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Climate Change, Urbanization and Humanitarian Crises

Summary

The impacts of climate change on urban settlements in the global south are, profound, complex and numerous. They are compounding the already substantial inequalities and impoverished environmental conditions experienced in these cities and towns. Vulnerabilities and risks are increasing, and the long-term deterioration in living conditions and deprivation also pose new challenges for the humanitarian response. Indeed, a key conclusion is that the short and long term effects of climate change may tip already extremely vulnerable urban areas over previously manageable coping thresholds and capacities.

1. Introduction

The negative impacts of climate change on urban areas are already a reality in sudden onset events such as flooding and the rising incidence of extreme weather events. There is little doubt of the propensity for these impacts to increase in the future, driven by slow onset phenomena of rising sea levels and desertification. Cities of low and middle-income countries of the global south are particularly susceptible and they are the focus of this paper.

Climate change will exacerbate the already severe environmental problems and living conditions generated by the failure of governance and economic development to meet the challenges of rapid urbanisation in recent decades. It will have implications, in both the short and the long term, for household livelihoods and the human security of urban dwellers as well as the physical and economic development of cities. And it will introduce unfamiliar challenges for which novel policy responses will be required.

Recognising municipal government and administrative structures as the most important actors for urban DRR and in preparedness, mitigation, response and reconstruction is essential. The increasing likelihood of urban disasters and crises, as a result of the impacts of climate change, further reinforce this necessity. Whilst the first line of response must remain with national and local actors, the implications for humanitarian agencies, as supporting institutions, are equally significant. But, this is a role for which they are currently less prepared, a major finding identified in the recent IASC Task Force report on Managing Humanitarian Crises in Urban Areas.

These outcomes and the changing context and nature of humanitarian needs:

- pose new demands and challenges on humanitarian actors and agencies;
- call for a review of the scope and role of DRR policies; and
- require the reconfiguration of disaster and risk management strategies and the mainstreaming of responses to climate change impacts in urban areas by humanitarian actors.

This paper maps out scenarios of climate change impacts on urban areas (in section 2), examines scenarios and typologies of humanitarian crises linked to urbanisation and the urban context (in section 3), reviews the implications for the humanitarian response in terms of operational actions and institutional, policy and normative needs (in section 4) and concludes with a summary of ways forward (section 5).

Although climate change will increase the propensity for cities and towns to experience disasters and humanitarian crises, it is important to recall that these events unfold when disaster management fails. This in turn arises when development policies have failed to enhance governance and institutional capacity and when policies aimed at economic and social redistribution have failed to reduce the conditions of poverty and marginalisation which underpin the vulnerability of the mass of the world's urban poor. Risk, vulnerability and disasters are first and foremost socially constructed phenomena. Thus the linkage of disasters to underlying structural conditions is important because there is much that can be done to improve disaster management through mainstreaming it in economic, social and spatial development strategies, even when this does not translate into a humanitarian crisis.

Inevitably the paper deals with these issues in general terms. Caution is therefore needed in interpreting the evidence, since each city has a unique configuration of topography, drainage and settlement patterns, and social economic and demographic structures, which will determine the extent of vulnerability to humanitarian crises. This alone suggests that a key policy recommendation is to develop preparedness planning based on urban risk mapping exercises in relation to climate change impacts.

2. Urbanisation, Urban Vulnerabilities and Humanitarian Crises – Setting the Context

More than 50% of the world's population now lives in urban areas. The process of rapid urbanisation experienced in recent decades, mainly in transitional economies and in the global south, is set to continue for the foreseeable future notably in low-income countries in Africa and Southeast Asia.

Weak governance in many cities and towns in these global regions, due to different reasons, has resulted in a poorly managed and largely uncontrolled and unplanned urbanisation process. Thus, over 1 billion people across the world - the urban poor - live in urban slums, inhabiting the more densely populated and poorly serviced environments. Moreover, urban areas are increasingly the destination for forcibly displaced populations such as refugees and IDPs; their presence adds to the population pressure on substandard living conditions and urban infrastructure. Urban violence, a largely invisible, but rising phenomenon, constitutes a new challenge to humanitarian actors.

The scale, patterns and processes of urbanisation outlined above have the propensity either to generate or to exacerbate humanitarian crises (or have the potential to do so). Climate change is already accentuating these trends through sudden onset events, and in the next few decades the slow onset effects of rising sea levels and

desertification will produce profound and permanent changes in urban areas causing more frequent disasters and humanitarian emergencies.

With a few exceptions, such as in China and India, the cities most vulnerable to the negative impacts of climate change produce far lower carbon emissions per capita than cities in high income countries; but concurrently it is these cities which have the least capacity and fewest resources to respond and adapt to the increasing incidence of disasters and to develop humanitarian preparedness. Nevertheless, a key precept for humanitarian actors mobilising preparedness activities must be to support national and local initiatives as the first line institutions in this policy arena.

Any discussion of the ways in which climate change might exacerbate humanitarian crises in urban areas must be predicated on an appreciation of the complexity of the urban setting and the conjuncture of a number of underlying factors.

Urbanisation – accentuating risks, hazards and vulnerability

- Cities in the global south already constitute high risk environments produced by their 'urban deficit' – for example high concentrations and densities of population, informal settlement, communicable disease risks posed by lack of basic water and sanitation infrastructure [1], settlement on hazardous land (Hardoy et al., 2009): climate change will accentuate the potential vulnerability of large numbers of urban dwellers at risk of disaster and the propensity for urban areas to reach potential disaster tipping points posed by these factors.
- Cities concentrate poverty, and the informal sector constitutes the livelihood means for the majority of urban populations where dwellings and labour are the primary livelihood resources: an increase in urban-based hazards associated with climate change will disproportionately impact on the poor with physical assets and health being most at risk and protective measures such as insurance being rarely available to the poor. These conditions increase the susceptibility to livelihood loss and limited capacity for recovery.
- Vulnerable urban groups such as women, the elderly and children may be particularly susceptible to the increasing incidence and severity of climate change induced humanitarian disasters in urban settings.
- Climate change will bring new vulnerabilities amongst which is population displacement. The potential relationship between climate-induced changes to environmental conditions and the propensity to migrate is broadly accepted but subject to intense debate[2]. It is reasonable to assume that if climate change does indeed intensify the role of migration, this will act as an additional driver of rapid urbanisation thus intensifying the potential vulnerability of large numbers of urban dwellers increasing risk to disasters[3].

Systems fragility

- In low and middle-income countries the urban growth trend of secondary and smaller cities is proportionately faster than primate and larger cities. Moreover, these same cities tend to have more limited investment in infrastructure – e.g. water and drainage – weaker urban management and planning capability and less active civil society, and they attract less investment and donor interest. These factors make them predisposed to greater vulnerability to, but least prepared for, the environmental effects of climate change.
- Cities are the major contributors to a country's GDP thus urban based disasters can disproportionately impact national economic growth production and the recovery phase may be more protracted compared with restoring basic infrastructure, health and nutrition systems.
- Compared to rural populations, the monetised economy of urban areas means that impoverished urban populations generally have more limited access to material resources with which to cope with environmental variations, risks and stressors.
- Urban authorities, civil society organisations and national governments act as lead agencies and they have improved their preparedness and response capacities in recent years. However the quality is very varied and capacity is still insufficient. In general, local institutions and, more especially, humanitarian actors have insufficient experience of working in urban settings and in the latter case their expertise lies mainly in rural settings.

Spatial instabilities

- The majority of the world's urban population live in coastal cities (including mega-cities such as Dhaka, Lagos, Shanghai, Mumbai) with coastal settlements experiencing the fastest urban growth globally: these

[1] For example 690 million urban dwellers lack adequate water supply and 850 million lack adequate drainage (UN Habitat 2003)

[2] These debates are outlined later in this paper in discussion of long onset climate change.

[3] Great caution is needed in quantifying and predicting the number of those who will be displaced by climate change. Rule of thumb estimates suggest that perhaps 200m will be displaced by 2050, not all migrating to cities of course (Myers 2005; Stern 2006).

urban areas are most at long term risk of rising sea levels and storm surges associated with climate change and global warming[4].

- The ongoing extension of urban infrastructure networks from urban cores into rural hinterlands to source critical resources including water but also food and energy increases exposure to climate change associated hazards, local events can cause major disruption and exacerbate if not catalyse disaster. The poor are most at risk as they are less able to access critical resources from the market.

Structural conditions

- Finally, it should be recalled that the vulnerability of urban dwellers to environmental hazards and humanitarian disasters is not just inherent to the physical conditions in which they live but are socially constructed conditions deriving from socio-economic status, differential exposure to risk and preparedness, coping capacities, and recovery capabilities[5]. Vulnerability in urban areas is differentially structured by the socio-spatial segregation in which poor people are made more vulnerable by the lack of access to suitable land for housing, inadequate planning and environmental infrastructure, lack of effective disaster preparedness and mitigation policies and practices, poor governance and lack of empowerment. This is the scenario where humanitarian emergency workers will have to act.

3. Urbanisation and Humanitarian Crises – Scenarios and typologies

The most commonly accepted typology which humanitarian actors use to describe the impacts of climate change distinguishes between rapid-onset phenomena, the so called 'extreme events' – increasing frequency of extreme weather events and natural hazards such as hurricanes, floods and storm surges [6] - and slow-onset trends where the humanitarian consequences are rising sea levels and desertification. But some of the other consequences, for example salination of coastal plains, wetlands and aquifers, and the incidence of drought, span these two temporal groupings. In practice the rapid and slow onset phenomena present a continuum of impacts rather than distinctively different outcomes. Nevertheless, the distinction can help to frame discussion of the nature and potential form of humanitarian crises in urban areas, the gaps in humanitarian capacity and where and how intervention can prepare for or mitigate the impacts.

Unfortunately, the phenomena about which the science of climate change is most clear are those where humanitarian concern is currently less focused: essentially the slow-onset implications of rising sea levels and desertification. Conversely, where humanitarian concerns are greatest, such as the changing incidence, geographical distribution and severity of extreme weather events and associated disasters in urban areas, the scientific evidence is less conclusive. Moreover, it is very difficult to attribute the proportional impact of climate change compared to background physical processes acting on any one-hazard event. Given the urgency of responding to existing risk waiting for this evidence is not an option.

Hazards and Disasters

Principal hazards: pluvial and fluvial floods, coastal storm surge flooding (either by changes in atmospheric pressure or sea level rise), wind storms and hurricanes, mass-movements including land and mud slides, temperature extremes and desertification, drought and hunger. All these hazard types are mediated to a greater or lesser extent by urban infrastructure. In some cases, for example contemporary urban drought, infrastructural failures are more significant that environmental drivers (precipitation) in determining exposure and hence vulnerability.

i. Flooding and landslips. The increasing intensity of flash flooding and seawater surges is producing greater frequency of urban humanitarian crises without extensive concomitant investment in mitigation and preparedness measures. The incidence and forms of flood damage are closely correlated with urban conditions and the structure and layout of built-up urban areas, which irrevocably alter hydrological conditions. Storm water drains, if they exist, usually have limited flow capacity and have not been designed to cope with heavier rainfall episodes. Poor maintenance capacity not only results in debris frequently clogging up and blocking drains, causing water to back up and flood. It also limits repair capacity, delays response and prolongs the impacts of flooding. Open sewers characterise many informal settlements, which become more susceptible to flooding with increasing rainfall.

Low lying areas are particularly susceptible to flooding. Hard impermeable surfaces such as paved roads and walkways increase the speed and volume of runoff and thus intensify the incidence of flooding and damage – a

[4] Although not caused by climate change, the 2004 tsunami illustrated the particular risks of coastal settlement to inundation and flooding by the sea.

[5] Hurricane Katrina in New Orleans, and its aftermath, provided dramatic evidence of the socially constructed nature of disasters.

[6] The IPPC only suggest that climate change may precipitate increasing frequency and intensity of these hazards, but it falls short of defining a causal link.

notable phenomenon in Rio de Janeiro for example. Greater volumes and intensities of rainfall multiply the occurrence of landslips as substrata become more and more unstable – particularly where protective vegetation has been removed in or around residential areas. Similarly, as coastal areas become more and more developed with urban settlement, reefs, mangrove stands and marshlands which in the past provided coastal defence services are lost: again, current vulnerability to storm surges is thus increasing. Storm surge damage also widely occurs in subtropical monsoon climates because there are insufficient drainage dykes, sea wall flood defences and pumping systems in poor, disaster-prone countries. The potential increases in these hydrodynamic conditions will render many areas uninhabitable for periods of time, as already happens for example in riverside areas of Bangladesh. Storm water surges may also lead to increasing salination of underground sources of potable water with potentially severe implications for urban water supply systems.

Some examples illustrate the extent of flood related disasters. In the 1988 floods in Dhaka – one of the most severe of the 10 major foods since 1954 - inundated 85% of the city, affected up to 400,000 dwellings and caused severe damage to over 260,000 homes of 30% in Dhaka MA. Nearly ten years later, in November 2007, up to 1.5 million homes were destroyed or damaged as a result of Cyclone Sidr and the subsequent storm surge. Over 1000 people were killed in Mumbai in July 2005 when unprecedented rainfall from the monsoon caused devastating floods. During early months of 2007, Mozambique suffered a double disaster of severe flooding and a cyclone: between 300,000 and 500,000 people were affected, though in towns and rural areas.

Given that the majority of urban dwellers in cities of the global south live in informal settlements are often on steep hillsides or low lying flood prone lands which are topographically or geologically unsuitable for housing, these conditions place large numbers of people at risk in these locations. The high residential densities of so many informal settlements accentuate the susceptibility of these communities to more flooding or land slips but also make it difficult for emergency services to access disaster-affected neighbourhoods.

Beyond these direct impacts of floods, the *secondary hazards and outcomes* may be even more severe because of the living conditions of the urban poor. Flood water and untreated sewage from open sewers carried along by flood water constitute major health hazards, carrying water borne diseases such as cholera and dysentery, polluting drinking water supplies and/or leading to temporary breaks in water supply. Lack of effective zoning policies to segregate land uses produces mixed residential and industrial use zones common in many cities in then low-income cities in the global south. The additional discharge of rubbish, noxious materials and pollutants from industrial activities results in further contamination of water supply, an outcome which intensifies with the impacts of potentially more frequent extreme weather events. Protracted flooding leads to disruption of the already fragile economic livelihoods of low-income urban dwellers. Flooding can severely disrupt urban communications and supply chains an outcome, which, simultaneously, hampers the logistics of humanitarian intervention and thus compounds the impacts. This is well documented in the case of the Mozambican floods of 2006.

As regards *hurricane damage*, despite several decades of experience in developing hurricane/disaster resistant housing standards, building codes and regulations are unaffordable an unenforced in many countries. More frequent hurricanes and storm surges as a result of climate change – even without sea level rise - will have more damaging consequences for housing than is currently experienced in tropical regions

The *shelter impacts* of extreme events notably flooding are severe. As we have seen the vulnerability of the urban poor is caused by the socio-economic structural conditions which compel them to live in hazardous, unsuitable and unplanned locations. These same conditions render their housing particularly at risk to damage and destruction with the growing frequency of extreme weather events since many of the urban poor live in housing constructed of semi-permanent materials and weak structures. The increase in intensity and volume of heavy rain, land slips and hurricanes, will inevitably destroy or damage more properties, compounding the problems caused by the events themselves.

ii. Rising sea levels. Rising sea levels are the slow onset manifestation of flooding that will make localities that are currently well above SL vulnerable to the effects of short term flooding and storm surges described above; but, more dramatically rising sea levels will permanently flood substantial coastal areas where an important proportion of the world's population lives[7]. These outcomes will contribute further complexity to the cocktail of physical, environmental, infrastructure, livelihood and health impacts and humanitarian responses described above.

[7] A 2°C rise in average global temperatures by 2100 will lead to 1.4 metre rise in sea level and a 1metre SL rise will put over 145m people at risk. The estimated global population in low elevation coastal zones (LECZs) is 634m of which 360m are urban (McGranahan et al., 2009). LECZs are defined as land up to 10m elevation above seal level. This is substantially higher than the 1990 IPCC predicted rise in sea level of 39cms by 2080 but gives some indication of the scale of population which might be affected especially by rising SLs, flooding and storm surges,

Rising sea levels may push peri-urban farmers and fishermen into destitution through loss of land and salination on the one hand, whilst depriving fishermen of their livelihoods with, for example, shoreline recession and the loss of harbours and mooring facilities on the other hand[8]. Both permanent and short term population displacement within cities will thus occur simultaneously: this will pose a complex set of demands on humanitarian actors for emergency interventions impacting heavily on developmental objectives as well, which are discussed below.

iii. Drought, desertification and water shortages. Just as increasing rainfall produces problems where drainage and flood prevention infrastructure are inadequate, paradoxically an inability of drinking water supply and infrastructure systems to cope with declining rainfall, as a result of changing rainfall patterns, together with rising temperatures, may also be the cause of urban based humanitarian crises. Urban drinking water supplies become more difficult to provide because evapotranspiration increases and reservoirs and aquifers lack consistent supply with unpredictable rainfall, thereby intensifying the impacts of seasonal or longer-term drought. Of course, at the same time as supply is reduced, demand for water increases in drought conditions. The secondary effects can be severe as urban dwellers are required to spend more time queuing for water at communal supply points, pay more for water for their households or be forced to drink unsafe water, thereby increasing financial and health stress on livelihoods and the potential for further impoverishing poor urban households. Moreover, in these conditions, groundwater supplies are particularly susceptible to exploitation, water tables fall as recharge rates decline and this may exacerbate the onset of a potential humanitarian emergency through reduced availability and increased salination of drinking water. In some cities – for example Shanghai - these conditions have also led to severe subsidence.

Just as rising sea levels are, in some respects, the slow onset manifestation of the extreme flooding events in the current era, so too desertification is, in some respects, the long onset equivalent of drought. Desertification and rising temperatures will have long-term impacts and humanitarian consequences for urban settlements in arid areas - notably in terms of urban water supply and population health - thus potentially fuelling other forms of humanitarian disasters. Rising globally temperatures, combined with locally increasing CO_2 emissions in urban areas will accentuate the heat island phenomenon of cities and increase the frequency of heat waves. This will lead to an increase in air pollution levels and heat stress which, in turn, is likely to produce an increase in morbidity and mortality rates, and respiratory problems – notably amongst the elderly and the young - and the increase in vector borne diseases. For example 10% of summer deaths in Buenos Aires are linked to heat stress (Hardoy et al., 2009:234)

Similarly, the long onset impacts of climate change on diminishing urban water supply, and consequently on health conditions, are likely to be severe, accentuating the vulnerabilities and crises already noted above with respect to rapid-onset weather events. Rising temperatures, increasing salination, loss of glacial melt waters and declining rainfall will result in increasing water shortages and reductions in water quality which, in turn will produce a higher incidence of disease. This is already a major concern for Andean cities with authorities considering major engineering works to bring water from the Amazon basin to cities on the western face of the Andes.

The conjuncture of high population densities in the cities of low-income countries, the poor existing health conditions of the majority of urban populations, and substandard environmental quality, will accentuate these health hazards. Moreover, health conditions and the availability and access to potable water are differentially determined by socio-structural as well as environmental and political factors. The urban poor will be most severely affected by these factors.

Drought exacerbates food insecurity and malnutrition, particularly amongst children. Rural populations tend to be more severely affected, although smaller cities and towns in drought-affected regions are not immune from food shortages. Climate change will accelerate the process of desertification and thus an increasing propensity for drought and food shortages to affect both an increasing number of cities and an increasing proportion the populations within these cities, extending beyond drought affected regions. Food production in urban hinterlands may come to crisis point and this will hit the poorest urban communities hardest potentially causing urban nutrition crises. For the poorest rural communities declining food production and rising costs in sub-Saharan Africa and South Asia will potentially increase rural to urban migration placing cities at increased risk of disasters and humanitarian crises because of the added pressure on already inadequate systems.

Slow onset climate change - implications

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especially if the ice caps melt at faster rate than predicted at that time. A 2°C rise in average global temperatures by 2100 will lead to 1.4 metre rise in sea level and a 1metre SL rise will put over 145m people at risk.

[8] Evidence from post- tsunami redevelopment shows how the designation of a development free coastal protection zone forces fishermen away from the coast, thus depriving them of their livelihoods.

The previous section has highlighted some of the principal impacts of climate change which is the principal driver of slow onset environmental changes - desertification, rising sea levels and permanent loss of landmass, and rising urban temperatures. As we have seen, there will be permanent impacts on urban areas and thus the scope and form of humanitarian response. The inevitability of these changes to the global climate regime has been clearly established by the IPCC. Research evidence is incontrovertible. However, perhaps because they do not have the immediacy of extreme weather events, the potential impacts of slow onset climate change have not claimed the attention of humanitarian actors and policy makers in the same way.

Yet the consequences are far reaching. In many respect the effects will replicate and exacerbate the humanitarian impacts of extreme weather conditions on urban areas described above, but with three principal differences:

- the impacts will take place over a longer time period; although lacking the immediacy of extreme weather events, preparedness and mitigation must be the key aims of humanitarian actors and preparation for these responses must commence now;
- the secondary impacts – for example with regard to migration, health and livelihoods - will be more pronounced; and
- the outcomes will be permanent: regardless of the particular climatic phenomenon, permanent displacement is the unifying characteristic, hence the urgency for capacity building by humanitarian actors.

These outcomes pose particular conceptual and operational challenges to humanitarian actors – the time scales for action, the modalities of response, the greater emphasis on longer-term development and adaptation strategies as opposed to emergency humanitarian responses.

Secondary impacts

The discussion so far has outlined the direct ways in which of climate change is and will increase the susceptibility on urban areas to disasters and humanitarian emergencies, and it has described some of the direct consequences and impacts. An important characteristic is the secondary or indirect outcomes and impacts which are now examined.

The concept of stress bundles. A key issue in understanding how extreme weather events and slow onset conditions will impact urban areas and generate humanitarian crises is that these phenomena and other environmental conditions do not occur in isolation from each other. Instead, they usually work in combination as multiple stressors to create multi-hazard exposure and multi-dimensional crises. Destructive though the increasing perturbations in weather patterns are, the events themselves are less problematic than the complex combination of factors. Thus the socio-ecological and socio-economic conditions of urban areas make it much harder for urban systems to withstand or cope effectively with extreme weather events than rural areas. Where high vulnerabilities exists even small increases in or changes to hazard can result in disaster.

In this context, the concept of 'stress bundles' (de Sherbinin et al., 2009:139) is an informative way of developing an analytical framework to investigate the interplay of physical, geological, environmental and human factors in precipitating humanitarian crises and to develop resilience, preparedness and mitigation strategies. Some of these multi-stressors have already been discussed, for example with respect to flooding and landslips and the potential for nutrition crises.

Urban Displacement and Migration, the potential increase in both inter- and intra- urban displacement and more permanent migration, and thus an increase in the rapidity and scale of urbanisation in low income countries, is perhaps the most significant, and most severe, secondary impact of climate change. Already intra-urban migration is increasing – albeit on a temporary basis - as those affected by environmental emergencies seek safety on higher ground until the crisis abates[9].

Slow onset climate change through desertification and rising sea levels also has indirect but potentially large scale consequences for cities in the global south – the accelerating speed and scale of urbanisation through migration and thus an increase in urban vulnerabilities and humanitarian needs. And at the same time the likelihood is that large parts of urban areas will become uninhabitable, even by contemporary standards.

[9] Data on urban displacement are not readily available; but in 2008 just over 20 million people are estimated to have been displaced or evacuated (i.e. in urban and rural areas) by 200 climate–related disasters, some 13% of the 207 million displaced and evacuated by all types of sudden onset natural disasters. These data do not record if displacement was temporary or permanent. (Monitoring Disaster Displacement in the context of Climate Change OCHA-IDMC-NRC, Sept 2009)

Nevertheless, the research evidence on the triggers, drivers and linkage between climate change and migration is complex, inconclusive and poorly understood[10]. Accordingly, estimates of the likely number of environmentally displaced people are speculative – a figure of 200 million by 2050 is often cited (Stern 2008). Regardless of these uncertainties, it is reasonable to assume that there will be significant population displacement – both distress migration and permanent displacement. Rising sea levels will leave people no option but to migrate as the land on which they reside and sustain their livelihoods becomes permanently flooded; desertification will likewise lead to migration but the scope and scale is more susceptible to fluctuation as people develop coping strategies to adapt to changing conditions.

What are the likely patterns of climate change induced migration? At least four migration trajectories are relevant here:

- rural to urban - as livelihoods deteriorate because of desertification or permanent flooding;
- urban to urban - as people search for higher land away from flooded seaboard settlements or better economic opportunities through secondary migration;
- intra-urban migration (noted above) – as people search for higher land away from rising sea levels or land less susceptible to lack of water through desertification;
- the growth of secondary and smaller cities is likely to faster – evidence from drought-affected regions suggests that people tend to migrate locally and we may expect a similar response to desertification.

Beyond these possible trajectories, there is, as yet, little research evidence on how climate change induced migration and displacement will affect urban areas. But this is perhaps a most pressing area for further study. A number of factors, acting concomitantly, can be considered. The principal impacts seem likely to be:

- an accelerating pace of rapid urbanisation, and an increase in the scale of informal settlements;
- shortages of development land especially for housing and increasing problems of access to land by the urban poor;
- rising densities of urban residential development;
- increased demand for already substandard urban services and infrastructure such as water, energy supplies, sewage disposal;
- undermining poverty reduction strategies by increasing economic and livelihood stress on low income households caused by higher costs of basic urban services and food, and the intensified competition for income earning opportunities in both the formal and informal sectors.
- the shifting of money from development budgets to urban reconstruction or relocation undermining the ability of governments to meet the basic needs of the poor.

In summary, the potential consequences of displacement and migration for urban areas as a result of climate change are profound but poorly understood. They pose major challenges to development and humanitarian policy makers alike. If nothing else, the need to address these potential outcomes brings into sharp focus the close relationship between development and humanitarian/disaster agendas, policies and programmes and the need for institutional and governance structures which underpin this relationship.

Rights Until recently, mainstream debate and policy making on the impacts of climate change has paid little attention to emerging rights-based implications (see Zetter 2009 for an extended discussion). Following on the discussion on displacement and migration above, the issue here is the role that legal and normative frameworks of protection might play in mitigating the impacts of displacement on people who are compelled or induced to move due to environmental pressures, or in assisting strategies of adaptation and resilience for those at risk of displacement (Boano, Zetter et al 2009). In these contexts, rights-based concerns should be driven by the need to protect lives, livelihoods and assets and encompass a range of socio-economic, political and cultural rights. Rights to enable access to land and shelter for displaced people, whether temporary or permanent, yet which also protect those who remain, are one crucial component. There are wider considerations relating to, for example, issues of gender equality – emergencies and disasters tend to increase existing inequalities – and rights to health care, food and water.

Enhancing the significant body of normative frameworks, legal instruments and policy responses that exist at national, regional and international levels for the protection of displaced people such as refugees and internally displaced persons (IDPs), is a significant need. Although not framed in the contest of climate change displacement, the 1998 *Guiding Principles on Internal Displacement* provide an essential foundation to fill the protection gap since

[10] In summary, the 'state of the art' stresses a multi-causal rather than a linear relationship, emphasises the significance of socio-economic and political contexts for migration, recognises the agency of migrants not just their vulnerability, and points to enormous local variations (see e.g. Boano, Zetter et al., (2009), Castles (2002) (Brown 2008)).

the Principles derive from the needs of those displaced by natural disasters. Development and humanitarian policy makers and actors working in governments, intergovernmental and non-governmental agencies, as well as civil society organizations, have a key role to play in developing and implementing rights-based provision.

Insurance Urban disasters, as noted above, have a disproportionately high economic impact because of the concentration of economic activities in cities. Whilst insurance systems may cover some of the losses, the biggest losers are probably the urban poor who do not have, or lack access to, insurance. Yet with substantial assets (housing and informal sector means of production) in proportion to low household incomes and very limited savings, large numbers of urban dwellers are particularly susceptible to devastating losses through disasters since they have no effective safety nets or support mechanisms to finance recovery and reconstruction.

4. Implications for Humanitarian Response

Discussion of climate change impacts and the scenarios of potential humanitarian crises, reveals wide ranging implications for enhancing the humanitarian response in urban areas. Slow onset trends will increase the intensity and duration of urban vulnerabilities and humanitarian needs. Even with enhanced preparedness and mitigation measures, effective emergency humanitarian interventions will be needed to respond to these crises in many sectors.

The following table summarises these implications and suggests that there are two major arenas where action is needed to enhance the capacity of humanitarian actors in the urban setting. Dividing up the agenda in this way will help to: identify the key tasks and strategic priorities; indicate the sectoral lead agencies that might be tasked with developing capabilities; and define the 'road map' to implement these proposals,

The humanitarian response in urban areas - existing initiatives/the way forward

Operational Actions to Support Humanitarian Crises Response	**Institutional, Policy and Normative Needs**
▪ Technical support for civil and municipal engineering capacity to remove flood waters, remedy failures in sanitation systems and provide potable water ▪ Mobilising emergency medical, health, nutritional, food supply, water, sanitation and hygiene programmes ▪ Supporting emergency shelter provision planning and temporary resettlement projects together with land delivery programmes for those displaced by disasters ▪ Assistance for shelter and infrastructure reconstruction programmes including building materials supplies and assistance ▪ Support for new shelter provision, and resettlement strategies for those permanently displaced ▪ Design economic safety nets and strategies to reduce impoverishment caused by loss of livelihoods	*Institutional and Policy Actions* ▪ Enhance regional settlement and resettlement strategies to cope with accelerating urbanisation and permanent population displacement ▪ Embed climate change scenario modelling in urban planning processes and strategies ▪ Enhance urban management and planning strategies for land delivery, land access and delivery mechanisms for the urban poor which avoid vulnerable locations; enforce effective zoning policies ▪ Embed climate change vulnerability, preparedness planning and risk mapping in urban development and planning strategies ▪ Support short term planning and land strategies to deal with increasing incidence of intra-urban migration caused by disasters ▪ Improve delivery, maintenance and development investment in basic urban services ▪ Develop urban strategies for permanent resettlement of displaced populations ▪ Improve urban flood defences and drainage ▪ Upgrade health care and sanitation provision to mitigate the impacts of rising temperatures, water shortages and air pollution *Normative* ▪ Enhance urban-based DRR capacity (preparedness, mitigation, response, recovery and

	reconstruction) in urban administrations ▪ Review humanitarian response standards (e.g. SPHERE) to ensure relevance to urban humanitarian crises; ▪ Strengthen urban governance capacity, civil society structures and the empowerment of urban dwellers to respond and adapt to the impacts of climate change ▪ Embed climate change awareness and adaptation strategies through civil society structures

5. Conclusions

The impacts of climate change on urban settlements in the global south are, profound, complex and numerous. They are compounding the already substantial inequalities and impoverished environmental conditions experienced in these cities and towns. Vulnerability and risk of humanitarian crises will increase, and the long-term deterioration in living conditions and deprivation also pose new challenges for the humanitarian response. Indeed, a key conclusion is that the immediate and longer term effects of climate change may tip already extremely vulnerable urban areas over previously manageable coping thresholds and capacities.

Conclusions and Key Learning Points

- Climate change will reinforce the significant on-going existing structural and spatial vulnerability of urban areas and thus the form and impact of humanitarian crises;
- Environmental stressors do not impact all households equally – the impacts of climate change will exacerbate the already existing vulnerability of the poor, the elderly, the young and women;
- The impacts of climate change on urban are best conceived as 'stress bundles' and this has important implications for the development of humanitarian responses strategies for developing resilience, preparedness and mitigation which will need to be integrated into overall urban development planning and governance;
- Climate change impacts on urban areas will accentuate the stress which disasters place on human and civil rights protection – physical, material, social and political rights (Zetter 2009). Rights protection must be a significant objective in the humanitarian response to disaster-affected urban populations and the protection of populations from, during and after displacement;
- Existing experience of DRR and recovery demonstrates the vital role of governance capacity and civil society structures. Detailed attention must be paid to these capacities in developing humanitarian responses to urban crises induced by climate change;
- Although we have little understanding, as yet, of the impacts of climate change on urban displacement and intra- and inter- urban migration, these are likely to be amongst the most significant impacts with profound implications for development and humanitarian actors and policies;
- Managing humanitarian crises is best done proactively through development planning to build resilience and adaptation rather than reactively by humanitarian action. However, humanitarian responses should consider adaptation and resilience strategies as ways of enhancing the capacity of local populations to respond to climate change impacts on the urban environments.

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