NO PLACE LIKE HOME

WHERE NEXT FOR CLIMATE REFUGEES?

A REPORT BY THE

ENVIRONMENTAL JUSTICE FOUNDATION

Protecting People and Planet

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CLIMATE CAMPAIGN - MISSION STATEMENT

Climate change is set to create millions of environmental refugees – people forced from their homes and land – by rising temperatures, sea-level change and extreme weather events. Many will be among our planet's poorest and most vulnerable people. These will be the first victims of our failure to prevent climate change. People, who without international help and new binding agreements on assistance, will have nowhere to go and no means to survive.

EJF is dedicated to arguing their case. Putting the call to governments and our political leaders for a new agreement on environmental refugees, guaranteeing them rights and assistance and a fair claim to our shared world.

EJF is also committed to empowering individuals and organisations to take positive actions to reduce their impact on the natural environment; encouraging them to act now, before the irreversible effects of climate change take hold.

EJF is a member of

STOP CLIMATE CHAOS COALITION

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EXECUTIVE SUMMARY

- Every year climate change is attributable for the deaths of over 300,000 people, seriously affects a further 325 million people, and causes economic losses of US$125 billion[1]. Four billion people are vulnerable to the effects of climate change and 500-600 million people – around 10% of the planet's human population – are at extreme risk[1,2]. As such, climate change has been recognised as a fundamental threat to human rights.

- The scientific evidence of human-induced global climate change is overwhelming. There is a significant chance that the world will be warmer by 4°C by 2100, with profound ecological and social impacts. Even a warming of 2°C – which is considered by many to be a best-case scenario – entails a devastating future for at least 660 million people[3].

- The most recent (2007) Assessment Report by the United Nations Intergovernmental Panel on Climate Change (IPCC) found that weather patterns have become more extreme, with more frequent and more intense rainfall events, more intense heat waves and prolonged droughts; the timing and location of rainfall has altered[4]. Weather-related disasters (storms, hurricanes, floods, heat waves and droughts) have more than doubled in number over the last 20 years[5]. There are now over 400 weather-related disasters per year and almost 90 million people require immediate assistance as a result; projections suggest that by 2030, this figure could be as high as 350 million[1].

- Almost two decades ago, the IPCC suggested that the "gravest effects of climate change may be those on human migration"[6]. Environmental factors leading to migration may be fast occurring – such as more intense tropical cyclones – or longer-term, such as desertification, or sea level rise that inundates low-lying regions. Longer-term consequences of climate change will include increased health problems, declining food security, soil infertility and drought, together with diminished access to freshwater, and infrastructure damage and disruption.

- In Africa, an estimated 10 million people have migrated or been displaced over the last two decades mainly because of environmental degradation and desertification[7]. The most widely cited figure for the number of 'environmental refugees' is 200 million people who could be forced from their homes by 2050, of which 150 million would be 'climate refugees'[8].

- The majority of people will be internally displaced, migrating only short distances from home. Relatively few are likely to migrate internationally, permanently resettling in other countries.

- The IPCC 4th Assessment Report predicts sea level rise in the range of 18-59 cm during the 21st century[4]. More recent longer term modelling on behalf of the Organisation for Economic Cooperation and Development (OECD) is predicting mean sea level rises of between 0.35 cm and 9m between 2000 and 2500[9]. Nearly one-third of coastal countries have more than 10% of their national land within 5m of mean sea level[9]. 11 of those countries have all of their territory below 5m[10]. The existence of five of these countries would be threatened by a 1m rise in sea level[11].

- Environmental stress caused by climate change is most affecting those communities and regions least able to adapt to change. Economically and socially disadvantaged and marginalised people will be worst affected. Developing countries stand to bear over nine-tenths of the climate change burden meaning, 98% of the seriously affected people and 99% of all deaths from weather-related disasters, along with over 90% of the total economic losses[1].

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- There is no internationally recognised legal term for people who migrate as a result of environmental degradation and climate change. A new legal definition is required for these people and one that does not compromise the status, perceptions or treatment of refugees under the 1951 Geneva Convention.The 1951 UN Convention Relating to the Status of Refugees (1951 Geneva Convention) is the principal international legal instrument benefiting refugees. Drafted in the immediate aftermath of the Second World War, its focus is on those people who are unable or willing to be in their country of origin due to fear of persecution "for reasons of race, religion, nationality, membership of a particular social group or political opinion". Refugee also implies a cross-border movement, rather than 'internal displacement'. Terms such as 'environmental refugee' or 'climate refugee' have no basis in international law, a situation which demands recognition if additional protection is to be conferred to those people worst afflicted by climate change.

"We must not lose sight of existing human rights principles in the tug and push of international climate change negotiations. A human rights lens reminds us there are reasons beyond economics and enlightened self-interest for states to act on climate change..."
Mary Robinson, former UN High Commissioner for Human Rights.

- Too little water in some regions and too much water in others, will bring about what is in effect a forced migration on an unprecedented scale, and with it great human suffering. This report argues that urgent international action to halt climate change is essential and that much can indeed be done; alongside this the international community must recognise that forced environmental migration, in particular due to sea-level rise or drought and desertification must have equitable, immediate and long-term solutions to protect those most at risk.

- Paradoxically, many of the countries and populations that will be most affected – specifically including those in lowlying areas and arid regions – also have some of the lowest per capita greenhouse gas (GHG) emissions. The 50 Least Developed Countries contribute less than 1 percent of global carbon emissions[1].The USA, Russia, Japan, Germany, Canada and the UK were among the top 10 emitters of carbon in 2004[12].

- The UN Framework Convention on Climate Change (UNFCCC) estimated that an additional US$49-171 billion will be needed annually by 2030 for adaptation to climate change[13]. To put these figures in context, the nine biggest US banks paid US$32.6bn in bonuses in 200815; and in the same year, US$150 billion was paid by the US federal government to bailout insurance company American Insurance Group Inc[16]. Meanwhile, weather-related disasters have cost as much as $230 billion over the past five years[1].

- **EJF contends that a new multilateral legal instrument - either a Protocol under the United Nations Framework Convention on Climate Change, or a stand-alone Convention - is required to specifically address the needs of 'climate refugees'. A new legal framework must be supported by a financial mechanism to ensure funding is available for climate change adaptation, and to ensure adequate protection for those most adversely affected.**

INTRODUCTION

"Human progress is neither automatic nor inevitable. We are faced now with the fact that tomorrow is today... Over the bleached bones and jumbled residues of numerous civilizations are written the pathetic words: Too late."
Martin Luther King, Jr.

Climate change is without doubt one of the foremost and most profound threats to environmental security and basic human rights, and its effects are already being observed across the globe. For human populations, the impacts are considerable, with an estimated 325 million people adversely affected, and 300,000 deaths each year[1]. Climate change is deteriorating environmental conditions and compromising the most basic human rights to life, food, shelter, health, and water. The short and long-term effects of climate change will compound existing poverty levels and obstruct social and economic development.

The overall impacts for the developing world are sobering: within this century, hundreds of millions of people are likely to be displaced by Sea Level Rise (SLR); accompanying economic and ecological damage will be severe for many. The world has not previously faced a crisis on this scale, and planning for adaptation should begin immediately[17].

Environmental factors arising from climate change and leading to migration may be fast occurring. For example more intense tropical cyclones or in the longer-term, effects such as desertification or sea level rise that inundates low-lying regions damaging homes and infrastructure, increased health risks, declining soil fertility and lack of freshwater. Fisheries and agriculture are already showing signs of stress, yet they are projected to face a 50% increase in demand by 2030[18]. In the oceans, climate change is reducing the abundance and diversity of fish and other marine life – this could be devastating for the 520 million people – around 8% of the global population – who are dependent on fisheries for food and income. In Africa, an estimated 10 million people have migrated or been displaced over the last two decades mainly because of environmental degradation and desertification[7,19]. A recent (2009) report suggested that about 12 million people have fallen into poverty today because of climate change[1].

Already 26 million people have been displaced as a direct result of climate change[1], by 2050, this number could grow to 200 million people[8] – over 10 times more people than the number of refugees of concern to the United Nations High Commission for Refugees (UNHCR) at the beginning of 2009[20]. The majority of these people are likely to be internally displaced, migrating only within a short radius from their homes and assets. Relatively few will migrate internationally, to permanently resettle in other countries. The Norwegian Refugee Council's International Displacement Monitoring Centre (IDMC) and the United Nations Office for the Coordination of Humanitarian Affairs' (OCHA) study found that in 2008 alone, more than 20 million people were displaced by climate-related sudden-onset natural disasters such as floods and storms, including 800,000 people displaced in the Irrawaddy Delta region by Cyclone Nargis; and almost 80,000 displaced by heavy floods and rains in Brazil in November 2008[21]. In addition, climate change has been linked to health impacts such as the spread of malaria and dengue fever, as well as illness or fatalities directly related to temperature extremes.

Further strains over diminishing natural resources could also lead to exacerbated conflicts. A recent report estimates that 46 countries – home to 2.7 billion people – will be at high risk of violent conflict due to the combined effects of climate change interacting with ongoing socio-economic and political problems[22]. As Ole Waever of the Centre for Advanced Security Theory at the University of Copenhagen notes: "Security is about violent conflict; we have found a new powerful causal variable [in climate change]"[23].

Climate change is exhibiting varying effects in different regions of the world, and developing countries and small island states are disproportionately vulnerable to the adverse effects due to relatively high exposure to physical changes and their low capacity to adapt. Financial and logistical assistance to these countries to help them adapt is slow-coming and insufficient. Of the US$320 million pledged so far through the United Nations Framework Convention on Climate Change (UNFCCC) funds, only US$154 million has been disbursed[24]. This is nine times less than what Americans spend on pet food each month[25]. To put further context on these figures, the nine biggest US banks paid US$32.6bn in bonuses in 2008[15]; and in the same year, US$150 billion was paid by the US federal government to bail-out insurance company American Insurance Group Inc[16]. In August 2009, Yvo de Boer, the Executive Secretary of the UNFCCC said that the global community should be investing US$300 billion annually to combat global warming.

Paradoxically, many of the countries and populations which will be most affected – specifically including those in low-lying areas and arid regions – also have some of the lowest per capita greenhouse gas (GHG) emissions. The 50 Least Developed Countries contribute less than 1 percent of global carbon emissions[1], yet these include a high proportion of the countries, which will be worst affected by climate

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change. Recent reports indicate that as many as 28 countries are at 'extreme risk' from climate change, 22 of which are African countries. Meanwhile, the top emitters (such as Australia and the USA) are at the other end of the scale, and least vulnerable[26].

This report provides an initial look at the observed and projected human costs of climate change, how the rights to life, food, health, water and housing in many regions are being undermined and driving population displacement. From the Small Island Developing States (SIDS), to Alaska and Mozambique, governments are now considering the unthinkable: the need for the relocation of communities, possibly even entire populations.

What is immediately clear is that the severity of the situation demands urgent action. As individuals, we must all takes steps to reduce consumption, saving energy and reducing global emissions. As an international community, we must reach an agreement to curb greenhouse gas emissions, therefore avoiding the worst-case scenarios of climate change. We must also recognize that *even if such action is taken immediately*, there will inevitably continue to be environmental and climatic changes that result in forced migration. Recent studies undertaken by the UK's Met Office show a "best estimate" of 4°C being reached by 2070, with a possibility that it could come as early as 2060[27]. Action must be taken now to plan for the protection of those who lose their livelihoods and homes as a result of climate change.

The Environmental Justice Foundation (EJF) suggests a new category definition of refugee is needed to reflect this unprecedented upheaval facing millions of people across our planet. We argue that this group deserves the equivalent level of protection and assistance conferred to other refugees under the 1951 Geneva Convention and propose a new legal framework must be negotiated to establish commitments and the financial assistance to ensure its timely implementation. Crucially, this must address the majority of displaced people who will not cross international boundaries and will be displaced only a relatively short distance from their homes.

To date only $154 million has been disbursed by the UNFCCC to ameliorate the effects of climate change. In 2008, despite the onset of financial collapse, the 9 biggest US banks alone paid US$32.6 billion in bonuses

The most recent financial crisis has shown that both finance and political will can be mobilised when the implications of impending crises are understood and when the support systems of our modern world are threatened. Climate change presents exactly this threat and developed countries in particular have a clear moral, political and utilitarian imperative to act and assist the primarily poor peoples who will be affected first and foremost as climate change takes hold.

EJF makes the clear case that action to mitigate and adapt should not be used as a reason for inaction elsewhere: while the need to address climate refugees is clear and compelling, so too is the need to urgently control and reduce carbon emissions and prevent the uncontrolled, irreversible warming of our planet.

We have it in our power to prevent the worst effects of global climate change and to help those who will be worst affected, what we need is political leadership and popular action to ensure this happens.

MAKING SENSE OF CLIMATE CHANGE

Until about 200 years ago, and the onset of the Industrial Revolution, the planet's atmosphere contained 275 parts per million (ppm) of carbon dioxide – today that figure stands at 390 parts per million, and is rising by about 2 parts per million every year[28,29]. James Hansen of America's National Aeronautics and Space Administration (NASA) , the first scientist to warn about global warming more than two decades ago, wrote recently, "If humanity wishes to preserve a planet similar to that on which civilization developed and to which life on Earth is adapted, paleoclimate evidence and ongoing climate change suggest that CO_2 will need to be reduced from its current 385 ppm to at most 350 ppm[30]".

THE NUMBERS SPEAK FOR THEMSELVES:

- The global mean temperature for 2008 stood at 14.3°C, making it the tenth warmest year on a record that dates back to 1850[31]. The ten warmest years on record have occurred since 1997[32].
- Global temperatures for 2000-2008 are almost 0.2°C warmer than the average for the decade 1990–1999[33]. Global temperature is now over 0.7°C warmer than if humans were not altering the climate[32].
- 11 of the 12 years between 1995 and 2006 were the warmest on record[32].
- The rate of warming over the last 50 years is almost double that over the last 100 years[32].
- There is a significant chance that the world will be warmer by 4°C by 2100, with profound ecological and social impacts. Recent studies suggest that the world could in fact be 4°C warmer by 2060[27].
- Global average sea level has risen since 1961 at an average rate of 1.8mm/yr, and since 1993 at 3.1mm/yr as a result of melting glaciers, ice caps and polar ice sheets, together with the thermal expansion of ocean waters[32].

BY 2080, A GLOBAL TEMPERATURE RISE OF[39]:

— **2-3 DEGREES CELSIUS**
39-812 million South Asians at risk from water stress

— **1-2 DEGREES CELSIUS**
Storm surges could affect over 100 million people each year; Water shortages could affect 700-1500 million people

CLIMATE CHANGE IS HAPPENING

"Warming of the climate system is unequivocal, as is now evident from observations of increases in global average air and ocean temperatures, widespread melting of snow and ice and rising global average sea level."[32]

WE ARE RESPONSIBLE

Most of the observed increase in global average temperatures since the mid-20th century is very likely due to the observed increase in anthropogenic (caused by human activities) greenhouse gases (GHG) concentrations[32].

Our planet is undergoing climate change as a result of the GHG emissions from human activities such as the burning of fossil fuels, cement production and deforestation. These GHGs, (including carbon dioxide, the most important anthropogenic GHG) occur naturally and form an insulating layer in the atmosphere, which makes the planet inhabitable (the 'greenhouse effect'). However, human activity has produced around 900 billion tonnes of carbon dioxide since pre-industrial times[34]. With annual emissions of GHGs growing, atmospheric concentrations of carbon dioxide (CO_2) and methane (CH_4) in the atmosphere exceed by far the natural range over the last



650,000 years. Global increases in CO_2 concentrations are due primarily to fossil fuel use, with land-use change providing another significant but smaller contribution. It is very likely that the observed increase in methane concentration is predominantly due to agriculture and fossil fuel use; increase in nitrous oxide (N_2O) is primarily due to agriculture[4].

Changes in atmospheric concentrations of GHGs and aerosols, land cover and solar radiation are altering the energy balance of the climate system. The earth's natural insulating layer is increased, enhancing the greenhouse effect: more energy is absorbed and the earth is heating up[4].

There are clear indications that the planet is entering a period of accelerated heating, in which 'positive feedback' processes are playing an important role: ice reflects 80% of the sun's heat, and therefore, "As the warming global ocean transports more heat into the Arctic, sea ice cover recedes and the darker open ocean surface absorbs more sunlight. The ocean stores the added heat, winter sea ice is thinner, and thus increased melting can occur in following summers"[35]. New modelling by the UK's Hadley Centre suggest that the Arctic could warm by up to 15.2°C in a 'high-emissions scenario'[36]. Meanwhile, current projections do not take into consideration the demise of the Greenland Ice Sheet, which alone contains 3 billion km^3 of ice – melting could lead to 7m of sea level rise[4]. Further, warming of tundra regions of the Canadian, Siberian and Alaskan Arctic is already leading to the demise of the permafrost, changing vast areas into bog and shallow lakes, and could lead to the release of billions of tonnes of methane – a GHG thirty times more powerful than carbon dioxide - into the atmosphere, exacerbating the warming effect[4]. Climate change impacts - including reduced rainfall and alterations in seasonal cycles - could result in significant reductions in the extent of forests, and therefore leading to a reduced absorption of CO_2 from the atmosphere[37].

Whilst scientific modelling cannot predict with absolute certainty the outcomes, there is now consensus that change is occurring and can already be observed and recorded. Projections dating to the early 1990s are closely approximating to the reality in regions across the globe. For example, since 1980, the tropical climate zone has expanded by 275 km to north and south, which could lead to 'profound changes in the global climate system', including changes in jet streams and storm tracks[38]. We are already seeing the knock-on effects in the oceans, in plants and animals, in precipitation levels, storms and heat waves, and in melting ice sheets and glaciers. These environmental and climatic changes in turn impact on all our lives, but, for the populations in regions worst hit, the only adaptation to climate change may be migration.

HUMAN INFLUENCE ON CLIMATE CHANGE

According to the IPCC, 'discernible human influences extend beyond average temperature to other aspects of climate'[31]. Human influences have:

- VERY LIKELY contributed to sea level rise during the latter half of the 20th century
- LIKELY contributed to changes in wind patterns, affecting extra-tropical storm tracks and temperature patterns
- °C LIKELY increased temperatures of extreme hot nights, cold nights and cold days
- MORE LIKELY THAN NOT increased risk of heat waves, area affected by drought since the 1970s and frequency of heavy precipitation events.



A RISING STORM

TOO MUCH WATER

Many areas have experienced heavier storms, with significant rainfall increases in eastern parts of the Americas, northern Europe and northern and central Asia[4]. Such heavy rainfall over short periods of time can overwhelm flood infrastructure, damaging crops and infrastructure, jeopardising health and causing fatalities. The world's mega deltas are particularly vulnerable to flooding, and every year there is already around a 75% chance of one of the world's major 136 port cities being inundated with a one-in-a-hundred-year flood[40].

TOO LITTLE WATER

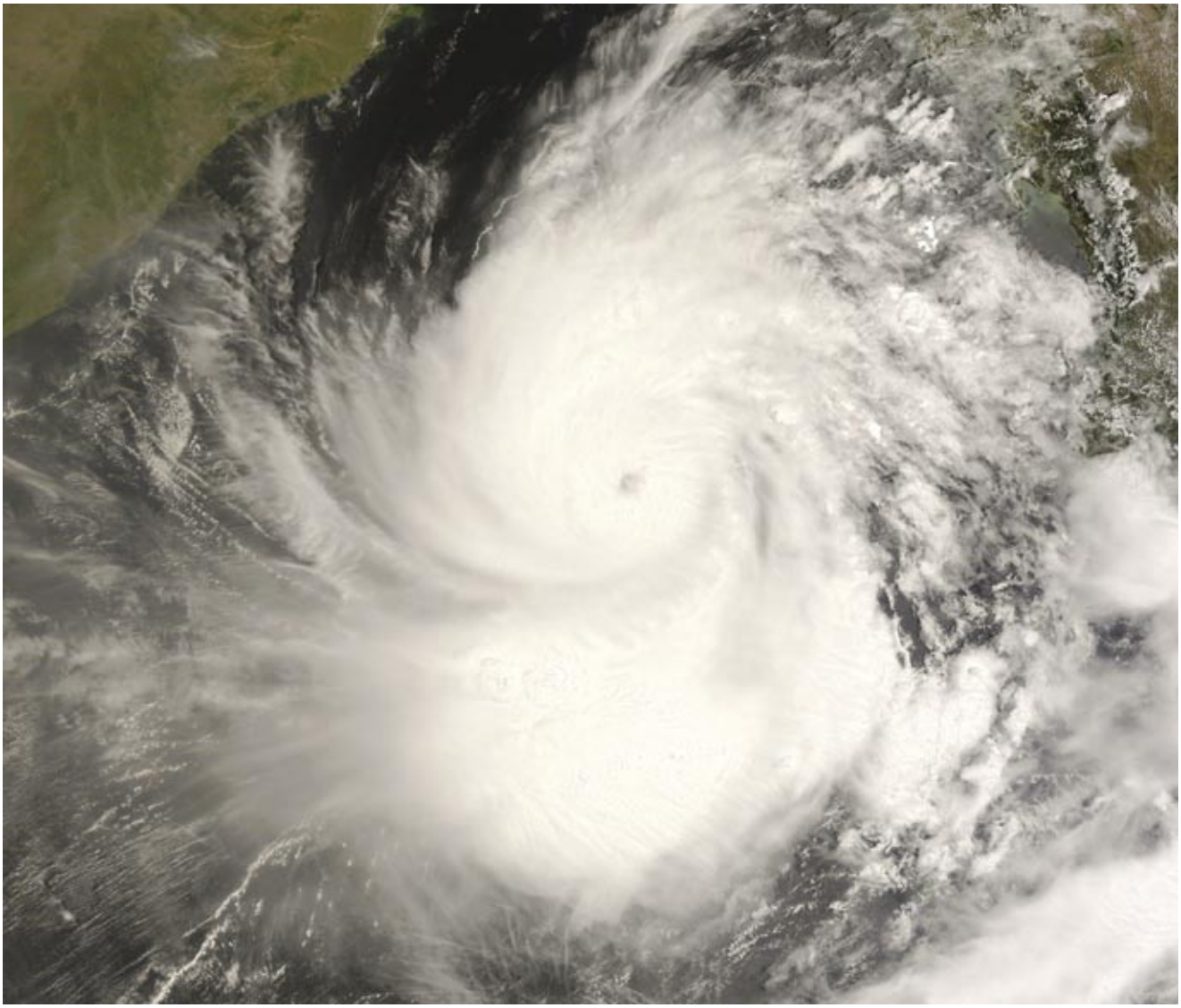
Decreases in precipitation have greatly contributed to desertification and drought. An estimated 250 million people are already directly affected by desertification, with another 1 billion people in more than 100 countries are at risk[41]. In 2008, in Canada, southern British Columbia experienced its fifth driest period in 61 years. Portugal and Spain had their driest winter in decades. Argentina, Uruguay and Paraguay experienced a prolonged and intense drought through much of 2008, causing damage to agriculture. Western Africa and southern Asia have experienced 7.5% decreases in rainfall between 1900 and 2005[32].

TROPICAL CYCLONES

Although it is unclear whether tropical cyclones are increasing in number due to climate change, there is evidence that such storms are becoming more intense in the North Atlantic[4]. Between 1995 and 2007, all but two years had above-average hurricane activity in the Caribbean; the exceptions (1997, 2002) being during the El Niño Southern Oscillation (ENSO), which reduces hurricane activity in the North Atlantic[4]. The 2005 hurricane season was exceptional: it began early, a record number of hurricanes (15) were experienced, of which four reached category 5 status (sustaining winds greater than 135 knots or 155.4 mph)[4]. Hurricane Katrina, which hit the southern coast of the United States in August 2005 was the sixth strongest hurricane on record[42]. More than 1,800 people were killed and caused more than US$80 billion dollars of damage[43]. With more hurricanes reaching higher categories on the Saffir-Simpson Hurricane Wind Scale, higher storm surges, faster wind speeds and subsequently greater damage and higher costs can be expected.

Flooding after Hurricane Katrina: one of 15 North Atlantic hurricanes in the record-breaking 2005 season.

In 2008, Cyclone Nargis, which developed in the North Indian Ocean and hit Myanmar in May, killed 78,000 and destroyed thousands of homes. Nargis was the most devastating cyclone to hit Asia for 18 years, and resulted in the worst natural disaster on record for Myanmar. The 2008 Atlantic hurricane season was devastating, with many casualties and widespread destruction. For the first time in history, six consecutive tropical cyclones made landfall on the USA and a record 3 major hurricanes hit Cuba. Several hundred people lost their lives, including 500 in Haiti[44].



Nargis was the most devastating cyclone to hit Asia for nearly two decades, and was the worst natural disaster on record for Myanmar.

MELTING ICE

Observed decreases in the extent of snow and ice are consistent with warming. The IPCC notes that satellite data since 1978 shows that annual average Arctic sea ice extent has shrunk by 2.7% per decade, with larger decreases in summer of 7.4% per decade[4]. The sea ice extent during the 2008 melt season dropped to its second lowest level since satellite measurements began. In September, sea ice extent was 4.67 million km^2, the second lowest on record (the record low of 4.3 million km^2 was set in 2007)[42]. However, ice was thinner in 2008, and overall volume was at its lowest level since records began[42]. A long-running study by the US Geological Survey of three 'benchmark' glaciers in Alaska and Washington State has indicated a sharp rise in the melt rate over the last 10-15 years[45]. Glaciers, snow and permafrost are melting due to higher temperatures, likely leading to changes to the hydrological systems (including flash floods), the number and size of glacial lakes, and some changes in Arctic and Antarctic ecosystems. Alaska's permafrost base has been thawing at up to 4cm per year since 1992, and at 2cm per year on the Tibetan Plateau since the 1960s[4]. The rate of ice sheet melt in West Antarctica along the Bellingshausen and Amundsen seas has increased by 59% in ten years to reach an estimated 132 gigatonnes per year[46]. The summer season of 2003 was the warmest since at least 1958 in coastal southern Greenland; 2005 was the second warmest and 2006, the third warmest, leading to the third-highest run-off from melting ice sheets in 49 years[47].

CHANGING SEAS

Sea levels are rising due to melt-water from glaciers and ice sheets and the thermal expansion of water in the seas and oceans (global ocean temperature itself has risen by 0.10°C between 1961 and 2003)[4]. Global average sea level has risen since 1961 at a rate of 1.8 [1.3-2.3] mm per year, and since 1993 at a rate of 3.1 [2.4-3.8] mm per year4. Steven Rahmstorf, Professor of Ocean Physics at Potsdam University and a lead author for the IPCC has analysed climate trends and found that sea level rise is actually far greater than even the highest predictions made by the IPCC[48].

NO PLACE LIKE HOME?

HOW CLIMATE CHANGE WILL AFFECT US ALL

SOURCE: IPCC 2007

POLAR REGIONS

• Projected reductions in thickness and extent of glaciers, ice sheets and sea ice. Changes in natural ecosystems with detrimental effects on many organisms including migratory birds, mammals and higher predators. Specific ecosystems and habitats become more vulnerable as climatic barriers to non-native species are lowered.

• For human communities in the Arctic, impacts, particularly those resulting from changing snow and ice conditions, are projected to be mixed; but with some detrimental impacts on infrastructure and traditional indigenous ways of life.

LATIN AMERICA

• By mid-century: increases in temperature and associated decreases in soil water lead to gradual replacement of tropical forest by savannah in eastern Amazonia. Semi-arid vegetation will tend to be replaced by arid-land vegetation.

• Risk of significant tropical biodiversity loss through species extinction.

• Productivity of some important crops and livestock productivity decline, impacting food security. In temperate zones, soybean yields are projected to increase. Overall, the number of people at risk of hunger is projected to increase.

• Changes in precipitation patterns and the disappearance of glaciers significantly affect water availability for human consumption, agriculture and energy generation.

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AUSTRALIA AND NEW ZEALAND

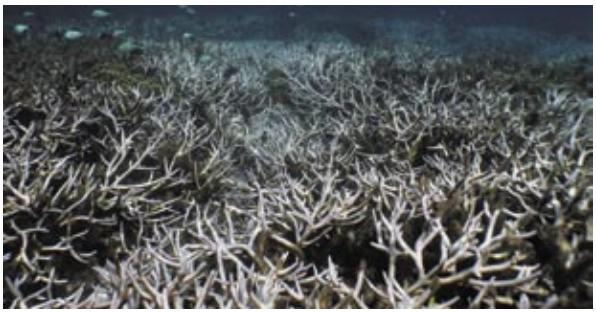
• By 2020: there will be a significant loss of biodiversity including in the Great Barrier Reef and Queensland Wet Tropics.

• 2030: water security problems will intensify in southern and eastern Australia; and, in New Zealand, in Northland and some eastern regions.

• 2030: production from agriculture and forestry will decline over much of southern and eastern Australia, and over parts of eastern New Zealand, due to increased drought and fire.

• New Zealand: initial benefits are projected in some regions.

• 2050: ongoing coastal development and population growth in some areas of Australia and New Zealand will exacerbate risks from sea level rise, storms and coastal flooding.



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EUROPE

• Increased risk of inland flash floods, more frequent coastal flooding and increased erosion.

• Mountainous regions will suffer from glacier retreat, reduced snow cover and declining winter tourism, and extensive species losses (in some areas up to 60% under high emissions scenarios by 2080).

• Southern Europe: high temperatures and drought are projected to worsen in a region already vulnerable to climate variability. Reduced water availability, hydropower potential, summer tourism and, in general, crop productivity are predicted.

• Increase in health risks due to heat waves and the frequency of wildfires.

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AFRICA

• By 2020, between 75 and 250 million people are projected to be exposed to increased water stress due to climate change.

• By 2020, in some countries, yields from rain-fed agriculture could be reduced by up to 50%.

• Agricultural production, including access to food, in many African countries is projected to be severely compromised. This would further adversely affect food security and exacerbate malnutrition.

• By the end of 21st century, projected sea level rise will affect low-lying coastal areas with large populations. The cost of adaptation to coastal countries could amount to at least 5 to 10% of their GDP.

• By 2080, an increase of 5 to 8% in area of arid and semi-arid land is predicted.

SMALL ISLANDS

• Sea level rise is expected to exacerbate inundation, storm surge, erosion and other coastal hazards, threatening vital infrastructure and settlements.

• Deterioration in coastal conditions, for example, through erosion of beaches and coral bleaching, is expected to affect local resources.

• By mid-century, climate change is expected to reduce water resources in many small islands, e.g. in the Caribbean and Pacific, to the point where they become insufficient to meet demand during low-rainfall periods.

• With higher temperatures, increased invasion by non-native species is expected to occur, particularly on mid- and high-latitude islands.

© NASA

NORTH AMERICA

• Warming in western mountains will cause decreased snowpack, more winter flooding and reduced summer flows, exacerbating competition over water resources.

• In the early decades of the century, moderate climate change is projected to increase aggregate yields of rain-fed agriculture by 5 to 20%, but with important variability among regions.

• Major challenges are projected for crops that are near the warm end of their suitable range or which depend on highly utilised water resources.

• Cities that currently experience heat waves will undergo increased number, intensity and duration of heat waves during the course of the century, with potential for adverse health impacts.

• Coastal communities and habitats will be increasingly stressed by climate change impacts interacting with development and pollution.

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ASIA

• By the 2050s, decreased freshwater availability in Central, South, East and South-East Asia, particularly in large river basins.

• Coastal areas, especially heavily populated mega-delta regions in South, East and South-East Asia, will be at greatest risk due to increased flooding from the sea and, in some mega-deltas, flooding from the rivers.

• Pressures on natural resources projected to intensify.

• Endemic morbidity and mortality due to diarrhoeal disease primarily associated with floods and droughts are expected to rise in East, South and South-East Asia.

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WHERE NEXT FOR CLIMATE REFUGEES?

"For the first time in history, you could actually lose countries off the face of the globe"
Stuart Beck, Permanent Representative for Palau at the UN[50]

Almost 20 years ago, the Intergovernmental Panel on Climate Change (IPCC) recognised that the "gravest effects of climate change may be those on human migration"[6]. There is, undeniably, a clear link between climate change, weather-related disasters, and migration, and the number of reported disasters is growing: over the past two decades the number of recorded (weather-related) natural disasters doubled from around 200 to over 400 per year[1]. Currently over 2.8 billion people live in areas of the world prone to more than one of the physical manifestations of climate change: floods, storms, droughts, or sea level rise[1].

A recent (2009) report[1] by the Global Humanitarian Fund suggested that the ten most vulnerable countries – being least-developed and prone to more than one type of weather disaster – are Comoros, Somalia, Burundi, Yemen, Niger, Eritrea, Afghanistan, Ethiopia, Chad and Rwanda. These ten countries have experienced almost 180 storms or floods during the last 30 years; 11 million people were affected by drought in 2008 alone, and 85 million have been affected by droughts in the last 30 years.

The most widely cited figure is of 150 million people who could be forced from their homes due to environmental factors (not solely attributable to climate change) by 2050[8]. Up to 150 million of these would be climate refugees, equivalent to around 1.5% of 2050's projected global population of 9 billion[8]. Other estimates however suggest that anywhere between 25 million and one billion people could be forced to move[53]. A recent (2009) study estimates

"Climate change threatens to cause the largest refugee crisis in human history"
Preparing for a warmer world
by Biermann and Boas[51]

that already 26 million people have been displaced as a direct result of climate change[1]; and the NRC's International Displacement Monitoring Centre and the UN Office for the Coordination of Humanitarian Affairs study[21] revealed that in 2008 alone, more than 20 million people were displaced by climate-related sudden-onset natural disasters such as floods and storms, including 800,000 people displaced in the Irrawaddy Delta region by Cyclone Nargis; almost 80,000 displaced by heavy floods and rains in Brazil in November 2008, and 38,000 affected by flooding in Papua New Guinea in December 2008[54]. Wave heights of recent cyclones have exceeded even those forecast by climate change models – Cyclone Heta which hit Niue in 2004 had waves up to 13.7m and four cyclones in the Cook Islands in 2005 registered waves over 12m[55].

Environmental factors leading to migration may be fast occurring – as a result of cyclones or hurricanes, or longer-term, such as drought and desertification, or sea level rise that inundates low-lying regions. Longer-term consequences of climate change will include increased health problems, with some commentators suggesting for example, the spread of malaria and dengue fever, declining food security, soil infertility and drought, together with diminished access to freshwater will all contribute to the potential for migration.
In Africa, an estimated 10 million people have migrated or been displaced over the last two decades mainly because of environmental degradation and desertification[19]. In Somalia, April 2009, over 60,000 internally displaced persons (IDPs) were thought to have moved as a result of conflict – in fact they had been forced to move because of a lack of food or because all their cattle had died due to the lack of rain[56].

"Unlike some people displaced by conflict or persecution who may one day return home, those displaced by the chronic impacts of climate change will require permanent resettlement.[52]" CARE International

BANGLADESH

Climate refugees from Bangladesh alone might outnumber all current refugees globally[57].

"There are more floods now and the river banks are being washed away faster. There is nowhere to go. My land is in the river, I have nothing now".
Intsar Husain, Antar Para, north-western Bangladesh, 2007[58]

With over 60% of its land less than 5m above mean sea level[59], Bangladesh is the most vulnerable country in the world to tropical cyclones and the sixth most vulnerable to floods[60]. Since 2000, the country has experienced 70 natural disasters[1]. Of its 155 million people, half live below the poverty line and over one third are already suffering from malnutrition and hunger[57,61]. Positioned on the low-lying deltas of the Ganges and Brahmaputra rivers, one-fifth of Bangladesh is flooded every year, and in extreme periods as much as two-thirds can be submerged[59]. More than 5 million Bangladeshis live in areas highly vulnerable to cyclones and storm surges; over half the population lives within 100 km of the coast; and flooding currently displaces about 500,000 people every year[50]. The floods of 1998 made 30 million homeless, killed more than a thousand people[56] and caused economic damage valued at around $3billion[62].

In 2007, two extreme weather events devastated the country: flooding caused 3,363 deaths and affected 10 million people as well as reducing crop yields by 13 percent[50]. Just months later, Cyclone Sidr destroyed 1.5 million houses, large areas of cropland and mangrove forests, and affected 30 out of 64 districts in the country[50]. Millions experienced food insecurity and needed evacuation, shelter and relief assistance. Disaster warnings have helped reduce the number of immediate casualties, but the impacts on food security remain significant. Although agriculture only accounts for around 20% of GDP, over 60% of people depend on production for food security and income[63]. Damage to crops or livestock as a result of natural disasters – such as the loss of 1.3 million tons to flooding in 2007[1] – places a profound pressure on the country's ability to meet its basic needs. In addition, temperature rises of 4°C linked to climate change have been projected as likely to reduce rice production by 30% and wheat production by 50%[64].

TOO MUCH WATER

'For island states, time is not running out. It has run out. And our path may very well be the window to your own future and the future of our planet'
President Remengesau of Palau

Scientists agree that there may be difficulties in accurately projecting sea-level rise in response to warming climates – not least because the response of the Greenland and Antarctic ice sheets to warming is not well understood[64,65]. However, a 2009 study published in *Nature Geoscience*[64] not only explained much of the variability observed over the past 22,000 years, but estimated a 4–24cm sea-level rise during the twentieth century, in agreement with the IPCC projections (2007). The same model also predicts between 7 and 82cm of sea-level rise by the end of the twenty-first century. Though these are slightly larger than the IPCC estimates (18-76cm), nevertheless the study is sufficiently similar to increase confidence in the projections [of sea level rise]. The study's lead author notes that as seas do not respond immediately to temperature changes: "What we did last century will continue to affect sea levels for centuries and centuries"[64].

Sea level rise may still be a remote threat faced by some populations in low-lying areas, but for others, climate change is considered to be at least partially responsible for impacting on lives and livelihoods. Climate change is already linked to coastal flooding and inundation, exacerbated storm surges, damaged coastal infrastructure, salinization of freshwater sources, impaired crop production, damage to coastal ecosystems and fisheries and a diverse range of health risks.

Furthermore, even if – and it is a significant 'if' - climate change is stabilised immediately and major ice-sheet melting avoided, Hadley Centre models still observe a 1m sea level rise over the next 500 years[9]. The fact that these projections are based on a best-case scenario, yet still predict significant sea level rise is important. An OECD report[9] meanwhile stated that "the sea level rise scenarios of up to 9m global mean rise by 2500 threaten large areas around the world's coasts with profound changes that may well exceed our ability to adapt to them". Areas at risk include the extensive coastal lowlands around the southern North Sea, and many deltas such as the Rhone (France), Ebro (Spain), the Po and adjoining Italian northern coastal plain, the Mississippi and the Sacramento San Joaquin Delta (USA). Coastal cities such as London, New York, Tokyo, St Petersburg and Istanbul are also threatened together with important cultural icons such as Venice and environmental treasures such as the Everglades and Louisiana coastal wetlands...the densely populated delta plain of south, south-east and east Asia are also threatened, as are many populated small islands[9,66].

- Of the 10 largest cities identified by the UN, seven – Tokyo, New York, Mumbai, Shanghai, Kolkata, Jakarta and Buenos Aires extend into the Low Elevation Coastal Zone (LECZ) (contiguous coastal land less than 10 metres in altitude)[67]. It has been estimated that, in the absence of any other changes, a sea-level rise of 38cm would increase five-fold the number of people affected by storm surges[2].

- In the densely populated Ganges, Mekong, and Nile River deltas, a sea level rise of 1m could affect 23.5 million people and reduce the land currently under intensive agriculture by at least 1.5 million hectares. A sea level rise of 2m would impact an additional 10.8 million people and render at least 969,000 hectares of agricultural land unproductive[52].

- Nearly one third of coastal countries have more than 10% of their land within 5m of mean sea level[9]; 11 of those countries have all of their territory below 5m[10] and the existence of five of these countries would be threatened by a 1m rise in sea level[11].

- 10% of the world's population – some 600 million people - live in coastal zones that are less than 10m above sea level[67]. The 10 countries with the most people living in the LECZ together account for about 463 million people. Most are populous, and many are also susceptible to subsidence and have populations at risk from storm surges. Vietnam, Bangladesh and Egypt have the largest overall populations in the zone (over 125 million people); China has over 140 million people living within it, and India, Indonesia, Japan, USA, the Philippines together have significant populations at risk[2].

- Between 1994 and 2004, about one-third of the 1,562 flood disasters, half of the 120,000 people killed, and 98% of the 2 million people affected by flood disasters were in Asia, where there are highly populated areas in the flood plains of major rivers (e.g. Ganges–Brahmaputra, Mekong and Yangtze) and in cyclone-prone coastal regions (e.g. Bay of Bengal, South China Sea, Japan and the Philippines)[2].

Being small in area and low-lying, inhabitants will have nowhere to retreat to as the seas inundate their coastlines.

High tides in Funafuti, Tuvalu, inundate homes, land and infrastructure.

"Climate change is today one of the main drivers of forced displacement, both directly through impact on environment – not allowing people to live any more in the areas where they were traditionally living – and as a trigger of extreme poverty and conflict".

Antonio Guterres, UN High Commissioner for Refugees[49]

PARADISE LOST? DISAPPEARING ISLANDS

© Guillaume Collanges/Collectif Argos

"We are just 1.5 metres over sea level and anything over that, any rise in sea level – anything even near that – would basically wipe off the Maldives, so we will be affected very quickly – and very soon – so we need a voice."
President Nasheed of the Maldives, Interview with EJF

One of the greatest threats is to the Small Island Developing states (SIDs), which have by far the largest share of land in the low-lying coastal zones are home to 6 million people[67], have high levels of endemism (species unique to one area), and unique cultures. SIDs tend to be disproportionately burdened with the impacts and costs of climate change, despite being some of the smallest emitters of greenhouse gases. With peak elevations of just a few meters, sea level rise spells catastrophe. In Caribbean and Pacific islands, more than 50% of the population lives within 1.5 km of the coastline[68]. Almost without exception, international airports, roads and capital cities in the small islands of the Indian and Pacific Oceans and the Caribbean are sited along the coast, or on small coral islands. Being small in area and low-lying, inhabitants will have nowhere to retreat to as the seas inundate their coastlines.

Islands in the Pacific are already experiencing a change in climate, and in the longer-term trends in rising sea level, threaten to drown these nations altogether. Tuvalu, in the South Pacific Ocean is the lowest-elevated state; comprising nine coral atolls with a total area of 26 km^2, Tuvalu has a peak elevation of less than 5m above high tide.
Measurements taken by Australia's National Tidal Centre (NTC) around Tuvalu - although unable to establish long-term trends in sea level - nevertheless provide estimates for short-term trends of 5.3mm rises per year[69]. Anecdotal and media reports from Tuvalu agree that sea level rise is being observed – flooding is more regular and spring tides are higher; saltwater intrusion is causing damage to traditional crops; new houses and other buildings are built on 10-foot tall stilts to avoid inundation[70].

Rising seas are projected to contribute to more frequent, higher storm surges and high tides which will exacerbate the existing erosion of the coastline, undermining coastal protection measures, and salinating soils and freshwater

NATIONS LIABLE TO LOSE ALL OR A SIGNIFICANT PART OF THEIR TERRITORY INCLUDE TUVALU, FIJI, THE SOLOMON ISLANDS, THE MARSHALL ISLANDS, PAPUA NEW GUINEA, THE MALDIVES AND, IN THE CARIBBEAN, SOME OF THE LESSER ANTILLES.

wetlands. The fragility was underscored when a damage assessment team estimated that approximately 6.7% of Tuvalu's total land mass had been washed away by Cyclones Gavin and Hina[71].

Migration patterns in Tuvalu follow two paths: from outer islands to the capital Funafuti, and from Tuvalu to Fiji and New Zealand. Under a negotiated scheme (classed as a labour programme rather than resettlement scheme), around 3,000 Tuvaluans have already migrated to New Zealand, many of whom were prompted at least in part by concerns about the environment.

The Maldives is a chain of 1,200 coral islands, home to 300,000 islanders. More than 80% of the total land area is less than 1m above sea level, and the highest point is only 2.4m above sea level. More than 40% of the population, 70% of fisheries infrastructure, 80% of powerhouses and 99% of all tourist accommodation is within 100m of the coastline[72]. In 2009, Raquel Rolnik, UN Special Rapporteur on adequate housing, during a mission to the country noted that "Maldives and its Atolls, because of their unique geological and topographic aspects and their fragile and delicate environmental system, are already experiencing the impacts of climate change."[73]

As in Tuvalu, the Government of the Maldives has considered the possibility of purchasing large tracts of land where the population could be relocated. In 2008, President Nasheed announced plans to create a fund from revenue generated by tourism, to be used to acquire land in countries such as India and Sri Lanka[74]. Whether a viable option or not, nevertheless the plan has helped bolster and highlight the very real prospect of climate refugees, focusing attention on the issue and garnering attention within the international community. In 2009, the Government took the remarkable step of announcing plans for the Maldives to become the world's first carbon-neutral country, achieved by switching from oil to 100% renewable energy production by 2020[75].

FAMILY TIES

A 2009 report published by CARE International reveals that 'most migrants interviewed in New Zealand indicated that climate change and rising sea levels had contributed to their decision to migrate. All interviewees noted a concern that their country could be inundated permanently. One migrant noted, "When I left, it was clear that it would be getting worse year after year...I return once a year, because I still have family in Tuvalu. Maybe they'll come as well to New Zealand, one day. That depends on how bad it gets. I don´t know if Tuvalu will disappear... but I don´t think people have a future in Tuvalu, it's going to get worse."[52]

Vanuatu's 83 islands covering an area of 860,000km^2, are home to around 215,000 people, of whom over 25% inhabit the narrow coastal terraces that make up 5% of the total land area, making them especially vulnerable to sea level change[76]. In 2005, the small community of Lateu became one of the first communities to be relocated, attributable to climate change. Coastal homes were repeatedly swamped by storm surges and more frequent king (exceptionally high, but regular) tides[77].

Kiribati comprises about 32 low-lying atolls and one island dispersed over an area of 3.5 million km^2 [78] – roughly equivalent in size to continental United States, but with a high point of just 5m and a population of around 100,000. Climate change has been described by the President Anote Tong as, "the most fundamental moral challenge for humans in this century. The future of real people is on the line"[79].

In 2009, the Government of the Maldives tabled Resolution L30 at the UN Human Rights Council (HRC), and the successful adoption of this resolution has helped drive recognition that fundamental human rights are inextricably linked to climate change. Various proposals have been made for planned migration and settlement, for example, New Zealand has allowed the resettlement of 3,000 Tuvaluans under a labour programme, but this represents a tiny fraction of the potential numbers who may ultimately need sanctuary as sea levels rise.

AFRICA

- **By 2020, between 75 and 250 million people are projected to be exposed to increased water stress due to climate change.**
- **By 2020, in some countries, yields from rain-fed agriculture could be reduced by up to 50%. Agricultural production, including access to food, in many African countries is projected to be severely compromised. This would further adversely affect food security and exacerbate malnutrition.**
- **Towards the end of the 21st century, projected sea level rise will affect low-lying coastal areas with large populations. The cost of adaptation could amount to at least 5 to 10% of GDP.**
- **By 2080, an increase of 5 to 8% of arid and semi-arid land in Africa is projected under a range of climate scenarios.**

Source: IPCC, 2007

Africa, home to around 900 million people[81], has among the lowest per capita greenhouse gas emissions[82] but is overall considered by many to be the continent most vulnerable to the impacts of climate change[83].

The recent Hadley Centre report suggests that western and southern regions could warm up to 10°C, as well as becoming more arid. Expanding populations, intense agricultural activity and poor management of natural resources combined with the early effects of climate change have already doubled the rate of desertification since the 1970s[84]. Every year 12 million hectares of land are lost to deserts[83] and the southward shift of the climate zones is already evident, with the Saharan desert extending into the Sahelian zone[85]. At present, almost half (46%) of Africa's land area is vulnerable to desertification[86] and the UN has warned that by 2025 two-thirds of arable land will have been lost[84]. Models project that climate change will expose 75-250 million people in Africa to increased water stress[86], with the water-stressed Sahel and other dry areas predicted to become even drier.

46% of people in Africa live in poverty, and Africa is the only region in the world where the number of people living in extreme poverty has almost doubled over the last two decades[87]. By 2015, more than 400 million people could be living in extreme poverty[87]. Climate change compounds existing poverty by undermining water and food security, health, economic development and even political and social stability. It represents a serious obstacle to development, and, in its most severe forms, is likely to contribute to increasing violent conflict.

Africa, home to around 900 million people, has among the lowest per capita greenhouse gas emissions but is arguably the continent most vulnerable to the impacts of climate change.

TOO LITTLE WATER...

In West Africa, rainfall declined by 20-40% between 1931-1960 and 1968-1990, and in the tropical rainforest zone of North and South Congo rainfall declined by 3% and 2% respectively[86]. Droughts are becoming more frequent and more widespread, and river flows in some of Africa's major rivers (such as the Niger and Senegal rivers) have declined[86]. In the future, it seems likely that Africa's Mediterranean coast will become drier, and some climate models project this drying trend to extend into the northern Sahara and down the West Coast as far as 15°N[4]. By 2050, rainfall in Sub-Saharan Africa is predicted to decline by up to 10%[88].

The consequences will be particularly severe for populations living on marginal areas dependent upon rain-fed agriculture[89]. In Sub-Saharan Africa, 75% of agriculture is rain-fed, and a decline in precipitation could reduce some yields by up to 50% by 2020[88]. The families that lack sufficient resources to cope with these food shortages will suffer food insecurity, which could lead to famine.

The drought of 2002-2003, for example, created a food deficit of 3.3 million tonnes and left 14.4 million people in need of food aid[90].

Currently, more than one-third of people in Africa live in a water-scarce environment[91], and the continent has been described as being in *"an increasingly critical water situation"* by the UN[89]. Sub-Saharan Africa is the most water stressed region in the world[92] and increasing water scarcity and drought lead to desertification, soil erosion, reduced agricultural productivity, and ultimately poverty. Drought and desertification have been labelled by the United Nations Economic Commission for Africa (UNECA) as some of Africa's most pressing environmental problems, and *"at the core of serious challenges and threats facing sustainable development in Africa"*[89].

Drought and desertification are at the very core of threats to sustainable development in Africa.

CASE STUDY: WATER, MIGRATION AND CONFLICT IN SUDAN

The conflict in Darfur, Sudan, has been described by the UN as one of the worst humanitarian crises in the world[94]. It continues to affect 4.7 million people, and has forced 2.7 million people from their homes[95]. A recent UN study suggested a 'very strong' relationship between land degradation and desertification and conflict in Darfur[96], and some have even claimed it to be the first war linked to climate change[97,98,99].

Sudan suffers from a chronic shortage of freshwater. The past 40 years have seen rainfall decline by 30% across the country, which has been devastating for agriculture. Deserts have expanded south by as much as 200km since the 1930s, and pasture land is disappearing and water-holes are drying up[96].

The impact of these deteriorating conditions is considered to be one of the underlying causes of the Darfur conflict, as it forced pastoralists to move south into areas owned by sedentary communities, causing competition for resources. For example, the southward migration of camel herders from the Hawazma Baggara tribe into Nuba rangelands, and the subsequent stripping of trees for camel fodder, has led to renewed warnings of armed conflict. Such competition over natural resources has motivated the majority of local confrontations between 1930 and 2000[96].

"There is mounting evidence that the decline in precipitation due to regional climate change has been a significant stress factor on pastoralist societies – particularly in Darfur and Kordofan – and has thereby contributed to conflict." UNEP

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In West Africa, a one-metre sea-level rise would affect up to 70% of Nigeria's coastline affecting over 2.7 million hectares. Egypt would lose at least 2 million hectares in the fertile Nile Delta, displacing 8-10 million people, including nearly the entire population of Alexandria, which would cost the country over $32 billion[80].

In West Africa, long-term declines in rainfall between 1970 and 1990 resulted in a 25-35km southward shift of the Sahelian, Sudanese and Guinean ecological zones[86]. The UN warns that by 2025 two-thirds of arable land in Africa could be lost, amounting to an average annual agricultural GDP loss of 3% in the Sub-Saharan African region alone[89].

Across Africa, desertification is displacing increasingly large numbers of people: whose livelihoods cannot be sustained by declining productivity. In Burkina Faso, for example, desertification is said to be the cause of 60% of the expansion of main urban areas[93]. By 2020, around 60 million Sub-Saharan Africans may have migrated from desert areas towards North Africa and beyond[93].

...TOO MUCH WATER

In African cities, 72% of people live in slums (often in poorly constructed homes on floodplains, unstable slopes, former mangrove swamps or tidal flats)[3], and it is these residents that are most vulnerable to the threat and impacts of flooding[100]. Climate change is intensifying rainfall and heavy storms, and rising seas threaten low-lying coastal deltas[88]. The Red Cross reports a rapid increase in the number of flood emergencies they have attended across the continent; jumping from just five in 2004 to thirty-two in 2006[101].

The impacts of coastal flooding are substantial because of the huge numbers of people exposed to the problem. One-quarter of Africa's population live in the resource-rich coastal zones, and in West Africa, 40% of the population live in coastal cities[86]. The fertile floodplains are used for agriculture, and urban centres attract industry and spending on infrastructure. In Eritrea, the government has estimated that the damage to the port city of Massawa associated with 1m sea level rise would cost more than US$250 million[102]. Whilst in Kenya, a 1m rise and the associated losses of three crops (mangoes, cashew nuts and coconuts) are predicted to cost almost US$500 million[103].

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Women in Mozambique practice flood evacuation plans

CASE STUDY: FLOODING IN MOZAMBIQUE

Mozambique is one of the most deprived countries in the world and the UN ranks it 175th out of 179th on its human development index[104]. Declining rainfall contributed to a 30% drop in cereal harvest for 2006/7, leaving 470,000 people in need of food aid[105].

The Global Humanitarian Forum identifies Mozambique as one of the countries most vulnerable to drought and flooding[1]. In early 2007, severe flooding of the Zambezi River and damage by Cyclone Favio left 520,000 people facing high levels of food insecurity and an additional 140,000 at risk of food shortages[105]. In 2008, new flooding displaced nearly 100,000 people[106], and up to a million people were adversely affected, by damaged transport infrastructure and water-borne diseases[105].

Over the coming decades, Mozambique is projected to lose 55% of its coastal GDP as 41% of coastal land is impacted by rising sea levels and intensified storm surges. Nearly half of coastal wetlands and more than three-quarters of urban zones along the coast are projected to be affected, directly impacting on the lives of around 400,000 people[17].

The floods of 2006 and 2007/2008 displaced 55,000 families and placed significant burdens on Mozambique's National Relief Agency (INGC) which worked to re-home people[107]. Such a resettlement illustrates the very basic needs of climate adaptation and the need for long-term planning and resettlement - families have had to wait for the pledged US$2,000 worth of materials to build their new homes[108] and a reported 18,000 people were evacuated due to further flood risks from the Zambezi[109].

WHERE NEXT? A CHARTER FOR CLIMATE REFUGEES

"A successful outcome of ongoing climate change negotiations matters for human rights. A new climate change agreement must be fair, balanced and sufficiently ambitious to be effective. Climate change is related not only to environmental factors but also to poverty, discrimination and inequalities – this is why climate change is a human rights issue"
Kyung-wha Kang, UN Deputy High Commissioner for Human Rights, June 2009.

THE RIGHT TO A SECURE ENVIRONMENT IS A FUNDAMENTAL HUMAN RIGHT, ONE WHICH IS BEING UNDERMINED BY THE ACTIONS OF THE BIGGEST EMITTERS OF GREENHOUSE GASES.

With an estimated 150 million climate refugees by 2050, it is clear that new strategic priorities and planning to address their needs is essential. Yet slow steps have been taken towards recognising that for millions of people, changing environments will render their homes uninhabitable, and potentially will do so within a very short timeframe. Addressing this issue in the near term must be seen not as an alternative to reducing GHG emissions, but complementary to it, recognising that even if stringent emissions targets are agreed to and met, existing GHGs in our atmosphere will have continued impacts on the global environment for decades to come.

Despite growing awareness of the impacts of climate change on migration, displacement and even conflict, there is no internationally recognised legal term for people who migrate as a result of environmental degradation and climate change, or the 'internally displaced persons' (IDPs), who are forced from their homes. As a 2009 report by CARE International acknowledged, "Climate change will result in cases that do not fit into current distinctions between voluntary and forced migration, at present, people who move due to gradually worsening living conditions may be categorized as voluntary economic migrants and denied recognition of their special protection needs"[52].

Crucially the terms 'environmental refugee' (which came into usage in the 1970s) and the more recent 'climate refugee' have no basis in international law. The 1951 UN Geneva Convention Relating to the Status of Refugees is the principal international legal instrument benefiting refugees. Drafted in the immediate aftermath of the Second World War, its focus is on those people who are unable or willing to be in their country of origin due to fear of persecution "for reasons of race, religion, nationality, membership of a particular social group or political opinion". Thus, in the context of climate change it would imply that the refugee is trying to flee a government: this is not the case – they are threatened by the actions of the international community and specifically the failure to reduce their carbon emissions and/or provide assistance for climate adaptation.

In the absence of a clear international legal framework, proposals have been mooted that would indeed give 'climate refugees' the same rights as refugees under the 1951 Geneva Convention. In 2006, delegates to a meeting organized by the Maldives Government proposed an amendment to the 1951 Convention, extending it to include climate refugees. However, legal commentators and governance experts have questioned whether this is the most appropriate and effective response. The United Nations High Commission for Refugees (UNHCR) which has responsibility for 10 million refugees would be stretched by the prospect of having to deal with 15 times that number. In fact, commentators have noted that most receiving States actually want to restrict the refugee regime further, rather than extend it in the current form[57]. The protection of climate refugees is "essentially a development issue that requires large-scale, long-term planned resettlement programs for groups of affected people, mostly within their country. Often this will be in concert with adaptation programs for other people who are not evacuated but can still be protected, for instance through strengthened coastal defences"[57].

The development of a new legally-binding international instrument for climate refugees is therefore needed to address these issues, and avoid inconsistency and confusion, which will lead ultimately to a failure in our collective humanitarian response. A new legal instrument, either a protocol under the UN Framework Convention on Climate Change or a stand-alone convention has been mooted. Docherty and Giannini of Harvard Law School (2009) propose a new convention on climate change refugees, precisely because neither refugee law nor climate change law precisely and definitively address the issue of climate change refugees, and no international institution has a clear mandate to serve the populations which need human rights protection and humanitarian aid. Their proposal is for a convention that would guarantee assistance, spread the burden of responsibility and establish an independent administrative system[110]. Meanwhile, Professor Frank Biermann and Ingrid Boas of Vrije University suggest that a protocol under the United Nations Framework Convention on Climate Change (UNFCCC) is the most appropriate vehicle to expedite the situation, having at its basis the following five principles:

1. Planned and voluntary resettlement and reintegration (as opposed to ad hoc emergency relief responses).
2. Climate refugees should be treated the same as permanent immigrants as they cannot return to their home.
3. It must be tailored to entire group of people, including entire nations, as is the case with small island states.
4. Support for national governments to protect their people will be required (as opposed to the existing refugee regime).
5. The protection of climate refugees must be seen as a global problem and a global responsibility. “In most cases, climate refugees will be poor and their own responsibility for the past accumulation of greenhouse gases will be small...the responsibility of the industrialised countries to do their share in financing, supporting and facilitating the protection and resettlement of climate refugees.”[57]

In whichever formulation proves to be most politically, technically and financially viable, it is clear that a new legal agreement is needed on both humanitarian and practical grounds. Further, because climate change’s link to global human activity and GHG emissions, the international community should take responsibility for mitigating the harm to which it has contributed. The planned resettlement of millions of people will require substantial funds, which should be committed under a global fund, and should include novel and equitable funding streams, such as will be required to mitigate climate change and planning for a low-carbon future.

With increasing recognition at all levels that the effects of climate change are already shaping lives, agreement for the negotiation of a climate refugees protocol should begin forthwith. Waiting until 2050 will be too late.

CONCLUSIONS

There is overwhelming and unequivocal evidence that climate change is occurring, with impacts on sea level, floods, droughts, storms and other extreme weather events. The impacts of climate change are being felt hardest by some of the world's poorest, most marginalised and remote communities, which have least responsibility for greenhouse gas emissions. Major cities as well as rural communities are at risk, with little opportunity or support for adaptation to the impacts of climate change.

Even with immediate, robust targets agreed to and implemented, the existing loading of greenhouse gases in the atmosphere will continue to have long-term effects, which must be considered. Of these, the potential for desertification, water stress and sea level rise have massive implications for populations at greatest risk, especially in Sub-Saharan Africa and in low-lying areas.

There are predicted to be many millions of people who are forced to leave their homes over the next century as a result of climate change and its impacts. These people, whether displaced internally or across national boundaries, currently have no recognition in international law. Nor do they have the necessary international support to assist them in adapting successfully to changes in their own localities and countries or to resettle elsewhere.

Support for adaptation, amelioration of the worst impacts and, as a last step, for relocation from the most vulnerable areas are essential. Some of the most culpable countries in terms of GHG emissions are rich, developed nations, and they bear the greatest responsibilities to take action on climate change and its impacts, including on climate refugees. The fact that the national governments of some of the poorest states will be burdened with the costs of resettling their population is inequitable when historically they are some of the smallest contributors to the problem.

There is a need for the international community to urgently adopt significant targets for the reduction of greenhouse emissions. Alongside this is the need to consider a new legally-binding agreement that addresses climate refugees, providing them with recognition in international law, and conferring the targeted support that they require. The countries with the highest per capita emissions levels should recognise their culpability in this issue, and commit to providing financial and other essential support that will help ameliorate the problem.

As a necessary first step, the international community should explicitly recognise within climate change negotiations that the right to a secure environment is a fundamental human right that must be upheld.

RECOMMENDATIONS

THE GLOBAL COMMUNITY MUST RECOGNISE THAT CLIMATE CHANGE IS ONE OF THE FOREMOST THREATS TO HUMANITY, WITH MASSIVE AND UNPRECEDENTED ECONOMIC, SOCIAL, ENVIRONMENTAL COSTS.

MITIGATE:

1. Address and mitigate climate change by agreeing to and abiding by robust new international targets to reduce GHG emissions. Rich countries must commit to reductions in emissions by at least 40% from 1990 levels by 2020 and all countries must act to reduce global emissions by at least 80% below 1990 levels by 2050. (In August 2009, a group of small Pacific states called for a 45% cut in emissions by 2020, and by 85% by 2050[111])

2. Shift to low-carbon, high-efficiency energy sources. Renewable energy portfolios must be developed and expanded. Alongside the domestic growth in 'green' technologies, developed countries should also work to remove obstacles to enable the transfer of these cleaner technologies to developing countries. This should include improved information exchange and funding.

3. Halt deforestation. The emissions from deforestation rival those from all transport combined, and so urgent action needs to be taken, with zero-deforestation targets in the mid- to long-term for key regions. Programmes developed must involve indigenous peoples and civil society groups in decision-making, and projects to protect the global forest estate must not be subverted to become a carbon offsetting tool for industrialized countries.

4. Individuals must recognise their culpability in climate change, taking responsibility for their greenhouse gas emissions. Simple, but effective, steps can be taken by everyone to reduce consumption, waste, and emissions.

Individuals can also make a difference by reducing their energy consumption and therefore their environmental footprint. These steps can actually save households money and will make a significant reduction in global emissions.

See EJF's leaflet titled 'Reducing your energy consumption', available on the website – www.ejfoundation.org/consumerguide

ADAPT:

1. The international community must acknowledge the fundamental link between climate change and displacement, and the importance of migration as an adaptive strategy. It must recognize climate refugees, the majority of whom are likely to displaced within a small radius of their homes rather than across national boundaries, in international law and ensure universally-agreed, targeted responses.

2. The international community must agree to initiate negotiations for a new legally-binding agreement on climate refugees. A new legal framework, either under the UNFCCC or as a stand-alone convention, must build on existing international mechanisms or ensure policy coherence between mitigation, adaptation, humanitarian relief and the attainment of the Millennium Development Goals.

3. A global fund to implement a new legally-binding agreement must be devised, with a focus on equitable solutions that reflect a growing commitment to redress the adverse impacts of climate change.

4. Additional funding to enable adaption in developing countries, especially those most vulnerable to climate change, must be made available. Based on the estimates of funding needed for adaption, EJF recommends annual funding of at least 1% of World Gross Product (WGP), or US$500-600 billion, is needed.

Note: EJF's recommendation for adaption funding is based on calculations in the latest UN World Social and Economic Survey (2009)[13], which suggests the figure of US$500-600 billion per year. Other estimates range from US$150 billion to US$1.2 trillion per year[112,113].

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