Resilient Cities
Disaster management and climate change: strengthening cities, reducing risks
Briefing note
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The challenge

In recent decades, the number of disasters resulting from extreme natural events has increased significantly around the world (UNISDR, 2012a). Between 2000 and 2009, natural disasters caused economic damage equating to at least 891 billion US dollars; a tenfold increase since the 1960s (based on Global Humanitarian Assistance, 2012). Only around one fourth of this damage is covered by insurance (Munich Re, 2012).

When such events occur in urban areas, they threaten the lives and livelihoods of huge numbers of people. Due to the fact that local and regional disasters frequently interrupt value chains, their impact is felt not only in the local area but also in the global economy. The Bangkok flood and the earthquake and resulting tsunami in Sendai, Japan in 2011 are two prime examples.

Climate change is predicted to lead to an increase in extreme weather events in urban areas, such as storms, heatwaves and heavy rainfall, which in turn can lead to floods and landslides. Coastal cities with limited potential for adaptation are particularly at risk. Earthquakes, tsunamis and volcanic eruptions are also having increasingly widespread impacts, as was shown by the eruption of Eyjafjallajökull in Iceland.

By 2050, the global population will have risen to approximately 9 billion people. According to the OECD (2012), at least two thirds of the population will be living in coastal regions by this time. This is a major cause for concern considering the fact that many countries and island states, such as Indonesia, are expected to lose stretches of their coastline, as well as entire islands, due to rising sea levels, with obvious consequences as far as the amount of available living space is concerned.

Urbanisation is proceeding at an extremely rapid pace, bringing with it an increased disaster risk and making it difficult to ensure sustainable urban development. Cities are now home to half the global population. By 2025, there are expected to be 37 megacities (cities with over 10 million inhabitants) in the world, 22 of which will be in Asia (UN-Habitat, 2012).

The Economic and Human Impact of Disasters* in the last 12 years

*Disasters refers to Natural Disasters as categorized in EM-DAT
Data source: EM-DAT: The OFDA/CRED International Disaster Database
Data version: 10 January 2012 - v12.07

It is thought that around one billion people currently live in informal settlements built on land whose ownership is in dispute. These are often located on landslide-prone hill-sides or in low-lying coastal areas, and sometimes lack access to public services, making residents particularly vulnerable to natural disasters.

Frequently, these precarious living conditions are perpetuated by poor governance and insufficient participation of local actors in urban planning and administration. Many vulnerable cities have not sufficiently developed adequate measures to prevent residents from and to prepare them for potential disasters. The density of people and material goods and property in urban areas makes disaster management a very challenging undertaking. If they are to become resilient toward disasters, cities must rise to the challenge and be proactive. Against this backdrop, urban development is currently receiving considerable attention within international cooperation.

Our understanding of disaster management

In recent years, the concept of resilience has gained widespread currency in international discourse. The term refers to “the ability of people and institutions – whether individuals, households, local communities or states – to withstand acute shocks or chronic stress caused by fragile situations, crises, violent conflict or extreme natural events, and to adapt and recover quickly without compromising their medium and longer-term prospects” (BMZ, 2013). Numerous methods have been developed for ensuring that regions, countries, societies, municipalities and households can manage the risks associated with social, economic and environmental change. Reducing the threat of extreme natural events in order to limit the impact of potential disasters plays a key role in these approaches. Efforts in this area are collectively known as disaster management (Geenen, 2008).
Around the world, and also within Germany, there are differences in the terminology used in the field of disaster management. The Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH understands the concepts as follows: disaster management includes all activities relating to preventing and preparing for disasters as well as those relating to response and recovery after a disaster has taken place. Disaster risk management encompasses all measures taken to prevent and prepare for disasters and to mitigate risks. Post-disaster management involves responding to disasters by providing disaster relief and emergency aid, and ensuring disaster-resilient recovery by carrying out reconstruction work with the aim of preventing further disasters. Pre- and post-disaster management activities can be seen as complementary elements of a simplified disaster management cycle.

However, there are areas where the phases of this cycle overlap. The boundaries between the segments shown in the diagram are often blurred and subject to debate. Despite this, the cycle represents a nationally and internationally recognised orientation framework for GIZ’s concepts and projects.

**Our approach**

By adopting an integrated approach to disaster management, GIZ aims to prevent disasters from taking place in urban areas, and to minimise the number of lives lost and the amount of damage caused as a result of unavoidable disasters. We support municipalities in optimising the way their administrations are organised, develop local capacity and strengthen institutions in order to improve urban quality of life and the resilience of cities. According to the United Nations Office for Disaster Risk Reduction (UNISDR, 2012b), cities can be called resilient when they are in a position to cope with or adapt to the impacts of certain hazards. Even during a crisis situation, they should be able to continue to function, which means maintaining the basic integrity of the natural environment, financial system, social structure, infrastructure and public services. They should also be capable of recovering from a catastrophic event and, where possible, restoring the city to its original state. The best way of counteracting climate change, avoiding future disasters and reducing the need for adaptation is to be proactive and to create environmentally compatible and climate-smart cities. Following these principles, we work together with our partners to develop innovative concepts for strengthening the resilience of cities.

We see disaster management as an element of good governance. This understanding gives rise to the term risk governance. Effective disaster management in cities requires the commitment and cooperation of all actors, i.e. state, private sector and civil society, at municipal and city district level. In order to increase local expertise in
at-risk areas, we help to establish links with regional and national structures. This involves sharing our knowledge and experience in the field of disaster management with the various actors.

From a sustainability perspective, it is essential that disaster-resilient capacities are developed in the form of personnel, legislation, financial systems, disaster management committees, neighbourhood initiatives, etc. To achieve this, we adopt a multi-level approach, supporting cooperation between actors at the national, regional and local level. Sustainable disaster management enables municipal administrations to continue to function in emergency situations and can also help to dramatically improve the urban environment before such situations occur.

State

One of the state's key responsibilities is ensuring the safety of its citizens; a task which is partly entrusted to the municipalities. Legal frameworks, political guidelines and strategies are required at all levels for a comprehensive disaster management, and can always be improved upon where they already exist. This needs to be taken into account in budget planning, and corresponding administrative structures should be established. Community-based approaches in informal settlements and complex high-tech solutions for cities as a whole receive support from GIZ in equal measure and emphasis is placed on linking the two approaches. This work aims to ensure greater transparency, accountability and more equitable distribution of public funds.

Civil society

It is vitally important to integrate at-risk citizens, representatives of non-governmental organisations, and strongly disadvantaged population groups, such as children, older people and in many cases women, in all disaster management activities. An increasing number of working groups and municipal committees are now operating independently, and sometimes differ in the way they perceive risks. These groups and committees are involved in such activities as drawing up emergency plans, developing evacuation measures and providing medical care. Civil society also plays a role in the recovery process following a disaster, assisting in the selection of beneficiary groups and regions and working to achieve accountability in the allocation of state funds. Civil society mechanisms that have previously proven effective in dealing with disasters are taken on board and modernised where necessary.

Private sector

As fundamental components of global value chains are located in cities, it is in the interests of the private sector to protect them. In most countries, micro, small and medium-sized enterprises (MSMEs) are the prime drivers of economic activity. As such, they play a key role in securing income and employment. Together with research institutions, companies can make use of innovative technologies to contribute both to sustainable, disaster-resilient urban and economic development and to disaster management. We therefore place great emphasis on supporting corresponding cooperation arrangements.
International agreements

The German Government attaches great importance to implementing the objectives contained in international agreements. Provisions aiming to reduce the vulnerability of societies in at-risk areas form the basis for our advisory services. One key agreement is the Hyogo Framework for Action, which was the outcome of the World Disaster Reduction Conference in 2005. It outlines five priority areas for action and aims to substantially reduce disaster-related losses by 2015. On behalf of the German Federal Ministry for Economic Cooperation and Development (BMZ), GIZ works with numerous specialist organisations and research institutions to support the implementation and further development of this and other agreements, with the objective of improving disaster management at the national and international level. Adaptation measures aiming to limit and effectively manage the impacts of climate change-related extreme events play a central role in our efforts.

Sharing experience of managing previous disasters puts decision makers at the municipal level in a better position to take appropriate preparatory and preventive measures and to cope with future extreme natural events. A number of global initiatives have been established for this purpose. One key organisation operating in the field is ICLEI, an association of cities and local governments which has been working to help cities of various sizes become more sustainable and resilient since 1990. In addition, over 1,400 cities are taking part in the ‘Making Cities Resilient’ campaign set up by the United Nations Office for Disaster Risk Reduction (UNISDR).

Our services

We offer partner cities a package of advisory services tailored to their specific needs. Our disaster management measures cover the phases of prevention, preparedness, response and recovery. At the recovery phase, emphasis is placed on preventing further disasters. There is considerable conceptual overlap and interaction between the various phases. In urban areas we focus primarily on disaster risk management in order to strengthen resilience against extreme natural events.

Within this spectrum, we offer the following services:

Our disaster prevention work involves activities that aim to mitigate or, where possible, entirely avoid the negative impacts of extreme natural events. These include political, legal, economic and infrastructural measures as well as risk assessments carried out to identify hazards and gauge the vulnerability of urban societies. We provide advice on implementing these comprehensive measures in multi-sector planning processes, thus contributing to sustainable spatial and urban planning. Due to the important contribution made by small and medium-sized enterprises (SMEs) to national economies, we support them in making their value and supply chains more disaster-resilient in a process known as business continuity management. In the context of risk transfer, we also communicate the importance of insurance in protecting livelihoods and suggest appropriate solutions, ranging from micro-insurance to macro-insurance, to meet a wide variety of needs.

Disaster preparedness involves planning and rehearsing measures that will be taken in the event of a disaster in order to minimise loss and damage. We support our partners in establishing local early warning systems, developing evacuation plans, strengthening competent institutions and staff and setting up local and regional disaster management committees.

In the direct aftermath of an extreme natural event, the preparatory measures will be applied in coping with its impacts. The objective of the response phase is to address the acute needs of the population, ensure their survival, and restore a functioning society.

Activities during the disaster-resilient recovery phase take account of the lessons learned from the event and incorporate preventive and preparatory measures based on risk assessments. The support we provide in recovery is environmentally sound, economically efficient and socially sustainable. We foster local self-organisation and self-reliance through initiatives such as ‘cash for work’ programmes.

Services in relevant areas of activity

GIZ provides disaster management services in a number of areas of activity. The services are modular in nature and
can be combined to meet the specific needs of the client. The sheer density of people, goods and property in cities makes an integrated approach essential. GIZ’s core competence, capacity development, is at the heart of our advisory services, which always aim to strengthen partners and unlock potential.

Our areas of activity can be summarised as follows:

Our first task is to carry out risk and vulnerability assessments in order to determine the degree to which societal groups are threatened and to gauge their capacity to cope with crises and adapt to their changed environment. Based on the results of these assessments, we analyse the costs and benefits of potential risk reduction measures and identify priority action areas. Ensuring a comprehensive risk assessment means involving all the relevant stakeholders, including state and local authorities, scientific institutions and representatives of the private sector and civil society, in particular at-risk population groups. Due to the strong interdependence between cities and their surrounding areas, it is also important to extend the scope of this work beyond the municipality itself to suburban and rural areas.

In order to ensure sustainable urban development and the disaster-resilience of cities, efficient institutions are required at all levels. We provide support in strengthening administrative structures and setting up multi-sector committees and cooperation arrangements. This involves establishing vertical and horizontal linkages and operating on a local, regional, national and international scale. In this process, it is vitally important to precisely define the role each actor is to play in disaster management.

In combination with our institutional capacity development, we provide advice on appropriate financing mechanisms for the implementation of planned measures. Possible options include local taxes, public-private partnerships and applying for international funding, depending on the situation.

Insurance policies are a particularly useful financing mechanism, forming a solid basis for rapid and sustainable recovery following a disaster. We therefore recommend appropriate insurance products that best meet the needs of the city concerned.

Foresighted urban planning is essential in reducing the impacts of disasters. In order to increase resilience, it includes a risk-sensitive land use planning, particularly with regard to vulnerable areas such as informal settlements. Preserving or creating green spaces, for instance, is necessary for rain water retention and plays a central role in preventing floods across the entire city.

One of the fundamental measures to be taken in developing resilient cities is securing infrastructure, particularly critical infrastructure in combination with citizen-oriented public services. Emergency units and other health care facilities must be easily accessible (that is on foot or by bicycle) for the whole population, including the poor, and must offer protection from further injury. Schools must be protected against collapse and flooding. Evacuation plans and instructions on how to behave in an emergency, along with well-signposted safe rooms and assembly areas, can be life-saving. Wastewater treatment, waste disposal and recycling facilities, as well as low-emission energy generation plants, manufacturing facilities and public transport systems, must also be planned and constructed with resilience in mind. Dikes and flood walls may serve that purpose.

Effective disaster management involves ensuring that disaster-resilient housing is built to withstand potential extreme natural events. It is recommended that guidelines be developed to minimise risks, e.g. in the area of earthquake-resistant construction. To ensure that roofs can provide a safe place to shelter during floods, they must be as sturdily constructed as possible in at-risk areas. Participative approaches are recommended in areas of extremely high risk. Considerable thought must be invested in developing appropriate and effective solutions for low-income groups living in particularly vulnerable city districts.

It is not only important to ensure that health care facilities are structurally sound, but also that health care systems are adapted to meet the needs of rapidly growing cities and are prepared for the specific demands of coping with the aftermath of disasters. As well as providing medical and psychological care to victims and preventing or limiting the spread of epidemics, they must be in a position to ensure continuing basic medical care, e.g. for chronically ill patients and pregnant women, despite the fact that health care infrastructure may be seriously impaired. We
provide advice on strengthening health care systems so that they are able to cope with these challenges.

The energy sector has the potential to make a significant contribution to mitigating climate change – the main cause of the increase in natural disasters – through the efficient use of existing energy sources and the expansion of renewables. At the same time, decentralised energy supply systems can limit the impact of disasters and ensure a basic level of energy supply for citizens, while also reducing dependence on external energy sources.

It is also vital that urban logistics are well-conceived and can continue to function in a crisis situation. Only then is it possible to ensure aid reaches the areas where it is most needed. As was clear from experiences in the aftermath of the 2010 Haiti earthquake, in the case of larger-scale disasters a functioning airport is essential, alongside sufficient funds, food and personnel trained in relevant disciplines. Access to data and information must also be assured, for instance by ensuring specific protection for servers. Information and communication technology also plays a key role in early warning systems, and in helping to maintain communication structures.

The establishment of early warning systems is a further important step in reducing the impacts of natural disasters. Even systems using simple technologies can be effective, as has been shown in a number of successful projects implemented by GIZ. When communication channels and decision-making processes are well-defined and clearly understood, warnings and instructions can be rapidly communicated to large sections of the population.

Raising public awareness of disaster management issues plays a vital role in increasing the resilience of urban populations. In order to be successful, awareness raising campaigns must reach all sections of the population, regardless of age, gender, level of education, income and cultural background. We advise our partners on suitable content and on the target group-oriented presentation and efficient distribution of information. This also involves updating school curricula to ensure children know how to react to emergency situations.

For sustainable urban development to be a success, it is crucial that the needs of civil society are taken into account, especially those of the most vulnerable members of society. Socially inclusive cities are less susceptible to the destructive effects of natural disasters and are in a better position to recover from such events. We therefore support the development of social security systems. Strong social structures are a particularly important aspect of post-disaster management, and their absence makes it extremely difficult for cities to recover.

We place special emphasis on adopting a gender-sensitive approach. Women are involved in all disaster management activities, from the risk assessment phase through to emergency preparedness and response, and frequently hold positions of responsibility. It is also important that gender aspects are taken into consideration when evacuating people and setting up emergency shelters (e.g. by providing separate sleeping quarters and washing facilities).

The private sector, particularly in the form of small and medium-sized enterprises (SMEs), plays an extremely significant role in strengthening resilience. Firstly, commercial companies provide large numbers of people with a regular income. In addition, cities are home to important components of global value chains, which means the impact of local disasters can soon be felt across a much wider area. An emphasis on disaster resilience in local economic development and the establishment of cooperation arrangements in the field of disaster management at an early stage improve its efficiency, and in countries at risk of disaster can be a key factor in attracting business investors to a city.

State security services, the police and military in particular, are frequently the first to respond after a disaster. They bring people to safety, ensure they are protected, and secure critical infrastructure at the time when it is needed most. Training, equipping and supporting these services
helps them to carry out this vital task to the best of their ability.

Cities with historic old towns are faced with the difficult challenge of preserving cultural heritage while simultaneously modernising to achieve greater sustainability and disaster resilience. The value of historical buildings and sites must be taken into account when designing disaster management measures. In many communities, traditional methods of coping with crises have long been in place; these can be taken on board and supplemented with modern techniques and technologies. We provide support in identifying and protecting this valuable heritage.

Increasingly frequent climate change-related droughts and floods in the regions surrounding cities also affect supplies of food and water to the cities themselves. It is therefore becoming ever more important to promote locally adapted urban agriculture. Low-income families in particular often grow their own food in small gardens or allotments, which represents a valuable contribution to food security.

Cooperation partners

Responsible organisations and at-risk citizens must be capable of making the logistical and organisational preparations necessary for effective cooperation. We integrate German experience into our advisory services and promote South-South cooperation between state and civil society actors as well as North-South dialogue.

Much of our work is commissioned by German ministries such as the Federal Ministry for Economic Cooperation and Development (BMZ) and the Federal Foreign Office (AA), but our clients also include the European Union (including ECHO), governments of other countries and private companies.

In providing our services, we cooperate with various partners, with whom we have worked for many years:

Public sector

In the area of security GIZ cooperates closely with the German Federal Ministry of the Interior and the relevant agencies within its jurisdiction: the Federal Office of Civil Protection and Disaster Assistance (BBK) and the German Federal Agency for Technical Relief (THW).

Private sector

On behalf of BMZ, GIZ works with the insurance company Allianz SE, the Swiss Agency for Development and Cooperation (SDC) and other partners to develop micro insurances for Asian countries and to facilitate access to the insurance market. As part of the project, the partners offer insurances against crop failures of the rice harvest to peasants.

In cooperation with the insurance company Munich Re, GIZ provides people in frequently affected areas with access to insurance against the impacts of natural disasters, thus supporting their recovery.

In the field of ICT, GIZ cooperates with the company SAP AG in order to explore how digital applications can increasingly be used in development cooperation. This is of special interest in the context of urban governance and disaster management.

In 2011, GIZ and Siemens AG concluded a cooperation agreement with the specific aim of increasing the resilience of cities. Energy-efficient technologies developed by the German company represent a promising solution to the complex challenges faced by rapidly growing cities in their efforts to pursue a sustainable development course.

GIZ and Deutsche Telekom AG are working together to implement ‘pay-as-you-pollute’ systems that function using smartphone apps. The aim is to reduce CO₂ emissions in megacities.
Research
GIZ fosters regular exchange between research and practice. We cooperate with the United Nations University (UNU) in Bonn and the International Institute for Environment and Development (IIED), among others. The London-based IIED conducts research into such areas as community-based adaptation to climate change and urban risk.

Foundations
GIZ works with the Munich Re Foundation, the Rockefeller Foundation and the think tank Stiftung neue Verantwortung. The latter promotes the exchange of ideas between various sectors and disciplines and is currently conducting a study on urban infrastructure.

Networks
At the national level, GIZ participates in the German Committee for Disaster Reduction (DKKV). In its role as a competence centre, DKKV addresses issues relating to national and international disaster risk management and provides a platform for exchange among its members. In addition, GIZ cooperates with the German Association of Cities (Verband Deutscher Städte) in areas such as international twinning. Within the framework of the Cities Development Initiative for Asia (CDIA), GIZ works with various other development actors, on behalf of BMZ, to support learning partnerships between over 50 Asian cities.

International organisations
The World Bank, the Global Facility for Disaster Reduction and Recovery (GFDRR) as well as the United Nations with the Office for Disaster Risk Reduction (UNISDR) and the Office for the Coordination of Humanitarian Affairs (OCHA) are knowledge hubs with vast specialist expertise. Consequently, they represent important partners for GIZ’s urban disaster management work. GIZ also cooperates with the international association of cities and local governments ICLEI on a variety of issues.

Your benefit
Effective disaster management helps to reduce the number of victims of extreme natural events and the amount of economic damage they cause. It is an essential part of achieving stable, sustainable development, particularly in at-risk countries. From a global economic perspective, it allows cities to maintain a comparative advantage by securing their status as business and production sites. A resilient city is well-prepared for extreme events and is in a better position to adapt to the impacts of climate change.

In implementing disaster management measures, GIZ can draw upon many years of experience, qualified experts, and tried and tested methods and instruments. Our particular strength lies in the combination of participatory assessment and planning methods with specially adapted technologies and modern instruments such as remote sensing and early warning systems. A further benefit for our clients is our capacity to provide advice on disaster management at all political levels.
Examples from the field

China

In 2008, an earthquake in Wenchuan in the Chinese province of Sichuan took the lives of tens of thousands of people and left several million homeless. As part of the response to these events, GIZ is working on behalf of BMZ to support the Chinese Government in implementing an effective disaster risk management system within the framework of the Sino-German Disaster Risk Management Project. The project promotes the development of institutions at all administrative levels and supports cooperation between vulnerable Chinese cities. By conducting systematic and standardised risk assessments, it has been possible to improve emergency planning. Complementary preparatory measures and the training of rescue workers will help ensure that future disaster management is more effective.

Peru

In the past, the Government of Peru has often made significant investments in the country only to see the results of these investments destroyed by disasters. To address this situation, BMZ commissioned GIZ to develop an assessment framework for investment projects together with the Peruvian Ministry of Economy and Finance. The framework, which must be applied at the planning phase of all projects, is used to assess the extent to which planned investments are subject to disaster-related risks and also which new risks they might cause. Measures to reduce risk (such as changes in location or preventive measures) are taken based on both the risk assessment and a cost-benefit analysis. The framework, which has been in use since 2007, has been particularly beneficial in developing infrastructure in the rapidly growing city of Lima.

Mozambique

Flash floods regularly cause widespread damage in the rapidly growing coastal city of Beira in Mozambique, and their effects are felt particularly strongly in poor districts. Working together with the affected population, GIZ was commissioned by BMZ to develop simple early warning systems and evacuation plans together with its partners that can easily be replicated elsewhere. Local disaster management committees also give citizens the opportunity to contribute their own urban planning ideas, aid in the design and construction of canals to transport excess water directly to the sea, and receive training in carrying out emergency measures. At the fourth International Disaster and Risk Conference in Davos in August 2012, the project received the RISK Award along with prize money of 100,000 Euro towards its implementation.

Indonesia

Following the devastating impact of the 2004 tsunami, the Indonesian Government set up an early warning system in cooperation with Germany and other countries, as well as a number of international organisations. Commissioned by the German Research Centre for Geosciences (GFZ),
GIZ provides support to national and local Indonesian partners, primarily in the area of initial and in-service training, in order to help develop a common understanding of the warning processes and the system as a whole among the competent institutions and the population. The effectiveness of the tsunami warnings that have been issued using the system so far has demonstrated that the authorities and the residents of the densely populated coastal regions of Sumatra and Java are now better prepared for future emergencies.

India

Flooding in the Indian region Tamil Nadu. (Photo: ©GIZ)

The coastal areas of the city of Chennai are regularly hit by tropical cyclones during the monsoon period. The storms are increasingly leading to floods and causing severe damage to residential and manufacturing districts in the booming IT hub. GIZ commissioned the University of Freiburg, Germany, to develop strategies for flood-sensitive urban planning on the basis of risk assessments. The strategies emphasise the integration of flood management into the city’s development plan, along with the use of risk transfer payments and the delegation of responsibility for water management to the local government level. A further project in India is helping to strengthen the capacity of the state and the private sector to prevent and manage large-scale industrial disasters.
List of references


