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# Climate Change and Humanitarian Action: Key Emerging Trends and Challenges

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## INTRODUCTION

During the past century global temperatures increased by approximately 0.7 degrees Celsius. According to the Intergovernmental Panel on Climate Change (IPCC), the pace of climate change is now such that even in a 'best-case' scenario, further increases of at least 1 degree are expected by 2050. According to the IPCC, current emissions are already nearing the limit required in 2015 to keep warming below 2 degrees Celsius; the level UNDP defines as a "a reasonable and prudent long term objective for avoiding dangerous climate change". In the absence of swift action to radically reduce greenhouse gas emissions, increases of a minimum of 3 degrees by 2050 can be expected.[i]

However, the effects of climate change can already be seen. They impact the lives of millions of people and will increasingly do so. Climate change already is increasing the frequency and intensity of natural hazards – particularly floods, storms, and droughts – and changing the morbidity patterns of diseases such as malaria and dengue fever, which increase the vulnerability of populations and are major killers in emergency settings. These trends are predicted to accelerate.

Climate change is also redrawing the world maps of population, wealth and resources – changing where and how people are able to live their lives. Despite certain positive benefits, for example on agriculture, in distinct environments, the overall effects will be overwhelmingly negative, particularly in developing countries. Increasing climate-related disasters and the more insidious impacts of climate change on sea levels, water availability and agricultural production are already increasing food insecurity and threatening livelihoods. Increased competition for scare resources such as water and fertile land is likely to increase the likelihood of forced displacement and migration, political instability and even violent conflict, especially when considered in the context of rapid population growth in many of the most at-risk regions.

Although climate change effects are being felt in all parts of the world, the poorest and most vulnerable communities will suffer most. People who are already vulnerable to hazard events – whether due to social factors such as poverty, social marginalisation, gender barriers, age, or a lack of access and knowledge of how to prepare themselves in the face of extreme hazards – are most at risk.

Climate change is therefore likely to mean increased humanitarian caseloads. The effect of climate change is already straining the disaster relief system and the threat of extreme climatic events in the future is likely to generate higher demands for disaster assistance that will prove more costly. Tackling the threat of climate change in risk-prone areas will need a system-wide shift in our attention – in the shape of more funds, resources and expertise – to strengthen disaster risk management, risk reduction and preparedness for an effective response.

## CHANGES IN THE FREQUENCY AND INTENSITY OF CLIMATE-RELATED HAZARDS

According to the IPCC, destructive heavy precipitation events are very likely to increase in frequency, increasing flood risk. Intense tropical storms are likely to increase as a result of climate change.[ii] According to WMO, every one-degree increase in tropical sea surface temperature will likely result in a 3-5% increase in cyclone wind-speed.[iii] The experience of recent storms, such as Hurricane Katrina and Cyclone Nargis show how easily even relatively small increases in storm strength, whether caused by existing variation or climate change, can overwhelm existing local preparedness capacity. These effects will be coupled with increased climate unpredictability and variability that will expose larger, often less prepared areas to extreme weather events.

We are already seeing the early effects of increased climate variability as it combines with increased social vulnerability to cause more climate-related disasters. In the last 20 years, the average annual recorded number of disasters caused by floods has risen from about 50 to more than 200. In terms of humanitarian response, floods and storms now make up the bulk of sudden onset international disaster responses. In 2008, the UN humanitarian system issued 10 flash appeals. Every one of these was in response to a disaster

resulting from extreme weather. In 2007, 14 out of 15 flash appeals were in response to extreme weather disasters.

The impact of increased climate-related disasters falls hardest on poor communities in the developing world, many of which are already especially vulnerable to natural hazards. Spatial analysis of the current hotspots of climate-related hazards (cyclones, droughts, floods and landslides) shows that those hazards largely concentrate in certain areas and that the poor are at significantly higher risk from most climate-related hazards.[iv] This has also been correlated to associated factors, including weak governance, in a number of contexts. Furthermore, the poorest communities tend to have limited adaptive capacities, and are more dependent on climate-sensitive resources such as local water and food supplies. They are less likely to have adequate shelter, preparedness measures, or insurance, making them more likely to require external humanitarian assistance in disasters.

Over the medium to long term, sea level rise is expected to further increase the impacts of floods and storms on coastal communities and threatens to put hundreds of millions more at risk of disasters.[v] The low elevation coastal zone covers two percent of the world's land area, but contains 10 percent of global population. Furthermore, least developed countries have a higher share of population (14 percent) living in coastal zones compared with developed countries (10 percent). Almost two-thirds of mega-cities with populations greater than 5 million are located, at least partly, in low-lying flood-prone areas.[vi]

Taking into account increases in coastal populations, sea level rise and extreme weather are projected to affect an estimated 20 percent of the population in developing countries and lead to a substantial increase in economic losses during the 21st century.[vii]

More frequent and intense storms and floods erode community coping capacity to prepare, respond and rebuild after successive hazard events. Increases in future financial losses from disasters will hold back economic growth and development in high-risk areas, further widening the gap between those countries able to afford to reduce their disaster risk, and those left increasingly vulnerable. Disaster losses are a major barrier to achieving the United Nations Millennium Development Goals and will continue to undermine development as climate change progresses, as well as potentially acting to increase inequity between rich and poor countries.[viii] According to the Stern Review, the economic costs of climate change could reach 5–20 percent of world GDP by 2050, depending upon how costs are measured.

## HUMANITARIAN IMPLICATIONS OF CLIMATE CHANGE

In addition to increasing the frequency and intensity of natural hazard events, climate change has a number of other effects with humanitarian implications. These relate to vital resources, including fertile land, food and water, health, and forced displacement and migration.

### Increased drought and stress on water resources affecting agricultural production and food security

Climate change is expected to lead to more prolonged droughts and increases in the extent of drought-affected areas. [ix] While drought itself does not necessitate increased humanitarian response, when combined with high vulnerability it can result in 'slow-onset' disasters characterised by emergency levels of malnutrition, human mobility and a breakdown of community coping mechanisms.

The world's major arid regions are in the developing world, where the population growth rate is high and socio-economic development levels are low. Around one-sixth of the world's population is currently living in arid and semi-arid regions and more than 250 million people are already directly affected by desertification, while another one billion are at risk.[x]

Drought – combined with other affects on fresh water availability, such as melting glaciers and salinisation due to sea level rise – is expected to have severe consequences for agricultural production. The effects are likely to be most severe in already vulnerable areas in Africa and South and South East Asia.[xi]

South Asia currently supports a quarter of the world population, with just one twentieth of the world's annual renewable water resources and 2.4 billion people in South Asia are predicted to be living in regions of high water-stress in the next fifty years. By 2035, there is a high chance that, under the influence of climate change, the glaciers that feed the Indus, Ganges, and Brahmaputra will have disappeared altogether. The flow of those rivers will become seasonal, bringing massive changes in the capacity of the land to support such the hundreds of millions of people who rely in them rivers to support their livelihoods.

In Africa, higher temperatures and lesser and more seasonal rainfall will also place up to 250 million more Africans under severe water stress by 2020. This will affect East, West and North Africa, the latter suffering a rapid and severe decline in potable water, possibly by as much as 50 percent up to 2050.[xii] On present trends, the area of Eastern Africa affected by drought is expected to double by the end of this century. In some African countries, agricultural production fed by rainfall is projected to halve by 2020, with the most populated regions of the Sahel and Southern Africa among the worst affected. Seventy percent of the African population relies on rain-fed agriculture for their livelihoods and even a slight shift in rainfall patterns or temperature could be disastrous.[xiii]

Reduced agricultural productivity will automatically result in reduced food availability leading to increased food insecurity, especially in the context of higher demand for food and food price volatility. Taking in to account substantial agricultural production losses and an increase in the prices of crops due to climate changes, by 2080 an additional 90 to more than 125 million people in poor nations will be at risk of hunger.[xiv]

Food shortages have also been linked to political violence, as demonstrated by the food riots that took place in at least a dozen countries during 2008 as a result of high food prices. Climate change is set to further exacerbate such tensions.

**Increased risks to human health**

The most obvious risks to health as a result of climate change are increases in deaths and injuries as a result of increased extreme weather events, as well as increased malnutrition as a result of droughts and other effects on food production. In addition, more frequent heat waves are likely to have significant health impacts, even in developed countries. Heat waves like that experienced in 2003 in Europe, when 35,000 people died and agricultural losses reached USD 15 billion will be commonplace by the middle of the century.

However, changes in the climate are also expected to have a diverse range of adverse impacts on disease ranges and epidemiology.[xv] Climate change will cause changes to the geographic range (latitude and altitude) and seasonality of certain infectious diseases – including vector-borne infections such as malaria and dengue fever, and food-borne infections (e.g. salmonellosis) which peak in the warmer months. Increases in temperatures resulting from global warming have already begun to extend the range in which diseases such as malaria and dengue fever can thrive.

While populations in well-established high-prevalence zones often have a degree of local immunity, newly exposed populations are more susceptible. Increased flooding may also contribute to higher rates of water-borne diseases and acute diarrhoea. Climate change may also play a role in the emergence of new disease strains that could cause a pandemic because environmental changes are very often the drivers for a new infection to emerge.

The magnitude of these complex impacts is difficult to quantify. However, studies suggest that climate change may swell the population at risk of malaria in Africa to 90 million by 2030.[xvi] Research by WHO suggests that changes to the climate over recent decades have already affected some health outcomes. It estimates that climate change was responsible in 2000 for approximately 2.4 percent of worldwide diarrhoea, and 6 percent of malaria in some middle-income countries.[xvii]

**Increased risk of forced displacement and migration**

The effects described above are likely to have significant secondary consequences on society as people are displaced or migrate as a result of increased disasters, sea level rise, and competition over scarce natural resources or environmental decline. These effects will take place in the context of rapid population growth, especially in many least developed countries and resource scarce environments, and are likely to increase social tensions and political instability, perhaps in some cases contributing to violent conflict. Climate change will occur in a demographic context where according to current trends, the population of many African countries will double within in the next 40 years. In some countries already experiencing recurrent food insecurity, such as Ethiopia, the population will double in closer to 25 years.[xviii]

The magnitude of these effects is almost impossible to predict but they are likely to have very significant consequences for humanitarian operations. The IPCC quotes estimates that by 2050 150 million people may be displaced as a result of the impacts of climate change, mainly the effects of coastal flooding, shoreline erosion and agricultural disruption. Shrinking glaciers and sea-level rise will also contribute to mass movements of populations. Population movements on such a scale may overwhelm the capacity of state authorities, and the international community, to respond, and even threaten global stability and security.

An increase in the number of people temporarily displaced will be an inevitable consequence of more frequent, intense extreme weather events affecting more people globally. These affects may be particularly intense in coastal areas and among the growing number of informal urban settlements. In 2008, at least 20 million people were forced to leave their homes due to sudden-onset climate-related natural disasters. This is roughly comparable in scale to the 26 million people internally displaced globally due to conflict in the same period.[xix] In the context of climate change, it is highly possible that displacement related to extreme weather events will outpace other forms of internal displacement in the near future.

Heightened drought risk, desertification and changes in land and water availability, coupled with reduced access to basic resources may also fuel longer term migration and forced displacement. Research in Egypt, Mozambique and many other locations, indicates that environmental factors, including those likely to result from climate change, are major factors influencing migration. A recent study in Mozambique suggested that forty percent of migrants to urban areas said that they moved from their original rural home in part because of environmental problems. Another forty percent of the urban migrants indicated that they expect environmental problems in the future to make them migrate again. Similar studies in Egypt showed that water shortages and land degradation fuelled internal population movements and that those with the most marginal livelihoods were more likely to move. [xx]

As land availability and land values change, some groups are at a greater disadvantage than others. For example, indigenous and pastoral communities are particularly vulnerable because the legitimacy of their land and territorial rights are often unrecognised. In addition, many indigenous peoples occupy territories that are particularly vulnerable to climate change, such as mountain and polar lands where melting glaciers and ice sheets may disrupt the supply of fresh water available and significantly alter the distribution range of fish and wildlife populations.

**Possible security implications**

The impact of climate change on water availability, food security, coastal boundaries, and population movements may also combine with non-climate related factors, such as poverty, governance and existing regional tensions, to trigger and exacerbate conflicts.

Although environmental factors are rarely, if ever, the sole cause of violent conflict, according to UNEP, over the last sixty years at least forty percent of all intrastate conflicts have had a link to natural resources, including minerals. Some, including those in Darfur and the Middle East, have specifically involved

control of scarce resources such as fertile land and water, which are likely to be affected by changes in the climate.[xxi]

Climate change will not happen in a vacuum, its effects will interact with other factors such as the financial, commodity and oil price volatility, extreme poverty, resource scarcity, overpopulation, and food security. All of these challenges can lead to increased violence and unrest, and will require longer-term structural responses.

In the longer term, and in the absence of sufficient global mitigation and adaptation action based on the "polluter pays" principle, there is a possibility that carbon emissions themselves may become a significant source of geo-political tension if climate change impacts widen the gap between carbon emitters and those most affected.

## IMPLICATIONS FOR OCHA AND THE HUMANITARIAN SYSTEM

**Member States' decisions on risk management, risk reduction and risk transfer systems and mechanisms in Copenhagen will significantly change the global humanitarian operating environment, particularly with regard to funding and operating systems.** This constitutes an unprecedented opportunity to strengthen global risk management and reduction systems. Conversely, it is essential that new financial commitments to support climate change adaptation do not result in fewer donations for 'regular' humanitarian action, or in confusion of roles, responsibilities and systems. This could undermine humanitarian systems, which are already under strain because of more frequent and intense climate related hazard events.

**Adapting to climate change will require significant adjustments to current humanitarian systems.** Climate change adaptation is not just doing more traditional disaster risk reduction better. Not only do humanitarian actors need to step up investment in seeing how existing systems and programmes can be adapted to take into account climate change risk, they need to do so in much closer partnership with longer-term development actors. There is currently a deficit in humanitarian adaptation programming at the field level.

**Climate change will require the adaptation of existing systems to fast-track implementation of a new business model for humanitarian and development action.** Existing systems certainly need to be scaled-up, but they will also need to become more effective, or services will not keep pace with increasing caseloads.

**Humanitarian adaptation action must be part of an integrated, multi-hazard risk management approach.** Climate change adaptation will require significant action to manage the direct impacts of extreme hazard events, but also greater food insecurity, forced displacement and migration, potential conflict and adverse health impacts. For humanitarians, this will require an increased focus on prevention and preparedness, and capacity building to reduce demand for international response.

**Humanitarian actors must become proactive in providing technical advice on emerging adaptation systems in closer consultation with other UN bodies, international organisations and – most importantly – Member States.** It is not sufficient to 'wait and see' if a global climate change deal is reached, and if additional resources become available. Humanitarian actors must proactively develop options and multiple potential models for risk management and risk reduction elements of an adaptation framework. They must also work with Member States to see how positive elements can inform a Copenhagen agreement, and its subsequent implementation.

**Preparations are already under-way for a 2011 Inter-governmental Panel on Climate Change (IPCC) Special Report on "Managing the Risks of Extreme Events and Disasters to Advance Climate Change Adaptation."** This provides a unique opportunity to significantly raise the bar regarding current knowledge on both physical trends and potential human impacts of climate change; but only if humanitarian actors sufficiently engage. Humanitarian actors must proactively engage with the research community to make sure current research gaps in all of the areas outlined above are addressed. It is clear that we have enough data now to make informed choices in many areas. However, the IPCC process is an opportunity to bring the climate science and social science communities closer and to strengthen Member State understanding and consensus on these issues.

**The scale of the humanitarian impacts of climate change will depend on action taken now.** The magnitude and severity of climate change's impact on humanitarian need will be largely determined by global action taken to reduce greenhouse gas emissions (mitigate) and to fast track action to cope with its effects (adapt) in the coming 5-7 years. The effects outlined above are based on an analysis of mid-range warming scenarios. However, current actual emissions, if sustained, will produce more severe and variable impacts than those outlined here.

**KEY FACTS**

- The number of recorded disasters has doubled from approximately 200 to over 400 per year over the past two decades (CRED).
- Over 97 percent of disaster deaths occur in developing countries (World Bank).
- 175 million children will suffer from climate-related disasters in the next ten years (UNICEF).
- Nearly 634 million people – one tenth of the global population – live in at-risk coastal areas just a few meters above existing sea levels. Three quarters are located in Asian flood-prone densely populated river deltas or in low-lying small island states.
- By 2050, 2.4 billion people may be living in regions of high water-stress in South Asia (IPCC).
- In Africa, higher temperatures and lesser and more seasonal rainfall will also place up to 250 million more Africans under severe water stress by 2020 (IPPR).
- Drought, and climate unpredictability is already impacting agricultural yields. Agricultural production fed by rainfall is projected to halve in some African countries by 2020 with the most populated regions of the Sahel and Southern Africa among the worst affected. 93 percent of farmed land in sub-Saharan Africa is rain fed (IISD).
- Climate–sensitive risk factors and illnesses are currently among the most important contributors to the global burden of disease; these include under-nutrition (which causes over 3.7 million deaths per year), diarrhoeal diseases, (which kill over 1.9 million annually) and malaria (which kills almost 1 million) (WHO).
- The number of seriously affected people by climate change is expected to increase more than double within 20 years, and lives lost every year are expected to increase by at least two thirds (ISDR & CRED).
- The average economic losses due to weather-related disasters amounted to around $115 billion per year between 2004 and 2008 (Munich Re).

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