LUND UNIVERSITY
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Managing Urban Disaster Risk

Analysis and Adaptation Frameworks for Integrated Settlement Development Programming for the Urban Poor

Christine Wamsler

THESIS

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- Risk management for settlement development in regions prone to 'natural' disasters;
- Building design with consideration for climate, comfort and energy consumption;
- User participation in housing processes; and
- Environmentally aware and cost-efficient construction.

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'Perhaps we cannot raise the winds. But each of us can put up the sail, so that when the wind comes we can catch it' – or, when it gets too strong, form wind breaks and cover the slopes.

Schumacher, E.F. (1973), amendment by the author of this doctoral thesis

Doctoral thesis (N°4 of HDM thesis series)

The **cover photograph**, taken by the author, shows a low-income settlement situated in a risk area in San Salvador. Disaster risk management measures are carried out in this settlement within the framework of an upgrading programme implemented by the non-governmental organisation FUNDASAL (Fundación Salvadoreña de Desarrollo y Vivienda Mínima), whose work and dedication is indispensable to the urban poor.

Keywords: adaptation, development assistance, disaster, disaster risk management, El Salvador, mainstreaming, mitigation, poverty reduction, prevention, risk accumulation, risk reduction, settlement development planning, social housing, urban planning, vulnerability.

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Dedicated to all those who have lost their lives in 'natural' disasters or whose lives are endangered by them.

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Executive summary

Context and problem definition

Over the past decades, the frequency of so-called 'natural' disasters has grown significantly worldwide. In fact, their number has quadrupled during the last 30 years, resulting in escalating human and economic losses (UNISDR 2006). In this context, it is the developing countries that bear the highest burden in terms of the human lives and proportion of gross domestic product lost as a result of disasters.

The urban poor are particularly vulnerable to 'natural' disasters, such as earthquakes, floods, landslides, windstorms, volcanic eruptions, wild fires, water surges, and droughts. Their settlements are often located on marginal land near rivers or on steep slopes and have substandard housing and infrastructure. Among other risk factors are leaking sewage pipes from better-off settlements that pass through slum areas; lack of water and waste management services; limited access to information; and overcrowding. While poverty reinforces people's vulnerability to natural hazards, disasters make their already precarious living conditions worse, creating a vicious circle of poverty. Currently, more than one billion people worldwide live in slums (UN-HABITAT 2003a). It is estimated that their number will double over the next 25 years, thus strongly increasing the number of people forced to accept living conditions that are dangerous and beneath human dignity. The threat of climate change presents an even more worrying outlook in this context (IPCC 2007a,b).

To address these challenges, increasing attention has been given to the need to reduce disaster risk through development work so as to bring about sustainable poverty reduction. One of the aims of the Millennium Declaration, to achieve a significant improvement in the lives of at least 100 million slum dwellers by 2020, alludes to this need; and the Hyogo Framework for Action 2005–2015 urges governments to address the issue of disaster risk in their sector development programming (UNISDR 2005a). However, in practice little attention has been paid to urban settlement development in comparison with other development sectors. Consequently, urban development actors (including donor and implementing organisations) still struggle to effectively tackle disaster risk through their everyday work (Woiwode 2002, 2007).

Research focus and methodology

The research is driven by the need to provide a better understanding of the challenges of increasing risk and its impact on the living conditions of the urban poor, as well as to provide new conceptual and strategic approaches to face those challenges. Such approaches are especially required within the pre-disaster context. Technically speaking, they come under the heading of 'adaptation' or 'ex ante disaster risk management' and include measures both for risk reduction and risk financing. With this in mind, the overall research objective is to enhance and

develop new knowledge and innovative ways in which urban development actors can contribute more effectively to disaster risk management, thus demonstrating their role and potential within this field. The overall research question can thus be framed as: how can disaster risk management be properly integrated into settlement development programming (i.e. social housing, upgrading and/or local urban governance programmes)? To answer this question, the following three areas were investigated: (a) the existing interlinkages between disasters and urban settlement development, more specifically, between disasters and building and planning practices related to low-income settlements; (b) the current relationship between the working fields of disaster risk management and settlement development planning; and (c) the possibilities for overcoming existing challenges and gaps in order to increase the potential of settlement development programming to reduce and transfer or share risk.

The research paradigm selected lies within the tradition of so-called 'Mode 2' knowledge production (Gibbons et al. 1994; Dunin-Woyseth and Nielsen 2004), which takes as its starting point the identification and experience of local problems and aims to produce knowledge that is intended to be directly useful or applicable. On this basis, an innovative research methodology was developed and used that combines case studies (Yin 2003), grounded theory (Glaser and Strauss 1967) and systems analysis (Sterman 2000; Hördur 2004). Case studies and an analysis of their context were carried out to assess the situation and the efforts being made at different research levels: *the local household, municipal, national and global level*. The Central American state of El Salvador, which is located in one of the most disaster-prone regions in the world, was the focus country for the cases studied. The cases analysed comprise four aid programmes, implemented in 15 disaster-prone slum communities, that to some extent integrate settlement development planning and disaster risk management. The outcomes of the different level analyses were complemented and generalised with a series of investigations in other countries. In fact, research trips were made to various locations in the United Kingdom; as well as to Geneva, Switzerland; Manila, the Philippines; Manizales, Colombia; Rio de Janeiro, Brazil; Stockholm, Sweden; and Washington DC, USA. Collaboration was established with the Salvadoran non-governmental organisations (NGOs) CEPRODE, FUNDASAL and FUSAI, and with the United Nations Human Settlement Programme (UN-HABITAT).

Data gathering methods included interviews, group discussions, walk-through analyses, observations, text reviews, questionnaires, as well as research workshops and 'hands-on' practice. At the global level, 64 key programme managers and operational or academic staff from 33 organisations were interviewed; at the national and municipal level 71 programme managers and operational staff from 40 organisations; and at the local level 62 households, comprising 331 persons, living in the 15 disaster-prone slum communities of the case study areas. For the data analysis, literal reading, grounded theory, systems analysis, and cultural theory were applied.

Main findings and analysis

The research reveals that while urban development actors have the responsibility for developing secure and sustainable settlements, they nevertheless unconsciously contribute to the increase in disaster risk and disasters. In fact, the research shows that urban settlement development and related practices are not only affected by disasters but are also one of their main causes, in that they can:

- Increase vulnerability;
- Increase exposure to existing hazards;
- Intensify/magnify urban hazards and create new ones;
- Subject vulnerability and hazards to constant change (thus making them virtually impossible to control);
- Reduce coping capacities at national and municipal level; and
- Reduce the local coping capacities of low-income households and communities.

To make matters worse, it was identified that the key variables that underlie the complex system of risk and disaster occurrence in slums, are not only closely linked to settlement development planning, but also reinforce each other. Increasing risk through urban settlement development thus strongly fosters the already existing vicious circle of poverty in which people find themselves trapped.

Unfortunately, neither urban development actors nor disaster risk management professionals have, as yet, effectively addressed the two-way and multifaceted relationship between disasters and urban settlement development. Four interconnected issues were found to drive this situation, creating barriers to effective disaster risk management and to its integration into development work:

1. Limited recognition and understanding of the nexus between disasters and urban settlement development. This can result in denial that urban development actors actually have an important role, influence and responsibility in preventing disasters or in reducing their impacts on households and communities at risk.

2. Separation between the working fields of disaster risk management and settlement development planning from the local to the global level – as well as among these levels. This separation is reflected in a number of instances of mutual incompatibility between these fields: in their respective stakeholders, programmes and institutional structures, in the discourses of their experts and practitioners, and in their working priorities, concepts, terminology and tools. The underlying causes lie in the disciplinary roots of the two fields and in the historical developments within each. Moreover, the separation is made even wider by the low priority assigned to both disaster risk management and settlement development programming on the agendas of aid organisations, and national and municipal authorities.

3. Increasing, but as yet unsustainable, efforts to mainstream disaster risk management within settlement development programming. In fact, whenever intolerable conditions and needs on the ground push forward such an integration proc-

ess (as was the case in El Salvador after Hurricane Mitch in 1998 and the 2001 earthquakes), it is often supported and implemented in such a way that it results in an unfruitful overlapping of the two fields, in other words, in only temporary improvements or even increased competition between and duplication of the efforts of different organisations.

4. Substantial gap between what households and communities need or do to deal with risk and disasters and the way in which urban development actors support them. One example is the insufficient consideration given to people's local coping strategies. The research found more than 100 coping strategies that the urban poor use to deal with risk and disasters. These coping strategies were analysed and, on this basis, categorised into coping strategies for risk reduction, self-insurance, and recovery. It was further revealed that the expenses that people incur in reducing risk and preparing for the annual rainy season account for an average of 9.2 percent of a household's yearly income. However, such local efforts and their financial impacts are generally unknown to urban development actors.

Apart from revealing the challenges, gaps and incompatibilities just described, the research also ascertained that *urban settlement development, and related programming, offer a potentially powerful platform for disaster risk management*. In fact, programmes designed to promote adequate building and planning practices (that incorporate disaster risk management) have the potential not only to substantially contribute to reducing risk and disasters, but also to achieve more sustainably poverty reduction. This potential was furthermore identified within the organisational structures and mechanisms for social housing provision and financing that are at the disposal of urban development actors. However, current conceptual and strategic approaches, and thus financial support and programmes are, as yet, inadequate in terms of tapping into this potential.

To counteract this problem, the following complementary frameworks were developed to provide knowledge on how disaster risk management could be integrated more effectively into the work of urban development actors:

Comprehensive descriptions and analytical frameworks. These assist in understanding and systematising the current situation and capacities at local household and institutional levels. The frameworks thus provide the knowledge base required for appropriate action to be taken. They address aspects, such as:

- The nexus between disasters and urban settlement development;
- The relationship between disaster risk management and settlement development programming;
- The enabling factors, pitfalls, and effects of existing processes aimed at integrating disaster risk management into settlement development programming;
- The key variables, and their causal relations, that influence risk and disaster occurrence in slums;

- The ways in which the lives and livelihoods of slum dwellers are affected by disasters;
- The local coping strategies for dealing with risk and disasters; and
- Urban (as opposed to rural) vulnerability and other risk factors.

Conceptual and strategic integration frameworks. These frameworks build on the analytical frameworks in providing conceptual and theoretical guidance regarding the integration of disaster risk management into settlement development programming. They show the relevant changes that need to be achieved through:

- Complementary strategies for disaster risk management integration for implementation at both local household level and related institutional levels;
- Complementary measures to reduce risk that possibly match with local heterogeneity regarding people's coping strategies and patterns of social behaviour;
- Coordinated and complementary integration procedures of both development and relief organisations;
- Improved financing mechanisms for disaster risk management integration; and
- Improved housing microfinancing mechanisms (i.e. microcredits, subsidies and savings) to become integral ex ante tools for disaster risk management.

Operational analysis and integration framework. This framework offers an extended understanding by 'translating' some aspects of the analytical, conceptual and strategic frameworks into practical guidance. It illustrates how organisations can, step by step, initiate and pursue the integration of disaster risk management into development programming. In fact, it provides a comprehensive indicator system, as well as sector-specific reference activities and recommendations.

Main outcome – 'Analysis and Adaptation Model'

On the basis of the set of frameworks described above, an 'Analysis and Integration Model' was elaborated. This provides a comprehensive understanding regarding the meaning and scope of disaster risk management integration and can assist in both analysing organisations' work and taking action to improve programme implementation. The model and the frameworks developed address policymakers, researchers, programme managers and operational staff of both governmental and non-governmental organisations that work at local household, municipal, national and/or international levels.

At the core of the 'Analysis and Adaptation Model' are *seven complementary strategies elaborated for the integration of disaster risk management* that are combined with *five complementary measures to tackle disaster risk*. In the following, first the strategies and then the measures are briefly presented.

For programme implementation at the local household level, three integration measures are distinguished within an organisation's programming: (*I*) direct stand-alone disaster risk management; (*II*) direct integrated disaster risk management; and (*III*) programmatic mainstreaming of disaster risk management (see

Table 1). *Strategies I* and *II* refer to the integration of disaster risk management 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 measures 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 management measures are 'added on'.

The research indicates that, currently, most funding for disaster risk management is directed at 'add-on' programmes or components (i.e. is in line with *Strategies I and II*). In fact, where 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 mainstreaming one. Remarkably, this was not identified as what most have sought or have been urged to seek by international and/or national organisations.

To back up the three strategies described, additional strategies are required that tackle related aspects at the institutional level. In fact, the research shows that – in the best cases – it is the (partial) changes at programme level that are currently supported, while institutional changes are put aside, resulting in merely temporary and thus unsustainable disaster risk management. 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. Based on these research findings, *Strategies IV and V* were designed to 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 (see *Table 1*).

To sum up, *Strategies I–VII* reflect the main lessons learned from the different level analyses of this research:

First, integrating disaster risk management is not necessarily – or only – about implementing additional disaster risk management measures. Its main aim is to search for ways of (better) managing risk through the organisation's core work.

Second, integrating disaster risk management involves changes not only at the local household level, but also, importantly, at the institutional level of the related implementing, cooperating *and* funding organisations.

Table 1: *Overview of the complementary strategies for analysing and integrating disaster risk management (DRM) into settlement development programming.*

Strategies		***Description/aim***	***Main question to be analysed by an organisation (working in settlement development planning)***
N°	**Type**		
I	Direct stand-alone DRM	DRM 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 DRM	Adding DRM 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 DRM	DRM 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 DRM	Institutionalisation of DRM mainstreaming (and programming)	What can be done to sustain and back up DRM mainstreaming (and programming)?
V	Internal mainstreaming of DRM	DRM 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 DRM	Coordination and complementation for improved DRM integration	How can DRM mainstreaming (and programming) activities of the organisation be coordinated with and made complementary to the work of other (implementing) organisations?
VII	Educational mainstreaming of DRM	Shift towards non-conventional settlement development planning to integrate DRM 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 DRM into the sphere of activity of urban development actors?

To achieve holistic and thus sustainable disaster risk management, five different measures to tackle disaster risk would have to be considered and combined within 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. Related knowledge and analyses are thus required on the part of urban development actors. The measures include:

- *Prevention,* 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;

- *Mitigation*, which aims (to increase the capacity) to minimise the vulnerability of households, communities, and/or institutions to 'natural' hazards/disasters;
- *Preparedness*, which aims (to increase the capacity) to establish effective response mechanisms and structures for houseseholds, communities, and/or institutions so that they can react effectively during and in the immediate aftermath of potential hazards/disasters;
- *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 obtaining 'readily available' compensation.
- *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 comparison to the 'Analysis and Adaptation Model', the research revealed that, in practice, urban development actors often consider only two out of the seven strategies identified for disaster risk management integration, and two (but only in part) of the five measures ascertained to sustainably tackle disaster risk.

Concluding remarks

The empirical and theoretical knowledge developed by this research is of intra-, trans- and interdisciplinary/intersectoral nature. In fact, based on the analysis of the nexus between disasters and urban settlement development, and of related programming, the research contributes to the advancement of knowledge in: (a) disaster risk management; (b) settlement development planning; (c) the interface and interconnection between the two fields; (d) related disciplines (i.e. architecture, urban planning, development and disaster studies); and (e) related research methodology appropriate for addressing similar intersectoral and interdisciplinary research fields.

All in all, the main contribution of this research is the development of conceptual and strategic approaches to integrating disaster risk management into (urban) development programming. With escalating disasters worldwide, these approaches are crucial for the sustainable reduction of both risk and poverty and can thus contribute to the achievement of the Millennium Development Goals (MDGs). They show how (urban) development actors could counteract the failure of current approaches, related financial support and programmes, and exploit their potential to more effectively reduce the disaster risk of the urban poor. Importantly, while the focus of this research is on settlement development planning and programming, most of the analytical, conceptual, strategic and operational outcomes can also be applied to other development sectors, as well as within disaster relief, rehabilitation and reconstruction.

Preface and acknowledgements

Every PhD has a history and is a long journey in which many people help along the way. In the following, I would like to briefly tell my 'backstage story' and give my deepest gratitude to all of those who supported me.

Looking back, this PhD was a logical step that built on my preceding studies and working experiences. During my undergraduate studies and MSc in architecture and urban planning in France and Germany, I specialised in the field of construction and planning in developing countries, with Togo, West Africa, being the focus of my final thesis. After graduation, I worked in different developing programmes around the world. I was engaged, amongst other things, in the establishment of a craftsmen's association in Togo, solid waste management in Mexico City, slum upgrading in Chile, and post-earthquake reconstruction in India. In 2001 after a master's degree in 'International Humanitarian Assistance', which included training on disaster risk management, the German Agency for Technical Cooperation (GTZ) offered me the opportunity to work in a regional disaster risk management pilot programme in Central America.[1] The headquarters were located in Guatemala, and the national counterpart was the Guatemalan National Emergency Committee (COEN). The pilot programme was one of many disaster risk management initiatives, which in this period – and with the support of international agencies – started to 'spring up like mushrooms' in Central America and worldwide. My task was to investigate how measures in the field of settlement development (including social housing and urban planning) could be included within the framework of GTZ's pilot programme in order to address the striking lack of knowledge about how to interface disaster risk management and settlement development planning (Wamsler 2001, 2002). I conducted related training for masons, assessed relevant programme measures, and, most importantly, worked at the local household level with people living at risk, trying to understand their perspectives, their most pressing needs and their efforts to cope with disaster risk. This on-the-ground work and experience was the first link in the chain that led towards the present PhD work. I was convinced of its importance, and there was no doubt in my mind that I wanted to continue in this direction.

The very welcome next opportunity came with subsequent consultancy work for GTZ. My task was to systematise how disaster risk management was integrated into reconstruction projects in El Salvador and Peru (GTZ 2003a,b). Again, the direct experience of people's needs and the lack of an adequate body of knowledge on how to address them was obvious and reinforced my desire to go into the topic more deeply.

1 See, for instance, www.gtz.de/de/dokumente/en-community-based-drm.pdf and www.gtz.de/de/dokumente/es-riesgo-el-salvador.pdf.

Whilst searching for further opportunities, I received an offer from Johnny Åstrand, director of Housing Development and Management (HDM), to give lectures on 'disaster risk management for settlement development planning'. This important 'next link in the chain' was followed by HDM's support for a related PhD proposal, which was presented to the Swedish International Development Cooperation Agency (Sida). Sitting in front of a malfunctioning computer in Peru, I received an e-mail about the funding decision. After having restarted the computer about a million times, I was sure that I had read it correctly. The answer was positive – and the starting point of this PhD research!

As my knowledge was mainly based on practical working experiences at the local level, this research on 'managing urban disaster risk' was designed to start by 'taking a step backwards' (i.e. acquiring a broader and more scientific/academic perspective) through a gradual analysis of the challenges and gaps at global, national and municipal levels. This approach allowed me to obtain a fresh and objective perspective before going back to the local household level studies, thus closing the loop (cf. section 1.5 and *Figure 3*).

Whilst the elaboration of this PhD went smoothly and according to plan most of the time, there were three short moments of 'uncertainty', caused ironically by 'natural' disasters. The first was my personal experience of an earthquake, which disrupted an interview in El Salvador in 2004. The second was when my partner was cut off during hurricanes and earthquakes in Taiwan in 2005. The third was caused by area-wide floods in United Kingdom in 2007, which affected my external tutor and thus delayed his revision of this thesis. In the end, none of the three occasions posed any real danger, but the feeling remained that this research was anything but theoretical or distant from my personal life.

For the successful elaboration of this PhD, I am deeply grateful to many colleagues and friends. For their insight and the time spent commenting on draft versions of this thesis and related articles, I would like to thank Johnny Åstrand, Kerstin Barup, Alfredo Stein and my other colleagues at HDM, Lund University; Joanne Bayer of the International Institute for Applied Systems Analysis (IIASA); Ian Davis of Cranfield Resilience Centre and Centre for Development and Emergency Practice (CENDEP), Oxford Brookes University; Jorge Gavidia of UN-HABITAT-ROLAC (United Nations Human Settlement Programme, Regional Office for Latin America and the Caribbean); Mohamed Hamza of the Stockholm Environment Institute; Rolf Johansson of the Swedish University of Agricultural Sciences and the Royal Institute of Technology in Stockholm; and Michael Thompson of the University of Bergen and Musgrave Institute, London. Helena Molin Valdez of the United Nations International Strategy for Disaster Reduction (UNISDR) and John Twigg of the Benfield Hazard Research Centre, London, were crucial for making first contacts and accessing information.

Thanks also to all who agreed to be interviewed, and for their time and the transparent manner in which they answered the questions. Claudia Hernandez and

Isabel Mendez, together with many other families and households living at risk, shared with me moments and insights worth a lifetime's experience. Particular thanks to the Salvadoran organisations that gave me boundless access to their programmes, notably CEPRODE (Centro de Protección para Desastres), FUNDASAL (Fundación Salvadoreña de Desarrollo y Vivienda Mínima) and FUSAI (Fundación Salvadoreña de Apoyo Integral). Without their strong commitment to the urban poor, as well as the support provided to me by their respective directors Lidia Castillo, Edin Martínez and Luis Castillo, this study would not have been possible. Other organisations, which I interviewed in El Salvador, and would like to thank here, are (in alphabetical order):

ACSA (Asociación Salvadoreña de Empresas de Seguros); AMUVASAN (Oficina de Planificación de la Asociación de Municipios del Valle de San Andrés); CARE El Salvador; CHF El Salvador (Cooperative Housing Foundation); COEN (Comité de Emergencia Nacional); COMURES (Cooperación de Municipalidades de El Salvador); FEDECACES (Sistema Cooperativo Financiero); FEDECREDITO (Federación de Cajas de Crédito); FISDL (Fondo de Inversión Social para el Desarrollo Local); FONAVIPO (Fondo Nacional de Vivienda Popular); Fundación Habitat; Fundación Techo para un Hermano; FUNDE (La Fundación Nacional para el Desarrollo); GTZ El Salvador (German Agency for Technical Cooperation); HFH (Habitat for Humanity); IDB El Salvador (Inter-American Development Bank); INTEGRAL; MARN (Ministerio de Medio Ambiente y de Recursos Naturales); OFDA El Salvador (Office of US Foreign Disaster Assistance); OPAMSS (Oficina de Planeación del Área Metropolitana de San Salvador); PAHO/WHO (Pan American Health Organization, regional office of the World Health Organization); PRISMA (Programa Salvadoreño de Investigación sobre Desarrollo y Medio Ambiente); national Red Cross; RTI (Research Triangle Institute); SNET (Servicio Nacional de Estudios Territoriales); Seguros Futuros; UCA (University José Simeón Cañas, department of engineering and department of architecture); SISA (Seguros e Inversiones Sociedad Anónima); UNDP El Salvador (United Nations Development Programme); VMVDU (Vice-Ministerio de Vivienda y Desarrollo Urbano); World Geologists El Salvador; World Vision El Salvador and the municipalities of Sacacoyo, San Salvador, Santa Tecla and Talnique.

The organisations that were interviewed at a global level, and to which I am very grateful, are (in alphabetical order):

Benfield Hazard Research Centre, UK; CARE International, UK; CENDEP (Centre for Development and Emergency Practice) at the School of Built Environment of Oxford Brookes University, UK; Cities Alliance, USA; Cranfield Disaster Management Centre (DMC), Cranfield University, UK; DFID (Department for International Development), UK; DPU (Development Planning Unit), University College London, UK; EDRG (Environment and Development Research Group), King's College London, UK; Geoffrey Payne and Associates,

UK; GTZ (German Agency for Technical Cooperation), Germany; Graduate Institute of Development Studies (IUED), University of Geneva, Switzerland; IDB (Inter-American Development Bank), USA; IDEA (United Institute of Development Studies), Colombia; IDRM (International Institute for Disaster Risk Management), the Philippines; IFRC (International Federation of Red Cross and Red Crescent Societies), Switzerland; ITDG (Intermediate Technology Development Group), UK; IIED (International Institute for Environment and Development), UK; ILO (International Labour Organization), Switzerland; Oxfam International, UK; OMPAD (Oficina Municipal de Prevención y Atención de Desastres), Colombia; PAHO (Pan American Health Organization), USA; PRDU (Post-war Reconstruction and Development Unit), University of York, UK; ProVention Consortium, Switzerland; Sida (Swedish International Development Cooperation Agency), Sweden; Tearfund, UK; UNDP–BCPR (United Nations Development Programme, Bureau for Crisis Prevention and Recovery), Switzerland; UN-HABITAT (United Nations Human Settlements Programme), Switzerland; UN-HABITAT-ROLAC (United Nations Human Settlements Programme, Regional Office for Latin America and the Caribbean), Brazil; UNISDR (United Nations International Strategy for Disaster Reduction), Switzerland; UNOPS (United Nations Office for Project Services), Switzerland; USAID (United States Agency for International Development), USA; the World Bank, USA; and WSP International Management Consulting Ltd, UK.

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Last, but certainly not least, I would like to thank my parents, brother and friends for always believing in me. Most importantly, I would like to thank Luis, the best thing that ever happened to me, for his love and boundless support, and our little baby boy – the best thing I 'developed' during my PhD work.

Lund, December 2007 *Christine Wamsler*

— List of figures, tables and abbreviations —

Figures

Tables

Abbreviations*

C	Capacity to respond to disasters
CBOs	Community-based organisations
CEPRODE	Centro de Protección para Desastres [Disaster protection centre]
DRM	Disaster risk management
FUNDASAL	Fundación Salvadoreña de Desarrollo y Vivienda Mínima [Development and Social Housing Foundation]
FUSAI	Fundación Salvadoreña de Apoyo Integral [Integral Social Action Foundation]
GDP	Gross domestic product
GIS	Geographical Information System
GTZ	Gesellschaft für Technische Zusammenarbeit [German Agency for Technical Cooperation]
H	Hazard(s)
HDM	Housing Development and Management, Lund University
LC/LC_{Res}	Lack of capacity to respond to disasters
LC_{Rec}	Lack of capacity to recover from disasters
M	Mitigation
MDGs	Millennium Development Goals
PAR	Pressure and Release
P_{Rep}	Preparedness
P_{Rev}	Prevention
R	Risk
R_F	Risk 'financing'
Sida	Swedish International Development Cooperation Agency
S_R	Stand-by for recovery
SWAp	Sector-Wide Approach
UN-HABITAT-ROLAC	United Nations Human Settlement Programme, Regional Office for Latin America and the Caribbean
UNISDR	United Nations International Strategy for Disaster Reduction
V	Vulnerability

* Note that only recurrent abbreviations and variables are listed.

CHAPTER

ONE

1 Introduction: research setting

1.1 Context and problem definition

Over the past decades, the frequency of so-called 'natural' disasters[2] has grown significantly worldwide. In fact, the number of disasters has quadrupled during the last 30 years, resulting in escalating human and economic losses (UNISDR 2006). From the 1950s to the 1990s, related economic losses were reflected in their 15-fold increase reported by the World Bank (2006a). More recent years have been characterised by a rapid succession of major catastrophic events, including the Indian Ocean tsunami in 2004 and the South Asian earthquake centred on Kashmir in 2005. In 2005 alone, more than 360 disasters were reported,[3] with around 92,000 people being killed and another 160 million suffering adverse impacts; direct material losses were of the order of US$160 billion (UNISDR 2006). In this context, it is the developing countries that bear the highest burden in terms of the human lives and proportion of gross domestic product (GDP) lost as a result of disasters.

The urban poor are particularly vulnerable to 'natural' disasters, such as earthquakes, floods, landslides, windstorms, volcanic eruptions, wild fires, water surges, and droughts. Their settlements, or so-called 'slums', are often located on marginal land near rivers or on steep slopes and have substandard housing and infrastructure. Among other problems that put them at heightened risk are leaking sewage pipes from better-off settlements that pass through slum areas to discharge into nearby rivers; lack of water and waste management services; limited access to information; and overcrowding. While poverty reinforces people's vulnerability to natural hazards, disasters make their already precarious conditions worse. This creates a vicious circle that may result in poverty traps. Currently, more than one billion people worldwide live in slums and are forced to accept living conditions that are both dangerous and beneath human dignity. It is estimated that their number will double over the next 25 years (UN-HABITAT

2 The increase in number relates to the changed frequency and intensity of weather-borne hazards, as well as to the increased vulnerability and reduced coping capacity of the population facing such hazards. The former is closely linked to climate change (IPCC 2007a). Related definitions of technical key terms such as 'disaster', 'hazard', 'coping capacity', 'risk', 'vulnerability', etc., are listed in the glossary of appendix 1 and are discussed in chapter 2.

3 This number includes, apart from the 'natural' disasters mentioned in the former footnote, 44 epidemics and two insect infestations, neither of which form part of the focus of this study. Other disaster-related data/numbers that are included in the following text do not include these two types of hazardous events.

2003a). Moreover, the threat of climate change presents an even more worrying outlook (IPCC 2007a,b).[4]

As a result of the situation just described, during the last two decades increasing attention has been given by international and national organisations to the field of disaster risk management (DRM), at first mainly within the context of emergency relief (DFID 2004). It is only in recent years that more consideration has also been given to the need to reduce disaster risk through development work so as to attain sustainable poverty reduction. One of the aims of the Millennium Declaration, to achieve a significant improvement in the lives of at least 100 million slum dwellers by 2020, alludes to this need;[5] and the Hyogo Framework for Action 2005–2015[6] urges governments to address the issue of disaster risk in their sector development programming (UNISDR 2005a). In practice, however, little attention has been given to urban settlement development in comparison with other development sectors. Consequently, international, national and municipal organisations working in settlement development[7] still struggle to effectively tackle disaster risk through their everyday work because of the lack of related knowledge and tools (Woiwode 2002, 2007).

While architects, planners and other urban development actors[8] have the responsibility for developing secure and sustainable settlements, this research hypothesises that they actually contribute to the increase in disaster risk and disasters. Disasters occur when a hazardous event strikes a vulnerable human settlement, with the coping capacity of its inhabitants further influencing the extent and severity of the impacts caused. Unfortunately, there is some indication that settlement development planning may negatively affect both hazard(s) and vulnerability (Aysan and Davis 1992; Mitchell 1999). Hence, related programmes need to be urgently re-evaluated to provide better solutions. With disasters being a product of past developments (DFID 2004), responding and adapting effectively to disaster risk is inherently complex. The conventionally recognised need to incorporate better knowledge into settlement development programming about how to make houses and infrastructure safer is thus just one of many issues that need to be addressed. In fact, the task of developing secure settlements cannot be achieved unless (a) the interlinkages between disasters and urban settlement development – that, to date, have been little investigated – are thoroughly under-

4 In the past, from the 1950s to the 1990s there has been a 50 percent rise in extreme weather events associated with climate change (UN-HABITAT 2007).

5 See www.unmillenniumproject.org.

6 The 'Hyogo Framework for Action 2005–2015: Building the Resilience of Nations and Communities to Disasters' was adopted at the United Nations World Conference on Disaster Reduction held in January 2005 in Kobe, Hyogo, Japan. It resolves to pursue a substantial reduction of disaster losses, in terms of lives and the social, economic and environmental assets of communities and countries by 2015.

7 From now on, the umbrella terms 'social housing/planning organisations' and/or 'urban development actors' will be used for this type of organisation (see glossary of appendix 1).

8 From now on, the umbrella term 'planners' will be used for the professional groups including architects, urban planners, engineers and other settlement developers (see glossary of appendix A1).

stood; and unless (b) based on this, holistic approaches and strategies are developed to effectively integrate disaster risk management into settlement development programming.

1.2 Research purpose and objective

This research is driven by the need to provide a better understanding of the challenges of increasing disaster risk and its impact on the living conditions of the urban poor, as well as to provide new conceptual and strategic approaches to face those challenges. Such approaches are especially needed, and thus sought, within the pre-disaster (i.e. development) context. Technically speaking, they come under the heading of 'adaptation' or 'ex ante disaster risk management'[9] and include measures for both risk reduction and risk financing.[10] With this in mind, the overall research objective is to enhance and develop new knowledge and innovative ways in which urban development actors can contribute more effectively to disaster risk management, thus demonstrating their role and potential within this field. The research is thus highly intersectoral and interdisciplinary. Being embedded at the disciplinary interfaces of architecture, urban planning, disaster studies, and development studies, it tackles the nexus between the working fields of disaster risk management and settlement development planning.

1.3 Research questions

In line with the research purpose and objective, the overall research question is defined as: how can disaster risk management be properly integrated into settlement development programming (see *Figure 1*)? The expected research outcome is thus the provision of knowledge, concepts and strategies to increase the potential of settlement development programming for disaster risk management, in order to assist in decreasing urban risk – and thus post-disaster destructions, forced evictions and relocations – and poverty.

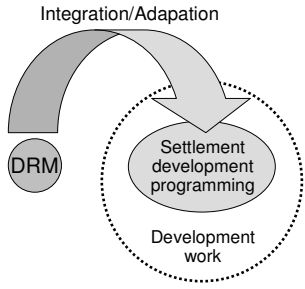

Figure 1: *Illustration of the overall research question.*

Underlying the overall research question is the search for a better understanding of the existing interlinkages between disasters and urban settlement development, more specifically, between disasters and the building and planning practices re-

9 'Ex ante' refers here to the period before a disaster strikes. From now on the terms 'ex ante disaster risk management' and 'disaster risk management' will be used as synonyms (see also glossary of appendix 1).

10 Risk financing includes risk transfer and risk sharing measures taken in a pre-disaster context (see glossary). Note that the focus of the thesis was firstly only on risk reduction (as conventionally defined), not including risk financing. In the course of the investigation, however, research outcomes made it obvious that risk financing is an important aspect that needed to be included in the research.

lated to low-income settlements. This is crucial, as these interlinkages can and should become 'translated' into improved settlement development programming. To respond to the overall research question, the research further seeks answers regarding: (a) the current relationship between the working fields of disaster risk management and settlement development planning; and (b) how related challenges and gaps can be overcome to increase the potential of settlement development programming to reduce and transfer or share risk. *Figure 2* provides an overview of the main research questions.

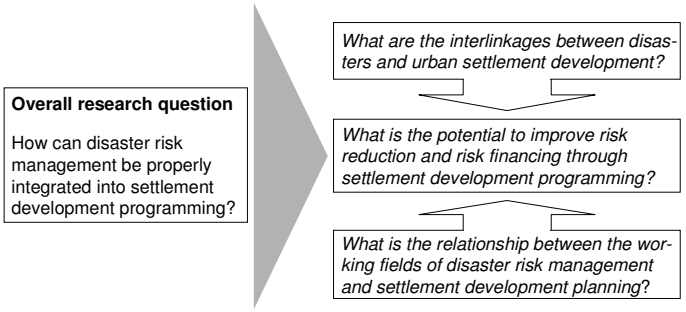

Figure 2: *Overview of main research questions.*

As described in the following, the three research questions illustrated are interconnected in the sense that their respective contents, investigations, and expected outcomes build upon each other.

Preparing the ground – linking disasters and urban settlement development. The first research question is: what are the interlinkages between disasters and urban settlement development? Or more specifically: what are the interlinkages between disasters and the building and planning practices related to low-income settlements? It will be argued that it is a two-way and multifaceted relationship that, to date, has not been well understood and theorised. The expected outcomes are new analytical frameworks that allow this relationship to be better viewed and analysed.

'Reality' versus current practices. The second research question is: what is the relationship between the working fields of disaster risk management and settlement development planning? And, thus, what efforts are being made to address, respectively, the identified interlinkages between disasters and urban settlement development? The relationship between the two fields and the efforts being made will be analysed mainly by looking at the existing separation or integration of respective aid programming, as well as related development processes of mainstreaming and/or divergence.[11] The analysis covers projects, programmes and stakeholders, the discourses of experts and practitioners, their working priorities,

11 Generally, 'mainstreaming' is a specific way of integrating a specific aspect, or working field, into another field. In fact, it signifies the modification of a specific type of core work (e.g. of a specific type/sector of development assistance) in order to take a new aspect into account and to act indirectly upon it (see annexed glossary).

concepts, terminology and tools, as well as the historical development of both working fields. The outcome is expected to be the identification and systematisation of (a) the related challenges and gaps at (and between) the global, national, municipal and local household levels; and (b) the relation between organisations' current efforts and the 'reality' of urban low-income settlements.

A way forward – interfacing disaster risk management and settlement development planning. The third research question is: what is the potential to improve risk reduction and risk financing through settlement development programming? To find the right answers, the following two questions are analysed: first, what risk reduction and risk financing measures are feasible in the field of settlement development planning? This relates to measures already implemented, as well as further potential measures that can be identified with the help of the two previous research questions. Second, how might these measures be successfully combined or integrated to meet existing challenges and gaps? The expected outcomes are conceptual, strategic and operational frameworks/models that provide new knowledge and guidance as to how international, national and municipal organisations engaging in settlement development planning can adopt a more proactive approach towards disaster risk management.

1.4 Geographical focus

Central America is one of the most disaster-prone areas in the world (Lavell 1994).[12] This fact became tragically obvious after Hurricane Mitch in 1998, which impacted nearly 11 percent of the total Central American population (IDB 1999; ECLAC 1999). Before Mitch, between 1960 and 1996, the 43 principal disasters of the region caused more than US$1.021 billion in economic damage and affected around eight million people (IDB 1999). Nevertheless, these numbers reflect only a small part of 'reality'. In the past three decades the US Agency for International Development's Office of Foreign Disaster Assistance (USAID/OFDA) actually registered approximately 70 major disasters in Central America (IDB 1999). But while it is these large-scale events that attract international attention, the region also suffers hundreds of small- and medium-scale disasters each year that have a tremendous impact in terms of damage, disruptions and fatalities, particularly within poor communities. A pilot study in the three Central American countries of Costa Rica, El Salvador and Guatemala registered over 2,400 small-scale disasters from 1990 to 1995 (IDB 1999).

Within Central America, El Salvador was chosen as the research focus country. Its capital San Salvador was destroyed by earthquake nine times between 1575

12 The Isthmus of Central America, forming a bridge between North and South America lies atop five tectonic plates, with active fault systems and 27 active volcanoes. It is located at the eastern extreme of the Caribbean hurricane belt and is hence regularly hit by severe winds and intense rainfall. Flanked by the Pacific and the Atlantic oceans, Central America's coastline is constantly battered and eroded. With mountainous terrain and complex river basin systems, landslides and flooding are also common. The combination of the hazards and the region's highly vulnerable social and economic setting produces a dynamic context of risk, with the permanent threat of disaster.

and 1986. More recently in January 2001, two severe earthquakes affected urban areas in El Salvador, which resulted in around 272,000 houses being damaged (equivalent to 20 percent of El Salvador's existing housing units) and losses of around US$2 billion (equivalent to 15 percent of El Salvador's GDP) (UNDP 2004a; Pleitéz and Acevedo Flores 2005). During the time frame of this research, within only one week in early October 2005, El Salvador was tragically hit by several disasters, namely, Hurricane Stan, floods, mudslides, an earthquake, and the Ilamatepec volcano eruption.[13]

Apart from the frequency and diversity of hazards and disasters that occur, El Salvador is an interesting case because of its very high population density. In comparison, the other Central American countries have – in relative terms – a more rural character. In El Salvador, population density rose from 170 persons per square kilometre in 1970 to about 328 in 2006. In the same year, San Salvador itself had around 3,660 persons per square kilometre.[14] In fact, El Salvador is the most crowded country in the whole of Latin America.[15] Although its high rate of population growth was, and is, similar to that of other Central American countries, its very limited national territory has aggravated the social and political effects of the population increase, one of which is the high concentration of urban poor living in risk areas. The demographic situation has actually exacerbated the problems associated with the inequality of national resource distribution, with around 54 percent of the urban households living in slums in 2002 (Ávalos and Trigueros 2005).[16] Nevertheless, compared to other Central American countries, El Salvador is economically better off, with per capita gross national income of US$2,000 (Garau et al. 2005) and a certain social and economic dynamism which has also been useful in helping to promote new ideas, including disaster risk management.[17]

A further criterion for the selection of El Salvador as the research focus country was the existence of operating and well-established non-governmental social housing/planning organisations with years of experience in the field. Examples of these organisations are the two NGOs called FUSAI (Fundación Salvadoreña de Apoyo Integral) and FUNDASAL (Fundación Salvadoreña de Desarrollo y Vi-

13 See, for instance, International Herald Tribune, 8 October 2005, at www.iht.com/articles/2005/10/08/america/web.flood.php.

14 The total population of El Salvador was around 6.9 million in 2006 on a territory of 21.040 km^2. The total population of San Salvador was around 2.2 million on a territory of 601 km^2.

15 See statistics of the Salvadoran Government at www.digestyc.gob.sv/ or www.marn.gob.sv/gis/sig/MAP_REF.htm, as well as country studies such as those at www.country-data.com/frd/cs/svtoc.html#sv0032 or CIA (2007).

16 For comparison, see the year 2001 statistics of the Salvadoran Government at www.digestyc.gob.sv/Objetivos Milenio/resumen.pdf, as well as country level statistics at http://millenniumindicators.un.org/unsd/mdg/Data.aspx and www.unhabitat.org/list.asp?typeid=44&catid=150.

17 Since the 1986 earthquake, and especially since Hurricane Mitch and the 2001 earthquakes, emergency and development organisations have gained increasing experience of disaster risk management networks and programmes (see Paper III of appendix B).

vienda Mínima).[18] In fact, the country offered a good infrastructure, as well as information richness as a result of the existence of settlement development planning and disaster risk management programmes. Moreover, some locally operating NGOs, municipalities, national agencies, and international organisations had a certain amount of experience in both fields of activity. Good access to information and collaboration could also be guaranteed through already-existing contacts[19] and newly established formal cooperation with FUSAI and UN-HABITAT-ROLAC (United Nations Human Settlement Programme, Regional Office for Latin America and the Caribbean).[20] Furthermore, and because of the country- and context-specific aspects just described, El Salvador provided a challenging opportunity for this study, as research outcomes were expected to have, comparatively speaking, good potential for evaluation and testing and, subsequently, for influencing programmes and policies.

Apart from the studies in El Salvador, field studies were carried out in several other countries (cf. sections 3.2 and 3.3). Field studies in the Philippines at the beginning of the research served as pre-studies for initial information gathering, which provided critical input in terms of specifying the research setting. The Philippines was selected as it is one of the most disaster-prone countries in the world (UNDP 2004a)[21] and because it provided significant information richness and years of experience of measures and programming related to disaster risk management, including innovative urban disaster risk management initiatives.[22] Looking at the disaster risk indices established by UNDP (2004a), El Salvador and the Philippines, while different in size and situated in very different geographical contexts, are also to some extent comparable.[23] Both are multi-hazard countries. From 1980 to 2000, the average annual number of people per million inhabitants dying from hazard-related events was 19.01 in El Salvador and 17.49 in the Philippines; the average Human Development Index was 0.701 and 0.749 respectively; and the annual average proportion of the population exposed to earthquake hazard was around 26.8 percent in El Salvador and 27.3 percent in the Philippines. Finally, minor field studies were also carried out in Manizales,

18 FUNDASAL was created in 1968 (see www.fundasal.org.sv/); ASAI, the predecessor of FUSAI, was founded in 1989 (see www.fusai.org.sv/).

19 Before starting this research, the author of this thesis carried out consultancies in Central America. Hence, good contacts with different organisations were already established, facilitating access to information. HDM's capacity building program in Latin America, PROMEHSA, provided further contacts. FUSAI is one of its cooperation partners, which supports an average of 5,000 low-income families per year to improve their housing conditions (Garau et al. 2005).

20 The access to general disaster information was also guaranteed through the inclusion of El Salvador in the national level disaster databases DesInventar (www.desinventar.org/) as well as EM-Dat (www.em-dat.net/).

21 See also the related database at http://gridca.grid.unep.ch/undp/.

22 One example are the national demonstration projects initiated by the Asian Urban Disaster Mitigation Programme (UNDP 2004a).

23 See UNDP (2004a) and related country profiles at http://gridca.grid.unep.ch/undp/. The respective disaster risk indices and data enable experts to measure and compare physical exposure to hazard, vulnerability, and risk among countries and demonstrate a clear link between human development and death rates following 'natural' disasters.

Colombia, because of its information richness as regards the focus of this research.

1.5 Methodological approach

The research had its genesis in the author's practical 'on-the-ground experience' of working for different development programmes, amongst others, a disaster risk management pilot programme in Central America (see preface to this thesis). Based on this direct engagement with people at risk, as well as pre-studies at local household and institutional levels in the Philippines, the present research was developed and designed in a circular way (see *Figure 3)*. It started by 'taking a step backwards'; that is, a broader and more scientific/academic perspective was taken to gradually analyse the challenges and gaps at global, national and municipal levels. Then, the loop was 'closed' as the research returned to the local household level. However, it should be noted that a number of minor household level studies were already carried out simultaneously with the analyses at national and municipal level.

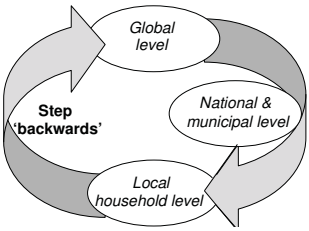

Figure 3: *Basic methodological research approach.*

On the basis of the circular approach described, the research is composed of case studies – and their context analysis – of programmes that integrate settlement development planning and disaster risk management to some extent. This type of research design was most appropriate for the development of this intersectoral and interdisciplinary research. It permitted a multi-level and multi-perspective analysis of an interconnected system from the local to the global level, as well as the consideration of the voices and perspectives of related actors and the interaction amongst them. The research methods for data gathering included interviews, group discussions, walk-through analyses, observations, text reviews, questionnaires, as well as research workshops and 'hands-on' practice (cf. section 3.3). Based on the analysis of the cases and their context, the focus of this research was on developing a grounded theory on the situation/system encountered and on how this situation/system could be improved (i.e. positively influenced). Hence, for the data analysis a combined 'grounded theory–systems analysis approach' was selected (cf. section 3.4).

Close contact with different development organisations, such as the formal cooperation partners (cf. section 1.4), as well as CEPRODE (Centro de Protección para Desastres), FUNDASAL, and Plan International, operating in El Salvador

and the Philippines, were crucial both for the data gathering process and for validating and generalising the research outcomes (cf. sections 3.2–3.4).

1.6 Target group

A differentiation must be made between the bottom line beneficiaries and the direct target group of this research. The bottom line beneficiaries are the urban poor who, if the outcomes are effectively 'translated' into practice, should benefit from the research. This is also reflected in the methodological research approach, which has its starting and end point at the local household level (cf. section 1.5 and *Figure 3*). In contrast, the direct target group (i.e. the persons directly addressed by the research), are policymakers, researchers, programme managers and operational staff of both governmental and non-governmental organisations working in settlement development planning at international, national, municipal and/or local levels.[24] However, the research outcomes also proved to be to some extent applicable by implementing and funding organisations engaged in other sectoral development work, as well as in relief, rehabilitation and reconstruction.

1.7 Limitations and delimitations

Disaster risk management is essential – and can be promoted and implemented – before, during and after large- and small-scale disasters. Yet, the focus in this research is mainly on measures that can be applied in the pre-disaster context of development programming. This limits the scope of the research so as to permit a focus on the most neglected and under-researched context. In fact, in contrast with the post-disaster phase of large-scale disasters, the pre-disaster context provides a wide range of challenges as regards advocacy, funding and knowledge of potential strategies and measures in terms of tackling disaster risk.

The study further focuses on settlement development planning for the urban poor, a field that, as yet, has been of comparatively little interest in the ongoing discussions on mainstreaming (or integrating) disaster risk management into development planning.[25] The emphasis here is less on general urban development, and mainly on social housing, upgrading, settlement planning and local urban governance programmes that have the potential to directly influence the 'reality' of the most vulnerable. In this context, the study concentrates on the conceptual, strategic and operational aspects of these programmes. Compared to structural disaster-resistant construction measures, which have been widely researched, these aspects have been somewhat neglected and are not restricted to a specific type of 'natural' hazard or disaster.

The research was further limited to the risk related to natural, small- or large-scale triggers (so-called 'natural hazards'), such as earthquakes, floods, land-

24 Non-governmental organisations include here both private profit and private non-profit institutions.

25 Development sectors, for instance, that have received more attention to date are rural development, agriculture, health, and education.

slides, windstorms, volcanic eruptions, wild fires, water surges and droughts.[26] Although these hazards are called 'natural', it is fully recognised that they can be closely linked to human-induced factors. So-called 'man-made risks', for instance wars, internal unrest or accidents, were not part of the enquiry. Accordingly, the case studies in El Salvador were carried out only in areas where the inhabitants identified and prioritised the risk related to 'natural' hazards/disasters as being the most pressing.[27]

Finally, it should be noted that the last year of research, in strong contrast with the first years, was characterised by a boom in academic and non-academic writings related to the integration of disaster risk management into general development work. Hence, only the literature that was the most relevant to the research focus, as described, could be included in this thesis.[28]

1.8 Content and outline of the thesis

This thesis consists of a research summary presented in seven chapters, as well as a compilation of eight reviewed papers (i.e. six journal articles, a book chapter and an operational framework in the form of a working paper), which were published between late 2004 and early 2008. Because of its size, the working paper has been enclosed on a separate CD.

Subsequent chapters are as follows. First, the conceptual framework of the study is presented (chapter 2), followed by a description of the research theory and methodology (chapter 3) and the cross-case findings (chapter 4). The latter comprises, on the one hand, a systematisation and synthesis of the key research findings included in the different papers mentioned above and, on the other hand, an analysis of related outcomes. These outcomes are then incorporated into a comprehensive model for integrating disaster risk management into settlement development programming. The main conclusions and final remarks follow (chapter 5), as well as a list of references and four appendices (chapters 6 and 7). Importantly, the first appendix is a glossary containing the technical key terms that are crucial for understanding this study. After the different chapters just described comes a chronological compilation of the eight papers listed below.[29] These pa-

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26 The difficulty of disentangling the threat of natural hazards from other threats to lives and livelihoods is frequently commented upon by disaster researchers (e.g. Burton et al. 1993; Wisner et al. 2004; Tobin and Montz 1997; Mitchell 1999). However, the utility of an approach that singles out individual threats can be justified for research and policy (Pelling 2003a).

27 Slum dwellers were asked about existing types of risk, which ones had the highest priority, and also about their views on the underlying drivers of disasters and disaster risk (cf. section 3.2.3). This bottom-up approach influenced the change of focus of this research so that it included not only large-scale one-off events but also small-scale everyday hazards/disasters.

28 This thesis can today be considered as falling within current 'streamline thinking' as regards the integration of disaster risk management into development work. This was quite the contrary when it was proposed and outlined at the beginning of 2002 and when the research started in 2003. At that time, the research focus described was highly innovative. However, and as mentioned above, within the field of settlement development planning the integration of disaster risk management has remained, and thus still is, an under-researched area.

29 'Chronological' refers here to the date of writing, and not the date of publishing.

pers build on each other by proceeding methodologically through the different research levels (i.e. the global, national, municipal and local household level) to answer the research questions presented in section 1.3.

- **Paper I:** Wamsler (2004) 'Managing urban risk: perceptions of housing and planning as a tool for reducing disaster risk', *Global Built Environment* (GBER) 4(2):11–28.
- **Paper II:** Wamsler (2006) 'Mainstreaming risk reduction in urban planning and housing: a challenge for international aid organisations', *Disasters* (Journal of Disaster Studies, Policy and Management) 30(2):151–77.
- **Paper III:** Wamsler (2006) 'Integrating risk reduction, urban planning and housing: lessons from El Salvador', *Open House International* (OHI) 31(1):71–83, special issue on 'Managing urban disasters'.
- **Paper IV**: Wamsler (2006) 'Tackling urban vulnerability: an operational framework for aid organisations', *Humanitarian Exchange* (HE) 35:24–26, special issue on 'Humanitarian action in urban contexts'.[30]
- **Paper V:** Wamsler (2006) 'Understanding disasters from a local perspective: insights into improving assistance for social housing and settlement development', *TRIALOG* (Journal for Planning and Building in the Third World), 91(4):4–8, special issue on 'Building on disasters'.
- **Paper VI:** Wamsler (2007) 'Bridging the gaps: stakeholder-based strategies for risk reduction and financing for the urban poor', *Environment and Urbanization* 19(1):115–142, special issue on 'Reducing risks to cities from climate change and disasters'.
- **Paper VII:** Wamsler (2008) 'Planning ahead – before disasters strike', book chapter in: *Hazards and the built environment: attaining built-in resilience*, Lee Bosher (ed.), Taylor and Francis Publications.

The eighth publication included in this thesis, enclosed as a separate CD, is:

- **CD:** Wamsler (2006) *Operational framework for integrating risk reduction for aid organisations working in human settlement development*, Disaster Studies Working Paper No. 14 (revised version published in December 2007, Benfield Hazard Research Centre (BHRC), London.

The following publications and working papers also present research outcomes; however, they could not all be included in this thesis work:

- Wamsler (2003) 'Local disaster risk management and the possible integration of GIS (Geographical Information System)', working paper, GIS-centre, Lund University, July 2003.

30 This paper was published not in an academic but in a practitioners' journal. However, as this research was being carried out within the tradition of so-called 'Mode 2' knowledge production (cf. section 3.1.1), with the bottom-line beneficiaries being the urban poor (cf. section 1.6), including it was considered vital.

- Wamsler (2004) 'Local disaster risk management for low-income settlements', European Network of Housing Research (ENHR) International Housing Conference on Housing Growth and Regeneration, Cambridge, July 2–6, 2004, proceedings, p.213.
- Wamsler (2004) 'Fieldwork and case study in El Salvador: a research strategy report', conference paper, European Network of Housing Research (ENHR) International Housing Conference on Housing Growth and Regeneration, Cambridge, July 2–6, 2004.
- Wamsler (2005) 'Preventing post-disaster destructions and forced evictions: integrating risk reduction, urban planning and housing in El Salvador', conference paper, N-AERUS Conference on Promoting Social Inclusion in Urban Areas Policies and Practice, Lund, September 16–17, 2005.
- Wamsler (2006) 'Conferencia mundial sobre la reducción de desastres', *PROMESHA Boletín* 1/2006:1–2.
- Wamsler (2006) 'Managing urban disasters' (Editorial), *Open House International* (OHI) 31(1) 2006:4–9, special issue on 'Managing urban disasters'.
- Wamsler (2006) *Marco operativo para la integración de la gestión del riesgo para organizaciones trabajando en el desarrollo de asentamientos humanos* [Operational framework for integrating risk reduction for aid organisations working in human settlement development], Disaster Studies Working Paper No. 14, Benfield Hazard Research Centre (BHRC), London.
- Wamsler (2006) 'Operational framework for integrating risk reduction for aid organisations working in human settlement development', International Disaster Reduction Conference, Davos Switzerland, August 27 – September 01, 2006, proceedings Vol. 3:626–629.
- Wamsler (2006) 'Building on disasters' (Editorial), *TRIALOG* (Journal for Planning and Building in the Third World) 91(4):2, special issue on 'Building on disasters'.
- Wamsler (2007) 'Coping strategies in urban slums', in: *State of the world 2007: our urban future*, chapter 6 on 'Reducing natural disaster risk in cities', p.124, The World Watch Institute, Norton & Company, New York.
- Wamsler (2007) 'Integrando la gestión del riesgo, planificación urbana y vivienda social: lecciones de El Salvador' [Integrating risk reduction, urban planning and housing: lessons from El Salvador], *INVI* (International Journal of the Institute of Housing, Faculty of Architecture and Urban Planning, University of Chile), 59:93–114.

In the following text of this thesis, references are included only if the content is based on work other than the author's.

CHAPTER

TWO

2 Conceptual framework

The intersectoral and interdisciplinary setting of this research is reflected in its conceptual framework, which is shaped by existing approaches to the fields of both disaster risk management and settlement development planning. In accordance with the research focus, the emphasis of this twofold framework is on those concepts that have influenced, and are influencing, related development programming.[31] The changing discourses and paradigms within both fields of activity are analysed in sections 2.1 and 2.2, which show how they have evolved on a largely independent basis, as well as their temporary convergences and divergences. Concrete examples from El Salvador illustrate some of the developments described. Within each section, a subsection describes the current shortcomings of each field, and where this research is positioned within the conceptual developments described. Note that the key technical terms mentioned are defined in the annexed glossary.

2.1 Changing discourses in disaster risk management

The key concept underlying (disaster) risk management is the notion of risk. In general terms, risk can be understood as the probability of adverse effects, and (disaster) risk management is thus seen as the reduction of that probability in order to minimise or prevent those adverse effects. The way in which different research communities and stakeholders define risk dictates how risk management is addressed. Slovic (1999:689) states that 'whoever controls the definition of risk controls the rational solution to the problem at hand. If risk is defined one way, the one option will rise to the top as the most cost-effective or the safest or the best. If it is defined another way, perhaps incorporating qualitative characteristics and other contextual factors, one will likely get a different ordering of action solutions. Defining risk is thus an exercise in power, as is its management.'[32] Similarly, Douglas (1992) promotes the idea that 'risk language' has a social

31 Due to the lack of interdisciplinary work and theory connecting both fields (Woiwode 2002, 2007), various concept maps were elaborated during the course of the research (cf. Maxwell 2005). These assisted the analysis of the interrelation between the two fields, as well as how this interrelation is linked to a range of other fields of activity, disciplines, and related concepts.

32 There are many political aspects to disaster risk management and these are present at all levels (i.e. from the local, municipal, national to the global level). Who gets or doesn't get related aid/support is often politically driven (Wisner and Walker 2006), and generally little effort is put into pre-disaster risk reduction as it is a field of activity which is not politically 'sexy', unlike, for instance, relief or reconstruction. Related aspects are explicitly commented on in the annexed Papers I, II, III, V and VI.

function in that it is often used to express blame and to accept or reject responsibility.

Before turning to the focus of the research, that is, the risk of disasters and the management of that risk within an urban context (sections 2.1.2 and 2.1.3), the following section 2.1.1 will give a brief background regarding general risk (management) research. In section 2.1.4 the relation between disaster risk management and adaptation to climate change is then explained. Finally, the shortcomings of the discourses in disaster risk management are highlighted and the resulting conceptual positioning of this study is described.

2.1.1 Risk (management) research

Risk research or science has a long tradition in sociology, psychology, philosophy, economics and other disciplines. It had its genesis around the 1950s, and since then has undergone a constant development that has generated various disciplinary trends, risk definitions and theories (Persson 2007a). In this context, it is mainly 'outcome risk' that is researched, that is, the consequences of certain well-defined events (Sahlin and Persson 1994).

Contemporary conceptions of risk researchers are typically agent-centred. These conceptions entail that risk emerges in a decision situation (e.g. Luhmann 2005) and/or is man-made (e.g. Douglas 1992; Beck 1992).[33] It is argued that a specific risk for a person exists or emerges only with his/her decision and that this risk is 'manufactured' and not of external, natural origin. Other risk researchers, such as Starr (1969), Rescher (1983) and Persson (2007b), disagree with these conceptions. In fact, they identify a so-called 'risk-taker fallacy', pointing out that there are also risks that people do not take, but (unintentionally) run. This recognises that 'risk runners' are not necessarily synonymous with 'risk takers'. Against contemporary conceptions, Persson (2007b) further argues with the so-called 'risk production fallacy', stating that not all risk that has to be managed is man-made. He thus suggests that risk – man-made or natural – has to be manageable in order to be called risk (as opposed to hazards, which Persson [2007b] defines as unmanageable).

2.1.2 Disaster risk (management) research and practice

In contrast with risk and risk management research, disaster risk management is still a relatively new field of knowledge and activity that has undergone its own seemingly independent evolution. The field is developing slowly, as is its multifaceted process of institutionalisation (cf. Twigg 2004). The analysis of existing literature shows that disaster risk management seems to have emerged and is

33 Beck is the founder of the social theory called 'risk society', which describes the production and management of risk in modern society. The theory focuses mainly on 'manufactured' risk and not 'external' risk. The latter includes risk produced by 'natural' disasters, which are seen to be caused only by non-human forces (see, for instance, http://en.wikipedia.org/wiki/Risk_society).

evolving, not so much from theory and science, but based on different working experiences. In fact, it has been evolving mainly through the practical use, and related analyses, of different approaches to managing risk carried out and evaluated by the humanitarian, development, environmental and climate change communities (cf. Wijkman and Timberlake 1984; Maskrey 1989).

Furthermore, disaster risk management seems to have developed in the opposite direction to risk research, as described in section 2.1.1. In disaster risk management, risk was first understood and dealt with as a purely natural issue, although according to contemporary perceptions, there is no such thing as a 'natural' disaster. The first understanding is referred to as the 'naturalistic paradigm' (Ferrero and Gargantini 2006) or 'technocratic approach' (Bankoff et al. 2004); the contemporary perceptions fall within the 'multidisciplinary paradigm', which states that all disasters are of socio-natural origin (Ferrero and Gargantini 2006). The different components that are considered to be part of disaster risk, and thus characterise the definition of risk, have evolved over time in different ways and within different communities (Pelling 1997; Adger 2006). However, within the framework of this thesis, in the following only the development of disaster risk management research and practice, as a whole, will be described in detail.

1960s–1970s. Traditionally, discussions about disasters took place in the humanitarian emergency relief arena (Twigg and Steiner 2002). Until the 1970s, the dominant view was that (the risk of) a 'natural' disaster was synonymous with a natural event (or so-called hazard), such as an earthquake, flooding, landslide, windstorm, volcanic eruption, wild fire, water surge or drought. Risk (R) was thus equated with hazard (H):

$$R = H \tag{2.1}$$

In other words, a natural hazard was, ipso facto, seen as a disaster. The magnitude of a disaster was thus considered to be a function of the magnitude of the hazard, with the latter being considered as an inevitable one-off event (Twigg and Steiner 2002). Consequently, the emphasis of researchers, as well as of national governments and the international community, was on pure disaster management, that is, searching for ways to improve the reaction to disasters and, in the best-case scenario, making preparations in advance to improve existing response capacities (Aysan and Davis 1992). Consequently, in many countries of the developed and developing world, national emergency agencies were established or restructured during this period.[34] From the early 1970s onwards, planners began to get involved in the ongoing disaster discussions, first, because of the need for adequate shelter in times of emergency and reconstruction (Davis 1975), and second, because it was found that the same natural hazard can have varying im-

34 For instance, in 1978 the Federal Emergency Management Agency of the United States of America (FEMA) was created to house civil defence and disaster preparedness (see www.fema.gov). El Salvador's National Emergency Committee COEN was founded in 1976 (Decreto No. 498, see www.coen.gob.sv).

pacts on the built environment. A general trend thus evolved to associate disasters more with their physical impact than with their natural trigger. This promoted conventional engineering and settlement development planning as an important means of mitigating disasters, mainly for formally built areas (UNDP 2004a).[35] However, in many countries efforts to reduce risk by these means have been minimal because of their high financial cost (UNDP 2004a).

1970s–1990s. Beginning quietly in the 1970s, but with an increased emphasis during the 1980s and 1990s, researchers in the social sciences triggered a shift in thinking by pointing out that the impact of a natural hazard depends mainly on the vulnerability of the people affected (Maskrey 1993 and 1989; Wijkman and Timberlake 1984; Blaikie et al. 1994). In fact, with the advent of the term 'disaster risk management' (replacing the term 'disaster management'), the focus of attention moved to social and economic vulnerability[36] and was further reinforced by the mounting evidence that natural hazards have widely varying impacts in different countries and on different social groups within those countries (UNDP 2004a). The idea that risk (R) is equated with hazard (H) and vulnerability (V) now started to be promoted by different researchers (e.g. Blaikie et al. 1994):

$$R = H + V \tag{2.2}$$

From the early 1990s onwards, a growing literature has also been emerging in Latin America and the Caribbean, Asia and Africa, born of increasing working experiences in disaster reduction and related social science research carried out by developing country researchers and institutions. In Latin America, for instance, researchers joined forces through the social studies and disaster prevention network 'La Red', created in 1997. Literature related to this network forms the basis of many of the contemporary approaches to disaster risk management being discussed and advocated at the international level.[37] In parallel, after a quiet beginning in the late 1970s, but mainly during the 1990s, engineering and settlement development planning was gradually removed from the disaster risk management agenda. This development took place because most socially oriented authors (and programme managers) accorded only secondary importance to the built environment and related planning practices. Indeed, they commonly neglected planning (including social housing and infrastructure development), perceiving it not as a vitally important risk reduction measure, but as a purely

35 An example from this period is UNDRO (1976), which focuses on physical planning, settlement management and building measures. Exceptional for this period is its focus on the pre-disaster context.

36 Until the 1980s 'vulnerability' received little attention as a distinct concept and then started to evolve from a very restricted concept measured by reference to physical indicators, to a broad and complex process (Pelling 1997). One of the first uses of the term 'vulnerability' was around the 1980s (cf. Chamber 1983). 'Eakin and Luers (2006), Bankoff et al. (2004), Pelling (2003a), Füssel and Klein (2006), Cutter (2003), Ionescu et al. (2005) and Kasperson et al. (2005), for example, present significant reviews of the evolution (…). These build on earlier elaborations by Liverman (1990), Dow (1992) (…) and others (…)' (Adger 2006:269). See also annexed glossary.

37 See, for instance, Lavell (1994, 1999); Martínez López (1999) and other publications of 'La Red' listed under www.desenredando.org/public/libros/index.html, www.desenredando.org/public/articulos/index.html and www.desenredando.org/public/revistas/index.html.

physical measure dealing only with the symptoms of the problem and not the causes (UNDP 2004a).

1990s–2000s. During this period many pilot programmes in the field of disaster risk management emerged in developing countries (see also preface to this thesis). This was prompted by the International Decade for Natural Disaster Reduction (IDNDR) between 1990 and 1999 and a number of highly destructive large-scale disasters that occurred at the end of the 1990s,[38] which resulted in increased resources being made available by international agencies. However, despite the start of a shift away from disaster management towards the reduction of risk, the post-disaster context (i.e. emergency relief, rehabilitation and reconstruction) remained the focus of research and intervention, with a few exceptions, such as those mentioned by Aysan and Davis (1992). In El Salvador, for instance, several programmes from this period, and the research related to them, emphasised the importance of integrating disaster risk management into reconstruction programmes (e.g. GTZ 2003a,b).

The new millennium. During recent years, the growing experience gained within the above-mentioned pilot programmes in the field of disaster risk management, combined with ongoing conceptual developments (see, for instance, Cuny [1983] and Anderson [1985]),[39] resulted in the gradual evolution of a common understanding. In fact, disaster risk management is now generally seen as a cross-cutting topic, and the causal factors of disasters are understood to be directly linked to development processes, which generate different levels of vulnerability (UNDP 2004a).[40] Hence, the integration of disaster risk management into development planning (i.e. the pre-disaster context) has become the main focus (cf. Lewis 1999). The United Nations International Strategy for Disaster Reduction (UNISDR), established in 2000, has helped to raise the profile of related discussions. UNISDR promotes the idea that the reduction of disaster risk requires a long-term engagement in development processes (including settlement development) and hence an increased engagement of international organisations in this field.[41] This shift in thinking is reflected not only in the literature, but also on the ground. Examples are:

(a) The move away from emergency organisations towards development organisations as the national counterparts for disaster risk management. Lavell (1999:1) states that: 'one of the results if not one of the causes of the growing concern for

38 Between 1997 and 2001 there were major floods in, for instance, East Africa, Latin America, the Caribbean and South and Southeast Asia; Hurricanes Georges and Mitch in Central America and the Caribbean; mudslides and debris flows in Venezuela; a cyclone in India (Orissa); and earthquakes in Turkey, El Salvador and India (Gujarat).

39 'Cuny provided a first systematised and comprehensive series of ideas on the ways disasters may interrupt development processes, whilst, at the same time, offering opportunities for future development' (Lavell 1999:1); Anderson (1985), whilst focusing on disaster response, provides a reconceptualisation of the linkages between disasters and long-term development, as well as related capacities and vulnerabilities.

40 Note that already 'since the early 1970s, the issue of the relationship of disasters and development has been a topic of intermittent writing and discussion;' however, it 'fade[d] repeatedly as increased demand for emergency action has focused on necessarily short-term responses' (Lewis 1999:xiv).

41 See, for instance, www.unisdr.org/eng/about_isdr/isdr-mission-objectives-eng.htm.

the development impact of disasters has been an increase in the number and types of institutions involved with the disaster problematic. These are no longer limited to the humanitarian preparedness and response organisations as was essentially the case towards the end of the last decade.'

(b) The 'disappearance' of pilot programmes on disaster risk management since disaster risk management has no longer been understood as a separate working field or sector, but has become a cross-cutting topic for all types of development sector programmes.

(c) The inclusion of special (and mainly added-on) disaster risk management components within different development sector programmes, with sectors such as rural development, agriculture and health seemingly being more 'popular' than settlement development planning.[42]

Recently, there have been further discourses to the effect that development processes are not only generating different patterns of vulnerability, but also altering patterns of hazard (UNDP 2004a; Chafe 2007). This argument is causing increasing concern, especially as evidence mounts regarding the potential impact of global climate change (IPCC 2007b).

Today, disaster risk management is considered to be a constantly evolving and integral paradigm that not only incorporates most of the different trends and perceptions mentioned above, but is also indispensable for cost-effective development and sustainable poverty reduction.[43] Within this framework, risk is defined by UNISDR (n.d.[a]) as: 'the probability of harmful consequences, or expected losses (deaths, injuries, property, livelihoods, economic activity disrupted or environment damaged) resulting from interactions between natural or human-induced hazards and vulnerable conditions.'[44] Accordingly, risk is conventionally expressed by:

$$R = H * V \tag{2.3}$$

Compared to the equation 2.2, this representation has improved as, from a mathematical point of view, probabilities are multiplied and not summed.[45] The multiplication further clearly illustrates that even if the hazard is small, the resultant risk can become multiplied and thus be extremely high. The 'Pressure and Release (PAR) Model' of Blaikie et al. (1994) looks in detail at the two different risk components, hazard and vulnerability. The model conceptualises the role of hazard and of vulnerability in the production of risk and allows a theoretical

42 For El Salvador, all three changes listed are illustrated in detail in Paper III (see appendix B).

43 In this context, changing discourses in development studies also effected that 'poverty' has been deconstructed, revealing its economic, political, social, psychological and environmental components, and then reconstructed around the concept of vulnerability (Pelling 1997).

44 Compared to risk research, such a definition turns away from an agent-centred approach (i.e. mostly looking at the consequences of being exposed to specific agents that – in conjunction – create a risk environment).

45 In the second edition of Blaikie et al. (1994), that is, in Wisner et al. (2004), the equation 2.2 originally used and included in the 'Pressure and Release' (PAR) Model was changed to equation 2.3.

chain of explanation to be constructed between global and local forces. Entitled the 'progression of vulnerability', this chain has three main levels: global 'root causes'; intermediate 'dynamic pressures'; and local 'unsafe conditions'. Root causes, acting at the most remote, macro level, are best seen as the dominant structures that underlie the allocation and distribution of resources and power. Unsafe conditions are the most visible producers of vulnerability and can be seen acting at the local household level. Examples could be substandard buildings or inadequate local economies and structures. Acting between the global and local forces are the intermediate, dynamic pressures 'that "translate" the effects of root causes into the vulnerability of unsafe conditions' (Blaikie et al. 1994:24).[46] Dynamic pressures can be, for instance, urbanisation as well as inadequacies in training, institutional systems, or government standards.

The growing interest of some researchers and practitioners in linking risk further with the positive capacities (*C*) of people to respond to disasters is reflected in the following extended risk equation (UNISDR 2002): [47]

$$R = H * V / C \qquad (2.4)^{48}$$

Here, 'capacities' refers to people reacting suitably during and in the immediate aftermath of disasters. In both definitions (i.e. equations 2.3 and 2.4), vulnerability is today generally understood as the opposite or antithesis of resistance (Benson and Twigg 2007) and can be experienced both individually and collectively.[49]

46 In the second edition of the book, the sentence fragment was slightly changed to 'that "translate" the effects of root causes both temporally and spatially into unsafe conditions' (Wisner et al. 2004:53).

47 'The use of the concept of capacity emerged in response to the negativity of the term vulnerability (…)' (Davis et al. 2004:2).

48 This illustration is unfavourable as it may give the impression that only the variable *V* is directly related to people's capacity to respond (see also section 2.1.5). Note that in the revised version from UNISDR (2002) (i.e. UNISDR [2004]), there is no longer any mention of this extended equation. This probably relates to the fact that the 'distinction between vulnerability and capacity has been criticised by certain authors as being unnecessary (…)' (Davis et al. 2004:2). This view relates to the fact that some researchers and practitioners consider people's response capacity in terms of responding to disasters implicitly as a component of vulnerability in the preceding equation 2.3. UNDP (2004a:11) states, for instance, that a 'natural disaster is understood to be an outcome of natural hazard and human vulnerability coming together, coping capacity of society influences the extent and severity of damages received.' Only very few exceptions, such as Benson and Twigg (2007) include coping capacity to respond to disasters more explicitly as part of vulnerability. The majority of other literature does not consider response capacity as being part of the risk equation. Hence, the variable 'capacity' in this equation was, and is, generally only understood (a) to be related to vulnerability, not hazard(s) (which was eventually not the original idea), and (b) to be counteracted by the increase in people's capacity to respond during and in the immediate aftermath of disasters (i.e. not by the increase in people's capacity to recover). The latter is probably based on the fact that it was relief organisations that first started to work in the disaster risk management field. In the course of this research, limitations of this definition were demonstrated (see sections 2.1.5 and 5.2.1).

49 Individual and collective vulnerability are deeply interlinked. Individual vulnerability is determined by asset profiles which are composed of, for instance, access to economic, social and physical resources and claims on social and political influence. Collective vulnerability of urban communities, settlements or nations is understood as being determined by institutional and market structures such as the mechanisms chosen for physical infrastructure provision (Pelling 1997).

2.1.3 Urban disaster risk management

The conceptual disaster risk management framework described above has evolved with a rural bias. In the main, related concepts (such as risk and vulnerability) and tools (such as vulnerability and capacity assessment tools) were actually developed with a focus on the rural environment and based on related working experiences (Pelling 1997; Davis et al. 2004).[50] Only recently have increasing attempts been made to 'translate' these concepts and tools to the urban context. The need to do this has been recognised by different researchers such as Moser et al. (1996) who have attributed higher vulnerability to the urban than to the rural poor. It has also been promoted by Pelling (2003a:vii), who has argued that 'urbanisation looks set to be one of the most forceful drivers for and contexts of social change that will prefigure disaster risk in the medium and long term.'

The near absence of urban disaster risk management is a subgroup of the failure to mainstream disaster risk management in development (Pelling 2003b). In this context, especially little research can be found that looks at the interface between disaster risk management and urban settlement development planning or programming (Woiwode 2002, 2007).[51]

2.1.4 Relation to the climate change adaptation approach

The terminology used by the disaster risk management community to define emerging experiences and research related to risk and disaster management is interpreted in vastly different ways by climate change scientists and practitioners (UN IATF/DR 2006; Schipper and Pelling 2006). In fact, specific climate change and disaster risk 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). 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 turn to adaptation considerations and an increase in its salience, the climate change adaptation community has clearly commenced to take up on a topic that is very close and complimentary to the traditional preoccupations of the risk and disaster 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).[52] Given this development, measures of adaptation and disaster risk management can, today, for the most part be

50 An exception to this is Aysan and Davis (1992) who focus on experiences and developments in urban contexts.

51 This also relates to the fact that the existing body of knowledge is mostly in the form of independent case study literature of NGO disaster reduction initiatives, evidence that often remains in agency files (Benson and Twigg 2004). For more details see also Paper I and II.

52 Note that within the framework of this research, this shared concern of the two communities was also expressed and highlighted by calling one of the main research outcomes the 'Analysis and Adaptation Model'.

seen as synonymous. Thus, an international trend has recently evolved that promotes the integration of the disaster risk and climate change concerns of the related 'Hyogo and Kyoto communities',[53] as well as the integration of their combined concerns into poverty reduction efforts.[54]

2.1.5 Shortcomings and conceptual positioning

Based on the foregoing sections, three main shortcomings and the related positioning of this research are highlighted as follows.

The first shortcoming is that hardly any alternative strategies for settlement development planning have been developed to replace the conventional engineering and planning practices that, from the late 1970s onwards, were gradually 'deleted' from the disaster risk management agenda (cf. section 2.1.2). Recently, these practices have once again started to be recognised as important risk reduction measures (cf. UNISDR 2005a; UNDP 2004a). However, their pitfalls and deficits, which were identified during the 1980s (such as their cost and the fact that they failed to meet the needs of the most vulnerable), have still not been tackled. This situation is reflected in the lack of comprehensive literature on the topic: (a) general disaster studies still tend to focus only on the hazards themselves and hence mainly address related scientific and structural aspects and solutions (e.g. high-tech structures and prediction systems) (cf. section 2.1.2); (b) more socially oriented disaster studies look principally at the (social) causes of vulnerability, thereby usually neglecting settlement development planning (cf. section 2.1.2); (c) only a few publications fully recognise urban disasters (cf. section 2.1.3); and hence (d) little literature is dedicated to finding improved planning practices for integrated and sustainable settlement development planning. Such literature would ideally address: (a) the pre- rather than the post-disaster context (i.e. not emergency relief, rehabilitation or reconstruction); (b) aspects of planning that are not primarily physical/structural; and (c) the most vulnerable who often live in informal slum areas. The present study was designed to address this gap.

The second shortcoming is that, despite the homogenisation of the disaster risk management framework described (cf. section 2.1.2), there are hints of the frustration and confusion that still exist on the part of many researchers and practitioners (Lavell 2003). In fact, at times risk reduction or disaster risk management is seen and used as if it is equivalent to vulnerability reduction, and risk and vulnerability are understood to be synonymous with each other and not separate 'reali-

53 The term 'Hyogo community' refers to the disaster risk management community that committed itself to the Hyogo Framework for Action 2005–2015 (UNISDR 2005a). The term 'Kyoto community' refers to the climate change (mitigation) community that committed itself to the Kyoto Protocol (established in 1997 and entered into force in 2005), an agreement made under the United Nations Framework Convention on Climate Change (UNFCCC).

54 See, for instance, 'Stockholm Plan of Action for Integrating Disaster Risks and Climate Change Impacts in Poverty Reduction' (http://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).

ties'. The author's belief, which was later confirmed by this research, is that this relates to the fact that the different components of risk and the respective measures designed to tackle them are seldom kept separate from each other and hardly ever systematised.[55] This often results in a poor understanding of and inadequate approaches to disaster risk management (and thus also to disaster risk management integration). In this context, from the beginning of this research the extended definition of risk was used, with only a slight change in its notation to better illustrate and thus separate the three equally important components of risk (cf. section 2.1.2):

$$R = H * V * LC \qquad (2.5)^{56}$$

where *LC* represents lack of capacity to respond to disasters. Equation 2.5 is mathematically identical to the equation 2.4 (i.e. *R=H*V/C*) presented above, but does not mix factors/variables with positive and negative connotations (which are all defined as ≥1). The separation of the different components of risk allowed a more systematised search for strategies to manage urban risk. The separation of vulnerability and capacity in this equation is, for instance, also supported by Davis et al. (2004) who propose such a distinction for the sake of clarity. Compared to the perception of Persson, described above (cf. section 2.1.1), some components of the equation contain both manageable and unmanageable elements. In this context it has to be noted that while, in the literature, the term 'disaster risk reduction' is increasingly replacing the term 'disaster risk management', the latter is the one that is used in this study. This is because the research revealed measures to tackle risk that do not avoid, prevent or minimise the established risk components as indicated and described in the commonly used equations 2.3 and 2.4 (i.e. *R=H*V*; *R=H*V/C*) (cf. sections 2.1.2 and 5.2.1). However, as this was one of the final research results, the term 'risk reduction' was used in several of the attached papers. This was also partly because of the trends then being dictated by the journals in which they were published and by different international agendas.

The third and most important shortcoming is that while the integration of disaster risk management into development work is the declared aim of many (international) aid agencies (and is thus commonly included as an indicator in their tools for monitoring and evaluating the progress in disaster risk management), the con-

55 For instance, by including capacity in vulnerability, while 'capacity and vulnerability cannot always be considered as two ends of a spectrum' (Davis et al. 2004:2), or by including within the definition of disaster risk management and disaster risk reduction the related 'measures to avoid (prevention) or to limit (mitigation and preparedness) adverse effects of hazards' (UNISDR n.d.[a]) without, however, relating them to the different risk components so that they become understandable and applicable on the ground.

56 Lack of capacity refers here to the capacity to respond effectively during or in the direct aftermath of disasters. Based on the research outcomes, the limitations of this definition were demonstrated and an adapted version proposed (see section 5.2.1). It is acknowledged that there can be a slight overlap between factors related to vulnerability and the capacity to respond. However, there are issues that clearly relate to only one or the other component. Thus, the advantages of the differentiation prevail, especially in the context of settlement development planning and programming, where vulnerability tends to be strongly associated with physical/structural issues.

cept is not yet fully developed.[57] In fact, there is hardly any grounded theory on disaster risk management integration/mainstreaming. Moreover, there is insufficient research and knowledge on the ground as to how different development sectors could, in concrete, practical terms, reduce disaster risk and as to how a sustainable process of integrating disaster risk management could be achieved (Tearfund 2005). In addition, the few investigations[58] that have recently advanced the related body of knowledge do not specifically address social housing/planning organisations and related settlement development planning, and are thus, for the most part, not applicable within this context.[59] In the course of this research it also became obvious that existing discourses on disaster risk management integration, and the tools related to them, are often limited in one or several of the following ways:

- They confuse mainstreaming with disaster risk management programming; or, in other words, they do not differentiate between 'integrating' and 'mainstreaming' disaster risk management;[60]
- They look at disaster risk management integration only at the local household level *or* only at the institutional level;
- They focus mainly on risk reduction through hazard and vulnerability reduction and thus do generally not consider other measures to manage risk;
- They make reference only to the physical/structural aspects related to settlement development planning (if, indeed, settlement development planning is mentioned at all); and
- They are based on knowledge gained from a top-down approach and/or the rural context.[61]

57 As a result, such indicators are commonly phrased as, for instance, 'development of a strategy which mainstreams disaster risk management within the organisation's development operations', without indicating what such a strategy consists of and/or could look like in practice, and without providing assistance for implementing organisations working in the field.

58 Important recent publications are, for instance, Benson and Twigg (2006); IDB (2004a,b); IDEA/IDB (2005); Mitchell (2003); Tearfund (2005); UNDP (2004a); UNDP/UNISDR (2006); and UNISDR (2003, 2005b).

59 There is even one tool developed by IDB (2004a) that had originally included housing and settlement issues; however, because of this sector's complexity, it was later excluded (see also Papers I and II). Benson and Twigg (2007) and Rossetto (2006) include some general aspects regarding construction design, building standards and site selection.

60 Compared to other cross-cutting issues, such as gender or HIV/AIDS, it was identified that the idea of mainstreaming disaster risk management is widely underdeveloped and/or misunderstood. Generally, 'mainstreaming' signifies the modification of a specific working field (within, for instance, development or relief work) so as to take a new aspect/topic into account and to act indirectly upon it. Thus, the term 'mainstreaming' does not mean to change an organisation's core functions and responsibilities, but instead to view them from a different perspective and to carry out any necessary alterations, as appropriate.

61 As was later revealed by this research, the limitations listed relate, amongst other things, to a lack of interconnections, coherence and knowledge transfer between and among the global, national, municipal and local level, as well as related theoretical discussions, tools and practice.

2.2 Changing discourses in settlement development planning

The second conceptual framework in which this thesis is embedded is settlement development planning.[62] Just as the definition of risk dictates how disaster risk management is addressed, so the definition of the housing problem determines the course of settlement development planning and programming. In fact, as Gilbert (2001) notes, the way the housing problem is defined can help justify and promote actions to prevent land invasion, hold down the level of rents, generate employment through housing, and/or improve shelter in informal settlements. Further, as with disaster risk management, settlement development planning is a politicised area, as both development and the built environment, and especially housing provision, are influenced by political decisions – and corruption (Broadbent 2001; Transparency International 2005).[63]

The following two sections (2.2.1 and 2.2.2) describe the change in the discourses and paradigms on settlement development planning and programming that have influenced related social housing, upgrading, settlement planning and/or local urban governance programmes in developing countries, including El Salvador. Temporary convergences and divergences that have occurred in terms of the discourses on disaster risk management are pointed out. Finally, section 2.2.3 highlights the shortcomings of the discourses in settlement development planning and describes the conceptual positioning of this study. For a definition of the technical terms used, see appendix A1.

2.2.1 Urban planning theory and practice

Originally, one of the main functions of the city was to provide defence, not against 'natural' disasters but against human threats from the 'outside', such as wars, armed conflicts and other depredations.[64] With the population growth that took place during the Neolithic Revolution,[65] urban communities became increasingly exposed to natural forces, such as 'natural' disasters, famine and diseases. In order to 'bring them under control, the king gathered himself extraordinary sacred powers. (…) Urban man [thus] sought to control natural events his more primitive forerunners once accepted with dumb grace' (Mumford 1961:40). In defiance of this view, subsequent urbanism was marked by the development of

62 For a definition of the term 'settlement development planning', please see glossary (appendix A1). Note that some of the annexed papers use alternative terms.

63 Related aspects were identified at all research levels (i.e. the global, national, municipal and local level), and are explicitly mentioned in the annexed Papers II, III, V and VI.

64 Mumford (1961:35–36) writes that in: 'the final creation of the city, the "little city", the citadel, towered above the village and overwhelmed the humble village ways. (…) The primitive citadel was (…) a holding point, where the chieftain's booty, mainly grain and possibly women, would be safe against purely local depredations – safe, that is to say, against attack by the resentful villagers (…). Once war became an established institution there is no doubt that the stronghold more and more served this fashion [i.e. the citadel being mainly a defensive place].'

65 The Neolithic Revolution is a term for the first agricultural revolution, and describes the transition from nomadic hunting and gathering to agriculture and settlement, as first adopted by various independent prehistoric human societies, in numerous locations on most continents between 10,000 and 12,000 years ago.

cities that were wracked by both human and natural threats. Mumford (1961:467) states that during the 18th century '(…) it was only by a continual influx of new life from the country that the cities so hostile to life could survive at all.'

During the colonial era, poor planning strongly fostered the vulnerability of Latin American cities.[66] In fact, cities were commonly sited for reasons of economic access and production rather than safety, making them cases of risk by origin. In addition, some cities were – and are – built according to imported colonial building codes and planning systems/mechanisms that are inappropriate for their locations (Pelling, 2003a; World Watch 2007). Moreover, the subsequent institutionalisation of urbanisation in Latin America, which began during the 1930s, was strongly influenced by foreign 'experts' who acted as advisors (Almandoz 2006). As a result, from the 16th to the 19th century, European planning theory and practice is reflected in Latin American city plans, and vice versa (Hardoy 1983).

Looking at the more recent planning theory and practice, during the last decades three paradigm shifts can be identified, with each shift in turn implying a change in the kinds of skills or techniques considered appropriate to settlement development planning and related programming.[67]

1940s–1960s. Between 1945 and 1965, urban planning theory and practice were dominated by a conception that essentially purported to be an exercise in physical design, thereby intimately connecting architecture and planning (Taylor 1999). Master planning was the approach promoted, and it was also introduced in the developing world (Jenkins et al. 2007). The modernist model of planning of this period can further be equated with a 'top-down' state-directed approach (Taylor 1999). In line with the original idea of cities being a defensive place against external human threats, Meurman (1947) coined the term 'protective city planning' for protection against fire and threats from the air. He suggested that vulnerable facilities should be 'deconcentrated' and isolated from the rest of the city.[68] Since the architectural modern movement, more inner-city (man-made) threats, such as assaults and accidents, have been actively factored into the vulnerability equation, with a move towards greater protection of cities through physical means and electronic surveillance. In this context, the term 'defensible space' was created in the 1970s by Newman (1972).

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66 Information on informal and formal planning and settlement development by the local population during the pre-colonial time is contradictory. Positive views seem to prevail. For example, Hardoy (1975) points out the selection of ecologically favourable areas for urbanisation during the pre-colonial period, as opposed to an 'ignorance of the characteristics of sites chosen' during the colonial period (Hardoy 1975:16). Other researchers, such as Vitale (1983), emphasise that it was the original inhabitants of Latin America who initiated the gradual process of environmental degradation (although being energetically auto-sustainable), leading to increasing disaster risk. Nevertheless, there seems to be general agreement that the environmental degradation escalated during the 16th century, the colonial period (cf. Vitale 1983).

67 Compared to other researchers, Taylor (1999:327) calls the developments that occurred not 'paradigm shifts' but 'outstanding changes in planning' or 'significant developments which "filled out" and enriched the rather primitive town planning theory which existed half a century ago'.

68 Meurman was the first teacher of urban planning at Helsinki Technical University in 1936 and the first professor of the discipline in 1940.

1960s–1970s. Since the 1960s the physical- and design-based view was increasingly complemented by the view of cities as systems. Planners were concerned with methods of analysing these systems, including their social and economic effects, with the aim of taking instrumentally rational planning decisions (Taylor 1999). This development towards systems thinking was in reaction to the rigidity and limited scope of master plans in the 1950s and 1960s, which were now being replaced by so-called structure plans (Jenkins et al. 2007). Where large-scale hazard maps existed, they were consulted and/or included in structure plans to avoid infrastructure development in high-risk areas.

1970s–the new millennium. Throughout the 1970s and 1980s planners were increasingly viewed less as technical experts than as facilitators and managers of planning decision-making processes. This shift was combined with an increased ideological commitment to participation in order to integrate the public as well as the marginal groups into these processes. In parallel, the private sector became more influential. With planning emphasising the task of facilitating or enabling decisions about appropriate policies and plans over that of taking action, a concern emerged with implementation. In response, 'action planning' became a central preoccupation of some planning theorists, and postmodernists promoted the move towards community-based bottom-up planning (Taylor 1999). Several new issues also began to emerge. Wider awareness of environmental issues during the 1980s, for instance, led to a new focus on environmental urban management, as well as discussions on the 'green' sustainability agenda and the 'brown' environmental health agenda (Jenkins et al. 2007). Related studies, such as 'nature ecology' and 'urban ecology', give consideration to planning that ensures compatibility between urban planning and the natural environment. However, the emphasis there is on physical/structural aspects that deal mainly with the conservation of the environment and/or climatic design features (i.e. the emphasis is not on aspects of 'natural' disaster reduction). Another increasing body of knowledge and related literature, prompted by a range of large-scale disasters at the end of the 1990s (cf. section 2.1.2), is devoted to the post-disaster context and focuses on the physical/structural aspects related to emergency relief, rehabilitation and reconstruction.[69] More recently, there have been some discourses on integrated and preventive urban planning, indicating the need for planning as a tool to help adjust urban areas to increasing disasters and climate change. However, related theory and practice are mainly concerned with 'greenhouse gas mitigation'. In fact, most literature focuses on the improvement of buildings and related construction processes so that they become more energy-efficient (e.g. Mazria 2003;

69 The surge in related conferences, related professional papers and special issues of international journals was, and is, indicative of this still continuing focus. Current examples of international conferences are, for instance, 'Earthquake Disaster Risk Reduction: Engineering Challenges after Recent Disasters', 14–15 April 2008, Jakarta, Indonesia; or the 4th Conference of the International Group for Research and Information on Post-Disaster Reconstruction (I-Rec) entitled 'Building Resilience: Achieving Effective Post-Disaster Reconstruction', 30 April – 2 May 2008, Christchurch, New Zealand.

Roaf et al. 2004; Smith 2005). Publications dealing with the adaptation of settlement development planning to disaster occurrence are an exception to this. However, these have, to date, mainly focused on the purely physical/structural aspects of the formally built environment of developed countries (e.g. EMA 2002).

2.2.2 Planning trends and practice of international agencies

The developments described in the previous section are reflected in the programmes and planning schemes promoted by international agencies engaging in settlement development planning in developing countries. In the following, the related discourses and paradigms are analysed. It is shown how these evolved on a mainly independent basis from disaster risk management concerns and how they indirectly supported or hindered the integration of the two fields. Examples from El Salvador are cited to illustrate the impacts of some of the developments on the ground.

1940s–1960s: government as architect.[70] The period after World War II was marked by massive public housing programmes and the eradication of informal settlements.[71] Most of the former, also called 'conventional public housing programmes', had to be declared unsuccessful. The reasons included unaffordable prices, corrupt procedures and favouritism, inaccessibility for the poor, and low quality caused by a lack of maintenance (Tannerfeldt and Ljung 2006). In El Salvador, state interventions in social housing began in the early 1960s, with new and completed housing units being constructed on subsidised land. These housing programmes were promoted and executed by the central government and through the autonomous national Urban Housing Institute (IVU: Instituto de Vivienda Urbana).[72]

1960s–1970s: government as planner and provider. As the conventional public housing programmes were not very successful,[73] several new developments occurred. In the late 1960s and early 1970s protagonists such as John Turner began to advocate the improvement of informal settlements as the way forward, and 'self-help' became a paradigm in housing in the developing world (Jenkins et al. 2007). As regards private residential housing, self-help was the corollary of a growing housing deficit, caused by the inability of the formal sector to provide sufficient shelters (Gilbert 2001).[74] In line with this, from the mid-1970s to the

70 The subtitles characterising the different periods were partly taken from the 'urban development timeline', elaborated by the Planning and Development Collaborative International (PADCO) (www.urbantimeline.org).

71 During the 1950s and 1960s, further typical initiatives supported in the developing world were the setting up of building research establishments for testing housing materials, techniques and designs (UN-HABITAT 2005).

72 In the early 1990s, IVU went bankrupt. The proceeds of its sale became investment capital for new institutional frameworks that emerged as the result of structural adjustment policies (Stein and Vance 2007).

73 In El Salvador, in the 1960s, an average of 10,000 new families were counted each year in the urban areas of El Salvador, but the formal public and private housing programmes only produced 2,600 units per year. By 1972, about 55 percent of the existing formal urban housing solutions available on the market could only be afforded by the richest 40 percent of the population (Bamberger et al. 1982).

74 Gilbert (2001:26) states that 'the proliferation of self-help housing has greatly increased access to home ownership in Latin American cities.'

mid-1980s, the World Bank introduced the 'sites-and-services' scheme (World Bank 1993), and related programmes were subsequently promoted by most international agencies. Through 'anticipating urban development by providing organised areas for settlement', this approach had the potential to 'prevent the occupation of hillsides or of low-lying land liable to flood, both of which are dangerous for the settlers and expensive to service' (Gilbert 2001:45). From 1972 onwards, the emphasis shifted to so-called 'squatter upgrading' or 'slum upgrading'.[75]

Other related trends that evolved during the 1960s and 1970s were 'bottom-up' approaches, the 'intermediate technology' concept (Schumacher 1973; see also citation at the beginning of this study), and a first recognition of the informal sector. Regarding the bottom-up approaches, urban community-development workers have championed participatory methodologies at the settlement level since the 1960s. Because of the failure of conventional urban (master) planning and of planners' lack of responsiveness to the fast-changing needs of developing cities, Otto Koenigsberger (1964) introduced the concept of 'action planning' (i.e. community-based schemes supported by government agencies) (cf. section 2.2.1).[76] This approach was subsequently further developed by Hamdi into 'community action planning' or so-called 'microplanning' (Hamdi and Goethert 1997). 'Methods and tools from community action planning have been used in various parts of the rapidly urbanising world – often as part of international agency-funded urban planning and management projects' (Jenkins et al. 2007:140), such as sites-and-services and slum upgrading programmes. The acceptance of participatory approaches/programmes such as these represented an important paradigm shift in theoretical and normative aspects of development. Their operationalisation has also been achieved through changes in the funding strategies of the international donor community, through the rise of social movements, and through the increasing influence of NGOs and community-based organisations (CBOs) in urban management in the South (Mitlin and Thompson 1995).

In El Salvador, several massive sites-and-services programmes (providing a minimal core house and infrastructure on 'greenfield' sites) and slum upgrading programmes (to improve conditions in unserviced settlements) started in the 1970s (UN-HABITAT 2005). The civil war in the first part of the 1980s interrupted this process. A subsequent restructuring process enabled different institutions to develop further site-and-services programmes during the period 1985–1987. In spite of their generally recognised success,[77] by the late 1980s the im-

75 Skinner et al. (1987) analysed upgrading programmes across the developing world, concluding that they tend to benefit low-income communities, which stimulated substantial individual home improvements.

76 Koenigsberger is one of today's acknowledged 'gurus' of self-help housing, together with Abrams, Mangin and Turner (Gilbert 2001). The action planning approach attempts to identify key issues that could be affected by immediate action and interventions and that would also be within the resources of the relevant authorities (Jenkins et al. 2007).

77 It has to be noted that occasionally such housing programmes were also introduced to remove a problematic slum. However, this was exceptional and often related to an emergency caused by 'natural' disasters (Gilbert 2001).

plementing NGOs, including FUNDASAL, faced the following two main problems: (a) they had been unable to influence national housing policy changes; and (b) the sites-and-services programmes were, for the most part, only reaching the higher income groups amongst the poor (UN-HABITAT 2005; Stein and Vance 2007). These problems were also common in the sites-and-services and upgrading programmes of other countries, as were difficulties with replicability and cost recovery. These were partly due to (a) the programmes' top-down approach; (b) their 'bypass' implementation structures (i.e. their realisation without the adequate involvement of the local authorities and communities); and (c) the fact that the programmes usually did not include institutional capacity building (Tannerfeldt and Ljung 2006). However, as regards upgrading, these constraints were step by step lessened as aid organisations became more experienced, and thus a more holistic upgrading approach was achieved. In fact, upgrading programmes increasingly began to involve different stakeholders, most importantly municipal governments and beneficiaries, and they gradually came to embrace non-physical/non-structural forms of slum improvement (Gilbert 2001). In the 1980s, for instance, employment activities and institutional capacity building started to be included (Jenkins et al. 2007; UN-HABITAT 2005).

Apart from the developments during the 1960s and 1970s in terms of sites and services and slum upgrading, in the early 1970s planners began to get involved in discussions on disaster risk management. Interest was growing in the design and implementation of ways to mitigate disaster losses through physical and structural measures (for example, by building levees and flood defences or by increasing the resistance of structures) (UNDP 2004a). However, in line with the changing conceptual understanding of disaster risk management, the role of planners within this field soon diminished yet again (cf. section 2.1.2).

1980s–1990s: government as enabler. From the early 1980s to the 1990s at the national and city levels, structural adjustment programmes (SAPs) were introduced by the World Bank and the International Monetary Fund (IMF). Public sector expenditure on housing was reduced and the state's role as a provider/developer changed into that of an 'enabling' agent, whose main function was now to remove the market-related bottlenecks that impeded the supply of inputs at the city level by private production agents (UN-HABITAT 2005). Subsequently, 'the World Bank increasingly drew on innovations in the creation of housing credit institutions' (Jenkins et al. 2007:168). This also initiated a shift from project-oriented lending to lending for housing finance, which was intended to lead to sector reforms (UN-HABITAT 2005). UN-HABITAT (2007), Moser et al. (1996), and Hamza and Zetter (1998) highlight that structural adjustment increased, and even caused, the present-day vulnerability of the urban poor. Structural adjustment had, for instance, the effect of marginalising urban planning by decreasing the influence and political role of planners and national planning units. An example of this was Jamaica after Hurricane Gilbert in 1988, where the Jamaican planning and housing sectors were blamed for the losses,

some of which were related to structural adjustment policies that had resulted in poor maintenance of rental property and non-compliance with building regulations (Ford 1989 in Wisner et al. 2004).

In short, from the 1980s to the 1990s, a shift from 'delivering' to 'enabling' housing and settlements took place. This 'enabling approach' involved the participation of a wide range of multi-sectoral actors, including the state, whose task was not to provide housing but to create legal, institutional and economic frameworks for housing provision. This shift towards policy intervention rather than project/programme activities, together with the increased role of the private sector, actually made it even more difficult to promote and implement disaster risk management measures. The 'enabling approach' can thus be viewed not only as a cause of urban vulnerability, but also as an obstacle to integrating disaster risk management into urban settlement development planning. During the 1990s, this situation was further aggravated by (a) a decline in interest on the part of international organisations in settlement development planning as an important means of poverty reduction, and thus a decline in related funding (Tannerfeldt and Ljung 2006); and (b) the occurrence of a number of large-scale disasters which resulted in international organisations diversifying their shelter portfolio away from slum upgrading and towards post-disaster relief (World Bank 2006b).

In El Salvador, during the 1980s and 1990s, the international approach towards 'enabling' and 'structural adjustment' influenced the way that housing policies and programmes were designed and implemented. The state of El Salvador deregulated its economy and privatised the banking system. In 1992, the National Fund for Popular Housing (FONAVIPO: Fondo Nacional de Vivienda Popular) was created to mobilise state resources to authorised financial intermediaries with the aim of addressing the demand for shelter credit from low-income families working in the informal sector. New organised settlements, so-called NAOs ('nuevos assentamientos organisados'), most of them situated far away from city centres, were the outcome. As the investment capital from FONAVIPO for financing housing subsidies was derived from selling the assets of the abovementioned national Urban Housing Institute, housing support of this kind is now coming to an end (Stein and Vance 2007). Whilst, during the same period, in El Salvador, too, shelter portfolios tended to be diversified towards post-disaster relief (World Bank 2006b), Sida allocated more than SEK 419 million (about US$52 million) to support settlement development planning programmes in Central America. The Sida programmes were executed through a variety of actors, including central and local governments, NGOs, private conventional and non-conventional financial institutions and CBOs (Stein and Vance 2007). In El Salvador, the resources provided by Sida were channelled through FUSAI, which is one of the cooperating partners in this research.

1990s–2000s: government as regulator. During this period, globalisation became a powerful trend, and whilst governmental stimulation/regulation of market

forces grew at the national and local levels, at the same time advocacy groups and civil society became stronger. With the Habitat Agenda (on 'Adequate Shelter for All and Sustainable Human Settlements Development in an Urbanising World')[78] being established in 1996 in Istanbul, a new basis was created for national and international housing and urban policy. Urban poverty, the social aspects of housing, good governance, alliance building, community participation, local government involvement, environmental sustainability and also, in this context, disaster prevention, became more salient issues (Tannerfeldt and Ljung 2006; Jenkins et al. 2007). Regarding the former, during the 1990s new approaches to the study and assessment of urban poverty were also developed, including the concept of 'vulnerability' (Moser 1996).[79] As regards environmental sustainability, another important framework was, and still is, Agenda 21 adopted during the 1992 United Nations Conference on Environment and Development in Rio de Janeiro. Chapter seven of Agenda 21 deals with human settlements and environmental planning. In parallel, since the early 1990s settlement development support for countries affected by disasters has increasingly become more than just an occasional type of intervention on the agendas of the World Bank and other aid organisations. This has gradually also led to the development of some programmes that are attempting to reduce housing vulnerability *before* disasters occur (World Bank 2006b); however, most of these programmes focus only on physical/structural aspects. In Central America after Hurricane Mitch in 1998 – as well as in various other regions that were hit by large-scale disasters during the 1990s – disaster risk management programmes were increasingly supported, but in most cases independently of support for settlement development programming (cf. section 4.2.2).

The new millennium: government as partner and facilitator. Since 2000 most international and national development agencies have been pursuing the Millennium Development Goals (MDGs). These goals represent a global partnership designed to respond to the world's main development challenges by improving the coherence of efforts focused on poverty reduction. Whilst aspects of urban development and 'natural' disaster concerns seem to be underrepresented in the MDGs, these goals are closely connected to both settlement development planning and disaster risk management (cf. Garau et al. 2005; UNISDR n.d.[b]; UN-HABITAT 2007). Most importantly, MDG 7, target 11, to improve the lives of at least 100 million slum dwellers by 2020 (many of whom live in risk areas), involves appropriate urban development and an improved understanding of disaster risk in densely populated areas (UNISDR n.d.[b]).[80] To promote sustainable set-

78 See, for instance, www.unhabitat.org/downloads/docs/1176_6455_The_Habitat_Agenda.pdf.

79 See also footnotes 43 and 179.

80 This target is also stated in the Millennium Declaration itself and reflects the goal set by the 'Cities without Slums Action Plan' in 1999. Note that the United Nations Millennium Project Task Force on Improving the Lives of Slum Dwellers reformulated MDG 7, target 11 as: 'by 2020, improving substantially the lives of at least 100 million slum dwellers, while providing adequate alternatives to new slum formation' (Garau et al. 2005:3). Target 10 of the same

tlement development, the 1999 'Cities without Slums Action Plan', developed by the Cities Alliance, defines key actions to meet MDG 7, target 11.[81] To the same end, the World Bank published its new urban strategy called 'Cities in Transition: A Strategic View of Urban and Local Government Issues' in 2000.[82] The actions that this strategy promotes are built upon successful community-based slum upgrading programmes, yet they mainly address the broader policy and institutional issues that often constrain(ed) the sustainability of such programmes. They focus, for instance, on expanded assistance and scaling-up of services for the poor, institutional in-country capacity building, and urban national/city strategies. The importance of direct support to local-level in situ improvements was, however, strongly emphasised by the United Nations Millennium Project Task Force on Improving the Lives of Slum Dwellers, which also states that: '(…) barring exceptional circumstances, such as those deriving from irreversible environmental hazards, informal settlements must be protected from forced evictions and regularized with the active consent and participation of the interested population' (Garau et al. 2005:4).

In parallel to the developments described above, social housing microfinancing has further evolved and is now perceived as a key issue for poverty reduction that should be addressed in the field of settlement development planning (UN-HABITAT 2005). Such housing microfinancing can be, and is increasingly being, provided through NGOs – as is also the case in El Salvador. In recent years, and in accordance with the above-mentioned shift towards sector reforms through housing finance (that is partly combined with subsidies), the World Bank has almost completely ceased lending for specific slum upgrading programmes (World Bank 2006b). Other connected trends of the new millennium are expressed in the title of the 2005 'Paris Declaration on Aid Effectiveness, Ownership, Harmonization, Alignment, Results and Mutual Accountability', which aims to push the continuous shift from project and programme funding towards: (a) basket funding; (b) Sector-Wide Approaches (SWAps);[83] and even further to (c) general budget support. With this, international organisations' responsibilities appear to be ever-more blurred, as it has become nearly impossible to link individual programme measures to specific donors. This is also true of programmes that aim at the development of disaster resilient and sustainable social housing and settlements.

MDG 7 ('ensure environmental sustainability') is to reduce by half, by 2015, the proportion of people without sustainable access to safe drinking water and basic sanitation.

81 See www.citiesalliance.org/activities-output/topics/slum-upgrading/action-plan-about-ca.html.

82 See http://wbln0018.worldbank.org/External/Urban/UrbanDev.nsf/3f4821145a56d40c8525688700750ae8/4accee4613282d0f852568c000503ca3/$FILE/CitiesSummary.pdf.

83 Further milestones which pushed the SWAps forward – apart from the 2000 MDGs and the 2003 Rome Declaration on Harmonisation – were the 1995 Social Development Summit in Copenhagen, the 1996 Highly Indebted Poor Countries (HIPC) Initiative, and the 2002 Conference on Financing for Development in Monterrey.

Finally, one month before this PhD thesis was finalised, the Global Report on Human Settlements 2007 was released, which focuses on 'Enhancing urban safety and security'. The report encompasses a wide range of concerns, amongst other issues, the risk of 'natural' disasters. In this context, it emphasises that 'international assistance for disaster risk reduction should not focus on recovery and reconstruction efforts alone, but also on longer-term development objectives' (UN-HABITAT 2007:xxxii).

Figure 4: *Example of a playing card associated with the 'Handbook: learning how to live with floods' (Feuerhake 2004a), elaborated within the framework of a UN-HABITAT upgrading programme in Mozambique. This programme can be considered as having evolved from developments during the 1990s–2000s, when disaster risk management began to become a more salient issue, partly also within the context of settlement development planning (see sections 2.1.2 and 2.2.2). Note that the card shows a variety of ways in which people could adapt their housing and living environment so as to better cope with risk and disasters.*

2.2.3 Shortcomings and conceptual positioning

Based on the previous sections, three important shortcomings are now highlighted that support the positioning of this research in terms of its focus and conceptual framework.

First, following the MDGs – and the outcomes of the World Summit on Sustainable Development, held in Johannesburg, South Africa, in 2002 – international donors are again promoting the private sector as a leading provider for settlement development, such as urban infrastructure and services (cf. section 2.2.2)[84]. 'In recent years, for example, increasing private sector involvement in water and sanitation utilities has been put forward as a widely applicable means of water and sanitation provision' (UN-HABITAT 2003c:xxii). Unfortunately, this also signifies: (a) that programmes with a focus on settlement development planning

84 This is mainly related to the agreed target to halve, by the year 2015, the proportion of people who are unable to reach or to afford safe drinking water, as well as the proportion of people who do not have access to basic sanitation (as was already outlined in the Millennium Declaration and MDG 7, target 10).

again tend towards one-sided physical/structural improvements, thus obstructing more holistic planning that would include disaster risk management; and (b) a move away from officially promoted poverty alleviation (i.e. the support for the poor who are most in need, including those living at risk) (World Bank 2006b). In Latin America, the currently poor economic performance, the rising inequalities and growing disaster risk, in combination with the extent of the shelter problem, certainly cast doubt on the efficacy of such a market-led model, reminding us that some form of national and local government intervention and civil society support in urban matters is essential (cf. Hasan et al. 2005; Garau et al. 2005).[85] In this context, the failure of the evolving approaches to settlement development planning in developing countries, which developed after self-help and bottom-up planning, means that the latter is still valid and thus a sound basis/focus of this research. In fact, Jenkins et al. (2007) state that support for self-help and bottom-up approaches is indispensable, at least for complementing other programmes or sector support. However, whilst related pre-disaster social housing, upgrading and governance programmes have a powerful potential to reduce disaster risk, current action plans, strategies and programmes to achieve effective urban development generally lack adequate and comprehensive approaches to disaster risk management (integration).[86] Such challenges underpin the need for this research.

Second, whilst the interest of international organisations in settlement development planning, and consequently in funding related to it, decreased during the 1990s (cf. section 2.2.2), the concept of SWAps is again augmenting the role of planning as the task of facilitating, developing and harmonising appropriate sectoral policies, related programming and budgeting. In theory, the integration of different actors and cross-disciplinary/sectoral aspects is a logical consequence of related preparatory sector assessments and could assist in more integrated planning (including disaster risk management). However, as this research will later reveal, little is being done on the ground in this respect. This demonstrates not only the timeliness of the present research, but also the need to show how such SWAps might look in practice.

Third, and building on the former point, the shift towards SWAps described above demonstrates that planning today is less about 'plan-making' as an activity

85 'From the 1950s to the middle 1970s, market failure was seen as the principal cause of underdevelopment in Latin America. During the 1980s, the blame shifted to government failure. Only since the early 1990s, has the debate become a little more balanced. Today, most authorities accept that there is an appropriate role for both the market and the state and the issue today is about the balance between the two' (Gilbert 2001:35). Nevertheless, in Latin America, there is currently still too much confidence in the power of market forces, as the market does not always work well, and land and housing markets often work much less well than other markets (Gilbert 2001). During the 1990s, El Salvador devoted around 3.7 percent of its GDP to construction, the majority of which was on housing. However, government expenditure on housing has been much lower (i.e. less than 0.2 percent between 1985 and 1994) (Gilbert 2001).

86 Giving increased emphasis to the post-disaster phase is, for instance, still current practice. Though the World Bank has carried out occasional disaster relief projects since 1972, disaster relief became a regular component of the shelter loans in 1986 and now accounts for approximately 25 percent of the annual shelter portfolios. In fact, the share of disaster relief projects increased from 11 percent during the first 15 years shelter lending to 25 percent during the last 18 years (World Bank 2006b).

fixed in time or strict regulatory control, but, in fact, a form of action planning that can respond to change, that is open to negotiation, and that goes far beyond the sectoral/disciplinary issues of housing and urban planning. Such a shift 'has widened the scope of action for planning and housing professionals enormously in principle, although many continue to work in quite narrow professional areas' (Jenkins et al. 2007:202). An important step forward to widen these 'narrow professional areas' is to develop knowledge on how disaster risk management could – in practice – be integrated into the working sphere of planning and housing professionals. Knowledge of this kind is also urgently needed to counteract the lack of literature in this regard: only a small amount of systematic research has been carried out on the interdisciplinary/intersectoral aspects in relation to disasters and urban settlement development, and more specifically, in relation to disasters and preventive building and planning practices associated with informal low-income settlements. In fact, there is a large amount of literature emerging from the planning field that deals purely with construction-related issues in the post-disaster scenario of mainly large-scale disasters (cf. section 2.2.2). Only very few publications, however, are based on a more proactive (rather than reactive) attitude and also include non-physical/non-structural aspects. Exceptions to this are publications on cities and general development issues with an ecological and health-centred approach. Nevertheless, these mainly cover the above-mentioned 'green' and 'brown' sustainability agendas, thus taking account of, but not specifically focusing on, broader disaster risk reduction measures. The recent report of UN-HABITAT (2007) on 'Enhancing urban safety and security' is a step further in the search for new knowledge and related approaches on how disaster risk management could be integrated into settlement development planning.

2.3 Interfacing the twofold conceptual framework

Sections 2.1 and 2.2 presented the twofold framework in which the research is embedded. They showed the separation of the disaster risk management and settlement development planning discourses, related concepts and paradigms, and how the two fields evolved mainly on an independent basis over time. The convergences that occurred, which were also highlighted, were not sustainable (as they were only temporary and/or not of a holistic nature).

The twofold discourses described, and their related concepts and paradigms, were crucial for defining the conceptual basis of this research. The fact of their separation further guided the research setting, directing it towards the construction of a grounded theory (hitherto lacking) for adequately interfacing disaster risk management and settlement development programming. The methodology selected to develop such a theory is presented in chapter 3 and is followed by a description of the research results and conclusions. The latter build directly on the twofold framework presented in this chapter by further advancing both the sector-specific body of knowledge related to it and the interface between the two.

CHAPTER

THREE

3 Research theory and methodology

This chapter is divided into five sections. The theoretical positioning of the research is described first (i.e. its underlying philosophical paradigms and disciplinary premises). This situates the study within the general 'research landscape'. Second, the overall design of the research is presented, which confronts and responds to the challenges resulting from the research's theoretical positioning. Sections 3.3 and 3.4 then describe how the overall research design was 'translated' into strategies and procedures for data collection and data analysis. Finally, the last section discusses key aspects related to research ethics and data validity and reliability.

3.1 Theoretical positioning

The theoretical positioning of the research was determined to be in accord with its purpose and objectives, the questions it raises, as well as its intersectoral and interdisciplinary field of enquiry and conceptual framework (cf. chapters 1 and 2).

3.1.1 Research paradigm

Philosophical positioning (epistemology and ontology).[87] The underlying philosophy of the research is post-positivist critical realism.[88] This is the belief that there is an external reality (independent of an individual's own view of reality), that every observation is fallible, and that all theory is thus revisable. In line with this, the research is further predicated on constructivist thinking, according to which everybody constructs his/her own view of the world based on personal perceptions. Hence, objectivity is not a characteristic of the individual, but rather an inherently social phenomenon that is achieved through discussions among multiple individuals (Trochim and Donelly 2006). In other words, the research is based on the belief that there is no single shared reality, thus emphasising: (a) the social construction of theory and concepts; and (b) the importance of qualitative approaches and triangulation to achieve knowledge through appropriate approximation (Guba 1990).

87 Epistemology is the philosophy of knowledge or how we come to know. Ontology involves the philosophy of 'reality'. Epistemology thus addresses how we come to know that reality, while methodology identifies the particular practices used to attain knowledge of it.

88 One of the main supporters of post-positivism was Karl Popper (see, for instance, http://en.wikipedia.org/wiki/Postpositivist).

'Mode 2' knowledge production. Apart from the philosophical positioning described, the research is further positioned within the spheres of academic science and actual practice. In fact, as far as permitted by the research setting, the selected research paradigm lies within the tradition of so-called 'Mode 2' knowledge production. This entirely new mode of knowledge production, which began to emerge during the last decade, is slowly gaining prominence over an older mode of knowledge production, 'Mode 1' (Gibbons et al. 1994; Nowotny et al. 2001).[89] In accordance with Walther-Jacobsen (2004) and Dunin-Woyseth and Nielsen (2004), the 'Mode 2' approach starts the research initiative from the identification and experience of local problems. These problems take the centre stage of the research, as the aim is to produce knowledge that is directly useful or applicable at the local level. The context of the application thus drives the form and content of the knowledge sought, while at the same time the research is 'predicated on the synergies between science and social mission' (Nowotny et al. 2001:91).[90] 'Mode 2' generally stems from the experience that problems have surfaced that are too complex for specialised academic-based science to solve. Their solution requires transdisciplinarity in the sense that the traditional boundaries between disciplines must be crossed, and a heterogeneous set of practitioners and experts must be involved if relevant new knowledge in more than one discipline is to result (Dunin-Woyseth and Nielsen 2004; Gibbons et al. 1994; Walther-Jacobsen 2004). Hence, 'Mode 2' provides an effective approach to the challenges of this intersectoral and interdisciplinary research.

Qualitative research paradigm. The choice of a qualitative research approach, which is part of social science, is directly related to the philosophical positioning of this study (see above).[91] As such an approach does not assume that there is a universal and shared view of a single unitary reality, it acknowledges the perceptions of individuals. Consequently, it (a) accepts and deals with potential research bias through the researcher's own perceptions; and (b) puts the researcher's own interpretation of the information at the centre (as opposed to a numerical focus). This orientation was also crucial in terms of finding satisfactory answers to the research questions presented in section 1.3. These required not statistical conclusions, but mainly the analysis of qualitative data related to the studied multi-level system and the various related sources and stakeholders. (cf. sections 1.5 and 3.2;

89 'Mode 1', which for many investigators is still the ideal model for university research, is also known as basic research, where problems are set, examined, and solved in a context governed by the academic interests and codes of practice of a single disciplinary community. In the words of Patton (1990:12), 'the purpose of basic academic research is to generate theory and discover truth, that is, knowledge for the sake of knowledge. The purpose of applied research and evaluation is to inform action, enhance decision making, and apply knowledge to solve human and societal problems.'

90 Nowotny et al. (2001:90–91) state that 'if the shift from Mode 1 science to Mode 2 knowledge production is accepted, it is accompanied, inevitably, by a more contentious phenomenon, the rise of contextualised science' and '(…) a more holistic perspective [of universities], predicated on the synergies between their science and social mission'.

91 As Trochim and Donelly (2006) point out, the 'qualitative-quantitative debate' lies primarily at the level of the underlying assumptions of a piece of research rather than at the level of the data. Hence, the qualitative research paradigm does not preclude the use of quantitative methods and data.

Figures 3 and 5). This search for a contextual/systemic understanding is in line with the underlying idea of qualitative research, namely, that the best way to understand a phenomenon is to view it in its context. In other words, one small part of 'reality' cannot be viewed separately without the importance of the whole being lost (Trochim and Donelly 2006). Given the mainly explanatory and exploratory nature of this research, the qualitative research approach was also essential in that it allowed flexibility and questions to emerge (which would not have been the case with a constructed and predetermined measurement instrument). The qualitative research approach was further seen as appropriate, as its aim is both to broaden the perspective from subject–object orientation, and to include the dimensions of social relations and organisational structures that this study required (Holme and Solvang 1996; Maxwell 2005).[92] Moreover, this approach was identified as being the most appropriate way of assessing complexity, while at the same time being flexible and also capable of spanning different disciplines (Capjon and Kvarv 2002).

During the course of the research, the qualitative research paradigm (i.e. the search for a contextual/systemic understanding based mainly on qualitative methods, data and salient theory) led to the development and use of an innovative combination of: (a) grounded theory (Glaser and Strauss 1967); (b) systems theory (von Bertalanffy 1950), in particular systems analysis (Hördur 2004; Sterman 2000); and (c) a form of evaluation theory (Patton 1990/2002), more specifically, case studies (Yin 2003; Stake 1995). The latter are a valuable and recognised evaluation tool and one possible design of qualitative inquiry (Yin 2003; Patton 1990, 2002). The emphasis of this combined 'case studies–grounded theory–systems analysis approach' was on developing a grounded theory on the situation/system encountered and on how this situation/system could be improved (i.e. positively influenced). For further details see sections 3.2 and 3.4.

3.1.2 Research in the 'Making Disciplines' – in developing countries

Research-to-praxis continuum. The present research was carried out – and provides knowledge – within the so-called 'making professions' of architecture and urban planning.[93] Hence, it has to comply with demands of two worlds: its own professions and the academic field. 'While the main criterion of viability in the former world is its relevance to the practice of the profession[s], in the latter it is the ability to fulfil the criteria of science (…)' (Dunin-Woyseth and Michl 2001:2). However, this does not cause any conflict, as the research is based on the belief that there is a continuum from scientific research to creative application that can link knowledge gained from academic investigation and practical experi-

92 See also www.qual.auckland.ac.nz/

93 The applied aesthetic fields such as architecture, urban planning and design, industrial design and art are establishing themselves as academic disciplines under the name 'The Making Disciplines' (Dunin-Woyseth 2003; Dunin-Woyseth and Michl 2001).

ence. This is in line with 'Mode 2' knowledge production described above in section 3.1.1.

Disciplinary identity making and interdisciplinarity. Because of the focus of this research and the methodology needed for its development, the research is embedded in the interface between different disciplines, as will now be described. First, architecture and urban planning, being part of the 'making disciplines', have only recently started to establish their academic and disciplinary identity and thus lack proper scientific research strategies. In fact, although architecture and urban planning are developing and advancing towards an academic and disciplinary positioning, their methodologies and methods are generally 'borrowed' from the social sciences.[94] Second, the focus of the research lies between the disciplinary borders of architecture, urban planning, disaster studies, and (international) development studies. As there is no common understanding of theories, concepts and methods across these disciplinary borders that would allow communication among them, a rigorous and transparent research logic/approach was imperative for this study in order to facilitate cross-disciplinary cooperation and communication. Cross-disciplinary cooperation and communication here relates both to the implementation of the research and the distribution and realisation of its findings.

The relation of the research to development studies and its implementation in developing countries entails additional methodological challenges. In fact, Sumner and Tribe (2004:1, 22) state that 'many generic concerns in social science concepts and methods are amplified in a developing country context (…).' 'For example, concerns over the validity of research, the extent to which the results are representative, the reliability of data, and the subjectivity and interpretation of results are particularly problematical in developing countries (…).' Hence, the above-mentioned rigorous and transparent research approach required had to be based on logical processes that link the research from start to finish with a coherent thread throughout, with each stage informing the next (see *Table 3* for this research).

Sections 3.2–3.4 describe the conduct of the research, which corresponds and responds to the challenges resulting from its theoretical positioning, as presented. This conduct is described by discussing, in each section, both the conceptual basis of the different implementation strategies/methods and their practical realisation within the research context.

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94 It has to be emphasised and acknowledged that there is a history of design-based research in architecture and urban planning, such as urban history studies (e.g. Benevolo 1971); picturesque studies (e.g. Cullen 1961); image studies (e.g. Lynch 1960); environment-behaviour studies (e.g. Whyte 1980; Gehl 1987); place studies (e.g. Jacobs 1993); material culture studies (e.g. Jackson 1984); typology-morphology studies (e.g. Moudon 1986); space-morphology studies (e.g. Hillier and Hanson 1984); and nature-ecology studies (e.g. Hough 1995). However, the design-based research mentioned also mainly uses and reverts to other disciplinary methodologies and methods. In addition, academic research coming from the architecture and/or urban planning field that focuses on developing countries and related management and policy issues is less frequent (cf. Hrushowy 2004).

3.2 Overall research design: case studies and context analysis

The overall research design is a logical and strategic plan that defines how to get from 'here' to 'there', where 'here' may be defined as the initial set of research questions and 'there' as a set of conclusions concerning these questions (i.e. answers and theories) (Yin 2003). It further links the study's theoretical positioning, presented in section 3.1, to the practical conduct of the research by 'translating' and adjusting it to the specific research context and setting.

The overall research design of this study is based on (qualitative) case studies[95] and the analysis of their context at different levels. This multi-level system was studied using an 'onion-peel strategy' (see *Figure 5*).[96] This gradual analysis of the cases' broader surrounding environment at global, national, municipal and household levels allowed a holistic multi-perspective analysis that included the voice and perspective of the various stakeholders, as well as the interaction between them. In fact, Feagin et al. (1991) stress that case studies provide a good tool for analysing a variety of different perspectives, including those of the 'powerless' and 'voiceless'. The case studies and context analyses carried out were, however, not only subject-focused (i.e. they did not just analyse people's perceptions), but were also object-focused. In fact, aspects such as risk-generating processes and the content and limitations of different programmes were studied in detail.

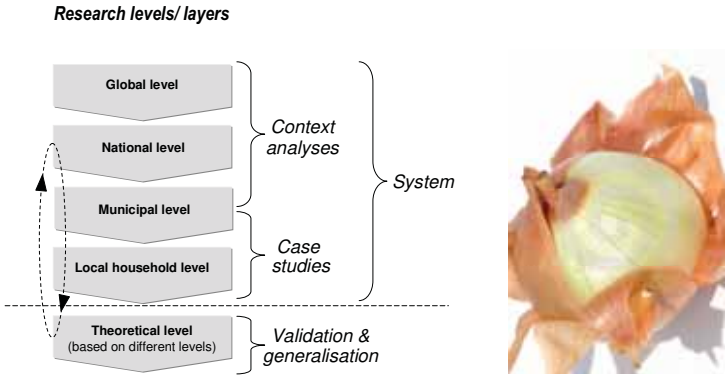

Figure 5: *Overall research design composed of case studies and their context analysis to study the system to be investigated through a multi-layered 'onion-peel strategy'. The circular, dotted arrow indicates the iterative nature of the research analyses, assisting the adequate selection of the cases, as well as the constant refinement and adaptation of the outcomes.*

95 Case studies have a long history. Their origins lie in the disciplines of philosophy, theology and law, and were widely used during the 1920s, 1930s and 1940s. During the next decades they lost their importance but regained their role in the mid-1980s (Kraimer 2003). The most well known published case study is 'The street corner society' by von Whyte (1943), which analysed street gangs in a slum called Cornerville in the USA.

96 Note that the term 'onion-peel strategy' is not a technical term. It was invented by the author. The multi-layered approach to investigating defined units of analysis and their context can also be described as a 'layered case study approach' (Patton 1990:385; Patton 2002:297, 447, 448).

The case study approach is in full accordance with the setting of this research. Its aim is to reconstruct the world both holistically and realistically by identifying significant characteristics and regularities of a (scientific) problem in its entirety (Lamnek 2005). It is based on the assumption that generalities can be created through the particularity of a case (Fatke 1997). Case studies were also appropriate for this research in terms of answering questions that aim primarily to: (a) gain an understanding of the underlying reasons for an existing and contemporary phenomenon within its 'real-life' context, where the boundaries between that phenomenon and its context are not clearly evident; (b) provide insight into the setting of related problems; and (c) generate possible ideas for solutions and recommendations that cannot a priori be foreseen (Yin 2003; Maxwell 2005). To find the best possible answers to the research questions, the case studies carried out were mainly explanatory, which is appropriate for studies on causal relationships and the development of theory building (Tellis 1997); they were also to some degree exploratory and descriptive (see research matrix included in appendix A2).

3.2.1 Unit of analysis – the case

The unit of analysis is the so-called 'case'. Within the framework of this research, the 'cases' to be studied are programmes that target urban slum dwellers living in disaster-prone areas and that integrate to a certain extent two fields of activity, namely, settlement development planning and disaster risk management. The selection of programmes as the unit of analysis is in line with the case study methodology, which is a valuable and recognised tool for project/programme evaluation (Yin, 2003; Patton 1990, 2002).[97] The main components of the unit of analysis to be studied, and thus the focus of this enquiry, were: (a) the selected programmes and programme measures; (b) their beneficiaries; (c) implementing organisations; and (d) geographical focus areas.

3.2.2 Context analysis of cases

Before making a final selection of the specific programmes to be studied, the general context of the programmes was analysed. The aim of this context analysis was to: (a) gain an understanding of the particular environment of the cases (for instance, the support available to them, their development context, as well as their design and implementation process); and (b) to search for causal explanations and conditions regarding the setting of this context. In practice, after a short

97 According to Patton (1990) and Merriam (1988), case studies have become a mainstay of evaluation, and evaluation research and theory, and recognised as such by investigators and international agencies. Evaluation research is further in line with 'Mode 2' knowledge production as described under section 3.1.1. However, in the context of this research, compared to conventional evaluations, the case studies were used less to explain the presumed causal links in 'real-life' interventions that are too complex for survey or experimental strategies (thus linking programme implementation with project outcomes and impacts); they were here used mainly to understand and describe programmes and analyse their 'real-life' contexts (i.e. prerequisites and conditions for their development at different levels, implementation processes, follow-up, match with local conditions and needs, etc.).

pre-study in the Philippines (cf. sections 1.5 and 3.2.6), the empirical research began at the global level. International aid organisations play an important role within the research framework in that they influence national and local agendas and policies related to urban development, social housing, and disaster (risk) management (cf. chapter 2). Thus, those international organisations that support or carry out programmes in the fields of settlement development planning and/or disaster risk management were the initial focus of the enquiry at the global level. Subsequently, the national and municipal context in El Salvador was studied.

The context analyses at the different levels determined the final choice of the specific cases to be studied (i.e. programmes implemented at the local household and in parts at the municipal level) (see *Figure 5*). The local level studies were begun in parallel with the national and municipal level analyses. These initial studies were then followed up by gradual and in-depth research of a more limited number of at-risk slum communities (15 in total, being the implementation areas of four programmes). This procedure was followed so that the most appropriate cases could be identified at an early stage of the research and, most significantly of all, to ensure that the research was based on the problems and risk as perceived by the urban poor themselves (cf. section 3.2.3). The initial outcomes of the context analyses and the case studies were subsequently compared, validated and further generalised to reach a higher theoretical level (see *Figure 5*).

In a sense, the design of the research as described follows the basic logic of the PAR model (cf. section 2.1.2), allowing the analysis of a chain of understanding and explanation to be constructed between global and local forces. Within the framework of this research, the identification of such a 'progression of vulnerability' or, better, a 'progression of risk', focuses on the nexus between disasters and urban settlement development and, specifically, on the related working fields of disaster risk management and settlement development programming.

3.2.3 Purposeful or theoretical sampling of cases

The search for the most information-rich cases (as regards the research objectives and questions) guided the research process. In fact, the selection of the programmes to be analysed was not based on their statistical representativeness but on their potential to increase knowledge as regards the focus of the research.[98] This procedure – originally developed within the framework of grounded theory (Glaser and Strauss 1967) – is a consecutive and cumulative procedure in the course of which additional cases are selected to confirm, control, modify, relativise and expand the outcomes of the cases selected previously (Ludwig-Mayerhofer 1999).[99] The gradual selection of specific programmes was thus

98 '"Rich" thus refers to the fact that 'a great deal can be learned from a few exemplars of the phenomenon in question' (Patton 1990:54).

99 Yin (2003) calls the procedure of selecting new cases that are expected to confirm (or to falsify) the findings from previous ones 'replication logic'.

based mainly on: (a) their content (i.e. the existence of a certain level of integration of settlement development planning and disaster risk management); (b) their context (i.e. their implementation in an urban environment); and (c) the type or character of the respective implementing organisations in terms of matching the direct target group of the research (cf. section 1.6). The selection was furthermore based on the risk perception of the programme beneficiaries, that is, the identification and prioritisation of the local risk by the inhabitants of the slum communities in respective programme areas. Only areas where 'natural' hazards/disasters were seen as one of the main risk to lives and livelihoods were selected. Finally, access to information was another selection criterion. For further details on the sampling of the cases, see the next paragraph. The sampling of the interviewees in the case study areas is described in section 3.3.1.

Based on the first three selection criteria described, namely, programme content, context, and implementing organisations, a total of eight programmes were initially assessed at local household and institutional levels (i.e. from the perspectives of the programme beneficiaries and the representatives of the implementing organisations). Four of these eight programmes were implemented by the social housing/planning organisations FUSAI and FUNDASAL, three by the development organisation CEPRODE, and one by the relief organisation The Red Cross.[100] This original selection can be seen as a nearly 100 percent sample, as hardly any other programmes could be identified that fulfilled the established selection criteria, especially as programmes that integrate(d) to some degree settlement development planning and disaster risk management were, and are, rare. On the basis of the increased knowledge gained of the eight initially selected programmes in terms of their information richness, and of their compliance with the fourth and fifth selection criteria established (i.e. access to and risk perception of programme beneficiaries), four of the eight programmes were selected for the case studies.[101] In-depth evaluations were then carried out of these four programmes and within the 15 slum communities where they were implemented.[102] *Table 2* provides an overview of the selected cases/programmes and related slum communities, both of which are described in detail in Papers V and VI.

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100 The categorisation of the three types of organisations is based on the products and services they offer, as well as their main objectives (i.e. construction of social housing and/or planning, development in general, or emergency relief). Whilst social housing/planning organisations can also be seen as development organisations, for the purpose of this study, it was necessary to categorise them separately. Relief organisations are commonly also called humanitarian aid organisations or emergency organisations. The term 'aid organisations' is used as an umbrella term for all three types of organisations. See also annexed glossary.

101 According to Lamnek (2005), the selection criteria for different cases can be: similar, characteristic/specific, particularly concise or contrastive. Fatke (1997) and Bude (2003) state that the selected cases should not represent the normal and average but something characteristic/specific. In line with this, the selected programmes, combining the working fields of disaster risk management and settlement development planning, are special and unusual, and differed from each other as regards the characteristics of their concrete project measures, implementing organisations and the geographical features and historical background of the implementation area. Within the terminology used by Patton (1990:170, 2002:233), the sampling strategy applied can be called 'extreme case sampling' as those cases were selected from which one 'could learn the most from'. See also footnote 98.

102 Eisenhardt (1989:545) mentions that while there is no ideal number of cases, somewhere between four and ten cases usually works well.

Table 2: *Selected cases studied in El Salvador.*

Name of programme	*Implementing organisation /supporting int. organisation(s)*	*Programme type*	*Slum communities involved in programme implementation (total=15)*	*N° of beneficiaries/ N° at high risk in 2005 (=research target population)*	*N° of interviewed beneficiaries at high risk*	*Period and approx. project costs (US$)*
1) 'Mejoramiento de las comunidades de los Manantiales'; short form: **'Los Manantiales'** ['Improvement of the communities called The Wellsprings']	FUNDASAL, supported by German federal government KfW development bank and GTZ	Slum upgrading (including offer of housing credits)	La Chacra, Llanos de la Charcra, Quiñones Privado, Quiñones Municipal, San Martín Privado, San Martín Municipal, Casitas del Coro, Coro Nuevo, San Luis Portales, Bolívar, Granjero II and Nueva Esperanza, forming the slum area 'Los Manantiales' in San Salvador	1,439 households* (≈6,400 people). Of these, ≈40 households at high risk in 2005	23 households (=113 people)	2003–2006 ≈6,700,000
2) 'Rehabilitación de viviendas y prevención de desastres en el barrio José Cecilio del Valle'; short form: **'Cecilio del Valle'** ['Housing rehabilitation and disaster prevention in the neighbourhood called José Cecilio del Valle']	CEPRODE, supported by DIAKONIE Germany	Slum upgrading (including construction of 66 social houses)	José Cecilio del Valle, situated in San Salvador	108 households* (≈1000 people). Of these, ≈30 households at high risk in 2005	22 households (=115 people)	2001–2002 (to be continued) ≈100,000
3) 'Rehabilitación de la comunidad Divina Providencia'; Short form: **'Divina Providencia'** ['Rehabilitation of the community Divina Providencia']	CEPRODE, supported by Lutheran Church	Slum upgrading (including construction of 50 social houses)	Divina Providencia, situated in San Salvador	103 households* (≈1,034 people). Of these, ≈20 households at high risk in 2005	11 households (=74 people)	2002–2003 (to be continued) ≈200,000
4) 'Fortalecimiento de la sociedad civil y creación de infraestructura básica y de vivienda'; short form: **'El Refugio'** ['Strengthening civil society and development of basic infrastructure and social housing'/'The refuge']	FUSAI, supported by Sida	Social housing settlement development (including construction of 165 social houses)	Refugio, situated in and made up of people from slums of the Bálsamo region	150 households* (≈650 people). Of these, ≈10 households at high risk in 2005	6 households (=29 people)	2004–2006 ≈1,240,000

* See appendix A1 (glossary) for a definition of 'households'.

3.2.4 Mode of enquiry

The mode of enquiry for the case studies and their context analysis was an iterative process of both induction and deduction. As Strauss and Corbin (1998:22) state: 'at the heart of theorizing lies the interplay of making inductions (…) and deductions (…).'[103] To focus and narrow down the research, tentative propositions or preconceptions were established.[104] These were constructed using elements of pre-existing theoretical and conceptual models in conjunction with emerging theory from initial data collection and analysis (e.g. pre-studies and theoretical desktop work). Based on these propositions or preconceptions, deduction was applied with an emphasis on manifest facts, such as risk generation, the inter-correlation between the working fields of settlement development planning and disaster risk management, as well as their respective risk reduction potential. During the research process, and based on the emerging data/information, new preconceptions or propositions were continuously established and tested in a cyclical process, with the final objective being to create theory. In contrast to deduction, induction, which is by its very nature more open-ended and exploratory, was an important means of looking into the meaning of the phenomena and perceptions encountered at the different research levels, of understanding them, and of finding solutions to them. The use in this research of an adapted and advanced grounded theory approach, as described, to allow the generation and testing of theory, is supported by the 'adaptive theory' of Layder (2005). It supports the interchange and dialogue between pre-existing and emergent theory. In line with this, 'prior theoretical concepts and models suggest patterns and "order" in emerging data while being continuously responsive to the "order" suggested or unearthed by the data themselves' (Layder 2005:27). The resulting theory is not only grounded but can also be 'general' and thus of 'universal' character (Layder 2005).

103 Induction starts with specific data collection, followed by the detection of patterns and regularities; some tentative preconceptions that can be explored are then formulated, and finally general conclusions and theories are developed. Compared to induction, which aims at generating theory, deduction aims to test a theory, propositions or preconceptions.

104 According to Yin (2003), it is crucial that the research design embodies a 'theory' of what is being studied to provide a sufficient blueprint for the research. These theoretical propositions, explained by Sutton and Staw (1995) as hypothetical stories about why acts, events, structure, and thoughts occur, provide strong guidance in terms of determining what data to collect and the strategies for analysing them. For this reason, theory development prior to the collection of any case study data is an essential step in doing case studies. This role of theory development, prior to the conducting of any data collection, is one point of difference between case studies and related methods such as grounded theory (Strauss and Corbin 1998). However, Glaser and Strauss (1980) acknowledge that it is possible to discover and work with prior/tentative theoretical frameworks, which they also call 'substantive theory' (as opposed to 'formal theory') (Layder 2005:20). Note that there is also a group of (mostly German) case study researchers that – unlike Yin – do not work with theoretical propositions but in an exclusively 'reconstructive' manner (cf. Bude 2003; Fatke 1997; Kraimer 2000, Schütze 1993, and Oevermann 2000).

3.2.5 Validation and generalisation

Case studies are generalisable to theory or theoretical propositions, especially if multiple case studies are carried out (Yin 2003).[105] The outcomes, obtained through the multi-layer analysis at global, national, municipal and household level, were first evaluated, validated and generalised within the Salvadoran context. This was achieved mainly through interviews, questionnaires, walk-through analyses, workshops and their direct use within programme planning and implementation (cf. sections 3.3 and 3.4). Thus, the academic analyses of the research were re-introduced into the 'real-life' context in El Salvador.[106] In parallel, the outcomes were also introduced to other geographical areas as well as to other disciplinary/sectoral professionals working in both development and humanitarian assistance (cf. *Table 3* and section 3.3.6). This helped to further validate and generalise the analyses of each research level, thus increasing their 'universal' validity. The last research phase was the theoretical generalisation of all research outcomes, presented in the form of a conceptual and strategic 'Analysis and Adaptation Model' that complements and combines the generalised outcomes from the analyses at different levels (see section 4.3). The way aid organisations have already adapted these generalised research outcomes to their own specific institutional and programmatic settings and objectives is also evidence of their transferability.[107]

3.2.6 Research 'roadmap'

To correspond and respond to the challenges resulting from the theoretical positioning (cf. section 3.1), a logical step-by-step research plan was elaborated. This so-called 'roadmap' is based on the overall research design and illustrates the outcomes and rationale behind each research phase and related subphases (see *Table 3*). It helped to guide a rigorous and transparent research logic.[108] In this context, the use of propositions or preconceptions provided a good precondition for such a rigorous process (Yin, 2003). Unlike Yin (2003), Eisenhardt (1989) discusses how to induce theory from case study research and elaborates a 'roadmap' based on: (a) qualitative research (Miles and Huberman 1994); and (b) grounded theory (Glaser und Strauss 1967).[109] *Table 3* draws on the same

105 As cases are conventionally not sampling units, only analytical and not statistical generalisation can be used. The case study approach is based on the assumption that general (i.e. 'universally' valid) conclusions can be drawn from the analysis of characteristic cases. However, within the 'universe' of the selected cases, statistical procedures can also be pursued (see also section 3.3.1).

106 These analyses were summarised in both research articles and an operational framework.

107 An example of this is the conceptual strategy for disaster risk management of the international organisation German Agro-Action (*Deutsche Welthungerhilfe*), which was developed based on some of the outcomes of this research (Amend et al. 2006:60–66).

108 According to Sumner and Tribe (2004), if other researchers can ultimately see when and why certain choices were made and if these choices can be intellectually defended, then in an imperfect world the research journey demonstrates transparency and 'rigour'.

109 According to Yin (2003), a research plan (i.e. 'roadmap') has not been developed to date for case study research. The use of grounded theory for theory testing and development of 'universal' theories is further in line with the described 'adaptive theory' of Layder (2005).

sources, revising and adapting them to match the specific setting and design of this research. Based on the emerging research outcomes and field study protocols developed during the timeline of this study, the logic and coherence of the 'roadmap' were repeatedly revised.[110] The main research phases, as described in the 'roadmap', can be summarised as follows:

Research phase 1: definition of the research setting and design. The personal experience of working directly with people living at risk was the starting point of this research. This assured that the research was anchored in existing local problems. On this basis, the research plan for phase 1 included pre-studies in the Philippines at the local household and related institutional levels, as well as theoretical desktop work, thus going beyond personal experiences and local contexts (cf. section 1.5 and *Figure 3*).

Research phase 2: context analysis at global level. The empirical research had its genesis at this level so as to gain a better understanding of the global environment of the research. This provided a first general overview of the research field.

Research phase 3: context analysis and case studies in El Salvador. An iterative analysis process was established to gain better understanding of the selected cases and their context at national, municipal and household level. This iterative nature of the analyses in El Salvador assisted in the selection of the most appropriate cases, as well as with the constant adaptation and refinement of the research outcomes.

Research phase 4: validation of research outcomes. This was achieved through the re-introduction of the academic analyses into the 'real-life' context. In fact, the research outcomes (systematised in the form of analytical, conceptual, strategic and operational frameworks) were tested and validated at the local household and related institutional levels.[111]

Research phase 5: generalisation of outcomes and closure. Outcomes were generalised by combining the validated results from the different level analyses and checking their applicability outside the geographical, disciplinary and/or sectoral focus of the research. This was followed by the closure of the research process, despite outcomes continuing to be tested. In fact, according to Glaser and Strauss (1967), the strategy of comparative analysis for generating theory puts a high emphasis on theory as a process, that is, theory as an ever-developing entity, not as a perfect product.

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110 The field study protocols elaborated include the following: an overview of the case study approach (objectives, case study issues, relevant readings about the topic being investigated, etc.) and field procedures (methodology and methods for data gathering and analysis, related interview guides, access to the case study 'sites', general sources of information, procedural reminders, etc.). Field study research protocols were, for instance, discussed and reviewed during a PhD seminar at the school of architecture in Copenhagen entitled 'Environmental Design Research Methods' in early 2004, and during an international conference of ENHR (European Network of Housing Research) held in Cambridge, 2–6 July 2004.

111 During the third phase, the studies at local household level were initiated in parallel to the analyses at national and municipal level and then finalised after subsequent in-depth studies. The latter were carried out in parallel to the validation of former research outcomes.

Table 3: *Research 'roadmap', indicating the phases and process of building a grounded theory on the system analysed in this study.*

Phase	Subphases	Outcome	Rationale[112]
1. Research setting and design	**1.1** Review of general theoretical and technical literature – combined with information from pre-studies, key informants, as well as personal knowledge/experience –	Identified key informants (snowball and purposeful sampling). Analysed general research context and problems (partly with help of concept maps). Defined purpose of research. Defined main and subresearch questions. Established first preconceptions/theoretical propositions. Defined geographical focus area (mainly through literature review and questionnaires addressed to potential cooperation partners). Established institutional cooperation.	Focusing of efforts and narrowing down of research scope. Sharpening internal and external validity Delimitation of research.
	1.2 Analysis of philosophical research paradigms	Positioning of research within the general research environment.	Questioning existing paradigms. Developing a coherent research approach.
	1.3 Elaboration of overall research design	Defined research design: case studies and context analysis Defined units of analysis and their context (i.e. defined criteria for the selection of cases). Identified potential journals for dissemination of research outcomes. Elaborated research matrix (see appendix A2).	Finding and focussing on cases which are useful (i.e. can generate theory). Developing a coherent research approach. Planning of the distribution of research outcomes to achieve further internal and external validity.
2. Context analysis at global level	**2.1** Preparation: logic linking of data collection and preconceptions/theoretical propositions	Literature/documents reviewed. Identified key interviewees/organisations at global level (snowball and purposeful sampling). Elaborated interview protocols: two sets for (a) general interviewees and (b) key informants. Elaborated method matrix (i.e. research matrix including methods and sources needed to answer research questions).	Increasing internal validity. Increasing reliability.
	2.2 Data collection	Flexible adaptation of methods. Combination and use of multiple data collection methods and sources of evidence. Elaborated field 'memos'. Elaborated interview transcripts.	Improving/adjusting data collection strategy. Data triangulation. Method triangulation. Facilitating data analysis.
	2.3 Data analysis	Existing programmes analysed (measures, strategies, methods, preconditions, overlapping, etc.). Coded data (through open, axial and selective coding and comparison of coding outcomes from transcripts, field notes, memos, diagrams, etc.). Comparison of data and identified patterns. Pattern-matching. Causal loop diagrams (systems analysis). Outcomes discussed with experts, key informants, and the target group.	Initiating 'formal' theory and explanation building and enhancing internal validity through: - Searching for categories, patterns and subpatterns; - Searching for connections/interrelations between them by analysing conditions, causes, contextual conditions and consequences of the studied system, including feedbacks; - Looking beyond initial impressions, see evidence through multiple lenses; - (Data and) theory triangulation.

112 The conventional terms, such as 'internal validity', 'external validity', 'reliability' and 'objectivity' used as the criteria for judging quantitative research (within the positivist paradigm) could be 'translated' to the qualitative research criteria as 'credibility', transferability', 'dependability' and 'confirmability' (Hoepfl 1997; Guba and Lincoln 1989). These four criteria are partly also grouped under the term 'trustworthiness' (Lincoln and Guba 1985; Guba and Lincoln 1989). However, the conventional terms are also commonly used for qualitative research, with it being known that in this context they each have a different connotation. In addition, note that the term 'transferability' is partly misleading as, in common with this investigation, qualitative research outcomes can not only be transferred to other cases but can also lead to generalisation (i.e. theories of 'universal' validity). Note that in addition to the four criteria mentioned, some researchers have established complementary criteria for qualitative research, such as 'authenticity' (Guba and Lincoln 1989).

(cont.)	**2.4** Data completion/verification	Confirmed information/citations. Theoretical sampling (search for additional organisations, related programmes, aspects, sources, etc. for filling data gaps). Theoretical saturation. More detailed preconceptions/theoretical propositions. Comparison of outcomes with conflicting and/or similar literature. Discussed and disseminated preliminary results (published articles in journals within both related working fields [i.e. disaster risk management and settlement development planning]). First validations and generalisations (included in every publication).	Continued 'formal' theory and explanation building and enhancing internal validity through: - Confirming, extending and sharpening of preconceptions/theoretical propositions; - Ending of process when marginal improvement becomes small; - First generalisations, raising theoretical level.
3. Context analysis and case studies in El Salvador	**3.1** Preparation: logic linking of data collection and preconceptions/theoretical propositions	Literature/documents reviewed. Purposeful selected programmes/cases through theoretical sampling (information richness). Identified organisations and interviewees at national, municipal and local household level (snowball, purposeful, stratified and random sampling). Elaborated field study research protocol. Elaborated interview protocols. Extended method matrix (for national, municipal and local household levels).	Increasing internal validity. Increasing reliability. Focusing efforts on theoretically useful cases.
	3.2–3.4 See subphases 2.2 to 2.4	See subphases 2.2 to 2.4. Repeated procedure of subphases 2.2 to 2.4 (including comparison of outcomes from different levels as well as related generalisation).	See subphases 2.2 to 2.4. Refining and adapting research outcomes from different levels.
4. Validation of research outcomes	**4.1** Re-introduction of the analyses' outcomes in the 'real-life' context in El Salvador and other countries	Systematised and combined research outcomes within different analytical, conceptual, strategic and operational frameworks. Test and validation of these frameworks within the 'real-life' context in El Salvador through both workshops and 'hands-on' practice. Revised frameworks to match better existing needs and capacities. Complemented former findings from different levels through additional review of research data and literature.	Questioning research outcomes, including related theories. Refining research outcomes and thus theory and explanation building. Further building of internal validity.
5. Generalisation and closure	**5.1** Comparison of the different emerging theories, comparison with existent literature, as well as their 'survival' in different geographical, disciplinary and/or sectoral contexts	Introduction and validation of the frameworks developed in other geographical, disciplinary and/or sectoral contexts (e.g. the Philippines; educational programmes). Synthesised and generalised outcomes in form of theoretical propositions, and finally a grounded theory ('Analysis and Adaptation Model'). Comparison of theory developed with conflicting and similar frameworks/models and literature, linking back to the original preconceptions/theoretical propositions.	Further building of internal validity. Building external validity (and transferability, for instance its potential to adapt to specific programmatic and institutional settings). Sharpening of generalisation (i.e. illumination, understanding and extrapolation to similar situations).
	5.2 Reaching closure	Final reports/outcomes reviewed by key informants who have been studied and final discussions with them. Theoretical saturation. Results and findings brought to closure, despite continuous testing of related frameworks/model. Disseminated combined, final and generalised outcomes (published book chapter and dissertation).	Finalising process of explanation and theory building when marginal improvement becomes small and theoretical saturation not further possible.

3.3 Methods of data collection

One of the strengths of the research being designed around case studies is that this allows (and necessitates) the use and mix of many different techniques for collecting and analysing empirical data. The selection of the specific methods used was dictated by the research setting, the research's theoretical positioning and design, and the resulting data requirements. The latter were defined with the help of a research matrix, which divided the main research questions into manageable subresearch questions. These, in turn, allowed the information needed to be determined (see appendix A2). In addition, method matrixes were developed for the different research phases, presented in *Table 3*, in order to link each type of information requirement directly to specific data collection methods, related sampling techniques, information sources, key organisations and informants, and time frames.

The data collection methods selected for this research are described in the following sections. They include interviews, walk-through analyses, observations, text reviews, questionnaires as well as research workshops and 'hands-on' practice. These methods were all applied to discover: (a) the interlinkages between disasters and urban settlement development, more specifically, between disasters and the building and planning practices related to low-income settlements; (b) the current practices in the working fields of disaster risk management and settlement development programming – and the relationships between them; and (c) the opportunities for overcoming existing challenges and gaps so as to increase the potential of settlement development programming to reduce and transfer or share risk (cf. section 1.3 and *Figure 2*).

3.3.1 Interviews

Interviews are usually one of the most important sources of case study information (Tellis 1997), especially as they are excellent tools for understanding complex phenomena, beliefs and attitudes in less well known research domains (Hastings and Chad 2000). Interviews were further crucial because of the limited literature available on the specific topic of this research, as well as its multiperspective nature. Because of their importance at all research levels, numerous and different types of interviews were conducted and the outcomes of their analyses highlighted in the research papers that are annexed to this study.

Interviewees at global level. Individual interviews for the context analysis at the global level were carried out with 64 key stakeholders, consisting of programme managers, operational or academic staff working at 33 multilateral and bilateral aid agencies and governmental and non-governmental organisations, including developmental or financial organisations, consultancies and research institutions working at the international level. Of these 33 organisations, eight could be clas-

sified as social housing/planning organisations, six as humanitarian relief organisations and 19 as general development organisations.[113] The respondents were selected in a balanced way: 25 interviewees had a disasters background, 26 an architecture or planning background, and 13 a general developmental background. The interviews at global level, presented in Papers I and II,[114] were mainly conducted between November 2003 and August 2004. Related research stays were carried out in Geneva, Switzerland; Stockholm, Sweden; Manila, the Philippines; Rio de Janeiro, Brazil; Manizales, Colombia; London and Oxford, United Kingdom; and Washington D.C., USA. These places were strategically selected either because specific key organisations are located there (e.g. research cooperation partners or precursors in research-related aspects), or because they represent a geographical concentration of several important international organisations.

Apart from the individual interviews at global level, focus group discussions were carried out within the framework of several research workshops in El Salvador, Costa Rica and Sweden (see below and section 3.3.6).[115] The workshops' 125 participants were from key stakeholders from Africa, Asia and Latin America working in settlement development planning and some also in disaster risk management.

The interviews at the global level aimed mainly to analyse global perspectives and practices as regards the three main aspects investigated by this research (see above; cf. interview protocols in appendixes A3–1; A3–2 and A3–3). As related information accumulated, a kind of inventory of research-related organisations, programmes and key aspects could be established that assisted in gradually delimiting the focus and direction of the research to be continued at different levels in El Salvador.

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113 The categorisation of the three types of organisations is based on the main products and services they offer, as well as their main objectives (i.e. construction of social housing and/or planning, development in general or emergency relief). These were mainly defined by the interviewees themselves, partly influenced by their affiliation to a specific department within the respective organisation(s). See also footnote 100.

114 Note that Paper II was complemented with data from the national, municipal and household level in El Salvador (and partly Colombia). The additional data permitted the verification, validation, and complementation of the outcomes of the international level with national and local perspectives and helped to develop a conceptual framework presented at the end of the second paper.

115 The Spanish-speaking workshop in El Salvador was carried out with 35 participants in San Andrés, within the framework of a course entitled 'Vinculación de la Gestión del Riesgo a Procesos de Desarrollo Urbano y Programas de Vivienda de Interés Social' [Interfacing Disaster Risk Management with Urban Development Processes and Social Housing Programmes], organised by FUSAI. Note that the participants were mostly from El Salvador, but some also came from other countries. The workshop in Costa Rica was called 'Disaster Risk Management for Settlement Development Planning'. It was held in English at the Faculty of Architecture, University of Costa Rica, San José. It was open for all interested organisations and offered as an optional course for the participants of the 'International Training Course: Organised Self-help Housing – Planning and Management', organised by HDM and FUPROVI (Fundación Promotora de Vivienda). 32 professionals participated. The first workshop in Sweden at HDM was carried out during the advanced international training programme on 'Shelter Design and Development', on 2 May 2006, with 31 professionals. During the second workshop in Lund within the same training programme, on 8 September 2007, including 27 professionals, no group discussions were held. The participants of the four workshops were mainly from NGOs and municipal authorities. During 2008 an additional workshop, including focus group discussions, will be held in the Philippines, in cooperation with Plan International.

Interviewees in El Salvador. For the studies at national and municipal level, interviews were carried out with 71 programme managers and operational staff from 40 organisations, including 11 social housing/planning organisations, three humanitarian relief organisations, 19 development organisations, four (housing) finance institutions, and three insurance companies.[116] At the local household level, during the initial case studies of eight programmes (cf. section 3.2.3), focus group discussions of around 35 beneficiaries were held. These were followed up during 2006 with in-depth studies of four cases, which included single interviews with 62 households, comprising 331 persons, living in 15 disaster-prone slum communities. In addition, within the context of a research workshop in El Salvador, focus group discussions were held with around 20 professionals from key stakeholders, both governmental and non-governmental (see below and section 3.3.6).

The interviews at national, municipal and local household level in El Salvador were held between August 2004 and March 2006 (and are presented mainly in Papers III, V and VI). These aimed to analyse the different-level perspectives and practices of the three aspects investigated (see above; cf. interview protocols in appendixes A3–4, A3–5 and A3–6). After the first field study trip, the research-related organisations, programmes and geographical areas were screened and the most important/relevant ones identified. In addition, the integration process of settlement development planning into disaster risk management after Hurricane Mitch in 1998 and the 2001 earthquakes was analysed in terms of driving forces, convergences and divergences, and results. During the second field study trip, the initial interviews were followed up and further directed at (a) the evaluation and validation of preliminary research outcomes (especially their limitations and possible ways of solving them); (b) the identification of financial means of supporting the integration of disaster risk management; and, most importantly; (c) the perspectives, needs, capacities and efforts of people, households and communities living at risk (cf. interview protocol in appendix A3–6).

Semi-structured interviews.[117] Most of the interviews were semi-structured – this is the type of interview generally used and recommended for case study research (Yin 2003; Rubin and Rubin 1995). Semi-structured interviews are embedded in the contradictory context between qualitative interviews and structured interviews (i.e. questionnaires), and are based on the assumption that 'relation-free' interviews do not exist (i.e. the relationship between researcher and interviewee is part of the research process). The interviews were based on interview protocols elaborated on the basis of the research questions (see appendix A3). These protocols were adapted for different purposes, such as the different research levels of

116 The categorisation of the four types of organisations is based on the main products and services they offer, as well as their main objectives (i.e. construction of social housing and/or planning, development in general, emergency relief or insurance). These were mainly defined by the interviewees themselves, partly influenced by their affiliation to a specific department within the respective organisation(s). See also footnote 100.

117 Also called 'structured open-ended interviews' or 'structured open-response interviews'.

this study. They were further adapted to the respective interviewee(s) and, when needed, updated with new findings (by adding new aspects and/or deleting irrelevant ones). Although a consistent line of inquiry was pursued, the interviews appeared, in practice, to be guided conversations rather than structured queries (Rubin and Rubin 1995; Yin 2003). Throughout the interview process, two aspects were considered: (a) to follow the defined line of inquiry, while (b) at the same time asking (conversational) questions in an unbiased manner that were relevant to the defined line of inquiry.[118] One challenge of the interviews was to ask questions about working fields and terms such as 'disaster risk management', 'urban planning' and 'settlement development planning' that were understood and used in various ways by the respondents.

Focused interviews.[119] Eight focused interviews were held with key informants from the different research levels.[120] The objective of these was to speed up the research process by obtaining necessary insights and background information to narrow down the research focus and discuss specific information in detail. Compared to the semi-structured interviews, the focused interviews were also open-ended and were conducted in a conversational manner. However, they were more of a direct cards-on-the-table type of discussion of the research topics (Merton et al. 1990). See, for instance, appendix A3–3.

Focus group discussions. Group interviews in the form of semi-structured discussions were conducted with beneficiaries of the eight initially selected programmes. Only a 'loose' interview guide was established, as the conditions at local level could not really be controlled and differed strongly from each other. The group interviews were held during programme visits, partly spontaneously, and partly organised beforehand by operational programme staff. As there is a danger in such interviews of people sometimes not expressing their 'real' belief or opinion, they were subsequently cross-checked and substantiated by interviews with key individuals from the respective groups. Information and/or initial conclusions obtained from the group interviews were thus verified. Group interviews were further held during different research workshops in El Salvador, Costa Rica and Sweden to discuss specific research outcomes (cf. section 3.3.6).[121] During these workshops, the participants were divided into small groups of around five people each. The group discussions and interaction generated additional data and insights that would not have been likely to emerge in the course of single interviews (Frechtling and Sharp 1997).

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118 Yin (2003:90) states that 'for instance, you may want (in your line of inquiry) to know "why" a particular process occurred as it did. Becker (1998:58–60), however, has pointed to the important difference in actually posing a "why" question to an informant (which in his view creates defensiveness on the informant's part) in contrast to posing a "how" question – the latter, in fact, being his preferred way of addressing any "why" question in an actual conversation.'

119 Also called 'key informant interviews'.

120 As Kraimer (2003) points out, for case study research, informants play an important role during both data gathering and data analysis.

121 See also footnote 115 for more information on the different workshops.

Sampling of interviewees at different levels and theoretical saturation. Purposeful sampling was used to select interviewees for the context analyses and case studies in a balanced way. Chain (or snowball) sampling was initiated with the help of key literature, as well as information obtained from research cooperation partners and key informants. Key informants also helped to establish initial contacts, most of which were the first elements of the chain. The chain was then pursued based on the suggestions of the first respondents regarding either other key persons or other sources of evidence. Something which made following the chain difficult at the institutional level, was the fact that the author was frequently guided towards relief specialists as appropriate contacts, whilst interviewees in sector development divisions and/or with an architecture or planning background were, in general, initially hesitant about discussing 'natural' disaster issues. At the global level, no further interviewees were identified (i.e. the chain was not pursued further) once the interviewees started to repeat the same issues and did not provide new relevant information. Naturally, the number of interviews conducted also related to the time and resources available for organising, holding, transcribing and analysing the interviews.

Compared with the global level, at the institutional level in El Salvador, the selected interviewees are a nearly 100 percent sample. In fact, key representatives from almost all organisations relevant to the research were interviewed (i.e. organisations which carry out programmes that, to a certain degree, integrate disaster risk management and settlement development planning in an urban context (cf. section 3.2.1).

At the local household level, the sample of the interviewees selected for the four case studies was also large in size in relation to the defined target population. This target population, consisting of 100 households, was purposely selected and defined as the households located within the extreme high-risk areas of the 15 slum communities studied (see *Table 2*). Those households most at risk were defined as the ones that were most affected during winter 2005, a recent disaster season characterised by a tragic combination of Hurricane Stan, floods, landslides, small-scale earthquakes and the eruption of the Ilamatepec volcano. The 100 households had been identified by censuses conducted locally and/or post-disaster evaluations carried out by the aid organisations working within these communities. To obtain significant, credible and further representative responses, 62 of the 100 households were interviewed,[122] providing, at a confidence level of 95 percent, a maximum margin of error of around 8 percent.[123] The selection of these 62 households (comprising 331 people), and also of the representative(s) of

122 The distribution of the 62 households as regards the four programmes/cases analysed is illustrated in *Table 2* (see 'N° of interviewed beneficiaries at high risk').

123 The confidence level indicates how sure one can be. It is expressed as a percentage (generally set at 95 percent) and represents how often the true percentage of the population (who would choose an answer) lies within the confidence interval. The margin of error expresses the amount of the random variation underlying a survey's results. See www.surveysystem.com/sscalc.htm.

each household interviewed, was based on a combination of stratified and random sampling: with the help of programme staff and local key informants, the most information-rich (i.e. knowledgeable and varied) households and household members were identified within the different high-risk areas in the 15 slum communities, trying to not leave out any subgroups. This procedure was followed by random sampling within each group to make a final selection of the households to be interviewed.[124] This sampling procedure was carried out with the help of, amongst other things, maps of each programme area and the numeration of the respective households (which allowed random selection of local households on a numerical basis). In practice, the sampling procedure described was time-consuming and difficult to follow rigorously all the time. Thus, some improvisation and flexibility were necessary.[125] For instance, in the end many interviews were held with more than one household member, who assisted from the beginning or were called when needed to provide, for instance, additional information as regards expenses, income and/or the specific coping strategies used. In addition, and in order to deal with bias in the selection of households and interviewees, different types of triangulation were used (see section 3.5).

Recording data. All the interviews were recorded, transcribed and then analysed (cf. section 3.4)

3.3.2 Walk-through analyses

In parallel with the national and municipal level studies, walk-through analyses were carried out in seven of the eight case study areas selected initially (cf. section 3.2.3).[126] Two to five local key informants participated in each case study area. Together with the implementing organisations, these informants were selected because of their information richness, that is, their knowledge of the programmes and the respective implementation area and beneficiaries. By walking through the areas and recording the inhabitants' explanations, observations and impressions along the way, initial assessments could be carried out. Aspects analysed were, for instance, the programmes' content, context and main features (both successful and unsuccessful), as well as local risk perceptions, needs and capacities. These initial 'walk throughs' provided important input for the selection of the four main case study areas (cf. section 3.2.3), which were then fol-

124 In line with Patton (1990:173, 2002:235) the approach described for selecting the households to be interviewed could be called a 'combination or mixed sampling'. This started here with 'homogeneous samples' ('to describe some particular subgroup in depth', that is, inhabitants living at high risk), and was finalised through a random selection process.

125 Some of the multiple reasons were: (a) the inexistence of (updated and adequate) digital maps and/or area photographs; (b) difficulties in accessing programme-related maps through the implementing organisation; and/or (c) lack of information on the households and their members.

126 Little theory is available on the walk-through analysis, and there are different methodological approaches. Most information is available from practitioners and implementing organisations engaged, amongst other things, in urban settlement development. See, for instance, the 'Urban Design Toolkit' at www.mfe.govt.nz/publications/urban/urban-toolkit-apr07/html/page4.html. Exceptions from a more theoretical/academic approach are, for instance, de Laval (1994, 1997).

lowed up by more in-depth analyses to complement and validate initial research findings. The 'storage' of the information obtained by the walk-through analyses was in the form of tape recordings, supported by memos or field notes and photographs.

Walk-through analyses were also used during the participatory research workshop in El Salvador (cf. section 3.3.6). Here, it was possible to select the composition of the guiding groups independently, thus ensuring that important members of society were not excluded. In fact, the workshop participants were divided into five groups and then guided through the settlement in question by either a group of local women, children, builders, men, or members of the resident development committee. In this way, it was assessed if the research outcomes (here, mainly the 'Operational Analysis and Integration Framework') adequately reflect as well as match the needs of both the local dwellers and the professionals working in comparable programmes and/or programme areas.

3.3.3 Questionnaires

To select the focus country for the case studies of this research, a first questionnaire was developed (see appendix A4–1), which addressed seven potential cooperation partners working in Bolivia, Ecuador, El Salvador, Guatemala, Honduras, Nicaragua, and Peru.[127] On the basis of this questionnaire, and in combination with the personal experience and information obtained from key informants and the review of literature, El Salvador was selected (cf. section 1.4). A second questionnaire was used for minor and basic background studies at the beginning of and throughout the research to assess the general disaster risk management knowledge of planners (see appendix A4–2). The target group of this questionnaire were around 100 professionals from Africa, Asia and Latin America, who had participated in different further educational training courses at HDM (e.g. courses on 'Urban Management and Development', 'Urban Housing Management and Housing' and 'Inner City Revitalisation').

Towards the end of the research, two more questionnaires were drawn up. The third questionnaire was developed to (a) help validate and refine the research outcomes presented in the 'Operational Analysis and Integration Framework' and (b) assist in reaching a higher level of generalisation and transferability of the outcomes to other geographical, disciplinary/sectoral or institutional and programmatic settings (see appendix A4–3). The fourth questionnaire was on financial mechanisms for social housing and disaster risk management and was used to

127 In May 2003, the questionnaires were given to representatives of IIA-UMSS, Instituto de Investigaciones de Arquitectura, Universidad Mayor de San Simon (Bolivia); IPUR-UCSG, Instituto de Planificación Urbana y Regional (Ecuador); FUSAI (El Salvador); MejorHa, Asociación para el Mejoramiento Habitacional de Guatemala (Guatemala); CEDAC, Centro de Diseño, Arquitectura y Construcción (Honduras); HABITAR, Centro de Investigación y Promoción del Hábitat (Nicaragua); and Desco, Centro de Estudios y Promoción del Desarrollo (Peru). These organisations offered a good possibility of cooperation as they are counterparts of HDM within the capacity building programme PROMESHA (Programa de Capacitación para el Mejoramiento Socio Habitacional). Sida finances the majority of the activities through a general agreement with HDM. See www.hdm.lth.se/PROMESHA/INDEX.HTM.

analyse the importance and possible inclusion of financing issues within the different research outcomes presented in the form of analytical, conceptual, strategic and operational frameworks (see appendix A4–4). Both questionnaires A4–3 and A4–4 were distributed to selected operational staff and programme managers of different (aid) organisations, most of whom were working in settlement development planning. These mainly included the 67 participants of the workshops held in Costa Rica and El Salvador,[128] as well as some of the interviewees at national and municipal level in El Salvador. To reach a broader audience, the two questionnaires were further included – together with the 'Operational Analysis and Integration Framework' – on different Web sites (e.g. of the Benfield Hazard Research Centre, UK; CEPRODE in El Salvador; HDM, Sweden; as well as within CARE's intranet 'Livelink'). However, compared to the return rate of the questionnaires A4–1 and A4–2, which was 100 percent, the return rate of A4–3 and A4–4 was very low. Hence, the information obtained through these questionnaires could not be analysed statistically, but was used to triangulate the information obtained from other data collection methods.

3.3.4 Observations

Observation was of great importance for the case studies. In fact, during the visits to the case study areas, a range of aspects crucial to the research could be observed. Examples of such aspects are the 'real-life' context of the cases/programmes; the way they were implemented; the quality of structural mitigation measures (quality of workmanship, technologies and techniques applied); success and/or failure factors; local relevance and acceptance of programme measures; accessibility; social relations; physical conditions and layout of settlements; local capacities, efforts and needs; as well as existing risk factors. Observation was especially important for crosschecking/triangulating information from other sources, for instance, that obtained from interviewees who overemphasised the programmes' merits and strengths or downplayed their weaknesses.

Compared to the case studies, observation was a method of lower importance for the context analyses at global, national and municipal level and was limited to 'participant observation' during interviews, research workshops, and specialised conferences on disaster risk management. Regarding the interviews, examples of the aspects that could be observed were the interviewees' behaviour, the availability and accessibility of information, the (physical) interconnection of different departments, and how many staff were employed in each. As regards the conferences, aspects such as their target groups, invitees and participants, their behaviour, interrelations, and way of arguing could be observed.[129]

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128 See footnote 115.

129 A crucial conference for this research was held by the NGO Tearfund in London, UK, in November 2003. It was entitled 'Supporting Natural Disaster Risk Reduction', and was based on a research on policy and practice of institutional donors on disaster risk reduction (Tearfund 2003). Conference participants identified and prioritised methods of mainstreaming risk reduction into institutional practice. Two other important conferences for analysing trends and

The 'storage' of the data gathered by observation was in the form of memos or field notes and was supported by photographs.

3.3.5 Text reviews

The review of 'grey' and 'white' literature was conducted constantly during the research process with the aim of identifying relevant past and present studies, research-related theories, appropriate research methods, and experts in the field. It was further crucial for determining preconceptions or propositions, the elaboration of interview protocols, and the triangulation of information obtained through other research methods.

The review of the accessible 'white' literature at the beginning of the research turned out to be difficult, as most publications did not meet the established search criteria.[130] In fact, while there was an immense, even overwhelming, amount of literature on the physical/structural aspects of reconstruction, little could be found with a focus on pre-disaster settlement development programming that tackled aspects related to (integrating) disaster risk management (cf. sections 2.1.5 and 2.2.3). This situation influenced the research approach and methodology in the following ways: (a) interviews were initiated during the early stage of the research process as a sort of 'shortcut' to access the information being sought (cf. section 3.3.1); (b) induction was an important mode of enquiry (cf. section 3.2.4); and (c) additionally, non-conventional data collection methods were used to find research-related information. These non-conventional methods included data gathering through participation in online conferences and specialised networks, as well as through the work of organising and editing two special issues on managing urban disasters for the professional journals *Open House International* and *TRIALOG* (Journal for Planning and Building in the Third World). The special issues were designed to assist in the identification of new and relevant studies within the research work. However, even so, the search for relevant studies and research articles proved difficult, serving to confirm that relatively little research has been carried out within the focus of this research.

As regards 'grey' literature, the following documents were gathered and reviewed: programme documentation, institutional and national policies, regulations, interview transcripts and notes, transcripts of presentations held during conferences,[131] observation memos and field notes, as well as e-mails circulated by the participants of online conferences organised by UNISDR[132] and special-

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observing the above-mentioned aspects were the World Conference on Disaster Reduction (WCDR), Kobe, Japan, 18–22 January 2005, and the ProVention Consortium Forum 2007 on Making Disaster Risk Reduction Work: Building Safer Communities in Africa and Worldwide, Dar es Salaam, Tanzania, 13–15 February 2007.

130 This situation was encountered despite the fact that specialised libraries were consulted (e.g. of different specialised organisations or universities such as Charles Sturt University, Australia).

131 See footnote 129.

132 The UNISDR through its Secretariat invited, for instance, to an online dialogue from 15 June to 15 July, 2004 to discuss 'priority areas for further action to implement disaster risk reduction 2005–2015'. A second online dialogue

ised risk reduction networks, such as the 'Disaster Risk Reduction Education Network' or RADIX[133] (Radical Interpretations of Disasters).

Once the first research outcomes were obtained, literature review was again crucial for their theoretical validation and systematisation, for instance, in the form of an operational framework for disaster risk management integration (see Paper IV and enclosed CD). In this context, a range of research-related frameworks, models and tools were critically assessed to analyse their scope, target group, structure, format, indicators and applicability. These included frameworks for: (a) assessing progress in disaster risk management; (b) mainstreaming HIV/AIDS in sector development planning; (c) designing appropriate humanitarian aid or development programmes (related to settlement development planning and/or disaster risk management); and (d) adapting to climate change impacts.[134]

3.3.6 Research workshops and 'hands-on' practice

In line with 'Mode 2' knowledge production, which aims to produce research outcomes that are directly useful or applicable at the local level, research workshops and 'hands-on' practice were essential for this research, for both data gathering and analysis (see also section 3.4.2). Research workshops and 'hands-on' practice assisted in: (a) testing the outcomes against 'reality' (i.e. the perceptions and needs of the direct and indirect research target groups); (b) refining and adapting them where needed; and (c) assessing their potential generalisation and transferability to other disciplines/sectors, as well as to other geographical, institutional and programmatic settings.

Research workshops are part of participatory research methods, also known as 'knowledge workshops', 'field action workshops' or 'participatory research workshops'. The participants of four workshops, totalling 125 professionals, were drawn from key urban development actors, both governmental and non-governmental, working in Africa, Asia and/or Latin America. The workshops combined practical exercises to apply research outcomes at local household level (e.g. the 'Operational Analysis and Integration Framework') with horizontal exchange between the participants, other potential beneficiaries of the outcomes (e.g. people living at risk), and the author. Such exchange was supported by, for instance, interviews, focus group discussions, and walk-through analyses (cf. sections 3.3.1 and 3.3.2; see *Figure 6*).

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was organised from 12 September to 10 October 2005 to discuss the key elements for 'assessing progress towards disaster risk reduction within the context of the Hyogo Framework for Action 2005–2015: Building the Resilience of Nations and Communities to Disasters'.

133 Radix is meant as a home for discussion, working papers, opinion pieces, resources and links that can help to develop radical interpretations of, and radical solutions to, all disasters in every part of the world. It is a resource base for those who are studying and working on these issues.

134 Examples of frameworks analysed were Benson and Twigg (2006, 2007); Diakonia (2004); Foro Ciudades Para La Vida (2002); FUSAI (2005); Holden (2004); IDB (2004a,b); IDEA/IDB (2005); Mitchell (2003); Tearfund (2005); The Sphere Project (2004); UNDP (2004a,b); UNDP/UNISDR (2006); UN-HABITAT (2004); UNISDR (2003, 2005b); and World Bank (2002).

The first workshop in Costa Rica, with 32 participants, took place on 15 February 2006; the second in El Salvador, with 35 participants, from 20–22 February 2006; and the third workshop in Sweden, with 31 professionals, on 2 May 2006. During the workshops, the participants assessed, amongst other things, if the research outcomes, in particular, the 'Operational Analysis and Integration Framework', was comprehensible, comprehensive/complete, relevant and applicable/useful. They also analysed if there were any financial, political or institutional threats that could hamper the use and implementation of the framework (i.e. the 'risks' to the framework itself), and how these could be overcome (cf. section 3.4.2). To carry out similar assessments of the final 'Analysis and Adaptation Model', a fourth and final workshop was held in Sweden on 8 September 2007, with 27 participants. A further workshop will be held in the Philippines in 2008 in cooperation with Plan International.[135]

Figure 6: *Workshop in El Salvador in February 2006: exercise in applying the 'Operational Analysis and Integration Framework' in the field (i.e. where one of the case studies was carried out). The picture shows the workshop participants interviewing inhabitants of the low-income settlement 'Refugio' to identify existing risk and – with the help of the framework – to develop possible disaster risk management activities.*

Apart from the practical exercises during the workshops, some of the research outcomes have been tested in a 'real-life' situation in programme implementation. This 'hands-on' practice was carried out in Central America by CEPRODE, FUNDASAL, FUSAI, and UN-HABITAT-ROLAC, as well as in El Salvador and the Philippines by Plan International.[136] Moreover, the strategic concepts developed for disaster risk management integration are also being used by other organisations, such as CARE and the Red Cross, within their ongoing main-

135 For further information on the different workshops see 115.

136 Aspects of the 'Operational Analysis and Integration Framework' and other research outcomes (especially those presented in Paper VI) are: (a) applied by FUSAI in different programmes in Colón, La Libertad and Usulután (information obtained from Luis Castillo, director, on 8 November 2006); (b) used as a point of reference by FUNDASAL for reconstruction projects and their upgrading programme (information obtained from Edín Martinez, director, on 29 and 30 August 2007); (c) applied by CEPRODE within all programmes, and currently for the extension of their programmes analysed by this study (see *Table 2*) (information obtained from Lidia Castillo, director, on 16 May 2007); (d) used by UN-HABITAT-ROLAC in different Central American projects (e.g. within the 'Programa fortalecimiento de capacidades locales en cuatro países en America Central') (information obtained from Ileana Ramírez Quirós, regional coordinator, on 17 March 2006); and (e) implemented by Plan International in their programme to integrate disaster risk reduction into Plan's work and systems, especially in the Philippines and El Salvador (information obtained by Nick Hall, disaster risk management coordinator, on 16 June 2006).

streaming processes.[137] While this re-introduction of academic analyses into the 'real-life' context did provide feedback, and thus input for the improvement of the research outcomes, the iterative progression of implementation and refinement is an ever-developing process, and thus is still ongoing.

Finally, it must be mentioned that initial research outcomes were also presented and discussed during different workshops/seminars, which assisted in refining and integrating them further. Examples are the European Network of Housing Research (ENHR) International Housing Conference on Housing Growth and Regeneration, Cambridge, 2–6 July 2004; the N-AERUS Conference Promoting Social Inclusion in Urban Areas Policies and Practice, 16–17 September 2005 Lund, Sweden; the TRIALOG 2006 conference entitled Planning in Need – Need for Planning, 20–21 October 2006, Technical University, Vienna, Austria; and the ProVention Forum 2007 on Making Disaster Risk Reduction Work, 13–16 February 2007, Dar es Salaam, Tanzania.

3.4 Methods of data analysis

On the basis of the data collected through the case studies and their context analysis, the emphasis of this research was on developing a grounded theory on the situation/system studied and on how this situation/system could be improved (i.e. positively influenced). For this purpose, and in line with the research's setting and theoretical positioning, for the data analysis and interpretation a combination of literal reading, grounded theory (Glaser and Strauss 1967; Strauss and Corbin 1990) and systems analysis (Sterman 2000; Hördur 2004) was applied. Cultural theory was also partly used (Thompson et al. 1990). These methods are described in the following.[138]

3.4.1 Literal reading

The analysis of 'white' literature throughout the research was mainly done through literal reading, which is the assessment of the information provided in relation to the research focus. This is an iterative analysis process, using constant comparison of information from different literature (Booth 2001). The outcome of this analysis verified and complemented information from other sources, and is reflected in the setting of the research, its conceptual framework, and the literature reviews included in the different research articles (mainly Papers I, II, III and VI). Other documents, such as programme documentation, institutional and national policies, regulations, and partly also the transcripts of interviews with key informants, were analysed in this 'straightforward' way.

137 Information obtained from staff by e-mail (in December 2006) and orally (in February 2007), respectively.

138 Note that the author participated in special PhD courses on case studies, systems analysis and grounded theory so as to guarantee its correct use and combination, resulting in this research's innovative 'case studies–grounded theory–systems analysis approach'.

3.4.2 Grounded theory

As stated in sections 3.1 and 3.2, the overall research design was influenced by grounded theory. Written down and systematised in the 1960s by Glaser and Strauss, this theory helps researchers to look systematically at data that have been gathered. Kraimer (2003) mentions grounded theory as a suitable data analysis strategy for case study research.[139] Through a permanent comparison, coding and categorisation process, the data gathered are conceptualised and thus a theory is generated that has a higher level of abstraction than the initial data description.

Within the framework of this research, the different texts mentioned in section 3.3.5 were first read and, where needed, interview recordings were played to cross-check transcripts and reorganise and rewrite interview notes. A combination of open coding, axial coding, and selective coding was then applied, which is described below. Compared to quantitative research, the goal of this coding process is not to count things, but to 'fracture' the data, and rearrange them into categories (Strauss 1987). This facilitates comparison among items in the same category and helps to develop theoretical concepts (Maxwell 2005).

Categorising strategy – open coding.[140] The focus of open coding is on similarities that could be used to sort data into categories (Maxwell 2005). Data are compared, and similar incidents are grouped together and given the same conceptual label. This process of grouping concepts at a higher, more abstract, level is termed categorising. Based on the research setting and related preconceptions or propositions, organisational categories were often established prior to the interviews, observations or review of documents. These functioned as primary 'bins' for sorting the written/transcribed data for further analysis. The categories often formed the first skeleton for the outline of the annexed research papers. Parts of the data were then copied and pasted within the respective categories. During this process of matching empirical evidence and predictions/propositions, categories sometimes needed to be changed or complemented. However, some of the categories are still reflected in the articles' final chapters or sections.

Pattern matching – axial coding. Whereas open coding fractures the data into concepts or categories, the axial coding process puts those data back together in new ways by making connections between a category and its subcategories. Thus, within the established organisational categories, patterns were identified through a comparison of the different empirical data. The patterns were established during, and not before, the analysis process, based on their occurrence throughout the different texts. To avoid the accumulation of unanalysed field notes and transcripts, the analysis began often immediately after the interviews. Thus, during the initial listening to interviews and the reading of the different texts, notes were

139 Although Glaser (1978) has pointed out that the method is uniquely suited to fieldwork and qualitative data, it can easily be used as a general method of data analysis.

140 The categorising strategy can also be referred to as 'thematic analysis' (Booth 2001).

already being written to develop tentative ideas about patterns and their relationships. During the process of axial coding, both substantive and theoretical patterns were identified. The substantive patterns are mainly descriptive, stay close to the data analysed, and can in a further step be used to develop theory. The theoretical patterns place the data into a more abstract framework, which is derived (a) from an inductive developed theory (i.e. the concurrent development of concepts and theories from emerging data) (Maxwell 2005); or (b) from deductive theory (i.e. based on the research propositions made). Theoretical patterns were, for instance, based on the theoretical classification of interviewees' perceptions, in contrast with the denoting of interviewees' own concepts (i.e. concepts being understood and expressed in the interviewees' own words). The coexistence of substantive and theoretical patterns is clearly visible in most of the annexed research publications.

The so-called 'linear paradigm model' is commonly used for axial coding. Its basic purpose is to enable the researcher to systematically analyse data and relate them in complex ways by dividing data into 'causal conditions', 'phenomenon', 'context', 'intervening conditions', 'action/interaction strategies', and 'consequences'. In the context of this research, the linear paradigm model was expanded by the broader systems analysis approach described in section 3.4.3, to allow the analysis of more complex (i.e. non-linear) interrelations, including feedbacks.

Theory building – selective coding. The final step, called selective coding, was the identification of connections and relationships through a comparison of different categories and patterns. This last step was crucial for identifying the underlying reasons for the situation/system identified and, finally, for theory building.

Paper III can be used as an example to illustrate the process of categorising and pattern matching. The paper analyses the integration process of disaster risk management into settlement development planning after Mitch in 1998 and the 2001 earthquakes. At first, changes regarding this integration process were analysed only within the defined categories 'implemented projects', 'national and municipal legislation' and 'institutional structures'. During the analysis process, 'operational instruments' and 'organisational structures' were added. Within these five categories, substantive patterns of change were identified (listed at the beginning of each section within chapters 2–4 of Paper III). Finally, the search for theoretical patterns and for causal links (presented in chapter 5 of Paper III) helped to identify the underlying drivers and the strengths and weaknesses of the process identified, which led to the generalisation of the research outcomes. This generalisation to theory is presented in the form of a strategic/methodological framework for integrating disaster risk management, urban planning and housing, included at the end of Paper III.

Certainly, during the analysis of categories and patterns to develop theory, attention was always given to the context of the texts to be analysed, as they were

'produced' under certain conditions. Hodder (1994) states that there is always a tension between the text and context. Within the framework of this research, such contexts were, for instance, false expectations of the interviewees at household level from the interviewer (i.e. the author of this study), and at institutional levels, the need of organisations to protect their reputation by overemphasising the programmes' merits and strengths or by downplaying their weaknesses.

Refinement of theory. Glaser (1998) suggests two main criteria for judging how well the emerging theory performs, namely (a) that it must fit the place studied and, thus, be suitable; and (b) that it works (i.e. it helps people in a particular situation not only to make sense of their experiences, but at the same time to help better manage their situation). Thus, with the aim of extending and/or sharpening the emerging theory by filling in categories that might need further refinement and/or development, workshops were held with the research's target group to present and evaluate the outcomes that were developed initially (cf. section 3.3.6). During the workshops, the participants assessed, amongst other things, if the 'Operational Analysis and Integration Framework' elaborated is comprehensible, comprehensive/complete, relevant and applicable/useful (see *Figure 7*). On average, the participants of the two workshops in Costa Rica and El Salvador rated all four aspects between four and five, on a scale of one to five, five being the best. After the revision of the research outcomes on the basis of the participants' evaluations and of further inputs received during additional field studies, the outcomes were again compared and complemented with existing literature to examine what was similar, what was different, and why (cf. section 3.4.1). Eisenhardt (1989:545) states: 'overall, tying the emergent theory to existing literature enhances the internal validity, generalisability, and theoretical level of the theory building from case study research (...).'

Figure 7: *Workshop in El Salvador in February 2006: exercise to evaluate research outcomes (e.g. the 'Operational Analysis and Integration Framework') as regards their comprehensibility, completeness, relevance and applicability.*

Citations and references: the use of citations/references from interviews is a special feature of Papers I and II to illustrate the categories or patterns identified. These references were selected as being representative of specific themes and were all confirmed by the interviewees. The publications that followed Paper I and II have made only little use of such citations/references, mainly to protect the

different interviewees at the institutional and household levels in El Salvador (c.f. section 3.5).

3.4.3 Systems thinking and analysis

The overall research design of this study, composed of case studies and their context analysis (cf. section 3.2), implies systems thinking. In fact, in line with systems thinking and theory,[141] and in comparison with traditional and commonly used analyses, this study looks at how the matter under study interacts with other parts of the system,[142] and analyses complex matters that involve a great variety of actors and their interactions.

According to Laws and McLeod (2004), the combined 'case study–grounded theory approach' breaks new ground in systems research, providing valid and reliable research outcomes based on rich and detailed data. Within the framework of this research, the use of systems analysis tools for data analysis can be further seen as an extension of the linear paradigm model of grounded theory used during axial coding (cf. section 3.4.2). In fact, in contrast to the linear paradigm model, systems analysis offers better tools for conceptualising and constructing circular connections, which is especially useful for research related to sustainable development (Haraldsson 2004). Systems analysis was thus crucial throughout the whole research.

Systems thinking has been evolving and developing over the last 60 years and is having increasingly more influence on scientific research.[143] It is a field of science that deals with the organisation of logic and integration of disciplines for understanding patterns and relations of complex problems (i.e. complex systems in nature, society, and science). It embeds 'system dynamics', a term coined in the 1960s by Jay Forrester at Massachusetts Institute of Technology (MIT) (Forrester 1961). System dynamics refers to the re-creation of the understanding of a system including its causal factors and feedbacks. Causal loop diagrams are used to map out the structure and the feedbacks of a system so that its mechanisms can be understood (see *Figure 8*).[144] This can, importantly, further help in developing strategies to counteract the mechanisms that have been identified (e.g. undesired behaviour) (Hördur 2004).

Causal loop diagrams were explicitly used at the local household level in this research. In fact, in the elaboration of Papers V and VI, they were used to de-

141 Systems theory generally refers to the 'science of systems' that resulted from von Bertalanffy's 'general system theory' (von Bertalanffy 1950) and was then further developed, also within social sciences (e.g. Bateson 1979).

142 In the words of von Bertalanffy (1950:134), 'in the past centuries, science tried to explain phenomena by reducing them to an interplay of elementary units which could be investigated independently of each other. In contemporary modern science, we find in all fields conceptions of what is rather vaguely termed "wholeness".' This kind of systems thinking is thus certainly in line with case study research (cf. section 2.1).

143 Only recently has its importance also been discussed for risk assessments (Benson and Twigg 2004).

144 The computer programme Vensim© was used to support the creation of the diagrams/models. These models can be used as a basis for computer simulations. See www.vensim.com.

velop illustrative models of the key variables and their causal relations that underlie the complex system of risk and disaster occurrence in slums. A causal relation between two variables is portrayed by an arrow with a plus sign (+) or a minus sign (-) (see *Figures 8* and *12*). A plus (+) or a minus (-) sign 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*. The inclusion of non-linear relationships is one of the most important advantages of causal loop diagrams compared to conventional models, such as the above-mentioned linear paradigm model or flow charts. They are also valuable in that they can identify reinforcing loops that can represent vicious circles – and thus the search for ways of interrupting and/or balancing them. Reinforcing loops consist of two or more variables, all of which are connected by arrows of the same polarity (i.e. plus or minus signs) going in the same direction, and are generally highlighted through bold arrows (see *Figures 8* and *12*).

Although causal loop diagrams were explicitly only used at the local household level, systems thinking was crucial throughout the PhD work. It is also reflected in the final outcome of this research, the 'Analysis and Adaptation Model', which (a) brings together the different key stakeholders that 'run' the system, and (b) indicates ways of 'breaking' negative reinforcing loops that were identified in the current system (cf. sections 4.3 and 5.1).

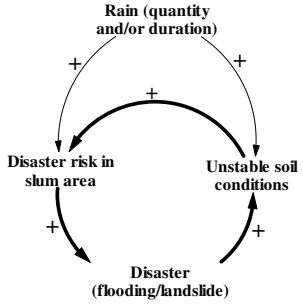

Figure 8: *Example of a basic causal loop diagram showing some natural key variables underlying risk and disaster occurrence in slums (cf. Figure 12).*

3.4.4 Cultural theory

Cultural theory was originally developed in anthropology and political science to explain risk perception. In fact, cultural theory aims to understand why different people and social groups view, and hence react, differently to risk. Four basic social patterns were established by Thompson et al. (1990) to explain the key differences in perception and behaviour: individualistic, communitarian/egalitarian, hierarchical and fatalist. These can also be applied to other, non-risk-related fields. For this research, these patterns were explicitly used to analyse the data gathered on: (a) institutional approaches to (and related measures of) disaster risk

management and settlement development planning; and (b) slum dwellers' behaviour to cope with disaster risk and disasters. As regards the local coping strategies, individualistic behaviour can be characterised by the use of self-help to fix things without assistance from people outside one's own household; communitarian behaviour is based on the belief that everybody sinks or swims together and is hence characterised by community efforts; hierarchical behaviour relates to the belief in authority structures for assistance, control and organisation, including strong prescriptions; and fatalist behaviour is a non-strategy for survival based on the idea that taking action or not taking action has the same (negative) result. As identified by cultural theory, under certain conditions the different patterns can move from the underlying social pattern of one strategy to another pattern (Thompson and Wildavsky 1986). Hence, cultural theory was further crucial to analysing if the programme measures studied helped or hindered such transitions, and if they were in line with the ways in which people actually cope with risk and disasters (see annexed Paper VI).

3.5 Validity, reliability and research ethics

To obtain a good approximation of 'reality', and thus reliability, and to deal with threats to the validity of the conclusions, like bias in the selection of cases/programmes and self-report bias by the interviewees, different types of triangulation were used. These include data, methodological, theoretical and investigator triangulation, as described below (Harvey and MacDonald 1993; Flick 2006).

Data triangulation was applied by comparing the information gathered by the same research method, either obtained from different information sources or even the very same source (e.g. comparing data from interviews with different stakeholders, or comparing data from different interview questions put to the same interviewee). *Methodological triangulation* was applied by cross-checking the information gathered using one method (e.g. interviews) with other data collection methods (for instance, walk-through analysis, observation and text review). Thus, information collected, such as interviewees' beliefs and perceptions, was accepted as true unless discrepancies in evidence were encountered in contradictory information obtained from the same person, other interviewees, or additional data collection sources.

Theoretical validation was achieved by checking resulting theories and concepts through: (a) searching for alternative explanations and negative evidence; (b) comparing them with initial expectations as well as already existing theories/concepts; and (c) holding regular meetings, presentations and workshops to discuss them with key informants, experts, and the target group of the research ('member check') (Ratcliff 1995). Theoretical triangulation was further achieved by distributing preliminary research outcomes through publications (in the form

of paper copies and online postings), with the aim of having them critiqued by a broader audience of researchers and practitioners.[145] The journals, books and working paper series for publishing the outcomes were selected to achieve a good match of their respective readerships with the target group of this research, as well as to distribute the findings within the different disciplines and working fields that are related to the research (i.e. urban settlement planning, disaster risk management, development and disaster studies, and humanitarian assistance). Finally, the framework of this research permitted only to a limited extent the application of *investigator triangulation*. The data analysis process, but not the data collection itself, was subject to revision and critical feedback from other investigators from different research institutions.[146]

In addition to the different types of triangulation described, listening to recordings of interviews and reviewing data on multiple occasions increased the reliability of the research. However, as the social context in which this research is embedded is constantly in a state of flux and development, its replicability is limited. However, importantly, this does not affect the high validity of the research and the analytical generalisation and transferability of its outcomes.

When it comes to research ethics, the question to be asked is if the research could harm. Organisations implementing the programmes studied within the field of disaster risk management and/or settlement development planning took a chance in that the research findings could show their performance to be less good than they thought it was or not as they would like it to be seen. However, first, all the programmes selected can be seen as positive precursors in the sense that they have, compared to usual programmes, already initiated the integration of settlement development planning and disaster risk management. Second, interviewees could decide if they wanted the information provided to be treated anonymously; and third, the research renounced the detailed description and explicit inter-institutional comparison of the programmes analysed. This also helped to obtain more accurate answers to the questions asked. To avoid harm to the programme beneficiaries, their identities were generally kept confidential.[147] In addition, all possible efforts were made not to generate unrealistic expectations on the part of the different stakeholders targeted by the research.

The idea of the research was to seek not Western knowledge, but mainly the existing (local) knowledge, perceptions, capacities, needs and practices of the different stakeholder groups. This approach was based on the author's conviction that a more effective means of responding to disasters and disaster risk is the

145 Feedback was received from a broad audience mainly from Latin America and Europe, but also from Africa, Asia and North America in the form of conversations, e-mails and conventional mail.

146 For instance, the data analysis for the elaboration of Papers V and VI was carried out during 2006 in consultation with investigators at the International Institute for Applied Systems Analysis (IIASA), Austria.

147 The aim of keeping beneficiaries' identity confidential was also a reason for not including in this study the maps of the case study regions indicating the location of the households that were interviewed (cf. section 3.3.1).

positive and intelligent participation of those who are most at risk or otherwise directly involved in the management of disaster risk (cf. Hewitt 1997). This general approach to the topic studied reduced the risk of unethical behaviour and procedures during the elaboration of the research.

Figure 9: *Illustration taken from the poster series 'Learning how to live with floods' (Feuerhake 2004b), elaborated within the framework of a UN-HABITAT upgrading programme. It shows strategies that could be adopted by low-income settlements to better cope with risk and disasters, for instance, through the establishment of an elevated platform/land area that lies above the water table.*

CHAPTER

FOUR

4 Cross-case findings and analysis

This section highlights the main findings and analysis of the papers included in the appendices of this thesis. In accordance with the research objective, all papers focus on demonstrating the role and potential of urban development actors within the field of disaster risk management (cf. section 1.2). They provide new knowledge and innovative ways that would allow these actors to more effectively tackle disaster risk through their everyday work.

Section 4.1 elaborates on how the different papers relate to and build on each other. Section 4.2 synthesises and analyses their cross-case and multi-level findings. Finally, section 4.3 presents the analysis of related outcomes by incorporating them into a new analytical and conceptual model for integrating disaster risk management into settlement development programming (the 'Analysis and Adaptation Model').

4.1 The 'red thread'

The 'red thread' of the annexed research publications, that is, the way that they relate and build on each other, reflects the overall research design. In fact, the global, national, municipal and local household level gradually became the focus of the enquiry (see *Figure 10*; cf. sections 1.5 and 3.2). Initial generalisations ascertained at each level were included in the related paper(s) and are mainly presented in the form of different analytical, conceptual and strategic frameworks. After the publication of the first three papers (I–III), which summarise the research at global, national and municipal levels,[148] the different research outcomes were for the first time interlinked and raised to a higher level of abstraction/generalisation (see *Figure 10*). The resulting 'Operational Analysis and Integration Framework' was published in its full length within a working paper series of the Benfield Hazard Research Centre and in the form of a summary description in an international journal (both on enclosed CD and in Paper IV). These first outcomes were subsequently revised, validated and complemented. This was mainly achieved through: (a) additional interviews, questionnaires, and workshops with the research target group (cf. sections 3.3.1, 3.3.3 and 3.3.6); and (b) additional in-depth studies at the local household level of the selected cases/programmes (cf. section 3.2). The latter are summarised in Papers V and

148 Note that Papers II and III, while focusing on the global or national and municipal level, respectively, also include research outcomes from other levels, including outcomes of the initial household level studies (see *Figures 10* and *11,* cf. section 1.5).

VI. Finally, Paper VII systematises, complements and interlinks most of the main research outcomes of the preceding papers, again reaching a higher level of generalisation (see *Figure 10*). The additional findings complementing the preceding papers were based on further desktop studies during 2006/7, when the newly emerging literature was analysed and interview transcripts and analyses were once again being revised. The resulting 'Analysis and Adaptation Model' (also included in Paper VII) is thus, on the one hand, the further development and generalisation of the key finding of all the different level analyses and, on the other hand, resumes them in one illustrative and all-encompassing framework. The model, however, does not replace the analytical, conceptual, strategic and operational frameworks that preceded its elaboration. In fact, its realisation within a specific programme/organisation would require a consideration and also a partial application of these frameworks. To better support and complement the model, at the end of the research the 'Operational Analysis and Integration Framework' was updated to take new research outcomes into account.

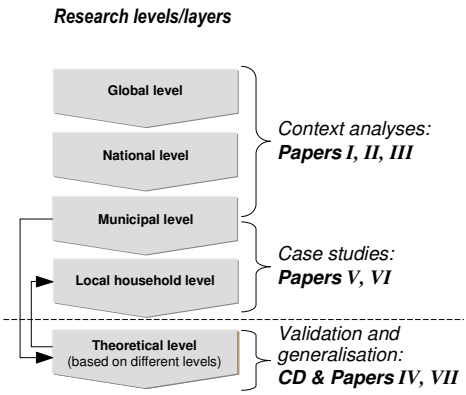

Figure 10: *Link between the research design and the sequence of publications (cf. Figure 5). The black arrows indicate that before the in-depth studies were carried out at local household level, the outcomes from the global, national and municipal level were firstly combined, validated and generalised. After the studies at local household level, the resulting frameworks were then complemented, further validated and generalised.*

Table 4 and *Figure 11* provide a more detailed overview of the interlinkages between the research design and the sequence of the eight publications included in this thesis. They illustrate how the publications build on each other as regards their focus, key aspects and outputs.

Table 4: *Sequence of elaborated publications in time and their interlinkages, building on each others focus, key aspects and outputs (cf. Figure 10 and 11).*

N° of paper/title *(N° according to respective elaboration in time)*	**'Red thread' linking the different research papers**			**Published in**
	Focus *(research levels/layers)*	***Analysed and systematised key aspects***	***Main outputs and contributions*** *(mainly in the form of analytical, conceptual, strategic and operational frameworks)*	
I) Managing urban risk: perceptions of housing and planning as a tool for reducing disaster risk	Global level	Current practices as regards the interconnection between disaster risk management and settlement development programming. Non-integrated and integrated programmes promoted by international organisations. Interlinkages between disasters and building and planning practices.	Identification of the relationship between disaster risk management and settlement development programming at global level and the fact that the separation encountered can lead to increased risk faced by the urban poor. First approximation and demonstration of the nexus between disasters and the building and planning practices from a global perspective.	*Global Built Environment* (GBER), 2004, 4(2):11–28
II) Mainstreaming risk reduction in urban planning and housing: a challenge for international aid organisations	Global level	Underlying reasons (barriers, problems, etc.) for the separation identified between disaster risk management and settlement development programming: - Generic challenges of mainstreaming disaster risk management within general development planning/programming; - Additional sector-specific barriers to the integration process into settlement development planning/programming. Ways of overcoming the barriers/problems identified in order to achieve better integration. Interlinkages between disasters and building and planning practices.	Analytical framework for the systematisation of the underlying reasons/causes of the separation identified at global level (see above). Introduction of the connection between disaster risk management and forced evictions. Conceptual and strategic framework for guiding an educational shift (from conventional to non-traditional urban settlement planning) needed for the sustainable integration of disaster risk management into settlement development planning and programming.	*Disasters,* 2006, 30(2):151–177
III) Integrating risk reduction, urban planning and housing: lessons from El Salvador	National and municipal level, El Salvador	Current practices as regards the interconnection between disaster risk management and settlement development programming. Integration/divergence process of disaster risk management and settlement development planning/programming in El Salvador after recent disasters (Hurricane Mitch in 1998 and 2001earthquakes); Underlying drivers, strengths and weaknesses of the integration process identified. Ways of overcoming persisting separation so as to achieve better and sustainable integration.	Identification of the relationship between disaster risk management and settlement development programming at national and municipal level and the fact that the separation encountered can lead to an increased risk on the part of the urban poor. Identification and systematisation of the integration process of disaster risk management and settlement development planning/programming at national, municipal (and local household) level in the form of an analytical framework. ⇒Ways in which (and with what effect) disaster risk management is currently integrated at national, municipal and local levels, as well as enabling factors and pitfalls.	*Open House International,* 2006, 31(1):71–83

(cont.)	(cont.)	Interlinkages between disasters and building and planning practices.	Systematisation of the underlying reasons for the persistent separation. Strategic/methodological framework for an improved (i.e. coordinated and complementary) integration process of disaster risk management and settlement development programming, carried out by development and relief organisations (as regards programme components, implementing structures, maps, plans and legal frameworks). Strategic framework for improved (international) financing of the integration process through development resources that target both local household and institutional levels (including operational instruments, institutional and operational structures and legislation).	(cont.)
CD) Operational framework for integrating risk reduction for aid organisations working in human settlement development	Theoretical level (based on different levels)	Further generalisation of outcomes of Papers I–III. Existing operational frameworks for mainstreaming disaster risk management (or other cross-cutting issues) into development planning/programming. Related organisational/institutional aspects of non-governmental social housing/planning organisations. Possible 'translation' of outcomes into an operational framework applicable to development organisations, more specifically to organisations working in settlement development planning.	'Operational Analysis and Integration Framework' that provides understanding and guidance for organisations to initiate and gradually pursue the process of integrating disaster risk management into their sectoral work, including different conceptual and strategic frameworks for: - Improved and comprehensive disaster risk management integration at local household level (including three different types of integration) - Improved and comprehensive disaster risk management integration at institutional level (including two different types of integration)	Benfield Hazard Research Centre, Working Paper Series, first version February 2006, revised version December 2007
IV) Tackling urban vulnerability: an operational framework for aid organisations	Theoretical level (based on different levels)	Summary of the 'Operational Analysis and Integration Framework' elaborated for practitioners. Internal and external validation strategy of the operational framework.	Concise illustration of the strategic and conceptual ideas of the operational framework	*Humanitarian Exchange*, 2006, 35:24–26
V) Understanding disasters from a local perspective: insights into improving assistance for social housing and settlement development	Local household level and general programme level	Aspects of what drives risk and disaster occurrence in slums, that is, the key variables and their causal relations underlying the complex system of risk and disaster occurrence, thereby also looking into: - Related practices as regards disaster risk management and settlement development planning, as well as their interconnection. - Interlinkages between disasters and building and planning practices.	Analytical framework and methodology for viewing, understanding and systematising disaster risk in slum communities (i.e. its key variables and causal relations), thus identifying the interlinkages between disasters and the building and planning practices at local household level. Analytical framework for systematising the ways urban slum dwellers' lives and livelihoods are affected by disasters.	*TRIALOG* 91 (Journal for Planning and Building in the Third World), 2006, 4:4–8

(cont.)	(cont.)	Ways in which urban slum dwellers' lives and livelihoods are affected by disasters.	(cont.)	(cont.)
VI) Bridging the gaps: stakeholder-based strategies for risk reduction and financing for the urban poor	Local household level and general programme level	Needs, capacities, efforts and perspectives of slum communities and the urban development actors servicing them (including related microfinancing and insurance institutions). Gap between the respective needs, capacities and efforts. Local coping strategies to deal with disasters and risk. Complex system of social housing provision, financing and insurance and its relationship to disaster risk management. Related aspects of how the existing gaps between, and challenges at, household and institutional levels can be overcome.	Identification of the expenses of slum dwellers for reducing risk and preparing for the seasonal disaster period. Identification of the reasons for urban (as opposed to rural) vulnerability (by identifying causes of weak coping in slums). Complementation of the former integration frameworks that focus on risk reduction (i.e. prevention, mitigation and preparedness) with additionally identified disaster risk management strategies (i.e. risk 'financing' and stand-by-for-recovery measures). Analytical framework (and definitions) for local coping strategies (i.e. strategies identified for risk reduction, (self-)insurance and recovery). Analytical framework for extending social housing financing mechanisms for disaster risk management (so that they can become an integral ex-ante tool for disaster risk management). Analytical and strategic framework for analysing and supporting local coping strategies through settlement development programming (assisting in the selection of adequate programme measures (that match local coping and local heterogeneity).	*Environment and Urbanization*, 2007, 19(1):115–142
VII) 'Planning ahead' – before disasters strike	Theoretical level (based on different levels)	Different-level key outcomes presented in the previous papers. Additional research outcomes in order to complement the previous studies at different levels (e.g. analysis of the interlinkages between disasters and building and planning practices).	Summary of former outcomes and frameworks. Analytical framework for viewing the interlinkages between disaster and urban settlement development at different levels, more specifically between disasters and the building and planning practices (related to low-income settlements). Comprehensive 'Analysis and Adaptation Model' addressing how disaster risk management could be better integrated into settlement development programming.	Book chapter 16 in: *Hazards and the built environment: attaining built-in resilience,* 2008

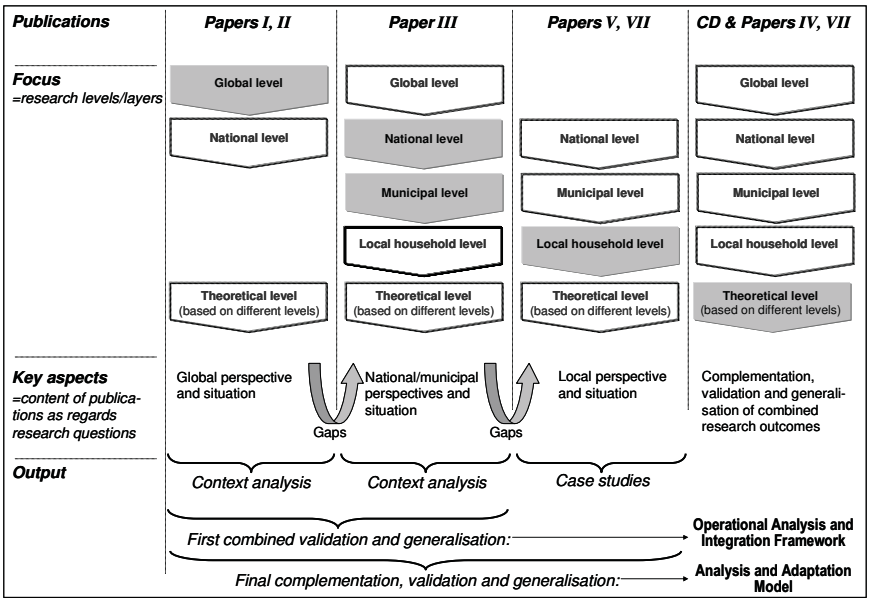

Figure 11: *Focus, key aspects and output of publications in relation to the research design (cf. Figures 5 and 10). The grey fields are the main focus while those with a grey border are tackled to a lesser extent. Note that all papers include a first generalisation of the respective outcomes (i.e. have a theoretical level).*

4.2 Key findings and synthesis of Papers I–VII[149]

This section synthesises and interlinks the main research findings presented in Papers I–VII by gradually analysing them in relation to the three main research questions: (a) what are the interlinkages between disasters and urban settlement development?; (b) what is the relationship between the working fields of disaster risk management and settlement development planning?; and (c) what is the potential to improve risk reduction and risk financing through settlement development programming?

4.2.1 Preparing the ground – linking disasters and urban settlement development

Underlying the whole research was the pursuit of a better understanding of the nexus between disasters and urban settlement development, more specifically, between disasters and the building and planning practices related to low-income settlements. Related findings, presented in the following, are summarised in analytical frameworks elaborated to assist in viewing this relationship (cf. Papers V–VII).

149 This section presents to some extent a synopsis of Paper VII, which incorporates in a systematised way most of the key research outcomes presented in the preceding publications (i.e. Papers I–VI and framework on enclosed CD). However, since its elaboration, the related contents presented here have been adapted, improved, synthesised and further developed.

Disasters ⇒ urban settlement development. On the one hand, 'natural' hazards and disasters have widely varying negative impacts on urban settlement development and related practices. In fact, the research shows that disasters can:

- Disrupt city functions;
- Intensify urban hazards and create new ones;
- Increase urban inequalities and poverty;
- Create new (ever-changing) challenges for future settlement development;
- Create barriers to sustainable settlement development; and
- Negatively impact the resources invested in the built environment.

These extensive effects, which are analysed in detail in *Tables 1–6* of Paper VII, are of a physical, socio-economic, environmental, organisational and institutional nature. Unfortunately, they are not only short-lived, but can – over decades – negatively impact the urban poor, as well as municipal and national development. The information obtained by slum dwellers, presented in Paper V, in fact suggests that disaster impacts can be classified as (a) immediate and short-lived; (b) immediate and long-lasting; (c) delayed and short-lived; and (d) delayed and long-lasting.

Urban settlement development ⇒ disasters. On the other hand, the reverse analysis indicates that inadequate urban settlement development, and related practices, can constitute one of the main causes of disasters, and not only in terms of generating increased vulnerability. In fact, it was revealed that it can:

- Increase vulnerability; and also
- Increase exposure to existing hazards;
- Intensify/magnify urban hazards and create new ones;
- Subject vulnerability and hazards to constant change (thus making them virtually impossible to control);
- Reduce coping capacities at national and municipal level
  - because of inadequate disaster risk management systems, or
  - because of inadequate urban management/governance systems; and
- Reduce local coping capacities of low-income households and communities.[150]

Tables 7–13 of Paper VII illustrate in detail how the related physical, socio-economic, environmental, organisational and institutional effects can be gener-

150 The negative impacts listed can also be caused by inadequate settlement development programmes supported by international and national aid organisations. Examples which were identified in El Salvador are, for instance: (a) increased economic vulnerability as a result of people losing sources of income and increased costs for living (for instance, due to new settlements being further from former working places and schools); (b) the creation of a false impression of security by improving only physical/structural aspects (without providing a broader understanding of risk); (c) the resettlement of people from one disaster-prone area to another one, for instance from an earthquake affected area after the 2001 earthquakes, to areas prone to landslides and flooding; (d) the lack of institutional capacity building; and (e) the creation of barriers for people to obtaining future formal or informal emergency or recovery credits as programme beneficiaries usually cannot use assisted programme housing as collaterals. For further examples see Papers III, V and VI.

ated. They clearly show that disasters are not one-off events caused solely by natural hazards but are generated by interacting development processes in which building and planning practices play a major role. Moreover, the in-depth analysis at local household level, presented in Papers V and VI, demonstrates that the key variables underlying the complex system of risk and disaster occurrence in slums are both directly and indirectly interlinked with settlement development planning. It also shows that disasters are the outcome of a non-linear development process, in which those key variables reinforce each other (see *Figure 12*).[151] Increasing risk through inadequate settlement development planning (and disaster occurrence) thus, not only makes the already precarious conditions of slum dwellers worse, but can also create vicious circles, of which 'poverty traps' can be the outcome. With growing urbanisation and climate change impacts, the two-way and multifaceted relationship described is becoming increasingly alarming.

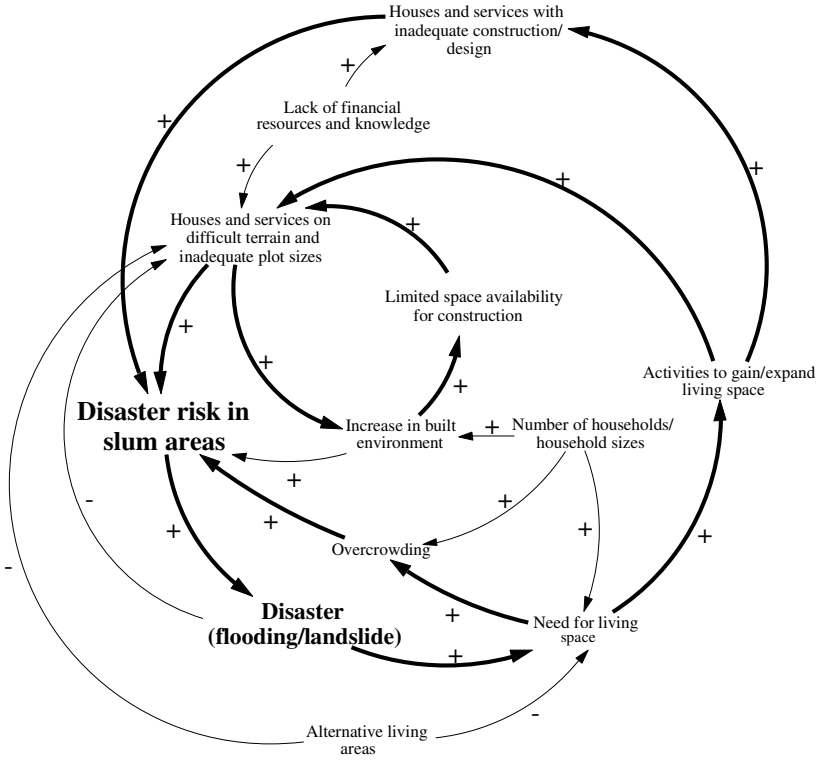

***Figure 12**: Example of space-related key variables underlying the complex system of risk and disaster occurrence in slums, reinforcing each other. Note that the other variables identified were categorised into the following groups: socioeconomic, institutional, organisational, natural/environmental, and infrastructure related (see Paper V).*[152]

151 Poverty has been identified as one of the key factors driving this reinforcing process. In turn, poverty has also been revealed as being negatively affected by this reinforcing process. (For an analysis regarding the interlinkages between settlement development planning and poverty in San Salvador, see also Ávalos and Trigueros [2005]).

152 For a general explanation of causal loop diagrams, see section 3.4.3.

4.2.2 'Reality' versus current planning practices

The interlinkages presented in the previous section indicate the importance that (support for) adequate urban settlement development could have in terms of assisting the reduction of disaster risk, disasters, and thus poverty. However, the comparative analysis of: (a) the interlinkages that were encountered between disasters and urban settlement development with (b) the current practices and efforts in the field of disaster risk management and settlement development planning, revealed that these interlinkages have, to date, not been effectively confronted by either planners or risk management professionals. The result is inadequate risk management and thus increasing risk faced by the urban poor.

One of the main reasons for the situation in question is the unfruitful separation, and even tension, identified between the working fields of disaster risk management and settlement development planning. The separation of these two fields was encountered at all the levels studied (i.e. the global, national, municipal and local household levels) and finds expression in their respective incompatibilities in terms of:

- Stakeholders and institutional structures;
- Sector-specific programmes;
- Discourses of experts and practitioners;
- Their working priorities, concepts, terminology and tools used; and
- Related literature.

All these five areas were analysed in detail in Papers I–VII and are summarised in section 3.1 of Paper VII.[153] The underlying causes for the separation described can be found in the disciplinary roots and the subsequent historical developments of the two respective working fields (cf. chapter 2 and Paper VII).

Three crucial and interconnected aspects further contribute to the separation identified by creating barriers to the integration of disaster risk management into settlement development planning. They are:

- The limited recognition and understanding of the nexus between disasters and urban settlement development (Papers I–VII);
- The marginal role of disaster risk management and settlement development programming on the agendas of both aid organisations and national and municipal authorities (Papers I–VII); and
- The fact that the increasing efforts to mainstream disaster risk management within settlement development programming are, as yet, supported and developed in such a way that they are neither sustainable nor successful (Paper III and operational framework on enclosed CD).

153 Note that some of the aspects analysed are part of the generic challenges to mainstreaming/integrating disaster risk management into settlement development planning. However, settlement development planning also faces additional sector-specific barriers.

Regarding the latter, the case of El Salvador demonstrates that disasters and the distress caused in their aftermath can push forward efforts to mainstream/integrate disaster risk management and settlement development planning. In fact, an integration of the two fields took place after Hurricane Mitch in 1998 and the 2001 earthquakes. Changes towards increased integration were mainly identified within the programmes that were implemented by different stakeholders at local household levels, but they were to some extent also identified in national and municipal legislation, organisations' operational instruments, and institutional and organisational structures. This was the case for organisations working not only in social housing and planning, but also in other development fields and in emergency relief.[154] However, the changes were supported and implemented in such a way that they often resulted in an unfruitful overlap of disaster risk management and settlement development planning. In fact, in many cases the integration process resulted in: improvements that were only temporary; increased competition; duplication of small-scale efforts (e.g. training in disaster management, research efforts into hazard-proof construction); higher investment costs; and mutual incompatibility of programme measures (e.g. the plans and maps developed, and the hazard-proof construction standards promoted). The reasons for this relate to the misinterpretation of the concept of 'mainstreaming' disaster risk management by most of the organisations involved, as well as to a lack of coordination among the different donor and implementing organisations.

In addition to the challenges and incompatibilities encountered at each research level (i.e. the global, national, municipal and local household level), a substantial gap was identified between the needs and efforts to manage disaster risk carried out by stakeholders at different levels. Examples can, for instance, be found in the needs of governmental and non-governmental organisations in El Salvador and the support and input they received from international aid organisations (Papers III, VI and on enclosed CD). In addition, at local level a substantial gap was encountered between what households need or do in order to deal with disasters and risk and how urban development actors support them. As described in Paper VI, at the household level in El Salvador more than 100 crucial but somewhat weak coping strategies were identified.[155] It was further revealed that, on average,

154 Characteristic changes implemented by organisations working in settlement development planning were: (a) the 'adding-on' of new disaster risk management programmes or programme components to their normal project work, which were not related or linked to their core activities. These programmes/programme components were, for instance, aimed at establishing emergency committees, capacity building for disaster management and the elaboration of local risk maps for awareness raising; and (b) the implementation of only a few adaptations within their core work. These were in most cases purely focused on physical/structural aspects at the local household level.

155 These coping strategies are vital for people to deal with risk and disaster. However, they are also somewhat weak. It was revealed that the reasons for weak coping in urban areas in El Salvador are, first, reduced solidarity and reciprocity among households because of (a) urbanisation and the related and increasing ease of mobility that enable households to 'default' on their obligations to relatives and neighbours; (b) different income levels (ranging between US$120 and US$750 per household and US$30 and US$500 per worker), which foster individualistic behaviour, with the better-off households opting out of mutual and hierarchical arrangements; (c) the persistent experience of bad living conditions over a period of years experienced simultaneously by most of the households; and (d) loss of trust in both community solidarity and hierarchical structures (due, amongst other reasons, to corruption and factionalism). Reasons for households' weak coping are, second, related to a lack of knowledge and resources that is due to (a)

households spend 9.2 percent of their yearly income on reducing disaster risk and preparing for the following disaster period (i.e. annual rainy season).[156] However, it was discovered that people's efforts and the financial impacts of these were both generally unknown to, and hence little considered by, urban development actors. In fact, while people's way of coping is holistic in terms of including strategies for risk reduction, self-insurance, and recovery (see *Figure 13*),[157] urban development actors look mainly at how to mitigate physical vulnerability and how to prevent imminent hazards (such as landslides). To make matters worse, some urban development actors even implement measures that create future hindrances to coping. Risk- and loss-financing are, for instance, not usually integrated into their housing finance mechanisms (i.e. government and non-government subsidies, microcredits and family savings) and assisted programme housing cannot be used by beneficiaries as collateral for future credits. Another important barrier to effective disaster risk management identified between different research levels is the fact that slum dwellers have little trust in community solidarity and hierarchical structures, and also fear being hoodwinked by national and municipal planning authorities.

Despite the situation just described, Paper VII demonstrates, importantly, that adequate urban settlement development, and hence programmes that aim to improve current building and planning practices, offer a potentially powerful platform for effectively tackling risk and disasters. This potential was furthermore revealed within the organisational structures and mechanisms for social housing provision and financing that are at the disposal of urban development actors (e.g. housing microcredits, subsidies, family savings, and mutual or self-help).[158] Related measures are described in detail in Paper VI.

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rapidly changing contexts; (b) professional specialisation to compete economically that makes coping through livelihood diversification difficult; (c) possession of few assets that could be sold to help themselves or others; (d) some of the inhabitants feeling a lack of attachment to their settlement/location because of being frequently relocated, which in turn lessens their instinctive coping ability and/or leads to poorly developed coping strategies.

156 Ranging from 0 to 75 percent. An average of 9.2 percent equals US$26 out of an average monthly household income of US$284.

157 For definitions on coping strategies for risk reduction, self-insurance and recovery, see glossary (appendix A1). Examples of these coping strategies are (a) risk reduction through prevention: stabilisation of soil through planting (b) risk reduction through mitigation: better elimination of rain and waste water through improved guttering or use of plastic sheets; (c) risk reduction through preparedness: establishment of local information systems combined with mutual help, so that, for instance, children of people living in high-risk areas can, in anticipation of a disaster, be sent to other families in more secure areas; (d) self-insurance: purchase, use and maintenance of construction materials that could be sold if needed (e.g. corrugated iron for the roofing not nailed down so that it can be sold after disaster impact); (e) recovery: diversification of people's income after disaster occurrence, for instance temporarily taking on a more profitable job in the construction sector.

158 This potential refers to both implementing *and* financing disaster risk management measures. This outcome was based on the in-depth study of the capacities, efforts and perspectives of organisations servicing slum communities at risk, as well as the comparative analysis of these organisational capacities/efforts vis-à-vis the capacities, efforts and needs of slum dwellers (Paper VI).

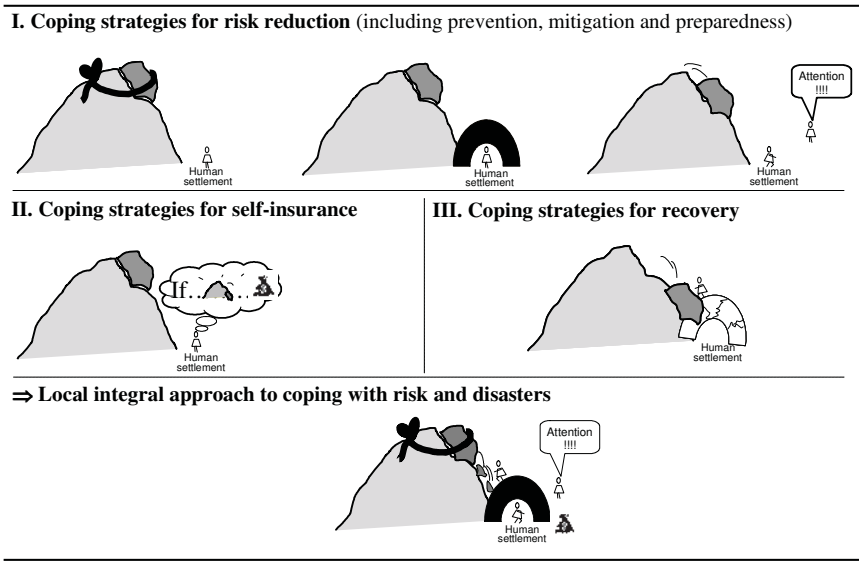

Figure 13: *Simplified illustration of the local integral approach of people to coping with disaster risk and disasters, including strategies for risk reduction, self-insurance and recovery (see glossary for definitions of these).*

4.2.3 A way forward – interfacing disaster risk management and settlement development planning

The two previous sections briefly presented the analysis of three important research findings: (a) the reciprocal and complex way in which disasters correlate with urban settlement development; (b) the fact that this correlation is not given enough (or proper) attention by international, national, municipal and local stakeholders engaging in either disaster risk management or settlement development planning; and (c) the incoherence and incompatibility identified at and among the different levels analysed. The result is unsustainable management of disaster risk (and thus increasing risk) caused by, first, the implementation of programmes that focus only on settlement development planning *or* disaster risk management; and second, the lack of initiatives, which properly integrate and combine the two fields.

While the research further ascertained that implementing and donor organisations working in settlement development planning are increasingly demanding strategic, conceptual and operational guidance on how to sustainably integrate disaster risk management within their core work, these organisations in fact confirmed that no adequate sector-specific and praxis-oriented tools are available.[159]

159 This is a paradox, as at a global level a fast-increasing number of tools for assessing progress in disaster risk management was encountered, most of them developed as a result of top-down processes created by international (and national) organisations (cf. sections 1.1 and 2.1.5, and working paper included on enclosed CD).

Based on the research findings and their analysis, an operational framework was thus developed for integrating disaster risk management into development programming, in order to counteract the situation described.[160] First published in 2006, this 'Operational Analysis and Integration Framework' drew mainly from the research outcomes of Papers I–III. Based on its validation and complementation with subsequent research outcomes, the framework was further developed during 2006–2007.[161] It supports organisations with concrete tools and guidance to:

- Evaluate the relevance of integrating disaster risk management within their organisation;
- Identify and prioritise the different possible strategies for integrating disaster risk management into their work;
- Formulate activities and measures to implement the selected strategies;
- Evaluate possibilities for financing these; and
- Define a step-by-step implementation plan (see also sections 4.3.1 and 4.3.2).

Apart from the 'Operational Analysis and Integration Framework', complementary analytical, conceptual and strategic frameworks were developed, all of which assist in better interfacing disaster risk management and settlement development planning. The analytical frameworks provide the knowledge base needed for suitable action to be taken; whilst the conceptual and strategic frameworks provide theoretical guidance for the integration of disaster risk management into settlement development programming. The different frameworks are listed in *Table 4*, are summarised in the executive summary and presented in Papers I–VI.

4.3 'Analysis and Adaptation Model'[162]

After the gradual studies at the global, national, municipal and local household levels, the different research findings and related generalisations (in the form of the above-mentioned frameworks), were further systematised, analysed, and then incorporated into one framework (see *Figure 14*; cf. *Figure 11* and *Table 4*). The outcome is a new and comprehensive 'Analysis and Adaptation Model' that addresses how disaster risk management might be better integrated into development programming at both the local household and institutional levels (Paper

160 Compared to most tools already in existence, it was developed in close collaboration with practitioners and with a focus on sector-specific, programme-level implementation. Based on growing experiences with its application in the field, it could also assist in creating over time a bottom-up development capable of nurturing the development of proper monitoring and evaluation tools for assessing progress in disaster risk management at both the national and international levels (cf. operational framework on enclosed CD).

161 After the operational framework's first publication in February 2006 by the Benfield Hazard Research Centre, a revised version was published in December 2007, incorporating the ideas and concepts underlying the 'Analysis and Adaptation Model' that had been developed in the meantime (cf. section 4.3). Both versions are included on the enclosed CD.

162 This section presents to some extent a synopsis of Paper VII, which incorporates in a systematised way most of the key research outcomes presented in the preceding publications (i.e. Papers I–VI and enclosed CD). However, since its elaboration, the related contents presented here have been adapted, improved, synthesised and further developed.

VII). The model thus reflects and combines the key findings and analysis, presented in the different research papers, in order to meet the current challenges and respond to the incompatibilities, gaps, and incomplete approaches to disaster risk management integration that were identified at and between the different research levels (cf. sections 4.2.1 and 4.2.2). It provides a comprehensive understanding of the meaning and scope of disaster risk management integration and can assist in both analysing an organisation's work and taking action to improve programme implementation. It is applicable to different contexts and working fields. While its focus is on settlement development planning and programming, many of its strategic concepts can actually also be applied within other development sectors and the working fields of disaster relief, rehabilitation and reconstruction. Its realisation within a specific context (i.e. a programme and organisation) would require consideration and also partial application of the analytical, conceptual, strategic and operational frameworks described in *Table 4,* the executive summary and section 4.2.3.

At the 'heart' of the model is a series of seven conceptual strategies for integrating disaster risk management into development planning. Three of the strategies relate to the integration of disaster risk management into programme implementation at local household level, two to the integration of disaster risk management at the institutional level of the implementing and donor organisations, and the remaining two to the promotion of sustainable disaster risk management in the work of other related implementing and training institutions. These seven strategies are presented in the subsequent sections 4.3.1 and 4.3.2 (summarised in *Table 1* and illustrated in *Figure 14*). The model is furthermore based on five complementary measures that were ascertained to be crucial in tackling disaster risk, namely, prevention, mitigation, preparedness, risk 'financing' and stand-by for recovery, to be considered within each of the seven integration strategies. These measures are presented in section 4.3.3.

4.3.1 Conceptual integration strategies at local household level

As mentioned above, the first three strategies present possible ways of integrating disaster risk management (DRM) into programme implementation at the local household level (see *Figure 14*, left side). The development of these three conceptual strategies was based mainly on the analysis of the research findings presented in Paper III and, to a certain extent, in Paper VI.

Strategy I: direct stand-alone DRM. This is the implementation of specific programmes for disaster risk management that are explicitly and directly aimed at tackling disaster risk. These stand-alone programmes are distinct, and they are implemented separately from other existing work carried out by the implementing development actors, such as social housing/planning organisations. Examples of these would be programmes aiming to: (a) establish early-warning systems or organisational structures for risk reduction (e.g. specialised disaster risk management committees); (b) construct mitigation structures (e.g. levees and em-

bankments to reduce floods); or (c) offer independent disaster insurance (i.e. insurance policies not included in housing financing schemes being offered to the poor).

Strategy II: direct integrated DRM. This is the implementation of specific disaster risk management activities/components alongside, and as part of, other sector-specific programme work. The only difference from *Strategy I* is that this work is carried out in conjunction with other programme components. An example would be the establishment of a local disaster risk management committee or the offer of capacity building for socio-economic risk reduction within the framework of a self-help housing project. Another example would be the implementation of disaster awareness campaigns and simulations alongside a slum upgrading programme.

Strategy III: programmatic mainstreaming. This is the modification of sector-specific programme work in such a way as to reduce the likelihood of any programme measures actually increasing risk and also to maximise the programme's potential to tackle risk. Hence, the objective of programmatic mainstreaming is to ensure that the ongoing core work is relevant to the challenges presented by 'natural' disasters. In contrast to the two strategies described above, in this case the programme's main objective is not disaster risk management as such. The modifications and/or the modified activities can be of a physical/structural, environmental, institutional and organisational nature. An example of this strategy could be a slum upgrading programme that adjusts its loan system to meet the specific needs of vulnerable households at risk (e.g. offering smaller credits with more lenient conditions attached to them or offering integrated risk insurance that take into account beneficiaries' limited capacity to pay). Programmatic mainstreaming can also result in the elaboration of new activities within the organisation's working field that are needed to take existing risk into account. An example of this would be a social housing organisation becoming engaged in land use planning and local urban governance programming for risk reduction, or the offer of risk- and loss-financing schemes through their existing housing financing mechanisms.

The 'Operational Analysis and Integration Framework' can assist an organisation in 'planning ahead' before disasters strike, by guiding the selection and prioritisation of the appropriate *Strategies I–III* (cf. section 4.2.3). Once the strategies are selected, the framework provides matrixes for the formulation of related programme measures. These matrixes include: (a) input and process indicators to get the integration process started; (b) input and process indicators in the form of benchmarks (i.e. the operational state that an organisation should seek to achieve); and (c) output indicators. The matrixes are organised into different subsections. Those for *Strategies I–III* include indicators related to human resources and capacity building; risk identification and community research; and physical, socio-economic, environmental, institutional and organisational programme

components. Furthermore, for each of the *Strategies I–III*, the 'Operational Analysis and Integration Framework' offers a list of sector-specific reference activities and recommendations for organisations working in settlement development planning. See chapter 5, Papers IV and VII, and enclosed CD for concrete examples.

4.3.2 Conceptual integration strategies at institutional levels

In contrast with *Strategies I–III*, presented in section 4.3.1, the following four conceptual strategies (i.e. *Strategies IV–VII*) do not directly refer to the integration process at local household level, but were developed to deal with the challenges, incompatibilities and incomplete approaches identified at institutional levels (see *Figure 14*, right side). The latter relate to the institutional levels of: (a) implementing organisations; (b) 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. The development of *Strategies IV and V* was mainly based on the research findings presented in Papers III, V and VI; *Strategy VI* relates to Paper III, and *Strategy VII* to Paper II.

Strategy IV: organisational mainstreaming of DRM. This means modification of the organisational management, policy, working structures and tools for programme implementation in order to back up and sustain (direct and/or indirect) disaster risk management at the programme level and to further institutionalise it. In fact, if integrating disaster risk management into programme work is to become a standard part of what an organisation does, then organisational systems and procedures need to be adjusted. The objective is to ensure that the implementing and donor bodies are organised, managed and structured to guarantee that risk reduction and risk financing are sustainably integrated within their core programme work. This includes, for instance, the adaptation of institutional objectives as well as programme planning tools.[163] Moreover, organisational mainstreaming also means that new tools must be adopted to properly integrate disaster risk management into (settlement) development programming. Examples are risk mapping or causal loop diagrams for analysing the key variables, and their causal relations, underlying the complex system of risk and disaster occurrence.

163 Examples are logical and results-based frameworks or vulnerability and capacity analyses. To date, social housing/planning organisations are using capacity analysis during programme preparation; however, this tool is applied only in respect of people's existing capacities for housing financing and construction and not for coping with risk and disaster occurrence. A summary of changes to be taken into account in the programming, identification and appraisal stages of construction projects are also presented by Benson and Twigg (2007) and Rossetto (2006).

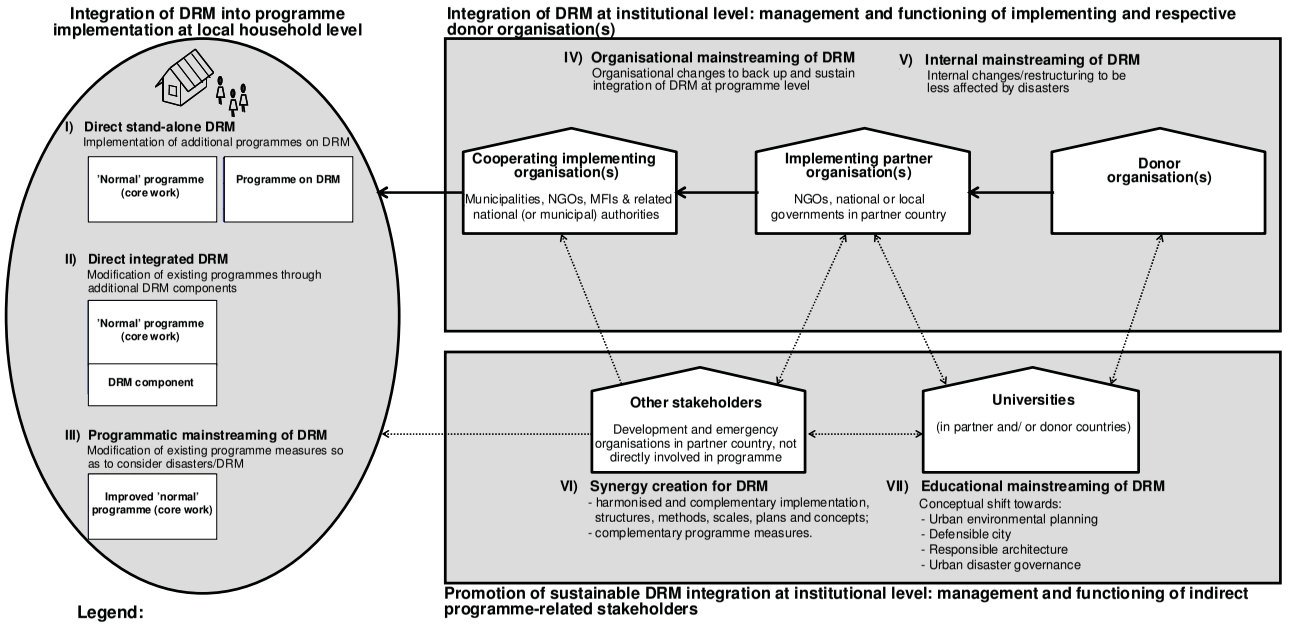

Figure 14: *'Analysis and Adaptation Model' for integrating disaster risk management (DRM) into (settlement) development programming.*

Strategy V: internal mainstreaming of DRM. This means modification of an organisation's way of functioning/operating and of its internal policies, so that it can reduce and transfer or share its own risk in terms of impacts created by disasters. The focus is on the occurrence of disasters and their effect on the organisation itself, including staff, head office and field offices. The objective is to ensure that an organisation can continue to operate effectively both during and after a disaster takes place. In practice, internal mainstreaming has two elements: (a) direct disaster risk management activities both for staff and for the physical aspects of the organisation's offices, for instance, the establishment of emergency plans and retrofitting; and (b) modification of how an organisation is managed internally, for example, in terms of personnel planning and budgeting.

Strategies IV and V refer foremost to implementing organisations that include both the donors' national counterparts and their national/municipal implementing partners. The latter are often governmental authorities, together with microfinancing institutions (MFIs). *Strategy IV* has direct relevance to programme implementation at the household level (as opposed to *Strategy V*, which is only indirectly related to it). In the case of governmental implementing organisations, for instance, housing and planning ministries and municipalities, organisational mainstreaming (i.e. *Strategy IV*) importantly includes the following activities: (a) revision (or creation) of national or municipal legislation and policies; (b) the formal standardisation of methods and approaches to elaborating maps and plans for settlement development planning and disaster risk management; and (c) the creation of improved institutional structures between the national and municipal levels and among the respective disaster risk management bodies.

Importantly, the organisational and internal mainstreaming strategies (*IV and V*) also apply to international donor organisations (see *Figure 14*, right side, top). In fact, donor organisations that wish to promote the integration of disaster risk management through and within their partner organisations need, themselves, to be committed to disaster risk management and its integration. This is a precondition if they wish to support their partners effectively in doing the same. Thus, not only the national partners and their cooperating implementing organisations, but also donor organisations, would have to integrate risk reduction and risk financing within their work. One important organisational change within a donor organisation (to be effected as part of the organisational mainstreaming process) would be the allocation of (primarily) development resources to push forward the integration of disaster risk management into urban settlement planning. Essentially, as described in Paper III, these resources would need to be channelled in such a way that they do not just promote integration in programme implementation at the household level; indeed, it is equally crucial to promote integration at the institutional levels of the implementing governmental and non-governmental organisations, which would affect related national and municipal legislation, operational instruments and internal structures (without separate ones necessarily being added).

As with *Strategies I–III*, for each of the *Strategies IV* and *V* the 'Operational Analysis and Integration Framework' offers further guidance. In fact, the matrixes for organisational and internal mainstreaming (i.e. *Strategies IV and V*) include indicators regarding human resources and capacity building; risk identification and staff research; working structure and procedures, policy and strategy; financial management; and external relations. For each of these topics, the following is provided: (a) input and process indicators to get the integration process started; (b) input and process indicators in the form of benchmarks (i.e. the operational state that an organisation should seek to achieve); (c) output indicators; and (d) sector-specific guidance for organisations working in settlement development planning through the provision of specific reference activities and recommendations (see operational framework on enclosed CD).

Two additional strategies (*VI, VII*) complement the five described thus far (*I–V*). As mentioned in section 4.2.2, the separation between the distinct working fields – in conjunction with misinterpretation of the concept of 'mainstreaming' disaster risk management and a lack of coordination – can result in competition with other implementing organisations; the duplication of small-scale efforts; higher investment costs; and mutual incompatibility of programme measures. Unsustainable disaster risk management is the outcome. *Strategy VI* aims to counter this situation.

Strategy VI: synergy creation for DRM. This is the promotion of 'harmonised' risk reduction and risk financing within the management and functioning of different (implementing) organisations, including both relief and development organisations.[164] The idea is to create synergies instead of competition among these organisations by fostering coordination and complementation of each other's work (see *Figure 14*, right side, bottom). As described in Paper III, coordination of the work of different organisations could be achieved by: (a) working with unified implementation structures (e.g. municipal committees for local development along with political and operational focal points for programme implementation); (b) the standardisation and unification of methods, scales and contents for the development of specific maps and plans; (c) the standardisation or flexible adjustment of the concept of disaster risk management within the different organisations; and (d) the coordinated inclusion of activities for capacity building and socio-economic development in terms of disaster risk management. Complementation and compatibility can be achieved by: (a) working through different municipal/local commissions (e.g. for relief, disaster risk management, project implementation); (b) the development of compatible products and services, such as maps and plans with different contents and scales; and (c) the implementation of additional sector-specific activities (that take risk indirectly into account).

164 This also includes institutions such as schools, police, etc.

Disaster risk management was shown to be a working field where interaction or cooperation between academia and practice can (and must) complement each other so that sustainable solutions for the urban poor can be developed. This can be by means of partnerships, by consultation, or by employing professional staff. Thus, in parallel to the integration strategies and related processes described above, a complementary process is required in order to: (a) generate a more proactive approach on the part of planners towards disaster risk management; and (b) shape their work so that it meets, and is thus relevant to, the current challenges of settlement development. In fact, such a process is indispensable if their work is to achieve a sustainable integration of disaster risk management. Hence the focus of *Strategy VII* is universities and other training institutions (see *Figure 14*, right side, bottom).

Strategy VII: educational mainstreaming of DRM. This means support for a conceptual shift in the philosophy that drives settlement development planning towards non-conventional planning in order to allow disaster risk management to be incorporated into planners' spheres of activity. In fact, the research indicates that planners require a different knowledge base and radically different skills to take on the task of developing secure settlements. Such a change also assists in bringing together planners and disaster risk management professionals by helping them to move towards an understanding of the risk faced by urban dwellers. The four concepts briefly presented below form an important basis on which to promote such a shift. They are explained more thoroughly in Paper II and section 4.6 of Paper VII. Donor organisations could promote this conceptual shift directly by supporting, for instance, universities or ministries of education as their counterparts. A more bottom-up approach would be the involvement of universities and training institutions in local programme implementation.

- *Urban environmental planning.* This concept expresses the need for interconnection between settlement development planning and broader environmental development aspects, thereby incorporating large-scale and everyday small-scale disasters.
- *Defensible city.* This concept expresses the need to make protection against 'natural' disasters a key aspect of settlement development planning.
- *Responsible architecture.* This concept encapsulates the need for urban planners to engage not only in large-scale structural improvements of the formally built environment, but also to target informal settlements, thereby combining large-scale structural improvements with structural and non-structural small-scale measures.
- *Urban disaster governance.* This concept contains the idea of the combined domain, where disaster and settlement development planning are coordinated, mediated and altered through joint governance practices. To facilitate timely, equitable and strategically coherent decisions in resource mobilisation and supply, it is important to identify those governance tools that will be likely to si-

multaneously benefit disaster risk management and settlement development planning.

4.3.3 Complementary measures to tackle disaster risk at local household and institutional levels

To achieve holistic disaster risk management, the analysis of the research findings identified five complementary measures to tackle risk that all need to be considered within each of the seven integration strategies presented. They are:[165]

- *Prevention:* measures to avoid or reduce the potential intensity and frequency of natural hazards that threaten households, communities, and/or institutions;
- *Mitigation:* measures to minimise the vulnerability of households, communities, and/or institutions to 'natural' hazards/disasters;
- *Preparedness:* measures 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;
- *Risk 'financing':* measures 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 obtaining 'readily available' compensation (both monetary and non-monetary).[166]
- *Stand-by for recovery:* measures 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.

Organisations can, importantly, carry out the measures mentioned directly and/or improve the related capacities of the respective households, communities and/or institutions to develop and implement them. With reference to the conventional understanding of risk (cf. sections 2.1.2 and 2.1.5), the first three measures aim to (increase the capacity to) reduce risk. In other words, they aim to reduce the three risk components: hazard(s), vulnerability, and the lack of capacity to respond to 'natural' hazards/disasters. In contrast, the last two measures aim to improve the capacity to recover from hazard and/or disaster impacts, that is, to 'bounce back' quickly and to a reasonable level. See also annexed glossary.

As described in Paper VI, while it is impossible to provide universal guidance for integrating disaster risk management into settlement development planning that would fit all types of programmes, most organisations would probably need to, first, analyse the content and scope of their (direct or indirect) risk reduction

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165 Risk assessment is also part of conventional disaster risk management, as suggested by different organisations (e.g. GTZ 2002). It is not listed separately here as this activity is understood as an inherent part of all measures (i.e. needed for the identification and planning of related measures).

166 Note that the term risk 'financing' has an extended connotation compared to its conventional meaning. This is indicated by writing the term 'financing' in quotation marks. See definition included in annexed glossary.

measures so as to improve their potential to better reduce (and certainly not increase) disaster impacts at the local household and institutional levels. Second, they would need to identify complementary risk 'financing' and stand-by-for-recovery mechanisms. At the local household level, special consideration has to be given to ensuring combined implementation of measures that work *during and also after* programme implementation with others designed to come into effect *after* programme implementation. This is especially crucial given the incremental development processes that are characteristic of slum communities. Examples of the disaster risk management measures listed can be found in chapter 5, the annexed papers and the 'Operational Analysis and Integration Framework' (on enclosed CD). Further illustrations are provided in Wamsler (2007).

4.3.4 (De-)limitations of the proposed model – and related frameworks

The development of an appropriate model and related frameworks, including concepts, guidelines and policy recommendations, is not in itself sufficient to stimulate the integration of disaster risk management into sector-specific development programming. It is, in relative terms, quite a simple task to ensure that such instruments are available, compared with other issues needed for their 'translation' into practice – which are mainly outside the sphere of influence of this research. In this context, the general conditions required for the implementation of technical policy instruments are: (a) scientific input and (b) political will/commitment (Benson and Twigg 2004). Within the context of this research, 'scientific input' refers, for instance, to information on existing risk, related local needs and capacities, the evolution of past disaster impacts, and knowledge on how to develop/support more disaster-resistant systems. Regarding 'political will', the political commitment of international and national (aid) organisations, national and municipal authorities, and civil society for the issue of disaster risk management and its integration into development planning is critical. It is a precondition for the promotion of the 'Analysis and Adaptation Model', and the related frameworks, in practice. However, the model itself (i.e. the proposed conceptual strategies and resulting activities) could help in the following regards:

- There are many competing demands on the resources of national and municipal governments and aid organisations that can negatively influence political commitment regarding disaster risk management. However, the model supports the perception of disaster risk management as a working field and cross-cutting topic that should – as a matter of good practice – be incorporated into (settlement) development planning and programming; it is not viewed as an additional area of investment that is directly competing for funding. This research and other available data suggest that disaster risk management of this nature could possibly be achieved at relatively little additional cost, while significantly increasing levels of achievement and success (Benson and Twigg 2004). In addition, different financing strategies for the promotion and 'translation' of the 'Analysis and Adaptation Model' into practice are described in Papers IV and

VI and the 'Operational Analysis and Integration Framework' (see annexes and enclosed CD).

- The successful implementation of the model's conceptual strategies would directly follow a number of policy strategies and instruments[167] – at national and municipal levels and at the institutional levels of aid organisations – to promote the integration of disaster risk management into (settlement) development programming, without duplicating efforts and resources. Ideally, it would also lead to agreements on principles of good practice in (settlement) development programming that include disaster risk management objectives, thus further pushing political commitments.

Training on the model and its related frameworks is furthermore crucial, not only for its promotion, but also to influence political will. The participants in the research workshops held in El Salvador (cf. section 3.3.6) indicated that it would be important for such training to address, to an increasing degree, not only technical staff but also decision makers, such as aid organisations' executive managers and mayors.[168] However, the distribution of the theoretical research outcomes, which are combined with practical and operational aspects, in conferences and workshops, both in English and Spanish, is already assisting its 'translation' to and 'infiltration' into the sphere of aid organisations (cf. Twigg and Steiner 2002).[169]

Finally, at international and national level, the ongoing linking of disaster risk management to existing priority political commitments, such as the MDGs or climate change adaptation, and the creation of specific targets, can further assist in securing the political will for integrating disaster risk management into development programming.[170]

Apart from political will and commitment, another condition and/or 'risk' for the implementation of the research outcomes is the lack of accountability and responsibility at operational and policy levels of aid organisations and national and municipal authorities. This refers mainly to accountability and responsibility for disaster-related losses and increasing risk, as well as to the organisations' own vulnerability, both of which can undermine the success of development programming. As regards international donors, responsibilities appear to be ever-

167 In line with the general portfolio of policy instruments, these include 'command-and-control instruments' (e.g. licenses, codes or performance requirements), 'economic instruments' (e.g. credits, subsidies and financial [tax] incentives), and 'informative instruments' (e.g. awareness-raising campaigns, information centres and certification) (Bemelmans-Videc et al. 1998).

168 During workshops held in El Salvador, the 'risks' identified to the realisation of the model as such were of a financial, institutional, and political nature. In addition, solutions such as the one described in this section were presented and discussed. As regards financial and institutional aspects, see Papers IV and VI, as well as the enclosed 'Operational Analysis and Integration Framework'.

169 Twigg and Steiner (2002) state that while work pressures clearly leave NGO staff very little time for reading and thinking, these professionals draw on a variety of information sources, selecting those that best meet the practical needs of their job and that are not only accessible in English.

170 Within the framework of this research, related presentations and advisory services regarding the research outcomes were initiated for different international organisations, such as Sida.

more blurred as external assistance is increasingly provided in the form of budget support (cf. section 2.2.2). Thus, individual measures (such as social housing and/or infrastructure) can no longer be linked to specific donors. As regards national and municipal governments, inadequate enforcement of building and planning codes are typical examples of the lack of accountability and responsibility.

*

To sum up, the cross-case and multi-level findings and analysis presented in sections 4.1 and 4.2 reflect the overall research design and provide the answers to the three research questions. As described in section 4.3, in a final step related outcomes were analysed, combined, and 'translated' into a comprehensive and grounded theory on integrating disaster risk management into (settlement) development programming, entitled the 'Analysis and Adaptation Model'. In chapter 5, conclusions are drawn from the different findings and outcomes. In fact, those aspects that demonstrate the main contribution of the research to the current body of knowledge are 'filtered out' in order both to highlight them and elaborate them further.

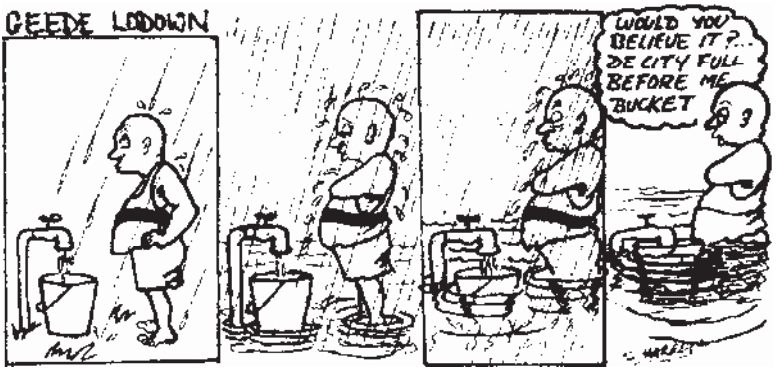

Figure 15: *Illustration of how deficient urban settlement development can affect the urban poor, for instance, through inadequate sewerage systems and lack of access to drinking water, which can directly and indirectly increase their level of disaster risk. The illustration is reproduced from Social Nature: Theory, Practice and Politics (Castree and Brown 2001) by permission from Blackwell Publishing Oxford. Source: Pelling (2003a).*

CHAPTER

FIVE

5 Conclusions and final remarks

Based on the findings and analysis presented in chapter 4, this chapter highlights the fundamental contributions of the research to the current body of knowledge. In general, the empirical and theoretical knowledge developed is of an intra-, trans- and interdisciplinary/intersectoral nature. In fact, the research contributes to advancements in: (a) disaster risk management and settlement development planning; (b) the current connection between the two sectors; (c) ways of interfacing them; (d) related disciplinary aspects of architecture, urban planning, development and disaster studies; and (e) research methodology appropriate for addressing similar intersectoral and interdisciplinary investigations (see *Figure 16*). Within the different areas just mentioned, the main contribution is the identification and systematisation of the nexus between disasters and urban settlement development and – on this basis – the advancement of conceptual and strategic approaches to integrating disaster risk management into development programming. As the research paradigm of this study lies within the tradition of so-called 'Mode 2' knowledge production (Gibbons et al. 1994; Dunin-Woyseth and Nielsen 2004), section 5.1 presents related conclusions that are intended to be directly useful or applicable for the research target group. These are mainly policymakers, programme managers and operational staff of both governmental and non-governmental organisations working in settlement development planning. In contrast, section 5.2 highlights more theoretical conclusions of the research that directly build on its conceptual framework and the methodology used. Finally, section 5.3 presents the implications of this study for future research.

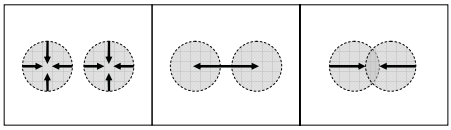

Figure 16: *Illustration of intra-, trans- and interdisciplinary/intersectoral knowledge production of this research.*

5.1 Fundamental contributions to settlement development programming

Sections 5.1.1–5.1.3 elaborate on the research's main conclusions regarding the role and potential of planners and other urban development actors to more effectively contribute to disaster risk management. In short, it is concluded that urban settlement development and related programming can reinforce both disaster risk and poverty, while at the same time providing a potentially powerful platform to

counteract them. Current conceptual and strategic approaches are, however, inadequate in terms of exploiting this potential. On this basis, implications are drawn as to how urban development actors could confront this situation by integrating disaster risk management in a holistic way into their everyday work.

5.1.1 Settlement development and the vicious poverty-disaster circle

Inadequate urban settlement development strongly fosters the vicious circle created by poverty, risk and disaster – by negatively influencing both risk and poverty (see *Figure 17*).[171] In line with this, the research revealed that urban development actors are often unconscious, but significant, contributors to the increase in risk. This is because their building and planning practices can actually not only increase vulnerabilities; they can also foster existing hazard(s) and reduce the capacities of households, communities and institutions to cope with risk and disasters.

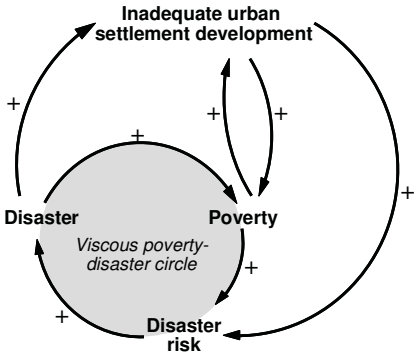

Figure 17: *Simplified causal loop diagram to illustrate the interlinkages between disasters and inadequate urban settlement development, as well as its interconnection with the 'vicious poverty-disaster circle'. This vicious circle develops as follows: increase in poverty increases people's disaster risk (as poverty can result in, for instance, people being marginalised and not having access to information, such as early warning). The increase in disaster risk directly leads, in turn, to an increased number of disasters. Finally, the occurrence of disasters increases poverty (e.g. by destroying people's belongings, assets, and/or livelihoods).*[172]

171 Three additional vicious circles are developed that foster the vicious poverty-disaster circle as illustrated in *Figure 17*: first, inadequate urban settlement development negatively influences disaster risk (i.e. hazard[s], vulnerability and coping capacities). This creates a new vicious circle as, in turn, the occurrence of disasters provokes further inadequate urban settlement development practices (e.g. by diverting related national development funds towards relief and reconstruction, or by forced evictions and relocations after a disaster occurs). Second, inadequate urban settlement development practices can also negatively influence poverty that can, in turn, lead to increased risk, disaster, and again inadequate settlement development. Finally, a third vicious circle is created as inadequate urban settlement development practices negatively influence poverty, while poverty, in turn, fosters inadequate urban settlement development practices (e.g. creating disregard for norms and standards, preventing knowledge of these being disseminated, or by creating corruption in the construction sector) (cf. section 4.2.1). (See also World Bank [2005] regarding the link between poverty and disaster risk.)

172 The loop diagram illustrates a key conclusion that can be drawn from this research. It demonstrates in a simplified way the two-way and multifaceted relationship between disasters and urban settlement development analysed at the different research levels. Note that the diagram has its limitations as it does not include additional influencing factors. This affects the reverse relations of the variables as follows: while an increase in poverty can lead to an

An important underlying reason for this unfortunate situation is the limited recognition and understanding of the nexus between disasters and urban settlement development. This can even result in denial on the part of urban development actors that they have any important role, influence and responsibility in preventing disasters or in reducing their impacts. In fact, while this research demonstrates that disasters are generated by complex and non-linear development processes in which building and planning practices play a major role, urban development actors commonly view the relationship between disasters and urban settlement development as a simple one-way, cause-and-effect relationship (see *Figure 18*). The limited perception that disasters are the uncontrollable cause and that the destruction of the built environment is the effect, is widespread amongst those professionals. Consequently, they have a tendency to focus mainly on physical/structural matters in the aftermath of disasters. This also correlates with their view of the very restricted potential of building and planning practices for disaster risk management, as urban development actors usually do not acknowledge informal settlements, small-scale everyday disasters, and non-physical/non-structural measures as being part of their sphere of activity (see *Figure 19*). The few preventive solutions that they offer, such as building codes or land-use zoning for formally built areas, are thus of little importance, and can even have negative consequences, for those urban poor whose lives are most at risk.

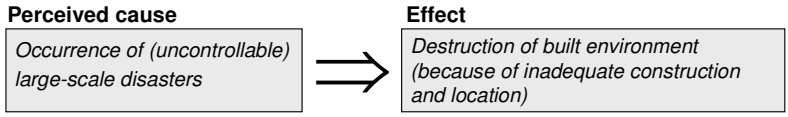

Figure 18: *Common, 'erroneous' view of the interlinkages between disasters and urban settlement development as being a simple one-way, cause-and-effect relationship.*

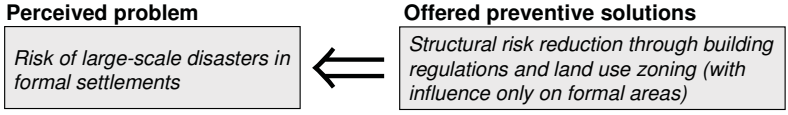

Figure 19: *Common, 'erroneous' view of the potential of building and planning practices for disaster risk management as being a simple one-way problem-and-solution tool with limited effectiveness and area of influence.*

5.1.2 Powerful – but not exploited – platform to tackle disaster risk

Whilst the research reveals the negative influence of urban settlement development and related programming in terms of increasing risk, it also concludes positively that such programming offers a potentially powerful platform for disaster

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increase in inadequate urban settlement development and in risk, poverty reduction does not always and automatically lead to more adequate urban settlement development or reduced risk, if these two aspects are not specifically targeted (cf. Papers V–VII). For a general explanation of loop diagrams, see section 3.4.3.

risk management. As can be observed in *Figure 12*, programmes that promote adequate building and planning practices (i.e. that incorporate disaster risk management) would, in fact, have the potential not only to substantially contribute to reducing risk and disasters, but also to achieve more sustainable poverty reduction. Furthermore, this potential was revealed within the organisational structures and mechanisms for social housing provision and financing that are at the disposal of urban development actors, for instance, housing microcredits, subsidies, family savings, and mutual or self-help.

Whilst urban development actors could thus make a substantial contribution to disaster risk management, many of the conceptual and strategic approaches that they currently use fail to tap into this potential. This can result in programme measures that not only have a direct negative impact on existing risk, but also create barriers for households, communities and organisations in terms of coping with future risk and disasters. Short-sightedness about the potential that exists also hampers the efforts of donor and implementing organisations to mainstream disaster risk management. While those efforts are, in fact, increasing, they have often been neither successful nor sustainable.[173] This is partly due to a lack of coordination among the different stakeholders and mainly because 'mainstreaming' is often conceived of as being synonymous with civil engineering improvements or with simply carrying out a few dedicated risk reduction measures.

5.1.3 Breaking the vicious poverty-disaster circle

To achieve or improve integration of disaster risk management into their everyday work, urban development actors would need, first, to recognise their role and influence in terms of increasing risk and, second, to acquire the knowledge and skills that would allow them to assume their responsibility for disaster risk management. However, while understanding the two-way and multifaceted relationship between disasters and urban settlement development, and also knowing how to carry out related analyses on a local basis, is an important requirement for appropriate action, it is not enough.

In fact, the research concludes that urban development actors are often unable to 'break' the vicious circle of poverty and disaster because they lack the tools necessary to adequately integrate disaster risk management into their work. Tools for merely developing and implementing hazard-proof constructions do not fill this gap. A structural adaptation of this kind actually needs to be combined with and backed by a holistic 'take-up system' that combines and integrates structural and non-structural measures at different levels. The grounded theory developed and presented in form of the 'Analysis and Adaptation Model' (together with related frameworks) offers such a 'take-up system'.

173 'Unsustainable' refers to institutional and financial sustainability at both the local household level and within donor and implementing organisations.

At the core of the 'Analysis and Adaptation Model' are seven complementary strategies elaborated for the integration of disaster risk management into development programming. In practice, urban development actors commonly consider only two out of the seven strategies identified. The model thus provides a comprehensive understanding of the meaning and scope of disaster risk management integration that assists in both analysing development organisations' work and taking action to improve programme implementation. This is crucial if both risk and poverty are to be addressed more effectively. The model and the related frameworks are therefore not just an academic exercise; they are of direct relevance to the target group of the research and its bottom-line beneficiaries, the urban poor. Within the framework of this research, their applicability was, to some extent, already tested and validated through their practical use for the planning and implementation of current development programmes in Central America and the Philippines.

In the following, those key aspects and conclusions of the model's conceptual strategies that are of especial relevance for urban development actors are highlighted (for a thorough description of the model, see section 4.3 and *Table 1*):

First, although the integration of disaster risk management into development work can include the integration of disaster risk management programming, it should, predominantly, include the mainstreaming of disaster risk management. These two approaches should not be confused.[174] The former is the 'adding-on' of dedicated disaster risk management programmes or programme components that are not related to the organisation's core work. The latter is the adaptation of the organisation's core work so that disaster risk can be tackled through the organisation's sector-specific programme measures. Both approaches are included in the model's seven strategies.

Second, to achieve sustainable integration of disaster risk management (both programming and/or mainstreaming), related changes are needed not only at the local household level, but also at the institutional levels of the implementing, funding and cooperating organisations. The model's strategies address both levels (i.e. the local household and institutional levels).

Third, within each of the seven conceptual strategies for disaster risk management integration five complementary measures to tackle risk have to be considered. They thus apply to both the local household and the institutional levels. These measures can be embraced under the heading 'ex ante measures for disaster risk management' and are called (1) prevention, (2) mitigation, (3) preparedness, (4) risk 'financing', and (5) stand-by for recovery (for a thorough descrip-

174 See annexed glossary for definitions of disaster risk management integration, mainstreaming and programming. Disaster risk management programming (included under *Strategies I and II* of the 'Analysis and Integration Model') are commonly confused with mainstreaming, which can result in competition among and the duplication of efforts of organisations that specialise in different humanitarian and development sectors. This was also the case in El Salvador after the 2001 earthquakes and it thus led to an unfruitful overlapping of disaster risk management and settlement development planning (cf. section 4.2.2 and Paper III).

tion of the measures see section 4.3.3 and annexed glossary). At present, urban development actors commonly adopt only some aspects of (1) and (2).

Fourth, the 'keeping separate' of the five complementary measures from each other during planning and implementation of development programmes helps ensure integral disaster risk management. In fact, the identification and development of these measures was carried out in this research in order to provide a frame of reference that allows urban development actors to systematically search for and analyse potential programme measures.

Fifth, to sustainably tackle disaster risk at local household level, the five measures just mentioned should, where appropriate, be built on local patterns of social behaviour and existing coping strategies. From the research it can be concluded that where local coping strategies are denied, unsustainable programmes often result. This refers to both programmes for disaster risk management and settlement development planning. However, the five measures were developed on the basis of the integral local approach of people to cope with risk and disasters (cf. *Figure 13*). Hence, delineating these measures also assists in the search for programme activities that match local needs, local capacities and local dimensions of risk. Within each type of coping strategy (i.e. strategies for risk reduction, self-insurance and recovery), the urban poor have a number of innovative, but also somewhat weak, practices that development actors could take on, support and/or improve. It is thus essential to consider, on the one hand, encouraging and scaling up sustainable practices and, on the other hand, scaling down unsustainable practices and offering better alternatives, where needed.[175] Moreover, the creation of barriers to coping by settlement development programming needs to be avoided.[176] The identification and analysis of people's local efforts are thus crucial – efforts that in El Salvador were reflected in more than 100 coping strategies being identified. In other words, the common practice of implementing physical/structural measures to reduce vulnerability that are not related to local efforts (and continue unchanged after the programme has ended) is not sufficient to sustainably reduce risk.

Sixth, for the five measures (i.e. prevention, mitigation, preparedness, risk 'financing', and stand-by for recovery), the aspects listed below were ascertained to be particularly relevant for settlement development programming at the local household level.

- *Prevention* relates to the avoidance or the reduction of the potential intensity and frequency of hazards that are understood as being partially manageable in

175 Only local efforts to cope with risk and disaster that, in effect, sustainably tackle the key variables, and their causal relations, underlying the complex system of risk and disaster occurrence in slum areas should be supported by aid organisations. Obviously, careful attention needs to be given here to the cost-effectiveness and sustainability of settlement development programmes.

176 An example would be giving permission to use assisted programme housing as collateral when applying for future credits for risk reduction and/or recovery.

terms of the human activity that can lead to their creation. In the case of landslides, human-induced processes, such as environmental degradation related to urban settlement development, could be counteracted through programme measures.

- The achievement of sustainable implementation of *mitigation* (to reduce vulnerabilities) and *preparedness* (to establish effective disaster response mechanisms and structures) often strongly depends on the existing relations between the local communities and national and municipal authorities.[177] Improving these relationships to overcome, for instance, the loss of trust in community solidarity and in the hierarchical structures of planning and emergency authorities at municipal and national level can thus be important. Examples of related programme measures are the improvement of local urban governance that addresses community rights and obligations, as well as better pre- and post-disaster communication and decision-making in which the urban poor have a stake.
- *Risk 'financing'* and *stand-by for recovery* aim to establish mechanisms and systems that can help slum dwellers recover quickly from hazard or disaster impacts. These measures should especially be considered for the adaptation of housing financing mechanisms. Examples are the integration of insurance mechanisms or special recovery funds. Housing microcredits, subsidies and family savings can thus become integral ex ante tools for disaster risk management. Moreover, the scope of social housing financing mechanisms could be extended to support the financing of risk reduction measures.

In conclusion, put into practice, the proposed conceptual and strategic 'take-up system' can assist in the sustainable reduction of both risk and poverty, and thus also to achieve the MDGs. Indeed, this system can help urban development actors to 'break' the vicious poverty-disaster circle described in *Figure 17* by:

- Enabling them to take on the role of developing secure and sustainable communities;
- Overcoming the constraints that they currently face to get disaster risk management 'translated' into their building and planning practices; and thus
- Not only improving the living status and security of the urban poor, but also enhancing poverty reduction, and decreasing post-disaster destruction and the forced evictions and relocations associated with this.

Concerning ways of 'translating' the complementary strategies and measures of the 'Analysis and Adaptation Model' into practice, various frameworks were developed under this research. One important contribution is the 'Operational Analysis and Integration Framework' that further details and operationalises the

177 Note that this often also applies to the other three measures (i.e. prevention, risk 'financing' and stand-by for recovery).

model's strategies. Its indicator system can assist in gradually initiating and pursuing the process of integrating disaster risk management into development organisations' work (see enclosed CD). This indicator system includes:

- Input and process indicators to get the integration process started;
- Input and process indicators in the form of benchmarks;
- Output indicators; and
- Sector-specific reference activities.

Other complementary analytical, conceptual and strategic frameworks were developed for, amongst other aspects, (a) viewing the interlinkages between disasters and urban settlement development; (b) viewing local disaster risk (i.e. its key variables and causal relations); and (c) analysing and supporting urban coping strategies (cf. Papers V–VII).

Importantly, most outcomes, including both the 'Analysis and Adaptation Model' and the 'Operational Analysis and Integration Framework', are applicable within a variety of cultural and geographic contexts, as well as to all types of 'natural' hazards and disasters. They can further be applied not only by different development sectors, but also in the context of relief, rehabilitation and reconstruction (i.e. in both the pre- and post-disaster context).

5.2 Fundamental contributions to the existing body of knowledge

Apart from the fundamental inputs, described in the preceding section, that are of direct use for the research target group, more theoretical conclusions can also be drawn. These build directly on the research's conceptual framework and the methodology used, which were presented in chapters 2 and 3. On this basis, section 5.2.1 elaborates on key conclusions that advance the conceptual framework of disaster risk management and its integration. Section 5.2.2 relates the research's main contribution to the current discourses on settlement development planning. Finally, section 5.2.3 highlights aspects of the innovative research methodology used, which offers a template for similar intersectoral and interdisciplinary investigations.

5.2.1 Conceptual framework of disaster risk management – integration

Since the 1970s, the discourses within the broader disaster risk management community have undergone a gradual paradigm shift from response, to improved response and preparedness, to hazard mitigation, to vulnerability reduction, to integrated disaster risk management, and finally to factoring disaster risk management into development programming (cf. section 2.1). The conclusions presented next advance the current discourses, and related concepts, and assist in overcoming the shortcomings and incomplete approaches to disaster risk management and its integration that were identified by this research.

Advanced understanding of risk and, thus, of risk reduction. Conclusions can be drawn from this research that enhance the current understanding of risk. This enhanced understanding can also have a bearing on the type of measures used to tackle risk and how they are prioritised. This is because the way in which risk is defined by different actors and research communities generally influences how disaster risk management is addressed (i.e. investigated, promoted and implemented). The following aspects led to an extension of the definition of risk:

- Identification and development of risk 'financing'[178] and stand-by for recovery as important (ex ante) measures for disaster risk management at both the local household and institutional levels. This was based, amongst other things, on the analysis and categorisation of local coping strategies that, to date, had been little systematised within an urban context. In fact, the identification and analysis of coping strategies for self-insurance and recovery revealed that these strategies are crucial in terms of helping slum dwellers to recover, not only from disasters, but also from localised small-scale hazards (cf. *Figure* 13). Such hazards were shown not only to have immediate and short-lived impacts, but also delayed and/or long-lasting effects that cannot always be sufficiently counteracted by the use of prevention, mitigation and preparedness measures. It is thus argued that risk 'financing' and stand-by for recovery, which aim to increase people's capacity to recover from hazards (and disasters), are an important complement to measures to support the urban poor so that they can better cope with disaster risk.
- Extension of the definition of risk to include the lack of capacity to recover from disasters (LC_{Rec}) (see *Figure 20*). This extension results from the inclusion, as described, of risk 'financing' and stand-by for recovery as measures for tackling disaster risk in a pre-disaster context. If, and only if, this change to the definition of risk is made, can the usual term 'disaster risk reduction' (as opposed to 'disaster risk management') be used as an umbrella term for all potential measures to tackle disaster risk within a pre-disaster context. These measures would thus include all types of activity that aim to minimise existing hazards (H), vulnerability factors (V), and a lack of both response *and* recovery capacities of households, communities and organisations (LC_{Res}; LC_{Rec}). These complementary measures would thus have the potential to match up with, and support, the coping strategies identified for risk reduction, self-insurance and recovery (as shown in *Figure 13*).
- Demonstration that all the risk components identified (i.e. H; V; LC_{Res}; LC_{Rec}), are directly linked to settlement development planning, which can thus generate different levels of risk (see *Figure 20*).

178 Note that the term risk 'financing' has an extended connotation compared to its conventional meaning. This is indicated by writing the term 'financing' in quotation marks. See definition included in glossary.

- Systematisation of prevention, mitigation, preparedness, risk 'financing', and stand-by-for-recovery measures to allow them to be 'kept separate' from each other (see section 4.3.3 and glossary for definitions of these). Doing this helps in relating each of the five measures to a specific risk component, and thus in providing a frame of reference that enables a systematic search for and analysis of measures to reduce risk (see *Figure 20*).
- Systematisation of the key variables, and their causal relations, of local disaster risk in slum communities (see *Figure 20*). These were identified as not only being closely linked to settlement development planning but also as reinforcing one other (see *Figure 12*).
- Identification of reasons for weak coping in slums (if compared to more rural environments). Although more evidence is needed, such coping also appeared to be less conscious and more individualistic (as opposed to communitarian) than in rural contexts, with stronger focus on housing construction and land issues and less emphasis on people's income sources. This outcome contributes to the improved differentiation between urban vulnerability and risk in general (see *Figure 20* and footnote 155).[179]

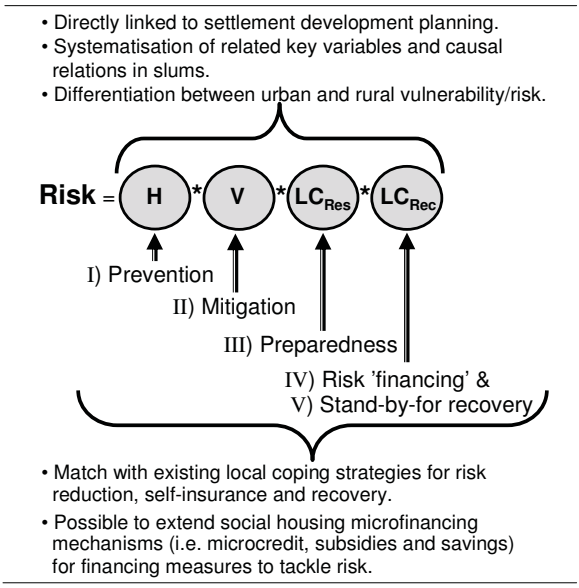

Figure 20: *Illustration of the extended definition of risk, its components, and the related five measures to reduce each risk component.*

179 This complements former studies, such as Moser et al. (1996) who identify three aspects of urban life and livelihoods that differentiate rural and urban experiences of vulnerability: commoditisation (integration into a cash economy); environmental hazard (poor housing and infrastructure and industrial pollution); and social fragmentation (loss of supportive social networks, greater social problems) (cf. footnote 43).

The aspects described led to an enhanced understanding of risk and, thus, an extension of the definition of risk. This extension could also be expressed through the following extended equation 5.1, with all risk factors being defined as ≥1 (cf. section 2.1.5):

$$R = H * V * LC_{Res} * LC_{Rec} \qquad (5.1)^{180}$$

The equation shows that even a small rise in one of the four risk component has a multiplicative effect on the others and thus can result in a major increase in risk. Assuming that this equation expresses the initial risk situation of a specific slum area at a given point in time, the following equation 5.2 illustrates how this risk can be minimised through the implementation of risk reduction measures:

$$R = H(\tfrac{1}{P_{Rev}}) * V(\tfrac{1}{M}) * LC_{Res}(\tfrac{1}{P_{Rep}}) * LC_{Rec}(\tfrac{1}{R_F+S_R}) \qquad (5.2)$$

where P_{Rev} stands for prevention, M for mitigation, P_{Rep} for preparedness, R_F for risk 'financing' and S_R for stand-by for recovery, with all denominators being defined as ≥1 (e.g. if no preventive measures are carried out, the respective denominator equals 1). Alternatively, equation 5.2 can also be expressed slightly differently:

$$R = \frac{H}{P_{Rev}} * \frac{V}{M} * \frac{LC_{Res}}{P_{Rep}} * \frac{LC_{Rec}}{R_F+S_R} \qquad (5.3)$$

The extension of the risk definition, as described and represented by these equations, is a potentially powerful tool for researchers and practitioners. It can actually help these professionals to systematise and gain a better understanding of existing risk components and the strategies required to reduce each of them. Its objective is *not* to actually calculate risk, but to help tackle risk more effectively. It allows the complementary risk reduction measures to be differentiated one from the other, which, subsequently, assists in properly designing and combining them. The extended definition of risk is thus meant to be mainly an analysis and planning tool for identifying and developing measures for holistic disaster risk management (integration) during the preparation and planning phase of programmes.[181]

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180 It is acknowledged that the term/variable 'lack of capacity' (*LC*) in this equation might not be the most appropriate term because the 'vulnerability' variable could, for instance, also be expressed as a 'lack of capacity to reduce vulnerabilities'. However, in order to stay as close to the commonly known risk equation 2.4 (i.e. $R=H*V/C$; which is mathematically identical to equation 2.5 [i.e. $R=H*V*LC$]), the variables LC_{Res} and LC_{Rec} were not replaced by the terms 'lack of structures and mechanisms for response' and 'lack of structures and mechanisms for recovery', respectively.

181 While the systematisation described can also be used for evaluating the disaster risk management approaches of organisations, its purpose is not the classification of already existing programme measures after implementation. In fact, such classification is sometimes not easy as (a) one and the same measures can serve different purposes; and (b) depending on the understanding of vulnerability, measures can be classified differently (e.g. can fall under mitigation or rather preparedness).

It is important to note that the research outcomes described, which advance the understanding of risk, could also be acknowledged by adapting the conventional risk definition. As described in section 2.1.2, this definition is based on the prevalent variables hazard (*H*) and vulnerability (*V*), that is, *R=H*V* (equation 2.5). This definition could continue be to be used if the lack of capacity to respond and the lack of capacity to recover are explicitly included as part of vulnerability (as has already been done by a few researchers such as Benson and Twigg [2007] and Wisner et al. [2004]).[182] It would then furthermore be necessary to adapt the current definitions of the respective measures to tackle each component, as these definitions, as yet, do not serve the purpose of identifying and developing respective actions. Another, more precise solution would be to adapt equation 2.2 (*R=H*V*LC*) used for this research and to explicitly define that *LC* includes the capacity to both respond *and* recover. *Figure 21* figuratively illustrates this definition of risk, and *Figure 22* the corresponding measures to tackle the respective risk components. Note that the advances presented are also reflected in the new and extended definitions included in the annexed glossary.

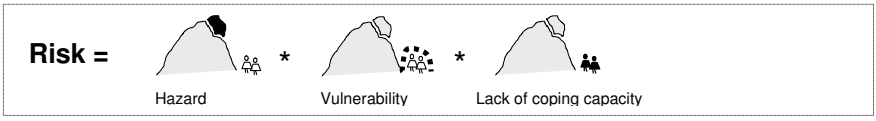

Figure 21: *Initial risk situation and components of a specific area (or organisation), being composed of: (a) hazard/s, (b) vulnerability, and (c) lack of coping capacity both to respond to and to recover from disasters.*

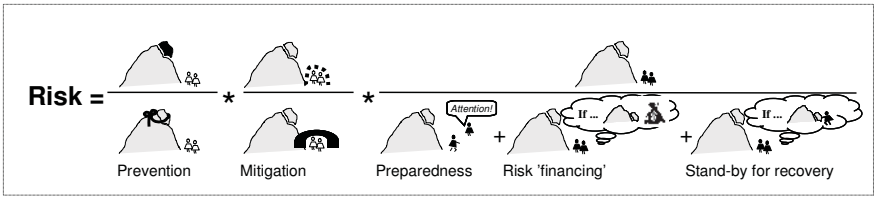

Figure 22: *Changed risk situation through the implementation of disaster risk reduction measures, namely, (a) prevention, (b) mitigation, (c) preparedness, (d) risk 'financing', and (e) stand-by for recovery (see denominator). The denominator thus illustrates the measure/capacity that is impl*emented/increased to reduce the three respective risk components (see numerator).

As concluded above, the advances described regarding the understanding of risk can influence the disaster risk management measures that are investigated, promoted and implemented. One concrete example of this would be the further development of (housing) microfinancing mechanisms (i.e. microcredits, subsidies and savings) to (a) support risk 'financing' and stand-by for recovery; and (b)

182 The capacity to respond and to recover would thus be part of social or institutional and organisational vulnerability (see glossary).

finance risk reduction measures. (Housing) microfinancing mechanisms would thus become an integral ex ante tool for disaster risk management (see *Figure 20*).

Advanced concept of disaster risk management integration. In addition to the aspects described above, further conclusions can be drawn that advance the concept of disaster risk management integration.[183] In fact, the analysis and integration frameworks elaborated, and especially the 'Analysis and Adaptation Model', provide a comprehensive continuation and advancement of related concepts by systematising and developing the following aspects:

- The concept of disaster risk management integration being divided into disaster risk management programming and disaster risk management mainstreaming;
- The concept of mainstreaming being differentiated into programmatic, organisational, internal and educational mainstreaming;[184]
- On this basis, seven complementary strategies being identified to integrate disaster risk management into development programming that address the local household and institutional levels;
- Related key stakeholders and their respective roles in disaster risk management integration at the global, national, municipal and local household level, namely, (a) implementing organisations, (b) donor organisations, (c) other implementing organisations, and (d) universities and other training institutions; and
- The five potential measures being identified to tackle risk that need to be considered by all the different stakeholders and within each of the seven integration strategies.

Sustainable disaster risk management integration. The research further provides conclusions regarding the aspects that are vital if sustainable integration of disaster risk management into programme implementation is to be achieved. These are:

- The perceptions, needs and capacities of urban slum dwellers, thus taking into account: (a) local coping strategies for risk reduction, self-insurance and recovery (cf. *Figure 13* and annexed glossary); and (b) local heterogeneity of social behaviour, compounded by individualistic, communitarian, hierarchical and fatalistic coping.[185]

183 While the focus of this research was on the pre-disaster context, the related conceptual outcomes can also be widely applied to post-disaster programming, that is, the integration of disaster risk management into relief, rehabilitation and reconstruction programmes (cf. discussions on linkages between relief and development [e.g. Anderson and Woodrow 1998]).

184 Note that not only the mainstreaming of disaster risk management, but also the integration of disaster risk management programming at local household level, needs to be backed up and complemented by organisational, internal and educational mainstreaming to become sustainable (cf. *Table 1*).

185 The offer of only community-based measures in communities where individualistic coping strategies prevail can, for instance, negatively influence the sustainability of programmes.

- The perceptions, needs and capacities of organisations servicing slum communities, thus taking into account their institutional settings, capacities and core work.
- The combined financial support provided by international, national and municipal organisations for strategies and related measures at both local household and institutional levels.

Extended academic and policy discussions. Apart from advancing discourses on risk and sustainable disaster risk management integration, the following research outcomes also contribute to the existing body of knowledge and open up new discussions:

- Thorough description and systematisation of the ways in which urban lives and livelihoods are affected by disasters,[186] as well as of the efforts[187] and personal financial resources invested by poor urban households in coping with risk and disasters.
- Identification and analysis of the separation of disaster risk management and settlement development programming, which can lead to an increase in the risk faced by the urban poor. This separation was recognised as being only identical in parts to the generic challenges to mainstreaming disaster risk management within development work. Additional reasons encountered relate to sector-specific barriers regarding social housing and urban planning.
- Demonstration that disasters and resultant distress can push forward the integration process of disaster risk management and settlement development planning. However, it was revealed that this integration process is not sustainable if it is, as is currently the case, not properly supported by international aid, governmental and public organisations.
- Illustration of the multiple scale of disaster risk management, where the different stakeholders working at local household, municipal, national, and global level interact and interfere in each other's efforts, thus constructing risk between local and global forces.

5.2.2 Discourses on settlement development planning

Since the 1940s the discourses within the field of settlement development planning and programming have undergone a gradual paradigm shift. Changes related to this shift have developed from a top-down physical design view (marked by public housing provided on a mass scale and the eradication of informal settlements) to a broad management approach, which goes beyond the sectoral issues of housing and urban planning (as elaborated in sections 2.2.1 and 2.2.2). It is

186 This outcome contributes to 'filling' a knowledge gap described, for instance, by Pelling (2003b) who states that little is known of the ways in which urban livelihoods are affected by disasters. In fact, related aspects had, as yet, mainly been studied in rural areas, especially in relation to droughts.

187 The analysis and systematisation of people's efforts to cope with risk and disasters complements and expands former studies, such as Wisner et al. (2004).

concluded that the frameworks/model developed are compatible with, and partly advance, the actual discourses and related practices of international donor and aid agencies in the sense that they:

- Provide new inputs for improved poverty reduction efforts that: (a) have over the last years, been increasingly strengthened and coordinated at the international level; and (b) now commonly include the reduction of vulnerability to disasters as an integral component.
- Substantiate the current tendency, promoted by Sector-Wide Approaches (SWAps), to link different sectors and actors and illustrate how such an approach might look in practice.
- Do not lose validity as a result of the shift towards budget support, as they can be: (a) used as a basis for defining related output and outcome indicators and stakeholders, and (b) be implemented independently of this shift in the sense that governmental and non-governmental organisations at the national and municipal level could directly apply the frameworks/model developed and/or take the lead in promoting them.
- Can assist in the improvement and scaling up of slum upgrading programmes that are promoted by international organisations.
- Complement trends towards the support of housing microfinancing for low-income households by providing input on how housing microcredits (and related subsidies and savings) could be developed to become an integral ex ante tool for disaster risk management.
- Substantiate the tendency to increase support for institutional capacity building and expand this conception by including capacity building within the donor organisations themselves.
- Are flexible enough to match the role of contemporary planning, being less about 'plan-making' as an activity fixed in time or strict regulatory control, but rather a form of action planning that can respond to change and is open to negotiation.

Apart from the aspects listed, current discourses can be expanded by the proposed conceptual shift away from conventional and traditional urban planning towards a planning framework based on the concepts of *urban environmental planning, defensible city, responsible architecture* and *urban disaster governance* (cf. section 4.3.2). This shift is important in encouraging planners to develop a sense of 'ownership' of disaster risk management. As with past paradigm shifts, this would also imply a change in the kinds of knowledge, skills and techniques that are required from these professionals.

5.2.3 Research methodology

Further conclusions can be drawn that contribute to knowledge development at the level of research methodology. In fact, the methodology used is an innovative combination of case studies, grounded theory and systems analysis, which could be used as a template for similar intersectoral and interdisciplinary investigations. Such a 'case studies–grounded theory–systems analysis approach' permits a grounded theory to be built from case study data, which is viewed and analysed as part of a system that includes causal factors and feedbacks. This is an important advancement of the linear paradigm model commonly used for axial coding, which is one of the data analysis tools of grounded theory (cf. section 3.4.2). Moreover, this approach allows theory to be built not only on any specific situation/system, but also on how this situation/system could be improved (i.e. be positively influenced).

The approach used allows investigations that cross the traditional boundaries between disciplines and sectors as regards: (a) the methods applied; (b) the research focus; (c) the heterogeneous set of practitioners and experts involved; and (d) the outcomes that are relevant to more than one discipline and/or sector (cf. section 3.1). In this context, the combined use of interviews, group discussions, walk-through analyses, observations, text reviews, questionnaires, and, importantly, research workshops and 'hands-on' practice proved to be an effective means of attaining this (cf. section 3.3).

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Finally, it is worth mentioning that this research is already contributing to and influencing the existing body of knowledge at the global, national, municipal and local levels, as evidenced by the various references to its outcomes – in relation both to settlement development planning and disaster risk management. Those references can be identified, inter alia, in related literature reference lists,[188] sector-specific Web pages,[189] and the publications of cutting-edge stakeholders and theoreticians.[190] In addition, the influence of the research on the ground can be

188 For instance, several publications elaborated during this research can be found on the course literature lists of different universities, as well as within the lists of key professional literature (e.g. 'Seminar on Building Disaster-Resilient Communities' at Muthesius University Kiel, Germany at www.martinvoss.de/muthesius/?Informations plattform:Linksammlung or of the Fraunhofer Information Centre for Environment and Construction at www.baufach information.de/publikationen.jsp?s=Entwicklungsland&pg=11&wo=z).

189 One important example is the Web page of the ProVention Consortium, which includes several links to outcomes of this research. The ProVention Consortium is supported by the World Bank and bilateral donors and hosted by the International Federation of the Red Cross and Red Crescent Societies. It is a think tank for disaster risk reduction and works closely with United Nations organisations.

190 Examples are Benson and Twigg (2007); World Watch (2007); UN-HABITAT (2007); ProVention Consortium (2007); Satterthwaite et al. (2007); as well as recent professional research articles:

- Benson and Twigg (2007:61) state that 'Christine Wamsler's Operational Framework for Integrating Risk Reduction is a detailed, comprehensive model that covers both operational and institutional dimensions, with indicators and guidance on implementation. Although written primarily for agencies working in human settlement development, it can easily be modified for use by a wider range of development organisations.' They further include Paper III on the list of key literature on interfacing disaster risk management and aspects related to construction design, building standards and site selection.

demonstrated by its actual use in practice by several international and national organisations (for details see sections 3.3.6 and 5.1.3). This ensures that its impact will not only be at a theoretical level but will also be 'translated', so that it reaches the bottom-line beneficiaries of this study, the urban poor. Moreover, the contribution of this research is reflected in the fact that some organisations have already used its outcomes as a basis for developing organisation-specific, operational tools, adapting and thus transferring them to their specific institutional settings and objectives.[191] In conclusion, the actual consideration of the research outcomes by multiple stakeholders and related initiatives can be taken as an indication of its relevance and validity.

5.3 Further research

New knowledge always leaves some uncertainties and opens up new questions, and thus has implications for subsequent research. Some potential fields of further research are now described.

The first field relates to empirical data that could be gained from the implementation of research outcomes. As different organisations are currently applying parts of the frameworks and model developed within the 'real-life' context, subsequent research could investigate in detail their experiences on the ground so that the frameworks/model can be refined. In fact, while the outcomes of this study present an important step forwards, there is a need to further develop and subsequently operationalise them. Questions that could be asked are: how can the seven conceptual strategies proposed be taken further? How can they, for in-

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- Chafe (2007) refers to the content of Papers I, V and VI, and states regarding the 'Operational Analysis and Integration Framework' that it '(…) guides aid agencies on how to best incorporate disaster risk reduction into housing and settlement development projects. It recommends ways to build safe housing, generate income through local risk reduction, make housing affordable to the most vulnerable families, and develop financial tools to sustain the aid agency itself' (World Watch 2007:129).
- Mark Pelling of the Hazards, Vulnerability and Risk Research Unit, King's College London, author in chief of chapters 7, 8 and 12 of the UN-HABITAT Global Report on Human Settlements 2007 entitled 'Enhancing Urban Safety and Security', draws on the outcomes of this research, mainly Paper II and III (e.g. box 12.4 of chapter 12 on 'Integrating disaster risk reduction, urban planning and housing in El Salvador').
- Within the section on 'community and civil society perspectives, local knowledge and coping strategies' the ProVention Consortium (2007:15–16) refers to Papers V and VI, stating, for instance, that 'too often local initiative and capacities continue to be overlooked during external interventions', as well as highlighting that 'the wealth of local risk solutions was well demonstrated by an example from San Salvador which identified more than a hundred coping strategies used by the people in a local urban community that was at risk of several hazards, including landslides. Households spent an average of 9 percent of their income on reducing risk and being prepared for recovery from hazard impacts.'
- Satterthwaite et al. (2007:47–48) include a summary of paper VI in their analysis of 'vulnerabilities of cities and the urban poor to climate variables and change'.
- Examples of recent professional research papers are Bosher et al. (2007) and Balamir (2007). The research outcomes influenced not only the studies mentioned, but were further supported by them. In fact, Bosher et al. (2007:174) state that their paper's 'discussion reinforces the results of research conducted by Wamsler (2004), which identified a lack of integration between the working fields of risk reduction and urban planning and illustrated how urban planning and the occurrence of disasters interact.'

191 An example of this is the conceptual strategy for disaster risk management of the international organisation German Agro-Action (*Deutsche Welthungerhilfe*), which was developed based on some of the outcomes of this research (Amend et al. 2006:60–66).

stance, be best 'translated' to a specific context and programme? Or how could each of the seven conceptual strategies be best implemented? How can, for instance, the curricula of a specific academic institution best be adapted to push forward the educational mainstreaming strategy (i.e. *Strategy VII*)?

The follow-up of on the ground experiences could furthermore provide the basis for research to establish, from the bottom up: (a) complementary frameworks for specific types of settlement development programming, for instance, programmes for social housing, slum upgrading, new settlement development and/or local urban governance; (b) guiding principles and/or standards for disaster risk management programming and mainstreaming;[192] (c) monitoring tools, allowing the assessment of progress in, and the effectiveness of, disaster risk management integration; and (d) appraisal methodologies to select which disaster risk management measures and strategies present the best options in terms of yielding the most significant development benefits.

Finally, this research provides partial answers to questions that could be more thoroughly investigated. These relate to broader aspects that are crucial if urban risk is to be managed effectively, such as:

- Why are urban households' coping strategies 'weaker' than those of rural households?
- How does climate change influence households' coping strategies?
- How could the private sector (be offered incentives to) get engaged in and develop housing microfinance and related disaster insurance systems so that these become an effective integral ex ante tool for disaster risk management?
- How could the research outcomes in the form of the frameworks and model presented be expanded to include other types of urban risk (i.e. others than disaster risk, such as, further climate change impacts and HIV/AIDS)? Or, how can the frameworks and model presented best be linked to existing theories and concepts on climate change adaptation and HIV/AIDS mainstreaming?

192 The outcome could be a tool comparable to 'The Sphere Project' (2004), which sets guiding principles and standards for disaster response.

References

Note that the references included in the attached research papers are not listed here.

Adger, W.N. (2006) 'Vulnerability', *Global Environmental Change* 16:268–281.

Almandoz, A. (2006) 'Urban planning and historiography in Latin America', *Progress in Planning* 65:81–123.

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Appendix A

A1. Glossary

The definitions listed in this glossary refer to the foregoing chapters and sections. These definitions do not apply across the board in all the different papers included in the appendices. This is because: (a) different terms were developed and improved throughout the thesis work; and (b) the different papers had to be adjusted to the perspectives of the journals in which they were published, as well as to current trends and international agendas.

The following definitions are drawn partly from Benson and Twigg (2004, 2007); Davis and Izadkhah (2006); Holloway (2003); UN-IATF/DR (2006); UNISDR (n.d.[a], 2004); UNDP (2004a); UN-HABITAT (2003b); Wisner et al. (2004); World Bank (2003); and World Watch (2007). However, most were expanded and adapted to reflect the research outcomes. In addition, some definitions had to be newly elaborated and are based purely on the research outcomes. Expanded or further detailed definitions are marked: [*]; newly elaborated ones are marked: [**]. Note that the glossary was elaborated to meet the needs of professionals working in disaster risk management integration and climate change adaptation, particularly where settlement development planning is involved.

Adaptation	(Continuous) modification of a system with the aim of increasing its ability to respond and adjust to the actual or potential impacts of changing climatic conditions and thus reduce harm and exploit opportunities.
Aid organisation	Organisations that support or directly implement programmes in developing countries that aim to alleviate poverty and/or reduce related harm. They can include both governmental and non-governmental development and relief organisations which, in turn, can be specialised in different sectors, such as health or social housing. Note that in this study the terms 'organisation' and 'institution' are used as synonyms.
(Coping) capacity *	The means by which households, communities or organisations use available resources and abilities to tackle adverse effects that could lead to (and are caused by) a disaster. While the term usually refers only to the (coping) capacity to respond to disasters and hence to related preparedness measures, it also includes the (coping) capacity to recover from hazards/disasters, and hence is related to measures of self-insurance and recovery that they take. Note that in contrast to response, recovery includes more long-term activities related to reconstruction and rehabilitation. (Coping) capacity can further refer to: - (Coping) capacity to resist disasters, which is related to vulnerability of households, communities or institutions, and hence to the mitigation measures that they take; and - (Coping) capacity to reduce or avoid hazards, and hence is related to measures of prevention.
Coping strategies (of people living at risk) *	Constantly changing and adapting cognitive and behavioural efforts to manage disaster risk or disaster impacts on the part of households and communities at risk. These efforts influence the key variables, and their causal relations, underlying the complex system of risk and disaster occurrence in specific (slum) areas, and can be carried out deliberately or automatically/instinctively.

Coping strategies for recovery *	Measures taken by households/communities at risk to (have the capacity to) recover quickly after hazards/disasters through effective recovery mechanisms and structures. These actions are taken to recover as fast as possible from the immediate, short-term, long-term and/or delayed impacts caused, that is, to regain their former standard of living/status quo, or an even higher one. Coping strategies for recovery are directly interlinked with those for self-insurance (see below). However, not all recovery strategies are initiated in a pre-disaster context; in fact, they are mainly implemented ad hoc after hazard/disaster occurrence. Examples are the establishment of mechanisms and structures (for accessing assistance) to reconstruct and/or replace damaged, destroyed or lost belongings, assets and systems. Only some risk reduction aspects are usually considered in this context. Note that slum dwellers also use some of the economic coping strategies for recovery-for financing risk reduction measures.
Coping strategies for risk reduction **	Measures of prevention, mitigation and preparedness taken by households and communities to reduce their risk. (Slum) dwellers use these measures mainly for risk reduction during 'normal' times, that is, in a pre-disaster context, so as to be less affected by future small-scale or exceptionally large-scale disasters. However, they are partly also used during reconstruction and rehabilitation. In an ideal case, they lead to an absence of disasters, as hazard impacts will be minimal, especially if combined with coping strategies for self-insurance and recovery.
Coping strategies for self-insurance **	Measures taken by households and communities at risk that aim to build adequate capacity to recover quickly after disasters by putting in place a formal or informal security system (safeguards) for use in the event of a hazard/disaster. In other words, it is the creation or maintenance of security systems that help them access as fast as possible sources of financing or mutual social help in the event of a hazard/disaster. Examples of financing sources are (illegally accessed) compensation from formal insurance, or the selling price of assets. Mutual help can include offering refuge, temporary custody of children, fostering a child, and assistance for washing and cleaning. In other words, to insure themselves, (slum) dwellers take pre-disaster action in the hope of obtaining direct or indirect compensation if a hazard/disaster leads to death, injury or loss of property or income. They thus ensure that they can 'bounce back' faster than if they do not have self-insurance to regain their former standard of living/status quo, or an even higher one.
Development programmes/ programming	Development programmes are initiatives in developing countries supported and/or implemented by so-called development organisations with the aim of alleviating poverty and achieving sustainable development through different sector support. Development programming is the act of supporting and implementing such sector-specific programmes (or programme components). Their focus is, as such, on the developmental context (i.e. not relief, rehabilitation or reconstruction). Note that in this study the terms 'programme' and 'project' are used as synonyms.
Disaster ('natural')	Serious disruption triggered, amongst other things, by a natural hazard causing substantial damage, disruption and possible casualties, and leaving the affected communities unable to function normally without outside assistance. It includes everyday and large-scale disasters. A disaster occurs when hazards strike in vulnerable areas where inhabitants have little coping capacity. Disaster management literature commonly distinguishes rapid-onset disasters, such as water surges or earthquakes, which cause immediate loss and disruption, and slow-onset events, notably drought.
Disaster Risk Management (DRM) *	Range of activities/programmes to minimise the likelihood, intensity or frequency of a disastrous occurrence, preferably carried out before potential

	disasters take place. Disaster risk management is thus the generic term for measures of: (1) prevention, (2) mitigation, (3) preparedness, (4) risk 'financing' and (5) stand-by for recovery. Risk assessment is not listed separately as it is understood as an inherent part of all five measures that is needed for identifying and planning related activities. Disaster risk management can be implemented and is essential before, during and after disasters. However, within the framework of this study, the term mainly pertains to the development (i.e. pre-disaster) context. The term thus does not refer to post-disaster actions such as relief (i.e. immediate emergency assistance to save lives and minimise disruptions), rehabilitation (i.e. restoring 'normal' activities within around two years after disaster); and reconstruction (i.e. longer-term work to restore and further improve infrastructure and services). Note that if risk is defined as listed in this glossary, the terms 'disaster risk management' and 'disaster risk reduction' can be understood as being synonymous.
Disaster risk management (DRM) programmes/ programming	Programme or programme components that aim to improve existing disaster risk management. Disaster risk management programming is hence the act of supporting and implementing such dedicated sector-specific programmes (or programme components). The integration of disaster risk management programming into sector-specific programmes includes 'direct stand-alone DRM' and 'direct integrated DRM', which to become sustainable should be complemented by organisational, internal and educational mainstreaming, as well as synergy creation for DRM (see *Table 1*). Note that in this study the terms 'programme' and 'project' are used as synonyms.
Discipline	Refers mainly to academic fields of studies/specialisations, such as architecture, urban planning, philosophy, theology, law, disaster studies, development studies, sociology, psychology, and economics. In comparison, disaster risk management and settlement development planning are understood to be working fields or sectors that are related to different disciplines. Note that in this context disaster risk management is also understood to be a cross-cutting topic to be integrated into different disciplines and sectors.
Hazard (natural)	A natural hazard may cause a 'natural' disaster (of both small or large scale). It is a geological, atmospheric, or hydrological event (e.g. earthquake, landslide, volcanic eruption, windstorm, wild fire, drought, flood, and water surge) that has the potential to cause harm or loss (e.g. death or injury, property damage, social and economic disruption, environmental degradation). Natural hazards are not necessarily caused by purely natural forces. In fact, human activity can also contribute to their creation. A landslide caused by environmental degradation is one example of such a 'human-induced hazard'.
Household	Group of people, consisting of the members of a family who live together along with non-relatives, occupying one living space. The latter refers to the constructions, composed of a single dwelling or conjoined houses that are built on one plot.
Integrating/integration of disaster risk management (DRM) **	Integration of disaster risk management aspects into the work of aid organisations, here, with a focus on development organisations. This includes disaster risk management mainstreaming as well as disaster risk management programming (see *Table 1*).
Mainstreaming of disaster risk management (DRM) *	Generally, the term 'mainstreaming' signifies the modification of a specific type of core work of an aid organisation (e.g. modification of the social housing activities of a specialised development organisations) in order to take into account a new aspect (e.g. disaster risk management) and to act indirectly upon it. Thus, 'mainstreaming' does not mean to completely change an organisation's core functions and responsibilities, but instead to

	view them from a different perspective and to make any necessary modifications/amendments, as appropriate. Thus, the integration of completely new sector-strange programmes or programme components is not part of mainstreaming (cf. DRM programming). There are different complementary strategies for mainstreaming: programmatic, organisational, internal and educational mainstreaming, as well as synergy creation for DRM (see *Table 1*).
Mitigation *	Measures to (increase the capacity to) minimise the vulnerability of households, communities and/or institutions, thus reducing existing disaster risk. These measures can support and be built on local coping strategies for risk reduction. Mitigation is part of disaster risk management (see above).
Planner	Umbrella term for professional groups of architects, urban planners, engineers and other settlement developers. They are among the stakeholders that are engaged in urban development (i.e. urban development actors).
Preparedness *	Measures to (increase the capacity to) establish effective response mechanisms and structures of households, communities and/or institutions so that they can react effectively during and in the immediate aftermath of potential hazards/disasters, thus reducing existing disaster risk. These measures can support and be built on local coping strategies for risk reduction. Preparedness is part of disaster risk management (see above).
Prevention *	Measures to (increase the capacity to) avoid hazards or reduce the potential intensity and frequency of human-induced hazards that threaten households, communities and/or institutions, thus reducing existing disaster risk. The potential intensity can refer to both time span and magnitude of hazards. These measures can support and be built on local coping strategies for risk reduction. Prevention is part of disaster risk management (see above).
Resilience	Capacity of a community, system, or society to withstand/resist hazards and/or disasters, and thus maintain an acceptable functional and structural standard – even in the case of a hazardous/disastrous occurrence – by 'bouncing back' rapidly, as well as adapting so as to be able to deal adequately with future threats. To put it simply, resilience is the opposite/antithesis of vulnerability. More precisely, it reflects a functioning disaster risk management system that works before, during and after disasters. The idea of resilience suggests a proactive stance towards risk. It has its origin partly within ecological theory and also partly in systems analysis and disaster studies.
Risk *	The probability of harmful consequences or losses (e.g. deaths, injuries, property damages, social and economic disruption, environmental degradation) resulting from interactions between natural and human-induced hazards (H), vulnerable conditions (V), and the lack of capacity of households/communities/institutions to respond to (LC_{Res}) and recover from (LC_{Rec}) disasters. Thus, risk is expressed by $R=H*V*LC_{Res}*LC_{Rec}$. Alternatively, the risk definition provided can also be expressed through the conventionally used equations $R=H*V$, $R=H*V/C$ or $R=H*V*LC$, but only if the definitions of variables V, C and LC are adapted, respectively, to take into account the capacity to both respond and recover from hazards and disasters. Note that in this study the terms 'risk' and 'disaster risk' are used as synonyms.
Risk financing (risk transfer/sharing)	Financial instruments of disaster risk management which aim to assure readily available post-disaster funds (e.g. through formal insurance systems). These instruments are conventionally called 'risk transfer' or 'risk sharing' as risk of individuals or organisations is partly 'transferred to' or 'shared with' other parties.
Risk 'financing' **	Measures 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 them to obtain 'readily available' compensation. The aim is to recover from hazard or disaster impacts, that is, to 'bounce back' quickly and to a reasonable level. These measures can support and be built on local coping strategies for self-insurance. In contrast to the conventionally used term 'risk financing' (see above), this measure includes formal *and* informal, and monetary *and* non-monetary mechanisms. Examples are formal and informal disaster insurance systems. Risk 'financing' measures are part of disaster risk management (see above).
Risk management	Here, used mainly as a synonym for disaster risk management.
(Disaster) risk reduction *	Popular term used to bring together all measures that aim to minimise disaster risk throughout a society. As with disaster risk management, risk reduction can be implemented and is essential before, during and after disasters. However, within the framework of this study, the term pertains mainly to the development, pre-disaster context. If risk is defined as described in this glossary (see above), disaster risk management and disaster risk reduction can be understood as being synonymous, and thus to include prevention, mitigation, preparedness, risk 'financing', and stand-by for recovery. If, however, the conventional risk definition $R=H*V$ is applied, in contrast with disaster risk management, risk reduction would not include risk 'financing' and stand-by for recovery.
Settlement development planning	In the context of the research focus, settlement development planning mainly refers to bottom-up planning exercised within the framework of development programming, through social housing, slum upgrading, settlement planning and/or local urban governance programmes. However, in this study related analyses also include other, more top-down and broader, approaches. Note that some of the annexed papers use alternative, more far-reaching terms, such as 'urban planning', 'human settlement development', and/or 'urban development planning'. Note also that, in this context, Paper I provides a wider definition of the term urban planning: 'the term (urban) planning includes the provision of housing, infrastructure and basic services. Planning is the "public forethought and conscious involvement preceding the pursuit of community-determined action, achieving social goals for the common good in both the public and private domain" (Riddell 2004:XV). It "includes the way places work and matters such as community safety, as well as how they look. It concerns the connections between people and places, movement and urban form, nature and the built fabric, and the processes for ensuring successful villages, towns and cities" (DETR 2000:8).'
Settlement development programmes/ programming	Programmes focused on supporting or directly providing social housing, slum upgrading, settlement planning and/or local urban governance. Settlement development programming is thus the act of supporting and implementing such sector-specific development programmes. Note that in this study the term 'programme' and 'project' are used as synonyms.
Slum	The term is used for poor-quality settlements and shelters. Typically, this would be locations with substandard housing and without access to adequate drinking water, sanitation, and security of land tenure, electricity and sewerage. The term also embraces shelters that are serviced but located in a dangerous place. Note that the terms 'slum' and 'low-income settlement' in this study are used synonymously, as are 'shelter' and 'social housing'.
Social housing/ planning organisation	Organisations that work in settlement development planning and whose core work is related to social housing and/or settlement planning, and which are thus a specialised subgroup of urban development actors (see below). They include both governmental and non-governmental organisations. Note that in this study the terms 'organisation' and 'institution' are used as synonyms.

Stand-by for recovery **	Measures to (increase the capacity to) establish appropriate recovery mechanisms and structures for households, communities and institutions that are accessible after a potential hazard/disaster. The aim is to recover from hazard or disaster impacts, that is, to 'bounce back' quickly and to a reasonable level through appropriate recovery mechanisms and structures. These mechanisms and structures relate to the rehabilitation and reconstruction of damaged, destroyed or lost belongings, assets, structures and systems. They can support and be built on local coping strategies for recovery. Stand-by-for-recovery measures are part of disaster risk management (see above).
Urban development actors	Umbrella term for stakeholders/organisations that work at the international, national, municipal and local household level in the field of settlement development planning and/or programming (without necessarily specialising in this sector). Social housing/planning organisations are a more specific subgroup (see above). Note that in this study the terms 'organisation' and 'institution' are used as synonyms.
Urban governance	Exercise of economic, political and administrative authority to manage a country's affairs at all levels – here, especially in relation to social housing, upgrading, and (local) settlement planning and development. It comprises related mechanisms, processes and institutions, through which citizens and groups articulate their interests, exercise their legal rights, meet their obligations and take action to mediate their differences. Good governance is, among other things, participatory, transparent and accountable. It is also effective and equitable and promotes the rule of law. Good governance ensures that political, social and economic priorities are based on a broad consensus in society and that the voices of the poorest and the most vulnerable are heard in decision-making, for instance, in decision-making over the allocation of resources for settlement development planning and disaster risk management.
Urban planning	See above under 'settlement development planning'.
Vulnerability *	Degree to which systems (i.e. households, communities and/or organisations) are susceptible to loss, damage, suffering and death in the event of a 'natural' hazard/disaster. It thus describes the existing condition and setting of an area exposed to hazards, where a vulnerable area is understood to being incapable of resisting their impacts. Both vulnerability and its opposite/antithesis, resilience, are determined by physical, social, economic, environmental, organisational and institutional factors that are the result of human conduct. An example of physical vulnerability is the susceptibility to hazards of the built environment (including technical and social infrastructure). Examples of social vulnerability are influenced by the levels of literacy and education, compliance with laws, systems of good governance, access to basic human rights, existence of peace and security, and the existing traditional values and ideological beliefs. Economic vulnerability characterises, for instance, a local economy with high levels of corruption and lacking a diverse productive base, as well as less privileged people who suffer proportionally larger losses. 'Less privileged' relates to class or caste, ethnic minorities, the very young and old, the disadvantaged, and are often women who are primarily responsible for providing essential shelter and basic needs for their families. Environmental vulnerability refers to the extent of natural resource degradation (e.g. contaminated air, water and soil caused by inadequate sanitation). Examples of organisational and institutional vulnerability are the lack of institutions, related organisational structures, laws and regulations for disaster risk management or secure social housing provision, as well as the lack of inter-institutional cooperation and learning.

Working field/sector	Area of activity that is not (necessarily) an academic discipline. Examples are disaster risk management and settlement development planning. Settlement development planning can further be understood as being part of the development sector 'urban development' (sometimes also called 'urban settlement development' or 'urban development planning'). Note that in this context disaster risk management is understood to be a cross-cutting topic to be integrated into different disciplines and sectors. Further note that in this study the terms 'working field' and 'field of activity' are used as synonyms.

A2. Research matrix

Title **Subtitle**	Managing urban disaster risk Analysis and adaptation frameworks for integrated settlement development programming for the urban poor.
Purpose	To provide a better understanding of the challenges of increasing disaster risk and its impact on the living conditions of the urban poor, as well as to develop new conceptual and strategic approaches to face those challenges.
Overall research objective	To enhance and develop new knowledge and innovative ways in which urban development actors can contribute more effectively to disaster risk management, thus demonstrating their role and potential within this field of activity.
Expected outcome	Provision of knowledge, concepts and strategies to increase the potential of settlement development programming for disaster risk management, in order to assist in decreasing urban risk – and thus post-disaster destructions, forced evictions and relocations – and poverty.
Overall research question	How can disaster risk management be properly integrated into settlement development programming?

Main research questions	**Subresearch questions**	**Information/data needed**
What is the relationship between the working fields of disaster risk management and settlement development planning?	**A. Focus of investigation: understanding the particular setting and search for causal explanations**	
	1.1 How is the existing situation? (=descriptive, that is, the description of current situation)	**1.1.1** Existing dedicated disaster risk management programmes/programming **1.1.2** Existing dedicated settlement development programmes/programming **1.1.3** Existing integrated programmes/programming **1.1.4** Interrelation of related institutional and organisational structures and legislation (e.g. organisations, policies and codes for settlement development planning and/or disaster risk management and related programmes) **1.1.5** Perceptions of the existing intersection and interrelationship of the staff involved (both sectors) (e.g. separated or integral, positive or negative, interest in cooperation or not)
	1.2 Why is the current situation like this? And what influences or influenced the degree of integration/separation positively or negatively? (=explanatory, that is, explanation of current situation)	**1.2.1** Interinstitutional, intersectoral and interdisciplinary barriers (cf. 1.1.3 – 1.1.5) **1.2.2** Knowledge of stakeholders of disaster risk management and settlement development planning as regards the respective other working field, as well as of the interlinkages between disasters and urban settlement development (cf. questions 1.1.1, 1.1.2 and 3) **1.2.3** Historical development of the working fields and the related programmes **1.2.4** Problems, needs and capacities of organisations working in settlement development planning to further include disaster risk management within their spheres of activity. **1.2.5** Related challenges at and among the global, national, municipal and household level.

What is the potential to improve risk reduction and risk financing through settlement development programming?	**2.1** What kind of approaches to reduce risk or finance risk are existent in relation to settlement development planning (i.e. are already implemented)? (=descriptive, that is, the description of existent intersection)	**2.1.1** Existing measures elaborated within both programmes for settlement development planning and disaster risk management (= overlapping measures) **2.1.2** Related objectives, strategies, concepts and terminology used within programmes for settlement development planning and programmes for disaster risk management (= overlapping institutional/organisational approaches) **2.1.3** Related tools and methods used within programmes for settlement development planning and programmes for disaster risk management (= overlapping programmatic approaches)
	B. Focus of investigation: identifying the unanticipated phenomena	
	2.2 What other disaster risk management measures in the field of settlement development are further possible? (=exploratory, that is, the description of potential intersection)	**2.2.1** Match of approaches (see 2.1) with existing problems, needs and capacities at local level, that is, problems, needs and capacities of people/communities living at risk to cope with disaster risk and disaster occurrence (cf. answers to question 3) **2.2.2** Match of approaches (see 2.1) with existing problems, needs and capacities at institutional level (i.e. of organisations working at global, national, municipal and/or household level) (cf. answers to question 1.2). **2.2.3** Lessons learned from existing (successful) approaches/programmes located in other regional areas **2.2.4** Post-disaster disaster risk management measures (applied within the context of reconstruction, rehabilitation, and/or recovery programmes)
	2.3 How can the identified measures (cf. 2.1 and 2.2) be successfully combined or integrated? (=explanatory and exploratory)	**2.3.1** The 'ideal' programme type: conceptual strategy for combining disaster risk management and settlement development planning measures within settlement development programming, thus overcoming challenges and gaps identified (theoretical, ideal intersection) **2.3.2** Why is this 'ideal' programme type (cf. 2.3.1) not 'reality?' (comparison with outcomes from questions 1 and 2)
What are the interlinkages between disasters and urban settlement development?	**3.1** How does the occurrence of disasters affect low-income settlements – as well as related building and planning practices? (=explanatory)	**3.1.1** Direct correlation perceived and analysed at the different research levels (compare with 2.2) **3.1.2** Indirect correlation perceived and analysed at the different research levels (compare with 2.2)
	3.2 How do low-income settlements – as well as related building and planning practices – affect disaster occurrence? (=explanatory)	**3.2.1** Direct correlation perceived and analysed at the different research levels (compare with 2.2) **3.2.2** Indirect correlation perceived and analysed at the different research levels (compare with 2.2)

A3. Interview protocols

In the following, the different interview protocols used at the global, national/municipal and local household level are presented. Note that not all the listed questions were always used as the protocols were generally adapted to the respective interviewee/organisation.

A3–1) Basic interview protocol for the global research level

1) Could you give some short background information about yourself, your professional background/career and your position within your organisation?

2) Could you give some background information about the department you work in?

- Number of employees (office/field) ⇔ total number of staff.
- Professional background of employees.
- Historical developments of and changes in department: since when, name, structure, etc.
- Historical developments of and changes in working field.
- Role and function within the organisation ⇔ organisational policy and priorities, internal co-operation, responsibility-share, part of relief or development, allocation of money, budget.
- Basic working concepts.

3) Could you describe your activities/projects in the field?

- Number of activities; de- or increasing.
- Planning steps: selection, initiation, counterparts, duration, etc.
- General vision, goal/aim, objectives.
- Focus: 'natural'/man-made disasters, pre/post, small/big ⇔ organisational focus
- Regional focus (LA) ⇔ focus of resources.
- Priorities: working level, target groups, working area: urban, rural, high-risk area
- Content: main sectors, most frequent/important measures.
- Changes.
- Methodology.
- Role of culture/country.

4) Could you describe the experience with your activities/projects in the field?

- Main results
- Positive experience: success stories/success factors.
- Negative experience: problems/failure factors.
- Effectiveness, efficiency and sustainability – correspond to existing problems, fast, reach poorest.
- Main constraints. Future challenges and trends.
- Improvement

5) Could you describe the linkages between your activities (and your department) with other activities (and other departments) in the field of disaster risk management/settlement development planning?

- Cooperation with other departments.
- Cooperation with other organisations.
- Similarities/differences in departments: priority within organisation, objectives, approaches, concepts, working procedures, employees, number and content of activities, roles within co-operation activity.
- Similarities/differences in activities.
- Unplanned correlation between activities in the field ⇒ increased vulnerability?
- Unplanned correlation between disasters, low-income settlements, urbanisation, urban settlement planning, housing.

- Existing research.

6) Could you explain the reasons behind the existing situation (cf. Nr.5)? What would cause your organisation to combine/separate disaster risk management and settlement development planning to a greater extent?

- Existing efforts.
- Combination (not) feasible/(not) useful/(not) beneficial.
- Why and how.
- Barriers: institutional, financial, inter-organisational.
- Other efforts of combination/integration: e.g. relief.

7) How do you see/how would you describe the correlation between the occurrence of 'natural' disasters and low-income settlements?

A3–2) Detailed interview protocol (global level)

- Presentation of research
- Ask for time frame of meeting
- Recording OK?
- Anonymity of person/quotations.
- Definition of activities/activities in the field

I. Personal background questions

1) Could you give me some background information about yourself and your position?
- Name, profession.
- Current department and position.
- Time working in the current position.
- Previous career within this or another organisation and/or working field.
- Academic background.
- Current tasks and responsibilities.

II. Departmental background information (disaster risk management or settlement development planning department respectively)

2) How many employees work within the department? Professional background?
- Office. Organisation.
- In the field.
- Professional background

3) Could you describe the development of the department and its working field within the organisation?
- Since when.
- Renamed.
- Departmental changes
- Same activities within another department.

4) Could you describe the role and situation of the department within the organisation?
- Policy or mandate.
- Organigram of organisation.
- Money allocation.
- Responsibility for activities.

5) What are the basic working concepts of the department?
- Visions, goals and objectives.
- Technical terms/concepts
- Basis
- Internal working papers.

6) Could you describe the general organisation and the planning steps of the activities that you elaborate?
- General organisation of the activities. Organisational chart.

- Counterparts.
- Working levels. Linkages.
- Are there linkages between the different levels? What linkages?
- Creation of new projects. Organisation and assessments.
- Lengths.

III. Concrete information about activities in the field (settlement development planning or disaster risk management activities respectively)

7) How many activities are elaborated, and where?
- Increasing/decreasing.
- Geographical focus.
- Latin America. El Salvador.

8) Could you describe me the general focus as well as the main target group of your activities?
- 'Natural' or man-made disasters.
- Pre or post-disaster
- 'Natural' disasters or general environmental risks, accidents, diseases.
- Large or small-scale disasters.
- Poverty reduction
- Change of focus.
- Most at risk/vulnerable.
- Cities or countryside.
- Low- or middle income.

9) What concrete activities do you carry out? How (methodology)?
- Most frequent activities.
- Most important/typical.
- Concrete measures. Changes.
- Coping mechanisms.
- Livelihood approach.
- General approach? Community-based.
- GIS.
- High-risk areas.
- Laws and codes.
- Disaster risk management: more mitigation, prevention or preparedness.
- Settlement development plannning: new houses or improvement.
- Urban or rural areas.
- Countries.

IV. Evaluation of activities (settlement development planning or disaster risk management activities, respectively): success and failure factors, general problems

10) How do you evaluate the activities?
- Correspond to the existing problems. Reach the poorest. Fast.
- Main results.
- Good, bad, improvement.
- Quantifiable benefits.
- Further measures needed.
- Sustainability.
- Best activity.

11) Based on your experience, what are the success or failure factors?
- Indicators.
- Biggest success story.
- New ideas/approaches.
- Main constraints.

V. Other type of activities (settlement development planning or disaster risk management activities respectively): linkages and comparison

12) Do you cooperate actively with other departments? (with their respective other working field)
- Why.
- How.

- Efficient cooperation work. Yes/no. Why (different roles, etc.).

13) What type of activities do 'the others' (i.e. other working field) perform? Are these similar regarding objectives, approaches, concepts, working procedures, employees, etc.? Why?
- Activities.
- More or fewer activities. Why.

14) How do you see the relationship between disaster risk management and settlement development planning activities/departments? Is there an interest in changing it/need to change it?
- Good/positive or bad/negative.
- Change needed/initiated.

15) Do you believe that it theoretically possible and/or useful to combine (more) disaster risk management and settlement development planning activities? What would be the barriers?
- Feasible/beneficial. How.
- Institutional or administrative barriers.
- Public demand.
- How to increase interest.

VI. General linkages between settlement development planning and disaster risk management? (research/opinion)

16) Could you describe the (unplanned) correlation between the activities in settlement development planning and activities in disaster risk management?
- Disaster risk management activities that influence living in settlements.
- Settlement development planning activities that influence disasters.
- Policies and institutional mandates.

17) What is the mutual influence of low-income settlements, urban settlement planning and disasters?
- Disasters.
- Low-income settlements.
- Urban planning.
- Living in low-income settlements.
- Urbanisation.
- Housing sector.
- Existing research.
- Available information.

A3–3) Interview protocol for key informants (global level)

1) What is the general relationship between development assistance in the settlement development planning and disaster risk management?
- Actors.
- Cooperation between specialised institutions or departments.
- Roles.
- Objectives.
- Budget.
- Staff.
- Working concepts.
- Number of activities.
- Changes over time.
- Trends.

2) What factors positively or negatively impact this relationship?
- Institutional, financial or technical barriers, etc

3) What risk reduction activities exist in the field of settlement development planning? (Intersection)
- Own organisation and others
- Main sectors
- Success and failure factors

4) What are further potential risk reduction activities in the field of settlement development planning? (potential intersection)

5) ⇔ What is the detailed existing correlation between 'natural' disasters and low-income settlements (urban settlement planning, urbanisation, the housing sector)?

6) Is there an unplanned correlation between the activities in the field of disaster risk management and settlement development planning, resulting in increasing vulnerability of the poor?

7) What 'real' and potential linkages exist between the international, city and neighbourhood level (flow of knowledge)

8) Would a (stronger) combination of pre-disaster activities in the field of disaster risk management and settlement development planning improve the existing activities/situation? If yes – how?

A3–4) First detailed interview protocol for national and municipal level

I. Información de base

1. Información personal
   - ¿Cuál es su nombre, profesión y posición?

2. Información institucional
   - ¿Me podría dar información general sobre su organización? (¿desde cuando existe? ¿cuál es el mandato/misión y los objetivos principales?)
   - ¿Qué documentos legales forman la base de las iniciativas desarrolladas?
   - ¿En qué ámbitos de trabajo su organización se enfoca? (¿en ayuda de desarrollo, ayuda humanitaria, rehabilitación y reconstrucción, o gestión de riesgo?
   - ¿Se considera gestión de riesgo como un área de trabajo independiente o parte de ayuda humanitaria, ayuda de desarrollo o rehabilitación y reconstrucción?

II. Importancia de planificación/desarrollo de assentamientos (PDA) y/o de la gestión de riesgo (GR) en la organización

3. Información sobre el departamento (PDA/GR)
   - ¿Tiene su organización departamentos especializados en PDA o GR? (¿Organigrama?)
   - ¿Me podría describir el desarrollo de éste departamento? (¿desde cuando existe?, ¿hubo cambios de objetivos o de contenidos de los proyectos?)
   - ¿El establecimiento de éste departamento y/o sus actividades se basan en un documento legal? ¿Cuál?
   - ¿Me podría describir el rol de éste departamento dentro de su organización (¿número de empleados?, ¿financiamiento?)?

4. Información sobre iniciativas en el ámbito de PDA/GR
   - ¿Cuantos proyectos implementa su organización actualmente en PDA/GR?
   - ¿Cuál es el grupo meta de éstas iniciativas?
   - ¿De dónde proviene el financiamiento? ¿Existe cooperación con otras organizaciones?
   - ¿Estos proyectos se encuentran en áreas de riesgo? ¿Qué tipo de riesgo (terremotos, inundaciones, huracanes, deslizamientos, erupciones volcánicas, fuegos, otros?)
   - Los proyectos, ¿se desarrollan en asentamientos precarios ilegales (área urbana, rural, semiurbana?)? ¿Cómo se llaman las áreas?
   - ¿Cuál es la influencia/el impacto de las iniciativas a nivel municipal/nacional/regional?
   - ¿Qué tipo de actividades se implementan? (¿sector de salud, agricultura, vivienda? ¿actividades de educación, técnicas, etc.?)

III. Integración de PDA ⇔GR en las iniciativas existentes

5. Evaluación de los proyectos PDA/GR
   - ¿Dentro de sus actividades de PDA/GR se integran actividades en el ámbito de GR/PDA? ¿Cuáles? ¿Por qué no/si?
   - ¿Cómo describiría las experiencias positivas/negativas de las iniciativas?
   - ¿Qué tipo de problemas existen?

- ¿Cuáles son los factores críticos de éxito/factores de fracaso?

IV. Factores que influyen la integración PDA ⇔ GR en las iniciativas

6. Diferencias y conocimiento

- ¿Qué similitudes existen o pueden ser identificadas entre proyectos/instituciones de GR/PDA?
- ¿Qué diferencias existen o pueden ser identificadas entre proyectos/instituciones de GR/PDA que hacen una cooperación/integración difícil (¿conceptos de trabajo, procedimientos de planificación que utilizan para la elaboración de las iniciativas?)?
- En el mandato de su organización, ¿se menciona también GR/PDA?

7. Experiencias

- ¿Conoce usted otras organizaciones en su país que trabajen en vivienda y planificación urbana (proyectos de desarrollo)/área de gestión de riesgo? ¿Y en América Central?
- ¿Existen muchas/pocas iniciativas integrales? ¿Por qué? (¿falta de compromisos políticos o falta de interés y acción de los actores de GR/PDA?)
- ¿Conoce proyectos que aumentaron vulnerabilidades por no haber integrado GR/PDA?

8. Percepciones

- ¿Cuál es la correlación entre la ocurrencia de desastres 'naturales', planificación urbana, y asentamientos precarios?
- ¿Sería posible/necesario de integrar más la GR/PDA en el ámbito de PDA/GR?
- ¿Cómo se podrían integrar más las áreas de trabajo de PDA/GR? ¿Cuáles son los factores claves?
- ¿Cuál es la relación entre desastres cotidianos y desastres de alta magnitud?

V. La institucionalización y legalisación de PDA/GR

9. Estructura institucional a nivel nacional y municipal

- ¿Cuáles organizaciones estatales son los responsables para la planificación urbana y de vivienda/para la gestión de riesgo? ¿Quien tiene el mandato para GR/PDA?
- ¿Cuáles son los procesos de decisión en el ámbito de planificación urbana y de vivienda/de gestión de riesgo?
- ¿Cuál es la importancia/interés de GR/PDA en el gobierno? (¿financiamiento?)
- ¿Hubo cambios del rol o de la importancia dentro de los últimos años? (¿Cuál fue el desarrollo histórico de planificación urbana y la gestión de riesgo?)
- ¿Cuál es el rol de los municipios en PDA/GR?
- ¿Cuál es el rol de la población en PDA/GR? ¿Puede la población participar en la planificación de los asentamientos? ¿Cómo?

10. Documentos legales a nivel nacional y municipal

- ¿Cuáles documentos legales presentan la base para PDA/GR en El Salvador (normas para la construcción de nuevas construcciones, la intervención en asentamientos existentes, la industria de seguros, la prevención de riesgos, el desarrollo, el uso de suelo, el medio ambiente, etc.)?
- ¿Quién desarrolló éstas normas? ¿En qué año y sobre que base de información? (¿normas importadas? ¿experiencias con desastres? ¿mapas de riesgo? ¿clasificación de edificios?)
- ¿Estas normas están obligatorias? ¿Para quién?
- ¿Cuál es el nivel de fiscalización? ¿Cuáles son los problemas de fiscalización? ¿Capacidad de las personas encargadas de la fiscalización? ¿Rol de seguros? ¿Suficiente personal para la fiscalización? ¿Posibilidad de transferir el control de las normas al sector privado? ¿Existencia de un registro de nuevas construcciones y de arquitectos, etc.? ¿Corrupción en la fiscalización? ¿Control de calidad de materiales? ¿Capacidad de arquitectos, constructoras etc. para cumplir con las normas?
- ¿Cuáles son los procedimientos de fiscalización?
- ¿Quién tiene la responsabilidad de implementar/controlar la fiscalización (instituciones y profesionales)? ¿Esta responsabilidad está definida en una norma? ¿Cual?
- ¿Son las normas adecuadas? ¿Qué tipo de desastres están considerados? ¿Cómo es la complejidad de las normas? ¿Hay una falta de normas?
- ¿Según usted, leyes y normativas tienen el potencial de mejorar la situación de asentamientos precarios en riesgo reduciendo las vulnerabilidades existentes? ¿Cómo? ¿También en asenta-

mientos ilegales? ¿Existen experiencias positivas con normas teniendo una influencia positiva sobre la vulnerabilidad existente de asentamientos precarios?
- ¿Cual es el grado de la sensibilización de los habitantes respecto al cumplimiento con las normas?
- ¿Existen seguros que promueven gestión de riesgo? ¿Cuál es su cobertura? ¿Cuál es el número de empresas de seguro? ¿Son seguros privados o estatales? ¿Tienen seguros para comunidades o individuales? ¿Se aplican ha asentamientos precarios?

11. Rol de profesionales

- ¿Pueden arquitectos, urbanizadores y planificadores influir en la gestión de riesgo de asentamientos precarios? ¿Por qué? ¿Cómo?

VI. Integración de PDA ⇔GR en la legislación e institucionalización

12. Similitudes y diferencias de normas de GR y PDA

- ¿Están interconectadas las diferentes normas/instituciones de GR y de PDA?

VII. La situación a nivel local

13. Asentamientos precarios en áreas de riesgo

- ¿Qué tipo de desastres 'naturales' ocurre con mayor frecuencia? ¿Por qué?
- ¿Cuáles son los factores que influyen el nivel de riesgo en asentamientos precarios?
- ¿Cuál es el proceso de acumulación de riesgos?
- ¿Qué estrategias locales de adaptación se implementan/desarrollan?
- ¿Los habitantes consideran su asentamiento/casa seguro o inseguro? ¿Por qué?
- ¿Cuánto tiempo dedican los habitantes a mejoramientos y mantenimiento de su asentamiento/casa?
- ¿Qué se debería hacer para aumentar la seguridad de las casas/los asentamientos?
- ¿Hay un lugar en el que los habitantes se sienten particularmente inseguros/seguros? ¿Por qué?
- ¿En cuáles meses existe más/menos seguridad/inseguridad? ¿Por qué?
- ¿Qué tipos de iniciativas existen en el ámbito de GR/PDA?
- ¿Cuál fue el rol de medidas de PDA para la reducción de riesgos?
- ¿Cuáles fueron los resultados de éstas iniciativas?
- ¿Tiene algunas sugerencias para actividades futuras?

A3–5) Second interview protocol for national and municipal level, for organisations working in settlement development planning

(PREGUNTA OPCIONAL) Como parte de sus proyectos de gestión de riesgo y/o de vivienda social/planificación urbana, ¿usted ha desarrollado análisis de riesgos locales? Si/No. (Posibilidad de obtener el estudio) Desde la perspectiva local, ¿cuáles fueron los resultados respecto a ...

- la percepción local de los riesgos/desastres existentes (priorización)?;
- las causas de los riesgos/desastres existentes?;
- la relación de los riesgos/desastres existentes con vivienda y planificación urbana?
- la importancia/el rol de la vivienda y planificación urbana?

I. Seguimiento de A3–4

1) ¿Estuvo su organización afectada por los últimos desastres? Ej. Pérdidas financieras, personal afectado, oficinas dañadas, etc. Por favor describa brevemente.

2) En éste momento, ¿su organización tiene proyectos enfocados en el tema de la gestión de riesgo?

3) Por favor describa brevemente qué tipo de actividades de gestión de riesgo desarrolla su organización en tales proyectos de gestión de riesgo.

4) ¿Su organización tiene proyectos enfocados en vivienda social/planificación urbana?

5) ¿Éstos también incluyen componentes de gestión de riesgo?

6) Por favor describa brevemente qué tipo de actividades de gestión de riesgo desarrolla su organización en sus proyectos de vivienda social/planificación urbana.

7) Además de tales actividades para reducir riesgos, ¿también tiene actividades que reducen riesgos de una forma más indirecta?

8) Además, ¿qué actividades de gestión de riesgo potenciales (no aplicadas) se podrían incluir en sus proyectos de vivienda social/planificación urbana?

9) ¿Por qué no las implementan? ¿Cuáles serían las barreras más importantes para su implementación?

10) Según usted, ¿cuáles serían las actividades más importantes? ¿Por qué?

11) ¿Usted trabaja en sus proyectos para reducir vulnerabilidades económicas?

12) Por parte de otros actores que trabajan en el tema de vivienda social, ¿qué más se podría hacer para que futuros desastres tengan un impacto menor (medidas técnicas)? (ya en implementación y/o en teoría) Por favor describa ¿qué más se podría hacer por parte de ...

- la comunidad?;
- del gobierno local/nacional?; y/o
- de otras organizaciones?
- ¿Y qué se podría hacer por parte de las familias viviendo en áreas de riesgo?

13) En general, ¿quién debería tener la principal responsabilidad de implementar actividades de gestión de riesgo?

14) ¿Cuál sería la actividad más importante? ¿Por qué?

15) ¿Cómo se deberían financiar tales actividades?

16) ¿Tiene su organización el objetivo de introducir más el tema de gestión de riesgo en su trabajo?

17) ¿Qué planes tienen para cumplir tal objetivo? ¿Por qué?

18) ¿Usted tendría financiamiento y personal suficiente para poder introducir más el tema de gestión de riesgo?

II. Instrumentos desarrollados para incluir la gestión de riesgo

1) ¿Conoce y/o utiliza instrumentos para incluir gestión de riesgo (u otro tema) en el trabajo de desarrollo? Por favor describa.

2) ¿De qué año, contenido, estructura, (de-)limitantes, éxito, etc.?

3) ¡Presentación del instrumento operacional! ¿Cree que tal instrumento podría ser útil para su organización?

4) ¿Contenido, estructura, lógica, (de-)limitantes, interés, etc.?

5) ¿Cuáles serían las barreras más importantes para su aplicación/implementación? (barreras políticas, sociales, financieras, etc.)

6) ¿Cómo se podrían sobrepasar tales barreras?

7) ¿Sería un problema para usted de financiar la implementación de tal instrumento? ¿Por qué?

8) ¿Qué ideas tendría para poder financiar su implementación por su organización/otros actores?

III. Financiamiento de proyectos

1) ¿Cómo financia sus proyectos/actividades en gestión de riesgo?

- ¿Con micro créditos?;
- ¿Con seguros?;
- ¿Con fondos especiales?;
- ¿Con subsidios?;
- ¿Con ayuda internacional, nacional, municipal, local?

2) ¿Qué otras formas de financiamiento aplican otras organizaciones para financiar proyectos/actividades en gestión de riesgo?

3) ¿Cómo financia sus proyectos en vivienda social y planificación urbana?

- ¿Con micro créditos?;
- ¿Con seguros?;
- ¿Con fondos especiales?;
- ¿Con subsidios?;
- ¿Con ayuda internacional, nacional, municipal, local?

4) ¿Qué otras maneras de financiamiento aplican otras organizaciones para financiar proyectos en vivienda social y planificación urbana?

- ¿Organizaciones internacionales?;
- ¿Gobiernos locales/nacionales?;
- ¿Familias?

5) ¿Por qué el mecanismo de financiamiento de actividades de gestión de riesgo es diferente de los mecanismos de financiamiento de vivienda social?

IV. Otros aspectos financieros

1) ¿Tiene su organización algún tipo de mecanismo para financiar pérdidas de desastres o compartir riesgos? Por favor describa.

- ¿Seguros?
- ¿Fondos especiales?
- ¿Subsidios?

2) ¿Piensa que algo (más) se podría hacer para que las pérdidas financieras de futuros desastres sean mejor distribuidas y/o los riesgos mejor compartidos? (ya en implementación y/o en teoría) ¿Qué podrían hacer....

- su/las organizaciones? ¿Cómo?
- familias afectadas? ¿Cómo?;
- las comunidades? ¿Cómo?;
- el gobierno local/nacional? ¿Cómo?; y/o

3) Piensa usted, que ¿sería posible de extender el mecanismo de financiamiento para viviendas (utilizado por su organización) de manera que se puedan al mismo tiempo financiar tal medidas/actividades de gestión de riesgo?

4) ¿Tiene su organización algún tipo de seguro? (automóvil, de bienes raíces, etc.)

5) ¿Conoce seguros de desastres? (funcionamiento, organizaciones que los ofrecen)

6) ¿Piensa que seguros de desastres podrían ser útil? ¿Cómo deberían funcionar para que los seguros sean útiles para:

- los beneficiarios de proyectos?
- su organización?

7) Según usted, ¿existen posibilidades para combinar mecanismos de financiamiento para viviendas con sistemas de seguro de desastres?

- ¿Micro créditos?
- ¿Fondos especiales?
- ¿Subsidios?

A3–6) Interview protocol for local household level

1) ¿Me podría describir qué tipo de riesgos afectaron su familia durante los últimos 5 años?

2) ¿Qué otros tipos de riesgos existen en su comunidad/asentamiento?

3) ¿Cómo priorizaría la importancia de los diferentes riesgos/desastres?

4) ¿Cuántas veces ocurren desastres en su comunidad/asentamiento?

5) ¿Por qué piensa que usted/su comunidad/su asentamiento está afectado por tales desastres?

6) ¿Respecto a los riesgos/desastres mencionados, cuál es el rol de su vivienda y el diseño de su asentamiento? ¿Éstos los afectan de forma negativa/positiva?

7) ¿Me podría describir más en detalle cómo vivió el último desastre y cómo lo afectó?

8) ¿Qué pérdidas tuvo? ¿Tuvo problemas para cubrir sus necesidades básicas?

9) ¿Cómo usted pudo recuperarse del desastre?

- ¿Con esfuerzos propios para recuperar?;
- ¿Con ayuda de familiares/la comunidad?;
- ¿Con ayuda del gobierno local/nacional?; y/o
- ¿Con ayuda de organizaciones?;
- ¿Con ayuda de un préstamo (de familiares, bancos, organizaciones)?;
- ¿Con el uso de ahorros y/o venta de propiedades?;
- ¿Con el recibo de compensaciones de sus pérdidas? ¿De quién?
- ¿Con remesas de familiares que trabajan en el extranjero? ¿De quién?

10) ¿Qué otro tipo de soporte técnico recibió para recuperar del desastre? ¿De quién recibió tal ayuda?

11) ¿Qué otro tipo de soporte financiero recibió para recuperar del desastre? ¿De quién recibió tal ayuda?

12) ¿Qué tipo de ayuda fue la más importante/faltó? (financiero y técnico)

13) ¿Le podría preguntar qué tipo de ingreso tiene? ¿De qué vive? (parte de II/III)

- ¿Recursos?;
- ¿Profesión – negocios – salario?;
- ¿Propiedades?

14) ¿Qué ha hecho en el pasado para protegerse de potenciales desastres? ¿Cómo? Por favor describa sus acciones. (Acciones técnicas: medidas de prevención/mitigación/preparación; acciones financieras: medidas para compartir riesgos y/o perdidas potenciales)

15) ¿Con ayuda de quién pudo realizar tales acciones para protegerse? (técnica y/o financiera)

- ¿Con su esfuerzo propio?;
- ¿Ayuda de familiares/la comunidad?;
- ¿Ayuda del gobierno local/nacional?; y/o
- ¿De organizaciones?

16) ¿Qué tipo de acción/medida usted considera fue la más importante? (de lo contrario el impacto del último desastre hubiese sido mayor)

17) ¿Qué medida importante faltó por implementarse?

18) ¿Piensa que algo (más) se podría hacer para que futuros desastres tengan un impacto menor (medidas técnicas)? (ya en implementación y/o en teoría) ¿Qué tipo de medidas? Por favor describa. ¿Cuál sería la iniciativa/medida/acción más importante?

19) ¿Cómo se deberían financiar tal iniciativas/medidas/acciones?

20) En general, ¿quién debería tener la principal responsabilidad de tomar acciones/medidas de gestión de riesgo?

- ¿Usted juntos con su familia/la comunidad?;
- ¿El gobierno local/nacional?; y/u
- ¿organizaciones?

21) ¿Cómo el gobierno y/u organizaciones de asistencia podrían motivar familias, negocios, comunidades para tomar medidas para reducir riesgos?

22) ¿Cómo se podrían incentivar a las familias para no vivir en áreas de riesgo?

Aspectos financieros

1) ¿Qué cree usted que se podría hacer para que las pérdidas de futuros desastres sean mejor distribuidas en términos financieros? (ya en implementación y/o en teoría)

2) ¿Quién debe o debería implementar éstas medidas?

3) Además, para financiar pérdidas económicas de futuros desastres, ¿qué podrían hacer....

- las familias/comunidades afectadas? ¿Cómo?;
- el gobierno local/nacional? ¿Cómo?; y/o
- las organizaciones? ¿Cómo?

4) ¿Usted tiene un tipo de seguro? (automóvil, de vida, de bienes raíces, etc.)

5) ¿Conoce seguros de desastres? (funcionamiento, organizaciones que los ofrecen)

6) ¿Piensa que seguros de desastres podrían ser útil? ¿Cómo deberían funcionar para que éstos sean útiles para usted?

A4. Questionnaires

In the following, the four different questionnaires used for the elaboration of this research are presented, focusing on a) the selection of the research focus country; b) basic background studies; c) the evaluation, validation and refinement of the 'Operational Analysis and Integration Framework'; and d) financial mechanisms regarding settlement development planning and disaster risk management.

A4–1) Questionnaire for the selection of the research focus country

Objetivo: El propósito de este cuestionario es obtener información preliminar acerca de las iniciativas dirigidas a asentamientos precarios que se desarrollan en su país, en el campo de vivienda y planificación y/o gestión local de riesgo. La información obtenida a través de este cuestionario será utilizada para asistir mí Doctorado, dirigida a la reducción de riesgos de desastres 'naturales' en asentamientos precarios. ¡**Muchas Gracias por su cooperación!**

1. Nombre: _____
2. Nombre de la organización que representa:_____
3. País:_____
4. La organización que representa desarrolla proyectos de:

	Sí, mucho	Sí, poco	No
a. Ayuda de desarrollo			
b. Ayuda Humanitaria			
c. Prevención, Preparación o Mitigación de desastres 'naturales'			
d. Rehabilitación o Reconstrucción			

5. Éstos proyectos se encuentran en áreas de riesgo de:

	Sí	No
a. Terremoto		
b. Inundaciones		
c. Huracanes		
d. Deslizamientos		
e. Erupciones volcánicas		
f. Fuegos		
g. Otros?		

6. Podría describir brevemente, de acuerdo a usted, el significado de:
   Gestión local de riesgo:_____
   Prevención:_____
   Preparación:_____
   Mitigación:_____
   Asentamientos precarios _____

7. La organización que usted representa desarrolla proyectos en asentamientos precarios:

	Sí, mucho	Sí, poco	No
a. Urbanos			
b. Rurales			

Detalles: _____

8. ¿Su organización implementa medidas de prevención, preparación y/o mitigación?
   Sí. Por favor describa_____
   _____
   No:_____
9. ¿Podría describir brevemente un proyecto típico de desarrollo de su organización que trabaja en asentamientos precarios?
   _____

_____

10. ¿Conoce usted otra(s) organización(es) en su país que trabajen en vivienda y planificación urbana (proyectos de desarrollo)?
    a. Si: _____
       Número total (aproximadamente):_____
       Nombre(s):_____
    b. No:_____
11. ¿Conoce usted otra(s) organización(es) en su país que trabajen específicamente en el área de gestión local de riesgo?
    a. Si :_____
       Número total (aproximadamente):_____
       Nombre(s):_____
    b. No:_____
12. ¿Cree usted que en su país existe interés por la gestión local de riesgo? Favor argumente su respuesta
    a. Si :_____
    b. No:_____
    c. Razón(es):_____
13. ¿Qué tipo de desastres 'naturales' ocurre con mayor frecuencia en su país? ¿Por qué?

_____

14. ¿Podría nombrar otra(s) persona(s) y/u organización(es) que trabaje en América Latina en el área de gestión local de riesgo?

_____

15. Qué otro país me recomendaría para la investigación planificada?

_____

16. Finalmente, considerando la presentación sobre mí investigación de Doctorado el lunes pasado, ¿usted y/o su organización estarían dispuestos a cooperar con el desarrollo de mí investigación si ésta se lleva cabo en su país?
    a. Si :_____
       ¿En qué podría constituir tal cooperación?:_____
    b. No:_____

Otros comentarios: _____

Nuevamente, ¡muchísimas gracias por su colaboración!

A4–2) Questionnaire for basic background studies

My country of origin: _____
Please explain the following words:

'Natural' Disaster	
Disaster Risk	
Prevention	
Mitigation	
Preparedness	
Vulnerability	
Disaster Risk Management	

A4–3) Questionnaire: operational framework for sustainable risk reduction integration into the work of aid organisations

Whilst the need to integrate disaster risk management with development aid in order to achieve sustainable poverty reduction is acknowledged amongst donors, experts and practitioners, little work has been undertaken to identify how this could be achieved. In order to meet this need, Christine Wamsler from Lund University recently elaborated an operational framework for development aid organisations. It provides general guidance for organisations working in human settlements to integrate risk reduction within their 'normal' work. From your answers to this questionnaire, it is hoped to obtain important information for the further development of the tool mentioned as regards its content, format, limits and implementation. Your contribution is of high relevance for us and all people living in risk areas around the world. Thank you very much for your kind cooperation, Christine Wamsler (christine.wamsler@hdm.lth.se)

1) For what type of organisation do you work? (Choose three alternatives)

⇒ Development organisation	⇒ Non-governmental organisation	⇒Local/municipal organisation
⇒Emergency organisation	⇒Governmental organisation	⇒National organisation
⇒Social housing organisation		⇒International organisation

2) Does your organisation work in the field of disaster risk management? (Choose one alternative)

⇒Yes, a lot ⇒Yes, a little ⇒No (Continue with question 4)

3) Within what type of projects does your organisation carry out activities in the field of disaster risk management?

(Choose one or more alternatives)

⇒within the framework of the organisations' specialised projects on disaster risk management
⇒within the framework of the organisations' development projects
⇒within the framework of the organisations' social housing projects
⇒within the framework of other types of projects. Describe: _____

4) Do you know operational tools – apart from the one elaborated by Christine Wamsler – that have the objective of providing guidance for development organisations working in human settlements to integrate risk reduction within their 'normal' work? (Choose one alternative)

⇒No ⇒Yes. Describe (name, organisation, etc.):_____
_____

5) ¿Does your organisation use operational tools which have the objective to provide guidance for development organisations working in human settlements to integrate risk reduction within their 'normal' work? (Choose one alternative)

⇒Yes ⇒No ⇒I don't know (continue with question 7)

6) Why do they use/not use such a tool? Describe:_____
_____

7) Do you consider the operational tool elaborated by Christine Wamsler useful for your organisation? (Choose one alternative)

⇒Yes, a lot ⇒Yes, a little ⇒Indifferent ⇒No ⇒Not at all

8) Why? (Please explain your statement given under question 7)

_____

9) Are there any disaster risk management measures/strategies that should be included in the tool?

⇒No ⇒I don't know ⇒Yes. Describe:_____
_____

10) Do you see any important constraints as regards the tool's content? ⇒No ⇒Yes. Describe:
_____

11) Do you see any important constraints as regards the tool's format? ⇒No ⇒Yes. Describe:
_____

12) How could the tool's content/format be improved to overcome the described constraints/limits?
_____

13) Do you see any important constraints as regards the tool's implementation? ⇒No ⇒Yes. Describe:_____
_____

14) How could constraints/limits as regards the implementation of the tool be overcome? Describe:
_____

15) How could your organisation finance the implementation of the strategies/measures proposed by the tool? Describe:_____
_____

16) Do you think that disaster insurance could be included in housing finance mechanisms?
⇒No. Why? ⇒Yes. Describe, how: _____
_____

17) Do you think that social housing financing mechanisms could be extended so as to be used for funding measures in disaster risk reduction?
⇒No. Why? ⇒Yes. Describe, how: _____
_____

Would you allow me to contact you if I have more questions? ⇒No ⇒Yes. Please note contact name, e-mail and telephone: _____

A4–4) Questionnaire: financial mechanisms for social housing and disaster risk management

1) For what type of organisation do you work? (Choose three alternatives)

⇒Development organisation	⇒ Non-governmental organisation	⇒Local/municipal organisation
⇒Emergency organisation	⇒Governmental organisation	⇒National organisation
⇒ Social housing organisation		⇒International organisation
⇒Financing organisation		

2) Does your organisation work in the field of disaster risk management? (Choose one alternative)

⇒Yes, a lot ⇒Yes, a little ⇒No (Continue with question 4)

3) Does your organisation work in the field of social housing/settlement planning? (Choose one alternative)

⇒Yes, a lot ⇒Yes, a little ⇒No (Continue with question 4)

4) Do you think that it would be possible to extend mechanisms for financing social housing/infrastructure in such a way that it can be used at the same time for financing activities/measures in the field of disaster risk management?

⇒No ⇒Yes. Please describe:_____

_____

5) Does you organisation have a mechanism for financing losses caused by disasters? (financial losses due to the disaster impacts on the organisation itself or its projects)

⇒No ⇒Yes. Describe: _____

_____

7) ¿Does your organisation have a mechanism for financing activities/measures in the field of disaster risk reduction implemented as part of their development work? ⇒No ⇒Yes. Describe:

_____

8) ¿Does your organisation have any type of insurance? ⇒No ⇒Yes. What type?_____

_____

9) Do you think that disaster insurance could be a useful mechanism for your organization and its projects? ⇒No ⇒Yes. How would such an insurance need to look in order to be useful for your organisation/the beneficiaries of your projects? Please describe:_____

_____

10) Would it be possible to combine financing mechanisms for social housing with disaster insurance systems? ⇒No. Why? ⇒Yes. How could this be best done? _____

_____

Could I contact you if I would have more questions? ⇒No ⇒Yes. E-mail, telephone and other contact details: _____

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The damage caused by the dramatic worldwide increase in 'natural' disasters is staggering, with the poor in developing countries being most at risk. Disasters make their already precarious living conditions worse, creating a vicious circle of poverty from which they find it hard to escape. To achieve sustainable poverty reduction, more and more attention has thus been given to the need to reduce disaster risk through development work. Despite related efforts, organisations working in urban settlement development still struggle to effectively tackle disaster risk in their daily work.

To address this challenge, the present research aims to demonstrate how disaster risk management could be integrated into settlement development programming (i.e. social housing, upgrading and/or local urban governance programmes). The research methodology used is an innovative combination of case studies, grounded theory and systems analysis. Case studies of four settlement development programmes were carried out in 15 disaster-prone slum communities in El Salvador, Central America, and their wider context analysed at the municipal, national, and global levels. The outcomes were complemented and generalised with investigations in a series of other countries. The research methods included interviews, group discussions, walk-through analyses, observations, text reviews, questionnaires, research workshops and 'hands-on' practice.

This study shows, on the one hand, that while architects, planners and other urban development actors have the responsibility for developing secure and sustainable settlements, they have nevertheless been unconscious contributors to the increase in disaster risk. In fact, they can negatively influence all three components of risk: hazard(s), vulnerability, and coping capacity. The reasons for this relate to: (a) the lack of knowledge regarding the two-way and multifaceted relationship between disasters and urban settlement development; (b) the separation between the working fields of disaster risk management and settlement development planning from the local to the global level – as well as among these levels; and (c) the substantial gap between what households and communities need or do to cope with risk and disasters and the ways in which urban development actors support them. On the other hand, the research importantly demonstrates that urban development actors – through their programmes, organisational structures and mechanisms for social housing provision and financing – can offer a potentially powerful platform for effectively tackling disaster risk.

The empirical and theoretical knowledge developed by this research is of an intra-, trans- and interdisciplinary/intersectoral nature. Based on the identification of the nexus between disasters and urban settlement development, and of the incomplete approaches to disaster risk management and its mainstreaming, analytical, conceptual and operational frameworks were elaborated. The resulting 'Analysis and Adaptation Model' combines seven strategies for the integration of disaster risk management into development programming with five complementary measures to reduce disaster risk. The model provides a comprehensive understanding of the meaning and scope of disaster risk management integration (which applies to the pre- and the post-disaster context). This assists in both analysing organisations' work and taking action to improve programme implementation. In conclusion, the research demonstrates how urban development actors working at the local, municipal, national and/or international level might exploit their potential to address the increasing disaster risk of the poor and thus enhance the sustainable reduction of both risk and poverty.

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