Climate Change Impacts on Cities: Ignore, Mitigate or Adapt?

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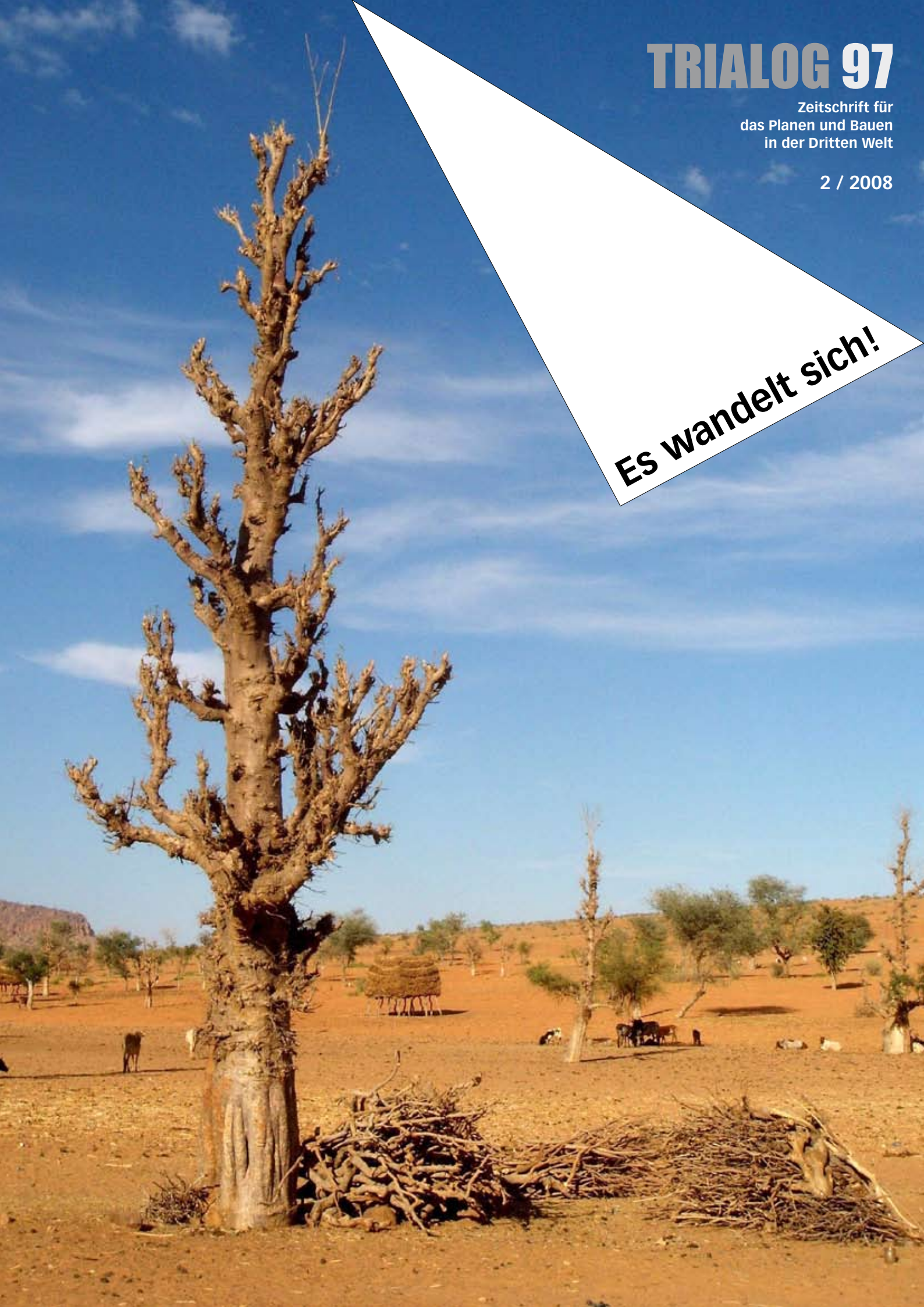

Editorial

Energieintensive Gebäude und auf individuellen Autoverkehr ausgerichtete Stadtstrukturen gehören zu den wichtigsten Faktoren für die globale Erwärmung. Daraus ist abzuleiten, dass Prinzipien und Praktiken in den Berufsfeldern Architektur und Stadtplanung einen wichtigen Beitrag dazu leisten können, dem Klimawandel entgegen zu wirken. Diesem banalen Statement folgt unwillkürlich die Frage nach dem ‚wie in der Praxis'? Diese Ausgabe von TRIALOG versucht, exemplarisch einige Antworten auf diese Frage zu liefern. Selbstverständlich kann und muss dem Klimawandel durch Energieeffizienz-Maßnahmen vorgebeugt werden, womit wir zur Sicherung minimaler und zum Überleben notwendiger Umweltqualitäten unserer Urenkel beitragen. Doch der Klimawandel ist heute bereits Realität und verlangt zusätzlich zu den langfristig präventiven Maßnahmen auch kurzfristig wirksame Antworten auf die bereits akute Bedrohung von Menschen insbesondere in den ärmeren Ländern des Südens.

Christine Wamsler hinterfragt Möglichkeiten einer Adaption des Handlungsrahmens für die Stadtplanung unter Berücksichtigung von konkreten Planungsspielräumen an die durch den Klimawandel veränderten Rahmenbedingungen, insbesondere für Siedlungen der armen Bevölkerung. Die Auswirkungen klimatischer Veränderungen erfordern unterstützende - beispielsweise politische - Maßnahmen, welche von Wolfgang Sachs in Verbindung mit den Menschenrechten näher untersucht werden.

Zur Zielbestimmung auf dem Gebiet der Stadtplanung präsentiert Peter Gotsch am Beispiel von Hyderabad eine auf den Klimawandel bezogene Agenda der Stadtforschung. Bezogen auf den Maßstab einzelner Gebäude geht es vorrangig darum, deren Komplexität von der Herstellung der Baumaterialen über die Nutzung bis hin zur Entsorgung der Materialen am Ende ihres Lebenszyklus im Auge zu behalten. Viele Antworten im Kontext konkreter traditioneller Erfahrungen, zeitgemäßer Weiterentwicklungen und gebauter Beispiele sind uns jedoch schon bekannt und müssen nicht neu erfunden werden, wie Kosta Mathéy in seinem Beitrag erläutert.

Ein Beispiel für die Erarbeitung ganzheitlicher Konzepte aufbauend auf eine genaue Kenntnis des Vorhandenen für die Entwicklung einer einzelnen Stadt ist Gegenstand des Artikels von Elvira Schwansee und Angelika Kurz: ihre differenzierte Analyse der komplexen und problematischen Situation von Mexiko Stadt vollzieht die Schritte nach, die zu dem neuen Umweltplan ‚Plan verde' für diese Metropole geführt haben.

Nicht immer gibt es die Möglichkeit einer langfristigen Planung wie in Mexiko. Häufiger stellen Naturkatastrophen die Planung von einem auf den anderen Tag vor anscheinend unlösbare Aufgaben. Dabei gilt es schnelle Lösungen aufzuzeigen, ohne die Grundlagen einer langfristig nachhaltigen Entwicklung zu blockieren. Am Beispiel von Myanmar in Südostasien geht Florian Steinberg auf die Folgen eines Zyklons ein.

Eine langfristige Entwicklung fordert mit dem Vorhandenen umzugehen. Ein Großteil der Gebäudesubstanz bedarf der Aufwertung, um aktuellen Standards in der Lebensqualität aber eben auch den ökologischen Ansprüchen gerecht zu werden. Am konkreten Beispiel der Sanierung von Plattenbauten in der Mongolei zeigen Ruth Erlbeck und Ralf Trosse eine Möglichkeit auf, wie diese Ansprüche in der Praxis eingelöst werden können.

Ein visionäres Zukunftsprojekt ist im Emirat Abu Dhabi geplant: Die neu gegründete Stadt Masdar City soll in der Nutzung vollständig CO_2 neutral sein. Welche Entwicklungen hieraus resultieren können und die Möglichkeit der Übertragung auf westliche Länder, erläutert Dietmar Wiegand.

Christoph Hesse berichtet von zwei Veranstaltungen, welche die aktuelle Entwicklung widerspiegeln: dem internationalen Kongress zu „Climate Change and Urban Design", der Mitte September 2008 in Oslo stattfand und dem Kongress zum nachhaltigen Bauen vom Juni 2008 in Stuttgart. Dort wurde unter anderem die Zertifizierung für das nachhaltige Bauen in Deutschland propagiert – ein Vorschlag, dem man aber nicht bläuäugig gegenüberstehen sollte. Jörg Dettmar setzt sich kritisch mit den Gefahren einer standardisierten Bewertung eines derart komplexen Sachverhalts auseinander.

Ulrike Gaube analysiert abschließend den Beitrag der Finanziellen Zusammenarbeit in Bezug auf das energieeffiziente Bauen als Teil der derzeitigen Aktivitäten der KfW Entwicklungsbank. Die Zusammenstellung der Daten erfolgte zum Teil als Vorbereitung einer Tagung der KfW Entwicklungsbank zu diesem Thema im Juni 2008, die auch Anlass für das vorliegende Heft werden sollte. Im Rahmen einer Podiumsdiskussion wurden dort mit Vertretern aus Politik, Praxis und Forschung die Erfahrungen aus Deutschland der Situation in Entwicklungsländern gegenübergestellt und über die Übertragbarkeit der Erfahrungen auf Entwicklungsländer diskutiert.

Die Veranstalter dieser Tagung regten an, das Thema im Rahmen einer Veröffentlichung zu vertiefen und die begonnene Diskussion zusammen mit TRIALOG in einem größeren Kreis fortzusetzen sowie mit praktischen Erfahrungen zu untermauern. In diesem Prozess kamen wir mit einer unerwarteten Vielzahl von Kolleginnen und Kollegen in Kontakt, die dieses Grundinteresse teilen und in ihrer Tätigkeit unterschiedliche Teilgebiete vertiefen, was dieses Heft illustriert. Wir danken der KfW Entwicklungsbank für die gewährte Unterstützung bei der Zusammenstellung und Produktion dieses Heftes.

Ulrike Gaube / Kosta Mathéy

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Climate Change Impacts on Cities: Ignore, Mitigate or Adapt?

Christine Wamsler

Klimawandel und Stadtentwicklung sind eng miteinander verknüpft und beeinflussen sich gegenseitig oft negativ. Sowohl geplante als auch ungeplante Verstädterung kann nicht nur klimatische Veränderungen verursachen, die Art der Verstädterung wird ihrerseits auch vom Klimawandel beeinflusst und ist dafür entscheidend, wie sich der Klimawandel auf die Bevölkerung auswirkt. Die Qualität der Stadtentwicklung kann daher einerseits dem Klimawandel und seinen Auswirkungen effektiv entgegenwirken, andererseits diese aber auch extrem verstärken. Das momentane negative Zusammenspiel von Klimawandel und Stadtentwicklung zeigt sich in einem gravierenden Anstieg von Naturkatastrophen, Krankheiten und der Verknappung von Wasser, Energie und Nahrungsmitteln, wobei die arme Stadtbevölkerung in den Entwicklungsländern am stärksten betroffen ist. Im Gegensatz zur Klimadebatte und -politik, die sich zur Zeit vor allem auf die Reduzierung von Treibhausgasen konzentrieren, müssen Architekten und Stadtplaner dringend auch im Bereich der Anpassung an den Klimawandel aktiv werden, und dies unter besonderer Berücksichtigung der Armen. Dies ist entscheidend, damit Städte den wachsenden Auswirkungen des Klimawandels standhalten und entgegenwirken können – und diese nicht verstärken. Momentan sind sich Architekten und Stadtplaner oft nicht ausreichend darüber bewusst, wie ihre Planungen möglicherweise eine lokale Anpassung von Armensiedlungen behindern. Um dieser Situation entgegenzuwirken, wird im vorliegenden Artikel ein erster Ansatz und Handlungsrahmen präsentiert, wie die Anpassung an den Klimawandel (besser) in armutsorientierte Stadtplanung integriert werden kann. Dieser sowohl theoretische als auch handlungsorientierte Rahmen soll dazu beitragen, die momentane Kluft zwischen den Arbeitsfeldern der Stadtentwicklung, der Katastrophenvorsorge, und der Anpassung an den Klimawandel zu überbrücken.

Climate change and urban development are closely interlinked and often adversely affect one another. Urbanisation – both planned and unplanned – can cause climatic changes. Moreover, urbanisation itself is affected by climate change and also influences the way climate change impacts entire urban populations. Urban development is thus capable not only of counteracting climate change and its impacts, but also of strongly reinforcing them. The current negative feedback loop between climate change and urban development is seen in the resulting increase in weather-borne disasters, diseases and shortages of freshwater, energy and food, which have the greatest effects on the urban poor in developing countries.

While current climate change debates and policy at the international level mainly focus on how to mitigate greenhouse gas emissions, urban development actors also need to find ways of adapting to climate change and of placing the urban poor at the centre of their debates and activities. This is crucial so that cities can become able to resist and counteract increasing climate change impacts – rather than inadvertently reinforcing them. So far, however, urban development actors have shown little understanding of how their actions can constrain effective local adaptation to climate change on the part of urban slum dwellers, too often with disastrous outcomes.

To counteract the situation described, this paper presents an initial framework for (better) integrating climate change adaptation into pro-poor urban development planning. This theoretical and operational framework should contribute to bridging the current knowledge gaps that exist between the fields of urban development, disaster risk reduction, and climate change adaptation.

1. Climate Change and Poverty

The urban poor in developing countries are the most affected by climate change and – at the same time – also have a particularly low adaptive capacity to cope with the new challenges.

Climate change is possibly one of today's most serious urban challenges, with the urban poor in developing countries being most at risk. According to the Fourth Assessment Report of the International Panel on Climate Change (IPCC 2007),[1] these nations are expected to suffer most from the negative impacts of climate change, as they have fewer resources to adapt socially, technologically and financially to them (UNFCCC 2008). This strongly affects poverty eradication efforts and is consequently a barrier to achieving the Millennium Development Goals (MDGs) (AFDB n.d.).

Climate change impacts reduce the already low adaptive capacities of the urban poor, increasing their risks by eroding their assets and reducing their coping capacities (ODI 2004). In Africa, Asia and parts of Latin America, it is common for half a city's population to live in poverty (Satterthwaite 2007). Currently, more than one billion people worldwide live in slums (UN-HABITAT 2003). It is estimated that this number will double over the next 25 years, with a corresponding increase in the number of people forced to live in conditions that are particularly vulnerable to the impacts of climate change.

Every year, evidence grows of the climate change-related impacts of increasing weather-borne disasters, diseases, overloaded energy supply systems, and shortages of food and water. Possibly the most visible outcome is the increase in the frequency and severity of extreme weather events, so-called hazards, and the resulting weather-borne disasters (such as droughts, wildfires, windstorms, storm surges, heat waves, sea level rise and floods). Such disasters can, in turn, cause other 'natural' disasters, including wildfires, landslides, and even local earthquakes. The number of additional people exposed to frequent flooding in the river delta areas of the Nile, the Mekong, and Bangladesh, and in coastal cities and villages of India, Japan, and the Philippines, could be in the hundred millions by 2080 – if we assume continuing growth in fossil fuel consumption and no adaptation measures (King 2004). While global climate change is driven largely by industrialised nations, developing countries bear the highest burden – not least in terms of the human lives and proportion of gross domestic product lost as a result of 'natural' disasters.

The number of 'natural' disasters reported has quadrupled during the last 30 years, resulting in escalating human and economic losses (UNISDR 2006). Over the past 20 years, disasters have claimed more than two million lives, with 98 percent of the casualties occurring in developing countries. While not all 'natural' disasters can be associated with climate change, on average two-thirds of all disasters are climate-related (UNISDR 2002) and weather-borne disasters have accounted for almost all the growth in natural disasters since 1950 (Satterthwaite 2007). In addition, the cities that are already at risk from disasters are those that are most likely to be impacted by climate change in the future (Moser and Satterthwaite 2008). Thus ignoring the existence of climate change cannot be a pretext for ignoring the urgent need for action to reduce disaster risk.

2. Climate change, Urbanisation and the Built Environment

Climate change and urban development – both unplanned and planned – are interlinked. While negative interaction currently prevails, causing a negative feedback loop of increasing greenhouse gases and unsustainable urban growth, the interconnection could also be used positively to mitigate, and adapt to, climate change.

Climate change and urban development are closely interlinked, and frequently have adverse effects on each other. In simple terms, inadequate urban development strongly increases greenhouse gas emissions, while climate change negatively impacts urban growth (Figure 1) (Wamsler 2007a; World Bank 2008). As mentioned above, the negative impacts of climate change on urban growth include not only weather-borne disasters but also other climate change impacts, for example, increased disease, overloaded energy supply systems, and shortages of food and water (Figure 2). Other climate change impacts affect urban development more indirectly, for instance, creating millions of environmental refugees as a result of disasters (sea level rise, expanding deserts and catastrophic weather-induced flooding or landslides). In fact, „there are well-founded fears that the number of people fleeing untenable environmental conditions may grow exponentially as the world experiences the effects of climate change".[2] Further examples of the impacts of climate change on urban development include rising temperatures that thaw out the layer of permanently frozen soil below the surface of the land, causing the ground to shrink, or rising sea levels that can cause water tables to rise and undermine the foundations of buildings. This results in damage to structures such as railway tracks, highways and houses, as well as landslides.[3] This example shows that 'natural' disasters can also be indirectly created by climate change, while disasters can in turn reinforce other climate change impacts (Figure 2). Indeed, disasters can affect public health and food security, and the water and energy supply, for example, by destroying health facilities, energy systems and technical infrastructure, or when flooding contaminates the water supply causing outbreaks of disease.

Historically, cities were – and often still are – perceived as places of refuge from disasters and as buffers against environmental change. Today, however, they are better described as hotspots of disaster risk (Pelling 2007). To make matters worse, city development is not only affected by disasters, but is also one of the main reasons for increasing risk, frequently creating:
(a) increased vulnerability to natural hazards;
(b) greater exposure to existing hazards;
(c) intensified and/or magnified hazards;
(d) new hazards;
(e) constantly changing vulnerabilities and hazards (thus making them virtually impossible to control);
(f) reduced coping capacities on the part of national and municipal institutions; and
(g) reduced coping capacities on the part of urban low-income households (Wamsler 2007a,b).

The creation of intensified, magnified and new hazards as a result of inadequate urban development is not only related to, for instance, the production of greenhouse gases (through, say, modified land use patterns); it can also be caused by a lack of open space provision and of proper infrastructure to absorb storm water and by inadequate settlement and building features, such as electrical equipment that attracts lightning.

Despite this, cities offer significant opportunities for combating the increasing impacts of climate change. Hotspots of disaster risk, cities also hold the key to slowing and eventually stopping global warming (Reid and Satterthwaite 2007). Moreover, adequate housing, living conditions and pro-poor urban governance can be critical to the success of climate change prevention, impact reduction, and the support and care of those affected (Moser and Satterthwaite 2008;

01
The IPCC is a scientific intergovernmental body set up by the World Meteorological Organization (WMO) and by the United Nations Environment Programme (UNEP). It was established in 1988 to provide the decision makers and others interested in climate change with an objective source of information about climate change.See www.ipcc.ch/ and www.ipcc.ch/pdf/10th-anniversary/anniversary-brochure.pdf

02
Statement of Janos Bogardi, director of the Institute for Environment and Human Security at the United Nations University in Bonn. See www.ehs.unu.edu/article:130

03
See, for instance, www.livescience.com/environment/top10_global_warming_results-1.htm

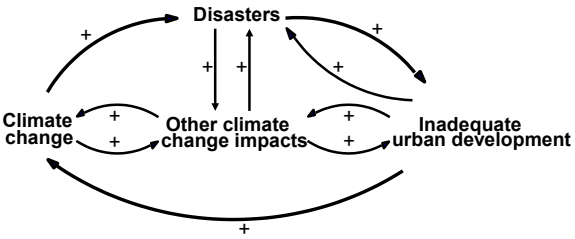

Figure 1: Simplified interlink between climate change, disasters and urban development.[4]

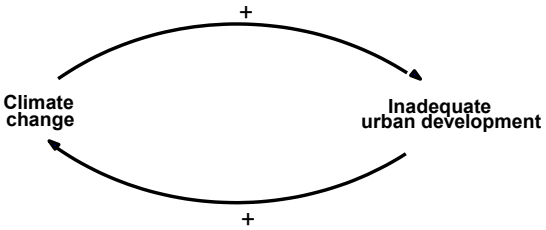

Figure 2: Simplified interlink between climate change and urban development.[5]

Wamsler 2007). However, the lack of real knowledge regarding the complex interconnections between urban development and climate change currently means that this potential cannot be fully tapped into. As Wamsler (2007a,b) demonstrates, the ways in which slum communities accumulate disaster-related risk and risk related to other climate change impacts is complex and generally little understood – even more so in the context of urban development planning.

In sum, both planned and unplanned urbanisation cause climatic changes, are themselves affected by climate change, and influence the way climate change impacts urban settlers, thus causing negative feedback loops (cf. Figures 1 and 2).

3. Tackling Climate Change: Mitigation versus Adaptation

While current policy debates and development practice focus mainly on climate change mitigation, climate change adaptation is equally important to lessen the impacts of greenhouse gas emissions, both past and unavoidable future emissions.

Tackling climate change has been placed high on the agenda of the European Union (EU), as reflected in the European Climate Change Policy and the European Climate Change Programme (ECCP).[6] In 1998 the EU signed the Kyoto Protocol to the United Nations Framework Convention on Climate Change (UNFCCC), which came into force in 2005. Since then, European and international efforts[7] to tackle climate change have focused on reaching the goals of the Convention, mainly through mitigation measures to reduce greenhouse gas emissions, for instance, through carbon trading, solar power or tree planting projects.

In the urban development context, existing activities and research on climate mainly deal with mitigation. The focus is on the improvement of buildings and related construction processes to make them more energy-efficient, with minimum reliance on fossil-based energy (e.g. Mazria 2003; Roaf et al. 2004; Smith 2005).[8]

While the focus to date has been on the reduction of greenhouse gas emissions, ongoing policy debates on climate change show a widespread consensus regarding the importance of adaptation (AFDB n.d). In this context, adaptation to the (expected) negative impacts of climate change generally includes two types of action: anticipatory (before impacts take place) and reactive measures (as a response to initial impacts) (ADB et al. n.d.). The adaptation fund established within the UNFCCC – albeit modest – aims to help poor nations cope with climate change impacts. The 2001 Marrakech Accords have also had a focus on adaptation (UNISDR 2002), and the European Commission (EC) is currently planning to adopt a White Paper on adapting to climate change as well as to support adaptation measures by promoting research and scientific cooperation to help developing countries move towards sustainable development.[9] The EU has recently adopted a strategy on climate change in the context of development cooperation that is based on support for greenhouse gas mitigation and adaptation, and on building the relevant capacities of development countries.[10]

Climate change is probably the most important factor to date in raising awareness of the need for disaster risk reduction.

However, the increasing interest in adaptation described above is still low in relation to the general problem of 'natural' disasters. In the debate on the MDGs, the issue of disaster risk reduction is rarely mentioned, and it is hardly mentioned at all in the country-level reports and studies that have been produced in this context.

Climate change has been an important factor in raising awareness of the need for disaster risk reduction and its integration into development planning and programming; in practice, however, it is only recently that a number of initial efforts have been made in the area of adaptation measures. The 2007 report of the IPCC confirms that some adaptation to current climate variability is taking place in Africa. However, it also points out that these efforts are likely to be insufficient in terms of the climate changes expected in the future (IPCC 2007).

The few existing adaptation efforts generally do not tackle the interconnection between climate change and urban development, and therefore fail to address the prevailing negative feedback loops related to them.

If one analyses existing adaptation efforts, it becomes clear that such efforts generally do not tackle the interconnection between climate change and urban development, thus failing to interrupt related negative feedback loops. They focus on sectors such as rural development (e.g. promoting drought-resistant seeds, climate-adapted species or diversification), health (e.g. establishing heat wave warning systems) and education (e.g. creating improved awareness of climate change through school curricula). National adaptation programmes of action have thus been developed primarily by environment ministries and not by ministries of housing, planning, public works or by local government (Moser and Satterthwaite 2008).

In addition, despite the fact that research groups related to climate change adaptation and urbanisation are

04 + 05
Causal loop diagrams portray a causal relation between two variables (e.g. A and B) by an arrow with a plus (+) or minus (-). A plus (+) or minus (-) indicates the type of change that occurs if variable A, at the beginning of the arrow, increases: a positive symbol (+) shows that the increase in variable A affects the increase in B. However, a negative symbol (-) means that the increase in A results in a decrease in B.

06
See europa.eu/scadplus/leg/en/s15012.htm

07
This includes different efforts on the part of international financing organizations, such KfW and the World Bank. See, for instance, under www.kfw-entwicklungsbank.de/DE_Home/Service_und_Dokumentation/Online_Bibliothek/PDF-Dokumente_Jahresberichte_-_KfW_Entwicklungsbank/Jahresbericht_FZ_2007_D.pdf and www.worldbank.org/eap/climatecities

08
See, for instance also the recent The Guardian Weekly special report on "Climate change and housing" from August 15-21 2008.

09
See europa.eu/scadplus/leg/en/lvb/r12542.htm.

increasingly being established, related research generally does not look at the role and/or potential of urban development planning. The newly established 'Climate Change Adaptation in Africa Research Programme'[11] as well as the 'Urbanisation and Global Environmental Change Research Project'[12] aim, for instance, to build better knowledge and understanding of the interaction between global environmental change and urban areas. However, urban development, and especially planning with a more bottom-up approach, such as programming for social housing, upgrading or urban governance, are usually overlooked. One important exception to this comes from the South African context (e.g. du Plessis et al. 2003).

4. Climate Change Adaptations versus Disaster Risk Reduction

Since the 1970s the discourses within the disaster management community have undergone a gradual paradigm shift from response, to improved response and preparedness, to hazard mitigation, to physical vulnerability reduction, to the reduction of social and economic vulnerability, to integrated disaster risk management, and finally to factoring disaster risk reduction into development programming.[13] In parallel, the scientists and organisations examining the problem of global climate change have gradually expanded their approach from initial concerns regarding the causes of climate change, through a desire to model its potential effects, to a concern with how societies and economies can adapt to changing climatic conditions. With this gradual evolution toward considering adaptation, together with the resulting increase in its salience, the climate change community has clearly started to engage with an issue that is very close and complementary to the traditional work of the disaster management community. 'How to live with and adapt to climatic extremes and how to promote more resilient and secure communities are questions that are at the centre of concerns for both communities' (UNDP 2002:14). With the gradual rapprochement of the disaster management and climate change communities, an international trend has recently been evolving that promotes the integration of disaster risk and climate change concerns, as well as integrating their combined concerns into poverty reduction efforts.[14]

The fact that disaster risk reduction and climate change adaptation share many of the same objectives, and that there is a large degree of overlap between the two fields, is not commonly understood.

This international trend is based on the slowly growing awareness that disaster risk reduction and climate change share many of the same objectives and that there is a large degree of overlap between the two fields, especially in terms of adaptation interventions. Figure 3 clarifies how these areas relate to each other and defines the value of disaster risk reduction in the broader context of the climate change agenda. In simple terms, the overlap between the two fields consists of risk reduction activities in the field of weather-borne disasters (Figure 3). In addition to these activities, the field of disaster risk reduction also targets, on the one hand, other, non-climate-related disasters, such as earthquakes and volcanic eruptions. On the other hand, the field of climate change adaptation additionally targets the above-mentioned climate change impacts of increasing climate-related diseases and shortages of water, food and energy supply.

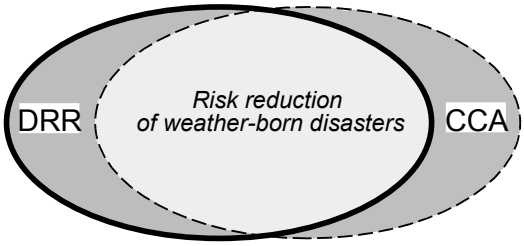

Figure 3: Relation between the working fields of disaster risk reduction and climate change adaptation. DRR = Disaster risk reduction. CCA = Climate change adaptation.

Despite this overlap, in practice there is continued confusion about the interface between disaster risk reduction and climate change adaptation, not least because of the gap between the Kyoto and the Hyogo communities (Tearfund 2008). This is also reflected in the different language and perspectives they use to describe similar issues and concerns. The terminology used by the disaster risk management community to define emerging experiences and research related to risk and disaster management is, in fact, interpreted in vastly different ways by climate change scientists and practitioners (UN IATF/DR 2006; Schipper and Pelling 2006). Specific climate change and disaster management discourses have hardly ever overlapped (UNDP 2002), and it is only recently that the connection between them has been made in earnest (cf. Sperling and Szekely 2005; Satterthwaite et al. 2007).

5. Frameworks for Urban Climate Change Adaptation

To interrupt negative feedback loops between urban development and climate change, and to reach the people most at risk, disaster risk reduction needs to be integrated into bottom-up urban development planning. While the climate change community has, as yet, little knowledge as to how this could be achieved in practice, much could be learned from the disaster management community.

Progress in terms of adaptation requires the integration of disaster risk reduction strategies into other sector policy initiatives related to sustainable development planning (UNISDR 2002). While the climate change community (also called the 'Kyoto community') has little knowledge as to how this could be achieved in practice, it could learn from the disaster management community (also called the 'Hyogo community').[15] Taking advantage of the synergies between disaster risk reduction and climate change adaptation and building on the existing knowledge on integrating risk reduction into urban development planning is, in fact, crucial to achieve urban resilience and sustainable poverty reduction.

5.1. Urban Climate Change Adaptation – Reduced

While there is a lack of emphasis on the urban sector in development and disaster risk research and policy, there is – in relative terms – more knowledge there than in the climate change field.

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The overall objective of this strategy is to assist EU partner countries in meeting the challenges posed by climate change. In the implementation, the EU will be guided by principles such as the contribution to the overarching objective of poverty reduction as stated in the EC development policy, the MDGs and the outcome of the World Summit on Sustainable Development, policy coherence, complementarity between the European Community, the Member States and other donors, primacy of national ownership of development strategies, and broad stakeholder participation in the implementation process. See europa.eu/scadplus/leg/en/lvb/r12542.htm.

11
See www.idrc.ca/ccaa/

12
See 'International Human Dimensions Programme on Global Environmental Change' www.ugec.org/tiki-index.php

13
From the 1970s, planners have been involved in international efforts to reduce risks because there was a strong focus on people's physical vulnerability. However, during the 1990s the focus of attention moved towards social and economic vulnerability, and hence planners' role diminished. Only recently, has the importance of urban development planning once again started to be recognised as important risk reduction measures (UNISDR 2005; UNDP 2004). However, the pitfalls and shortcomings in the use of urban development planning in the context of risk reduction identified during the 1980s, have still not been solved by planners and other urban development actors.

The few existing frameworks developed for urban climate change adaptation generally consider only weather-borne disasters and related aspects to reduce physical vulnerability, and are mainly just analytical tools. To avoid repeating the same mistakes, misconceptions and/or wasted efforts experienced by the disaster management community since the 1970s, such frameworks could, and should, be based on those elaborated for disaster risk reduction. While these are few in relation to urban development planning, there are exceptions. One is a recently developed 'Analysis and Adaptation Model', which provides a comprehensive understanding of the meaning and scope of integrating disaster risk reduction into urban development planning. It was specifically designed for planners and other urban development actors.

At the core of the 'Analysis and Adaptation Model' are seven complementary strategies, elaborated to help integrate disaster risk reduction and urban development planning, combined with five complementary measures to reduce disaster risk. The strategies, and then the complementary measures, are briefly presented here. For programme implementation at the local household level, three integration strategies are distinguished within an organisation's programming:
(I) direct stand-alone disaster risk reduction;
(II) direct integrated disaster risk reduction; and
(III) programmatic mainstreaming of disaster risk reduction (Table 1).

Strategies I and II refer to the integration of disaster risk reduction programming into the work of an organisation, while Strategy III refers to its mainstreaming (i.e. the adaptation of an organisation's core work). Depending on the core mandate of an organisation, as well as the concrete context of a specific programme, certain types of programme measure would be defined as programming or mainstreaming activities. For example, a slum upgrading programme, which includes planning measures to reduce the inhabitants' exposure to risk, is clearly in line with the mainstreaming role of urban development actors. Facilitating, within the same programme, the distribution of leaflets on disaster occurrence and related early-warning mechanisms is not usually associated with slum upgrading. These activities would thus fall within Strategy II, as specific disaster risk reduction measures are 'added on'.

Currently, most funding for disaster risk reduction is directed at 'add-on' programmes or components (i.e. in line with Strategies I and II). In fact, when NGOs or government politicians and leaders have been mobilised to act as champions in responding to disasters and disaster risk, this has seldom been about considering how they could contribute through their core work of service delivery (which would correspond to Strategy III). However, given the role of NGOs, and of national and municipal governments as planners and implementers (and, more recently, facilitators) of urban settlement development, their response should, at the very least, be a mainstream one. Remarkably, this was not identified as what most of these urban development actors have sought or have been urged to seek by international and/or national organisations.

To support the three strategies described, additional strategies are required that tackle related aspects at the institutional level. Currently – in the best cases – it is the (partial) changes at programme level that are supported, while institutional changes are put aside, resulting in merely temporary and thus unsustainable disaster risk reduction. This failure relates not only to
(a) the programmes' implementing organisations, but also to
(b) related donor organisations,
(c) other implementing organisations that are not directly involved in the programme, and
(d) universities and other training institutions working in settlement development planning.

Strategies IV and V thus relate to both implementing and donor organisations; Strategy VI tackles the cooperation between these organisations and other implementing organisations; and Strategy VII deals with related training institutions (Table 1).

To sum up, Strategies I–VII reflect the main lessons learned from the analyses of current practice and frameworks. First, integrating disaster risk management is not necessarily – or only – about implementing additional disaster risk reduction measures. Its main aim is to search for ways of (better) managing risk through the organisation's core work. Second, integrating disaster risk reduction involves changes not only at the local household level, but also, importantly, at the institutional level of the related implementing, cooperating and funding organisations.

To achieve holistic and thus sustainable disaster risk reduction, five different measures to reduce disaster risk would have to be considered and combined with each of the seven integration strategies already described. These measures should match the local needs, capacities and dimensions of risk and – where appropriate – build on people's coping strategies. They include:

1. Prevention (or hazard reduction), which aims (to increase the capacity) to avoid or reduce the potential intensity and frequency of natural hazards that threaten households, communities, and/or institutions;
2. Mitigation, which aims (to increase the capacity) to minimise the vulnerability of households, communities, and/or institutions to 'natural' hazards/disasters;
3. Preparedness, which aims (to increase the capacity) to establish effective response mechanisms and structures for households, communities, and/or institutions so that they can react effectively during and in the immediate aftermath of potential hazards/disasters;
4. Risk 'financing', which aims (to increase the capacity) to transfer or share risk so as to establish a 'security system' (safeguard) for households, communities, and/or institutions that comes into force after potential hazard/disaster impacts and helps people obtain 'readily available' compensation.
5. Stand-by for recovery, which aims (to increase the capacity) to establish appropriate recovery mechanisms and structures for households, communities, and/or institutions that are accessible after a potential hazard/disaster. This includes mechanisms and structures for both rehabilitation and reconstruction.

In practice, urban development actors often consider only two out of the seven strategies identified by the 'Analysis and Adaptation Model' for the integration of disaster risk

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See, for instance, Vordzorgbe, S. (2007), the "Harmonization Portal" of ProVention Consortium under www.proventionconsortium.org/?pageid=95 and/or the 'Stockholm Plan of Action for Integrating Disaster Risks and Climate change Impacts in Poverty Reduction' (gfdrr.org/docs/StockholmPlanOfAction.pdf), established on 24 October 2007 during a workshop in Stockholm, Sweden, organised jointly by Sida, the World Bank and UNISDR under the Global Facility for Disaster Reduction and Recovery (GFDRR).

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This term stems from the fact that the disaster management community committed itself to the Hyogo Framework for Action 2005–2015 (UNISDR 2005).

Strategies		Description/aim	Main question to be analysed by an organisation (working in settlement development planning)
No.	Type		
I	Direct stand-alone DRR	DRR programming	What dedicated programmes can be implemented separately from and additionally to the organisation's core work to specifically address risk and disaster occurrence?
II	Direct integrated DRR	Adding DRR programming elements to core activities	What dedicated programme measures can be added to the organisation's core work to specifically address risk and disaster occurrence within existing programme areas?
III	Programmatic mainstreaming of DRR	DRR mainstreaming within programme implementation	What can be done within the core work of the organisation to reduce risk and increase the capacities of programme beneficiaries to cope with risk and disasters? (Or, at least, to ensure that risk is not increased and capacities not reduced).
IV	Organisational mainstreaming of DRR	Institutionalisation of DRR mainstreaming (and programming)	What can be done to sustain and support DRR mainstreaming (and programming)?
V	Internal mainstreaming of DRR	DRR for reducing the organisation's own risk	What measures can be taken so that the organisation (i.e. its offices and staff) becomes more disaster-resilient?
VI	Synergy creation for DRR	Coordination and complementation for improved DRR integration	How can the DRR mainstreaming (and programming) activities of the organisation be coordinated with and made complementary to the work of other (implementing) organisations?
VII	Educational mainstreaming of DRR	Shift towards non-conventional settlement development planning to integrate DRR into the philosophies that drive urban planning	What has to be done so that universities and other training institutions (decide to) facilitate the sustainable integration of DRR into the sphere of activity of urban development actors?

▲ Table 1: Overview of the complementary strategies for analysing and integrating disaster risk reduction (DRR) into settlement development programming.

reduction, and two (but only in part) of the five measures ascertained to sustainable reduce disaster risk.

5.2. Disaster Risk Reduction – Adapted

Theoretical and operational frameworks for comprehensive urban climate change adaptation need to target all types of climate change impacts, not only weather-borne disasters.

The strength of the 'Analysis and Adaptation Model' presented above lies in its applicability to all types of 'natural' disasters and to both the pre- and the post-disaster context. This comprises pre-disaster protection within a development context and post-disaster response, including relief, reconstruction and rehabilitation. The model was also developed on the basis of in-depth analyses of current practice and existing frameworks, including those for both disaster risk reduction and climate change adaptation, and has a local bottom-up approach, combining both conceptual and operational tools. It thus presents an important basis for pro-poor urban climate change adaptation and has the potential to bridge the gap between the Hyogo and the Kyoto communities. However, the model has, to date, only targeted climate change impacts due to disasters (cf. Figure 3).

At the Global Urban Research Centre (GURC), University of Manchester, England, however, a project is currently under way to examine how cities could meet the challenges of climate change. The aim of the project is to demonstrate the potential of urban development actors for fostering local adaptive capacity so as to achieve urban resilience and more sustainable poverty reduction. Settlement development programmes will be evaluated to assess their strengths and weaknesses in terms of increasing slum dwellers' assets in order to improve their resilience to climate change impacts. Furthermore, in the respective programme areas, climate-related impacts on the urban poor and their response capacities and assets will be studied in detail, as will the interlink ages between climate change and planned and unplanned urbanisation. The knowledge gained will assist in the analysis of recent initial theories on asset-based climate change (e.g. Moser and Satterthwaite 2008) and in expanding the 'Analysis and Adaptation Model' to target climate change impacts other than those due to disasters.

6. Outlook and final remarks

In the light of the increasing impacts of climate change on the urban poor, this paper argues that the task ahead is to increase local adaptive capacity through the integration of pro-poor climate change adaptation into the everyday work of urban development actors. Without integration of this kind, settlement development programmes will not only lose an opportunity to build assets of resilience, but will also aggravate existing risks. The most obvious increased risk from climate change suffered by urban centres comes from 'natural' disasters. Disaster risk reduction and climate change adaptation share many of the same objectives and there is a large degree of overlap between the two fields (cf. Figure 3).

Adaptation and disaster risk management measures can, in fact, for the most part be seen as synonymous. Taking advantage of the synergies between the two fields and building on the existing knowledge regarding integrating risk reduction into urban development planning are vital if urban resilience and sustainable poverty reduction are to be achieved. On this basis, and in order to develop comprehensive models, tools and related policies for urban climate change adaptation, this knowledge needs to be further adapted and extended so that it:

- also considers the specific interlink ages between climate change and planned and unplanned urbanisation, which so far are little understood and systematised (cf. Figure 2), and
- allows planning for climate change impacts other than weather-borne disasters, including unexpected, although often predictable events. The dynamic nature of urban development under demographic variability and climate change means that it is no longer possible to rely solely on past events and trends to prepare for the future.

Alleyway in Guatemala
(Photo: Kosta Mathéy)

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