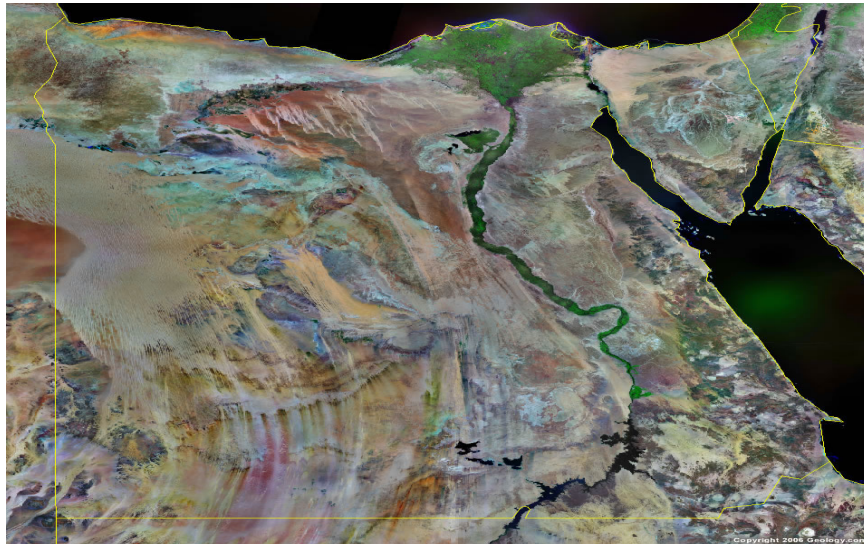


Figure 4 : Distribution of arid and fertile lands in Egypt
(Source: Geology.com <http://geology.com/share-geology.shtml>)

The average rate of soil loss due to wind erosion in the Western desert Oases has been estimated varies from 4.5 to 66.9 tons/ha/year (Egyptian National Action Program to Combat Desertification, 2002). The area influenced by the active encroachment of sand and sand dunes is estimated to be 1.6 million hectares.

Land productivity has diminished by about 25 percent compared to its original productivity (Regional Report on Desertification in the Arab World, 2000). The annual water erosion rate has been estimated between 0.8 and 5.3 ton/ha/year (Egyptian National Action Program to Combat Desertification, 2005). Soil scrapping for manufacturing red bricks has been nearly overcome as a result of the legislation issued in 1983 and amended in 1985 (Egyptian National Action Program to Combat Desertification, 2002). Urban encroachments started during the fifties and caused the loss of 15000 hectares annually (Institute of Lands, Water and Environment, 2000). A military order has then been issued to stop and eliminate such encroachments in 1996, significantly limiting such phenomena, but probably, after it was too late. It has also been proven that the losses of plant nutrients; nitrogen, phosphorus and potassium are linearly proportional to soil loss (Egyptian National Action Program to Combat Desertification, 2005).

31 questionnaires were distributed mainly in the centre of the Nile Delta, the Nile Valley (South and North), Eastern and Western Nile Delta, newly reclaimed desert lands and

slums of Old Cairo. The questionnaire was semi-structured and included other non-environmental factors that could have led to the migration of interviewees, such as poverty and social problems. 24 experts in Egyptian Universities and Ministries, United Nation Offices in Cairo, and NGO representatives were interviewed. Environmental problems, such as water shortage and land degradation are certainly important challenges facing the Egyptians, given the rapid population growth. From the results of the field work it can be concluded that the people in Egypt would be moving/migrating from one place to the other within the country in case of water shortage and/or land degradation only under certain conditions; they would only do that, if they are not land owners, if they can socially and financially afford leaving their place of origin, and/or if they are forced to be displaced by the government or the owners of the land. The water shortage and land degradation factors in Egypt are definitely not strong enough to make people decide to leave the entire country. This would need additional pull factors in the receiving countries such as a big financial return and/or higher living standards on one hand, and/or additional push factors in Egypt, such as poverty or unemployment, on the other. In general, as long as the people are not facing a sudden natural disaster, such as earthquakes or floods, they would not be willing to leave their home.

4.2 Flooding and relocation in Mozambique

Climate change is becoming increasingly problematic for the people of Mozambique who were particularly affected by extreme floods of the Limpopo River in the south of the country in 2000 and by the extreme floods of the Zambezi River in the central region in 2001, 2007 and 2008.

In 2001, 2007 and 2008 heavy rains caused flooding along the Zambezi River in central Mozambique and in 2007 another tropical Cyclone Favio increased the number of homeless people in Mozambique following the flooding of the Zambezi River.

Floods and cyclones are not the only natural hazards to affect the people of Mozambique; droughts, coastal soil erosion and rising sea levels can also be connected to climate change and affect a large amount of people. The river delta regions and the 2,700 km long coastline are particularly at high risk of inundation and erosion.

Environmental-related reasons given by questionnaire respondents who had decided to leave their places of origin.

"I was affected by 2001 floods, and I lost everything and after that the government moved us to this place."

"Me and my family was displaced in the 2001 floods. The Government moved us to this place where it is safe. We have lost everything."

"I moved from my area because of the floods 2000/2001. We could not sleep inside the house because there was water everywhere and our beds were all wet, so I decided to take my family and rent a place in Maputo city"

"I was living in a risk area and water destroyed all my farms and houses"

"I was living in a lower area and the rain season starts flooding areas near my place and once we have been noticed by the government of the floods not to build houses in that area. So I decided to move to a safe area. And now I will move to another area due to drought."

Data for this case study was gathered in seventeen semi-structured expert interviews conducted in Maputo, the capital of Mozambique. The expert interviews were carried out with government officials, NGO representatives, representatives from international organisations and academics working on migration and environment. Furthermore, thirteen semi-structured interviews at resettlement centres with displaced and resettled people along the Zambezi River valley in central Mozambique were conducted, and twenty-five questionnaires completed by migrants and non-migrants. The questionnaires have been mainly conducted in urban areas.

A central question for Mozambique, but relevant to other countries facing environmentally induced migration, is the degree to which environmental factors contribute to displacement or migration today and more migration in the future. Environmental degradation is currently not a major cause for migration in Mozambique. However, for the case of the Zambezi River Valley, it has been shown that following an individual flood event, people will be displaced on a temporary basis, generally during the flood emergency period. Following re-occurring flooding events, people tend to be relocated on a permanent or semi-permanent basis. Along the Zambezi River Valley, temporary mass displacement that is taking on permanent characteristics can be observed. There is no evidence yet for major international migration resulting from the Zambezi River flooding events and the people are yet not prone to moving to urban agglomerations. Moreover, the Government of Mozambique is trying to develop rural areas by providing the essential infrastructure and giving people incentives to produce more solid houses within the resettlement process.

Nevertheless, resettlement does not seem to be the best option to deal with the existing and upcoming impacts of climate change in Mozambique. Resettlement is causing further problems. It is not solving the problems of the people that even after the resettlement process are still dependent on governmental and international aid and remain very vulnerable to upcoming flooding events. If extreme weather events will continue to impact Mozambique in the future, the environment will increase its role as a push factor for people's decision to leave their places of origin.

4.3 Sea level rise in the Mekong River Delta in Vietnam

Vietnam is selected as a case study for examination in the context of climate change and migration for the following reasons; firstly, because a large portion of the country's population is directly dependent on the environment for their livelihood (Adger, 2001), secondly, it is a country prone to water or water-related disasters some of which are thought to be increasing due to the influence of climate change and, thirdly, according to the results of a *World Bank* study released in February 2007, Vietnam will be one of the countries that is most severely impacted by sea-level rise (Dasgupta et. al. 2007).

The conducted field research examined the influence of environmental change (principally flooding) on migration in the Mekong Delta of Vietnam. In total, 45 expert interviews were carried out in Ho Chi Minh City (HCMC), Ha Noi, the Mekong Delta and Phnom Penh with NGO representatives, government officials, representatives from international organizations and academics working on migration, environment, development, social welfare or disaster relief issues. The 45 interviewees also included individual experts such as lawyers and doctors who have knowledge of how migrants' lives are affected or influenced.

In addition to the above-mentioned semi-structured interviews with migrants from the Mekong Delta, 32 EACH-FOR questionnaires were completed by Vietnamese migrants in Phnom Penh, Cambodia. The distribution of the questionnaire was coordinated by a Vietnamese medical doctor living in Phnom Penh operating two private medical clinics and who is connected with the Vietnamese community of Phnom Penh. Migrants who completed the questionnaires had migrated from Vietnamese Mekong Delta region to Cambodia during the previous fifteen years.

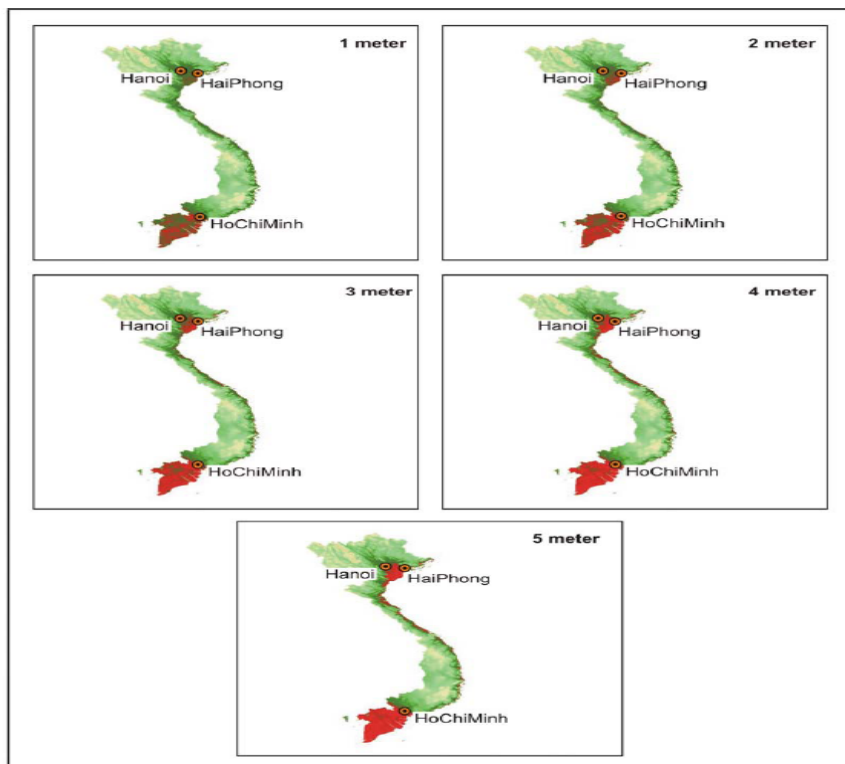


Figure 5: Sea-Level Rise Scenarios (red indicates inundated areas), Source: Dasputa et al. 2007, p30.

Environment degradation is not currently a major cause for migration in the Mekong Delta of Vietnam. Migration is driven by economic or social reasons with the majority of migrants moving internally and from rural to urban areas. While recognizing that economic and social factors are the clear drivers of migration in Vietnam, the interesting question is the point at which flooding becomes an underlying trigger for migration or displacement.

Figure 5 illustrates sea level rise scenarios for the Mekong Delta, highlighting that even a one meter sea level rise could affect the densely populated southern delta severely. Vietnam will be the worst impacted developing country in terms of percentage of population affected (10.8 percent), percentage of GDP affected (approx 10 percent), urban extent affected (approx 10 percent), and percentage of wetlands inundated (approx. 28 percent) based on current statistics for these factors. These impacts would be mostly felt in the Mekong River delta and Red River delta with Vietnam ranking second worst impacted developing country for the percentage of land area inundated (approx 5%) and agricultural extent affected (approx. 7%) by a one meter sea-level rise (Dasgupta et. al. 2007).

The following linkages between flooding and migration were found from this research study:

- During the flooding season, people undertake seasonal labor migration and movement towards urban centers to bolster livelihoods.
- That for those directly dependent on agriculture for their livelihood (usually rice farmers), successive flooding events leading to destruction of crops on more than one occasion can drive people to migrate elsewhere in search of an alternative livelihood.
- As an extreme coping mechanism, anecdotal indicators point to human trafficking into neighboring areas as one strategy adopted by families who have suffered from water-related stressors.
- The government as part of a flood management and environmental sanitation strategy is currently undertaking planned resettlement of people living in vulnerable zones along river banks

Natural hazards, in combination with the stress placed on the environment due to rapid socio economic development within Vietnam and upstream South-east Asian countries, overlaid with the threats posed to Vietnam by climate change, places Vietnam's environment and those who depend directly upon it for their livelihood in a precarious position. In the face of environmental stressors, people in the Mekong Delta will adapt in various ways. One type of coping mechanism may be migration, particularly in light of the rapid socio-economic changes that Vietnam is currently experiencing which will create stronger pull factors towards urban environments. Even for those people who will be potentially or are currently being directly affected by climate change e.g. those citizens living in the Mekong Delta, there is very little awareness of the concept of climate change and even the government in Vietnam is only now beginning to grapple with this new information and the difficulties they face in dealing with such an issue.

5. What actions must be taken? A five-pronged policy approach

There is currently a lack of solid and substantial scientific and empirical research on linkages between environmental change and migration. Yet policy cannot afford to wait for perfect global time series data on environmental migration flows. Instead, a simultaneous though iterative approach is advised.

UNU-EHS proposes that a precautionary principle should apply and serves as the basis of the following five-pronged policy approach to address the relationship between environmental degradation/change and forced migration (see also Renaud and Bogardi 2006; Bogardi 2007; Renaud et al. 2007). These policy suggestions should be implemented in parallel to environmental, development, and climate change policies. Addressing environmentally induced migration means a degree of mainstreaming the topic into efforts to limit environmental degradation and improve land use practices, reduce poverty and improve livelihood opportunities. These efforts are based on a solid scientific basis.

5.1 Building a strong scientific basis

Research must foster better understanding of the cause-effect mechanisms between environmental degradation and forced migrations. Most reports on the topic of environmental migration recommend further quantification and research. Few research activities have attempted rigorous quantification. This needs to be rectified now.

In addition, there is a need to develop proper definitions of environmentally motivated and/or forced migration, environmental migrants. Definitions and research will be more easily achieved if there is a political recognition of the importance of the problem, if the research topic is accepted by major funding organisation, if long-term, sustained funding for research is made available, and if research cooperation between emigration and immigration countries as well as international organisations is achieved.

Progress to date: In 1994 at the end of the International Symposium on Desertification and Migrations in Almeria (Almeria Statement, 1994) and during the subsequent symposium in Almeria during October 2006 – (the theme/statement missing). A proposal has been put forward by Vlek (2005) for an International Panel on Land Degradation (IPLD) – along the same lines as the International Panel on Climate Change (IPCC) – that would allow distilling scientifically-based information regarding the impacts of land degradation on societies.

5.2 Increasing Awareness

It is important to raise worldwide knowledge-based public and political awareness of the issue and its environmental, social, economic and political dimensions. This step is particularly urgent as the debate on migration is high on the current agenda of many countries/regions.

The concept of environmental migration and environmentally displaced persons needs to be included in any future debate dealing with migration issues in general. In addition, it is recommended that these concepts be included in dialogues on environmental issues, for example through mechanisms such as the Intergovernmental Panel on Climate Change (IPCC) or the proposed International Panel on Land Degradation (IPLD).

Finally, the fact that migrants/refugees are first of all people who have faced hardship rather than people coming to “steal” other people’s livelihoods needs to be communicated more efficiently throughout the world.

Progress to date: An initial Expert Seminar on Migration and the Environment jointly organised by the International Organization for Migration (IOM) and United Nations Population Fund (UNFPA) was held in Bangkok, Thailand on 22-23 February 2007. This seminar kick started a process at the international level of awareness raising and dialogue on environmental degradation/change as a cause for migration.

Following this event a panel discussion entitled “Environmental Refugee Office: The Forgotten Migrants” was jointly organised by UNU-EHS and the United Nations University in New York (UNU-ONY) to engage further UN agencies in the dialogue initiated during the February 2007 Expert Seminar. The New York event gathered together representatives of the United Nations High Commissioner for Refugees (UNHCR), United Nations Development Program (UNDP), International Organization for Migration (IOM) and UNU-EHS to discuss the notion of environmental refugees during a three hour session. Each speaker presented the perspective of their organization on the concept of environmental refugees. Discussion focused on problems of defining environmental refugees, environmental degradation processes, who should be responsible for environmental refugees (national governments or the international community) and how to take progress this issue. This event brought together a diverse community of NGO workers, representatives of international organizations, government staff and policy makers, UN representatives, donor organizations and students interested in this topic.

These two events defined common ground and provided a platform for further cooperation.

During 2008 many activities are planned to continue awareness raising and encourage investment in this topic for the future. From 16-18 April 2008 UNU-EHS and IOM with support from the Munich Re Foundation (MRF) and the Rockefeller Foundation, in collaboration with the United Nations Environment Program (UNEP), will convene the “Research Workshop of Migration and the Environment: Developing a Global Research Agenda”. This workshop will gather together a small group of international research experts in the fields of migration and environmental research in order to address and develop a research agenda, identify priority areas of research for policy makers and establish an expert task force to create momentum among a core research network of experts to carry a research strategy on environment and migration forward.

A synthesis report produced from the research workshop will feed into a wider series of activities on environment and migration taking place in 2008. This includes three core mid-year activities. First, a week-long Summer Academy on environmental change, migration, and social vulnerability builds capacity among young professionals for more empirical research. Second, a donor dialogue is planned to attract investment in research on environmental change and migration. Third, a policy dialogue is planned with IOM to promote discussion at the national level and link different ministries whose work touches on the aspects of either migration or environment.

Year-end activities in 2008 will consolidate knowledge to date about environmentally induced migration. The International Conference on Environment, Forced Migration and Social Vulnerability to (from 9 to 11 October, Bonn) will conceptualise environmentally induced migration, discuss current research including the major findings of the EACH-FOR project, and establish a future outlook. In order to mainstream environmental migration into the broader migration debate, outcomes from the EFMSV conference (which will incorporate broader progress on the topic of environmental migration) will be presented at the 13th International Metropolis Conference also held in Bonn, Germany

during October 2008. The International Metropolis Conference is the largest annual gathering of experts in the fields of migration and diversity.

5.3 Improving legislation

The rapid deterioration of environmental conditions worldwide and the rising migration pressures linked to it demand a framework of recognition of environmentally induced migration in its full spectrum. This paper does not suggest that the 1951 Convention on refugees be amended, adding a new category of refugees. Such a step has been widely discussed with the conclusion that tampering with the Convention could weaken the case of categories of refugees already covered by it. Nevertheless, individuals who are clearly displaced by environmental degradation processes (even if mixed with other socio-economic factors as will often be the case) need adequate protection of their legal and human rights. Some bilateral agreements related to sea-level rise and forced migration are in development (such as in some of the Pacific Islands), but this should be systematised (possibly in other forms) for the most pressing environmental degradation issues.

Progress to date: Conisbee and Simms 2003 argue that the 1951 Geneva Convention relating to the Status of Refugees should be expanded to incorporate a category of “environmental persecution”. Others (e.g. Castles (2002) and Gemenne *et al.* (2006)) argue against this raising a legitimate worry that to include environmental refugees in the 1951 Geneva Convention would dilute the case for those refugees currently protected under the convention. Furthermore, during the 50th Anniversary of the 1951 Refugees Convention Global Consultations meetings in 2001, there was overwhelming support amongst the international community to reaffirm its support for the current Refugee Convention (UNHCR, 2007). This implies that there would be understandable and legitimate reluctance on behalf of states which are party to the Refugee Convention to deviate from the current definition of refugee to potentially encompass “environmental refugees” within its definition.

5.4 Adequate humanitarian responses

Gradual and sudden environmental changes will result in substantial human movements which will require sufficient humanitarian efforts to avoid escalating crises. Natural disasters will displace large numbers of people temporarily, while the steady and continuous impact of climatic stressors will permanently displace many more people over an extended period. In the face of environmental stressors, assistance must be in place to prevent crisis and maintain peace among resource-stressed and possibly poverty-stricken groups on the move.

Progress to date: The United Nations High Commissioner for Refugees (UNHCR 2002:13) as the agency mandated with responsibility for protecting refugees⁶⁸, has been urged by “environmental refugee” advocates to also assume responsibility for the ensuring that the rights of such people are also protected. As previously mentioned, the

⁶⁸ As defined under Article 1A of the 1951 Convention relating to the Status of Refugees amended by the 1967 Protocol (the Refugees Convention).

UNHCR (2002:12) does acknowledge that there are approximately 24 million people around the world who have fled because of floods, famine and other environmental disasters. They also recognize that the common element between such people and refugees is the forced nature of their flight and their need for assistance and permission to reside elsewhere (UNHCR 2002). However, the UNHCR (2002:2), while recognizing that the “relationship between refugees and the environment has long been overlooked” and that “civilians were often forced to flee in the first place because of environmental degradation and the battle for natural resources”, has often dismissed its role as the agency *primarily* responsible for ensuring that people displaced by environmental factors are protected. The UNHCR explains this by way of clarifying that there is a difference between Convention refugees and those popularly known as “environmental refugees” (UNHCR 2002:13) stating that “refugees could not turn to their own governments for protection because states were often the source of persecution and they therefore needed international assistance, it said, whereas environmental migrants continued to enjoy national protection whatever the state of the landscape.” This is often backed by the fact that the definition of refugee contained in the 1951 Refugee Convention does not include environmental factors, therefore the Office of the UNHCR has no mandate for the protection of “environmental refugees” (Zlotnik, 1994).

There have been few alternative suggestions to date for humanitarian aid related to environmentally displaced person, this may be due to a lack of recognition of the issue as well as the lack of consensus on the topic, especially relating to the definition of ‘environmental refugee’. One suggestion by King (2006) proposed the creation of an International Coordinating Mechanism for Environmental Displacement that would address the chain prevention-preparedness-mitigation-rehabilitation-resettlement through the coordination of specialised and competent international and intergovernmental agencies, although the exact functioning and funding of this mechanism were not explicitly described.

Further work needs to be done to ensure adequate crisis prevention and humanitarian response. The direction for this work will be clearer as scientific consensus on environmental migration is built and legal frameworks are established. Initial indications are that humanitarian aid should link with aid provided for environmental protection and livelihood improvement projects as well as development initiatives.

5.5 Strengthening institutions and policies

The final suggestion is that institutions be strengthened to assist the flux of forced environmental migrants, both at the international and national levels. At the national level, this could imply strengthening and encouraging various ministries to work hand in hand (e.g. ministry of interior, ministry of environment, ministry of immigration, ministry of cooperation, etc.) in order to address jointly the issue thus incorporating a multi-dimensional array of competences and perspectives. There also needs to be a better understanding of the social and economic losses people experience in order to help structure aid responses, particularly community resettlement. Finally, new policies should also acknowledge the various environmental migrant categories.

Progress to date: The UN is currently addressing the issue of migration through the mechanism of a High-Level Dialogue which targets ministers and country delegates in informal round table discussions on various themes linked to migration and creates a forum for establishing partnerships at the bilateral and regional levels. Such a mechanism could be targeted to raise the dialogue on environmental migration at the inter-governmental level.

Various other processes during 2007 and 2008 are paving the way for inter-governmental dialogue on environment and migration. For example, as a first step towards an inter-governmental process on this topic, the IOM hosted a workshop on environment and migration in Geneva during November 2007. The conference 'Climate Change, Environmental Degradation and Migration: Addressing Vulnerabilities and Harnessing Opportunities' co-organized by the Greek Chairmanship of the Human Security Network and IOM on the 19th of February 2008 is further step towards raising the awareness at the inter-governmental scale. As part of the European Commission's TAIEX (Technical Assistance and Information Exchange) process the issue of environmental migration will be introduced to newly joined member states of the European Commission during an April 2008 presentation in Kecskemet, Hungary.

In terms of practical applications that could be adopted by policy-makers or applied by institutions, tools have been developed within the context of development induced displacement and resettlement (Oliver-Smith, 2005) which could be further developed and/or adapted in the case of environmentally-driven forced migration.

6. Conclusions and the way forward

This paper draws the link between climate change, migration and humansecurity. The paper covered three case studies from three different regions of the world: Egypt (Middle East and Northern Africa), Mozambique (Sub-Saharan Africa and Ghana) and Vietnam (Asia and Pacific Region). The empirical research found links between migration and environmental change. Experts and migrants expressed concern that climate change could lead to human insecurity, which could cause migration within countries and abroad, leading in turn to further human insecurity. While fieldwork suggests that *today* the climate change signal in existing migration patterns is secondary to political and economic factors, the same work also indicates that the signal will *grow in strength* in the near future.

Environmentally induced migration is an issue of increasing policy relevance, because of the magnitude and scope of environmentally induced migration now and in coming decades. As the window for identifying appropriate adaptation pathways for climate change narrows, it is imperative to address how changing environmental conditions affects individual and group decisions to migrate. A new level of policy and scientific attention to this issue is required to identify the policy alternatives to smooth the way forward and avoid tensions over natural and social resources or even potential conflict. At the national level, countries must understand how environmental processes and environmental quality affect living standards of their populations. At the regional level, multilateral dialogue may be necessary about how to address, coordinate, and ease

environmental pressures as well as migration that results in part because of climate change. At the international level, policy frameworks still need to define the issue of environmentally induced migration and how to approach individuals and groups that fall into these categories. There is still active debate about including 'environmentally induced migrants' within international treaties or developing a new international convention that would recognize individuals or communities whose displacement is mainly by environmental factors.

The time to address the effects of dangerous environmental change including climate change is now. Many policy alternatives exist that countries can undertake: Furthering scientific understanding, increasing awareness, strengthening legislation, ensuring adequate humanitarian responses, and strengthening legal institutions. Human security requires freedom from fear, freedom from want, and freedom from hazard impact. To secure people in the face of climate change requires policy attention today, and attention to those people who are and who may be induced to migrate in order to seek safe and sustainable existences.

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4. The Impact of Climate Change on Human Security

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An Introduction to Human Security and Climate Change

“Human security in its broadest sense embraces far more than the absence of violent conflict. It encompasses human rights, good governance, access to education and health care, and ensuring that each individual has opportunities and choices to fulfill his or her potential...Freedom from want, freedom from fear and the freedom of the future generations to inherit a healthy natural environment - these are the interrelated building blocks of human, and therefore national security.”⁷⁰

The UNDP Human Development Report, (1994) defined human security as ‘safety from chronic threats such as hunger, disease, and repression as well as protection from sudden and harmful disruptions in the patterns of daily life – whether in homes, in jobs or in communities’,⁷¹ and as the totality of economic security, food security, health security, environmental security, personal security, community security and political security⁷². Human security has become ‘both a new measure of global security and a new agenda for global action’⁷³. Culture, economies, trade, production-lines, values, politics are no longer framed within national boundaries, peoples of the world are connected through their actions and inactions, and as such threats to security and livelihoods transcend state apparatus. Human security necessitates a more global approach than traditional national security to respond to threats that hold no respect for national borders. Security literature is no longer simply concerned with wars between states, but also with a human-centric approach to security and to addressing affects of internal conflicts on the civilian population; the affects of social, physical and environmental degradation on all individuals; and the impacts of terrorism and organised crime.

The environmental security aspect of human security arises out of our own damage to our local environments and to our planet. To be truly secure we must maintain a healthy environment, particularly in regions of the world where livelihoods are most dependent upon the natural environment and resources. Worldwide development has been thus far

⁶⁹ This summary has been prepared by Saleemul Huq, Head of Climate Change Group, and Catherine Pettengell, Programme Officer, Climate Change Group, International Institute for Environment and Development (IIED).

⁷⁰ Commission on Human Security (CHS), 2003.

⁷¹ UNDP, 1994.

⁷² UNDP, 1994.

⁷³ *A Perspective on Human Security: Chairman’s Summary 1st Ministerial Meeting of the Human Security Network*, Lysen, Norway, 20th May 1999 <http://www.humansecuritynetwork.org/menu-e.php>

highly polluting and resource intensive, and has dramatically impacted upon the quality of the air, water and land locally and contributed to anthropogenic climate change globally. As a global problem, climate change will not just threaten the environmental security of the polluting countries, its impacts will not respect national borders nor be restricted to the physical environment; its reach will be global and its impacts will be felt hardest by those whose human security is not assured.

The IPCC Fourth Assessment Report's⁷⁴ review of the scientific research confirms the consensus that anthropogenic climate change has already started and that its impacts are likely to be worst than previously reported. The consequences of anthropogenic climate change will include both sudden climatic shocks and events, and a progressive changing of climate systems globally. The human consequences of these consequences are what makes climate change a human security issue. There will be a human cost as the effects of climate change impact on communities and cause '*threats such as hunger, disease*' and '*sudden and harmful disruptions in the patterns of daily life*'.⁷⁵ Societies will have to adapt to minimise the negative impacts on individuals and communities. However where social, political and economic institutions are already weak the social impacts will be felt the hardest; where there is poverty, underdevelopment, unstable states, and poor governance the social capacity to deal with the impacts of climate change will be undermined, and existing failings can become mutually and negatively reinforcing.

It has been argued that the UNDP definition of human security is too broad to identify the scope of what threats to individuals this should meaningfully include. A narrower definition focusing on 'freedom from fear' is used by many to limit the focus to violence whilst recognising that the conditions for violence are often associated with issues of poverty, poor governance or state-capacity, and inequality. The inclusion of 'freedom from want' into the framework for human security, expands the focus to include development goals, thus creating overlap with that field, but thereby including hunger, disease and natural disasters which kill far more people world wide each year than violence alone.

Vulnerability to Climate Change

*'An extreme climatic event will result in higher losses of life in a developing country than in a developed country because of differential adaptive capacity.'*⁷⁶

Vulnerability is key to the human security issues around climate change. Insecurity caused by climate change is not simply the result of changes in the environment; it is more acutely about the ability of the population experiencing environmental change to

⁷⁴ IPCC 2007.

⁷⁵ UNDP, 1994.

⁷⁶ IPCC, 2001 citing Burton, *et al.*, 1993; Blaikie, *et al.*, 1994 ; Kundzewicz & Takeuchi, 1999.

cope. Cutter⁷⁷ describes vulnerability to climate change as the biophysical risk of climate change in combination with pre-existing social vulnerability.⁷⁸ The IPCC Third Assessment Report finds this to be the case as ‘...particular climate events or hazards can have “vastly different consequences for those on whom they infringe because of differences in coping ability.”’⁷⁹ The people and communities most vulnerable to the risks of climate change are not simply those who live in regions with the most climatic impacts (though it often is the case), it is those who are already socially vulnerable, and it will only compound their insecurity. Roughly speaking this will be people in developing countries and those with little or no political voice and economic power. The injustice being that these are also the people who are the least responsible for anthropogenic climate change.

The developing world will suffer disproportionately to the developed, not because climate change isn’t global in its reach, but because of the lack of development and associated human security leaves the population vulnerable to additional risks, be they from extreme climate events; year-on-year changes to the region’s climate system; or from political unrest, reduced access to global markets, violent conflict, or economic fluctuations.

Climate Change – a threat multiplier

When looking at the impacts of climate change on different regions it is therefore important to look at the interaction of other factors in the region from a human security perspective. Just as violent conflict is rarely induced by a single cause, human insecurity is usually the result of interacting factors, not least the myriad factors of underdevelopment. Therefore although climate change will adversely effect many populations it is useful to view it as another agent impacting on the current socio-political and economic situation. As such climate change has been described as a ‘threat multiplier’⁸⁰; the ‘double vulnerability’ (poverty compounded by climate change)⁸¹; and *one of the greatest threats to development*⁸². This final statement by UK International Development Secretary Douglas Alexander, cited predictions that due to climate change by 2080 an additional 600 million people will be malnourished in areas already experiencing food insecurity; an additional 400 million people will be at risk of malaria in regions already unable to meet the basic medical care needs of the population, and 1.8 billion more people will be without sufficient water in areas already experiencing water scarcity.⁸³

⁷⁷ Cutter, S (1996) ‘Vulnerability to Environmental Hazards’ in *Progress in Human Geography* 20: 529-539 cited in Barnett, 2006.

⁷⁸ Also see Chambers, 1989.

⁷⁹ Rayner & Malone, 1998 cited in IPCC, 2001 chapter 18.5.1.

⁸⁰ Geoff Dabelko, Director of the Environmental Change and Security Program at the Woodrow Wilson Institute in Washington, quoted in *Global warming may heat up conflicts, too* <http://www.csmonitor.com/2007/1206/p13s02-wogi.html>, 6th December 2007.

⁸¹ Barnett, 2006.

⁸² Douglas Alexander quoted in ‘UK warms to climate change aid’ in *The Guardian* 7th February 2008. <http://www.guardian.co.uk/environment/2008/feb/07/climatechange.greenpolitics/print>

⁸³ Douglas Alexander quoted in ‘UK warms to climate change aid’ in *The Guardian* 7th February 2008..

Developing countries experience the most human insecurity, so have the most existing threats and vulnerabilities for climate change to impact upon. Though there will be many differences in the way developing countries experience climate change and their ability to cope, the very fact of their underdevelopment and the human insecurity associated with that indicates the need for an international response. Many areas can be highlighted as particular hotspots requiring urgent action, either through climate modelling showing targeted biophysical effects, such as for many Small Island Developing States (SIDS), or through the degree of social vulnerability such as for Least Developed Countries (LDCs). These countries will experience many similar and many different concerns regarding the impacts of climate change. For example many LDCs in Africa will have the particular difficulties of violent conflict or relatively unstable post-conflict societies where the immediacy of other security concerns will be paramount ahead of responses to climate change and will impair the ability to respond to additional causes of insecurity brought about by climate change. SIDS are particularly exposed to loss of viable agricultural land and to the ultimate degree to national security issues not in terms of violent conflict but in terms of territory and sovereignty when adaptation to climate change may no longer be possible and evacuation becomes the only remaining option, and where human security can no longer be ensured by a nation state and people become nationless.

Climate change will most severely impact upon vulnerable regions and vulnerable groups because of its effect as a threat multiplier and because of the inherent vulnerability to any addition risks by people whose human security is not assured. Conditions of pre-existing conflict, poverty, weak institutions, food insecurity and spreading diseases will leave communities unable to meet the challenges of adapting to climate change impacts and will exacerbate existing problems.

Climate Change and Freedom from Fear

Violent Conflict

Climate change has made its way onto the security agenda with a rising perception that as environmental degradation depletes natural resources on which communities rely; as changes in weather patterns reduce growing seasons and agricultural outputs; as increased desertification and rising sea-levels diminish viable agricultural land; and as extreme environmental disasters have devastating effects on local livelihoods; competition will increase for fewer and fewer resources, competition which the headlines tell us will inevitably lead to violent conflict and for example 'water wars'. These perceptions are starting to inform national security policy.

However, climate change has been described by Geoff Dabelko, director of the Environmental Change and Security Program at the Woodrow Wilson Institute in Washington as a "threat multiplier"⁸⁴. "It's not that it creates a whole new set of

<http://www.guardian.co.uk/environment/2008/feb/07/climatechange.greenpolitics/print>

⁸⁴ Quoted in Global warming may heat up conflicts, too. <http://www.csmonitor.com/2007/1206/p13s02-wogi.html>, 6th December 2007.

problems, it's that it will make things that are already a problem worse." Climate change does not automatically lead to violent conflict. What it does is impact the most on the already vulnerable and its consequences interact with the current geopolitical situation, which could heighten pre-existing tensions, re-open recent/historical tensions and test a state's capacity to protect and provide for its citizens. It has been suggested that existing tensions would be exacerbated by such factors as crop failure, reduced access to internal agricultural markets, reduction of viable agricultural lands, loss of livelihoods, increased epidemics, floods, desertification, natural disasters, lack of natural resources and access to energy supplies, and large-scale migration, as communities become increasingly under stress. It is also suggested that these consequences of climate change could potentially throw up new tensions and flash-points.

The environmental security literature is dominated by environmentally induced conflict, however Barnett and others (he cites Gleditsch 2001; Levy 1995; Matthew, Gaulin and McDonald 2003)⁸⁵ argue that environmental change (due to climate change and/or other causes) has not yet been satisfactorily proven to be a serious contributor to conflict, though there has been a good deal of anecdotal evidence. With the exact effects of climate change so location specific and uncertain; predicting and modelling the way these effects will interact with other location specific factors (socio-political, cultural, economic) to contribute to violent conflict is 'untenable' in their view.⁸⁶

There are a number of reasons for the lack of empirical research regarding climate change induced conflict. Firstly conflict analysis informs us of the complexity of situations which lead to violent conflict and the difficulty in predicting outcomes of complex social, economic and political, and now biophysical, factors interacting; in short there is rarely a single cause of violent conflict. Secondly, predicting the exact biophysical effects of climate change in specific locations is still a matter of a great deal of uncertainty. As is, thirdly, the extent to which the biophysical effects of climate change impacts upon the human community; exposure to climate change effects is not the same as vulnerability to those effects, at a very basic level it is understandable that communities in the US and in Guinea if exposed to the same effects of climate change would fare differently. Fourthly, conflict over resources is a fact of life that does not automatically lead to violence; the literature tends to be bounded in the negative and extreme notions of conflict, rather than including non-violent conflict and any positive responses to this, such as changes to systems of use, more equitable sharing of resources rather than elite capture, better resource management, and adaptation. Finally, studies have simply not been local enough. There is a growing consensus that nations are unlikely to go to war over climate change impacts⁸⁷, (this is an area encompassed in the fourth point, that there will be 'conflict' but at a political level where non-violent outcomes are most likely). It is therefore at a more local level where, if it is to occur, violent conflict due to climate change will be located, and it is at these levels evidence is lacking.

Though there is limited evidence for climate change directly inducing conflict, climate change is a security issue for communities recovering from or in the midst of conflict, as

⁸⁵ Barnett, 2006.

⁸⁶ Barnett, 2006.

⁸⁷ see Barnett, 2000 and Homer-Dixon, T. & V. Percival 1996 cited in Barnett, 2000.

this increases their vulnerability and it forces crucial adaptation lower down the agenda. These communities are already very insecure and the normal functioning of institutions and economic processes are severely undermined. With climate change the 'threat multiplier', the impacts of conflict and instability leaves communities more vulnerable to climate change as their capacity to cope is severely reduced. The link between violent conflict and underdevelopment and human insecurity has been clearly made, Barnett's⁸⁸ analysis of recent conflict concluded that since 1989 most violent conflict has been located in developing countries and Stewart and Fitzgerald⁸⁹ found that of the ten countries with the lowest Human Development Index (HDI), eight of them have recently experienced conflict. Smith & Vivekananda's⁹⁰ study insecurity also identified 46 conflict-affected states and a further 56 unstable states for whom climate change will exacerbate existing weaknesses, intensifying the and the incidences of conflict. Their conflict-affected states are characterised by '*some combination of current or recent wars, poverty and inequality, and bad governance.*' Their unstable states are those suffering '*corruption, arbitrary authority, poor systems of justice and weak institutions or government, causing deficiencies in economic regulation and basic services.*' Under these circumstances the ability to respond to climate change is severely undermined and the threat multiplying effect of climate change can be disastrous.

Climate Change and Freedom from Want

Poverty

The impacts of climate change will disproportionately affect the poorest countries. Underdevelopment and poverty makes people insecure, living hand-to-mouth with no cushion against short-term shocks and long-term changes. This makes them vulnerable to any additional risks including climate change, and provides them with practically no capacity to adapt. Livelihoods in poor communities tend to be environmentally dependent and therefore climate-sensitive. Shortening growing seasons and extreme weather events will impact heavily on livelihoods in these regions, and there is no insurance to protect in times of difficulties. Where livelihoods are threatened or wiped out by climate change, economic development is impossible; and unjustly this lack of economic development leaves the community less able to adapt to climate change. In short, climate change impacts include reducing the opportunities for economic development and deepening poverty for the world's most vulnerable communities.

Weak institutions

The impacts of climate change will increase demand on basic state functions and services, such as health care provision in terms of increased risks of certain diseases brought about by climate change and medical treatment following shock climatic events; the state's ability to ensure enough food for the population will be strained as local availability of

⁸⁸ Barnett, 2006.

⁸⁹ Stewart, F. & V. Fitzgerald (2001) 'Introduction: Assessing the Economic Costs of War' in F. Stewart & v. Fitzgerald eds., *War and Underdevelopment: Volume 1, The Economic and Social Consequences of Conflict*, Oxford: Oxford University Press, 3-38, cited in Barnett, 2006.

⁹⁰ Smith & Vivekananda, 2007.

food may become limited and in drought years decimated; and the state's ability to provide sufficient water will require investment and planning. In developing countries, particularly LDCs basic needs provision is often not available or is always operating at capacity, leaving the population vulnerable to other shocks and changes, such as the effects of climate change. Where institutions do not exist or are already unable to provide for the population, a greater impact of climate change will be felt. Weak governance structures not only leave the population more vulnerable to climate change, they also create the conditions under which adaptation is almost impossible, thereby reducing a community's ability to reduce their vulnerability to this particular risk.

Food insecurity

Both bio-physical and socio-political effects of climate change impact on the availability of food. The direct impacts of climate change on agricultural production are clear, from shortening growing seasons, to reduced availability of water for irrigation, to the loss of viable agricultural land due to desertification or flooding. However other impacts of climate change can impact on the availability of food to the population even where production is not necessarily reduced. Disruptions in the supply-chain can also effect whether there is food available at market, for example where food is transported by road, flooding can halt transportation, equally where rivers are used drought will have the same effect. The fear of instability in food availability can also lead to misappropriation by elites or indeed the high jacking of food supply networks can be used as a tool in conflict, as can the pricing of food out of the range of ordinary citizens by corruption, though this can also occur by market forces in times of economic instability. Where food shortages, or the potential for them, already exist, climate change can multiply the threat in a number of ways.

Adaptation to Climate Change and Human Security

Climate change will increase human insecurity in LDCs and SIDS through its direct (biophysical) and indirect (socio-political and economic) impacts. Already insecure communities are less able to cope with and adapt to climate change risks. These impacts will exacerbate existing problems in volatile regions where adaptive capacity is undermined by conflict as well as underdevelopment. Climate change is not a single or direct cause of violent conflict and nor is violent conflict the inevitable outcome of climate change, but where climate change acts on conditions of crisis such as existing conflict, poverty, weak institutions, and food insecurity, the crisis will deepen and crucial adaptation activities will be difficult to implement. Climate change impacts will be felt less severely by populations where social, economic and governance systems function effectively to prevent, cope with, recover from, and adapt to adverse impacts. Special consideration must therefore be made by the international community in terms of how to pursue adaptation to climate change in different locations, both in terms of how it is undertaken in difficult circumstances and how it can be prioritised in a complex situation of competing priorities.

Adaptive capacity is lower in situations of underdevelopment and crisis, whatever the cause. According to Barnett⁹¹ there are three determinants of adaptive capacity – ‘the availability of and access to natural, economic, and human and social capital’⁹² – all of which are adversely effected by violent conflict, poverty, unequal access to resources, weak institutions, food insecurity, and disease; in short, human insecurity. In the case of violent conflict, it is clear how this denies the population the natural, economic, and human and social capital that would enable them to adapt to the new threats of climate change. It also has the effect of lowering the priority of adaptation to climate change and the longer term view essential to combating the worst effects of climate change, at local, national and international levels. In volatile regions, the priority needs are immediate; socially-wide for conflict resolution, and human-centric daily subsistence in a situation that impacts on livelihoods, availability of food, physical insecurity, and often times necessitates migration.

Under these conditions appropriate adaptation responses are unlikely, ‘... *violent conflict reduces the amount of economic resources available to individuals and states to pay for adaptation responses; suppresses the extent of technological development and diffusion needed to select the most appropriate adaptation responses; suppresses educational attainment and restricts the policy learning necessary for understanding the nature of climate changes, to devise appropriate responses, and successfully to implement those responses; damages the infrastructure needed to deliver resources and information throughout a society; and weakens institutions and social cohesion, and undermines the possibility of collective responses to changes. Indeed, it is reasonable to suggest that no other process can rival violent conflict for its ability to render a population vulnerable to climate change.*’⁹³

The threat of climate change is most often viewed as divisive in terms of increasing competition for fewer resources; however the global nature of the threat as well as the local level of the direct impacts can offer the commonality to divided communities and the international community. As such it is argued that adaptation to climate change has the potential to promote peace and stability by uniting divided communities for a shared common good, and promoting cooperation and innovation between hostile governments. Attempts should be made to harness the shared nature of the threat and promote cooperative action. There are a number of initiatives to this end, such as Transboundary Protected Areas (also known as Transfrontier Conservation Areas (TFCAs) or Peace Parks)⁹⁴.

⁹¹ Barnett, 2006.

⁹² Barnett, 2006, pp.121.

⁹³ Barnett, 2006, pp.124 -125.

⁹⁴ Wikipedia, 13th March 2008: ‘A Transboundary Protected Area is a protected area that spans across boundaries of multiple countries, where the political border sections that are enclosed within its area are abolished. This includes removal of all forms of physical boundaries, such as fences, allowing free migration of animals and humans within the area. A boundary around the area may however be maintained to prevent unauthorised border crossing. Such areas are also known by terms such as Transfrontier Conservation Areas (TFCAs) or Peace Parks.

The preservation of traditional animal migration patterns, ensuring sufficient food and water sources for population growth, are the primary reason for the creation of peace parks. Peace parks however

*Environmental issues encourage people to cooperate at the societal level, as well as the international. Social interest groups can use this mutual ecological dependence to facilitate cooperation across territorial borders. This is often the first step toward dialogue, which can be difficult to initiate through official political channels. Over time, regular interaction between academia and civil society actors can help lay the foundation for mutual trust and implicit political cooperation. For example, despite the daily battles on the streets of the West Bank and Gaza, Palestinians and Israelis continue to manage their shared water resources through informal and technical dialogue.*⁹⁵

A new and powerful addition to this environmental platform could be adaptation to climate change. Climate change captures all the issues associated with environmental cooperation and offers more in its global reach (globally unifying), immediacy and longevity, and as such has the potential to be a useful tool in conflict resolution and peacebuilding activities. Indeed the effect of climate change to multiply existing threats and vulnerabilities means that not considering climate change in peacebuilding solutions may be risky, leading to increased vulnerabilities a decade or two down the line and an undoing of previous successes. The impacts of climate change ignore political borders and therefore the solution must also. The response requires both short and long term planning for adaptation, participation of local organisations and NGOs, capacity building in administrative and knowledge centres, and social capacity for action. This makes it a mechanism for cooperation and capacity building that will also benefit other areas of society. Whether conflict exists due to the impacts of climate change or despite of it, the solution to climate change lies only with long term cooperation and knowledge sharing. The shared threat as well as the longevity of the problem encourages the bringing together of parties to cooperate that usually would not; *'in divided communities, climate change offers a threat to united against; the need for adaptation offers a task on which to cooperate.'*⁹⁶

There is a unique need for cooperation on building a body of scientific data, on the ground observations, and local shared learning on what works for adaptation at a local and regional level; this is not information that will come from the developed world. In adaptation to climate change the technology transfer is not a material technology or science learned in the North and transferred to situations in the South, it is a body of knowledge from the South of those doing adaptation shared within the South. The cooperation is paramount as without this local knowledge there is little evidence available to base long term planning upon. Parties, even those in conflict, must share their observations of local climate change, knowledge of adaptation projects and lessons learnt, and build their capacity to generate and interpret climatic information and modelling as it becomes more locally relevant.

'The best process of change for a successful adaptation to climate change, in short, is the same as the processes involved in peacebuilding. In both, energies must be engaged in

also encourage tourism, economic development and goodwill between neighbouring countries, as well as facilitating travel of indigenous inhabitants of the area.'

⁹⁵ Carius, 2007 pp. 63.

⁹⁶ Smith & Vivekananda, 2007 pp. 23.

different parts of society –among communities and their leaders, in the private sector, media, political groups, social activists, students and intellectuals – and at different levels – among the elite and among ordinary people. In both, the process must include women as well as men, youth as well as mature adults, minorities as well as majority communities, and it must cross political divides as well. The techniques that will be used are also the same: encouraging dialogue; building confidence; addressing the issues that divide groups and out of which they perceive conflicts to grow; learning; mutual education; developing and strengthening civil society organisations to carry the work forward; strengthening both the capacity and the accountability of the institutions of government.

The processes of peacebuilding and adaptation are not only similar in these ways, they are also synergistic. A society that can develop adaptive strategies for climate change in this way is well equipped to avoid armed conflict. And a society that can manage conflicts and major disagreements over serious issues without a high risk of violence is well equipped to adapt successfully to the challenge of climate change.⁹⁷

Regional adaptation to climate change projects may not be able to end conflicts within and between communities, but what they may offer in addition to their inherent benefits for the region, are a platform for communication and for collecting and synthesising data that is shared among parties and requires cooperation to implement solutions. Communication and cooperation are seen as the first step of any peace process, and placing people on an equal footing (knowledge and capacity) on the climate change issue can begin to dispel distrust and resentment between hostile and marginalised groups. In conflict and post-conflict societies there is a need for peace-building activities to unite divided communities and to rebuild availability of and access to natural, economic and social capital throughout the population. It is suggested that climate change can play an important part in these activities and thus enable a society to address climate change issues alongside more obviously pressing concerns which might otherwise, push out climate change priorities. The key to both peacebuilding and adaptation to climate change is to build social resilience which ensures the capacity to adapt to future challenges, whether they are conflict resolution or responses to climatic changes in order to ensure human security.

The example of the potential for adaptation to climate change to be partnered with peacebuilding activities to more effectively address insecurity, illustrates how the human security agenda can promote international cooperating strategies on development, adaptation to climate change, disaster risk reduction and peacebuilding which are mutually supportive and reinforcing. *‘Climate change activities may, of course, have some additional benefits in countries where there are severe biophysical risks. For example, in East Timor, soil erosion, deforestation, uncertainty about the extent and location of water resources, lack of water resource infrastructure, lack of advanced agricultural technologies, and a lack of climate records and monitoring, among many other things, render much of the population vulnerable to El Niño-induced dry periods. If climate funding mechanisms can help implement disaster management and early warning systems, reforestation, soil conservation, water resource infrastructure, food security*

⁹⁷ Smith & Vivekananda, 2007 pp.32.

*measures, and the development of meteorological services, then the UNFCCC may contribute to immediate development problems in East Timor in a substantial way (Barnett, Dessai, and Jones 2003; Wasson 2001). Indeed, such activities, if implemented carefully, may contribute to peace building. The UNEP (2003) has made a similar argument about the benefits of the UNFCCC to Afghanistan.*⁹⁸

An International Response: Rights, Responsibilities and Justice

Climate change is a pressing human security issue. It can create and increase risk and vulnerability for many people in many regions, most especially those people for whom themselves and their state and sub-state systems leave them least able to respond. The international response must be people-centred and oriented around the needs of vulnerable communities, and must not be high jacked by national security rhetoric and assumed threats. A global response oriented around community-based adaptive capacity-building in vulnerable communities and regions will strengthen human security.

International cooperation should be two pronged; adaptation to the now unavoidable climate change, as well as concerted and far-reaching mitigation against further climate change. The focus of international cooperating strategies in response to climate change has to date been primarily in mitigation and as a response to economic concerns, nationally and in the global economy. As yet mitigation activities are not far-reaching enough, and the international community must do more to curb emissions to prevent further harm. However, this approach from a global and economic perspective has failed to capture the social justice issues surrounding climate change.

*'...climate policy is for the most part seeking equity – the fair distribution of costs and benefits among interdependent parties (after Paterson 2001). Justice, I propose, has a deeper meaning in that it intuitively refers to two additional issues; the risk that something unique and irreplaceable may be lost – for example loss of life, loss of places, and loss of species (see Schneider, Kuntz-Duriseti, and Azar 2000); and the way past injustices structure vulnerability to climate change. This more substantive notion of distributive justice is in sharp contrast, and is far more than, the value of equity as it is commonly understood (as fair distribution).*⁹⁹

The adaptation arm has thus far been severely neglected, and threatens to undermined development activities if more is not done as a matter of urgency. Climate change is a major threat to human development '*...in some places it is already undermining the international community's efforts to reduce extreme poverty.*¹⁰⁰

'The case for international action on adaptation is rooted in past commitments, shared values, the global commitment to poverty reduction and the liability of rich nations for climate change problems. Under the terms of the United Nations Framework Convention on Climate Change (UNFCCC), northern governments are obliged to support adaptation capacity development. Support for the MDGs provides another powerful rationale for

⁹⁸ Barnett, 2006 pp.127-128.

⁹⁹ Barnett, 2006 pp.127-128.

¹⁰⁰ UNDP Human Development Report 2007.

*action: adaptation is a key requirement for achieving the 2015 targets and creating the conditions for sustained progress. Application of the legal principles of protection from harm and compensation for damage would constitute further grounds for action.*¹⁰¹

In light of this, a high priority in the international response is to not simply focus on those strategies, programmes and processes which are climate specific, but to ensure that all international strategies are climate sensitive, from development assistance programmes, to peacebuilding activities, there needs to be an active engagement with the growing regional data on climatic impacts that feeds into these processes, and ensures that operations are sustainable or at least don't run counter to the additional burden of climate change induced insecurity.

Climate change already poses an immediate and far-reaching threat to people and communities around the world and has implications for the full enjoyment of human rights, as recognised by the UN Human Rights Council's Human Rights and Climate Change Resolution adopted by consensus earlier this year.¹⁰² The international community's response to climate change must include redress of those rights violated by climate change both because of international human rights obligations, and also because of the role as polluters in creating anthropogenic climate change and its resultant impacts on vulnerable communities. The human security discourse clearly shows the global nature of climate change and the myriad local problems it will cause particularly for those least able to respond, suggesting the need for an international response. The human rights discourse adds the dimension of a responsibility of redress by polluters to the victims of their polluting; of a moral and legal imperative to respond to the insecurity brought on others who are not responsible for causing anthropogenic climate change. Indeed, the International Covenant on Civil and Political Rights (ICCPR) and the International Covenant on Economic, Social and Cultural rights (ICESCR) enshrine in international law that *'in no case may a people be deprived of its own means of subsistence'*¹⁰³ yet as a result of climate change this is already happening in many communities in LDCs and SIDS who rely on climate-sensitive livelihoods such as agriculture. The right to life and security, to subsistence, to health, and to food will all be impacted upon by climate change among vulnerable populations.

The international response to climate change must therefore be two-fold;

1. to significantly reduce global emissions to prevent further climate change by committing to keeping global warming below 2°C, and
2. to protect the rights and security of those people who will be affected by the now-unavoidable impacts by enabling them to adapt.

Recommendations

¹⁰¹ UNDP Human Development Report 2007, pp. 14.

¹⁰² UN Human Rights Council, Human rights and climate change resolution, 28th March 2008.

¹⁰³ ICCPR, Article 1.2 and ICESCR, Article 1.2.

1. Facilitate LDCs and SIDS to participate more vigorously and meaningfully in the UNFCCC negotiations, and in particular for the post-2012 climate change regime currently under negotiation.

Direct engagement by LDCs and SIDS is the best way to ensure that the post-2012 agreement will respond to the priorities and needs of those most at risk from climate change, as well as build capacity in country on climate change issues and direct international mechanisms for adaptation.

2. Provide more and adequate international funding for adaptation to climate change, and for such funding to be focused on the LDCs and SIDS as a priority.

*'Measured in terms of returns for human security, adaptation financing is a highly cost-effective investment.'*¹⁰⁴

Mitigation has been the primary focus of international responses to climate change to date. Preventing future climate change is of vital importance to global human security. However, adaptation to the now unavoidable climate change in motion is of equal importance globally and of paramount importance in LDCs and SIDS. Prioritising adaptation is crucial for protecting communities at direct risk from climate change. The priority must be made at the international level by the countries responsible for causing the risk, and must be appropriately resourced to deliver adaptation for the victims of climate change.

3. Establish partnerships that help SIDS and LDCs to address climate change.

International actors (such as donors, international financial institutions, civil society, private sector, and others) should be encouraged to engage with SIDS and LDCs to help them address climate change and actively support and invest in adaptation activities.

4. Provide technical assistance, and where necessary, finance, and launch implementation of NAPAs for all SIDS and LDCs as relevant by 2009.

NAPAs provided an opportunity for SIDS and LDCs to prioritise communities and sectors at risk, these actions must now be implemented with support and technical assistance where required from the international community.

5. Link together international frameworks of action, integrating international and local development; adaptation to climate change; and peacebuilding and conflict resolution activities; to ensure that development

¹⁰⁴ UNDP 2007, p. 15.

and peacebuilding activities are climate-proof and adaptation to climate change is conflict-sensitive.

*'There are several different internationally agreed frameworks that address aspects of the interlinked issues of climate change, peacebuilding and development, for example the OECD-DAC guidelines on development in fragile states, NAPAs and Poverty Reduction Strategy Papers at national level, the European Commission, the disaster risk reduction frameworks such as Hyogo and the ISDR, the Global Environmental Facility and its various funding mechanisms. A concerted effort is needed in a variety of different international fora to ensure that these different frameworks are coherent with one another and mutually supportive.'*¹⁰⁵

LDCs and SIDS are subject to interconnecting vulnerabilities and human insecurity caused variously by underdevelopment, violent conflict, poverty, weak institutions, climatic change, and more, so for international and local responses to make significant and lasting changes they must be sensitive to each of the other determinants. In the case of the National Adaptation Plans of Action (NAPAs), it is vital that they *'take account of a state's socio-political and economic context and conflict dynamics. To this effect, they should be joined up to existing national strategies on poverty and conflict resolution.'*¹⁰⁶ Likewise peacebuilding must take into consideration the need for adaptation to climate change.¹⁰⁷ Conflict and post-conflict states are increasingly (lead by donor demand) making strategic plans for peacebuilding and development. These plans must include adaptation to climate change due to the interconnecting nature of these three issues, to ensure success and longevity.

6. Further research is needed into the direct and indirect local consequences of climate change.

Both the effects of climate change and vulnerability to climate change are acutely location specific, down to a community level and thus beyond most of the current data on climate modelling. Further research is needed into the observed impacts of climate change at a local level, and the capacity of local communities to adapt, and the role of factors that impair adaptive capacity, particularly violent conflict and post-conflict situations.

7. Move the focus of the conflict and climate change debate.

The focus of the conflict and climate change debate should move from the political rhetoric of climate change induced conflict and towards a people-centric response to the vulnerabilities to climate change of conflict and post-conflict states unable or unwilling to respond to the additional risks of climate change. The focus thus far on climate induced conflict runs the risk of securitising the climate change issue and diverting research and

¹⁰⁵ Smith & Vivekananda, 2007, pp. 41.

¹⁰⁶ Smith & Vivekananda, 2007 pp. 40.

¹⁰⁷ Smith & Vivekananda, 2007.

economic resources away from local responses and adaptation to prevent insecurity, to national security spending. Building resilience in communities at risk and integrating these activities with mechanisms for conflict resolution where necessary, would be preferable in order to avoid any potential exacerbation of violence by climate change.

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International Organizations

Organisation	Acronym	Web Address	Status	Brief Description	Climate Change Indicative Publications
African Development Bank	AfDB	http://www.afdb.org/	International Organisation	The ADB is a multilateral development bank whose shareholders include 53 African countries (regional member countries—RMCs) and 24 non-African countries from the Americas, Asia, and Europe (non-regional member countries—non-RMCs). It was established in 1964, with its headquarters in Abidjan, Côte d'Ivoire, and officially began operations in 1967. However, due to political instability in Côte d'Ivoire, the Governors' Consultative Committee (GCC), at a meeting in February 2003 in Accra, Ghana, decided to move the Bank to its current temporary location in Tunis, Tunisia. The Bank has been operating from this Temporary Relocation Agency since February 2003.	Davidson, R., Ogunlade (2007). Climate Change and Africa: Financing Opportunities, African Development Bank Annual Meeting Shanghai Convention Centre, Shanghai, China, 13-16 May, 2007 van Aalst, M., Hellmuth, M. and Ponzi, D. (2007) Come Rain or Shine: Integrating Climate Risk Management into African Development Bank Operations. Working Paper No 89. African Development Bank, Tunis. Vyas, Y. (2007). Investment Framework on Clean Energy & Development, African Development Bank Annual Meeting Shanghai Convention Centre, Shanghai, China, 13-16 May, 2007
Canadian International Development Agency	CIDA	http://www.acdi-cida.gc.ca/index-e.htm	Development Agency	The Canadian International Development Agency (CIDA) is Canada's lead agency for development assistance. It has a mandate to support sustainable development in developing countries in order to reduce poverty and to contribute to a more secure, equitable, and prosperous world	Cannon, T. ,2002. Gender and climate hazards in Bangladesh. Gender and Development 10,2 (July 2002): 45–50 Gender and Climate Change website: www.gencc.interconnection.org/resources.htm ¶
European Bank for Reconstruction and Development	EBRD	http://www.ebrd.com	International Organisation	The European Bank for Reconstruction and Development was established in 1991 when communism was crumbling in central and eastern Europe and ex-soviet countries needed support to nurture a new private sector in a democratic environment. Today the EBRD uses the tools of investment to help build market economies and democracies in countries from central Europe to central Asia.	European Bank for Reconstruction and Developmentm (June 2005). Investing and working responsibly for a sustainable future: ERBD Sustainability Report 2004, Printed by EBRD European Bank for Reconstruction and Developmentm (June 2007). Promoting sound and sustainable development, Focus on Sustainable Energy: Sustainability Report 2006, Printed by EBRD
European Commission, DG Environment		http://ec.europa.eu/environment	Directorate General of European Union	The main role of the European Commission's Environment Directorate-General (DG) is to initiate and define new environmental legislation and to ensure that agreed measures are put into practice in the EU Member States. The Environment DG is based in Brussels and has around 650 staff.	DECISION No 280/2004/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 11 February 2004 concerning a mechanism for monitoring Community greenhouse DIRECTIVE 2004/101/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 27 October 2004 amending Directive 2003/87/EC establishing a scheme for greenhouse gas emission allowance trading within the Community, in respect of the Kyoto Protocol's project mechanisms DIRECTIVE 2003/87/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 13 October 2003 establishing a scheme for greenhouse gas emission allowance trading within the Community and amending Council Directive 96/61/EC COUNCIL DIRECTIVE 2003/96/EC of 27 October 2003 restructuring the Community framework for the taxation of energy products and electricity COMMISSION OF THE EUROPEAN COMMUNITIES, COMMUNICATION FROM THE COMMISSION TO THE COUNCIL AND EUROPEAN PARLIAMENT, on EU policies and measures to reduce greenhouse gas emissions: Towards a European Climate Change Programme (ECCP), Brussels, 8.3.2000, COM(2000) 88 final

Food Agricultural Organisation II	FAO II	http://www.fao.org/	International Organisation	The Food and Agriculture Organization of the United Nations leads international efforts to defeat hunger. Serving both developed and developing countries, FAO acts as a neutral forum where all nations meet as equals to negotiate agreements and debate policy. FAO is also a source of knowledge and information. We help developing countries and countries in transition modernize and improve agriculture, forestry and fisheries practices and ensure good nutrition for all.	FAO and IIASA, (2007). Mapping biophysical factors that influence agricultural production and rural vulnerability, FAO, Italy, ISBN 978-92-5-105689-9 FAO, (2007). Climate Change – The Issue. (available at http://www.fao.org/clim/issues_en.htm). FAO and ADPC (2007). Climate variability and change: adaptation to drought in Bangladesh: A resource book and training guide, Implemented under the project "Improved Adaptive Capacity to Climate Change for Sustainable Livelihoods in the Agriculture Sector – DP9/1-BGD/01/004/01/99"
International Atomic Energy Agency	IAEA	http://www.iaea.org/About/index.html	International Organisation	The IAEA is the world's center of cooperation in the nuclear field. It was set up as the world's "Atoms for Peace" organization in 1957 within the United Nations family. The Agency works with its Member States and multiple partners worldwide to promote safe, secure and peaceful nuclear technologies.	International Atomic Energy Agency, (2000). Climate Change and Nuclear Power, IAEA/PI/A72E, 00-02779, Printed by the IAEA in Austria
Nuclear Energy Agency	NEA	http://www.nea.fr	International Organisation	The Nuclear Energy Agency (NEA) is a specialised agency within the Organisation for Economic Co-operation and Development (OECD), an intergovernmental organisation of industrialised countries, based in Paris, France.	OECD and NEA, (1998). Nuclear Power and Climate Change, OECD Publ.
North Atlantic Treaty Organisation	NATO	http://www.nato.int/	International Organisation	The North Atlantic Treaty Organization (NATO) is an alliance of 26 countries from North America and Europe committed to fulfilling the goals of the North Atlantic Treaty signed on 4 April 1949. In accordance with the Treaty, the fundamental role of NATO is to safeguard the freedom and security of its member countries by political and military means. NATO is playing an increasingly important role in crisis management and peacekeeping.	The Science and Technology Committee of NATO, (2007). Climate Change: Beyond Kyoto, North Atlantic Treaty Organisation (NATO) , 177 STC 07 E bis
Organisation for Economic Cooperation and Development	OECD	http://www.oecd.org	International Organisation	The OECD brings together the governments of countries committed to democracy and the market economy from around the world to support sustainable economic growth, boost employment, raise living standards, maintain financial stability, assist other countries' economic development and contribute to growth in world trade. The OECD also shares expertise and exchanges views with more than 100 other countries and economies, from Brazil, China, and Russia to the least developed countries in Africa.	Barbara Buchner (November 2007). Policy Uncertainty, Investment and Commitment Periods, COM/ENV/EPOC/IEA/SLT(2007)8, OECD, Paris Jane Ellis (OECD), Richard Baron and Barbara Buchner (IEA), (November, 2007). SD-PAMs: What, Where, When and How? , COM/ENV/EPOC/IEA/SLT(2007)5, OECD, Paris Stéphane Willems, (June 2004). Institutional Capacity and Climate Change Actions: Summary Paper, COM/ENV/EPOC/IEA/SLT(2004)2, OECD, Paris Ellina Levina and Dennis Tirpak, (May 2006). Adaptation to Climate Change: Key Terms, COM/ENV/EPOC/IEA/SLT(2006)1, OECD, Paris Ellina Levina and Helen Adams, OECD (May 2006). Domestic Policy Frameworks for Adaptation to Climate Change in the Water Sector, OECD, Paris. Ellina Levina (OECD), John Jacob, Luis Enrique Ramos Bustillos, and Ivonne Ortiz (Private consultants), (2007). Policy Frameworks for Adaptation to Climate Change in Coastal Zones: The case of the Gulf of Mexico, OECD, Paris. Gigli, S. and S. Agrawala (2007), Stocktaking of Progress on Integrating Adaptation to Climate Change into Development Co-operation Activities, COM/ENV/EPOC/DCE/DAC(2007)1/FINAL, OECD
Swedish Defence Research Agency	FOI	http://www.foi.se	Swedish Defence Research Agency	FOI is one of Europe's leading research institutes in the defence and safety area. The agency is financed on contracts' basis and is responsible to the ministry of defence. The core business is research, method and technology development and studies.	Sven-Ove Hansson, 2007. Gender issues in climate adaptation, Swedish Defence Research Agency, Base data report, ISSN 1650-1942
The Organization for Security and Co operation in Europe	OSCE		Regional security organization	The OSCE is the world's largest regional security organization whose 56 participating States span the geographical area from Vancouver to Vladivostok.	UNDP, UNEP, OSCE, (2004). ENVSEC: The case of Southern Caucasus, OSCE UNDP, UNEP, OSCE, (2004). ENVSEC: The case of Central Asia and South Eastern Europe, ISBN: 82-7701-023-0, OSCE UNDP, UNEP, OSCE, (2003). ENVSEC: Addressing Environmental Risks in Central Asia Risks, Policies, Capacities, ISBN 92-990011-8-9, OSCE

The World Conservation Union ♪	IUCN	http://cms.iucn.org	International Organisation	IUCN, the International Union for Conservation of Nature, helps the world find pragmatic solutions to our most pressing environment and development challenges. IUCN supports scientific research; manages field projects all over the world; and brings governments, non-government organizations, United Nations agencies, companies and local communities together to develop and implement policy, laws and best practice. IUCN is the world's oldest and largest global environmental network. IUCN is a democratic membership union with more than 1,000 government and NGO member organizations, and some 10,000 volunteer scientists in more than 160 countries.	<p>Niasse, Madiodio, Afouda, Abel and Amani, Abou. (Eds.) (2004). Reducing West Africa's Vulnerability to Climate Impacts on Water Resources, Wetlands and Desertification: Elements for a Regional Strategy for Preparedness and Adaptation. IUCN, Gland, Switzerland and Cambridge, UK. xviii + 66pp.</p> <p>IUCN, IISD, SEI, SDC, 2003, Livelihoods and Climate Change: Combining disaster risk reduction, natural resource management and climate change adaptation in a new approach to the reduction of vulnerability and poverty, ISBN: 1-895536-72-3</p> <p>IUCN (eds), 2002, Poverty and Climate Change : Reducing the Vulnerability of the Poor, A Contribution to the Eight Conference of the Parties to the United Nations Framework Convention on Climate Change</p> <p>IUCN, (2007).Gender and climate change: Women as agents of change, IUCN Gender Programme, www.genderandenvironment.org</p> <p>Wilkinson, C.R. & R.W. Buddemeier. 1994. Global Climate Change and Coral Reefs: Implications for People and Reefs. Report of the UNEP-IOC-ASPEI-IUCN Global Task Team on the implications of climate change on coral reefs. IUCN, Gland, Switzerland. x+124 pp.</p>
United Nations	UN	http://www.un.org/	International Organisation	The purposes of the United Nations are to maintain international peace and security; to develop friendly relations among nations; to cooperate in solving international economic, social, cultural and humanitarian problems and in promoting respect for human rights and fundamental freedoms; and to be a centre for harmonizing the actions of nations in attaining these ends.	<p>United Nations Climate Change Conference, Bali 3 - 14 December 2007, http://unfccc.int/meetings/cop_13/items/4049.php</p> <p>United Nations, (2004). A more secure world: Our shared responsibility, Report of the High-level Panel on Threats, Challenges and Change , ISBN: 92-1-100958-8</p>
United Nations Division for the Advancement of Women	DAW	http://www.un.org/womenwatch/daw/	Division of the United Nations	The Division for the Advancement of Women (DAW) advocates the improvement of the status of women of the world, and the achievement of their equality with men –as equal actors, partners, and beneficiaries of sustainable development, human rights, peace and security.	United Nations Division for the Advancement of Women (DAW) - Inter-Agency Secretariat of the International Strategy for Disaster Reduction (UN/ISDR), 2002. Environmental Management and the Mitigation of Natural Disasters: a Gender Perspective, Report of the Expert Group Meeting Ankara, Turkey, 6 – 9 November 2001, EGM/NATDIS/2001/Rep.1
United Nations Human Settlement Program	UN-Habitat	http://www.unhabitat.org/	United Nations agency for human settlements	The United Nations Human Settlements Programme, UN-HABITAT, is the United Nations agency for human settlements. It is mandated by the UN General Assembly to promote socially and environmentally sustainable towns and cities with the goal of providing adequate shelter for all. The main documents outlining the mandate of the organization are the Vancouver Declaration on Human Settlements, Habitat Agenda, Istanbul Declaration on Human Settlements, the Declaration on Cities and Other Human Settlements in the New Millennium, and Resolution 56/206	<p>UN-Habitat, 2006, Habitat Debate, December 2006, Vol. 12, No. 4</p> <p>UN-Habitat, The Urban Environment Section, P.O. Box 30030, Nairobi, Kenya</p> <p>UN-Habitat and UNEP, 2005, Climate Change : The Role of Cities involvement influence implementation, United Nations Environment Programme (UNEP) United Nations Avenue, Gigiri, P.O. Box 30552, 00100 Nairobi, Kenya ♪</p>

World Bank		http://www.worldbank.org/	International Organisation	The World Bank is a vital source of financial and technical assistance to developing countries around the world. We are not a bank in the common sense. We are made up of two unique development institutions owned by 185 member countries—the International Bank for Reconstruction and Development (IBRD) and the International Development Association (IDA).	<p>Patt, A. and Schröter, D., (2007). Perceptions of Environmental Risks in Mozambique: Implications for the Success of Adaptation and Coping Strategies, Policy Research Working Paper 4417, World Bank, Washington</p> <p>Lecocq,F., and Shaliz, Z., (2007). How Might Climate Change Affect Economic Growth in Developing Countries? : A Review of the Growth Literature with a Climate Lens, Policy Research Working Paper 4315, World Bank, Washington</p> <p>Lecocq,F., and Shaliz, Z., (2007). Balancing Expenditures on Mitigation of and Adaptation to Climate Change: An Exploration of Issues Relevant to Developing Countries, Policy Research Working Paper 4299, World Bank, Washington</p> <p>Dasgupta, S., Laplante, B., Meisner, C., Wheeler, D. Yan, J., (2007). The Impact of Sea Level Rise on Developing Countries: A Comparative Analysis, Policy Research Working Paper 4136, World Bank, Washington</p> <p>Buys, P., Deichmann, U., Meisner, C., Ton That,T., Wheeler, D., (2007). Country Stakes in Climate Change Negotiations: Two Dimensions of Vulnerability, Policy Research Working Paper 4300.</p>
World Health Organisation	WHO	http://www.who.int/en/	Directing and coordinating authority for health within the United Nations system	WHO is the directing and coordinating authority for health within the United Nations system. It is responsible for providing leadership on global health matters, shaping the health research agenda, setting norms and standards, articulating evidence-based policy options, providing technical support to countries and monitoring and assessing health trends.	<p>WHO, R. S. Kovats, B. Menne, A.J. McMichael, R. Bertolini and C. Soskolne (Ed.) (1999), Early Human Health Effects of Climate Change and Stratospheric Ozone Depletion in Europe. Third Ministerial Conference on Environment and Health, London 1999</p> <p>WHO (Regional Office for Europe), (2002). Floods: climate change and adaptation strategies for human health, EUR/02/5036813, Copenhagen</p> <p>WHO & APAT, Charlotte Huntly (Ed) (2007). Environment and climate change and variability in Italy, ISBN 978 92 890 72946, Copenhagen</p> <p>Campbell-Lendrum D, Woodruff R. Climate change: quantifying the health impact at national and local levels. Editors, Próss-ástón A, Corvalan C. World Health Organization, Geneva, 2007. (WHO, Environmental Burden of Disease Series No. 14)</p>
World Meteorological Organisation	WMO	http://www.wmo.ch	Specialized agency of the United Nations.	The World Meteorological Organization (WMO) is a specialized agency of the United Nations. It is the UN system's authoritative voice on the state and behaviour of the Earth's atmosphere, its interaction with the oceans, the climate it produces and the resulting distribution of water resources.	World Meteorological Organisation, (2008). Future Climate Change Research and Observations: GCOS, WCRP and IGBP Learning from the IPCC Fourth Assessment Report, Workshop and Survey Report, WMO/TD No. 1418, Switzerland
World Tourism Organisation	UNWTO	http://www.unwto.org	Specialized agency of the United Nations.	The World Tourism Organization (UNWTO/OMT) is a specialized agency of the United Nations and the leading international organization in the field of tourism It serves as a global forum for tourism policy issues and a practical source of tourism know-how.	UNWTO (2007). Climate Change and Tourism: Responding to Global Challenges, Summary, UNWTO, Spain
World Trade Organisation	WTO	http://www.wto.org/	International Organisation	The World Trade Organization (WTO) is the major global international organization dealing with the rules of trade between nations. The goal of WTO is to help producers of goods and services, exporters, and importers conduct their business.	<p>Ludivine Tamiotti (Ed.), (2007). The role of the WTO in the Climate Change, Debate WTO Public Forum 2007, Geneva</p> <p>Knudsen, O., and Nash, J., (2005). Building Capacity in Sustainable Development Strategies, WTO Symposium on Trade and Sustainable Development, 10- 11 October, 2005</p>

Non Governmental Organizations					
Organisation	Acronym	Web Address	Status	Content	Climate Change Indicative Publications
BirdLife International	RSPB	http://www.birdlife.org/	Environmental Organisation	BirdLife International is a global Partnership of conservation organisations that strives to conserve birds, their habitats and global biodiversity, working with people towards sustainability in the use of natural resources.	Birdlife, 2007, Climate Change is already impacting biodiversity, http://www.birdlife.org/action/science/sowb/case_studies/p46-47.pdf Birdlife and RSPB, 2007, Tropical Forests and Climate Change, http://www.birdlife.org/climate_change/RED/RED_pamphlet.pdf
Citizens' Global Platform	CGP	http://www.globalplatform.fi/	NGO for Civil Society	The Citizens' Global Platform (CGP) brings together civil society actors from the South and North to tackle the negative impacts of globalisation. The platform is a joint initiative by civil society actors in Tanzania and Finland and open to all those interested in global issues.	Citizens' Global Platform, 2007, <i>Turn the Tide, Civil</i> , Position Paper for Helsinki Process Review Conference 'Inclusive Governance – Bridging Global Divides' 27th-29th November 2007, Dar es Salaam, Tanzania
Genanet		http://www.genanet.de	NGO for Gender, Environment and Sustainability	Genanet is a project of the organisation LIFE - Women develop ecotechnology. The organisation promotes environmental protection and equal opportunities for women and men in skilled trades, science and technology, develops new educational concepts, with environmental protection forming an integral part of all areas of training, forges links between environmental and feminist politics and organises women's networks to promote equality of opportunity in the environmental sector and on the labour market and cooperates with many other countries in Europe.	GENANET, 2006, Gender and Climate Change, Input from Women to Governments Preparing their Submissions Regarding Article 3.9 - Consideration of Commitments for Subsequent Periods for Annex I Parties of the Kyoto Protocol, Prepared by genanet / LIFE e.V. / WECF based on consultations with women's organisations and gender experts from around the world, g+cc.article3.9_23Feb06.doc / © genanet / LIFE e.V., WECF
Greenpeace		http://www.greenpeace.org	Environmental Organisation	Greenpeace is a global campaigning organisation that acts to change attitudes and behaviour, to protect and conserve the environment	Greenpeace, 2007, Stop Climate Change campaign, http://www.greenpeace.org Stop climate change Greenpeace, 2007, How to Save the Climate: Join the Energy [R]evolution, http://www.greenpeace.org
Heinrich Böll Foundation		http://www.boell.de/	Think Tank	The Heinrich Böll Foundation is part of the Green political movement that has developed worldwide as a response to the traditional politics of socialism, liberalism, and conservatism. Our main tenets are ecology and sustainability, democracy and human rights, self-determination and justice.	Baer, P., Athanasiou, T. and Kartha, S., November 2007, The Right to Development in a Climate Constrained World: The Greenhouse Development Rights Framework Heinrich Böll Foundation, ISBN 978-3-927760-71-4
Northern Alliance for Sustainability	ANDEP	http://www.anped.org/	Network of Non Governmental Organisations	The Northern Alliance for Sustainability, ANPED works to empower Northern civil society in creating and protecting sustainable communities and societies world-wide	Church, C. and Malkova, T., 2008, Action on Climate Change: From a Divided Europe to a Common Purpose, The role of NGOs in tackling climate change, The Northern Alliance for Sustainability, ANPED, March 2008
Royal Society for Protection of Birds	RSPB	http://www.rspb.org.uk	Environmental Organisation	The RSPB is the UK charity working to secure a healthy environment for birds and wildlife. The RSPB's work is driven by a passionate belief that birds and other wildlife enrich people's lives, the health of bird populations reflects the health of the planet, on which our future depends, we all have a responsibility to protect biodiversity	RSPB with BirdLife International, 2007, Birds on the Move: Introducing A Climatic Atlas of European Breeding Birds, http://www.hbw.com/lynx/en/lynxeditions/novedades/ALT0007-climaticatlas-european-breeding-birds.html , Lynx Edicions, Montseny 8, E-08193, Bellaterra, Barcelona, Spain
World Wide Fund for Nature	WWF	www.panda.org	Environmental Organisation	WWF is an independent foundation registered under Swiss law, governed by a Board of Trustees under an International President.	Climate Witness, www.panda.org/climatewitness WWF Annual Review 2006, WWF International Avenue du Mont-Blanc 1196 Gland, Switzerland
Research Institutes					
Organisation	Acronym	Web Address	Status	Content	Climate Change Indicative Publications
Antarctic Climate and Ecosystems Cooperative Research Centre	ACE CRC	http://www.acecrc.org.au	Co-Operative Research Center	The Antarctic Climate and Ecosystems Cooperative Research Centre (ACE CRC) provides a focus for Australia's national effort to understand the variability of Antarctica and the Southern Ocean and their role in Australia's future	Antarctic Climate and Ecosystems Cooperative Research Centre, (2007) Climate Futures for Tasmania, FS03/070925, http://www.acecrc.org.au/drawpage.cgi?pid=publications&aid=797528 Antarctic Climate and Ecosystems Cooperative Research Centre, (2007), Sea-level rise: planning for the future, IB02/071106, http://www.acecrc.org.au/drawpage.cgi?pid=publications&aid=797528 Antarctic Climate and Ecosystems Cooperative Research Centre, (2007), Sea-level rise: what does the future hold?, IB03/071106 http://www.acecrc.org.au/drawpage.cgi?pid=publications&aid=797528 Antarctic Climate and Ecosystems Cooperative Research Centre, (2007), Annual Report (2006-2007), http://www.acecrc.org.au/drawpage.cgi?pid=publications&aid=797040

The Arctic Council	ACIA	http://www.arctic-council.org/	Research Institute	The scientific work of the Arctic Council is carried out in six expert working groups focusing on such issues as monitoring, assessing and preventing pollution in the Arctic, climate change, biodiversity conservation and sustainable use, emergency preparedness and prevention in addition to the living conditions of the Arctic residents.	The Arctic Council (ACIA), (2004). Arctic Climate Impact Assessment, Susan Joy Hassol (eds.), Cambridge University Press
Center for International Climate and Environmental Research	http://www.cicero.uio.no	CICERO	Research Center	The Norwegian government established CICERO (the Center for International Climate and Environmental Research – Oslo) by royal decree in 1990. CICERO is an independent research center associated with the University of Oslo.	CICERO, 2000. Developing Strategies for Climate Change: The UNEP Country Studies on Climate Change Impacts and Adaptations Assessment (eds. Karen O'Brien), ISSN: 0804-4562 Knut H. Alfsen , 2001. Climate change and sustainability in Europe, CICERO, www.cicero.uio.no
The Geological Society of America	GSA	http://www.geosociety.org/	Scientific Society	The Geological Society of America will be a broad, unifying scientific society for fostering the human quest for understanding Earth, planets, and life:Catalyzing new scientific ways of thinking about natural systems; and supporting the application of geoscience knowledge and insight to human needs, aspirations, and stewardship of the Earth.	Mark Peters, Thure Cerling, Judith Curry, Yehouda Enzel, Jim Finley, Alan Gillespie, Mickey Glantz, Lynn Soreghan, October 2006. Position Statement, The Geological Society of America, http://www.geosociety.org/positions/position10.htm
HM Treasury		http://www.hm-treasury.gov.uk/	Governmental Organization	The Treasury is the United Kingdom's economics and finance ministry. It is responsible for formulating and implementing the Government's financial and economic policy. Its aim is to raise the rate of sustainable growth, and achieve rising prosperity and a better quality of life with economic and employment opportunities for all.	HM Treasury, 2007, <i>The Economics of Climate Change: The Stern Review</i> , Nicholas Stern (eds.), ISBN-13: 9780521700801
International Peace Institute	IPI	http://www.ipacademy.org/	International Organisation	IPI is an independent, international institution dedicated to promoting the prevention and settlement of armed conflicts between and within states through policy research and development.	Nils Petter Gleditsch, Ragnhild Nordås and Idean Salehyan, May 2007, Climate Change and Conflict The Migration Link, International Peace Institute, http://www.ipacademy.org/
Leibniz Institute of Marine Sciences at the Christian-Albrechts University of Kiel	IFM-GEOMAR	http://www.ifm-geomar.de/	University Institute	The institutes' mandate is the interdisciplinary investigation of all relevant aspects of modern marine sciences, from sea floor geology to marine meteorology. Research is conducted worldwide in all oceans.	Yearly References can be found at the website : http://www.ifm-geomar.de/index.php?id=publikationen&L=1
National Oceanic and Atmospheric Administration	NOAA	http://www.noaa.gov	Scientific Agency	NOAA is an agency that enriches life through science. From daily weather forecasts, severe storm warnings and climate monitoring to fisheries management, coastal restoration and supporting marine commerce, NOAA's products and services support economic vitality and affect more than one-third of America's gross domestic product. NOAA's dedicated scientists use cutting-edge research and high-tech instrumentation to provide citizens, planners, emergency managers and other decision makers with reliable information they need when they need it	Richter-Menge, J., J. Overland, A. Proshutinsky, V. Romanovsky, L. Bengtsson, L. Brigham, M. Dyrgerov, J.C. Gascard, S. Gerland, R. Graverson, C. Haas, M. Karcher, P. Kuhry, J. Maslanik, H. Melling, W. Maslowski, J. Morison, D. Perovich, R. Przybylak, V. Rachold, I. Rigor, A. Shiklomanov, J. Stroeve, D. Walker, and J. Walsh (2006) State of the Arctic Report. NOAA OAR Special Report, NOAA/OAR/PMEL, Seattle, WA, 36 pp.
Pacific Institute		http://www.pacinst.org/	Non for Profit Think Tank	The Pacific Institute is an independent, nonpartisan think-tank studying issues at the intersection of development, environment, and security.	Knut H. Alfsen , 2001. Climate change and sustainability in Europe, CICERO, www.cicero.uio.no
Tyndall Center for Climate Change Research		http://www.tyndall.ac.uk/	Research Institute	The Tyndall Centre brings together scientists, economists, engineers and social scientists, who together are working to develop sustainable responses to climate change through trans-disciplinary research and dialogue on both a national and international level - not just within the research community, but also with business leaders, policy advisors, the media and the public in general.	Richard J.T. Klein, Siri E.H. Eriksen, Lars Otto Naess, Anne Hammill, Thomas M. Tanner, Carmenza Robledo and Karen L. O'Brien (2007). Portfolio screening to support the mainstreaming of adaptation to climate change into development assistance, Tyndall Centre for Climate Change Research Working Paper 102
The Woodrow Wilson Center		http://www.wilsoncenter.org/	Research Institute	The Woodrow Wilson International Center for Scholars aims to unite the world of ideas to the world of policy by supporting pre-eminent scholarship and linking that scholarship to issues of concern to officials in Washington.	Environmental Change and Security Program, 2004. The Security Implications of Climate Change for the UN System, ECSP Report , Issue 10, The Woodrow Wilson Center Environmental Change and Security Program, 2007. Climate-Related Conflicts in West Africa, ECSP Report, Issue 12, The Woodrow Wilson Center Günther, B., 1998. Why Environmental Transformation Causes Violence: A Synthesis, Environmental Change and Security Project Report, Issue 4 (Spring 1998): 24-44
Global Environmental Change and Human Security	GECHS	http://www.gechs.org/	Research Organisation	GECHS is a core project of the International Human Dimensions Programme. The research focuses on the way diverse social processes such as globalization, poverty, disease, and conflict, combine with global environmental change to affect human security.	Global Environmental Change and Human Security, 2008. Climate Change in Eastern and Southern Africa : Impacts, Vulnerability and Adaptation, Report 2008:2, ISSN: 1504-6338

German Advisory Council on Global Change	WBGU	http://www.wbgu.de	Scientific Advisory Body	The German federal government set up WBGU as an independent, scientific advisory body in 1992 in the run-up to the Rio Earth Summit	<p>Kruk,G., Petersen, L., Sieber, M., 2008. Climate Change and Security, Challenges for German Development Cooperation, German Advisory Council on Global Change, http://www.gtz.de/en/themen/umwelt-infrastruktur/3958.htm</p> <p>Schubert, R., Schellnhuber S., Buchmann, N., Epiney, A., Griefhammer, R., Kulesa, M., Messner, D., Rahmstorf, S., Schmid, J., 2008, Climate Change as a Security Risk, German Advisory Council on Global Change, Welt im Wandel: Sicherheitsrisiko Klimawandel Springer-Verlag Berlin, Heidelberg, New York, 2008, ISBN 978-3-540-73247-1</p>
Stockholm Environment Institute	SEI	http://www.sei.se	Research Institute	SEI is an independent, international research institute specializing in sustainable development and environment issues. It works at local, national, regional and global policy levels.	Kasperson, R. and Kasperson, J., 2001. Climate Change, Vulnerability, and Social Justice, Stockholm Environment Institute (SEI), ISBN: 91-88714-73-X