REFUGEE STUDIES CENTRE

FORCED MIGRATION POLICY BRIEFING 1

Environmentally displaced people

Understanding the linkages between environmental change, livelihoods and forced migration

Authors
Dr Camillo Boano
Professor Roger Zetter
Dr Tim Morris

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Refugee Studies Centre
Oxford Department of International Development
University of Oxford

Forced Migration Policy Briefings

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To contact the Series Editor email: rscpolicy@qeh.ox.ac.uk

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Executive summary

There is increasing evidence that serious and relatively rapid alterations to ecosystems induced by climatic and anthropogenic factors will have direct and indirect impacts on societies which, when other coping mechanisms are overcome, will have no other option but to migrate as a permanent or temporary coping strategy.

Although it has no international standing, widespread use of the term 'environmental refugees' draws attention to the increasing significance of protection and human rights issues for those likely to be displaced by environmental change. However, the label is highly contested not least because it grossly oversimplifies the multi-causality of social, economic and political factors which underpin environmentally-forced migration.

Estimates of the global numbers of people who may be displaced vary so widely that they offer an inadequate basis for formulating policies and obscure the enormous regional variations and responses that will occur. Establishing a framework of typologies of displacement, mapping and monitoring potential environmental 'hotspots' and changing regional conditions, and tracking migration trends, offer a more fruitful route for policy development.

Challenges related to migration and the environment include rapid urbanisation and sprawl, deforestation, soil erosion, agro-chemical pollution, water shortages, abandonment of rural areas, declining health and physical resilience, unsustainable agricultural and production systems, difficulties in building effective governance systems and the effects of migrants on source and destination communities and ecosystems.

Focus on the generalised potential of climate change is obscuring evidence from the developing world of adaptability and livelihood resilience in the face of environmental change. This experience suggests that development policies should be predicated on proactive reduction of vulnerability rather than automatic assumptions of mass forced migration.

Climate change poses risk to human security, principally through its potentially negative effects on people's livelihoods. However, caution should be used in linking environmental change to conflict and forced migration. Substantially more research is needed on the environmental change–conflict–migration nexus and the ways it may undermine human security.

Projecting the likely future distribution and movement of people and responding to the conservation threats and opportunities associated with migration, will require new skills and greater collaboration and integration among disciplines and organisations. In a warmer world, the traditional definition and understanding of the concepts of 'refugee' and 'protection' may both need to change.

Public policy can mitigate environmental migration, but a holistic approach is needed if the international community is to overcome deficiencies in its understanding of the issues and its ability to make projections and implement response mechanisms.

The Briefing stresses the need for collaboration between donors, national governments, UN organisations (principally UNHCR, UNEP, UNDP, IOM), the World Bank, and INGOs to develop policies.

Amongst the key policy recommendations are:

Strengthening the knowledge base and harmonising understanding by:

- promoting high-level dialogue in order to develop international understanding of concepts, knowledge-base, vocabulary and experience related to the multiple cause–effect links between environmental degradation, socio-economic impacts and environmentally-induced forced migration;
- promoting the development of more sophisticated typologies of environmentally-induced migration;
- generating, collating and disseminating reliable data on the numbers of people migrating because of environmental impacts;
- promoting the identification and mapping of potential environmental 'hotspots', 'tipping points' and migration trends in relation to environmental depletion;
- enhancing knowledge of livelihood resilience, successful adaptation, preparedness and coping strategies used by local populations to mitigate the impacts of environmental change;
- supporting research which will enhance understanding of the relationship between environmental change and conflict;
- commissioning research on potential governance models for areas experiencing degradation and migration pressures.

Fostering institutional reform and enhancing policy responses and competences by:

- advocating the clarification of international institutional responsibilities for promoting and co-ordinating policy responses to environmental change and forced migration;
- developing a comprehensive, accepted and concrete definition of environmental forced migrants, without risk of eroding international refugee law;
- promoting the development of adequate and appropriate protection instruments to safeguard the rights, needs and human security of environmentally displaced populations;
- adopting proactive development policies to address the potential migratory impacts of climate change which stress coping capacities, adaptation and sustainability and which strengthen the incorporation of resilience strategies in programmes and projects;
- recognising that sustainable adaptation measures must be locally and regionally place-specific;
- promoting policy responses which mainstream the participation of local partners and community-focused approaches;

- promoting the integration of environmental policies and responses in relief, recovery and development programmes in situations of conflict and forced displacement;
- urging developing countries to integrate the impacts and responses to climate change into Poverty Reduction Strategy Papers and conflict reduction strategies;
- developing principles and practices for 'environment proofing' development strategies, programmes and projects and requiring donors and development agencies urgently to adopt them.

1 Introduction

"Developed countries cannot isolate themselves from distress and disaster in developing countries: already there are sizeable numbers of environmental refugees who have made their way, usually illegally, into OSCE countries and today's stream will surely come to be regarded as a trickle when compared with the floods that will ensue in decades ahead."
Professor Norman Myers, Green College, University of Oxford[1]

"This is a highly complex issue, with global organizations already overwhelmed by the demands of conventionally-recognized refugees, as originally defined in 1951. We should prepare now, however, to define, accept and accommodate this new breed of 'refugee' within international frameworks."
Professor Dr. Hans van Ginkel, United Nations University (UNU)[2]

"There are well-founded fears that the number of people fleeing untenable environmental conditions may grow exponentially as the world experiences the effects of climate change. This new category of 'refugee' needs to find a place in international agreements. We need to better anticipate support requirements, similar to those of people fleeing other unviable situations."
Dr Janos Bogardi, UNU Institute for Environment and Human Security (UNU-EHS)[3]

"Sustainable development can reduce vulnerability to climate change by enhancing adaptive capacity and increasing resilience. At present, however, few plans for promoting sustainability have explicitly included either adapting to climate change impacts, or promoting adaptive capacity."
Intergovernmental Panel on Climate Change[4]

In 1990, the Intergovernmental Panel on Climate Change (IPCC) predicted that "the gravest effects of climate change may be those on human migration as millions are displaced by shoreline erosion, coastal flooding and severe drought."[5] Subsequent research has demonstrated that climate change will have increasingly dramatic impacts on ecological and social systems. Pessimists have predicted dramatic population movements, political instability, conflict, a vast level of human suffering and intense pressure on receiving societies.

Debates around linkages between environmental degradation and forced migration have led to the emergence of a range of highly contested terms – primarily *environmental refugee*, but also *environmental migrant, forced environmental migrant, environmentally motivated migrant, climate refugee, climate change refugee, environmentally displaced person (EDP), disaster refugee, environmental displacee, eco-refugee, ecological displaced person* and *environmental refugee-to-be (ERTB).* These terms have no accepted place in international refugee law, for environmental conditions do not constitute a basis for international protection. They are descriptive terms, not a status that confers obligations on States. Debate about their validity is often shaped by simplistic judgements and preconceived definitional labels. The lack of precise definition of the terms routinely deployed, fears around the emotionally-charged issue of migration, vastly divergent estimates of the likely scale of climate-induced displacement and lack of dialogue between

ecologists and social scientists render the links between environmental change and forced migration complex and debatable.

Evidence that climate change and extreme environmental events (EEEs) are causes of migratory flows is, for some observers, still speculative. However, there is growing concern about the need to develop strategies to prevent environment-induced migration and the conflict which may be related to it. Predicting the complexity and scale of the environmental migration problem is fraught with difficulty, not least because of the many causes of forced migration. It is therefore important to investigate the extent to which environmental degradation is a root cause for migration and conflict, to urgently address the issue of environmentally-induced migration and to develop consistent policies, supported by rigorous scientific and academic research, which cater for vulnerability to environmental, economic and political changes. Questions of humanitarian protection must be incorporated in a policy framework which promotes resilience, livelihoods and adaptation within the context of sustainable development. This framework, rather than the more alarmist views of the inevitability of forced displacement and/or conflict, constitutes a key theme of this policy paper.

Of course forced displacement for environmental reasons is not a recent phenomenon. Scarcity of land resources and environmental degradation has led to waves of out-migration and/or conflict throughout history. Migration, and population movement in general, is part of human history and an important adaptive mechanism. Thus, it has always been difficult to differentiate "environmental refugees" from "economic migrants". A decision to move may often be a function of a push to leave one disaster-affected location and the economic pull of another, more promising location. Three million people fled the Dust Bowl of the 1930s, whilst 700,000 mostly poor black people departed to northern states following the Mississippi Delta flood of 1927. Their decisions in many instances reflected a combination of pressures and aspirations.

However, what distinguishes both the present era and the foreseeable future, are two factors. First, the global scale of environmental change and thus the potential impacts it will have, such as forced migration, are new phenomena. No longer will these impacts be episodic or localised. Second, human agency is unarguably at the centre of environmental change and the potential to respond to it. Recognising these facts, this paper calls for policy responses at all levels of governance. Its underlying theme is that proactive policies to support resilience, adaptation and sustainability of livelihoods are the best means to respond to the spectre of environmental refugees.

This policy paper begins by exploring how the term 'environmental refugee' has been constructed (parts 2 and 3) before assessing the accuracy of estimates of environmentally-induced displacement (part 4). New approaches to understanding the potential scale of displacement, and thus the scope for policy intervention, are then developed (part 5). Evidence is presented from countries and regions whose populations are most affected by climate change, and proactive approaches of resilience, sustainability and adaptation

are advocated to mitigate environmentally-induced displacement (part 6). The relationship between environmental degradation and conflict is then assessed (part 7). The paper analyses proposed legal and institutional reforms, recommending holistic and multidimensional approaches to understanding the human impact of climate change and mitigating its likely impacts (part 8). The paper concludes with policy recommendations (part 9).

2 Describing and categorising the environmentally displaced

Given the lack of precise definition of an environmental migrant/refugee, and the fact that migration is an emotionally charged and sometimes even fear-inducing issue in host countries, it is not surprising that the links between environmental change and forced migration are the subject of much public and scientific debate.

First coined in the 1970s by Lester Brown of the World Watch Institute, 'environmental refugee' became popularised in the 1990s. It is increasingly used despite having no agreed definition in international law and never having been formally endorsed by the United Nations. Furthermore, the term does not readily fit within the globally recognised labels used to define forced displacement: refugees (who have crossed internationally recognised borders) and internally displaced persons (IDPs).

The most-quoted definition of an environmental refugee was provided by Essam el-Hinnawi in 1985, then working for the UN Environment Programme (UNEP). In the aftermath of the displacements caused by the gas leak in Bhopal in India and the nuclear catastrophe in Chernobyl he defined environmental refugees as:

"*…those people who have been forced to leave their traditional habitat, temporarily or permanently, because of a marked environmental disruption (natural and/or triggered by people) that jeopardised their existence and/or seriously affected the quality of their life*" (el-Hinnawi 1985:4).

He identified three broad categories of environmental migrants: persons who are displaced temporarily but who can return to their original home when the environmental damage has been repaired; persons who are permanently displaced and have resettled elsewhere; and persons who migrate from their original home in search of a better quality of life when their original habitat has been degraded to such an extent that it does not meet their basic needs (el-Hinnawi 1985:4).

The British environmentalist Norman Myers, who has written extensively on environmental change and population displacement for several decades, has defined environmental refugees as:

"*people who can no longer gain a secure livelihood in their homelands because of drought, soil erosion, desertification, deforestation and other environmental problems, together with associated problems of population pressures and profound poverty. In their desperation, these people feel they have no alternative but to seek sanctuary elsewhere, however hazardous the attempt. Not all of them have fled their countries, many being internally displaced. But all have abandoned their homelands on a semi-permanent if not permanent basis, with little hope of a foreseeable return*" (Myers 2005:6-7).

Avoiding the term 'refugee', UNHCR has cautiously moved towards a definition of environmentally displaced persons as those:

"who are displaced from or who feel obliged to leave their usual place of residence, because their lives, livelihoods and welfare have been placed at serious risk as a result of adverse environmental, ecological or climatic processes and events" (Gorlick 2007).

To avoid confusion with other categories, the agency notes that such a definition makes no reference to cross-border movement, nor to displacement related to persecution, armed conflict or human rights violations (Gorlick 2007).

A recent paper from the United Nations University's Institute for Environment and Human Security (UNU-EHS) defined a "forced environmental migrant" as somebody

"who has to leave his/her place of normal residence because of an environmental stressor … as opposed to an environmentally motivated migrant who is a person who 'may' decide to move because of an environmental stressor" (Renaud et al. 2007: 29–30).

UNU-EHS advisor Anthony Oliver-Smith has argued the term "environmental refugee" can be misleading, as it "tends to suggest that nature is at fault, when in fact humans are deeply implicated in the environmental changes that make life impossible in certain circumstances".[6] UNU-EHS is working to establish an internationally-agreed glossary of terms to facilitate cooperation in the broad area of environment and human security. In the meantime, and in the absence of a better term, the conference it convened at UN HQ in May 2007 was entitled "Environmental Refugees: The Forgotten Migrants".

The UN may not have reached consensus about phraseology to describe the phenomenon, but the UN Statistics Division in a glossary of environmental terms defines an environmental refugee as simply "a person displaced owing to environmental causes, notably land loss and degradation, and natural disaster."[7]

3 Do environmental refugees exist?

What are the links between environmental change and forced displacement? What does the term environmental refugee mean? Does it include both cross border migrants and internally displaced persons? What is the root cause of flight? Should the term 'environmental refugee' include those migrating because of livelihood loss or depletion, or only those fleeing conflict over resource scarcity?

Multi-causality

More than twenty years have elapsed since the publication of el-Hinnawi's paper, but debate is more active than ever about linking the environment with refugees. The use of 'refugee' was strongly contested by US civil rights activists in the aftermath of Hurricane Katrina. Academic analysts have critiqued definitions of environmental migrants/refugees, arguing they are based on simplistic explanations of the casual relationships of forced migration.

Examining population displacement in the Horn of Africa in the 1990s, Kibreab argued that the label environmental refugee was "poorly defined and legally meaningless", suggesting that the term was "invented at least in part to depoliticise the causes of displacement, so enabling states to derogate their obligation to provide asylum" (Kibreab 1997:21).

Black is a trenchant opponent of the concept of environmental refugees. He argues that "although environmental degradation and catastrophe may be important factors in the decision to migrate, and issues of concern in their own right, their conceptualisation as a primary cause of forced displacement is unhelpful and unsound intellectually, and unnecessary in practical terms… the linkages between environmental change, conflict and refugees remain to be proven ... rather, migration is… perhaps better seen as a customary coping strategy" (Black 2001:3). Indeed, a list of causes as divergent as wars, flooding and global warming is reason enough for some of Black's scepticism.

Conversely, Diamond (2005) argues that climatic variations combine with stressed social-ecological systems to result in many cases of catastrophic social change: he finds that environmental change was a common factor in all of them, and climate change in particular was a cause of many. Although not focusing on environmentally-induced migration, the implicit potential for linked social and ecological stress to produce environmentally induced migration is clear from Diamond's work.

Castles (2002:5) takes a more nuanced view, noting that migration involves "complex patterns of multiple causality, in which natural and environmental factors are closely linked to economic, social, and political ones". Environmental change does not undermine human security in isolation from a broader range of factors – poverty, the degree of state support to community, access to economic opportunities, the effectiveness of decision-making processes and the extent of social cohesion within and surrounding vulnerable groups.

The importance of *multi-causality* in any explanation of environmentally-induced migration, and thus policy responses, is confirmed in the cases of El Salvador, Haiti, the Sahel and Bangladesh scrutinised by Lonergan (1998:9). A plethora of processes have been

responsible for displacement in a complex mixture of social, economic and institutional factors. The same argument has been strongly developed by Lee (2001) considering the cases of Bangladesh, North Korea and Sudan where people fled their homes because of multiple causes, which included environmental factors but also involved human induced disasters, international and governmental reasons.

The question of status and recognition

A key issue is the extent to which environmentally displaced people should have some form of international recognition or status. Zetter recently noted how more and more groups of forced migrants are tagged as 'refugees': "it is against the [1951] Convention definition that all forced migration labels are tested. Yet paradoxically, the label 'refugee' is increasingly used to designate any group of forced migrants ... the labels 'environmental refugees', 'tsunami refugees' and 'development refugees' offer novel prefixes to groups of people who are undoubtedly forced from their normal habitats. But this conjuncture of labels is problematic, not least for its conceptual inadequacy in interpreting the complex structural causes and consequences of flight" (Zetter 2007).

The key aspect of the internationally accepted definition of a refugee, set out in the 1951 Refugee Convention, is of a person with a well-founded fear of persecution. Many have argued that unless it is assumed that 'nature' or the 'environment' can be the persecutor, the term 'refugee' should not be used to describe those forced to migrate, either in part or entirely, by environmental factors (Renaud et al. 2007, Keane 2004). There is general agreement in the literature that because not all people displaced by climate change will be fleeing violence or crossing a national border, it is critical to avoid referring to them as refugees. Indeed, there is much concern that any expansion of the definition would lead to a devaluation of the current protection for 'Convention refugees' – a concern noted above (Kibreab 1997:21) and endorsed by McGregor since it may "encourage receiving states to treat [refugees] in the same way as 'economic migrants' to reduce their responsibility to protect and assist" (McGregor 1993:162). Governments have a strong interest in keeping the definition narrow because of the obligations they have to refugees. There is no consensus for extending the refugee regime to 'environmental refugees' because most "receiving states want to restrict it further rather than improve it" (Castles 2002:10). For this reason, the 'knee-jerk' reaction for most of them will be to resist granting refugee status to a large new group of people. Most academic commentators continue to agree with the comments made by Suhrke in the 1990s that "giving refugee status to environmental refugees would only distort the definition and strain the desperately scarce resource of the international refugee regime" (Suhrke 1994:492). Lopez reflects consensus among international lawyers that "the expression 'environmental refugees,' though widely used for the past twenty years, is mistakenly applied" (Lopez 2007:367).

Rights and Human Security

Regardless of the recognition of an international status, the issues of rights for those who are environmentally displaced and associated questions of human security are urgent matters of policy. Davis (2001) argues that famine is frequently triggered by drought, but

caused by the way political and economic systems deprive people of their entitlements to natural resources. Following Sen's iconic work, most analyses of famines now identify the issues of rights in relation to poverty, inequality, market and policy failures, as the deeper causes of what ostensibly seem to be 'natural' disasters. As in the case of famine, so too in most areas of environmental change, recognising the role of human agency and the need for States to articulate and address the protection of rights in relation to environmental stresses leading to displacement, is a pressing issue. The case is reinforced by the likelihood that the majority of environmentally induced migrants may be IDPs rather than refugees. The protection of rights may be a much more profitable route to follow than the problematic call for an international status.

In support of a rights-based approach set within the context of multi-causality, the related concept of human security is also a useful framework for policy development. In terms of environmental change, human security can be considered as a people-centred concept enabling individuals and communities to respond to change, whether by reducing vulnerability or by challenging the drivers of environmental change (GECHS 1999). The concept is valuable because environmental change does not undermine human security in isolation from a broader range of social factors such as: poverty, the degree of state support to a community, access to economic opportunities, the effectiveness of decision-making processes and the extent of social cohesion within and surrounding vulnerable groups.

4 Struggle over data: the politics of numbers, the need for typologies of displacement and mapping

How do we predict the nature, incidence and scale of environmentally-induced displacement? Does debate over the numbers of those likely to be affected help or hinder the development of preparedness, preventive and response strategies? Can the international community monitor and respond to environmental disasters in the making? Are there key 'tipping points' that might trigger displacement rather than adaptation?

Estimating environmentally-induced displacement

Due to the challenge of multi-causality it is extraordinarily difficult to develop and defend any methodology for calculating the number of climate migrants/environmental refugees. However, this has not stopped researchers and policymakers from trying – often in response to pressures from governments and international agencies. Some of the more prominent estimates are as follows:

- The International Federation of Red Cross and Red Crescent Societies (IFRC) estimated in 2001 that for the first time the number of environmental refugees exceeded those displaced by war.
- UNHCR (2002:12) estimated there were then approximately 24 million people around the world who had fled because of floods, famine and other environmental factors.
- el-Hinnawi estimates there are already some 30 million environmental refugees, while Director of UNEP Klaus Toepfer predicts there will be 50 million by the end of 2010 and the IPCC predicts 150 million environmental refugees by 2050 – equivalent to 1.5% of 2050's predicted global population of 10 billion.[8]
- the Almeria Statement (1994) observed that 135 million people could be at risk of being displaced as a consequence of severe desertification.
- Myers, who in 1993 predicted 150 million environmental refugees, now believes the impact of global warming could potentially displace 200 million people (Myers 2005).
- The Stern Review, commissioned by the UK Treasury, agrees it is likely there could be 200 million displaced by 2050 (Stern 2006).
- Nicholls (2004) suggested that between 50 and 200 million people could be displaced by climate change by 2080.
- Friends of the Earth (2007:10) predict climate refugees at 200 million worldwide – and one million from small island states – by 2050.
- UNEP argues that by 2060 there could be 50 million environmental refugees in Africa alone.
- Most apocalyptically, Christian Aid have postulated that a billion people could be permanently displaced by 2050 – 250 million by climate change-related phenomena such as droughts, floods and hurricanes and 645 million by dams and other development projects (Christian Aid 2007).

It is not only Christian Aid's methodology – and hyperbolic tone – that has been questioned.[9] All these figures, their estimation methods and the underlying assumptions behind them are the subject of intense criticism and debate. Uncertain global estimates compromise the possibility of producing reliable, usable and comparable data – without which action is not possible. Whilst not denying the potentially widespread displacement consequences of environmental change, these estimates instil a fear of waves of migrants

and humanitarian crises. They may obscure the positive role of human agency in mediating these potential outcomes – how, in practice, local communities actually do, or might, react and thus what the appropriate policy responses should be. By homogenising the concept of environmentally-induced displacement, they deny the need to design a complex variety of policy interventions adjusted to many different situations of such displacement.

Ways forward – typologies and mapping

Climate change will differentially impact regions/localities not only because of geo-physical variations (long onset or episodic environmental impacts) but also because of the variable coping capacities of local social, political and economic structures. Rather than have recourse to global estimates, a more valuable route to understanding the potential scale of displacement, and thus the scope for policy intervention, is as follows.

First, a more nuanced understanding of different forms of environmental displacement is needed. Renaud et al. (2007:29–30) offer the most useful typology, amongst a number currently available, by distinguishing three different categories: environmentally motivated migrants and environmentally forced migrants who have a choice of timing (as quoted above p.8), and environmental refugees, who must flee immediately (e.g. because of floods), regardless of whether they cross a border. These typologies are then related to the nature of environmental trigger events and the assistance available to the exposed communities. These distinctions take pressure off the automatic assumption that all environmentally-displaced migrants are refugees – the problem noted earlier – whilst acknowledging that policy responses must be tailored to local circumstances.

Second, instead of a 'numbers prediction' agenda, a much more empirically grounded approach to the issues of environmentally-induced population displacement is needed. This would: identify and map potential environmental 'hotspots' and problem locations (both rural and urban, and both longer term processes and specific episodic events) and monitor changing conditions; examine 'tipping points' that trigger displacement rather than adaptation in these localities/regions; track migration trends (in relation to environmental depletion, competition for resources and potential or actual sources of conflict); and tailor policies of resilience and sustainable development to evolving local/regional needs. A focused mapping programme, which could be conducted by national agencies, is the key to more accurate prediction of the nature, scale and time-scale of environmentally-induced migration crises in the making and how these might be mitigated.

By significantly challenging the catastrophe ideology promoted by many of those making global estimates, these two proposals offer a positive way forward. Precise typologies and mapping, whilst desirable, are by no means essential for comprehending and responding to future environmental migrations. Approximate prediction, indicating the regions of the world which are particularly vulnerable and the order of magnitude of the number of people who may be forced out of these regions, would be a sufficient first step for planning concrete responses and raising more positive global awareness, whilst ensuring a much needed professionalising of the important functions of field research and statistical methods.

5 Environmental change impacts on livelihoods: the case for resilience, adaptation and sustainability

How does environmental change affect livelihoods? What resources are impacted and with what effects? Why is it important to distinguish between slow onset and disaster related environmental changes? Are poor people differentially affected? Should development agencies and donors 'environment proof' their development policies and programmes?

Having reviewed the concept of environmentally-induced displacement and the challenges of comprehending the scale of the phenomenon, this section examines the relationship between livelihoods, environmental change and forced migration. It considers the important differences between long-onset and acute, episodic or disaster related environmental impacts, and their implications, before advocating proactive approaches of resilience, sustainability and adaptation.

Slow onset environmental degradation

Slow onset migration, with the possibility of return or permanent displacement, is frequently caused by depletion of resources (land and water), deforestation, desertification and pollution. But it is one of the most difficult to predict because of the types of migration (seasonal, return, repeat, permanent and temporary), the multi-causality of intervening variables (socioeconomic status and migrant selectivity) and the complexity of environmental outcomes (deforestation and fisheries depletion) (Curran 2002).

Already about 1.1 billion people – 17% of the global population, but concentrated in the Global South – lack access to potable water: climate change will almost certainly accentuate this problem. Deforestation rates are highest in the global south.[10] Although at this stage deforestation is not principally attributable to climate change, it is likely to be accelerated by the direct and indirect effects of it.

These conditions are likely to intensify. A recently released IPCC report (IPCC 2007) warns agricultural production will be severely compromised by climate variability and change. The area suitable for agriculture, the length of growing seasons and yield potential, particularly along the margins of semi-arid and arid areas, are expected to decrease. Farmers in warmer and drier conditions in the Sahel region of Africa have already curtailed their cropping seasons. Yields from rain-fed agriculture are expected to fall as much as 50% in some poor African countries by as soon as 2020. It is likely there will be a decrease of up to 30% in agricultural yields in Central and South Asia by 2050. Lying behind these data is the fact that the smallest amounts of arable land per capita are in developing countries.[11]

Fisheries production will likely also decline. Reduction of water supplies stored in glaciers and snow cover will mean less water available in regions supplied by meltwater from major mountain ranges, where more than one-sixth of the world's population lives. Aquifer depletion threatens the existence of whole cities: Sana'a, the capital of Yemen and Quetta, the capital of Pakistan's Baluchistan province are cities said to be at particular risk of having to be abandoned within the foreseeable future. A shift to a permanent El Niño would increase water resource stress across large parts of Asia and south and east Africa,

reducing crop productivity, affecting fishing stocks and increasing risk of hunger and malnutrition (Arnell 2006).

Water depletion is paradoxically complemented by increased propensity for flooding. Rising sea levels caused by climatic change may take away the living space and source of living for millions of people in the future. With approximately 41% of the world's population living within 100 km of the coast the importance of the coastal zone and issues of sustainability are paramount. Sea-level rise is very likely to induce large scale migration in the longer term. Seventeen million Bangladeshis live less than one metre above sea level. Seven per cent of Bangladesh could be permanently lost to sea level rise, land subsidence, melting Himalayan glaciers and increased monsoon rains. By 2050 sea level rise may displace more than 14 million Egyptians: intrusion of saltwater up the foreshortened Nile would further reduce the irrigated lands supporting virtually the whole of Egypt's agriculture. There are other deltas at risk in Indonesia, Thailand, Pakistan, Mozambique, Gambia, Senegal, Surinam and elsewhere. A number of island states are also imperilled, such as the Maldives, Kiribati, Tuvalu and the Marshalls plus dozens of states in the Caribbean.

The negative health effects of rising temperatures world-wide will particularly impact the poor and already less-resilient. The IPCC predicts increases in malnutrition, diarrhoeal diseases, disease and injury due to heat waves, floods, storms, fires and droughts and cardio-respiratory diseases.[12] Vector-borne diseases such as malaria and dengue fever could become more widespread. A four degree temperature rise could expose up to 170 million more people per year to coastal flooding; lead to 60 million more Africans being infected by malaria and increase the proportion of land area experiencing severe droughts at any one time from around 10% today to 40% (Stern 2006:56–57). Global warming is likely to exacerbate an already apparent trend of depopulation and ageing in many rural areas. Environmental migrants often leave behind barely enough labour to address ongoing land degradation processes.

Acute onset or episodic environmental degradation

Recently it has become more evident that climate change expresses itself not only through slow shifts in average environmental conditions over relatively long periods, but also by the growing incidence of extreme weather events due to increased energy within the climate system.

Data are disputed but the trend is unmistakable, with the greatest impact felt in the global south. One estimate contends that, from 1980 to 2000, 141 million people lost their homes in 3,559 natural hazard events, of whom over 97% lived in developing countries (Gilbert 2001:1).[13] The International Federation of Red Cross and Red Crescent Societies (IFRC 2006) notes that in the past decade, weather-related natural hazards have been the cause of 90% of natural disasters and 60% of related deaths and have been responsible for 98% of the impacts on disaster-affected populations, the majority in developing countries.[14], [15]

Evolving insights into vulnerability to environmental disaster show that the impacts of these physical events on factors such as migration are mediated by the build-up or erosion of social-ecological resilience (Adger 2006:269). The impacts and recovery from the Asian tsunami of 2004, or the ability of small islands to cope with weather-related extremes, for example, demonstrate how discrete events in nature expose underlying vulnerability and push systems into new domains where resilience may be reduced (Adger et al. 2005). In other words, although disasters are self-evidently a more obvious cause of forced migration than slow onset environmental change, we should not neglect the fact that the impacts and the responses reflect a multiplicity of social, economic and political variables.

Extreme weather conditions resulting in disasters focus policymakers' attention on how people and societies can adapt and prepare for the risks which they pose. Victims of sudden and highly-publicised catastrophes like the 2004 Asian tsunami or the 2005 US Gulf Coast hurricanes benefit from the mobilisation of private and public sector generosity and humanitarian relief. But many more people are silently uprooted by gradual environmental change, receiving comparatively little support to cope and adapt, and are not recognised as either refugees or IDPs with the entitlements and expectations that these statuses often bring. The total assistance to tsunami victims is estimated to have reached an average of $7,100 dollars per affected person, while those whose homes were destroyed and livelihoods devastated by the poorly-reported 2004 Bangladesh flooding catastrophe received just three dollars.[16]

Ways forward

These admittedly selective examples of the impacts of environmental change on potential forced migration point to four conclusions with respect to policy development.

First, as King (2006:545) notes, the speed of displacement, whether resulting from the immediate or gradual deterioration of the environment, and the possibility of return to place of origin, differentially affect the movement of people confronting environmental stress and change. Added to the multi-causality of environmental impacts (discussed in section 3), these conclusions reinforce the case for developing environmental mapping and monitoring environmental 'hotspots', changing regional conditions and tracking migration trends, as well as producing more sophisticated typologies of environmental change.

Second, not all environmental change, whether acute or slow onset, affects the poorest most, "yet poorer people tend to be both more exposed and more susceptible to hazards, suffer greater relative loss of assets, and have a lower capacity to cope and recover. Furthermore, disasters can induce poverty, making better-off people poorer and the poor destitute despite programmes aimed at fighting poverty" (DFID 2005:3). Reducing impoverishment and the potential migratory impacts of environmental change on poor people should be at the core of development strategies: these aims should also take into account the protection of rights and human security.

Third, given the multi-causality of environmentally-induced displacement, in which development programmes and projects themselves may accentuate the destructive impacts of climate change, there is an urgent need for donors and development agencies to 'environment proof' their projects and programmes, and for national governments to ensure that issues of environmental migration are embraced by Poverty Reduction Strategy Papers and conflict reduction strategies.

Fourth, the range and scope of impacts discussed above challenges the international community to find new ways of conceptualising and putting into operation proactive policies and responses to environmentally induced migration. The next section proposes how to move forward.

6 Putting resilience, sustainability and adaptation first

What examples are there of resilience and coping? Can communities prepare for environmental change in ways that mediate potential conflict and pressures to migrate?

A key concept in a new approach to mitigating forced migration as an outcome of environmental change should be the reduction of vulnerability and the promotion of adaptation, resilience and sustainability.

Of course this is neither to deny the inevitability of some environmentally forced migration, nor the possibility of conflict in relation to environmental change. Nor should we forget that migration is sometimes a positive strategy that households, individuals and sometimes whole communities adopt to improve their lives and to reduce risk and vulnerability. As studies in areas as diverse as Asia, Africa and the Arctic have also found, migration is often less a function of immediate stress undertaken as a consequence of disaster: instead it is often a proactive diversification strategy (Hussein and Nelson 1998; Berkes and Jolly 2001).

Nevertheless, concepts and practices of resilience and adaptation challenge the deterministic notion of vulnerable groups being passive victims. Rather, they highlight people's skills, strategic responses, and agency – necessarily built on enhanced institutional capacity and reform to governance and civil society – in relation to climate change in which migration is only one of the possible adaptation measures.

Adaptive capacity can be defined as "the ability of a system to adjust to climate change (including variability and extremes) to moderate potential damages, take advantage of opportunities, or cope with the consequences" (Fussel and Klein 2006:319). A variety of factors enable and constrain effective adaptation to climatic variability: at a community level, three factors predominate – the level of development, access to resources, and scientific and technical capacity.[17]

Adaptation can take a variety of forms[18]: better education, training and awareness of climate change[19] and more technical measures (roof water catchments, alternative storage tanks in Nepal[20] and India,[21] drought-resistant seeds and better coastal protection in Vietnam and Bangladesh,[22] diversification of livelihood options and community-based natural resource management to prevent overexploitation of marginal lands and rehabilitate rangelands[23]). Similar examples of resourcefulness at the household and community level have been demonstrated in responses to floods (Few 2003), for natural-resource-dependent societies (Thomas and Twyman 2005), as well as in the case of coastal risk management in Vietnam, where "institutions and civil society both facilitate adaptation to social and environmental change" (Adger, 2000:754). Focus on increasing the adaptive capacity in relation to key sectors, such as agriculture and health, is crucial (as provided in examples in Sri Lanka,[24] Kenya[25]).

Examples of drought in Gujarat, floods in Uttar Pradesh and Nepal, and water scarcity in Yemen, reveal that in virtually all situations livelihood diversification represents a central

element in the adaptation process (Moench 2005:30). Where local opportunities for diversification are limited, proactive migration or commuting strategies release pressure on local resources. Thus, evidence from Burkina Faso shows that the risk of out-migration is higher in villages with unfavourable agroclimatic conditions and lower in villages with increased water conservation technologies (Henry et al. 2003). These effects are largely on short-term migration, which supports the theory that this may be part of a strategy to diversify income sources in a risky environment.

Community-Based Adaptation (CBA) provides a crucial approach to stimulating appropriate development activities, practices, research and policies.[26] A pivotal project in developing these approaches is in villages in the Philippines at risk from rising sea levels and tropical cyclones. In partnership, CBA has developed community-based monitoring of changes in coastal areas, created community early warning systems and promoted traditional knowledge, encouraged sea use zoning, promoted alternative livelihood development as well as eco-waste management and has helped to provide secure property rights and micro-finance schemes that enhance the adaptive capacity of vulnerable groups.

An understanding of adaptation and resilience, as the counterpart to vulnerability and forced migration, demands an approach that is wider in scope than much current impact-driven sectoral adaptation research and programmes. It embraces components such as initial well-being, livelihood resilience, self-protection, and social capital (Cannon 2000), all of which go beyond a reductionist vulnerability perspective. It fosters the recognition of non-climatic factors, including sources of livelihoods, assets, access to resources, institutional networks, education, gender, race, ethnicity, and poverty that delineate vulnerable populations (Pelling and High 2005; Paavola and Adger 2006). It allows for complementary adaptation measures to be conceived that either reduce human sensitivity and exposure, or minimise adverse non-climatic factors that, in turn, lessen sensitivity to climate-related stressors. And it recognises the ways in which gradual direct or indirect environmental change or degradation contributes to the decision to migrate, but relates this to coping mechanisms and available assistance.

Caution is still needed in promoting these concepts. As the evidence from food security research demonstrates, coping strategies of resilience and adaptation are actions taken by households when faced with extreme food insecurity; but they are frequently short-term adjustments and adaptations to extreme events, usually involuntary and almost invariably lead to subsequent states of vulnerability to future famine situations (Adger 2000). In respect of environmentally induced migration, this food security evidence demonstrates the complexity of the challenges which have to be confronted, both in long term development policies and in mitigation of the short term propensity for forced migration in the face of environmental stress.

7 Environmental degradation and conflicts: a causal chain?

What are the links between environmental change, conflict and migration? Are there causal links? What are the implications for national and international security? How do interstate and intrastate impacts differ? What are the implications for protecting 'refugees' and IDPs?

The starting-point for much of the literature, as we have seen, is that climate change reduces resources for livelihood, such as food or water, with one of three consequences. Those affected by the increasing scarcity may adopt strategies of resilience and adaptation. Alternatively, they may become embroiled in conflict over the remaining resources. Finally, people may be forced to leave the area, adding to the number of international refugees or internally displaced persons. Fleeing environmental destruction is, at the outset, a less violent response to adverse conditions than armed conflict between those who remain. But, equally, when the migrants encroach on the territory of other people who may also be resource constrained, the potential for violence rises here as well (Nordas and Gleditsch 2007:5).

However, as with estimates of the scale of environmentally-induced migration, assessing the actual or potential "climate change–migration–conflict nexus" (Reuveny 2007:2) is equally problematic. It is necessary to be very cautious about the links for there is little solid empirical research and many weak normative assumptions.

Concerns about environmental change are increasingly couched in terms of geopolitical security and the potential for conflict. In April 2007 the then British Foreign Secretary Margaret Beckett argued that the impacts of climate change, sea-level changes, and river basin degradation "went to the very heart of the security agenda". A panel of former serving US military leaders has urged that the national security consequences of climate change should be urgently integrated into US security and defence strategies (CNA Corporation 2007). Although cautious in linking environmental change with conflict, the Stern Review warned that "higher temperatures will increase the chance of triggering abrupt and large-scale changes that lead to regional disruption, migration and conflict" (Stern 2006:56).

Barnett and Adger summarise the growing consensus as follows:

"Climate change will effect some major environmental changes which, when superimposed on existing environment and development problems, may result in security problems for some individuals, social groups, and countries. It may undermine human security by reducing access to, and the quality of, natural resources that are important to sustain livelihoods….It may be one among numerous coexisting factors that contributes to violence" (Barnett and Adger 2007).

Current research suggests that environmental factors do not, as yet, as yet play a part in open conflict *between states* (Baechler 1999, 1999a; Homer-Dixon and Percival 1996; Wolf 1999). Although not addressing the specifics of environment induced conflict and cross border migration, a recent study indicates that most countries with an influx of refugees

since 1950 remain peaceful, although the probability of organised armed conflict increases, either in the host country or more likely across borders (Salehyan and Gleditsch 2006). There is little future inter-state scenario building in this context, although the IPCC suggests a "potential for international conflict over water resources" (IPCC 2001:225) where reduced availability may induce conflict between different users. Specifically the report refers to reduced water availability in the semi-arid savannah ecosystems of tropical Africa exacerbating conflict between herdsmen and farmers (IPCC 2001:394). The report also notes the same potential arising from the depletion of fish stocks which, like water, are an important trans-border economic resource in many countries (IPCC 2001:396).

Current thinking suggests that conflicts in which environmental change appear to be a contributing factor tend to be at *intra-state* levels. This being so, the case for adapting IDP status rather than refugee status to take account of conflict-induced environmental displacement seems to be strengthened.

In perhaps the most comprehensive review of the links between environmental factors and a range of recent conflicts, Reuveny finds evidence that severe environmental problems can play a role in causing conflict and migration, which, at times, may also lead to conflict in receiving areas (Reuveny 2005, 2007). In half the 38 cases he examined in Asia, Africa and Latin America no immediate connection was found. But in the remaining cases, he identified environmental pressures mixed with the incidence of conflict but often predating migratory outcomes, and in some cases (El Salvador and Guatemala) conflict escalated by ideological tensions of the Cold War. In the absence of multi-variate analysis, it is difficult to conclude how much migration can be attributed to violence over environmental factors. Often violence was localised and unorganised, though still highly destructive for the communities involved, and would not show up on compilations of armed conflict.

Thus, whereas in the 1990s the argument was developed, and widely accepted, that scarcity of environmental resources contributed to violent conflicts within states (Baechler 1999, Homer-Dixon 1991), now analysis has shifted in two ways.

First, a polarised argument now suggests that it is the abundance of resources, rather than scarcity, which drives conflict to gain dominant control (Collier 2000): this reduces the environmental depletion–conflict–migration case.

Second, and more plausible, is the current 'state of the art' which suggests that whilst environmental forces are expected to intensify as climate change progresses, the key point Reuveney and others make is that these factors do not work in isolation. Underdevelopment, dependence on the environment for livelihood, high population density and growth and income inequality are also present (Reuveny 2007:7, Collier 2000). Besides poverty and inequality, factors from the pragmatic (such as the availability of weapons), to the structural (institutional resilience, state legitimacy and capacity to intervene) play a vital role in the propensity for conflict in relation to environmental

stress and competing interests (Baechler 1999). Echoing the case for multi-causality, in reality, migration (whether induced by conflict over the environment or not) takes place in response to a combination of factors which are often in a state of flux: environmental, economic, social and political. People rarely migrate for environmentally-related conflict reasons alone. Thus, separating 'environmental conflict' processes from the structures within which they are embedded is both difficult and a distortion of reality.

A sensitive understanding of the way climate change increases a propensity for conflict that may induce more migration in any particular location, requires understanding the way it will interact with other factors, and the ways these factors may change because climate change will have uneven impacts on even proximate social and ecological systems.

Illustrative of the contradictory understanding and the complexity of the environmental change–migration–conflict nexus is the case of Darfur (Box 1). [27, 28]

The recent Tearfund report on Darfur stresses that in conflict situations the environment is a crosscutting theme that must be incorporated into the relief programme planning framework of sustainable resource management (Tearfund 2007).

As the case of Darfur shows, it is necessary to be highly cautious about the links between climate change and conflict. Much of the literature on environmental conflicts is more theoretically than empirically driven.

Box 1. Darfur: environmental conflict?

A recent UNEP report has listed the erosion of natural resources caused by climate change as among the root causes of the Darfur tragedy. "The scale of historical climate change, as recorded in Northern Darfur, is almost unprecedented: the reduction in rainfall has turned millions of hectares of already marginal semi-desert grazing land into desert. The impact of climate change is considered to be directly related to the conflict in the region, as desertification has added significantly to the stress on the livelihoods of pastoralist societies, forcing them to move south to find pasture".

The UNEP report also acknowledges that many elements contributing to the conflict in Darfur, as in other areas of Sudan, have little or no link to the environment or natural resources.

The Tearfund provides an authoritative and nuanced assessment of environmental factors in the Darfur case. Acknowledging that it is a crucial part of the current crisis in an already resource-poor environment, and noting that the conflict and prolonged displacement are severely accentuating environmental degradation, it stops well short of claiming this as an 'environmental conflict' (Tearfund 2007).

This has not stopped claims that global warming is a cause of the Darfur crisis. Jeffrey Sachs, Director of the Earth Institute at Columbia University, has claimed it "has roots in an ecological crisis directly arising from climate shocks". Echoing these views in a *Washington Post* opinion piece, UN Secretary-General Ban Ki-moon stated that "the Darfur conflict began as an ecological crisis, arising at least in part from climate change."

Climate change may, indeed, be one of the causes of the Darfur crisis, but to consider it the single root cause obscures other important factors and could hamper the search for solutions. Undue emphasis on competition for dwindling natural resources absolves the Sudanese government of responsibility for instigating conflict and failing to prevent mass displacement. The Woodrow Wilson Center has warned of the danger of commentators rushing to embrace over-simplistic or deterministic formulations that equate climate change inexorably with genocide or terrorism (Dabelko 2007).

8 Institutional capacity and funding arrangements: developing new responses

Is there a need for a new organisation with a specific mandate for this category of forced migrants? How should the international community protect the environmentally displaced? Should UNHCR take the lead? Would this compromise its ability to undertake its existing mandate? Has the humanitarian reform process launched by the UN in 2005 taken account of the needs of this new group? How can research and operational experiences be brought together? Who should fund the costs of protecting and assisting the environmentally displaced?

The status of the displaced

Whatever they are termed, those who are motivated by environmental degradation will continue to lack legal status unless there is fundamental institutional change and consideration given to the development of appropriate instruments and norms. These requirements apply both to those who migrate, as a result of environmental change, as well as those who are unable or unwilling to abandon their familiar lands and livelihoods. Not being persecuted for their belonging to a particular group and not always crossing an international border, they cannot qualify for the status of 'refugee' defined by the 1951 Geneva Convention. They are set to remain "legal gypsies, without a home in the Geneva Convention" (Simms 2003: 6). UNHCR has shared scepticism concerning the concept of the environmentally displaced. UNHCR involvement would risk diminishing the responsibility of national governments towards their own citizens, blurring the distinctive need of refugees for protection and hindering the agency's core function to protect and to assist 'traditional' refugees. Nevertheless, the parallel experience of UNHCR taking on new responsibilities towards IDPs suggests that accommodation is possible. Critics argued that the resource and operational challenges of IDP responsibility would compromise its primary responsibility for refugees. Yet UNHCR is implementing structures and procedures to avoid such compromises.

Despite these crucial reservations, and notwithstanding the likelihood that IDPs will form the majority of environmental forced migrants, a process has started to persuade the international community to accept the status of environmental refugees (see Box 2).

Whilst raising the profile of environmentally-induced displacement, such a redefinition of refugeehood as proposed by the LiSER initative would, if ever adopted, fundamentally reconfigure the international refugee regime so painstakingly developed in the aftermath of World War Two.

Less contentiously, the International Peace Academy also argues for a lead UN role in fostering a global dialogue, and calls for a special session of the UN General Assembly to ensure climate change is on the Security Council agenda. The Refugee Convention, it argues, is "out-dated and is fraught with ambiguities" (Gleditsch et al. 2007).

Even so, reviewing the problems encountered in protecting environmentally-displaced persons from an international legal perspective – and the conundrums in any revision of

Box 2. The Living Space for Environmental Refugees (LiSER) initiative
A proposed protocol on environmental refugees, endorsed by the governments of the Maldives, Tuvalu and other Small Island Developing States (SIDS), is being promoted by the Living Space for Environmental Refugees network (LiSER). It builds on momentum generated by the Toledo Initiative on Environmental Refugees and Ecological Restoration. Describing environmental refugees as "persons displaced by impacts on the environment, which include, but are not limited to, climate change, *force majeure*, pollution, and conditions that are forced upon the environment by state, commercial enterprises or a combination of state and commercial entities", LiSER aims to establish a Working Group to explore how to incorporate environmental refugees into the 1951 Convention. Their objective is to include within the defining characteristics of a refugee a well-founded "fear of life endangerment, harm or loss of life due to severe environmental impact, or due to materials left, existent or being released in the displacement grounds by the state, commercial entities, or both."

the traditional refugee definition – Lopez is optimistic that legal and political difficulties can be overcome (Lopez 2007).

These arguments point to the case for a new international agreement. Thus UNU-EHS regrets that the impact of environmentally induced displacement has not been factored in by humanitarian agencies or incorporated within humanitarian regulatory frameworks. The responsibilities of States are implied in the Hyogo Framework for Action,[29] an agreement produced by the World Conference on Disaster Reduction in Kobe, Japan in 2005, and also in the Guiding Principles on Internal Displacement.[30] However, notes UNU-EHS, States' obligations are not formalised. A separate convention or treaty is needed to avoid diluting protection for traditional refugees. UNU-EHS is bringing UN agencies together to discuss the issue.[31]

The New Economics Foundation (Conisbee and Simms 2005:33) has called for UN recognition either in the Geneva Convention or, like UNU-EHS, a new international convention that gives "internationally assured protection, independent of, and separate from, the actions of their own governments." Recognition would be followed by the formation of a UN commission that would report directly to the Security Council. The question remains whether nations that have historically been big polluters should acknowledge their "ecological debt" and shoulder responsibility to developing nations which will suffer the consequences.

As we have argued, it is essential to recognise the multi-causality of displacement in which climate change and environmental pressures are only one of the triggering factors. Thus, despite the gathering momentum for a 'new' convention dealing with environmental displacement or, more contentiously, revisions to the 1951 Geneva Convention and 1967

Protocol, caution is needed. A more promising line is to take the example of the 1998 Guiding Principles on IDPs as a model for an incremental process of aggregating and adapting the wide range of extant legal and normative frameworks in order to protect the rights and human security of the 'environmentally displaced' and those who remain behind (Zetter 2008).

Developing understanding – linking scientific and social scientific awareness of environmentally induced forced migration

Despite the breadth of research on climate change and the prediction of extensive population displacement, as this review has demonstrated, there is little shared understanding of the concepts, vocabulary and terminology dealing with these processes. There is still a dearth of robust and precise empirical evidence on regional and local impacts, in particular the potential for conflict-induced migration arising from climate change. These deficiencies in the international community's understanding inhibit the capacity to respond. More comparative and cross-scale research (i.e. micro- and macro-studies) is needed, possibly through the study of recent episodes of migration where environmental factors may have played a key role, in order to develop a fuller understanding of the multi-dimensional interplay between environmental, political, social and economic factors and forced migration outcomes. Developing this understanding is crucial to establishing organisational responsibilities and the appropriate policy apparatus to tackle environmentally-induced displacement.

The Ecological Society of America (Meyerson et al. 2007:187) has noted that governments of many developing countries lack the scientific and technical expertise to conduct effective ecological assessments and develop conservation policies. Accountability and enforcement systems may also be weak. Governance strategies are often not well coordinated across agencies, so that strategies to promote migration and development may be in direct conflict with environmental policies. These incongruities and contradictions exist not only at local and national levels, but also with respect to the programmes of international development and environmental agencies.

To understand the evidence and make projections, far better communication and collaboration is needed between communities of ecologists, demographers, sociologists, economists and relief and development workers. To date, there has been only limited exchange of cross disciplinary information.

Similarly, climate change and disaster risk (and the related migratory impacts) have been separated in research due to uncertainty about the role played by climate change in determining extremes in climate variability. With scientific evidence enabling signals to be read more clearly, policymakers are starting to realise the importance of taking action that can address disaster risk while also diminishing the impacts of climate change through vulnerability reduction and resilience measures. The scholarly realms of disaster risk and climate change are also starting to merge. Differences in language and institutional responsibility remain barriers. Efforts to bring together stakeholders in climate change,

disasters research and policymaking and to incorporate risk management into work on climate change, natural hazards and development planning offer opportunities for more integrated action. Such approaches are also capable of dealing with the long-term transformations that climate change may bring and the ways in which people respond (in terms of migration for example), both at the national, regional and local level.

Whilst not denying crisis potential and the inevitability of permanent displacement in some situations (for example flooding by rising sea levels), it is essential to address alternative approaches to enforced migration, where this is possible, that challenge deterministic notions of vulnerable passive victims, lacking agency and ingenuity. Global warming is usually analysed in terms of international and national effects, with insufficient attention to these local impacts and coping strategies. Community-focused approaches to adaptation commonly take vulnerability to and coping with current climate as a vital first step to enhancing resilience to climate-related shocks. This is widely regarded as the basis on which to build resilience to longer-term shocks and stresses which might lead to conflict and/or enforced migration. However, there is limited experience to date in combining measures that manage and reduce present-day risks but are suitably flexible and robust to cope with an uncertain future climate. Current disaster risk reduction initiatives therefore provide an important area of intervention. Of crucial importance in finding a balance between current and future risk reduction is the participation of local partners and vulnerable people themselves. This will also enable climatic factors to be gauged in relation to other shocks and stresses, avoiding adaptation being imposed from above.

A new paradigm

A new paradigm, of adaptation and resilience to reduce vulnerability, has been a central theme of this paper and holds the key to future policy development to mitigate the impacts of climate-induced environmental change and avert the propensity for conflict and/or forced migration. In parallel, specific measures directed at the underlying macro and micro multi-causal variables of environmentally-induced migration should be integrated into development policies. Thus Watson and Ackermann (2000:24) underscore the view that the onset of climate change may not necessarily require different or new strategies, but enhanced responses to existing and wider structural development problems and the elimination of poverty. Repositioning resilience and adaptation has crucial implications for development policies and goals.

Institutional reform and responsibility

Institutional infrastructure can provide some established local and national focal points for policy implementation, for example in the case of mapping environmental change and 'hot spots'. At the same time, the higher international political and public profile of climate change adaptation might also generate additional impetus for innovation in internationally-financed frameworks and institutional structures to respond to environmentally-induced migration within a development framework. This could potentially bring the realms of environmental change (both long and short onset), migratory impacts and development closer together (Schipper and Pelling 2006:33).

Financing responses

Who should pay the costs of any new institution and protection and assistance mechanisms? The 'polluter pays' principle, which developed countries implement at home, suggests that they should finance most of the global effort required to defend the less developed countries against the effects of climate change, for it is their over-reliance on fossil fuels which is the primary cause of climate change (Reuveny 2007).

The Kyoto Protocol provides an example of a burden-sharing scheme for the curbing of greenhouse gases emissions; parallel schemes are needed to meet the human cost of climate change such as resulting forced migrations.

Environment Proofing Development

Donor-driven development programmes and projects may accentuate the displacement impacts of environmental change by undermining local coping and adaptive capacities. For example, the introduction of new farming technologies, produce marketing strategies and land tenure systems – designed to increase household incomes or to enhance domestic food production – can also upset the delicate balance between the environment and its productive exploitation.

Given this propensity, donor governments and agencies should pay far greater attention to assessing these potential outcomes at the design stage, and designing out or mitigating the likely negative impacts in advance. This call for 'environment proofing' development projects draws on the extensive domestic experience which most donor countries have in conducting Environmental Impact Analysis (EIA) of development projects and Strategic Environmental Assessment (SEA) of large scale development strategies (EU 2005, 2006; Jay et al. 2007; Jones et al. 2005; Wallington et al. 2007).

A model for the future?

Albeit small scale in the context of the potential impacts of environmental change on migration, the case of Tuvalu (outlined in Box 3 below) offers a model of how international agreement and positive policies offer a way forward.

Box 3. Tuvalu: model for protection of climate change 'refugees'?
Rising sea levels have meant that tides are increasingly washing through the crop gardens in several of the smaller atolls in both Melanesia and Polynesia. Salt-water intrusion reduces productive capabilities, while coral bleaching from rising ocean temperatures is depleting fisheries.

Evacuees forced by rising sea levels from the Carteret Islands, north-east of the Papua New Guinean island of Bougainville and the first group relocated from Tuvalu to New Zealand have been dubbed the world's first environmental refugees. The people of Tuvalu have reluctantly accepted the idea of relocation and under a negotiated scheme New Zealand has undertaken in principle to resettle the entire population. Australia, which has not ratified the Kyoto Protocol, has refused to receive migrants from Tuvalu, and has been accused of 'eco-terrorism' by the authorities of the sinking atoll (Friends of the Earth, Australia 2005). As global warming threatens to force millions of people to relocate, Gemenne argues the New Zealand–Tuvalu agreement provides a model of international cooperation, global environmental responsibility and sharing of the burden of climate change-induced relocation. New Zealand calls the citizens it is accepting from sinking Tuvalu members of a "migration programme", trying to keep the programme as low-key as possible, concerned that conservative groups could exploit the Tuvaluan example for political advantage (Gemenne 2006).

9 Conclusion and policy recommendations

The environment being shaped by human activities is, by definition, in constant flux. Despite the immense amount of research, evidence currently available indicates that making concrete operational policy recommendations with regard to environment-induced displacement and/or conflict is certainly extremely difficult and possibly somewhat premature. Nevertheless there is a substantial agenda for action.

Although it is primarily States that have responsibility for planning, predicting and managing the potential forced displacement impacts of environmental change, the international community, national governments and civil society need to determine whether the appropriate institutions:

- are accepting sufficient responsibility for their citizens displaced by environmental degradation;
- are committed to mitigating and responding to migratory flows;
- are using holistic and human rights-based approaches;
- are doing enough to preserve, protect and care for the environment;
- are sufficiently prepared to prevent, mitigate and respond to disasters;
- are working with communities to ensure land tenure and access rights as a step towards combating land degradation.

UNDP has urged the international community to set an objective of eliminating 'environmental refugees' while promoting 'environmentally motivated mobility'. (Niamir-Fuller 2007). Whilst donors and national governments must play a key role, international collaboration lies at the crux of policy responses to mitigate the migratory impacts of environmental change. Policy initiatives to accomplish these objectives require high level, coordinated dialogue between governments, intergovernmental and non-government agencies.

The Humanitarian Response Review in 2005 developed a lead agency, sectoral cluster approach to the operational needs of humanitarian interventions. An exact replica of the cluster approach is not being suggested here. But this approach offers a model to kick-start *co-ordinated* action to tackle environmentally induced forced migration. Perhaps under the auspices of UNEP, this would embrace not just the operational resources of the cluster system, but also the wide-ranging institutional, legal, conceptual and information needs outlined in the following recommendations.

A. Policy recommendations to strengthen the knowledge base and understanding

Donors, national governments in collaboration with UN organisations (principally UNHCR, UNEP, UNDP, IOM), the World Bank, and INGOs, should:

- promote high-level dialogue in order to develop, strengthen and harmonise international understanding of concepts, knowledge-base, vocabulary and experience

related to the multiple cause–effect links between environmental degradation, socio-economic impacts and environmentally-induced forced migration;
- promote fruitful collaboration among the environmental and social sciences, including the development of common terminology, statistical methods, indicators, and databases;
- encourage cohesion between analysts and practitioners engaged in the currently separate realms of disasters, climate change and development planning in order to bring them closer together;
- generate, collate and disseminate reliable data on the numbers of people migrating as a result of environmental change and from areas hit by natural disasters and enhance the professionalisation of field research and statistical methods;
- promote the development of more sophisticated typologies of environmentally-induced migration;
- promote the identification and mapping of potential environmental 'hotspots', monitoring the potential 'tipping points' in these localities/regions and migration trends in relation to environmental depletion, competition for resources and potential sources of conflict-induced migration;
- enhance knowledge of livelihood resilience, successful adaptation, preparedness and coping strategies used by local populations to mitigate the impacts of environmental change and its potential to induce conflict and/or forced displacement;
- support research which will enhance understanding of the relationship between environmental change and conflict;
- commission research on potential governance models (stewardship, rights, incentives, and management) for areas with valuable ecosystems and biodiversity that are experiencing degradation and migration pressures.

B. Policy recommendations to foster institutional reform, enhance policy responses and harmonise competences

Donors, national governments in collaboration with UN organisations (principally UNHCR, UNEP, UNDP, IOM), the World Bank, and INGOs, should:
- advocate clarification of international institutional responsibilities for promoting and co-ordinating policy responses to environmental change and forced migration;
- develop a comprehensive, accepted and concrete definition of environmental forced migrants, but without risk to any erosion of current international refugee law;
- recognise that use of incorrect terminology gives governments grounds to disregard advocacy on behalf of the environmentally displaced;
- promote the development of adequate and appropriate protection instruments to safeguard the rights, needs and human security of environmentally displaced populations;
- encourage governments to sign up to and adhere to the Guiding Principles for Internal Displacement and to recognise their applicability to the protection needs of those displaced as a result of climate change within country borders;
- adopt proactive development policy responses to the potential migratory impacts of climate change which stress coping capacities, adaptation and sustainability and strengthen the incorporation of resilience strategies in programmes and projects;

- recognise that sustainable adaptation measures must be locally and regionally place-specific: there are no one-size-fits-all solutions that will contribute to both vulnerability reduction and poverty reduction.
- promote policy responses which mainstream the participation of local partners and community-focused approaches to adaptation and enhancing resilience;
- promote the development of appropriate funding regimes to support protection and assistance mechanisms;
- promote the integration of environmental policies and responses in relief, recovery and development programmes in situations of conflict and forced displacement;
- offer greater support to national disaster preparedness and response agencies;
- urge developing countries to integrate the impacts and responses to climate change into Poverty Reduction Strategy Papers and conflict reduction strategies;
- develop principles and practices for 'environment proofing' development policies, projects and programmes, and require donors and development agencies urgently to adopt them.

References

Adger, W.N. (2000) "Institutional adaptation to environmental risk under the transition in Vietnam", *Annals of the Association of American Geographers*, 90(4), pp. 738–758.

Adger, W.N. (2006) "Vulnerability", *Global Environmental Change*, 16(3), pp. 268–281.

Adger, W.N., Hughes, T.P., Folke, C., Carpenter, S.R. and Rockström, J. (2005) "Social-ecological resilience to coastal disasters", *Science*, 309(5737), pp. 1036–1039.

Almeria Statement (1994) *The Almeria Statement on Desertification and Migration*. Statement following the International Symposium on Desertification and Migrations, Almeria, 8-11 February, www.unccd.int/regional/northmed/meetings/others/1994AlmeriaSpain.pdf

Arnell, N.W. (2006) *Global impacts of abrupt climate change: an initial assessment*. Working Paper 99, Tyndall Centre for Climate Change Research, University of Southampton, www.tyndall.ac.uk/publications/working_papers/twp99.pdf

Baechler, G. (1999) "Environmental degradation in the south as a cause of armed conflict", in: Carius, A., Lietzmann, K., eds., *Environmental Change and Security: A European Perspective*. Springer, Berlin, pp. 107–130.

Baechler, G. (1999a) "Environmental Degradation and Violent Conflict: Hypotheses, Research Agendas and Theory Building", in Suliman, E., ed., *Ecology, Politics and Violent Conflict*. Zed Books, London and New York, pp. 26–112.

Barnett, J. and Adger, W.N. (2007) "Climate change, human security and violent conflict", *Political Geography* (2007), pp. 1-17. doi:10.1016/j.polgeo.2007.03.003.

Berkes, F. and Jolly, D. (2001) "Adapting to Climate Change: Social-Ecological Resilience in a Canadian Western Arctic Community", *Conservation Ecology*, 5(2), www.ecologyandsociety.org/vol5/iss2/art18/print.pdf

Black, R. (2001) *Environmental refugees: myth or reality?* New Issues in Refugee Research, Working Paper 34, www.unhcr.org/research/RESEARCH/3ae6a0d00.pdf

Cannon, T. (2000) "Vulnerability analysis and disasters", in Parker, D.J., ed., *Floods*, London: Routledge.

Castles, S. (2002) *Environmental change and forced migration: making sense of the debate*, UNHCR Issues in Refugee Research, Working Paper No. 70, www.unhcr.org/research/RESEARCH/3de344fd9.pdf

Christian Aid (2007) *Human Tide: the Real Migration Crisis*, www.christianaid.org.uk/Images/human_tide3__tcm15-23335.pdf

CNA Corporation (2007) *National Security and the Threat of Climate Change*, www.securityandclimate.cna.org/mab

Collier, P. (2000) *Economic causes of civil conflict and their implications for policy*. World Bank, www.worldbank.org/research/conflict/papers/civilconflict.pdf

Conisbee, M. and Simms, A. (2005) *Environmental Refugees: The Case for Recognition*, New Economics Foundation, www.neweconomics.org/gen/uploads/lpce0g55xjx5eq55mfjxbb55231020031800 40.pdf

Curran, S. (2002) "Migration, Social Capital, and the Environment: Considering Migrant Selectivity and Networks in Relation to Coastal Ecosystems", *Population and Development Review*, 28, Supplement: Population and Environment: Methods of Analysis, pp. 89–125.

Dabelko, G. (2007) *A word of caution on climate change and 'refugees'*, www.gristmill.grist.org/story/2007/7/24/24756/6675

Davis, M. (2001) *Late Victorian Holocausts: El Niño Families and the Making of the Third World*. London: Verso.

DFID (2005) *Disaster Risk Reduction: A Development Concern*. Department for International Development, www.dfid.gov.uk/pubs/files/drr-scoping-study.pdf

Diamond, J. M. (2005) *Collapse: How societies choose to fail or succeed*. New York: Viking Penguin Publishers.

el-Hinnawi, E. (1985) *Environmental Refugees*, Nairobi: UNEP.

EU (2005) Commission Guidelines on Impact Assessment and their Annexes SEC, www.ec.europa.eu/governance/impact/key.htm.

EU (2006) Impact Assessment in the Commission (portal), www.ec.europa.eu/governance/impact/practice.htm.

Few, R. (2003) "Flooding, vulnerability and coping strategies: local responses to a global threat", *Progress in Development Studies*, 3(1), pp: 43–58.

Friends of the Earth (2007) *A citizen's guide to climate refugees*. Friends of the Earth. Australia, www.liser.org/Citizen's%20Guide_2007_small.pdf

Friends of the Earth Australia (2005) *A Citizen's Guide to Climate Refugees*, www.foe.org.au/campaigns/climate-justice/activities-and-projects/climate-refugees

Fussel, H.M. and Klein, R.J.T. (2006) "Climate change vulnerability assessments: an evolution of conceptual thinking", *Climatic Change* 75(2), pp: 301–329.

Gemenne, F. (2006) *Climate Change and Forced Displacements: Towards a Global Environmental Responsibility? The Case of the Small Island Developing States (SIDS) in the South Pacific Ocean*, www.cedem.ulg.ac.be/m/cdc/12.pdf

Gleditsch, N.P., Nordås, R. and Salehyan, I. (2007) *Climate Change and Conflict: The Migration Link*, International Peace Academy, www.ipacademy.org/asset/file/169/CWC_Working_Paper_Climate_Change.pdf

Gilbert, R. (2001) *Doing More for Those Made Homeless by Natural Disasters*. Disaster Risk Management Series No. 1, Washington, DC: World Bank, www.proventionconsortium.org/themes/default/pdfs/housing.pdf

Global Environmental Change and Human Security (GECHS) (1999) *Global Environmental Change and Human Security*. GECHS Science Plan, IHDP, Bonn.

Gorlick, B. (2007) *Environmentally-Displaced Persons: a UNHCR Perspective*, www.ony.unu.edu/seminars/2007/16May2007/presentation_gorlick.ppt

Henry, S., Schoumaker, B., Beauchemin, C. and Dabire, B. (2003) "Impacts of environmental conditions on migration in Burkina Faso", *Population and Environment*, 25(5), pp. 423–460.

Homer-Dixon, T. (1991) "On the threshold: environmental change as causes of violent conflict", *International Security*, 16(2), pp: 76-116.

Homer-Dixon, T., and Percival, V. (1996) *Environmental Scarcity and Violent Conflict: Briefing Book*. American Association for the Advancement of Science, Toronto.

Hussein, K. and Nelson, J. (1998) *Sustainable Livelihoods and Livelihood Diversification*, Working Paper 69, Brighton, Institute of Development Studies www.ids.ac.uk/ids/bookshop/wp/wp69.pdf

International Institute for Sustainable Development (2003) *Sustainable drylands management: a strategy for securing water resources and adapting to climate change*. Information Paper N. www.iisd.org/pdf/2003/envsec_livelihoods_3.pdf

IFRC/RCS (2005) *World Disasters Report 2005: Focus on information in disasters*. International Federation of Red Cross and Red Crescent Societies, Geneva.

IFRC/RCS (2006) *World Disasters Report. Focus on Neglected Crises*. IFRCRCS, London, UK.

IPCC (Intergovernmental Panel on Climate Change) (2001) *Climate Change 2001: Synthesis Report. A Contribution of Working Groups I, II, III of the Intergovernmental Panel on Climate Change*, Cambridge, Cambridge University Press, www.grid.no/climate/ipcc_tar

IPCC (Intergovernmental Panel on Climate Change) (2007) *Climate Change 2007: Impact, Adaptation and Vulnerability*. Working Group II Contribution to the Intergovernmental Panel on Climate Change Fourth Assessment Report. Geneva: IPCC.

Jay, S., Jones, C., Slinn, P., and Wood, C. (2007) "Environmental Impact Assessment: Retrospect and Prospect", *Environmental Impact Assessment Review*, 27, pp. 287–300.

Jones, C., Baker, M., Carter, J., Short, M., and Wood, C. (2005) *Strategic Environmental Assessment and Land Use Planning*, London Earthscan.

Keane, D. (2004) "Environmental Causes and Consequences of Migration: A Search for the Meaning of 'Environmental Refugees'", *Georgetown International Environmental Law Review*, findarticles.com/p/articles/mi_qa3970/is_200401/ai_n9353848/print

Kibreab, G. (1997) "Environmental causes and impact of refugee movements: a critique of the current debate", *Disasters* 21(1), pp. 20–38.

King. T. (2006) "Environmental displacement: coordinating efforts to find solutions", *Georgetown International Environmental Law Review* 18(3), pp. 543–565.

Lee, S. (2001) *Environment matters: Conflict, Refugees and International Relations*. Tokyo: World Human Development Institute Press.

Lonergan, S. (1998) "The role of environmental degradation in population displacement", *Environmental change and security program report*, Issue no. 4. Washington: Woodrow Wilson International Centre for Scholars, pp. 5–15.

Lopez, A. (2007) "The Protection of Environmentally-Displaced Persons in International Law", *Environmental Law Review* 365, Clark Law School, www.lclark.edu/org/envtl/objects/37-2_Lopez.pdf

McGregor, J.A. (1993) "Refugees and the Environment" in Black R., Robinson, V., eds. *Geography and Refugees: Patterns and Processes of Change*. London: Belhaven Press, pp. 159–170.

Meyerson, F.A.B., Merino, L., and Durand, J. (2007) "Migration and environment in the context of globalization" *Frontiers in Ecology and the Environment*, 5(4): 182–190, www.frontiersinecology.org/specialissue/articles/meyerson.pdf

Moench, M. (2005) *Water, Climatic Variability and Livelihood Resilience: Concepts, Field Insights and Policy Implications*. Institute for Social and Environmental Transition (USA/ Nepal),
www.resalliance.org/files/1133262768_swedishwaterhouseresiliencepolicypaper2.pdf

Myers, N. (2005) *Environmental Refugees: An Emergent Security Issue*, Organisation for Security and Cooperation in Europe, www.osce.org/documents/eea/2005/05/14488_en.pdf

Niamir-Fuller, M. (2007) *Environmental migrants: institutional and policy issues*, UNDP-GEF, www.ony.unu.edu/seminars/2007/16May2007/presentation_niamir-fuller.pdf

Nicholls, R.J. (2004) "Coastal flooding and wetland loss in the 21st century: changes under the SRES climate and socioeconomic scenarios". *Global Environmental Change*, 14(1), pp. 69–86.

Nordås, R. and Gleditsch, N.P. (2007) *Climate Change and Conflict*, International Peace Research Institute, Oslo,
hei.unige.ch/sections/sp/courses/0607/gleditsch/Environmental-Security-Article-Nordas-Gleditsch.pdf

Paavola, J. and Adger, W.N. (2006) "Fair adaptation to climate change", *Ecological Economics*, 56(3), pp. 594–609.

Pelling, M. and High, S. (2005) "Understanding adaptation: What can social capital offer assessments of adaptive capacity?" *Global Environmental Change*, 15(3), pp. 308–319.

Renaud, F., Bogardi, J.J., Dun, O. and Warner, K. (2007) "Control, Adapt or Flee: How to Face Environmental Migration", *InterSecTions*, UNU-EHS, no. 5/2007,
www.ehs.unu.edu/file.php?id=259

Reuveny, R. (2005) *Environmental Change, Migration and Conflict: Theoretical Analysis and Empirical Explorations*. Human Security and Climate Change Workshop, Asker, Norway, www.gechs.org/downloads/holmen/Reuveny.pdf

Reuveny, R. (2007) "Climate change-induced migration and violent conflict", *Political Geography*, xx (2007) 1e18.

Salehyan, I., and Gleditsch, K.S. (2006) "Refugees and the spread of civil war", *International Organisation*, 60(2), pp.335–366.

Schipper, L. and Pelling, M. (2006) "Disaster risk, climate change and international development: scope for, and challenges to, integration", *Disasters*, 30(1), pp: 19–38.

Simms A. (2003) *The Case for Environmental Refugees*, New Economics Foundation.

Stern, N. (2006) Stern Review on the Economics of Climate Change, www.hm-treasury.gov.uk/independent_reviews/stern_review_economics_climate_change/stern_review_report.cfm

Suhrke, A. (1994) "Environmental degradation and population flows". *Journal of International Affairs*, 47(2), pp. 437–496.

Tearfund (2007) *Darfur: relief in a vulnerable environment*, London, TearFund www.reliefweb.int/rw/RWFiles2007.nsf/FilesByRWDocUnidFilename/AMMF-74MBYJ-Full_Report.pdf/$File/Full_Report.pdf

Thomas, D.S.G.and Twyman, C. (2005) "Equity and justice in climate change adaptation amongst natural-resource-dependent societies", *Global Environmental Change*, 15(1), pp: 115–124.

UNHCR (2002) "A critical time for the environment", *Refugees*. No.127. Geneva.

Wallington, T., Bina, O., and Thissen W. (2007) "Theorizing Strategic Environmental Assessment: Fresh Perspectives and Future Challenges", *Environmental Impact Assessment Review*, 27, pp. 569-584.

Watson, R.T. and Ackermann, R.O. (2000) *Poverty and Climate Change. Environment Matters at the World Bank: Annual Review 2000*, World Bank, Washington, D.C.

Wolf, A. (1999) "Water wars and water reality: conflict and co-operation along international waterways", in Lonergan, S., ed., *Environmental Change, Adaptation and Security*, Kluwer Academic Publishers, Dordrecht, pp. 251–265.

Zetter, R.W. (2007) "More labels, fewer refugees: remaking the refugee label in an era of globalization", *Journal of Refugee Studies*, 20(2), pp: 172–192.

Zetter, R.W., (2008) "Legal and Normative Frameworks", *Forced Migration Review*, 31, Special issue on Climate Change and Displacement, pp: 62-63.

Endnotes

[1] Myers (2005)
[2] www.ehs.unu.edu/file.php?id=58
[3] www.physorg.com/news8213.html
[4] www.ipcc.ch/SPM13apr07.pdf
[5] Created by the World Meteorological Organization (WMO) and the UN Environment Programme (UNEP) in 1988, the IPCC assesses scientific, technical and socio-economic information relevant to understanding the risk of human-induced climate change, its potential impacts and options for adaptation and mitigation. www.ipcc.ch
[6] forum.stirpes.net/environment-news/6305-climate-change-creating-millions-eco-refugees.html
[7] unstats.un.org/unsd/environmentgl/gesform.asp?getitem=473
[8] www.alternet.org/environment/19179
[9] www.icar.org.uk/?lid=8733
[10] www.fao.org/docrep/009/a773e/a0773e00.htm
[11] www.unep.org/geo2000/english/i5b.htm
[12] www.ipcc.ch/SPM13apr07.pdf
[13] e.g. Hurricane Mitch,1998: 300,000 homeless; Gujarat earthquake, 2001: one million families homeless; Mozambique floods, 2000: 550,000 people in need of relocation; the tsunami of 2004: 231,000 people dead or missing, and more than one million displaced across 12 affected countries; Hurricane Katrina, 2005: 1.5 million displaced temporarily, of whom 300,000 will never return.
[14] www.kpbooks.com/details.asp?title=World+Disasters+Report+2005
[15] IFRC/RCS (2006:217) reported that for the decade 1996–2005 the disasters affecting the most people were droughts and famines in Africa and Oceania (accounting for 86% and 51% of the disaster-affected population in Africa and Oceania respectively) and floods in Asia, the Americas and Europe (57%, 43% and 38% of the disaster-affected population in Asia, the Americas and Europe respectively).
[16] Tsunami Evaluation Coalition (TEC) www.tsunami-evaluation.org
[17] http://www.eldis.org/index.cfm?objectid=63728FE2-CB95-9E98-2873FA230B4FCE86&id=2&pageNo=2
[18] For a full collection of adaptation measures collected in a database see http://www.cba-exchange.org/
[19] www.eldis.org/index.cfm?objectId=63728FE2-CB95-9E98-2873FA230B4FCE86
[20] www.bcas.net/2nd-cba/Documents/tc-1a/Dahal.pdf
[21] www.bcas.net/2nd-cba/Documents/tc-1a/Nambi.pdf
[22] www.bcas.net/2nd-cba/Documents/tc-1b/Belayet-SEMP&Climate%20Change%20Experience.pdf
[23] IISD (2003) *Sustainable drylands management: a strategy for securing water resources and adapting to climate change*. Information Paper 3. www.iisd.org/pdf/2003/envsec_livelihoods_3.pdf
[24] www.bcas.net/2nd-cba/Documents/tc-1b/Champa%20Sri.pdf
[25] www.bcas.net/2nd-cba/Documents/tc-1b/Rachel%20PA.pdf
[26] www.eldis.org/index.cfm?objectId=63728FE2-CB95-9E98-2873FA230B4FCE86
[27] www.unep.org/Documents.Multilingual/Default.asp?DocumentID=512&ArticleID=5621&l=en
[28] www.irinnews.org/Report.aspx?ReportId=72985
[29] www.unisdr.org/eng/hfa/hfa.htm
[30] www.brookings.edu/fp/projects/idp/gp_page.htm
[31] www.ony.unu.edu/16May2007.html

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Refugee Studies Centre
Oxford Department of International Development
University of Oxford

3 Mansfield Road, Oxford OX1 3TB, UK

Tel: +44 (0)1865 281720
Fax: +44 (0)1865 281730
Email: rsc@qeh.ox.ac.uk
www.rsc.ox.ac.uk