UNITED NATIONS UNIVERSITY

UNU-EHS

Institute for Environment and Human Security

Alliance Development Works

Brot für die Welt · welthungerhilfe · terre des hommes Hilfe für Kinder in Not · medico international · MISEREOR Ihr Hilfswerk · cbm

Focus: The city as a risk area

WorldRiskReport 2014

www.WorldRiskReport.org

The print version of the WorldRiskReport has a volume enabling fast reading. The texts of the Report are supplemented by maps, diagrams and pictures to illustrate their content. More in-depth information, scientific details of the methodology applied and tables are available at www.WorldRiskReport.org. There, the 2011, 2012 and 2013 Reports can be downloaded, too.

The term developing countries:

Finding the right word for the "poor countries" in Africa, Asia and Latin America is not unproblematic. For one thing, different terms are used by the various global organizations (the UN, UN organizations, the World Bank) in this context. Second, any expression one might use will be questionable. "Third World" is a term that the countries thus referred to will hardly appreciate. "Developing countries" suggests that the countries in North America or Europe are developed and the countries in the other continents are underdeveloped. Of course we do not subscribe to such a simple view, but we have nevertheless opted for using the term developing countries (not in inverted commas) in this report. In accordance with UN practice, it refers to all countries in Africa, Asia (with the exception of Japan, South Korea and Taiwan) and Latin America, including the emerging countries.

1. Urbanization – trends and risk assessment

Peter Mucke

Whether extreme natural events will pose a threat to populations does not depend solely on their intensity. The vulnerability of a society affected by the impact of such an extreme event also plays a crucial role. The WorldRiskIndex calculates the risk of becoming the victim of a disaster resulting from an extreme natural event, i.e. by multiplying the vulnerability index by the exposure index. Given this year's thematic focus "The city as a risk area", for the first time, risk has also been assessed for urban areas. But regardless of whether urban or rural areas, development definitely helps mitigating the risk of disasters.

In 1950, two thirds of the world's population lived in rural areas. 100 years later, this ratio will be reversed: By 2050, two thirds of the world's population will be city-dwellers. The turning point in this development was around the year 2007 ("Urban Turn", see Illustration 1), when the 50-percent threshold was crossed. Cities are booming and are set to have 6.3 billion inhabitants by 2050 according to the official forecasts of the United Nations. This would be 2.5 billion more than today, an increase of 65 percent. In contrast, the population in rural regions is expected to decline by 150 million people worldwide by 2050 (UN DESA 2014). In other words, global population growth is taking place in cities.

Yet, there are considerable differences at regional level. The concentration of population in urban areas has since long been characteristic of the industrialized countries in Europe and North America. In Europe, 73 percent of the population live in cities nowadays, while in North America this figure amounts to even 81 percent. In the emerging economies and the developing countries of South and Central America, too, the city has already been the major settlement area since the 1960s, with 80 percent of the population currently living in cities. Here, as compared to other developing countries and emerging economies, at 180 million people, urban population growth ought to be fairly low by 2050. The situation in Africa and Asia is entirely different. Currently, 48 percent of Asia's population live in cities, while it is 40 percent in the case of Africa. By 2050, cities in Asia will have grown by 1.25 billion inhabitants, equaling 60 percent, whereas in Africa an increase of 900 million or 190 percent is estimated (UN DESA 2014).

Owing to its strong growth rates, the urban area gains particular significance regarding risk assessment and the demands on risk reduction, especially in Africa and Asia. According to the WorldRiskIndex, it is precisely in these aforementioned continents where the majority of countries show a particularly high disaster risk (see Chapter 3). In risk assessment, the WorldRiskReport is based on the fundamental understanding that the crucial issue is not only the magnitude with which a population is hit by a natural event. Rather, a country's or a city's risk of becoming a disaster victim is equally determined by exposure towards natural hazards and the level of development in a society.

The WorldRiskIndex, which was published by Alliance Development Works (Bündnis Entwicklung Hilft) and the United Nations University, Institute for Environment and Human Security, in Bonn for the first time in 2011, calculates this disaster risk for 171 countries worldwide. The Index consists of indicators in the four components of **exposure** towards natural hazards such as earthquakes, cyclones, flooding, drought and sea level rise, **susceptibility** depending on infrastructure, food, housing and economic framework conditions, **coping capacities** depending on governance, risk reduction, early warning, healthcare, social and material coverage and **adaptive capacities** related to future natural hazards and the impacts of climate change (Bündnis Entwicklung Hilft 2011). The Index is established per country via multiplying exposure to natural hazards with vulnerability, which comprises the above-mentioned three components (see Figure 2 on pages 40/41). In accordance with this year's thematic focus of the city as a risk area, exposure, vulnerability and the resulting risk were additionally calculated for the urban area for 140 countries (see Figure 3 on page 45).

The **WorldRiskIndex** is meant to answer four central questions:

+ How probable is an extreme natural event, and will it affect people?
+ How vulnerable are people to natural hazards?
+ To what extent can societies cope with acute disasters?

+ Is society taking risk reduction measures to prepare for natural hazards to be reckoned with in the future?

The answers are of crucial importance to every country – both for the rural and for the urban areas.

Using an index for representation clearly illustrates both the problems and the fields of action. Nevertheless, it is important to also bear in mind the limitations of this representation. Just like any other index, the WorldRisk-Index can only consider indicators for which comprehensible and quantifiable data are available. For example, immediate neighborly assistance in the event of a disaster is not quantifiable globally, but it is nevertheless very important. It cannot contribute to the calculation of the WorldRiskIndex because of a lack of data. Moreover, data quality may vary among the different countries if data has only been gathered at national level and not by an independent international institution. Therefore, in addition to the data section, focusing on quantitative aspects, the WorldRiskReport always contains a focus chapter with a qualitative approach that sheds light on backgrounds and interrelations (Bündnis Entwicklung Hilft 2013).

For the thematic focus of the **"The city as a risk area"**, the analyses of the WorldRiskReport 2014 show that urbanization need not inevitably bring about changes in risk levels. The crucial aspect is how urbanization develops: whether the new houses and settlements are situated in exposed zones, whether urban growth is well coordinated, and whether it goes hand in hand with investment in sanitation and power supply, educational facilities and infrastructure. Where only slums and informal settlements emerge that the municipal authorities seek to clear or, at best, tolerate, urbanization becomes a critical driver of risk. Yet, where living and working in a city leads to better income and where city institutions such as health and counseling centers, hospitals, rescue services or, also, early warning systems are made available, urbanization

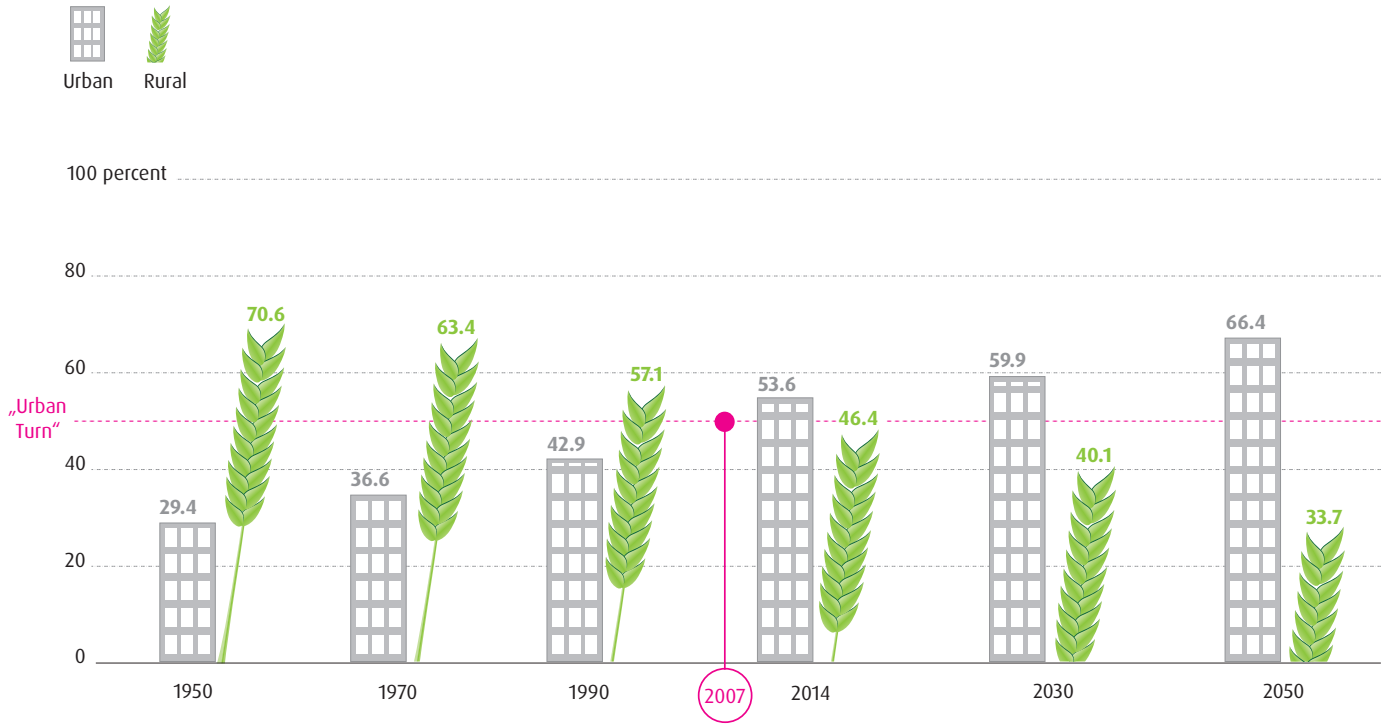


Figure 1: Distribution of world population into urban and rural areas (UN DESA 2012, 2014)

can mitigate risk as well. This complexity is described in Chapters 2.1 to 2.4 from various angles.

The complexity of the issue is also due to cities having very different areas and sizes. Statistics of the United Nations divide cities into the five categories of "up to 500,000", "500,000 to 1 million", "1 to 5 million", "5 to 10 million" and "more than 10 million" inhabitants. In 1990, almost six out of ten city-dwellers lived in cities of up to 500,000 inhabitants. By the end of the coming decade, this picture is going to look rather different (UN DESA 2014). By 2030, more than 55 percent of the urban global population will be living in cities of more than 500,000 inhabitants (see Chapter 4).

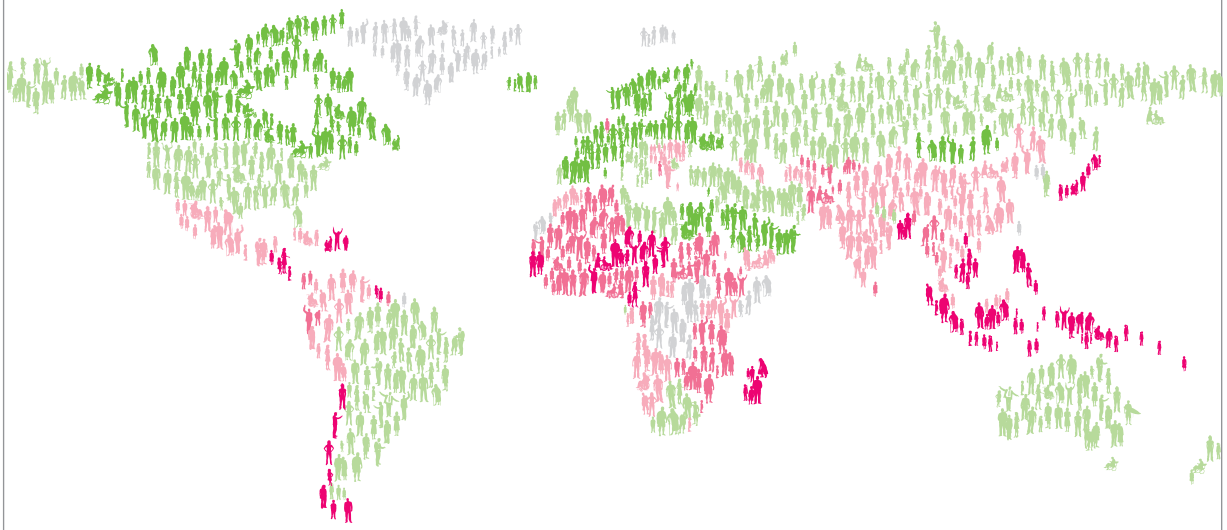
The megacities, i.e. cities with more than ten million inhabitants, show the greatest dynamics. United Nations forecasts for 2010 to 2030 predict a growth from 370 to 730 million inhabitants, which is almost a doubling of numbers. The United Nations counted 28 megacities in 2014. The thirteen largest ones in this list, each of them with more than 15 million inhabitants, are Tokyo, Delhi, Shanghai, Mexico City, São Paulo, Mumbai, Osaka, Beijing, New York-Newark, Cairo, Dhaka, Karachi and Buenos Aires. By 2030, there will be 41 megacities, 13 more than today. Most of these 13 new megacities will be in Asia. This also holds for what are predicted to be the world's three largest cities: by 2030, Tokyo is projected to have 37 million, Delhi 36 million and Shanghai 31 million inhabitants (UN DESA 2014).

Adequately planning urban growth will be one of the major challenges that cities and states will be facing in the future, especially if the financial resources of a city or a country are very low. In the absence of effective urban planning, high urban growth rates have most often resulted in a spiral of urban poverty and the spread of slums or informal settlements (UN-Habitat 2013). Already, a third of the urban population in developing countries is living in slums. This usually implies a lack of drinking water supply and insufficient sanitation as well as unreliable and even hazardous power and gas supply. In developing countries, less than 35 percent of the cities have functioning wastewater treatment, and there is no garbage collection for between a third and half of the urban waste in low to medium-income countries (ibid.).

In addition, with the predicted impacts of climate change (IPCC 2014), cities will be facing growing challenges. The increase in extreme weather events and sea level rise with regard to cities in coastal areas, which account for 40 percent of urban settlements worldwide, will particularly raise pressure to take action.

The publishers of the WorldRiskReport 2014 see an important challenge in understanding emergency relief and development cooperation as a whole and linking its components more closely in practice. Risk assessment, risk reduction, and coping and adaptive strategies are parts of this concept, which is formulated in the WorldRiskReport 2011: "Whether it be an earthquake or a tsunami, a cyclone or floods, the risk of a natural event turning into a disaster always depends only partly on the force of the natural event itself. The living conditions of the people in the regions affected and the options available to respond quickly and to provide assistance are just as significant. Those who are prepared, who know what to do in the event of an extreme natural event, have a greater chance of survival. Countries that see natural hazards coming, that are preparing for the consequences of climate change and are providing the financial means required will be better prepared for the future. Alliance Development Works publishes the WorldRiskReport to look at these links at global level and draw forward-looking conclusions regarding assistance measures, policies and reporting."

Results at a glance



The WorldRiskIndex examines the risk of becoming the victim of a disaster resulting from an extreme natural event for every country worldwide. Risk comprises exposure to natural hazards and the vulnerability of a society. In this year's edition of the WorldRiskReport the modular structure of the WorldRiskIndex has been adjusted to focus on risk in urban areas. The comparison of urban risk patterns with those of the WorldRiskIndex at national level yields a number of interesting results. Differences between these two measures are particularly evident in Africa, North America and South America. Parts of West Africa, for example, are classified as countries with high to very high risk at a national scale. In contrast, focusing only on the urban areas of these countries changes the picture considerably as some countries, such as Ghana or Mali, feature very low and low urban risk. In contrast, the USA, for instance, is classified as having high risk in urban areas, whereas its national risk score is low. Similarly, urban risk is very high in Peru and Colombia, whereas national risk levels are classified as medium. At the same time, it can be stated that six of the 15 countries with the highest urban risk are also among the 15 countries with the highest risk at national level (see right-hand table): Costa Rica (urban risk position 1), the Philippines (2), Guatemala (9), Bangladesh (11), El Salvador (13) and Papua-New Guinea (14).

WorldRiskIndex

Rank	Country	Risk (%)
1.	Vanuatu	36.50
2.	Philippines	28.25
3.	Tonga	28.23
4.	Guatemala	20.68
5.	Bangladesh	19.37
6.	Solomon Islands	19.18
7.	Costa Rica	17.33
8.	El Salvador	17.12
9.	Cambodia	17.12
10.	Papua New Guinea	16.74
11.	Timor-Leste	16.41
12.	Brunei Darussalam	16.23
13.	Nicaragua	14.87
14.	Mauritius	14.78
15.	Guinea-Bissau	13.75
.....	.....	.....
147.	Germany	3.01
.....	.....	.....
157.	Israel	2.38
158.	Norway	2.31
159.	Egypt	2.29
160.	Singapore	2.25
161.	Finland	2.24
162.	Sweden	2.19
163.	United Arab Emirates	1.91
164.	Bahrain	1.78
165.	Kiribati	1.72
166.	Iceland	1.56
167.	Grenada	1.44
168.	Barbados	1.21
169.	Saudi Arabia	1.17
170.	Malta	0.62
171.	Qatar	0.08

2. Focus: The city as a risk area

Urbanization is one of the megatrends of our times – and as such it bears a vast complexity. While the pull of the cities often creates problems for rural regions in the industrialized countries, massive urban population growth is posing great challenges for the metropolises in many developing countries. For often enough, the growth of cities exceeds the capacity of authorities to develop and maintain adequate social and physical infrastructure. One of the most pressing results is the formation of marginal settlements in which urban dwellers lack basic civil rights and frequently face high levels of vulnerability towards natural hazards.

2.1 Urbanization and risk – challenges and opportunities

Matthias Garschagen

What influence does urbanization have on social vulnerability towards natural hazards? Which effects can be observed in terms of exposure, susceptibility, coping capacities and adaptive capacities? How do these interactions vary between countries and the different social groups within individual countries?

These questions are of key importance not only for gaining an understanding of the city as a "risk area" but also for developing applied risk mitigation strategies. However, finding answers is anything but simple owing to the partly contradictory implications of urbanization on risk. In addressing this topic, one cannot solely concentrate on examining current urban risk patterns and the lessons learned from past disasters. Rather, it is necessary to also consider future trends since urban risk at the global level is increasingly shaped by the interaction of two unfolding megatrends: urbanization and climate change.

In this context, special attention needs to be given to developing countries and emerging economies. This is because unlike industrialized nations, most often located in temperate climates, these countries are expected to experience particularly strong changes in terms of both urbanization and the projected impacts of climate change (IPCC 2012, UN DESA 2012). Therefore, key questions emerge for the field of international development cooperation: does urbanization produce exclusively negative effects on vulnerability? Or can development and economic growth help break the alleged cycle of detrimental feedbacks in this relationship?

To date, urban risk trends have all too often been explained by changes in natural hazard patterns (such as sea level rise or the increase in extreme weather events) or, at most, by shifts in physical exposure (caused, for example, by rapid growth of cities in coastal areas). However, what is typically underemphasized is the influence that urbanization has on the other components of risk defined in the WorldRiskIndex, i.e. on susceptibility, coping capacity and adaptive capacity. This is problematic given that neglecting the effects of urbanization on these other risk components results in highly simplified and ultimately distorted appraisals of the dynamics in urban risk.

In the following, these effects will therefore be examined more closely. The focus will be especially directed towards the crosslinks between the individual components, i.e. on self-reinforcing but also contradictory effects of urbanization on susceptibility, coping capacity and adaptive capacity.

Urbanization and exposure

With regard to exposure, multifaceted impacts of urbanization can be observed. On a global scale, much of the urban growth takes place in highly exposed coastal and delta regions, particularly in developing countries and emerging economies. In Asia, for example, more than 18 percent of the urban population lives in the Low Elevation Coastal Zone, i.e. the contiguous area along the coast that is less than 10 meters above sea level (McGranahan et al. 2007). Ho Chi Minh City, Mumbai and Jakarta are prominent examples. In contrast, only about eight percent of Europe's and North America's urban population lives in this coastal zone. At the same time, out of the 350 million urban inhabitants of this zone, around 30 percent live in low income countries and another 36 percent in lower-middle-income countries (according to the World Bank classification; see also the country groups in the table on page 16/17, notably groups 8 and 10) (ibid.).

Country example Haiti

Safety thanks to barrier-free reconstruction

After the earthquake early in 2010, Haiti had the opportunity to carry out not only a quakeproof but also a barrier-free reconstruction enabling persons with disabilities, restricted mobility or other physical impairment an optimum of independence and freedom particularly in access to their living areas and public institutions.

In contrast to rural areas, in the urban region, where there is a significantly higher concentration of buildings in general and of public infrastructure (schools, hospitals, administrative bodies, etc.) in particular, barrier-free access and barrier-free orientation within these institutions benefits everyone. But it is precisely here, where many people come together, that often enough no scope is left for measures to create barrier-free access due to lack of money, time or space. Houses are built as quickly as possible, standing close together and are full of corners. High steps, steep and unpaved paths have to be negotiated. Aids such as signs or railings are completely absent. And yet experience by Christoffel-Blindenmission (CBM) shows that in the event of a disaster, persons with disabilities run a greater risk of injury or death, on the one hand because they are forgotten when others escape the danger or because obstacles prevent them from getting away in time, and on the other hand because shelters and emergency accommodations are often not designed with their needs in mind. Practice has shown that many measures to create barrier-free areas can be implemented in a very simple way and at a low cost – especially if they are already considered when buildings are in the planning stage.

Reconstruction is in progress in Haiti, and laws have been introduced prescribing barrier-free public buildings. "While the international organizations in particular focus on the topic of safety, they often forget that barrier-free spaces are an important contribution to more safety in the event of new disasters, even if a fire breaks out in a confined area," explains accessibility expert Benjamin Dard, who was sent to Haiti by CBM shortly after the earthquake. "Not only does barrier-free construction promote access to public buildings for people with disabilities, but it also lowers everyone's vulnerability in the event of a disaster – for example by creating wide escape routes and getting rid of open manholes and other trip hazards in roads and footpaths. Or by the routes to assembly points and hospitals being signposted not only with written instructions but also with pictograms for those who are unable to read."

The main task of the CBM expert in Haiti is the sensitization, training and practical counseling of local and international aid organizations as well as Haitian architects, engineers, self-help groups representing people with disabilities, and administrative bodies. So far, a total of more than 200 people have been trained in barrier-free construction. Benjamin Dard has already participated in the compilation of expert assessments on barrier-free construction at more than 50 schools and 25 further public buildings.

In a pilot project, access to the municipal administration of Petion-Ville, a district in Port-au-Prince, has been reconstructed without barriers. But all this is not solely up to the experts and administrative bodies. It is above all a participatory process in which community members are involved and contribute their ideas and persons with disabilities are taken notice of in particular as responsible citizens. Then the conditions for being well prepared when the next extreme natural event occurs will be much better.

Oliver Neuschäfer, Christoffel-Blindenmission

Terms for "The city as a risk area"

→ **Urbanization:** The growth of urban population (largely through migration) and the spread of urban lifestyles as well as the resulting spatial processes affecting the respective area and its physical structure. These include predominantly the construction of buildings and the development of urban infrastructure for water, sewage, transportation, communication and energy supply.

→ **Urban area:** An urban area is determined geographically by the physical extent of a city. It comprises the characteristics typical for a city, such as a larger number of inhabitants, a high density of settlements and population as well as central functions in terms of administration, education, health care and other social services. Further criteria include a concentration of employment outside the agricultural sector, an economy based on a high division of labor and a large proportion of inhabitants working in the industrial and services sectors.

→ **Informal settlement:** An informal settlement is characterized by its inhabitants' complete or partial lack of basic rights and institutional as well as legal security. This particularly includes formal landownership or land use titling and the right to access basic (social) infrastructure. Informal settlements are often marginal settlements in places with unfavorable settlement conditions (e.g. close to dumpsites, in flood plains or at steep slopes). Informal settlements consist predominantly of makeshift housing. Their inhabitants often live below the poverty line. In most cases informal settlements are unplanned urban quarters.

→ **Slum:** An inner-urban settlement with substandard living conditions which is, unlike informal or marginal settlements in peri-urban or newly urbanized areas, originally understood as an emergency accommodation in dilapidated parts of the existing city. The housing standards and the infrastructure conditions are correspondingly poor. In developing countries, but also in some industrialized countries, they often serve to absorb new urban immigrants. Slums are frequently of informal status.

Source: glossary based in part on "Diercke-Wörterbuch Allgemeine Geographie" (Leser 1995).

On a meso-scale, it can be observed that many cities, especially in developing countries and emerging economies with rapid urbanization, are sprawling into hazard exposed areas which had previously been exempted from development. Much of the damage caused by the Bangkok flood in 2011, for example, resulted from unplanned sprawl of the city along the Chao Phraya River and the filling of tributaries and canals (Kraas 2012). Similar developments can also be observed in many other rapidly growing metropolises such as in Ho Chi Minh City (Storch and Downes 2011). In addition, in many megacities, the threat of flooding is increased by an anthropogenic land subsidence – mainly caused by the extraction of groundwater, as is the case, for example, in Jakarta (Ward et al. 2011).

Some of the exposure effects of urbanization can be traced to even smaller scales down to the neighborhood or individual housing level. In many developing countries with rapid urbanization and shortages of affordable housing, labor migrants and other poor groups often have to settle in urban wastelands. These areas frequently carry a hazard potential and are therefore avoided by other user groups (Satterthwaite et al. 2007). Prominent examples include marginal settlements on steep and landslide-prone slopes in South American cities such as Rio de Janeiro, or slums along the flood- and erosion-prone banks of rivers and canals in many Asian or African cities such as Mumbai or Lagos.

However, problematic exposure effects of urbanization can also be observed in industrialized countries (e.g. in the countries of group 2 in the table on page 16/17). For example, in Gold Coast in Australia or in Miami, it is predominantly the high-priced holiday or luxury domiciles that are constructed along the coast and are exposed to flooding and, partly, to cyclones. Also in European cities, residential development projects in close proximity to rivers or coasts are generally in high demand

due to perceived advantages in terms of recreation and life-style.

Urbanization and susceptibility

Feedbacks between urbanization and susceptibility can most notably be observed in relation to urban marginalization processes. Marginalized urban residents such as labor migrants in, for instance, Dhaka or Manila are all too often not only forced to live in highly exposed locations, but frequently have to make do with improvised housing structures which are highly susceptible to damage or destruction, e.g. through flooding or storms. At the same time, the inhabitants of such settlements in many countries do not hold any formal land titles. This institutional insecurity typically restricts the possibilities to reduce the susceptibility of buildings (for example with regards to long-term investments for renovation).

In addition, large parts of the urban population, especially in developing countries and emerging economies, have to face an increased social susceptibility since their access to social goods and services is severely restricted or entirely blocked. Important examples include sanitation infrastructure, clean drinking water, health care facilities, sufficient food supply, educational facilities or formal employment (Moser and Satterthwaite 2008). While all of these aspects potentially have great impact on the immediate vulnerability in crisis situations related to floods, cyclones or earthquakes, they also bear great relevance for shaping the baseline susceptibility and the likelihood of indirect or secondary impacts.

However, susceptibility related to urbanization can be observed not only in developing countries and emerging economies but also in countries with higher income levels (for example group 2 in the table on page 16/17). For example, the increased dependence on urban infrastructure in the information, energy and transport sectors results in a high susceptibility towards impact cascades that reach far beyond the respective city limits. The shutdown of city airports or central administrative institutions, for instance, can cripple regions or even entire countries in the event of a disaster. Further, susceptibility can be propelled by demographic aging and the fact that, especially in Western urban lifestyles, the elderly or people with disabilities are oftentimes fairly isolated and lack social networks to support them when natural hazards strike.

Nevertheless, urbanization does not inevitably lead to an increase in social susceptibility. On the contrary, urbanization opens up a number of options to mitigate and reduce susceptibility, particularly in developing countries and emerging economies. Cities continue to be central drivers of economic growth and they often enable a rise in income both for the economy as a whole and for individuals. In turn, this increased income can be reinvested into reducing susceptibility (e.g. through measures to improve the structure of buildings or the availability of sanitation or health care infrastructure). Hence, it is hardly surprising that national urbanization rates are – on a global scale – positively correlated with per capita income levels and national HDI scores (UNDP 2013).

Urbanization and coping capacities

Also with respect to the capacities to cope with natural hazards and crisis situations, urbanization can imply both challenges and opportunities. In most developing countries and in many emerging economies, the rapid urbanization pressure leads to urban growth rates that exceed the capacity of government authorities to adequately develop and operate urban infrastructure e.g. for healthcare, flood protection, storm evacuation or, simply, an effective municipal administration (Kraas 2007). At the same time, small towns and medium-sized cities, equally experiencing rapid growth, often lack technical staff with distinctive urban expertise altogether.

In Vietnam, for example, the legal and institutional set-up of disaster risk management perpetuates a mindset that frames natural hazards as chiefly a problem of remote rural areas, rather than urban centers (Garschagen 2013). In addition, socio-economically marginalized groups face particularly grave difficulties in compensating for the lack of public hazard protection (e.g. with regard to flood barriers or emergency relief) through individual action or private market products (for example by purchasing health or property insurance or maintaining financial reserves to cope with crises).

However, urbanization also carries considerable potential for strengthening coping capacities. In principle, the high density of buildings and other infrastructure in cities allows for an efficient implementation and operation of protective measures such as dyke systems or pumping stations. At the same time, cities concentrate large numbers of people, putting them into direct reach of central disaster management facilities such as ambulance services or fire brigades. Further, the previously mentioned urban potential for boosting economic growth can also be translated directly into the enhancement of individual as well as public coping capacities in cities, under the condition of an appropriate and functioning institutional and legal framework.

Urbanization and adaptive capacities

Urbanization also implies a duality of challenges and opportunities with respect to key adaptive capacity factors (e.g. investments, educational standards or public participation). Grave shortages in these factors can be observed to date particularly in cities in developing countries and emerging economies. At the same time, however, many strongly exposed cities muster high levels of capital, innovation and political attention – e.g. New York City and London on the part of rich countries, but also Jakarta or Lagos on the part of developing countries and emerging economies. Therefore,

How does urbanization affect risk?

	Group features	Examples of countries
1	very high high high high to very high	Bahrain, Kuwait, Qatar, Saudi Arabia, United Arab Emirates
2	medium-high to very high high low to medium low to very high	Australia, Brunei Darussalam, Germany, Greece, Hong Kong, Japan, Oman, Portugal, Puerto Rico, Rep. Korea, Singapore, United States of America, United Kingdom
3	moderate to medium-high middle to high negative medium to high	Armenia, Bulgaria, Estonia, Latvia, Lithuania, Moldova, Poland, Romania, Russian Federation, Slovenia, Ukraine
4	moderate high low to high low to very high	Barbados, Equatorial Guinea, Liechtenstein, St. Kitts and Nevis, Trinidad and Tobago
5	very high middle low to medium low to very high	Argentina, Brazil, Chile, Colombia, Cuba, Djibouti, Gabon, Jordan, Lebanon, Libya, Mexico, Uruguay, Venezuela
6	medium-high middle high medium to very high	Angola, Belize, Cameroon, Côte d'Ivoire, Ghana, Indonesia, Malaysia, Panama, Philippines, Rep. Congo, São Tomé and Príncipe, Syria
7	medium-high middle low to medium low to very high	Algeria, Bolivia, Botswana, Dominican Republic, Georgia, Iraq, Kazakhstan, Macedonia, Mongolia, Nicaragua, Peru, Seychelles, South Africa, Turkey, West Bank and Gaza
8	moderate middle low to high high to very high	Albania, Bhutan, China, Egypt, Guatemala, India, Laos, Namibia, Nigeria, Pakistan, Papua New Guinea, Solomons, Senegal, Sri Lanka, Uzbekistan, Vietnam, Yemen, Zambia
9	moderate middle low to medium low to medium	Grenada, Guyana, Kiribati, Micronesia, Samoa, St. Lucia, St. Vincent and the Grenadines, Swaziland, Tonga
10	moderate to medium-high low medium to high low to very high	Afghanistan, Bangladesh, Cambodia, Chad, Ethiopia, Haiti, Kenya, Kirgizstan, Liberia, Madagascar, Malawi, Mali, Mozambique, Myanmar, Nepal, Rwanda, Uganda, Zimbabwe

= Level of urbanization:
Very high: >75 %; medium-high: 50 – 75 %; moderate: <50 %

= Level of income (per capita gross national income per year):
low: ≤1,025 US$; middle: 1,026 – 12,475 US$; high: ≥12,476 US$
(in accordance with World Bank classification)

= Average urban population growth per year (2000 – 2010):
high: >3 %; medium: 1.01 – 3 %; low: 0 – 1 %; negative: <0 %

= Per capita GDP growth per year (2000 – 2010):
negative to low: <1 %; medium: 1 – 3 %; high: 3.01 – 5 %; very high: >5 %

A look at different country groups

Description	Exp.	Susc.	Cop.	Adapt.
This group consists of oil-exporting countries of the Middle East with high GDP per capita and high urbanization levels as well as with high rates of urban and GDP growth.				
This group comprises high income OECD countries in Europe, Northern America and East Asia as well as some of the city-states in Asia with matured economies and consolidated urbanization levels.				
This group is constituted mainly by states of the former Soviet Union. It is the only group with negative rates of urban population growth, while comprising middle to high income countries with relatively dynamic economic growth.				
This rather small group comprises a number of small and geographically fairly dispersed countries with very low levels of urbanization but comparatively high average per capita income rates and different dynamics in urban and economic growth.				
This group consists of some countries in Latin America, the Middle East and Africa which have already reached high levels of urbanization and middle income but which experience continued urban growth and mixed economic development.				
This is a group of middle income countries with medium urbanization levels to date, yet with high dynamics in both urban and economic growth, comprising countries in Africa, Asia and the Middle East.				
Similar to group 6, the countries in this group have medium current levels of urbanization and income. Yet, their growth in urbanization is less rapid. The group includes countries in the Maghreb, in Southern Africa, Central and South America, Central Asia, the Middle East and Eastern Europe.				
The group consists of developing countries and emerging economies mostly in Asia and Africa with current urbanization levels of below or around 50 percent and with mid-income levels (largely lower-middle-income), yet with very dynamic urban and particularly economic growth.				
This group mainly includes countries with low urbanization and middle income (as in group 8), but with less dynamic urbanization and especially with lower economic growth.				
The countries of this group are largely developing countries in Africa and Asia with comparatively low current urbanization levels and low income but with highly dynamic growth in urbanization that is, however, in most cases not corresponding with high economic growth rates.				

Effects of urbanization on the WRI components

Exp. = Exposure; Susc. = Susceptibility; Cop. = Lack of coping capacities; Adapt. = Lack of adaptive capacities

- = strong improvement for the overwhelming majority of urban residents
- = improvement for the overwhelming majority of urban residents
- = no significant effect
- = deterioration for the overwhelming majority of urban residents
- = strong deterioration for the overwhelming majority of urban residents
- = strong differences in the effects experienced by different urban population groups

Source of data and assessment methodology: The data sources and the methodology for the country grouping is based on the analysis in Garschagen and Romero-Lankao (2013). The assessment of effects of urbanization on risk (right column) is based on a comprehensive literature review and the expert judgment by urban scholars in UNU-EHS. Owing to the overview character and the generalizing approach, this assessment needs to be regarded as an approximation only.

such metropolises have, at least in theory, the potential to play a pioneering role in the accumulation of adaptive capacities and the development and implementation of adaptation measures. In this context, the crucial question for developing countries and emerging economies will be whether the projected future urbanization (see chapter 1) is going to trigger sufficient economic growth and equitable socio-economic development so as to provide the resources necessary for successful adaptation – or whether urbanization will be paralleled by economic stagnation, truncating the urban potential for development and adaptation.

Conclusions

The above exploration demonstrates that there are multi-facetted and often ambiguous feedbacks in the relationship between urbanization and urban risk which make it extremely difficult to predict future risk dynamics – especially in highly transformative developing countries and emerging economies. This is due to the fact that urbanization can – depending on the context – drive up urban disaster risk while, at the same time, unleashing potential for risk mitigation. Most notably, urbanization often leads to increasing levels of exposure towards natural hazards, frequently coupled with growing susceptibility, while on the other hand contributing to a strengthening of the capacities to cope with and adapt to these hazards. The question of whether individual countries and cities will be able to harness the urban opportunities for mitigating the impacts of natural hazards ultimately depends on the implementation of integrative and effective risk governance, as the following articles will illustrate.

2.2 Light and dark – citizens and invisible city-dwellers

Almuth Schauber

Cities divided into light and dark – a phenomenon that is a characteristic of many metropolises in developing countries at night, such as Delhi, Mumbai or Manila. In developing countries and emerging economies, this divide conceals a spatial and social logic that one only notices in daylight. Why does this light and dark occur, and what exactly does a city's light and dark symbolize?

These questions can be answered best from the perspective of those who live in the city, but are not necessarily citizens of the city who are able to enjoy all the rights afforded to full citizens. The historical notion "the air in the city makes you free" suggests that all city-dwellers are citizens. It is this notion that arouses attention precisely when not everyone who lives in the cities are citizens. These individuals live in the cities and contribute to them but at the same time, they have only limited access to decision-making and power structures. They are living in the twilight zone as unregistered inhabitants that are not represented in the city's statistics. They and their children are denied access to public services such as a steady power supply and sanitation as well as healthcare and educational institutions.

In some countries, citizens' rights and rights of access are automatically acquired at birth. In other countries, however, one can only be registered as a citizen if one has an address in a legal residential area, whereas informal settlements lack legal status even if some of them have already existed for generations. Throughout the world, around one billion people are currently living in informal settlements, almost all of them without citizens' rights. By 2030, this figure will have doubled and is set to rise threefold by 2050 (UNFPA 2007). In developing countries, four out of ten city-dwellers live in huts,

squatting on lots. In Mumbai, India, these people account for at least 55 percent of the inhabitants. 30 to 50 percent of all newborn children in the rapidly growing cities and metropolises of the developing countries and emerging economies are not registered due to their parents' informal status. (UNICEF 2012).

Many cities have systematically turned a blind eye to both the extent and the consequences of informal settlements. The reasons for the non-legalization of these informal residential areas may be due to the property situation of the land settled on or its proximity to rivers, railway lines, airports, roads or steep slopes. People settle in these districts because of a lack of residential areas, an issue that has been ignored for decades. In India, for example, there is a shortage of just below 25 million homes, almost all of which are needed by low-income people (Government of India 2007). This translates into a major, and in many cities, growing part of the population living in informal settlements. This population often represents significantly more than half of the total population. The cramped, formally unrecognized settlements in low-income and dangerous residential areas are a symbol of social, political and economic exclusion.

In the context of natural hazards, the risk is multiplied by the type of settlement areas and the form of settlement. If it were possible for people to settle in safe areas, and if measures to make their houses safer – many of which would be easy to implement, such as reinforcing roofs or walls – were available to them, there could be significantly lower levels of damage (to persons) in extreme natural disasters. The risks faced by those living in informal settlements are exacerbated by a lack of infrastructure development (sewage systems, embankments) and early warning systems and evacuation plans. This combination of exposure and living conditions has dire consequences. A further

Country example Philippines

Displacement as "protection" against disasters

The Philippines are regularly hit by severe typhoons – people still vividly recall the shocking images in the wake of "Haiyan" in November 2013. Haiyan spared Manila, but in 2009, the capital bore the full brunt of "Ondoy" and "Pepeng". More than 1,000 deaths were registered, and 200,000 houses were destroyed or damaged. As is so often the case, Manila's low-income population living in extremely precarious homes along the river banks were especially hardly hit.

In many Asian metropolises, the numbers of urban poor are rising rapidly. In Manila alone, 540,000 people live along the banks of a widespread network of river tributaries under bridges, on dams or on slopes. Here, they are exposed to dangers such as floods and landslides without any protection. All in all, around three million people in Manila live in areas threatened by flooding.

After the disastrous storms in the autumn of 2009, the government enforced the implementation of the "Flood Control Programme". The plan was to ensure that a three-meter-wide buffer zone between the river banks and the residential areas was observed and no longer built on. However, putting these measures into practice would result in at least 500,000 people losing their homes without being offered any alternative. The Misereor partner "Urban Poor Associates" (UPA) presumes that protecting people against flooding is also a pretext to carry out and legitimize evictions that have been planned long beforehand. So far,

→ continued on page 20

→ Country example Philippines, continued from page 19

official planning provides for embankments being built around the areas affected once they have been cleared and the new spaces being used for commercial purposes. However, according to UPA, embankment could also be accomplished in combination with the protection of existing settlements.

Together with other organizations, UPA, which has been supported by Misereor since 2007, is taking a stand for the most marginalized groups in society to assert their right of residence. One of their activities is to promote networking among the residents of low-income districts and strengthen their potential to help themselves so that they can improve the conditions they are living in with their own resources. For example, supported by a renowned architect's office, the inhabitants along a stretch of river have presented an alternative planning concept that enables both the important embankment measures and the retention of their right of residence. This requires that the most marginalized urban residents succeed in gaining the attention of politics and society. Here, UPA can draw on a wealth of experience it has gathered over time. In other cases, joint efforts have resulted in families being able to carry on living within the city in new settlement areas. For here, the people concerned have significantly better income prospects than on the periphery, where they were originally supposed to be relocated to.

In 2011, the steady activities of the NGOs which are campaigning for the rights of the marginalized urban populations had a very concrete impact. The Aquino government set up a fund with 50 billion pesos (83 million EUR) for inner-city resettlement projects for 104,000 families. Back in the early 1990s, together with other NGOs, UPA had already succeeded in bringing about legislation outlawing evictions, the Urban Development and Housing Act (UDHA), which is unique in Asia. However, this law on the protection of the rights of residence and abode has loopholes for displacement if infrastructural measures aimed at protection against natural hazards are carried out. UPA is involved in lobbying and media activities urging that these loopholes be closed. Initiatives of such importance as the "Flood Control Program", which cover cities as a whole, must also address the interests of the most marginalized.

Barbara Wiegard, Almuth Schauber, Misereor

hazard arises from improperly installed access to energy, such as power lines and gas mains. Fire, often also in conjunction with natural events, also represents a tremendous risk in and for informal settlements.

The fact that the administrative actions of the municipal administration/authorities are only intended for registered citizens and not for informal city-dwellers has particularly disastrous consequences. On the municipality level good governance would entail meaningful infrastructure development and protective measures as well as adaptation measures to climate change – for the benefit of the city. Involving civil society structures in these urban planning processes should be integral to this process. Here, the inclusion of city-dwellers who are not citizens is a challenge, also in terms of development cooperation. But given the role many municipalities see themselves in, they are unlikely to consider the situation of city-dwellers. Both administrative and political decision-makers frequently fail to notice that informal settlers have rights and that municipal administrations have to guarantee these rights.

Municipal action – tackling darkness in the light

If a municipality does not see its mission as providing municipal services to all of its inhabitants, how could it protect its entire population in the event of a disaster? Many municipalities in developing countries and emerging economies are currently attempting to adapt their city's infrastructure to the effects of climate change. Rather than providing people in informal settlements with a safe environment, municipalities are often threatening them with evictions. In this case, what is the role of municipalities?

The municipalities identify areas that are at a particular risk for floods, landslides or heatwaves – with the aim of making these areas

safer. Many cities have defined buffer zones along rivers (frequently three to five meters wide) in order to implement (technical) protective measures, for example in Manila and Jakarta. The people living there hope for improvements in their living conditions, e.g. securing their settlements, sewage systems, access to power and drinking water. But these aspects are not considered by the municipalities. Instead, in practice, such adaptive measures often mean that people living in informal settlements lose their homes – without any compensation. This is why the responses by municipalities are often a threat to the informal settlers in addition to natural hazards and the conditions they are already living in. Expulsions, which have been planned for a long time, and which were intended to serve as a "beautification of the city" and a rededication of lots, can be made socially acceptable by referring to protecting the city and particularly vulnerable people. And then, for example, luxury homes and business areas are developed along dyke systems. Where alternative settlement areas for the original inhabitants might be available and whether these will be provided at all is hardly an aspect of urban planning and social debate in this context.

At the same time, it is frequently the case that informal settlers are blamed, e.g. in the event of flooding. It is argued that informal settlers "block" the flow of the rivers and overflow areas. Such rhetoric eclipses the fact that cities particularly badly affected by flooding, such as Manila or Jakarta, have been practicing deficient environmental management for decades, e.g. by not making any investments in improving the sewage system. In Jakarta, where half of the urban area was flooded in the winter of 2013, just two percent of all homes are linked to sewage systems.

In addition, many municipalities are fighting a losing battle with the globally unprecedented growth of their cities. They are inexperienced in dealing with informal settlements and have reservations towards informal settlers. The consequence is failure: In Jakarta, the municipal authorities made an attempt to record all informal settlement districts. 392 were identified, but even in this survey, 64 were overlooked – a discrepancy of 16 percent of the informal settlements that were established (Indonesia Business Daily, January 2014; project communication of Misereor with Rujak 2014). The fatal consequence: If necessary data with regard to the size of the population in an urban center are missing, any need-based planning and thus any assignment of services including adequate protection measures in the event of a disaster is impossible.

Mapping and enumeration to counter invisibility

How can city-dwellers stand up for their districts if basic preconditions – the acceptance of their settlements and being perceived as citizens –are not fulfilled? How can a municipal administration notify informal settlers of a hazard without being in contact with a settlement?

Good governance is simultaneously a precondition and a goal in efforts to achieve safety and functionality in cities. Good governance is tangible when living conditions improve and poverty is reduced. Here, developing the acceptance of a democratic distribution of land and political and social participation is a further aim.

This is put into concrete terms when it comes to making informal settlements visible and keeping records of them. Grassroots organizations are addressing this gap by mapping their settlements with the precise number and location of houses as well as all infrastructures that the settlements have been provided with. Last but not least, in an enumeration process, the number of people living and working in the districts is

established. In this manner, claims can be justified, and the inhabitants can acquire an identity and, often for the first time, an address. Over the last few years, grassroots organizations have extended their mapping activities around hazard scenarios.

Over the last few years, informal settlers in developing countries have taken adaptive measures to respond to threats posed by natural hazards. For example, grassroots organizations have prepared emergency action plans and early warning systems for their settlements. They are attempting to have budgets provided by the municipal authorities for this purpose. Unfortunately, again and again their proposals are ignored by the authorities. At the same time, there is a need for examples and concepts of how cities can enhance their resilience – in cooperation with the inhabitants. Consequently, from the perspective of the informal settlers, the objective is to ensure that their interests and their experience-based knowledge are not only recognized but also play a role in decision-making. See the project example of the Philippines on page 19. In this sense, it is crucial for the informal city-dwellers to speak with one voice, and articulate and represent their interests towards local authorities. It is also important to maintain records of "best practices" that could serve as a model to others in conjunction with a network of grassroots groups that support each other in lobbying municipalities and implementing and discussing technical measures. In the context of natural hazards, the need for protection and the right to protection have to be addressed and assured both in administrative action and in political decision-making processes.

These are highly political negotiating processes. For example, what will the future be like for a settlement in the Philippines – situated on the banks of a river estuary that is exposed to flooding both by the river and the sea, often all at once? Livelihoods and people's identities are firmly connected to the sea – where could they live safely by the sea in a densely populated urban area? How will things carry on in settlements where inhabitants were already living on the margins of society before a disaster hit? What happens to settlements serving as refuge for people who would not have found any housing otherwise?

Not only does solving such problems require that municipalities recognize the rights of all city-dwellers and thus turn their needs into an issue the administration / politics as a whole has to address, but it also calls for financial means. From the perspective of the informal settlers, climate adaptation projects make sense if they are poverty-oriented, however, this is frequently ignored. Therefore, supported by architects, grassroots organizations are developing alternative plans showing concrete alternative options that serve the interests of the city-dwellers while being beneficial to the city as a whole (see project example on page 19).

"Documents that are worth more than life itself"

Natural hazards are a threat to the physical existence of all people. However, owing to the circumstances they are living in and the areas where they live, city-dwellers in informal settlements tend to be particularly exposed to hazards. Privately, these people have little ability to provide for their own protection. No traditional bank would ever approve a loan, and no conventional insurance company would ever insure them. Without micro-insurance (see box on the right), they can lose everything in the event of flooding or an earthquake – just like Enamul Khan from Calcutta. Early in April 2014, fire broke out in Enamul's informal settlement, making 5,000 people homeless. But in a situation where homelessness is a reality and all valuables are destroyed, Enamul was most affected by many of his friends having lost vital official

Microinsurance to protect the poor – an advantage for cities?

Microinsurance has seen rapid development over the last ten years. Between 2005 and 2011, the number of those insured more than doubled in Latin America and the Caribbean, and even trebled in Africa, so that there, 7.8 and 4.4 per cent of the population are now microinsured. The microinsurance market is also growing at a fast pace in Asia, often at two-digit rates. In India, the country with the largest number of microinsured clients, more than 110 million people are now covered.

The insurance products, which are based largely on the market economy, aim to provide protection against shocks for people with a very small income. In the event of severe illness, a disaster, an accident or a death in the family this prevents them from falling into the poverty trap. According to the latest surveys of the Inter-American Development Bank, the Münchener Rück Foundation and Gesellschaft für Internationale Zusammenarbeit (GIZ), more than a quarter of a billion people are microinsured across the globe. In addition, alone in Asia, 17 billion people are safeguarded by so-called "social microinsurance", i.e. systems that are very similar to social security systems and are frequently operated and also subsidized by the government. According to a 2010 Swiss Re survey, the market potential is at 2.6 billion people worldwide. A further 1.4 billion could be covered via government systems or "social microinsurance".

One big challenge is the considerable transfer and development costs in relation to the premium level. First of all, people's demand has to be established, and then suitable products need to be developed. Since the target groups have often never heard of insurances, it is important to inform them about how they work and the rights involved. The sale of insurance policies, client services, collecting premiums and the settlement of claims require a considerable effort. Usually, microinsurance only becomes profitable when a large client base has been created, costs are low and systems are well established. In combination with a microcredit, life insurances offer favorable conditions. They are relatively simple to handle. For payment flows and client relations already exist, while training programs and other transactions are simpler. Already existing communities such as cooperatives or church parishes offer particularly favorable conditions.

While agents also regularly visit rural areas in India, clients have to come to the bank or an insurance office in many other countries. Thus city-dwellers enjoy a considerable advantage compared to the rural population. For thanks to the short routes involved, selling policies is much simpler, which can save valuable time and money. Sale via mobile phones offers new opportunities. For mobile communications exist everywhere nowadays – also in rural areas.

In terms of risks, cities and rural regions differ according to their location. Generally, the rural population, who usually have to rely on agriculture, are threatened much more by drought, whereas in cities, poor people very often live in exposed areas such as slopes or areas that are subject to flooding. Nevertheless, illness and death are perceived as the greatest risks everywhere.

Thomas Loster/Dirk Reinhard, Münchener Rück Stiftung

documents that at least partially enabled them to be citizens: "Some inhabitants have lost certificates and identity cards that are worth more than their lives. Whereas I, for example, was able to save my high-school certificate, many children and promising students have lost their identity cards and certificates, documents that have given them an identity – and the sole proof of their civil rights." (Project communication of Misereor with Tiljala Shed 2014)

Enamul Khan's statement highlights the vital significance of light and dark for city-dwellers who are not allowed to be citizens. However, this quote also shows that the informal city-dwellers can only improve their living conditions by working together with the municipal authorities. From the perspective of the informal settlers, this is the difference that characterizes the relationship between power and precipitated powerlessness, whereas actions taken by many municipal authorities and politicians demonstrate that they still do not wish to change this situation. For all city-dwellers to become citizens, it is necessary that a firm political will is achieved together with the awareness that responsibility for human rights, security and social peace is inseparably linked and thus cannot be split into light and dark and the detrimental separation of citizens and non-citizens – neither before, during or after disasters.

2.3 A city of arrival and its wild growth

Thomas Seibert

Two disasters in quick succession immediately drew the world's attention to Dhaka and the rapid process of urbanization in Bangladesh. On November 24, 2012, more than 100 workers were killed in the fire that broke out in the "Tazreen Fashion" factory in Ashulia, on the outskirts of Dhaka. Five months later to the day, the factory complex "Rana Plaza" collapsed in Savar, Ashulia's twin city. More than 1,100 workers died, while over 1,500 were injured (Jeppesen 2014). However, not only was and still is the mass of deaths distressing; what is even more distressing is the very conditions that these people are living and working in. It remains outrageous that ultimately, the circumstances that they live and die in is determined not locally but far away: in the countries of North America and Europe, in which the textiles manufactured in Dhaka have become a mass commodity of incessantly growing consumption at steadily falling prices. The survivors of the two disasters and next of kin criticize with great indignation that political decision-makers, businesses and consumers in the countries of North America and Europe have drawn no consequences that are visible to them at the local level.

The disasters in the industry are a warning sign of what would beset the metropolitan region of Dhaka in the event of an earthquake. There is a realistic danger of such a disaster occurring. Alongside floods and cyclones, earthquakes are the other major natural hazard in Bangladesh (Bangladesh Disaster Knowledge Network 2013). The country is the most densely populated territorial state in the world, with more than 1,087 people living in one square kilometer. In Dhaka, Bangladesh's largest city, this number is even higher. Here, more than 8,200 people on average are crowded on one square kilometer (Bangladesh Bureau of Statistics 2011). In spite of this, the city's population is growing by 1,400 new arrivals a day (Grefe 2013).

Therefore, understanding megacities first of all means viewing them as "cities of arrival", as they are referred to by Canadian author Doug Saunders (Saunders 2011). At the same time, it means regarding urbanization itself

as a process of social movement, because it is based on an at least potentially political desire: the wish, shared by millions of people across the world, to escape the unbearable living conditions in rural areas and achieve a better and more decent life in the city. The deeply contradictory character of this movement is reflected by the fact that in most cases, it only leads to another misery: starting with countless individuals failing to find a place to live in the city in the first place, which means shelter and access to drinking water, food, health and education facilities as well as scope for cultural expression.

Dhaka as an example of the urbanization movement

However, the contradictory nature of the urbanization movement also means having to simultaneously regard a country's urbanization as a ruralization of the city. Dhaka is also a good example to demonstrate this aspect. Whereas the metropolitan region has an estimated population of 15 million today, in 1950, little more than sixty years ago, it was just 400,000. But this means that the overwhelming majority of Dhakayas are only living in the city as first or second generation immigrants and that their attitudes and lifestyles continue to be profoundly shaped by a rural environment. What applies to an individual's way of life also holds for the social relations and the social texture in general. The crucial ties of most Dhakayas go back to the rural areas, to the region of respective origin. The double aspect of urbanization and ruralization becomes apparent when one traces the route taken by the 1,400 daily new arrivals (Grefe 2013) and passes from the true rural region and the true urban region through what is known in Bangladesh as the "Greater Dhaka Area". It is accessed by arterial roads and is basically nothing more than a single urbanized country road lined left and right by one or even two or three rows of buildings each: workshops, shops, restaurants, stores, sometimes becoming denser and then thinning out

Country example Bangladesh

Catastrophic working conditions

Over the last thirty years, globalization has not stopped at the textile industry. Jobs have been transferred almost entirely to the global South, and from there often to the urban fringe of megacities like Dhaka in Bangladesh. Today, in the metropolitan region of Dhaka, about five million of its 15 million inhabitants work in textile factories. Their living and working conditions are therefore typical of day-to-day life in many big cities.

The textile workers in Dhaka drew the attention of the world when fire broke out at "Tazreen Fashion" in November 2012 and when the "Rana Plaza" complex collapsed in 2013 – disasters that claimed the lives of more than 1,200 people and left over 1,500 injured, many of them seriously. That their situation can now improve little by little is due crucially to continuing public interest in the tragedy. Immediately after the first disaster, medico international took advantage of all access it had to the media to enable its South Asian partners to gain attention. Spokespeople for the Bangladesh's National Garment Workers Federation (NGWF) and its Pakistani sister organization, the National Trade Union Federation (NTUF), toured around European cities, met representatives from the media, politics and the trade unions, and addressed local meetings as well as major events such as the "Umfairteilen" Congress in Berlin in May 2013.

→ continued on page 26

→ Country example Bangladesh, continued from page 25

Financial backing of the NGWF included both support for campaign activities and providing it with funding for the payment of individual immediate aid to the survivors and the bereaved. In all, a total of 15,000 euro was made available for this purpose. The health organization "Gonoshasthaya Kendra" (GK), which has been a medico partner in Bangladesh since 2006, received 17,000 euro to ensure further medical treatment in fifty particularly severe cases and run five "health camps" in textile workers' housing districts where teams of health workers supported by medical practitioners provided mobile primary healthcare. This was done to stand by the survivors of the disaster in health issues but also to draw attention to their human right to access to healthcare. The Research Institute for Social Equity (RISE), founded by young activists, was supported with a budget of 10,000 euro. RISE is recording the extremely dramatic situation of the survivors and making this documentation available both to the negotiations on compensation and to the international media.

As insufficient as these measures may appear given the two disasters, they have contributed to making the world more aware of what life is really like in the industrial cities of the world market. Further information activities are necessary. For improvements in the working and living conditions in the producing countries depend on decisions taken in the executive committees of the textile corporations, and also on the purchasing behavior of consumers in the industrialized countries.

Thomas Seibert, medico international

again but only interrupted by wasteland at very few points. In the main, the inhabitants of this area are those crossing it: hundreds of thousands a day on the way from the rural districts to the city, or from the city to the rural districts.

A world market megacity

Dhaka's growth is based heavily on the growth of its textile industry, which started around 1980. In just under three decades, Bangladesh has become the second-largest textile manufacturer in the world, and 4,000 of the country's 5,000 factories are in Dhaka, all of which produce goods almost exclusively for the world market. While these factories currently employ about five million workers, it is their income that the survival of up to 20 million people depends on, if the relatives in the rural areas are included (BGMEA 2012).

The textile workers also usually live as first or at most second generation immigrants in Dhaka. They work between ten and fourteen hours a day, six days a week, which earns them 60 dollars a month: the sum that sets the poverty line worldwide. This enormous performance is achieved by working in buildings threatened by fire and collapse, in unfiltered air sodden with textile fibers, and in great heat and deafening noise.

Just like 40 percent of all of Dhaka's inhabitants, the majority of the textile workers live in the slum districts which, taken together, only account for a twentieth of the city's overall area. The huts and the houses divided into one-room flats in which they "recover" from their ten- or fourteen-hour shifts are usually in the immediate proximity of the factories, in places that only consist of these factories, houses, huts, a couple of street markets each and the most basic street restaurants. The reason for the textile workers being some of the winners among the new arrivals is simply the fact that they are earning a steady income that

they can also reckon with, i.e. that they enjoy a minimum of security that the majority lack.

The struggle for compensation

One year after the collapse of "Rana Plaza", the disputes over compensation and improvements in working conditions and industrial safety are still not getting anywhere. The fire prevention agreement for Bangladesh, which was given much attention by the media, has been signed by a large number of companies but not even 10 of the agreed 40 million US dollars had been paid into the compensation fund by March 2014 (Süddeutsche Zeitung 2014).

The situation of the survivors remains critical. Whereas they were at least given medical first care, in most cases, necessary secondary and further care has only been secured for few, and just a very small number of victims are given physiotherapeutic and psychotherapeutic assistance. Since all compensation was paid on a voluntary basis and was, in nearly all cases, well below the amount required, while at the same time, only a minority of the workers concerned found new jobs, many survivors have become drastically impoverished. The most tangible consequence is the loss of accommodation, having to resort to even poorer residential districts, or falling into homelessness.

Dangerous union membership

That such a situation could arise and fundamental changes have not yet occurred is also due to the weakness of trade union support structures, given a level of organization among the Dhaka textile workers of just one percent. Although Bangladesh guarantees this right, a worker joining a trade union risks losing his or her job, and hence his or her own survival as well as that of the family. Living in a city of arrival means knowing that, within the shortest notice, hundreds will be applying for one's own job.

Country example Brazil

Reducing conflict and violence, strengthening urban communities

Fourteen-year-old Murilo gives the ball an artful kick. Fernanda stops the ball and passes it to unmarked Marcio. A header and – it's a goal! The children of the Favela Santa Madalena, in the east of São Paulo, which, with its more than 20 million inhabitants is one of the fastest-growing metropolises of Latin America, often play soccer, and always in the street. The concrete access road to the Favela, in which more than 5,000 people live in improvised homes, is their arena.

It is just a ten-minute drive to the Itaquerão Soccer Stadium – newly built for the 2014 Soccer World Championship, and a mirror image of reality in many a megacity: on one side, investments in large-scale projects worth millions and the development of lucrative inner city complexes and, on the other, the majority of the population on the periphery, living in poverty and without sufficient security.

The government's social welfare programs of the last few years have resulted in a reduction of the worst forms of poverty, but so far, they have not triggered any structural changes. An inflated bureaucracy, persistent, rampant corruption and police operations involving violence continue to prevent the inhabitants of the Favelas from developing their communities. Life is largely determined by domestic violence and drug-related crime. More than 50,000 victims of violent crime across the country in 2013 signify a permanent threat. Retreating to private areas represents a defensive reflex the consequences of which are social isolation and the loss of viable social networks.

→ continued on page 28

→ Country example Brazil, continued from page 27

The program "A Chance to Play", supported by terre des hommes and Volkswagen employees, addresses a key matter of concern. Within the scope of their capabilities, children and youths are to become responsible, engaged actors. Here, "A Chance to Play" regards itself as a contribution to the implementation of the UN Children's Rights Convention, which also attests the right to an intact environment and safe areas to play in.

Back in Santa Madalena, the children and youths discuss the rules of the game. Girls and boys play together. It is not only goals that determine who wins. Points can also be scored with fairness, involvement and playing ability. After the game, the points are awarded in debates that can often carry on for a long time. Here, children and youths learn how to actively participate, and they practice respect and dialog and discover what it is like to be in a community. A total of ten personnel work with the roughly 700 children and youths at the "A Chance to Play" children's rights center Sapopemba, four of them fulltime. In all, the children's rights center Sapopemba has 140,000 EUR at its disposal for a period of two years. Street soccer, graffiti, Capoeira, theater, photography, video and drumming – the program for the children and youths living in this urban district contains a wide range of activities.

Soccer artist Murilo stresses: "We play a lot of soccer, and I love painting graffiti on our Favela's walls, which are usually grey. We do everything together in the project. For me, what is really the most important discovery is the strength that our community has." Sapopemba works together closely with the families, with neighborhood groups and municipal institutions, and with its children's and youths' groups. It is an active element of urban district organization. Given the large number of fires in the Favela, its inhabitants have organized an alarm and extinguisher system, but have also concentrated on how the fires are caused. In addition to the poor gas and electricity installations as well as the generally flimsy method of construction, they suspect that "hot demolition", with which the investors smooth the way for new construction projects, represents an important cause of fires. The inhabitants are opposing this and demanding that the authorities guarantee their rights and their safety.

Werner Lamottke, Beat Wehrle, terre des hommes

Even so, neither the textile workers of Dhaka nor the other new arrivals in the megacity can be described merely as the victims of an urbanization process that has been thrust onto them. As a social movement, urbanization is also always driven by the everyday creativeness of survival and life: a spirit of improvising and a will to assert oneself that is expressed, usually unpredictably, in political demands as well. In Dhaka, this could be observed between September and November 2013. For weeks, several tens of thousands, and occasionally even hundreds of thousands of textile workers joined forces and organized a mass movement. With persistent demonstrations, they forced an at least formal increase in the legal minimum wage level of 75 percent (Muller 2014). If they manage to have the success that has so far scored only on paper enforced at individual company levels as well – which is going to be a second hard struggle – they will then not only have improved their personal income situation but will also have changed the city as a risk area. Dhaka will then have become an area where also those have the power to shape developments who so far had to make do with the option of struggling along individually. In order to understand what this can mean, one only has to recall the history of urbanization in Europe, or more precisely, the role that the European workers' movement played in overcoming the terrible misery characteristic of the poor districts in Europe's industrial cities. Of course history cannot simply be repeated. The problems of Dhaka already exceed the problems of Europe's industrial cities in the late 19th and early 20th century by a multiple in terms of their sheer quantity, and they are posed in a world which can no longer be compared with that of the 19th and 20th century. What still remains true is that, just like in Liverpool, Berlin or Vienna at that time, the challenges Dhaka poses can only be overcome by the organized action of those who first of all have to face them in the new arrivals' individualized struggle for survival.

Local and global responsibility

Reference to the wave of strikes among textile workers that were maintained for more than three months is also instructive in terms of action that aid, development and human rights organizations can take – as well as pointing to what people who happen to be at the other end of the global trade chains purchasing jeans and T-shirts manufactured in Dhaka can do:

+ If megacities are cities of arrival in the widest sense, then help and solidarity are required so that those newly arriving every day are to be able to stay. Such help and solidarity classically starts with "help towards self-help" and "working with partners" in all major areas of day-to-day life: housing, health, education, options for participating in the city.

+ If the solidary structures of the new arrivals – the trade unions in the case of the textile workers – are, of necessity, weak, they have to be supported on a partnership basis recognizing their own formal organizational status. Supporting a trade union run by hundreds of members acting in an honorary capacity without a fulltime head office has to look different from supporting a non-governmental organization run by a small number of employees that campaign for others on a professional basis.

+ If the problems of the megacity, which are concentrated in an exemplary manner in the textile industry, can in no way be solved at local level because they are caused by global society as a whole – by the structures of the global textile trade in the case of the textile workers – they have to be understood as global problems that can as such only be solved globally. If aid is to be more than disaster relief in the risk area of the megacity, which as such has always come too late, the chief issue must be that of disaster prevention. Disaster prevention also starts with a liability regime according to which an enterprise that has sewing carried out in Dhaka has to bear responsibility for the conditions under which this is taking place. Import regulations that also include the conditions that products are manufactured in and their origin with regard to liability could support efforts to achieve reasonable and decent working conditions.

In no way can such regulations contribute to preventing the inconceivable suffering that the people in Dhaka would experience in the event of an earthquake. Nevertheless, they would be enough to prevent a repetition of what happened there on November 24, 2012 and April 24, 2013. At a closer glance, this ought to sufficiently demonstrate just how necessary they are.

2.4 Urbanization and food security

Ira Matuschke*, Stefan Kohler*

Food security means that a country's inhabitants are provided with sufficient and healthy food, everywhere and at any time, including in crisis situations. The global population is expected to continue to grow, especially in urban regions, which also implies a rising demand for food. Already the need to secure food for more people is confronting agriculture with the monumental task of working more sustainably and productively. Rapid urbanization, which occurs mainly in emerging economies and developing countries, means that people and governments will be facing further enormous challenges. For example, a Nigerian city with four million inhabitants requires around 3,000 tons of food a day. In order to provide this quantity, two lorries would have to each deliver three tons of food to the city every three minutes (Bayo 2006).

In contrast to rural regions, food is usually not grown in city areas and it is increasingly also no longer prepared there (FAO 2013). In terms of food security, city-dwellers, who earn more on average, are more dependent on external factors than the rural population. However, currently most of the cities in emerging economies and developing countries do not have the resources to develop urban infrastructure to keep pace with the rapid rise in population numbers (UN-Habitat 2014). Thus, urbanization could lead to an increase in the number of people living in urban slums, in which food security is more difficult to achieve than in planned settlements.

Whether the opportunities or the risks of urbanization regarding food security will predominate is going to depend crucially on how the rise in economic prosperity in urban areas is utilized.

* This article reflects the opinions and views of the authors, but not necessarily those of the Institute for Advanced Sustainability Studies or Charité University Medical Center.

Food security is a multi-layered concept. The Food and Agriculture Organization of the United Nations defines four key dimensions of food security:

+ sufficient availability of food
+ secured access to food
+ adequate and need-based utilization of food
+ long-term stability of food supply.

Urbanization can affect all of these four dimensions of food security.

Availability of food

Food supply: Urbanization processes are sharpening competition between areas used for agricultural production and areas used for expanding urban settlements. This can mean that agricultural production will have to retreat to less attractive locations (Matuschke 2009). Moreover, climate change will increasingly impact agricultural production and animal husbandry. It is expected that many farmers in developing countries will have to grow their crops in drier conditions, and extreme natural events such as droughts or floods will occur more frequently (IPCC 2014). Exposure to extreme natural events can reach a point where land becomes unsuitable for crop production and animal husbandry. A soon as there is no more adaptive capacity, the resulting loss of production will affect food supply and – in connection with food demand – food prices.

Food demand: Urbanization affects the composition of food demand. Since eating habits in cities are different from those in rural areas, a shrinking demand for staple food such as wheat, rice and millet is expected. In contrast, the demand for animal and protein-rich food, such as milk products and meat as well as

for fruit and vegetables will increase sharply. These changes in the composition of demand can be explained by higher incomes and global changes in the lifestyle of the urban population (OECD-FAO 2014).

Access to food

Food prices: Household expenditure on food depends on many factors, such as food prices, the purchasing behavior of individual households, the possibility to produce individual foodstuffs oneself (e.g. in one's own garden) or the extent of and access to food via the government or private assistance (e.g. subsidies, food expenditure, food donations) (Ruel and Garrett 2004). Since the urban population in developing countries, and partly also in emerging economies, spend a large share of their income on food, they are on the one hand especially threatened by fluctuations in food prices. On the other hand, unlike the rural population, city-dwellers can draw on a larger and more diversified supply of food. This means that city-dwellers are in a better position to adapt the composition of their food consumption to a certain degree when price fluctuations of individual foodstuffs occur. Compared to previous years, fewer strong price fluctuations for staple foods are projected in the next decade, because of the smaller growth rate of staple food crops produced for biofuels and other industrial non-food purposes (OECD-FAO 2014).

Commercial food value chains: Nowadays, due to urbanization and income growth, most people in developing countries must at least partly rely on food from commercial food value chains. These comprise a mixture of traditional (e.g. street vendors, small merchants, farmers) and modern actors (e.g. supermarkets, food manufacturers, restaurant chains) (Gómez et al. 2013). In South Africa, for example, a considerable share of the population in informal (19.4 percent) and formal (16.7 percent) urban areas eat at least twice a week at street vendors or snack-bars. In contrast,

Country example Liberia

Monrovia – the city as a place of refuge

Between 1989 and 2003, Liberia experienced two brutal civil wars with a total of around 450,000 victims. In particular, the villages in the country's interior were terrorized by marauding fighters pillaging, maiming and raping inhabitants. The capital of Monrovia was a relatively safe refuge, so that a major portion of the rural population fled there. The city's population of originally 300,000 people grew fourfold. Today, more than a third of Liberia's population live in Monrovia.

Initially, the peasant refugees could not find enough employment in the capital and suffered from hunger. They were forced to set up their huts and temporary homes wherever they happened to find space, while also making use of every vacant lot they could find to grow food, including sweet potatoes, cabbage, leafy vegetables, eggplants and tomatoes.

Even today, the food situation remains critical. 30 percent of the children in Monrovia are said to be suffering from malnutrition, although 50 percent of the population in the metropolitan region of Monrovia have a plot of their own or tend a small kitchen garden. This is what the Welthungerhilfe program launched in 2009 with financial support from the EU and involvement from the municipal authorities and the Ministry of Agriculture centers. First of all, tools and seeds were handed out to the farmers. They were given advice on irrigation and tillage, supported in direct marketing via farmers' markets and in organizing an urban farmers' association. The measures reached around 1,000 families in Monrovia and the surrounding areas that are organized into 45 farmers' groups. 60 percent of the direct contacts were women.

→ continued on page 32

→ Country example Liberia, continued from page 31

Whereas vegetable growing has become well established in the areas immediately surrounding the city, developments in the inner city districts face a large number of problems. For example, growers have no legal ownership of the land, which means that they enjoy no security regarding their production basis. The urban farmers' association is therefore campaigning on behalf of the growers to ensure that they do not lose their plots without compensation once new construction and infrastructure projects are pending.

A further major problem that the program evaluations of Welthungerhilfe point to is that much of the cultivated land in the urban areas bears health hazards, for example when vegetables are grown in hygienically dubious conditions on refuse grounds or on the premises of sewage works, but also when heavy metals pollute the plants grown next to roads.

Monrovia's authorities have recognized that farsighted urban planning with a dedication of areas safe to use for horticultural purposes would be very useful for urban development. Such protected green areas in the urban area that can also be used for vegetable growing must not be built on in the long term, and a binding agreement on utilization has to be signed with the producers.

For the urban farmers, this is important at individual level – even if their work is probably going to be less important for the food security of the urban population as a whole in the long run. For once the security situation stabilizes and urban infrastructure development proceeds normally, land will be too much in demand to be farmed on a larger scale. It is becoming apparent that the surrounding countryside is again performing the role of producing food for Monrovia. In normal, peaceful times, co-operating with the surrounding countryside is the key to the urban population's food security. But in crises and disasters, urban agriculture can make a valuable contribution to ensuring survival.

Heinz Peters, Welthungerhilfe

just 4.7 percent of the rural population regularly eats street food (Steyn and Labadarios 2011). Therefore, secure access to food for people in urban areas is closely linked to commercial value chain prices.

Utilization of food

Food security: In many countries, there are no regulations for the sale of food at street stands, which frequently lack sufficient cooling, water and sanitation. Often, street food vendors have not been trained in preparing, handling and storing food. As a result there is a belief that a strong link exists between the consumption of food at street stands and the incidence of food poisoning, particularly in developing countries. In addition to risking the intake of pathogenic microorganisms by eating food cooked in street stands, there may also exist an increased risk of consuming chemical-toxic substances, which are a long-term health hazard. These substances may come from cheap ingredients containing illegal or undesirable residues, poorly stored and spoilt commodities, metals leaching from cooking utensils or process contaminants such as polycyclic aromatic hydrocarbons and acrylamide (Proietti, Frazzoli und Mantovani 2014).

Malnutrition: Whereas greater food diversity and higher average incomes in urban areas result in an overall greater consumption of meat as well as fruits and vegetables, a parallel increase in the consumption of industrially processed food causes a greater intake of fats, sugars and salt (FAO 2013). Thus increasing urbanization can lead to malnutrition based on too much energy-rich food and not enough complex carbohydrates and roughage. Weight increase, owing to prolonged overnutrition, has been observed among an increasing share of the population both in high and low-income countries and frequently follows a common pattern: In countries with low average incomes, obesity is more frequent among people with a higher socio-

economic status and among city-dwellers. By contrast, in high-income countries obesity is associated with a low socioeconomic status and rural areas (Swinburn et al. 2004). However, city-dwellers whose income is not sufficient to secure an appropriate supply of safe and nutritious food are threatened by malnutrition. Thus cities may suffer from a simultaneous increase in undernourishment and micronutrient deficiency as well as overnutrition. Various studies on the nutritional status of children in developing countries, which exhibit the highest urbanization rates, all indicate that on average, children in urban areas are better nourished than children in rural areas. In 82 out of 95 developing countries for which the latest data are available, the prevalence of underweight children in rural areas is higher than in urban areas (FAO 2013). However, in addition to being associated with a lower risk of undernourishment among children, urbanization is also thought to be linked with a greater risk of obesity among both children and adults (Eckert und Kohler 2014).

Long-term stability of food supply

A stable or sustainable supply of food implies both that enough food has to be stored to make up for failed harvests and periodic food scarcity and that food distribution has to be efficient.

Sufficient storage of food is often a national responsibility. India, for example, is one of the few countries that publish data on government food supplies, and since 1964 one of the duties of the Food Corporation of India has been the maintenance of buffer stocks to guarantee national food security in periods of crisis. The prescribed average minimum buffer stock is 19.82 million tons of wheat and rice. In June 2014, the present stocks were significantly higher, at 62.23 million tons of wheat and rice. Storage facilities for highly perishable food that requires cooling is often better in urban areas, meaning that greater food diversity is available for some city-dwellers in the event of production bottlenecks.

Efficient distribution of food presupposes a sufficient and functioning infrastructure. Often, however, the transport infrastructure of many growing cities in developing countries that links up producers with consumers is not capable of meeting urban food demand. In addition, existing supply structures (e.g. cooling chains, warehouses) or networks of wholesale merchants are often inadequate and cannot ensure a stable supply of food for a growing urban population.

Urbanization bears opportunities and risks for food security

According to the World Bank and the International Monetary Fund (IMF), developing countries with a high level of urbanization stand a better chance of achieving the Millennium Development Goals than countries with a low level of urbanization (World Bank and IMF 2013). City-dwellers usually enjoy higher incomes and as a result eat better, more nutritious and more diversified food, which raises their food security.

However, greater dependence of the less self-sufficient city-dwellers can jeopardize the food security of an increasingly urbanized population. For example, urban populations depend on commercial food value chains and food prices, the safety of purchased food and the efficiency of the transport infrastructure for food distribution. The risk of an irregular supply of food owing to inefficient supply structures is exacerbated by rapid and uncontrolled urbanization processes characterized by a lack of investment in infrastructure. Supporting urban agriculture could reduce the dependence of urban areas on external

supply and provide the urban population with food via shorter transport routes.

Changes in urban lifestyles which encourage overnutrition for a growing share of people in urban areas represent a further risk for city-dwellers. Also, ever more frequent natural hazards such as droughts or floods are generally threatening food security, while higher temperatures or increased flooding raise the risk of food poisoning, which today is already assessed as being more widespread in urban areas than in rural areas. Rapid and uncontrolled urbanization exacerbates the above-mentioned problems.

In order to reduce these risks and prepare cities for rising numbers of inhabitants, forward-looking urban planning and investments in the development of urban infrastructure (e.g. streets, markets and food distribution networks) are needed. Furthermore, extensive investments in agriculture are required to ensure a sufficient and diversified supply of food for both urban and rural regions. An attractive agricultural industry safeguards the incomes of the rural population and actively contributes to combating poverty (World Bank and IMF 2013). Furthermore, a flourishing agricultural industry can mitigate rural exodus and reduce population pressure on the cities. Investment in training, infrastructure, modern technologies and cultivation methods, marketing, banking and legal systems as well as supporting women in agriculture are some examples of how agriculture can be strengthened and expanded (FAO 2011).

Children living and working on the streets of Nairobi

In Kenya, hundreds of thousands of children and youths live or work on the streets. For 2007, their number was estimated at 250,000 to 300,000, about 60,000 of whom are believed to be in Nairobi. Especially on account of the major drought in the Horn of Africa in 2011, it can be expected that these numbers have since grown considerably, for many minors also escaped hunger by migrating to the cities. Those children who live or hang around on the streets in the daytime but go home at night are called "street children". The reasons why children and youths are out on the streets include domestic violence and no access to food, education or healthcare owing to poverty or the death of the parents or one parent. On the street, the children and youths try to pull through by begging, cleaning pavements, squares or cars or by collecting reusable refuse on piles of garbage. Especially among girls, the list also includes sexual exploitation.

The marginalization and exclusion of children living and working on the streets from any structures – whether they be family or government ones – is in breach of the Kenyan Constitution of 2010, which states that every child enjoys free access to primary education, to adequate food, to adequate accommodation and to healthcare. And in particular, protection has to be ensured. Since the family structures at home are disrupted in the case of children living and working on the streets, no one claims these rights and protections for the children.

Kindernothilfe's partner "Undugu Society of Kenya" performs this task – through lobbying and advocacy vis-à-vis government authorities. This also includes active cooperation with the police in order to reduce discrimination and unlawful treatment of children living and working on the streets.

At the same time, working together with the children and youths themselves is very important in order to encourage them to assume their rights. In groups, they are instructed in fundamental areas such as children's rights, sex education or getting on with each other without violence. The aim of the groups is above all to experience mutual support and security, communicate problems and challenges and help each other. The program activities reach around 6,000 children and youths each year.

If they wish to do so, the children and youths can move into a hostel for a limited period where they are given psycho-social support and assisted in looking for family relatives in order to enable a return to their homes. Last but not least, Undugu offers the children an opportunity to continue primary education and/or join technical training programs.

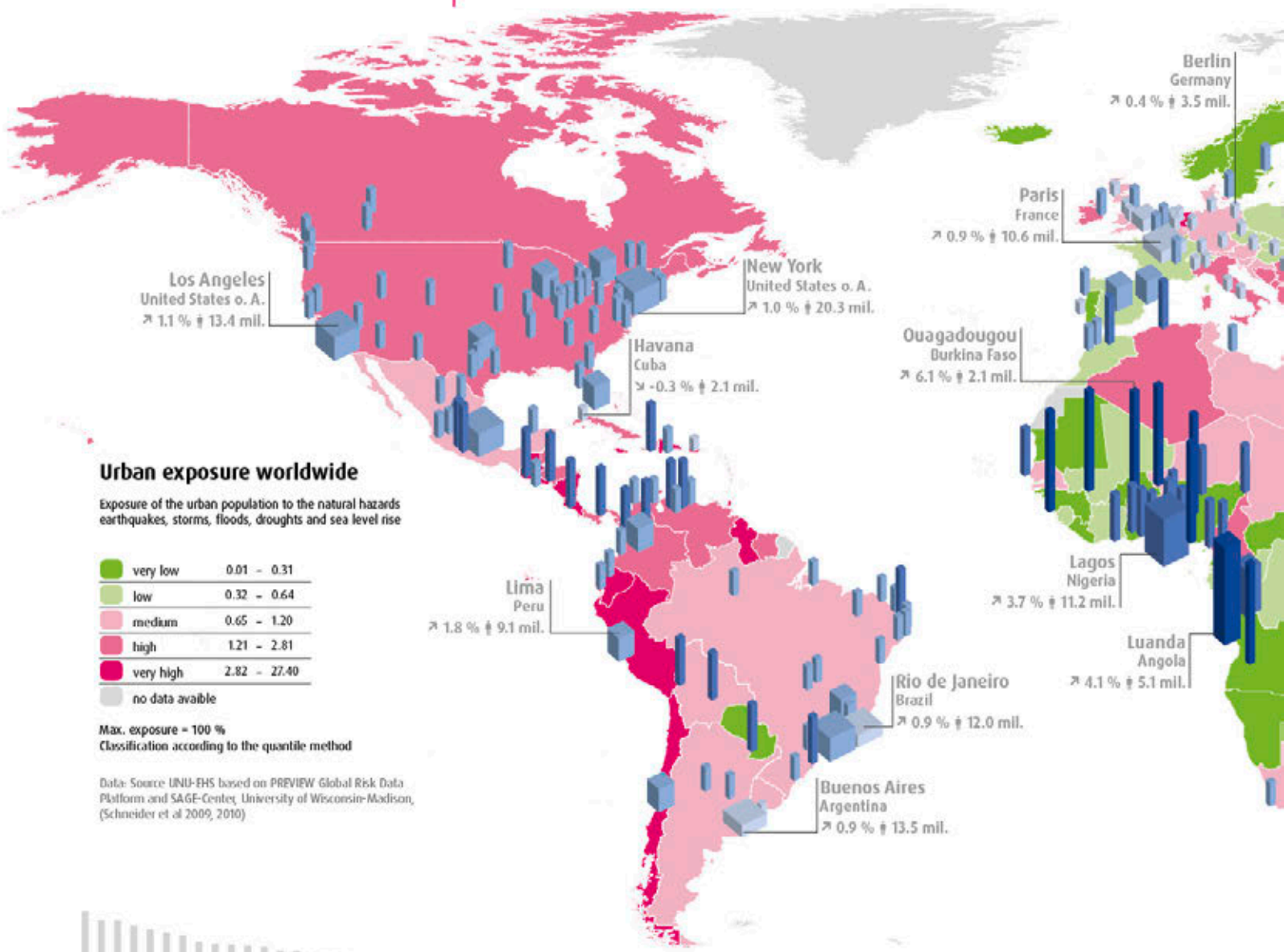
The work of Undugu shows children a way to escape poverty through education, which also raises their resilience towards natural hazards. For a steady income enhances food security and improves access to healthcare, since many services in Kenya have to be paid out of pocket, as they are not covered by health insurance. In order to be able to benefit from public services, it is important for children who live and work on the streets to turn from "city-dwellers without rights" into "full citizens". Integrating these children and youths into society is a forward-looking measure and plays a preventive role – both in the event of disasters and during possible civil conflicts.

Tanja Pazdzierny, Kindernothilfe

Alliance Development Works

Brot | MISEREOR | cbm

City growth worldwide



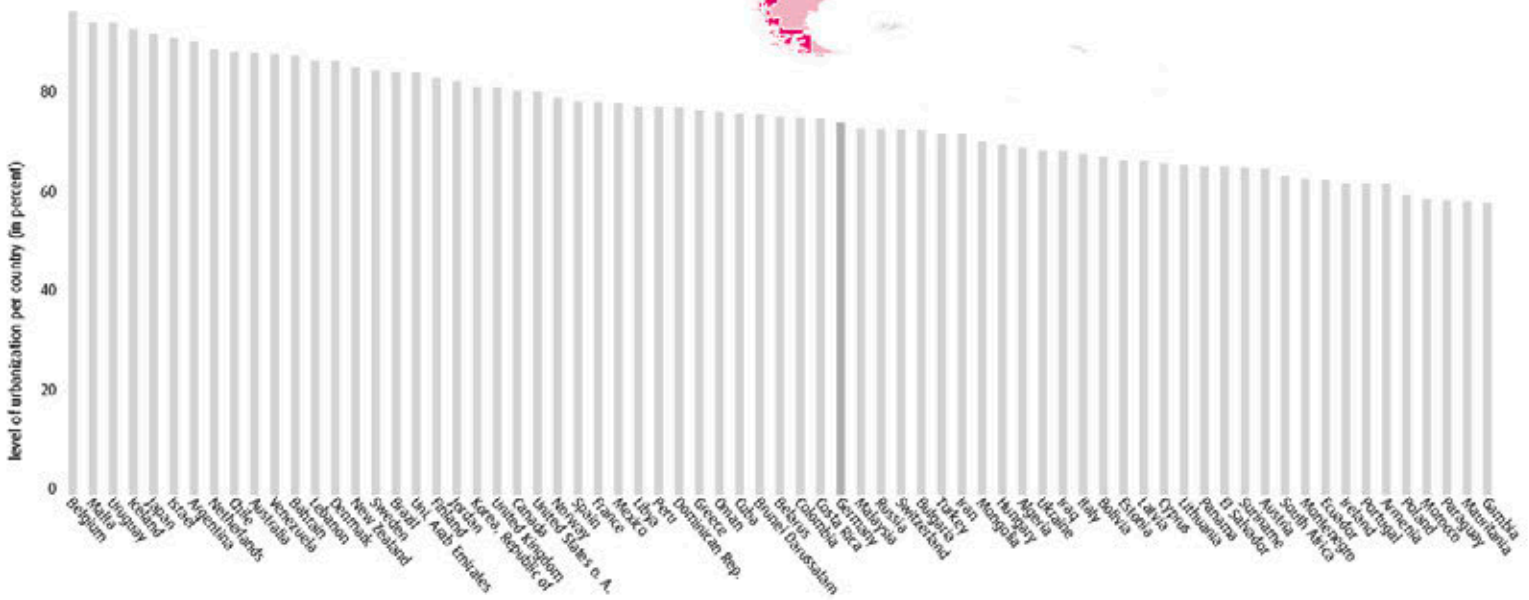
Urban exposure worldwide

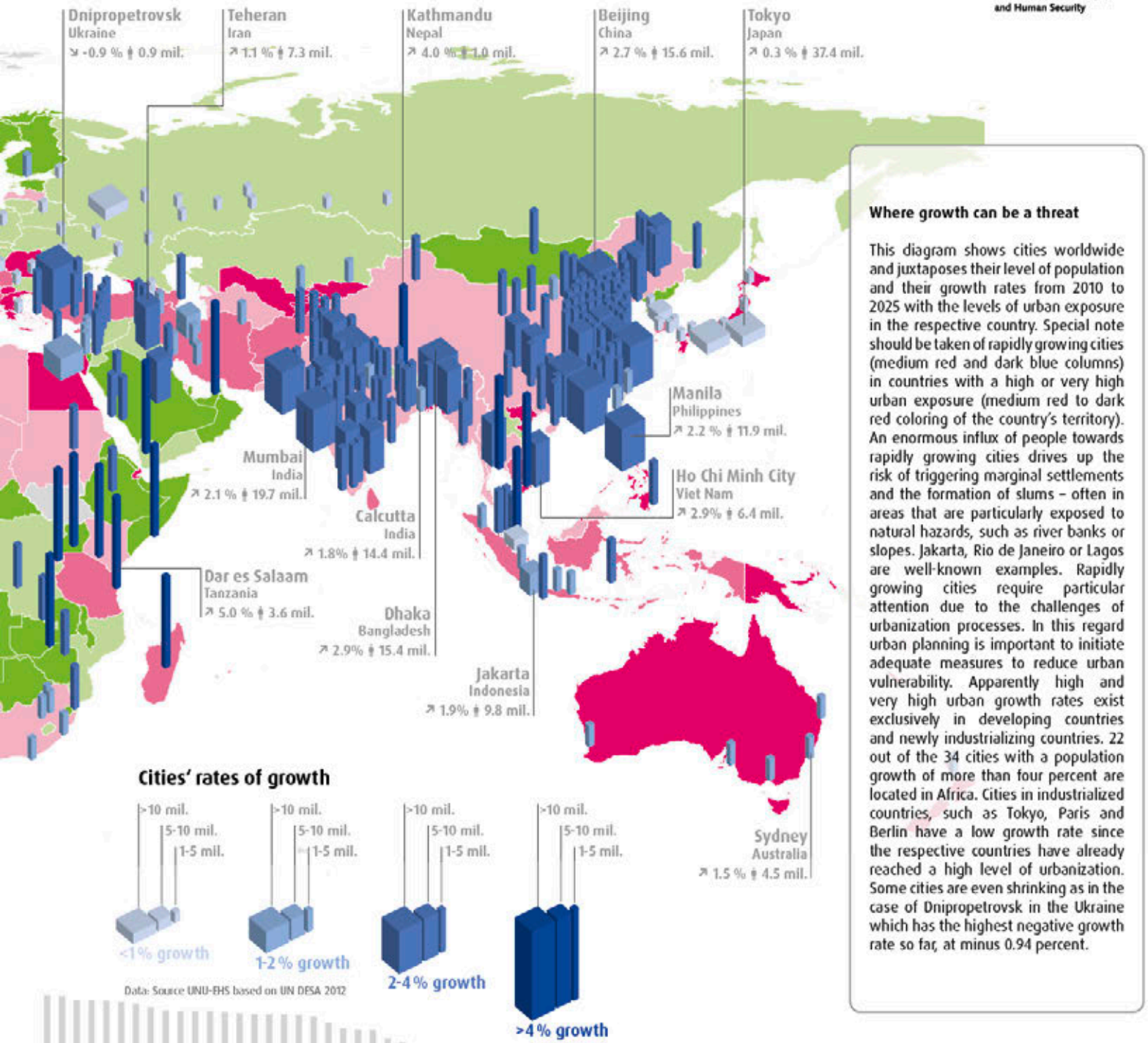
Exposure of the urban population to the natural hazards earthquakes, storms, floods, droughts and sea level rise

very low	0.01	– 0.31
low	0.32	– 0.64
medium	0.65	– 1.20
high	1.21	– 2.81
very high	2.82	– 27.40
no data avaible		

Max. exposure = 100 %
Classification according to the quantile method

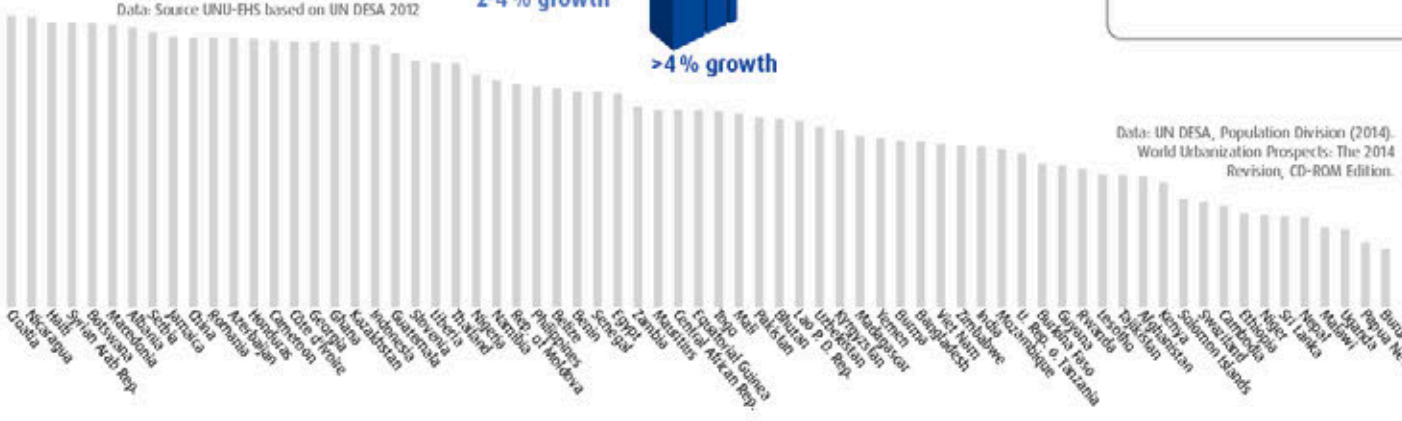
Data: Source UNU-EHS based on PREVIEW Global Risk Data Platform and SAGE-Center, University of Wisconsin-Madison, (Schneider et al 2009, 2010)





Where growth can be a threat

This diagram shows cities worldwide and juxtaposes their level of population and their growth rates from 2010 to 2025 with the levels of urban exposure in the respective country. Special note should be taken of rapidly growing cities (medium red and dark blue columns) in countries with a high or very high urban exposure (medium red to dark red coloring of the country's territory). An enormous influx of people towards rapidly growing cities drives up the risk of triggering marginal settlements and the formation of slums – often in areas that are particularly exposed to natural hazards, such as river banks or slopes. Jakarta, Rio de Janeiro or Lagos are well-known examples. Rapidly growing cities require particular attention due to the challenges of urbanization processes. In this regard urban planning is important to initiate adequate measures to reduce urban vulnerability. Apparently high and very high urban growth rates exist exclusively in developing countries and newly industrializing countries. 22 out of the 34 cities with a population growth of more than four percent are located in Africa. Cities in industrialized countries, such as Tokyo, Paris and Berlin have a low growth rate since the respective countries have already reached a high level of urbanization. Some cities are even shrinking as in the case of Dnipropetrovsk in the Ukraine which has the highest negative growth rate so far, at minus 0.94 percent.



3. The WorldRiskIndex 2014

Torsten Welle, Jörn Birkmann, Jakob Rhyner

Millions of people worldwide are exposed to natural hazards. However, what are the key factors that turn droughts, cyclones, floods, earthquakes and sea level rise into disasters? The WorldRiskIndex calculates the risk of becoming the victim of a disaster resulting from an extreme natural event for 171 countries. A country faces a high risk if it is highly exposed to natural hazards and if their society is highly vulnerable. For the first time in 2014, risk has also been analyzed with respect to urban areas covering 140 countries. The countries with the highest urban risk are Costa Rica, the Philippines, Chile, Japan, and Jamaica.

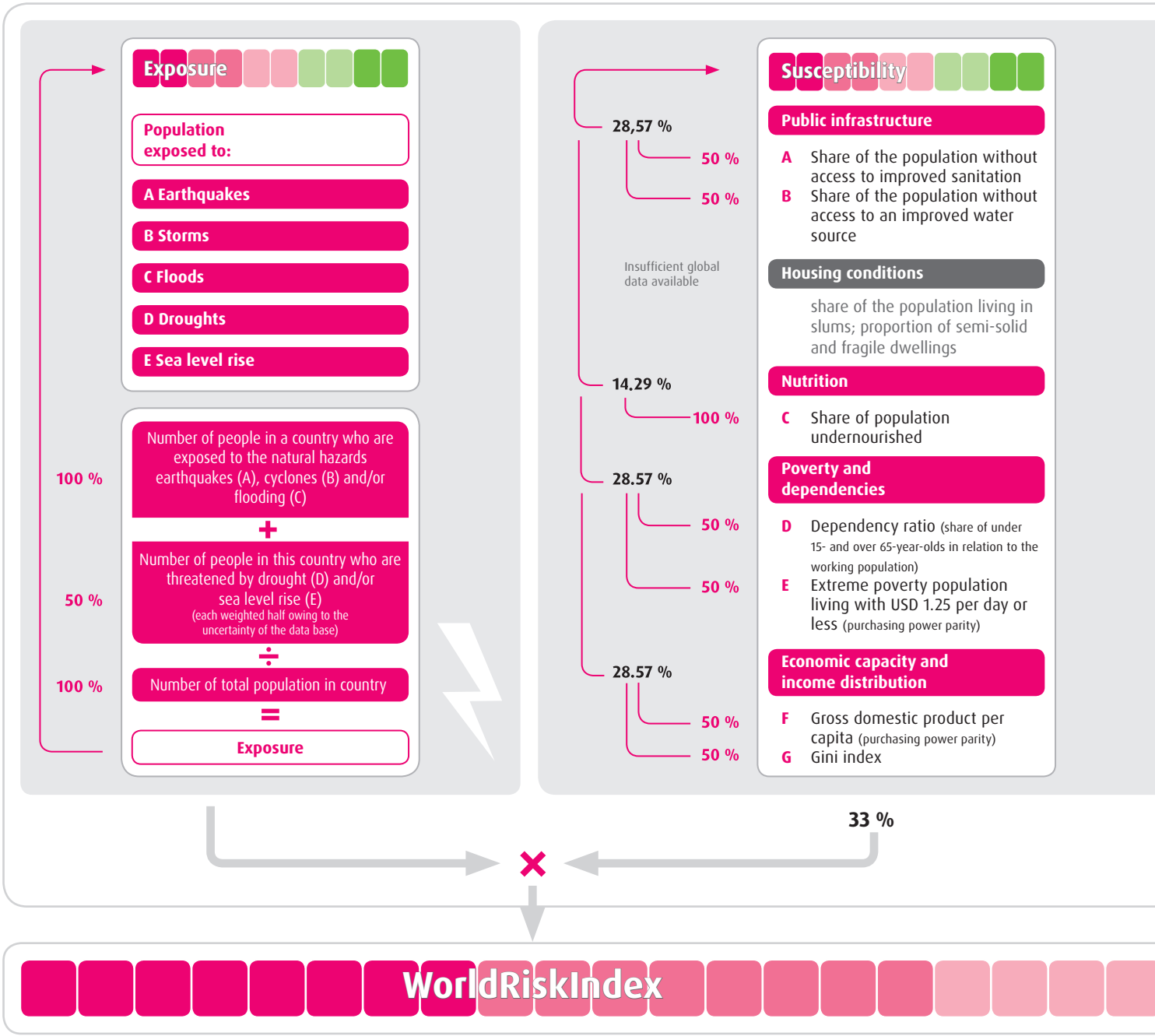
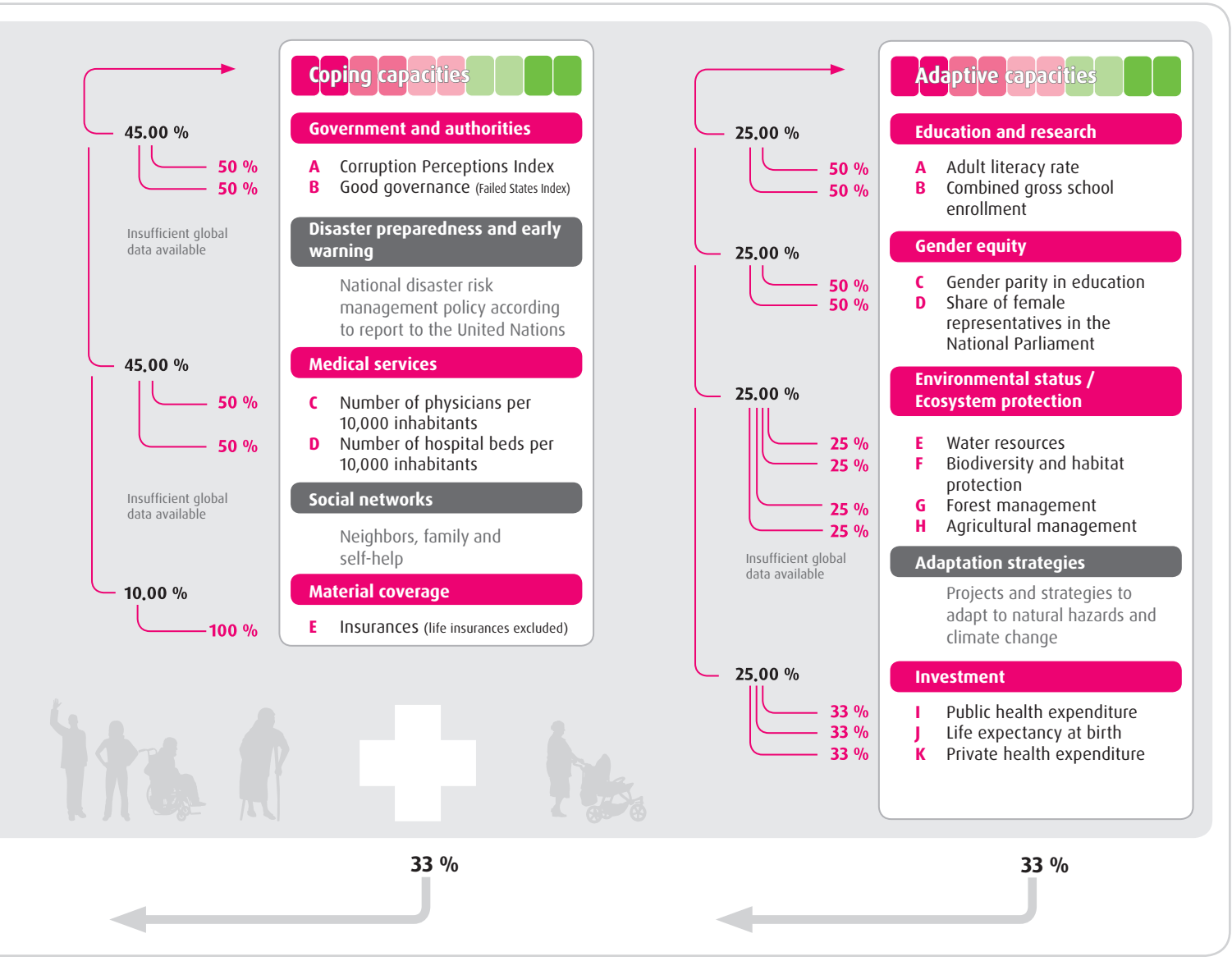


Figure 2: Calculation of the WorldRiskIndex

3.1 The concept

The WorldRiskIndex is a tool used to assess and estimate the disaster risk of a country. It takes into consideration both external and internal factors, i.e. threats by natural hazards such as earthquakes, cyclones, floods, droughts and sea level rise and societal conditions. By combining the exposure of countries to natural hazards, and the social, economic and ecological conditions within these countries, it is possible to calculate the potential risk for 171 countries and to compare these results against one another. The WorldRiskIndex is not a forecasting tool and therefore cannot be used as an early-warning system announcing disasters due to natural hazards. The aim of the Index is to demonstrate that not only the magnitude or intensity of a natural event influences disaster risk, but a multitude of different factors such as the political and institutional structures,



the state of infrastructure or the nutrition situation, economic and environmental conditions of a country determine whether a natural hazard will turn into a disaster (Birkmann et al. 2011; Welle et al. 2012, 2013; IPCC 2012).

The WorldRiskIndex consists of four components: exposure towards natural hazards, susceptibility, coping capacities and adaptive capacities. The Index is calculated from 28 indicators using data that is available worldwide and accessible to the public. Assigning of specific indicators into the four components and their weightings is described in the modular structure of the Index in figure 2 on pages 40 and 41.

The components of the WorldRiskIndex are described in the following:

→ **Exposure** refers to entities (population, conditions of built-up areas, infrastructure component, environmental area) being exposed to the impacts of one or more natural hazards (earthquakes, cyclones, droughts, floods and sea level rise). The World Map of Exposure can be seen in Map A on the right fold-out page of the cover.

→ **Susceptibility** refers to the likelihood of suffering from and experiencing harm, loss and disruption in an extreme event or natural hazard. Thus, susceptibility describes structural characteristics and framework conditions of a society.

→ The terms coping and **coping capacities** comprise various abilities of societies and exposed elements to minimize negative impacts of natural hazards and climate change through direct action and the resources available. Coping capacities encompass measures and abilities that are immediately available to reduce harm and damages in the occurrence of an event. For the calculation of the WorldRiskIndex, the opposite value, i.e. the lack of coping capacities, has been used, which results from the value 1 minus the coping capacities.

→ **Adaptation**, unlike coping, is understood as a long-term process that also includes structural changes (Lavell et al. 2012; Birkmann 2010). In addition, adaptation focuses on measures and strategies dealing with and attempting to address the negative impacts of natural hazards and climate change in the future and long-run. As with the coping capacities, the lack of adaptive capacities is hereby included in the WorldRiskIndex.

→ **Vulnerability** comprises the components of susceptibility, lack of coping capacities and lack of adaptive capacities (Birkmann et al. 2011, Welle et al. 2012, 2013) and relates to social, physical, economic and environmental factors which make people or systems susceptible to the impacts of natural hazards, the adverse effects of climate change or other transformation processes. Moreover, the term vulnerability covers factors which comprise the abilities and capacities of people or systems in order to cope with and adapt to the negative impacts of natural hazards.

→ The vulnerability index multiplied by the exposure index yields the **WorldRiskIndex**. Risk is understood as interaction between exposure to natural hazards including the adverse effects of climate changes and the vulnerability of societies.

A detailed description of the concepts, the indicators used and the method to calculate the WorldRiskIndex is given in the WorldRiskReport 2011 (Birkmann et al. 2011) and at www.WorldRiskReport.de.

3.2 Updating and modification of the indicators

The WorldRiskIndex 2014 calculates the risk for 171 countries, which are two countries less than in the previous years from 2011 to 2013. The reason for this stems from a new calculation of the Environmental Performance Index (EPI) 2014, which was enhanced methodically and now has a modified data base and weighting of indicators (Hsu et al. 2014). A total of four indicators from the EPI are used for the WorldRiskIndex. However, since these four indicators were not available for Samoa, São Tomé and Principe, those countries were not taken into consideration in the 2014 issue. In total, 21 out of 28 indicators have been updated (see Table in the menu item "Indicators" at www.WorldRiskReport.de). For the remaining seven indicators, the data from the previous year was used, since no updated data was available. This applies to

the five indicators of exposure as well as to the GINI Index and insurances. The worksheets for the 28 indicators together with the latest data sets and their sources are available at www.WorldRiskReport.de.

3.3 The WorldRiskIndex 2014

As in the previous year, no new data is available on exposure, hence the changes in the country rankings relate exclusively to changes in vulnerability. The results of the individual values for 171 countries are listed in the table in the Annex. The graphic representations of the Index can be seen on the right fold-out page of the cover and on the World Map on pages 48 and 49.

From a scientific angle, it needs to be emphasized that changes in indicators over a short or limited period have to be interpreted with caution since data quality and data currency in the individual indicators sometimes differ considerably (Freudenberg 2003; Meyer 2004). Hence, the creation of the Index as well as the ranking can be critically looked at. A direct comparison of the individual Index values with those of the WorldRiskIndex 2013 is therefore not very meaningful since the calculation base of individual indicators, such as the EPI, has changed (Bündnis Entwicklung Hilft 2013). A comparison of the country rankings with the previous year is also not possible given the change in the number of countries. However, an advantage is that the WorldRiskIndex represents the respective most up-to-date status of data, enabling a year-by-year continuous progression.

In spite of the restrictions referred to above, individual countries can be critically reviewed, as can the shifts of certain countries from one risk class to another. Thus, the Index and its various components, being based on a broad system of indicators, help assess the key risk factors and present an initial overview of current knowledge regarding risk profiles and risk levels by means of the indicators. The indicators chosen and represented in this context as well as trends and structures also suggest important options for reducing risks.

In this respect, the country rankings serve the purpose of initiating discussions and measures among political decision-makers in the context of disaster risk reduction and development planning.

The results:

→ Countries in the Sahel Zone and in the tropical part of Africa show a very high level of **susceptibility**, as shown in Map B1 on the left fold-out page of the cover and in the Top 15 Table. Except for Haiti, all countries among the top 15 belong to Africa.

→ The map representing the lack of **coping capacities** (Map B2, left fold-out page of the cover) shows hotspot regions in Africa and Asia which is substantiated by the Top 15 Table.

→ Through changes in the calculation base for the four indicators in the sub-category "Environmental status / Ecosystem protection", the map for the lack of **adaptive capacities** has also changed in comparison to last year (Map B3, left fold-out page of the cover). For example, Russia and Brazil have moved from the classification "low" lack of adaptive capacities to the classification "medium". However, as in the previous year, countries with the largest lack of adaptive capacities are mainly concentrated in Africa and South Asia. In addition, countries with the largest lack of adaptive capacities (see the table showing the top 15 countries) have

The 15 countries with the highest susceptibility worldwide

Country	Sus. (%)	Rank
Mozambique	65.89	1
Madagascar	65.81	2
U. R. o. Tanzania	64.27	3
Chad	64.19	4
Burundi	63.79	5
Liberia	63.36	6
Zambia	62.78	7
Haiti	62.24	8
Eritrea	61.70	9
Centr. Afr. Rep.	61.54	10
Niger	61.03	11
Malawi	60.68	12
Comoros	59.09	13
Sierra Leone	58.33	14
Ethiopia	57.73	15

The 15 most exposed countries worldwide

Country	Exp. (%)	Rank
Vanuatu	63.66	1
Tonga	55.27	2
Philippines	52.46	3
Japan	45.91	4
Costa Rica	42.61	5
Brunei Darussalam	41.10	6
Mauritius	37.35	7
Guatemala	36.30	8
El Salvador	32.60	9
Bangladesh	31.70	10
Chile	30.95	11
Netherlands	30.57	12
Solomon Islands	29.98	13
Fiji	27.71	14
Cambodia	27.65	15

The 15 countries with the highest lack of coping capacities worldwide

Country	Lack of C. C. (%)	Rank
Afghanistan	93.37	1
Sudan	93.05	2
Chad	91.88	3
Haiti	91.04	4
Yemen	91.03	5
Guinea-Bissau	89.71	6
Iraq	89.30	7
Guinea	89.29	8
Zimbabwe	89.19	9
Centr. Afr. Rep.	89.14	10
Eritrea	88.67	11
Nigeria	88.06	12
Uganda	87.68	13
Burundi	87.62	14
Cote d'Ivoire	87.56	15

The 15 countries with the highest vulnerability worldwide

Country	Vuln. (%)	Rank
Chad	75.72	1
Haiti	73.79	2
Afghanistan	73.73	3
Eritrea	73.18	4
Centr. Afr. Rep.	72.22	5
Niger	72.12	6
Sierra Leone	72.10	7
Liberia	72.03	8
Guinea	70.94	9
Mozambique	70.89	10
Mali	70.52	11
Burundi	70.00	12
Guinea-Bissau	69.94	13
Madagascar	69.86	14
Nigeria	68.33	15

The 15 countries with the highest lack of adaptive capacities worldwide

Country	Lack of A. C. (%)	Rank
Afghanistan	71.89	1
Sierra Leone	71.84	2
Mali	71.21	3
Chad	71.08	4
Guinea	69.51	5
Eritrea	69.18	6
Niger	68.54	7
Liberia	68.11	8
Haiti	68.08	9
Cote d'Ivoire	67.84	10
Guinea-Bissau	66.90	11
Ethiopia	66.38	12
Centr. Afr. Rep.	65.99	13
Benin	65.71	14
Yemen	64.74	15

The 15 countries that are most at risk worldwide

Country	Risk (%)	Rank
Vanuatu	36.50	1
Philippines	28.25	2
Tonga	28.23	3
Guatemala	20.68	4
Bangladesh	19.37	5
Solomon Islands	19.18	6
Costa Rica	17.33	7
El Salvador	17.12	8
Cambodia	17.12	9
Papua New Guinea	16.74	10
Timor-Leste	16.41	11
Brunei Darussalam	16.23	12
Nicaragua	14.87	13
Mauritius	14.78	14
Guinea-Bissau	13.75	15

changed. For example, Côte d'Ivoire, Guinea-Bissau, Ethiopia, the Central African Republic and Yemen recently joined this ranking, replacing Pakistan, Mauretania, Burkina Faso, Nigeria and the Comoros in the table.

→ The map for **vulnerability** (Map B, right fold-out page of the cover) as well as the Top 15 Table show that the majority of the most vulnerable countries lie in Africa. Except for Haiti and Afghanistan, 15 of the world's most vulnerable countries lie in Africa.

→ Since the WorldRiskReport 2012, no new data has been available for exposure. Thus, the World Map of **exposure** (Map A, right fold-out page of the cover) shows the same global exposure zones as in 2012 and 2013. The hotspot regions are Central America and the Pacific coastal countries of South America, parts of Southern Europe and West Africa as well as Southeast Asia and the Pacific islands.

In comparison to 2011, 2012 and 2013, the global hotspot regions of **risk** have not changed and continue to be in Oceania, Southeast Asia, Central America and the Southern Sahel. The map representing the WorldRisk-Index for 171 countries can be seen on the right fold-out page of the cover (Map C) and on pages 48 and 49. The individual values for the 171 countries are listed in the table in the Annex.

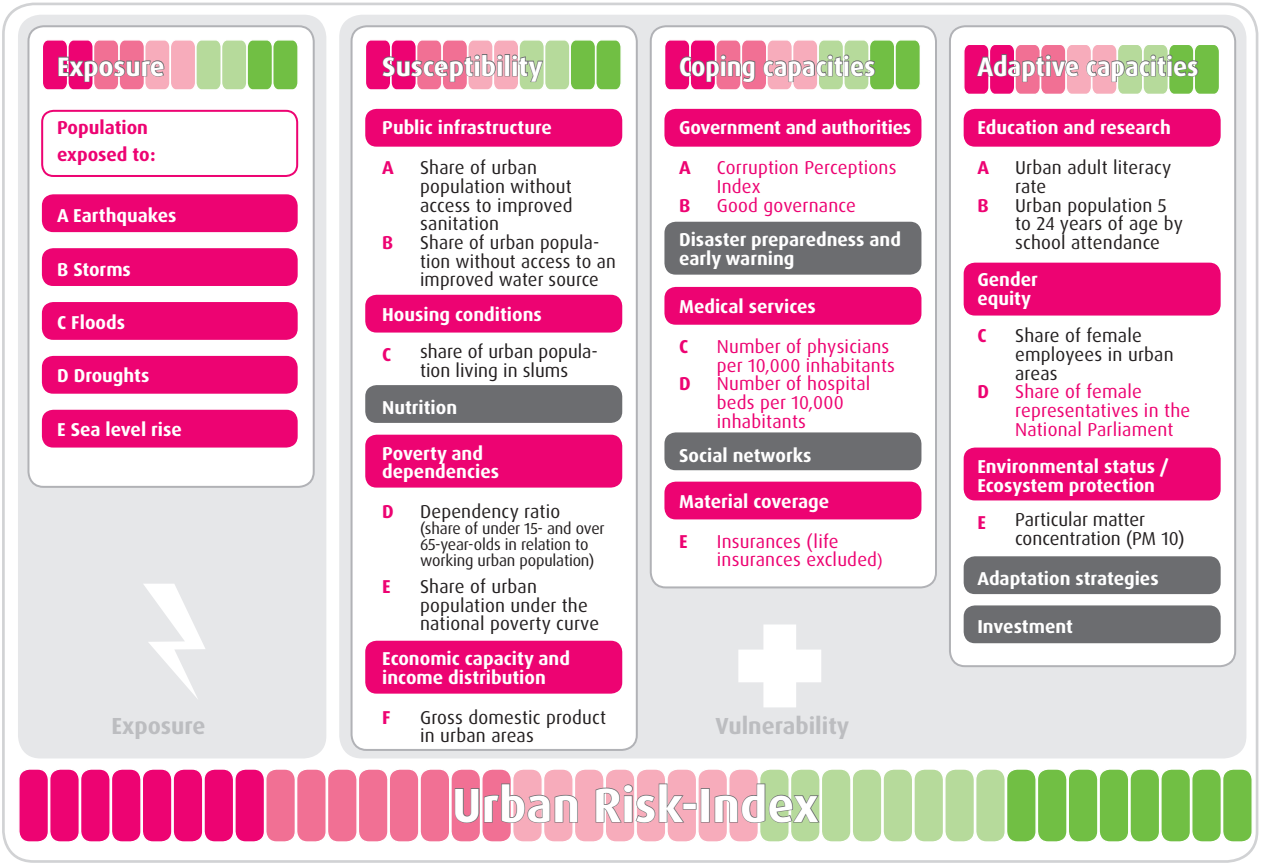


Figure 3: The fields marked in grey are subcategories for which no data is available. The indicators in red are identical with those of the WordRiskIndex 2014.

3.4 Urban risk analysis

Depending on the database, the modular structure of the WorldRiskIndex allows for risk analyses to be carried out on different spatial scales. This was demonstrated at the local level for Indonesia in the WorldRiskReport 2011 and is shown in this report in terms of the main focus "urban areas". The focus on urban areas aims at demonstrating global exposure, vulnerability and risk patterns for urban areas in industrialized and developing countries in order to highlight the need for disaster risk reduction strategies in urban and urbanizing regions and countries. Particularly against the background of increasing urbanization, on which Chapters 1 and 2 concentrate, urban risk analysis provides basic information for decision-makers to intensively discuss this issue and to develop respective measures.

The relevance of the topic is not new. Many international projects examine opportunities and risks that are connected with development of urban areas. In the following a few selected examples are described.

The initiative "Risk Habitat Megacity" of the Helmholtz Centre for Environmental Research (UFZ) examines opportunities and risks resulting from the development of megacities (Heinrichs et al. 2012). In "World Urbanisation Prospects: the 2011 Revision" of the United Nations Department of Economic and Social Affairs (UN DESA), various risk classes are combined regarding different natural hazards (such as earthquakes and floods) with 633 cities of more than 750,000 inhabitants (UN DESA 2012). Adger et al. (2009) and Keck et al. (2012) stress the key functions of cities, such as production and trade, politics and decision-making powers as well as food supply, and further examine the vulnerabilities in the context of natural hazards. A failure of these key functions would not only cause problems in the regional and national context, but partly also in terms of global economic relations (Zingel et al.

2011; Huq et al. 2007). An urban risk index has been developed in the World Bank survey "A global urban risk index" that compares the risk of human and economic losses due to disasters resulting from extreme natural events for 1,934 cities in developing countries across the world (Brecht et al. 2013). Further studies, such as the "Resilient Cities: Multi-hazard City Risk" index, are based on a risk analysis approach for urban areas that was tested in five cities (Shah 2011). Finally, the World Bank study on the assessment of urban risk should be mentioned. It provides project managers and urban planners a flexible approach to assess the risk of their city (Dickenson et al. 2012).

Whereas the studies of urban risks outlined above focus mainly on individual cities, the following presents an approach to urban risk assessment that is based on the methodology and terminology of the WorldRiskIndex. Hence, no individual cities or megacities are considered, but the risk of urban areas in 140 countries is assessed and can be compared. Consequently, no comprehensive specific data for individual cities can be established in this national and global analysis. In accordance with the core statement on which the WorldRiskIndex centers, that a country's risk of becoming the victim of a disaster does not depend solely on the natural hazard but is instead conditioned by societal, ecological and political circumstances, the urban risk analysis is calculated on the basis of exposure to selected natural hazards (earthquakes, cyclones, floods, droughts and sea level rise), susceptibility, the lack of coping capacities and the lack of adaptive capacities (see figure 3 on page 45). This enables a differentiated understanding of the various key factors that also determine risk in urban areas.

→ **Urban exposure:** The base used for the calculation of urban exposure contained the same data sets on exposure to natural hazards as those referred to for the WorldRiskIndex. They were combined with a remote-sensing data set (classification of urban areas based on satellite images) representing all urban areas worldwide (Schneider et al. 2009, 2010). This enabled the establishment of the share of exposed urban populations for 187 countries.

→ **Urban susceptibility:** The international data bases also contain some indicators for the urban level. This is why it was possible to calculate susceptibility solely with indicators having a direct urban context, such as sanitation and water supply for the urban population or the share of the urban population living in slums. No meaningful data was found on the food situation in cities, therefore this area could not be covered in the analysis.

→ **Lack of urban coping capacities:** No specific indicators relating directly to urban context were available for this context. Therefore, given the lack of separate data, the national values also had to be used for the calculation of urban coping capacities.

→ **Lack of urban adaptive capacities:** The subcategories of adaptation strategies and investments could not be considered for the calculation of the lack of urban adaptive capacities since no adequate data for urban areas was available on a global scale. This becomes further apparent as in case of the environmental status only one indicator ("particulate matter emissions (PM 10)") could be used. Furthermore, the indicator "percentage of female representatives in the national parliament" was also taken from the national index.

→ **Vulnerability:** Urban vulnerability is calculated by adding the urban susceptibility, the lack of coping capacities and the lack of urban adaptive capacities. It has been calculated for 140 countries in accordance with the respective data situation.

→ **Risk:** The product of urban exposure (Map 1 on page 51) and urban vulnerability (Map 2) yields the urban risk (Map 3). Hotspot regions

of urban risk can be identified in the Caribbean and Central America as well as the Pacific states of South America. Furthermore, countries in Southeast Europe, Central Asia and Southeast Asia as well as Japan bear a very high urban risk potential.

The Map of Urban Exposure shows a very high level of exposure in the Caribbean and Central America, in the Pacific states of South America, in parts of Southeast Europe and Southeast Asia as well as Japan and in Australia. Striking is the low urban exposure in some African countries, which can be explained due to the phenomenon that compared to other world-regions only very few African cities are exposed to natural hazards.

In contrast, urban areas in most African countries show a very high level of vulnerability. This class also includes Asian countries such as Iraq, Iran, Pakistan, Afghanistan, India and Bangladesh. A comparison of risk classes in the urban analysis with those of the national analysis reveals that high-income countries or industrialized countries such as the USA, the United Kingdom or Australia bear a much higher urban risk than in the WorldRiskIndex, which also includes the rural areas. Therefore, it may be concluded that in these countries, in a global comparison, risk mainly prevails in the cities. Hence, specific risk reduction strategies need to be developed for urban areas such as, for example, early warning systems tailored to the country. Since cities in industrialized countries show a lower rate of urban growth (see Map on page 36/37), a key question is not that of planning new settlements in areas that are not exposed, but rather, the protection of existing settlements against future natural hazards such as sea level rise.

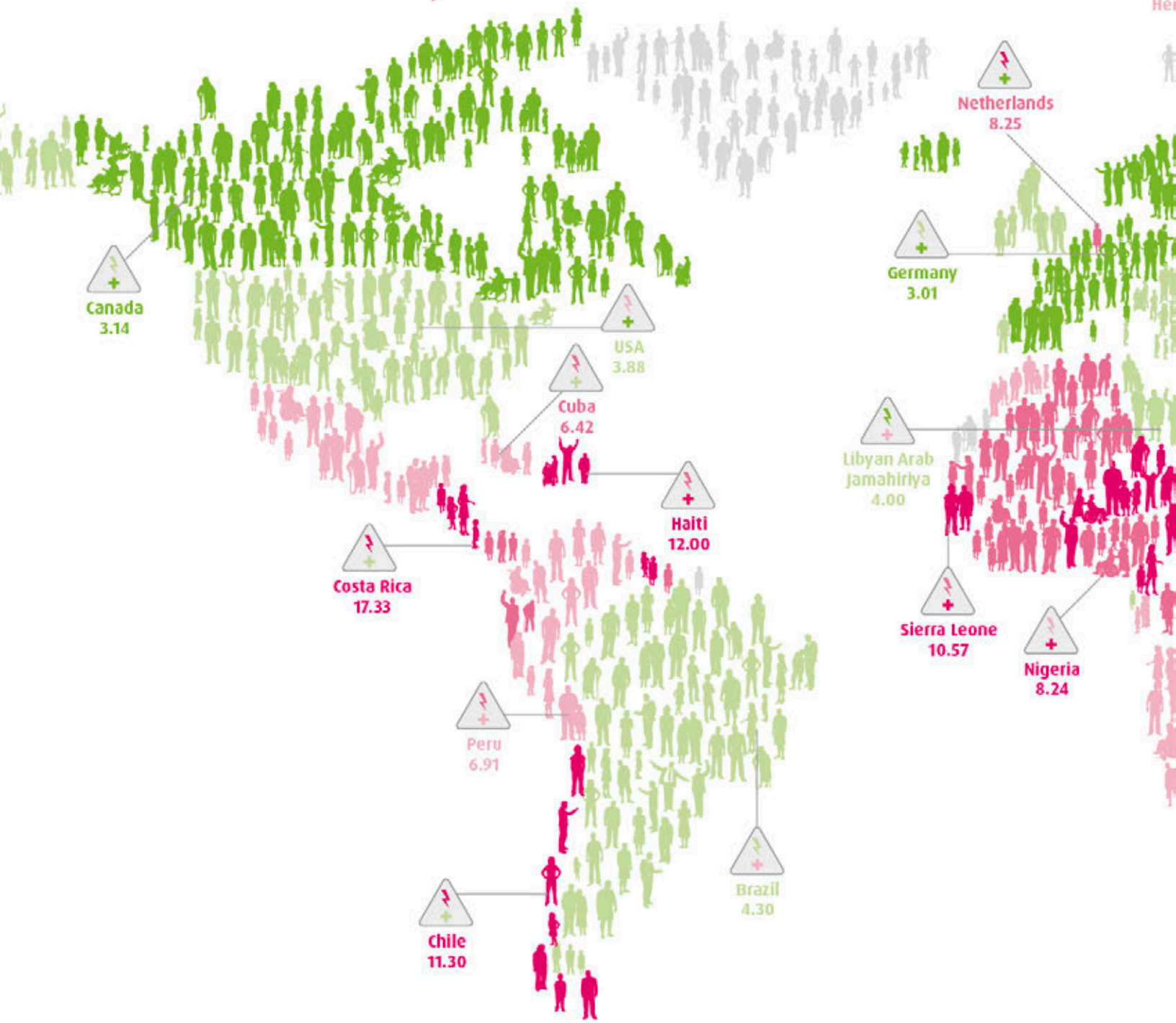
In contrast, many low-income countries in Africa, such as Ghana, demonstrate a low urban exposure. However, if the high national exposure (based on the WorldRiskIndex) and the rapidly growing urbanization of 51 percent (status: 2011) to more than 70 percent in 2050 are taken into account, it can be assumed that urban exposure is very likely to rise. In combination with a very high urban vulnerability, urban risk will thus rise, too. Unlike with slowly growing or shrinking cities, this requires appropriate planning systems, measures and risk reduction strategies that need to be applied both to exposure (sustainable planning of new settlements in non-exposed areas) and to susceptibility (e.g. reducing percentage of population living in slums, strengthening formal work situation, improving building standards), coping capacities (e.g. development of early-warning systems) and adaptive capacities (e.g. strengthening educational system and the role of women, improved environmental protection).

Many interrelations between urbanization and risk are as yet not fully understood and established. This urban risk analysis is therefore also aimed at drawing attention to the issue of urbanization and risk, both in order to stimulate debate among the decision-makers and to demonstrate that the data situation has to be improved for urban areas in particular. This would enable improvements in urban risk analyses in the future so that in turn, adequate sustainable planning criteria could be created.

Alliance Development Works

Brot | MISEREOR | cbm

WorldRiskIndex

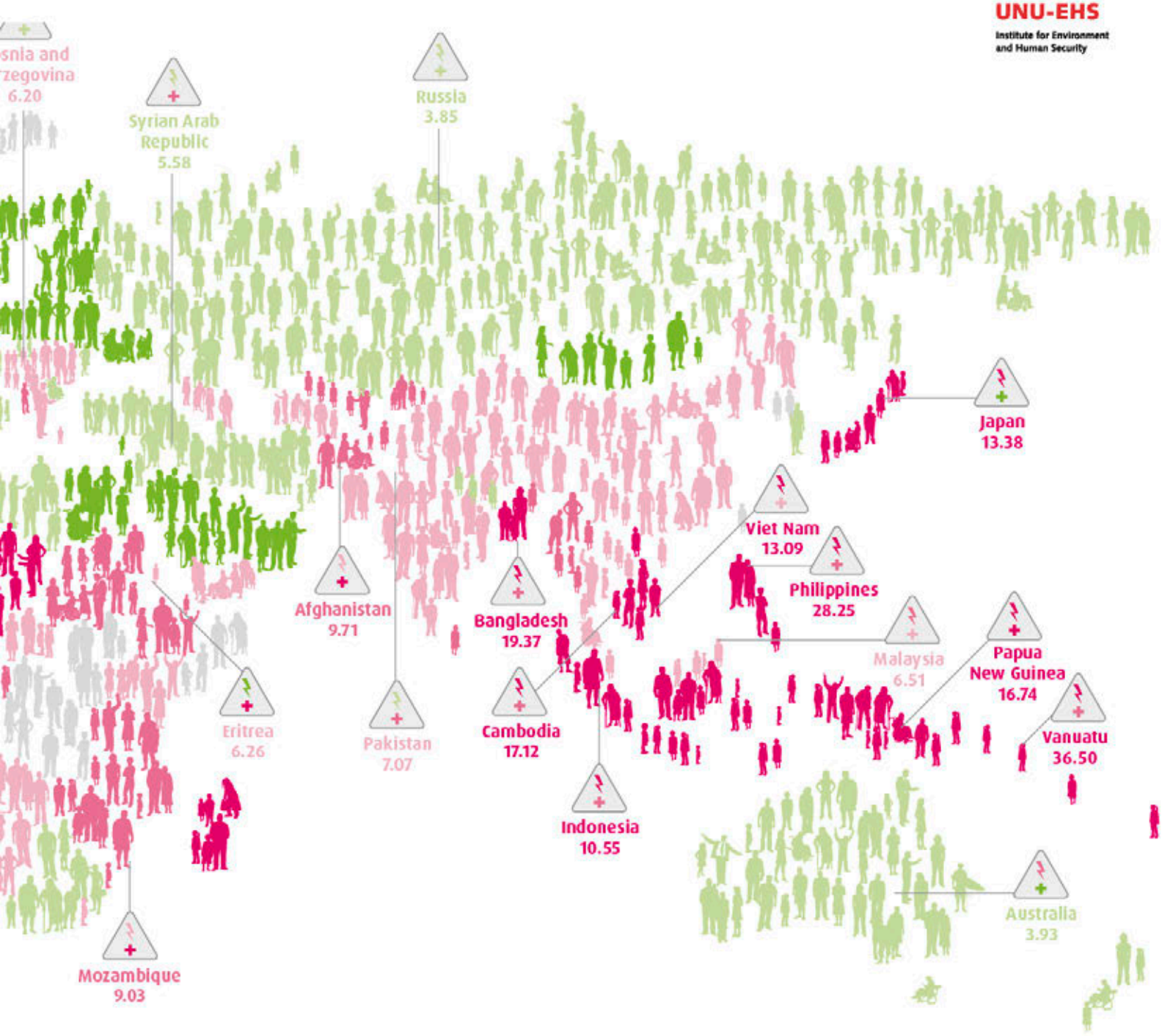


WorldRiskIndex (WRI)	
very low	0.08 – 3.46
low	3.47 – 5.47
medium	5.48 – 7.30
high	7.31 – 10.47
very high	10.48 – 36.50
no data available	

Exposure	
very low	0.28 – 9.25
low	9.26 – 11.53
medium	11.54 – 13.85
high	13.86 – 17.45
very high	17.46 – 63.66
no data available	

Vulnerability	
very low	25.98 – 34.96
low	34.97 – 44.55
medium	44.56 – 51.64
high	51.65 – 63.76
very high	63.77 – 75.72
no data available	

Data: Source UNU-EHS, based on the PREVIEW Global Risk Data Platform, CReSIS, CIESIN and global databases; detailed information at www.WorldRiskReport.org



Country	WRI		
Afghanistan	9.71	13.17	73.73
Australia	3.93	15.05	26.10
Bangladesh	19.37	31.70	61.10
Bosnia a. Herzegovina	6.20	14.02	44.26
Brazil	4.30	9.53	45.09
Cambodia	17.12	27.65	61.90
Canada	3.14	10.25	30.61
Chile	11.30	30.95	36.53
Costa Rica	17.33	42.61	40.68
Cuba	6.42	17.45	36.79

Country	WRI		
Eritrea	6.26	8.55	73.18
Germany	3.01	11.41	26.37
Haiti	12.00	16.26	73.79
Indonesia	10.05	19.36	54.48
Japan	14.68	45.91	29.14
Libyan Arab Jamahiriya	4.00	7.80	51.27
Malaysia	6.51	14.60	44.60
Mozambique	9.03	12.73	70.93
Netherlands	8.25	30.57	26.98
Nigeria	8.24	12.06	68.33

Country	WRI		
Pakistan	7.07	11.36	62.24
Papua New Guinea	16.71	24.91	67.15
Peru	6.91	14.40	48.00
Philippines	28.22	52.40	53.85
Russia	3.85	9.38	41.05
Sierra Leone	10.57	14.65	72.10
Syrian Arab Republic	5.58	10.56	52.82
United States	3.88	12.25	31.67
Vanuatu	36.50	63.66	57.34
Viet Nam	13.09	25.35	51.64

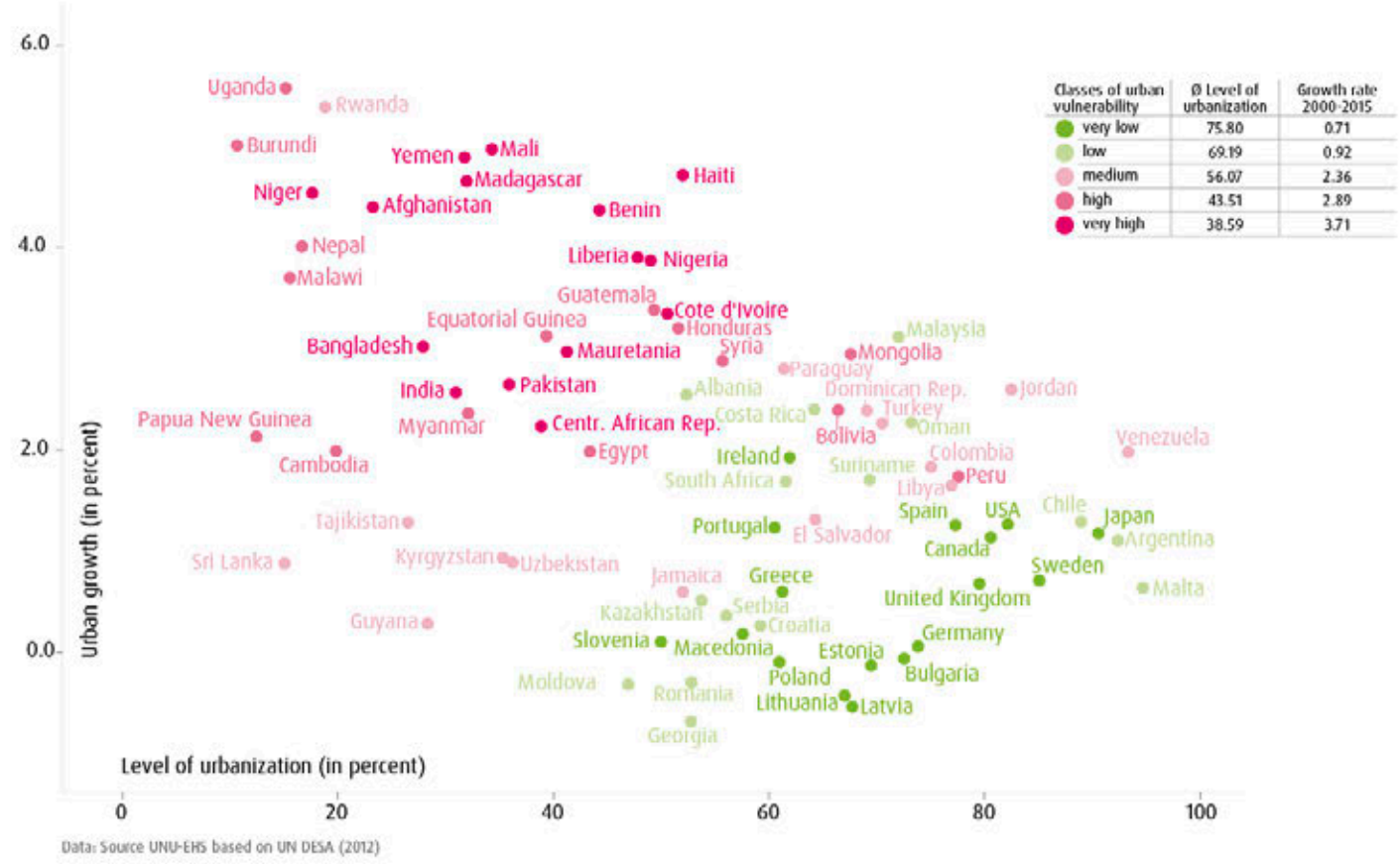
= Exposure = Vulnerability

Risk in urban areas

The vulnerability of people in urban areas is highest in countries with a low level of urbanization yet high rates of urban population growth. The figure below uses the example of India (level of urbanization: approx. 31 percent, urban growth rate: 2.57 percent) and Bangladesh (level of urbanization: approx. 28 percent, urban growth rate: more than 3 percent) to demonstrate this connection. Conversely, a level of urbanization of more than 60 percent combined with a low urban growth rate of less than one percent mostly implies low to very low vulnerability in urban areas. This is apparent by the examples of Germany (level of urbanization: 73 percent, urban growth rate: 0.05 percent) and Sweden (level of urbanization: 85 percent, urban growth rate: 0.71 percent).

What does this mean for the future?
Especially in developing countries and countries with a low level of income and a low level of urbanization, rapidly growing urban areas bear a high risk. However, these countries also have a considerable opportunity of mitigating urban vulnerability, and hence urban risk, through applying effective development planning during the period of growth.

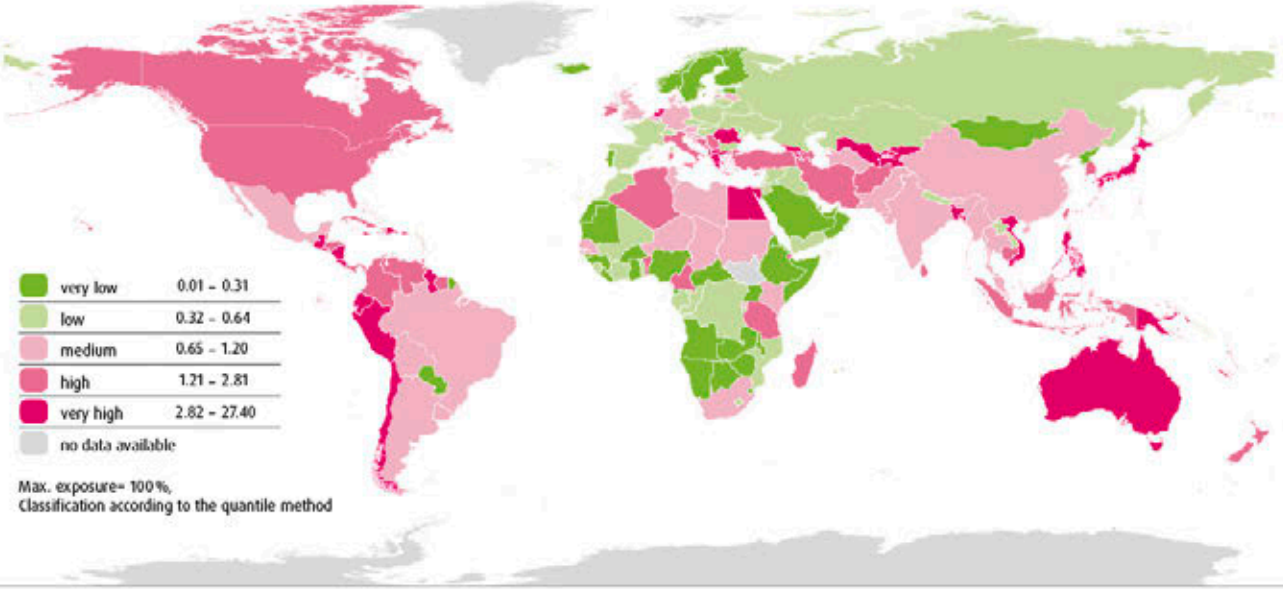
Where rapid growth faces high vulnerability



Data: Source UNU-EHS based on UN DESA (2012)

Urban exposure

Exposure of the urban population to the natural hazards earthquakes, storms, floods, droughts and sea level rise.

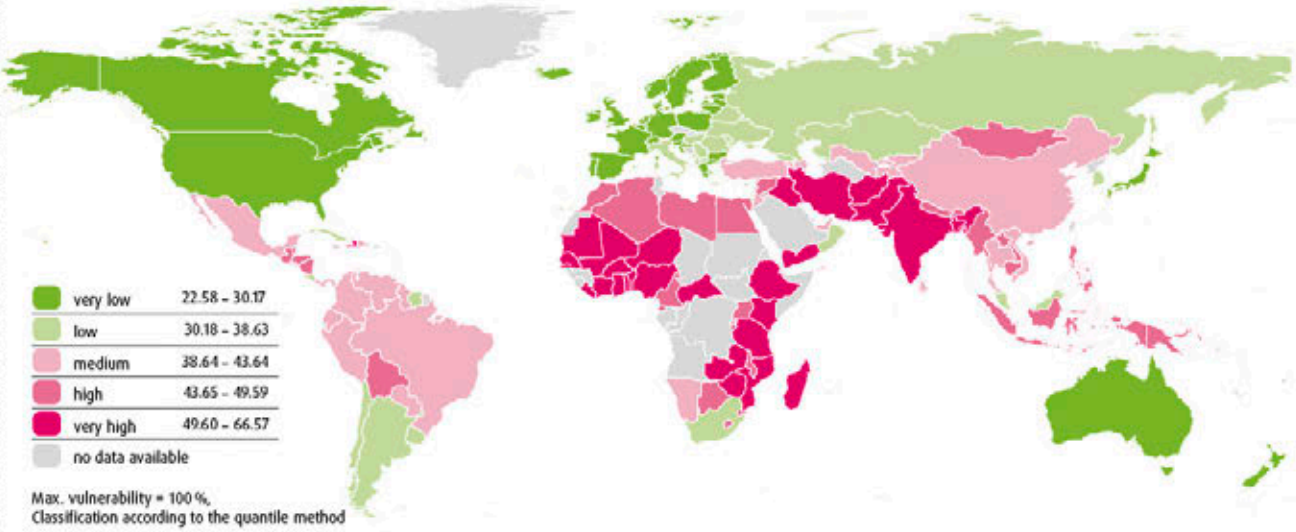


Max. exposure= 100 %,
Classification according to the quantile method

Map 1

Vulnerability

Vulnerability of society in urban areas as the sum of susceptibility, lack of coping capacities and lack of adaptive capacities

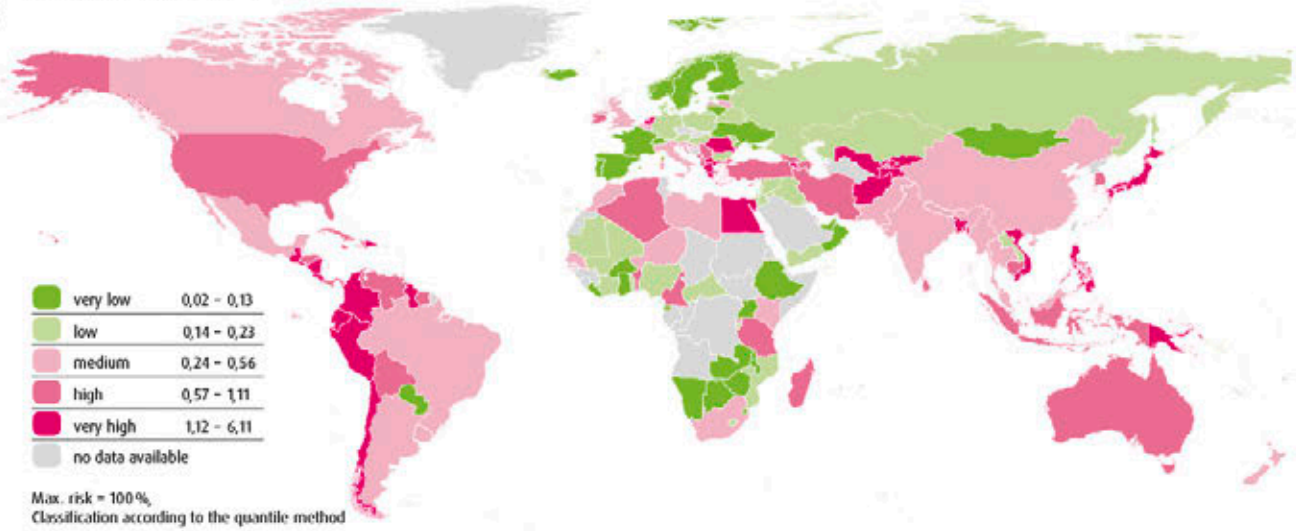


Max. vulnerability = 100 %,
Classification according to the quantile method

Map 2
Map 3

Urban risk

Urban risk as the result of exposure and vulnerability



Max. risk = 100 %,
Classification according to the quantile method

COMPARE FOLD-OUT PAGE MAP A →
COMPARE FOLD-OUT PAGE MAP B →
COMPARE FOLD-OUT PAGE MAP C →


8

4. Political challenges and perspectives

Peter Mucke

When cities in developing countries and emerging economies grow so fast that the local authorities can no longer cope with the influx of new inhabitants, the question arises which measures are suitable at national and international level to raise the resilience of cities towards natural hazards and the impacts of climate change. 2015 is going to be a crucial year regarding answers to this question. In all, three world summits are to address the aspects that massively influence the city as a risk area. Whether urbanization is going to be a driver of risk or mitigate risk levels in the future will also depend on the decisions taken there.

Urbanization is one of the four megatrends determining the future of the world, alongside economic and cultural globalization, demographic change and climate change. What is conspicuous is that urbanization is often interpreted and communicated as a threat. Future scenarios of urban growth often sound apocalyptic. And yet, in future, thanks to people being within reach in a relatively smaller area, providing for them and reducing vulnerabilities could be better achievable.

However, the demands on the city of the future are indeed enormous. Given that the number of inhabitants is set to grow in many cases, it will have to make efficient and environmentally friendly use of resources. In urban areas, available land, energy, sanitary and process water, and building material are just as scarce or expensive goods as, for example, food, potable water and clean air. In view of the forecasted increase in extreme weather events such as flooding and storms, the constructional safety of buildings and settlements is going to be of greater significance. Given the traffic gridlock in many larger cities, viable solutions for transport and mobility are urgently required. Last but not least, considering increasing social tension, especially because of high income disparities within many countries, preventing violence and armed conflict will become a central objective particularly in urban areas.

The relief organizations in Alliance Development Works have to address these challenges while at the same time keeping in mind that solely raising the resilience of cities and nations cannot be a sufficient solution. What is just as important is to focus on the underlying problematic areas as development challenges: i.e. social injustice within and between societies or states, the overexploitation of natural resources by production and consumption, the causes of climate change, and the weaknesses from the level of urban administrations up to that of national government institutions.

Urban planning and urban development

Given these multi-layered demands, urban planning and urban development always evolve in a field of tension. Urban planners have to find solutions both for a frequently high demand for housing, the requirements of industry, commerce and service enterprises, and for the demands of public institutions, for transport and traffic, for recreational centers as well as for the demands posed by effective environmental protection and nature conservation. Particularly the as yet not built-up urban areas are usually competed for by different user interests. Regional and national provisions have to be considered by the municipal decision-making committees. In addition, urban planning faces the challenge of not only taking the demands of citizens with regard to constructional, design and regional planning issues into account but also having to focus on developments that need to be reckoned with in the future. This may include both rapid urban growth, especially at two and more percent, and adaptive measures to counter increasingly severe storms and flooding or sea level rise, a considerable threat to coastal cities.

However, in many cases, cities lack both trained personnel to cope with this multitude of interests and objectives and the financial means for a city's development options, such as compiling and implementing construction guidelines, promoting the construction of social housing and local public transport or establishing and maintaining recreational and green areas. If protection against natural hazards and the impacts of climate change are included, the immense challenges that the cities are going to face in the future in terms of both planning and financing become all the more apparent.

This is why hopes are again and again set on the private sector, which can or ought to raise

The ten essentials for making cities resilient

1. Put in place organisation and coordination to understand and reduce disaster risk, based on participation of citizen groups and civil society. Build local alliances. Ensure that all departments understand their role in disaster risk reduction and preparedness.
2. Assign a budget for disaster risk reduction and provide incentives for homeowners, low income families, communities, businesses and the public sector to invest in reducing the risks they face.
3. Maintain up to date data on hazards and vulnerabilities. Prepare risk assessments and use these as the basis for urban development plans and decisions, ensure that this information and the plans for your city's resilience are readily available to the public and fully discussed with them.
4. Invest in and maintain critical infrastructure that reduces risk, such as flood drainage, adjusted where needed to cope with climate change.
5. Assess the safety of all schools and health facilities and upgrade these as necessary.
6. Apply and enforce realistic, risk compliant building regulations and land use planning principles. Identify safe land for low income citizens and upgrade informal settlements, wherever feasible.
7. Ensure that education programmes and training on disaster risk reduction are in place in schools and local communities.
8. Protect ecosystems and natural buffers to mitigate floods, storm surges and other hazards to which your city may be vulnerable. Adapt to climate change by building on good risk reduction practices.
9. Install early warning systems and emergency management capacities in your city and hold regular public preparedness drills.
10. After any disaster, ensure that the needs of the affected population are placed at the centre of reconstruction, with support for them and their community organisations to design and help implement responses, including rebuilding homes and livelihoods.

Source: UNISDR 2012

the financial resources required for urban development. However, this hope is deceptive. In the general tangle of interests, it is only natural for the private sector to be guided first and foremost by its own objectives. Given this situation, if a strong municipal administration and decision-makers who are independent of economic interests fail to act, there is a danger that urban development will only proceed in a very one-sided manner. It is precisely when the municipal executive committees and the municipal administrations are weak that private sector actors can gain considerable influence. However, they do not hold responsibility for the consequences arising from this, for the municipal committees are politically accountable – and the impacts are ultimately borne by all city-dwellers.

Forward-looking urban development rests on the following essential requirements:

+ Urban planning objectives and responsibilities have to be defined and must be transparent. Objectives are to focus on the needs of all city-dwellers.
+ The regional and national provisions and laws have to address existing challenges and objectives for the future resulting from urban growth and existing as well as future hazards, and they have to offer solutions in this respect.
+ The institutions responsible for urban planning require appropriate financial support and adequate personnel for their activities and responsibilities and have to hold the mandate required for the implementation of urban provisions and decisions.
+ The inclusion of different interests and, in particular, those directly affected has to be accomplished in a comprehensible manner, i.e. in transparent procedures

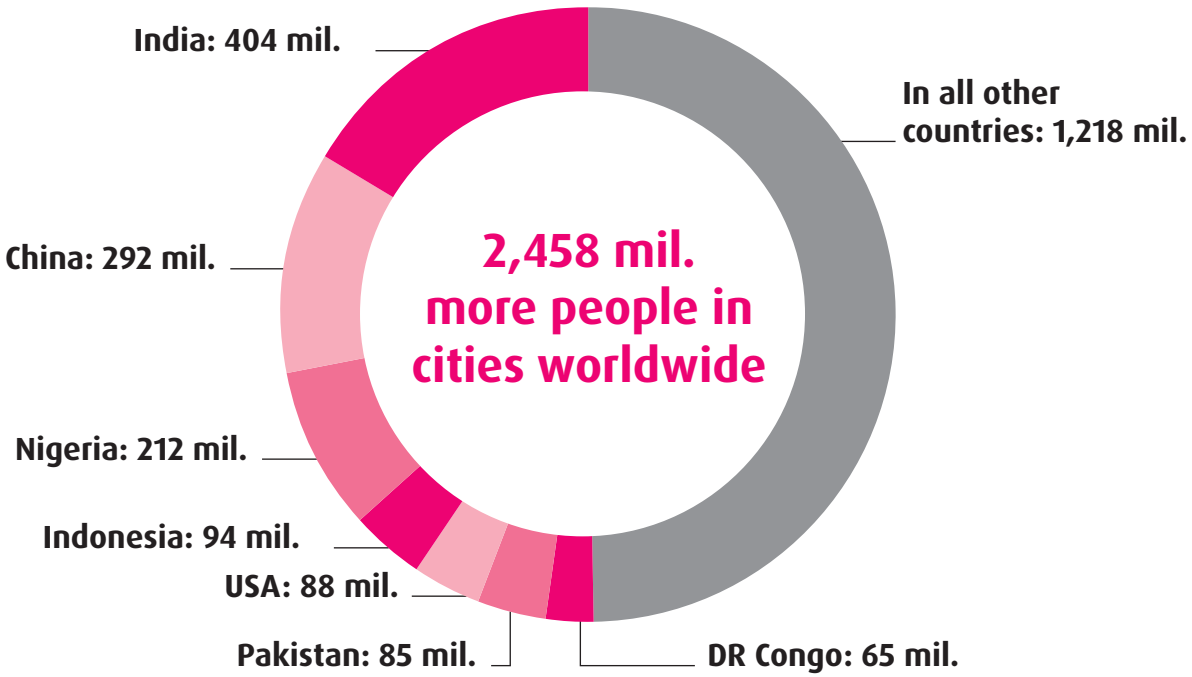


Figure 4: Urban population growth between 2014 and 2050 (UN DESA 2014)

and observing a balance of interests that provides for special support for disadvantaged sections of the population.

+ Urban planning has to be designed as a continuous process analyzing future requirements and developing timely planning provisions and measures on this basis.

Urbanization as a multi-layered process

What already makes the search for suitable concepts and perspectives for urban development difficult is that urbanization is a highly multi-layered phenomenon. Showing both extremely high growth rates and a decline in the number of inhabitants, cities across the world are going to face very different challenges. 90 percent of the predicted increase in urban population will be concentrated in urban areas in Asia and Africa. The urban population is set to grow by 2.5 billion people by 2050, with the countries China, India and Nigeria alone accounting for around 37 percent of this increase. Taking the growth rates in Indonesia, the United States of America, Pakistan and the Democratic Republic of the Congo into account as well, more than 50 percent of urban growth will happen in these seven countries (UN DESA 2014, see Figure 4 on page 56).

Also, urban growth is distributed unevenly depending on the size of cities. Whereas three out of five city-dwellers currently live in cities with less than one million inhabitants, by 2030, this will only be approximately one out of two inhabitants. Cities with fewer than 500,000 inhabitants are to grow by well over 15 percent, whereas the megacities, i.e. the cities with ten or more million inhabitants, will grow by 65 percent (UN DESA 2014, see Figure 5 on page 58).

Nowadays, the growth of cities occurs mainly of its own accord, while on a global scale, immigration from rural areas accounts for a comparatively smaller proportion of urban growth (UN DESA 2012). However, because

International negotiations

Universal goals for sustainable development / Post-2015 Summit

The eight Millennium Development Goals (MDGs), launched in 2000 by heads of state and government from more than 150 countries with the signing of the United Nations Millennium Declaration, have dominated the development debate for fifteen years. They are to expire in 2015 and will be replaced by the universal Sustainable Development Goals (SDGs).

The MDGs concentrate on eradicating the most extreme forms of poverty and hunger and on basic social services for the population, especially in the areas of primary education, health and water supply. The SDGs are to take a broader view of the global challenges ahead. The proposal completed by a UN General Assembly task force in July 2014 comprises 17 MDGs. In addition to alleviating poverty, which continues to be a focal aspect, reducing inequality is one of the topics referred to a goal in its own right. Unlike the MDGs, the SDG also contains a number of ecological goals, including goals addressing sustainable modes of consumption and production and climate protection. However, many of the goals and sub-goals have been formulated so vaguely that as yet, no verifiable commitments to action can be derived from them (Martens 2014).

With the proposal for SDG 11, cities and settlements are explicitly adopted in the new catalogue of goals. It reads: "Make cities and human settlements inclusive, safe, resilient and sustainable."

UN Secretary General Ban Ki-moon will bring together the SDG report and further contributions in a synthesis report scheduled for November 2014. It forms the basis of negotiations on the Post-2015 Agenda that are to start at government level by the end of 2014/beginning of 2015. They are to be concluded with a summit meeting in New York from September 21 to 23.

→ continued on page 59

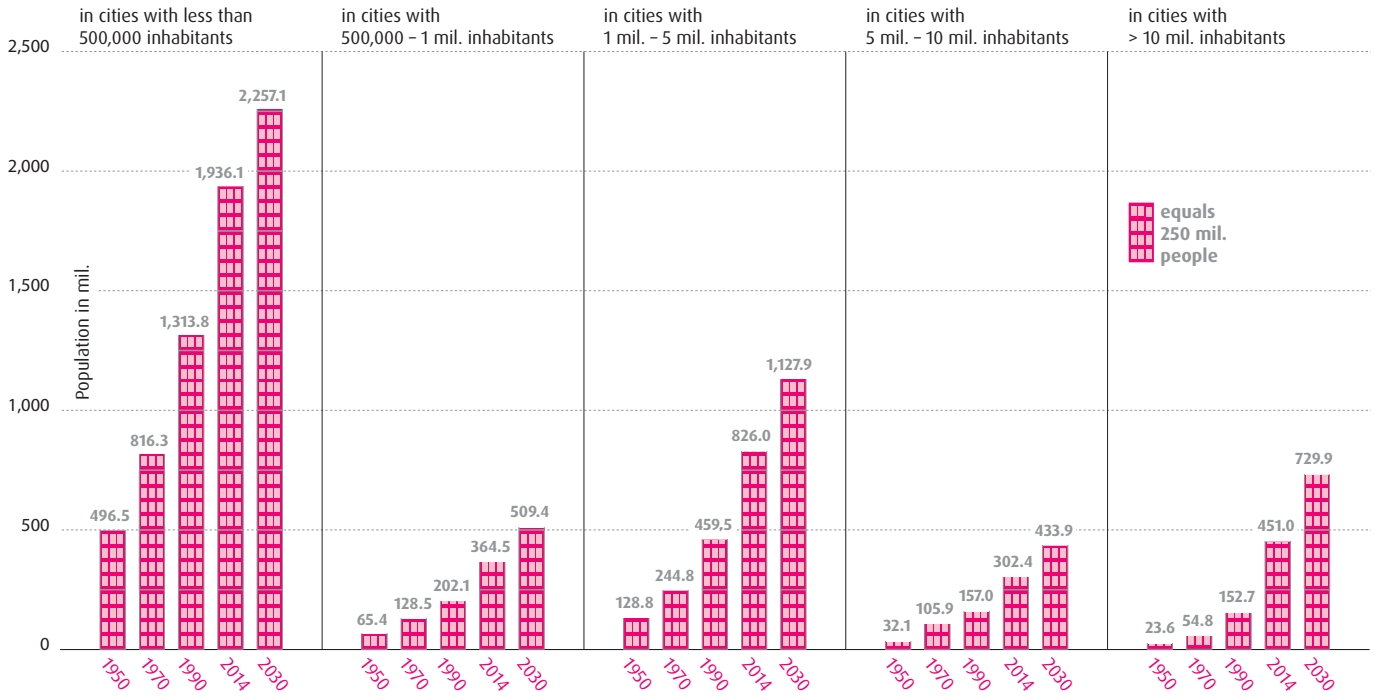


Figure 5: Total number of inhabitants in millions in cities worldwide of different size classes (UN DESA 2014 and own calculations by Alliance Development Works)

of conflicts or wars in their own country or a neighboring country, individual cities are confronted with very high population growth owing to refugees seeking protection.

Therefore, no generally valid solutions exist to develop urbanization in a positive direction. Certain types of urbanization can be identified:

- strong growth – medium growth – constant development – decline in population
- small town – medium-sized city – large city – megacity
- cities in developing countries, emerging economies and industrialized countries.

Ultimately, however, the strategies to deal with urbanization and risk minimization have to be developed individually for every city.

Strong growth, weak administration

In many cases, urban planning and political steering by the municipal committees and the implementation of the measures required do not work, or do so only insufficiently. In addition to a lack of necessary financial means, inadequate training of those responsible, a lack of support by the political decision-makers, and unclear mandates for action on the part of the urban planners and the institutions involved are the chief reasons for this. And if, on top of this, the national provisions and laws are weak, the failure e.g. of disaster risk reduction at community level will be inevitable.

In the case of strong urban growth, there is the additional aspect that the institutions, which are already weak in financial and personnel terms, are unable to cope with the rising demands. Especially with urban growth, municipal administration faces a conglomerate of private interests, business interests, and, partly, individuals accepting advantages.

However, even well-governed cities do not automatically prioritize combating urban poverty and creating socially balanced conditions. Often enough, municipal governments seek to achieve improved urban functionality through good governance, thus creating the foundations for investments, the establishment of new industries and future sales markets.

Participation and inclusion

In view of these weaknesses and trends, seeing to it that those affected are given voice and are involved in the urban planning processes as a

whole seems all the more important: people in strongly exposed residential areas, informal settlers, disabled and disadvantaged people. UN Habitat estimates that the number of slum-dwellers will continue to rise. Already, a third of the city-dwellers in the developing countries live in slums, and even 62 percent of those in Sub-Saharan Africa do so (UN-Habitat 2013).

Frequently, the municipal authorities refuse to install infrastructure in informal settlements. Often enough, the inhabitants make do with individual measures, but usually, there is a lack of wider approaches or comprehensive solutions for the city as a whole.

Enumerations, mapping of settlements and, thus, making informal settlements visible in official data, as described in Chapter 2.2, are important initial steps in helping these people. This is also going to be a growing challenge for relief organizations within Alliance Development Works. The aim here has to be that of enabling poor sections of the population to participate in shaping urban planning processes and the implementation of their results. One key aspect here is that of strengthening these people's self-organization so that they can contribute to the respective processes with the necessary degree of vigor.

"Resilient Cities" and international politics

Various initiatives by the UN and by international alliances of cities are concentrating on enhancing the resilience of cities to natural hazards and climate change. To date, more than 1,800 cities are involved in the global campaign "Making Cities Resilient: My City is Getting Ready" of the United Nations Office for Disaster Risk Reduction (UNISDR 2014). According to the original term, resilience refers to a system's ability to return to its initial state after substantial changes. In a figurative sense, resilience describes a system's resistance towards acute and chronic stress. This may also include stress causing a system

→ International negotiations, continued from page 57

Climate negotiations and the Kyoto Protocol

The climate negotiations at international level are of high relevance to disaster risk reduction. The UN Framework Convention on Climate Change adopted by the United Nations in 1992 provides the chief basis for these negotiations. The current 195 states party to the Convention meet annually, with the next Conference of Parties (COP) to be held in Lima from December 1 to 12.

The Conference of Parties in Paris from November 30 to December 11, 2015 is going to be of particular importance. For this is where the follow-up agreement to the internationally binding commitment to reduce emissions, the Kyoto Protocol, is to be signed.

One of the items agreed by the states party to the Convention in the Japanese city of Kyoto in 1997 was to reduce emissions of the six most important greenhouse gases by 2012. Setting out from the present UN timetable, the follow-up agreement to the Kyoto Protocol is to be negotiated by 2015 and to enter force from 2020 on at the latest.

The Hyogo Framework for Action

From March 14 to 18, 2015, the third World Conference on Disaster Risk Reduction is to be held in Sendai City. At the previous World Conference on Disaster Reduction in Kobe, in 2005, the ten-year plan Hyogo Framework for Action (HFA) was adopted, and has since been signed by 168 member states. This plan for action is titled "Building the Resilience of Nations and Communities to Disasters" and serves the overarching goal of substantially reducing losses arising in the context of disasters owing to extreme natural events.

The HFA defines five priorities for action that are to contribute to reducing disaster risk:

1. Ensuring that disaster risk reduction becomes a national priority and a strong institutional implementation base is established.
2. Identifying, monitoring and assessing the respective disaster risk.
3. Supporting early warning.
4. Making use of knowledge, innovation and education to develop a culture of safety and resilience at all levels.

→ continued on page 61

to undergo further development. Derived from this, the term "resilient cities" has been formed for cities that are resilient to natural hazards and climate change. In the context of the campaign, ten essential aspects have been worked out that raise the resilience of cities (see Box on page 55).

In the international negotiating processes addressing sustainable development, disaster risk reduction and urban areas at UN level, four milestones ought to be emphasized in particular:

- the 2015 World Conference on Disaster Risk Reduction in Sendai, where a new plan for action for disaster risk reduction is to be adopted (www.unisdr.org).
- the 2015 United Nations World Summit in New York, where the Sustainable Development Goals (SDGs) are to be adopted (www.sustainabledevelopment.un.org).
- the 2015 World Climate Conference in Paris, where the follow-up agreement on the Kyoto Protocol, in which internationally binding emission reduction targets for industrialized countries in connection with a timeframe are to be resolved (www.unfccc.int).
- the Habitat III 2016 World Summit (location yet to be fixed), where guidelines for sustainable urban development are to be formulated and the consequences arising from the three above world conferences for the development of cities and other habitats are to be addressed (www.unhabitat.org).

The most important contents of these negotiations and the respective timetables are represented in the Boxes on pages 57, 59 and 61. The close succession of these four world conferences offers the opportunity and virtually demands that the topics of "Urbanization", "Sustainable Development", "Climate Change" and "Disaster Risk Prevention", which are of central importance for cities, are discussed in their mutual dependence and conclusions are drawn.

Urbanization and climate change

Regarding urbanization and risk assessment, very high significance has to be attached to the negotiations in the context of the world climate conferences. For one thing, 40 percent of the world's population live in coastal and delta areas (UN-Habitat 2013). They are directly affected by the forecasted sea level rise and will have to go to great lengths in terms of adaptive measures to climate change. Furthermore, far-reaching experience has shown that e.g. the increase in droughts is driving a growing number of people from rural areas to the cities, rapidly stretching the city as a system to its limits, in particular in the case of acute or creeping disasters. Therefore, in the future, one of the most important questions will be what a municipality can do to adapt the city to the impact of climate change, both with regard to infrastructure and in general. Often, eco-system-based adaptation is more cost-efficient and effective compared to technical adaptation. Attempts are being made at international level to identify positive examples via best-practice initiatives, offering other cities options for action (World Bank 2011).

Here, it has to be borne in mind that the cities themselves are drivers of climate change, e.g. through transport, energy consumption, industry and consumption in general. Thus they can actively contribute to mitigating greenhouse gas emissions and counter the impacts of climate change. In this context, energy efficiency in public buildings, industry and the private sphere and modern mobility concepts ("bicycle cities" such as Copenhagen or cities largely handling transport through public suburban transport systems) ought to be referred to as well as creating or maintaining urban green areas, "green lungs", and the development of comprehensive recycling systems for waste and wastewater.

Often, the people affected by the impacts of climate change belong to the most marginalized sections of the population. For they live in simply-built houses, are usually not connected to drinking water supply, lack sanitation and have only insufficient power supply. The informal settlements, the slums, almost always lack urban infrastructure. Even in "normal" times, these people suffer poor living and environmental conditions in their habitats along river banks, on steep slopes or dams or under high bridges. The predicted impacts of climate change will quickly turn these circumstances into a disaster.

Eviction versus human rights

For relief organizations committed to supporting the poorest of the poor, it is especially shocking that under the pretext of disaster risk reduction, the blame has been put to informal settlers in many cases. It is claimed that inner-urban rivers and canals are "blocked" by settlements, so that the informal settlements have to be removed to establish flood protection (Schauber 2010). Here, municipal committees often tend to overlook the fact that informal settlers also have a right to decent housing and evictions are inadmissible in accordance with international law.

In 1948, in the Universal Declaration on Human Rights, the United Nations stipulated in Article 25, Paragraph 1 that: "Everyone has the right to a standard of living adequate for the health and well-being of himself and his family, including food, clothing, housing and medical care and necessary social services, and the right to security in the event of unemployment, sickness, disability, widowhood, old age or other lack of livelihood in circumstances beyond his control." (UN 1948)

The right to adequate housing was emphasized in the International Covenant on Economic, Social and Cultural Rights in 1966. There, Article 11, Paragraph 1 states that: "The States Parties to the present Covenant recognize the

→ International negotiations, continued from page 59

5. Reducing the risk factors determining disasters and strengthening disaster reduction in order to enable an effective response at all levels.

The implementation of the HFA is being coordinated by the Secretariat of the United Nations International Strategy for Disaster Reduction (UNISDR), which regularly reports on progress made in implementing the plan. The first preparatory meeting for the third World Conference on Disaster Risk Reduction was held in Geneva in July 2014, and the second preparatory meeting takes place there on November 17 and 18, 2014. In the meantime, it has become apparent that urban risk is going to be an important topic at the world conference in Sendai City.

Habitat III World Summit

The United Nations program for human settlements, UN-Habitat, is responsible for housing and settlement issues. It is a program in its own right within the UN, and has its headquarters in Nairobi. The first World Settlements Summit (Habitat I) was held in Vancouver in 1976, and was followed by the World Cities Summit (Habitat II) in Istanbul.

Habitat III, titled "United Nations Conference on Housing and Sustainable Urban Development", is planned for 2016. The conference will be the first world summit after the conclusion of the negotiations on the Post-2015 Development Agenda and the new climate convention. Habitat III offers the opportunity to discuss the consequences of urbanization and worsening natural hazards, setting measures and taking decisions on their financing.

According to a resolution of the UN General Assembly (UN Resolution 67/216, 2012), the aim of Habitat III will be to "secure renewed political commitment for sustainable urban development, assessing accomplishments to date, addressing poverty and identifying and addressing new and emerging challenges (...)." The resolution stresses "Sustainable urban development: the future of urbanization" as an important topic.

The first two preparatory conferences take place in New York in September 2014 and in Nairobi in April 2015. The place and time of the third preparatory conference and the Habitat III world summit in 2016 are yet to be set by the UN General Assembly.

right of everyone to an adequate standard of living for himself and his family, including adequate food, clothing and housing, and to the continuous improvement of living conditions." (UN 1966)

In accordance with the international standard, improved living conditions include e.g. access to clean drinking water and improved sanitation. However, 750 million people, i.e. approx. 10.5 percent of the population, continue to live without clean drinking water, including approx. 3.5 percent in urban areas. And 2.5 billion people worldwide, i.e. approx. 35 percent of the population, are without access to improved sanitation, including approx. 21 percent in urban areas (World Bank 2014).

Opportunities and risks

The complexity of urbanization leads to the consequence that every state has to conduct its own surveys for its cities, and each municipal administration has to do so for its own areas to find out what opportunities urbanization offers and what risks it bears. These surveys ought to be organized as an on-going process, for both opportunities and risks are subject to continuous change. The context can change within a matter of years, especially in the case of rapid urban growth.

Both the individual countries and the international community of states ought to regard the mitigation of urban risk as a central task to address, especially since they are aware of the continuing rapid urbanization over the coming decades. In the future, too, given the complexity referred to above, the cities will be pursuing entirely different development paths. For example, the conditions and capacities which New York City has to cope with in a storm are very different from those e.g. of Dhaka in Bangladesh. Here, requirements differ fundamentally both in terms of planning processes and the steering of urban growth. Cities in developing countries and emerging economies ought to comprehensively reduce their existing vulnerability both with regard to the present status and with a view to growth forecasts. The analyses with the aid of the WorldRiskIndex offer important clues both with regard to social, economic and ecological factors, such as better construction standards, turning informal settlements into residential areas with an adequate infrastructure, better educational and training facilities for children and youths and compliance with environmental standards.

In contrast, as a rule, cities in industrialized countries are recording only low growth rates and can concentrate on aspects such as establishing early warning systems, the compilation of suitable contingency plans and drills in this area. And this is also a big challenge. How can a city like Tokyo be evacuated in the event of a disaster without panic breaking out? What sort of risk communication has to be established for such events? This includes bearing in mind that most cities have a range of different cultural groups that may resort to different respective approaches in a disaster event. And it includes early warning and emergency relief and also having to reach those who require special protection and special help, e.g. because of disablement, disease or age. Despite the complexity referred to and the differences, the exchange of experience and ideas between cities offers great opportunities regarding the development of concepts and concrete plans for each individual city's future viability and its ability to minimize risks. Corresponding regional and international initiatives therefore deserve special support.

Country	WRI	Rank	Country	WRI	Rank	Country	WRI	Rank	Country	WRI	Rank
Afghanistan	9.71 %	40.	Ethiopia	7.57 %	63.	Morocco	6.80 %	80.	Turkmenistan	6.76 %	83.
Albania	10.17 %	37.	Fiji	13.65 %	16.	Mozambique	9.03 %	44.	Uganda	6.69 %	84.
Algeria	7.63 %	60.	Finland	2.24 %	161.	Myanmar	9.14 %	43.	Ukraine	3.11 %	145.
Angola	6.67 %	85.	France	2.69 %	152.	Namibia	5.61 %	100.	Uni. Arab Emirates	1.91 %	163.
Argentina	3.68 %	131.	Gabon	6.26 %	92.	Nepal	5.29 %	108.	United Kingdom	3.54 %	136.
Armenia	6.21 %	94.	Gambia	12.23 %	19.	Netherlands	8.25 %	51.	U. R. o. Tanzania	8.11 %	55.
Australia	3.93 %	126.	Georgia	6.80 %	81.	New Zealand	4.20 %	122.	United States	3.88 %	127.
Austria	3.58 %	133.	Germany	3.01 %	147.	Nicaragua	14.87 %	13.	Uruguay	4.00 %	124.
Azerbaijan	6.04 %	98.	Ghana	8.77 %	46.	Niger	11.45 %	24.	Uzbekistan	8.67 %	47.
Bahamas	4.19 %	123.	Greece	7.10 %	71.	Nigeria	8.24 %	52.	Vanuatu	36.50 %	1.
Bahrain	1.78 %	164.	Grenada	1.44 %	167.	Norway	2.31 %	158.	Venezuela	5.85 %	99.
Bangladesh	19.37 %	5.	Guatemala	20.68 %	4.	Oman	2.74 %	151.	Viet Nam	13.09 %	18.
Barbados	1.21 %	168.	Guinea	8.53 %	48.	Pakistan	7.07 %	72.	Yemen	6.07 %	97.
Belarus	3.12 %	143.	Guinea-Bissau	13.75 %	15.	Panama	7.41 %	68.	Zambia	7.61 %	62.
Belgium	3.41 %	139.	Guyana	11.81 %	22.	Papua New Guinea	16.74 %	10.	Zimbabwe	10.01 %	38.
Belize	6.59 %	86.	Haiti	12.00 %	21.	Paraguay	3.74 %	130.			
Benin	11.42 %	25.	Honduras	10.80 %	31.	Peru	6.91 %	77.			
Bhutan	7.83 %	58.	Hungary	5.46 %	104.	Philippines	28.25 %	2.			
Bolivia	5.04 %	109.	Iceland	1.56 %	166.	Poland	3.28 %	141.			
Bosnia a. Herzeg.	6.20 %	95.	India	7.04 %	73.	Portugal	3.61 %	133.			
Botswana	5.45 %	105.	Indonesia	10.55 %	34.	Qatar	0.08 %	171.			
Brazil	4.30 %	119.	Iran	4.88 %	112.	Rep. of Moldova	4.92 %	111.			
Brunei Darussalam	16.23 %	12.	Iraq	4.84 %	113.	Romania	6.55 %	86.			
Bulgaria	4.21 %	121.	Ireland	4.52 %	117.	Russia	3.85 %	128.			
Burkina Faso	9.62 %	41.	Israel	2.38 %	157.	Rwanda	7.30 %	69.			
Burundi	10.59 %	32.	Italy	4.48 %	118.	Saudi Arabia	1.17 %	169.			
Cambodia	17.12 %	9.	Jamaica	12.20 %	20.	Senegal	10.96 %	30.			
Cameroon	11.20 %	28.	Japan	13.38 %	17.	Serbia	6.91 %	76.			
Canada	3.14 %	143.	Jordan	4.75 %	115.	Seychelles	2.51 %	154.			
Cape Verde	10.32 %	36.	Kazakhstan	3.74 %	129.	Sierra Leone	10.57 %	33.			
Centr. African Rep.	6.78 %	82.	Kenya	7.00 %	75.	Singapore	2.25 %	160.			
Chad	11.28 %	27.	Kiribati	1.72 %	165.	Slovakia	3.57 %	135.			
Chile	11.30 %	26.	Korea. Republic of	4.80 %	114.	Slovenia	3.64 %	132.			
China	6.90 %	78.	Kuwait	3.34 %	140.	Solomon Islands	19.18 %	6.			
Colombia	6.83 %	79.	Kyrgyzstan	8.33 %	50.	South Africa	5.38 %	106.			
Comoros	7.44 %	66.	Lao P. D. Republic	5.75 %	100.	Spain	3.20 %	142.			
Congo	7.53 %	64.	Latvia	3.45 %	138.	Sri Lanka	7.43 %	67.			
Costa Rica	17.33 %	7.	Lebanon	5.01 %	110.	Sudan	8.08 %	56.			
Cote d'Ivoire	9.29 %	42.	Lesotho	7.03 %	74.	Suriname	8.42 %	49.			
Croatia	4.28 %	120.	Liberia	7.90 %	57.	Swaziland	7.66 %	59.			
Cuba	6.42 %	89.	Libyan Arab Jam.	4.00 %	125.	Sweden	2.19 %	162.			
Cyprus	2.76 %	150.	Lithuania	3.01 %	146.	Switzerland	2.48 %	155.			
Czech Republic	3.46 %	137.	Luxembourg	2.52 %	153.	Syrian Arab Rep.	5.58 %	102.			
Denmark	2.93 %	149.	Madagascar	11.20 %	29.	Tajikistan	7.17 %	70.			
Djibouti	9.93 %	39.	Malawi	8.21 %	53.	Thailand	6.38 %	89.			
Dom. Republic	11.50 %	23.	Malaysia	6.51 %	88.	Rep. of Macedonia	6.14 %	96.			
Ecuador	7.63 %	61.	Mali	8.85 %	45.	Timor-Leste	16.41 %	11.			
Egypt	2.29 %	159.	Malta	0.62 %	170.	Togo	10.47 %	35.			
El Salvador	17.12 %	8.	Mauritania	8.17 %	54.	Tonga	28.23 %	3.			
Equatorial Guinea	4.71 %	116.	Mauritius	14.78 %	14.	Trinidad a. Tobago	7.49 %	65.			
Eritrea	6.26 %	92.	Mexico	6.27 %	91.	Tunisia	5.47 %	103.			
Estonia	2.43 %	156.	Mongolia	3.00 %	148.	Turkey	5.34 %	106.			

Countries not listed in the WorldRiskIndex
Andorra
Antigua and Barbuda
Dem. People's Republic of Korea
Demokratic Republic of the Congo
Dominica
Federated States of Micronesia
Liechtenstein
Maledives
Marshall Islands
Monaco
Montenegro
Nauru
Palau
Samoa
San Marino
São Tomé und Príncipe
Somalia
St. Kitts and Nevis
St. Lucia
St. Vincent and the Grenadines
South Sudan
Tuvalu

Rank	Country	WorldRiskIndex	Exposition	Vulnerability	Susceptibility	Lack of coping capacities	Lack of adaptive capacities
1.	Vanuatu	36.50 %	63.66 %	57.34 %	36.40 %	81.16 %	54.45 %
2.	Philippines	28.25 %	52.46 %	53.85 %	33.35 %	80.03 %	48.17 %
3.	Tonga	28.23 %	55.27 %	51.08 %	29.15 %	81.80 %	42.28 %
4.	Guatemala	20.68 %	36.30 %	56.98 %	37.92 %	80.84 %	52.19 %
5.	Bangladesh	19.37 %	31.70 %	61.10 %	40.28 %	86.05 %	56.96 %
6.	Solomon Islands	19.18 %	29.98 %	63.98 %	45.37 %	85.44 %	61.12 %
7.	Costa Rica	17.33 %	42.61 %	40.68 %	22.98 %	64.61 %	34.46 %
8.	El Salvador	17.12 %	32.60 %	52.52 %	32.10 %	75.35 %	50.13 %
9.	Cambodia	17.12 %	27.65 %	61.90 %	41.99 %	86.96 %	56.74 %
10.	Papua New Guinea	16.74 %	24.94 %	67.15 %	56.06 %	84.22 %	61.16 %
11.	Timor-Leste	16.41 %	25.73 %	63.76 %	54.16 %	81.10 %	56.02 %
12.	Brunei Darussalam	16.23 %	41.10 %	39.48 %	17.97 %	63.08 %	37.40 %
13.	Nicaragua	14.87 %	27.23 %	54.63 %	37.79 %	81.70 %	44.41 %
14.	Mauritius	14.78 %	37.35 %	39.56 %	18.94 %	61.68 %	38.07 %
15.	Guinea-Bissau	13.75 %	19.65 %	69.94 %	53.21 %	89.71 %	66.90 %
16.	Fiji	13.65 %	27.71 %	49.28 %	25.33 %	75.43 %	47.08 %
17.	Japan	13.38 %	45.91 %	29.14 %	17.55 %	38.28 %	31.58 %
18.	Viet Nam	13.09 %	25.35 %	51.64 %	27.98 %	76.87 %	50.05 %
19.	Gambia	12.23 %	19.29 %	63.39 %	46.54 %	83.19 %	60.45 %
20.	Jamaica	12.20 %	25.82 %	47.27 %	27.07 %	72.17 %	42.57 %
21.	Haiti	12.00 %	16.26 %	73.79 %	62.24 %	91.04 %	68.08 %
22.	Guyana	11.81 %	22.90 %	51.56 %	29.02 %	79.47 %	46.18 %
23.	Dominican Republic	11.50 %	23.14 %	49.69 %	29.75 %	74.44 %	44.89 %
24.	Niger	11.45 %	15.87 %	72.12 %	61.03 %	86.79 %	68.54 %
25.	Benin	11.42 %	17.06 %	66.89 %	52.91 %	82.07 %	65.71 %
26.	Chile	11.30 %	30.95 %	36.53 %	20.22 %	58.54 %	30.82 %
27.	Chad	11.28 %	14.89 %	75.72 %	64.19 %	91.88 %	71.08 %
28.	Cameroon	11.20 %	18.19 %	61.59 %	43.57 %	85.27 %	55.92 %
29.	Madagascar	11.20 %	16.03 %	69.86 %	65.81 %	83.63 %	60.14 %
30.	Senegal	10.96 %	17.57 %	62.40 %	47.42 %	80.53 %	59.26 %
31.	Honduras	10.80 %	20.01 %	53.99 %	35.23 %	82.14 %	44.61 %
32.	Burundi	10.59 %	15.13 %	70.00 %	63.79 %	87.62 %	58.60 %
33.	Sierra Leone	10.57 %	14.65 %	72.10 %	58.33 %	86.11 %	71.84 %
34.	Indonesia	10.55 %	19.36 %	54.48 %	32.06 %	80.98 %	50.40 %
35.	Togo	10.47 %	15.56 %	67.31 %	54.37 %	85.28 %	62.27 %
36.	Cape Verde	10.32 %	20.26 %	50.95 %	34.45 %	70.24 %	48.17 %
37.	Albania	10.17 %	21.25 %	47.87 %	21.65 %	74.75 %	47.23 %
38.	Zimbabwe	10.01 %	14.96 %	66.92 %	57.27 %	89.19 %	54.30 %
39.	Djibouti	9.93 %	16.34 %	60.75 %	37.36 %	82.09 %	62.80 %
40.	Afghanistan	9.71 %	13.17 %	73.73 %	55.93 %	93.37 %	71.89 %
41.	Burkina Faso	9.62 %	14.32 %	67.17 %	55.39 %	84.06 %	62.05 %
42.	Cote d'Ivoire	9.29 %	13.67 %	67.95 %	48.44 %	87.56 %	67.84 %
43.	Myanmar	9.14 %	14.87 %	61.48 %	37.32 %	87.21 %	59.92 %
44.	Mozambique	9.03 %	12.73 %	70.89 %	65.89 %	84.15 %	62.64 %
45.	Mali	8.85 %	12.55 %	70.52 %	55.21 %	85.15 %	71.21 %
46.	Ghana	8.77 %	14.48 %	60.56 %	45.17 %	77.63 %	58.88 %
47.	Uzbekistan	8.67 %	16.18 %	53.61 %	30.79 %	78.42 %	51.62 %
48.	Guinea	8.53 %	12.03 %	70.94 %	54.04 %	89.29 %	69.51 %
49.	Suriname	8.42 %	18.12 %	46.48 %	28.21 %	70.96 %	40.27 %
50.	Kyrgyzstan	8.33 %	16.63 %	50.10 %	27.35 %	77.09 %	45.87 %
51.	Netherlands	8.25 %	30.57 %	26.98 %	14.84 %	42.15 %	23.96 %
52.	Nigeria	8.24 %	12.06 %	68.33 %	54.63 %	88.06 %	62.29 %
53.	Malawi	8.21 %	12.34 %	66.53 %	60.68 %	83.14 %	55.78 %
54.	Mauritania	8.17 %	12.47 %	65.51 %	49.35 %	85.95 %	61.23 %
55.	United Republic of Tanzania	8.11 %	12.01 %	67.51 %	64.27 %	83.23 %	55.03 %
56.	Sudan	8.08 %	11.86 %	68.15 %	52.44 %	93.05 %	58.96 %
57.	Liberia	7.90 %	10.96 %	72.03 %	63.36 %	84.60 %	68.11 %
58.	Bhutan	7.83 %	14.81 %	52.86 %	30.74 %	74.80 %	53.03 %
59.	Swaziland	7.66 %	12.76 %	60.03 %	46.75 %	80.78 %	52.55 %
60.	Algeria	7.63 %	15.82 %	48.24 %	22.93 %	77.02 %	44.76 %

Rank	Country	WorldRiskIndex	Exposition	Vulnerability	Susceptibility	Lack of coping capacities	Lack of adaptive capacities
61.	Ecuador	7.63 %	16.15 %	47.23 %	29.83 %	73.76 %	38.09 %
62.	Zambia	7.61 %	11.37 %	66.95 %	62.78 %	80.30 %	57.76 %
63.	Ethiopia	7.57 %	11.12 %	68.12 %	57.73 %	80.24 %	66.38 %
64.	Congo	7.53 %	11.65 %	64.66 %	55.69 %	86.16 %	52.11 %
65.	Trinidad and Tobago	7.49 %	17.54 %	42.74 %	19.66 %	68.76 %	39.80 %
66.	Comoros	7.44 %	10.97 %	67.82 %	59.09 %	84.13 %	60.23 %
67.	Sri Lanka	7.43 %	14.79 %	50.26 %	25.65 %	78.52 %	46.60 %
68.	Panama	7.41 %	16.45 %	45.03 %	27.92 %	67.87 %	39.30 %
69.	Rwanda	7.30 %	11.98 %	60.90 %	54.57 %	79.15 %	48.99 %
70.	Tajikistan	7.17 %	12.98 %	55.22 %	34.76 %	76.82 %	54.08 %
71.	Greece	7.10 %	21.11 %	33.62 %	17.76 %	51.21 %	31.89 %
72.	Pakistan	7.07 %	11.36 %	62.24 %	36.89 %	86.71 %	63.14 %
73.	India	7.04 %	11.94 %	58.91 %	38.72 %	80.31 %	57.71 %
74.	Lesotho	7.03 %	11.40 %	61.65 %	49.66 %	78.50 %	56.80 %
75.	Kenya	7.00 %	10.69 %	65.54 %	55.32 %	85.62 %	55.68 %
76.	Serbia	6.91 %	18.05 %	38.30 %	18.47 %	66.17 %	30.27 %
77.	Peru	6.91 %	14.40 %	48.00 %	29.57 %	73.28 %	41.16 %
78.	China	6.90 %	14.43 %	47.79 %	27.57 %	70.03 %	45.77 %
79.	Colombia	6.83 %	13.84 %	49.34 %	28.82 %	75.11 %	44.07 %
80.	Morocco	6.80 %	13.25 %	51.34 %	27.92 %	75.71 %	50.40 %
81.	Georgia	6.80 %	14.69 %	46.30 %	28.19 %	64.81 %	45.91 %
82.	Central African Republic	6.78 %	9.39 %	72.22 %	61.54 %	89.14 %	65.99 %
83.	Turkmenistan	6.76 %	13.19 %	51.24 %	27.83 %	75.68 %	50.21 %
84.	Uganda	6.69 %	10.16 %	65.90 %	56.05 %	87.68 %	53.95 %
85.	Angola	6.67 %	10.18 %	65.51 %	50.26 %	84.89 %	61.37 %
86.	Belize	6.59 %	13.31 %	49.52 %	28.18 %	74.23 %	46.14 %
87.	Romania	6.55 %	15.77 %	41.52 %	22.12 %	61.36 %	41.08 %
88.	Malaysia	6.51 %	14.60 %	44.60 %	19.65 %	67.56 %	46.59 %
89.	Cuba	6.42 %	17.45 %	36.79 %	19.62 %	57.20 %	33.56 %
90.	Thailand	6.38 %	13.70 %	46.61 %	19.87 %	75.46 %	44.50 %
91.	Mexico	6.27 %	13.84 %	45.27 %	23.99 %	72.16 %	39.65 %
92.	Gabon	6.26 %	11.95 %	52.41 %	33.51 %	74.53 %	49.18 %
93.	Eritrea	6.26 %	8.55 %	73.18 %	61.70 %	88.67 %	69.18 %
94.	Armenia	6.21 %	14.51 %	42.78 %	21.24 %	71.09 %	36.02 %
95.	Bosnia and Herzegovina	6.20 %	14.02 %	44.26 %	20.63 %	69.64 %	42.51 %
96.	T. f. Yugo. Rep. of Macedonia	6.14 %	14.38 %	42.70 %	20.88 %	64.38 %	42.83 %
97.	Yemen	6.07 %	9.04 %	67.18 %	45.77 %	91.03 %	64.74 %
98.	Azerbaijan	6.04 %	13.16 %	45.90 %	22.39 %	70.36 %	44.96 %
99.	Venezuela	5.85 %	13.15 %	44.48 %	23.64 %	74.24 %	35.56 %
100.	Lao People's Democratic Republic	5.75 %	9.55 %	60.21 %	41.69 %	84.00 %	54.96 %
101.	Namibia	5.61 %	10.41 %	53.92 %	45.70 %	71.02 %	45.04 %
102.	Syrian Arab Republic	5.58 %	10.56 %	52.82 %	26.28 %	84.38 %	47.82 %
103.	Tunisia	5.47 %	12.45 %	43.96 %	21.02 %	72.51 %	38.36 %
104.	Hungary	5.46 %	15.61 %	34.96 %	16.76 %	53.27 %	34.86 %
105.	Botswana	5.45 %	10.55 %	51.62 %	37.03 %	67.31 %	50.52 %
106.	South Africa	5.38 %	12.08 %	44.55 %	30.38 %	69.58 %	33.69 %
107.	Turkey	5.34 %	12.25 %	43.59 %	20.54 %	67.57 %	42.67 %
108.	Nepal	5.29 %	9.16 %	57.73 %	42.42 %	80.38 %	50.40 %
109.	Bolivia	5.04 %	8.98 %	56.14 %	40.91 %	80.19 %	47.33 %
110.	Lebanon	5.01 %	11.14 %	44.94 %	20.21 %	70.00 %	44.61 %
111.	Republic of Moldova	4.92 %	11.11 %	44.31 %	22.92 %	68.06 %	41.94 %
112.	Iran	4.88 %	10.19 %	47.92 %	20.05 %	81.58 %	42.13 %
113.	Iraq	4.84 %	8.08 %	59.82 %	30.06 %	89.30 %	60.10 %
114.	Korea, Republic of	4.80 %	14.89 %	32.26 %	15.02 %	46.60 %	35.14 %
115.	Jordan	4.75 %	10.53 %	45.09 %	22.03 %	68.79 %	44.44 %
116.	Equatorial Guinea	4.71 %	8.22 %	57.28 %	30.19 %	85.09 %	56.58 %
117.	Ireland	4.52 %	14.74 %	30.64 %	16.05 %	46.57 %	29.31 %
118.	Italy	4.48 %	13.85 %	32.36 %	17.27 %	54.41 %	25.39 %
119.	Brazil	4.30 %	9.53 %	45.09 %	25.53 %	66.60 %	43.15 %

Rank	Country	WorldRiskIndex	Exposition	Vulnerability	Susceptibility	Lack of coping capacities	Lack of adaptive capacities
120.	Croatia	4.28 %	11.53 %	37.13 %	18.18 %	55.97 %	37.24 %
121.	Bulgaria	4.21 %	11.66 %	36.08 %	17.57 %	56.56 %	34.10 %
122.	New Zealand	4.20 %	15.44 %	27.22 %	16.74 %	43.79 %	21.13 %
123.	Bahamas	4.19 %	10.71 %	39.09 %	19.06 %	53.43 %	44.80 %
124.	Uruguay	4.00 %	11.10 %	36.05 %	21.56 %	50.80 %	35.78 %
125.	Libyan Arab Jamahiriya	4.00 %	7.80 %	51.27 %	26.16 %	76.53 %	51.10 %
126.	Australia	3.93 %	15.05 %	26.10 %	15.05 %	42.29 %	20.96 %
127.	United States	3.88 %	12.25 %	31.67 %	16.47 %	48.57 %	29.98 %
128.	Russia	3.85 %	9.38 %	41.05 %	21.59 %	58.80 %	42.76 %
129.	Kazakhstan	3.74 %	9.11 %	41.09 %	18.00 %	63.57 %	41.72 %
130.	Paraguay	3.74 %	7.03 %	53.18 %	32.32 %	79.12 %	48.10 %
131.	Argentina	3.68 %	9.55 %	38.55 %	21.04 %	59.72 %	34.90 %
132.	Slovenia	3.64 %	11.59 %	31.42 %	16.02 %	51.15 %	27.08 %
133.	Portugal	3.61 %	10.93 %	33.01 %	17.91 %	48.38 %	32.73 %
134.	Austria	3.58 %	13.60 %	26.31 %	14.36 %	37.61 %	26.95 %
135.	Slovakia	3.57 %	10.21 %	34.92 %	14.53 %	55.66 %	34.57 %
136.	United Kingdom	3.54 %	11.60 %	30.49 %	16.57 %	47.08 %	27.82 %
137.	Czech Republic	3.46 %	10.82 %	32.02 %	15.07 %	50.87 %	30.12 %
138.	Latvia	3.45 %	9.26 %	37.30 %	21.12 %	55.19 %	35.57 %
139.	Belgium	3.41 %	11.66 %	29.23 %	15.59 %	42.38 %	29.70 %
140.	Kuwait	3.34 %	9.04 %	36.98 %	11.53 %	66.24 %	33.17 %
141.	Poland	3.28 %	9.79 %	33.51 %	17.67 %	53.16 %	29.68 %
142.	Spain	3.20 %	10.23 %	31.27 %	16.08 %	52.00 %	25.74 %
143.	Canada	3.14 %	10.25 %	30.61 %	15.19 %	46.45 %	30.19 %
144.	Belarus	3.12 %	8.46 %	36.89 %	16.87 %	61.69 %	32.12 %
145.	Ukraine	3.11 %	7.50 %	41.42 %	19.10 %	61.15 %	44.02 %
146.	Lithuania	3.01 %	8.88 %	33.91 %	18.58 %	49.36 %	33.78 %
147.	Germany	3.01 %	11.41 %	26.37 %	15.41 %	37.73 %	25.97 %
148.	Mongolia	3.00 %	6.52 %	46.07 %	31.05 %	64.67 %	42.47 %
149.	Denmark	2.93 %	10.87 %	27.00 %	15.08 %	39.49 %	26.42 %
150.	Cyprus	2.76 %	7.44 %	37.13 %	14.85 %	58.05 %	38.48 %
151.	Oman	2.74 %	6.41 %	42.75 %	15.98 %	63.51 %	48.76 %
152.	France	2.69 %	9.25 %	29.08 %	16.13 %	43.29 %	27.83 %
153.	Luxembourg	2.52 %	9.12 %	27.66 %	12.87 %	41.44 %	28.67 %
154.	Seychelles	2.51 %	5.99 %	41.86 %	22.44 %	63.20 %	39.93 %
155.	Switzerland	2.48 %	9.56 %	25.98 %	14.93 %	37.92 %	25.10 %
156.	Estonia	2.43 %	7.23 %	33.57 %	18.67 %	51.15 %	30.89 %
157.	Israel	2.38 %	6.41 %	37.20 %	19.15 %	58.93 %	33.52 %
158.	Norway	2.31 %	8.58 %	26.86 %	14.41 %	40.05 %	26.13 %
159.	Egypt	2.29 %	4.72 %	48.56 %	21.34 %	77.86 %	46.48 %
160.	Singapore	2.25 %	7.82 %	28.78 %	14.41 %	49.20 %	22.73 %
161.	Finland	2.24 %	8.19 %	27.38 %	15.60 %	39.39 %	27.17 %
162.	Sweden	2.19 %	7.97 %	27.49 %	15.39 %	40.90 %	26.18 %
163.	United Arab Emirates	1.91 %	5.93 %	32.27 %	10.47 %	56.51 %	29.84 %
164.	Bahrain	1.78 %	4.27 %	41.56 %	13.04 %	66.57 %	45.07 %
165.	Kiribati	1.72 %	3.05 %	56.45 %	42.31 %	83.69 %	43.36 %
166.	Iceland	1.56 %	5.67 %	27.46 %	15.00 %	43.15 %	24.21 %
167.	Grenada	1.44 %	3.13 %	46.15 %	24.99 %	69.03 %	44.43 %
168.	Barbados	1.21 %	3.46 %	34.95 %	16.85 %	50.36 %	37.63 %
169.	Saudi Arabia	1.17 %	2.93 %	39.82 %	15.19 %	70.05 %	34.22 %
170.	Malta	0.62 %	1.65 %	37.67 %	15.28 %	59.58 %	38.16 %
171.	Qatar	0.08 %	0.28 %	30.30 %	8.97 %	44.76 %	37.16 %

Adger, W.N., H. Eakin and A. Winkels (2009): Nested and teleconnected vulnerabilities to environmental change. Frontiers in Ecology and the Environment. 7(3): 150–157.

Agus, R. (2013): DKI JAKARTA targetkan 392 kawasan kumuh hilang pada 2020. In: Indonesia Business Daily. As of: 11.01.2014. http://news.bisnis.com/read/20130103/186/121279/dki-jakarta-targetkan-392-kawasan-kumuh-hilang-pada-2020 (Called up on 11.06.2014).

Bangladesh Bureau Of Statistics: Population Census 2011 (Dhaka & Khulna). Bangladesh at a glance. Dhaka Division. Dhaka Table C01. http://www.bbs.gov.bd/Census2011/Dhaka/Dhaka/Dhaka_C01.pdf (Called up on 12.08.2014).

Bangladesh Disaster Knowledge Network: Hazard Profile. Stand: 21.02.2013. http://www.saarc-sadkn.org/countries/bangladesh/hazard_profile.aspx (Called up on 04.08.2014).

Bayo, A.O. (2006): City Planning, City Growth and Food Security: The Inevitable Trinity in the Nigerian Food Equation. Agricultural Journal. 1(3): 113-118.

Bgmea (2012): Industry Strengths. As of 08.04.2012. http://www.bgmea.com.bd/home/pages/Strengths#.U99os60u0Vp (Called up on 04.08.2014).

Birkmann, J., P. Buckle, J. Jaeger, M. Pelling, N. Setiadi, M. Garschagen, N. Fernando and J. Kropp (2010): Extreme events and disasters: A window of opportunity for change? Analysis of changes, formal and informal responses after megadisasters. Natural Hazards. 55(3): 637-669.

Birkmann, J., T. Welle, D. Krause, J. Wolfertz, D. C. Suarez and N. Setiadi (2011): WorldRiskIndex: Concept and results. In: Bündnis Entwicklung Hilft: WorldRiskReport 2011: 13-43.

Brecht, H., U. Deichmann and H. G. Wang (2013). A Global Urban Risk Index. Policy Research working paper. No. WPS 6506. World Bank. Washington, DC. http://documents.worldbank.org/curated/en/2013/06/17920427/global-urban-risk-index (Called up on 04.08.2014).

Bündnis Entwicklung Hilft (2011): WorldRiskReport 2011. Berlin.

Bündnis Entwicklung Hilft (2013): WorldRiskReport 2013. Berlin.

Dickson, E., J. L. Baker, D. Hoornweg, A. Tiwari (2012): Urban Risk Assessments : Understanding Disaster and Climate Risk in Cities. Urban Development Series. World Bank. Washington, DC. http://documents.worldbank.org/curated/en/2012/06/16499064/urban-risk-assessments-understanding-disaster-climate-risk-cities (Called up on 04.08.2014).

Eckert, S. and S. Kohler (2014): Urbanization and Health in Developing Countries: A Systematic Review, World Health & Population. 15: 7–20.

FAO (2011): The State of Food and Agriculture 2010–11: Women in Agriculture – Closing the Gender Gap for Development. Food and Agriculture Organization of the United Nations. Rome.

Fao (2013): The State of Food and Agriculture: Food Systems for Better Nutrition. Food and Agriculture Organization of the United Nations. Rome.

Freudenberg, M. (2003): Composite Indicators of Country Performance: A Critical Assessment. OECD Science, Technology and Industry Working Papers. 2003/16. OECD Publishing.

Garschagen, M. (2013): Risky Change? Dynamics in Vulnerability and Adaptation to Natural Hazards between Transformation and Climate Change in Can Tho City, Vietnam. Doctoral Thesis, Mathematisch-Naturwissenschaftliche Fakultät der Universität zu Köln.

Gómez, M. I., C. B. Barrett, T. Raney, P. Pinstrup-Andersen, J. Meerman, A. Croppenstedt, B. Carisma and B. Thompson (2013): Post-Green Revolution Food Systems and the Triple Burden of Malnutrition. Food Policy. 42: 129–138.

Government Of India, Ministry Of Housing and Urban Poverty Alleviation (2007): Report of the Technical Group [11th Five Year Plan: 2007-12] on Estimation of Urban Housing Shortage. New Delhi. http://mhupa.gov.in/ministry/housing/housingshortage-rept.pdf (Called up on 13.06.2014).

Grefe, C. (2013): Metropole Dhaka: Willkommen im Chaos. In: Die Zeit. 15/2013. As of 13.04.2013. http://www.zeit.de/2013/15/megacity-dhaka-urbanisierung (Called up on 04.08.2014).

Heinrichs, D., K. Krellenberg, B. Hansjürgens and F. Martínez (Eds.) (2012): Risk Habitat Megacity. Springer Verlag. Heidelberg.

Hsu, A., J. Emerson, M. Levy, A. De Sherbinin, L. Johnson, O. Malik, J. Schwartz, and M. Jaiteh (2014): The 2014 Environmental Performance Index. New Haven, CT: Yale Center for Environmental Law and Policy.

Huq, S., S. Kovats, H. Reid and D. Satterthwaite (2007): Editorial: Reducing risks to cities from disasters and climate change. Environment and Urbanization. 19(1): 3–15.

IPCC [Field, C. B. Et Al. (Eds.)] (2012): Managing the risks of extreme events and disasters to advance climate change adaption. A special report of working groups I and II of the Intergovernmental Panel on Climate Change. Cambridge University Press. Cambridge and New York.

IPCC [Field, C. B. Et Al. (Eds.)] (2014): Climate Change 2014: Impacts, Adaptation, and Vulnerability. Part A: Global and Sectoral Aspects. Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change Cambridge University Press. Cambridge and New York.

Jeppesen, H. (2014): Entschädigung für Opfer von Fabrikeinsturz in Bangladesh. Deutsche Welle. As of 09.04.2014. http://dw.de/p/1BZgQ (Called up on 04.08.2014).

Keck, M., H.-G. Bohle and W.-P. Zingel (2012): Dealing with Insecurity. Informal Relations and Risk Adaptation among Food Wholesalers in Dhaka, Bangladesh. Zeitschrift für Wirtschaftsgeographie. (1/2): 43–57.

Kraas, F. (2007): Megacities and Global Change: Key Priorities. The Geographical Journal. 173(1): 79–82.

Kraas, F. (2012): Das Hochwasser 2011 in Bangkok. Geographische Rundschau. (1): 11–13.

Lavell, A., M. Oppenheimer, C. Diop, J. Hess, R. Lempert, J. Li, R. Muir-Wood and S. Myeong (2012): Climate Change: new dimensions in disaster risk, exposure, vulnerability, and resilience. In: IPCC [Field, C.B. et al. (Eds.)]: Managing the Risks of Extreme Events and Disasters to Advance Climate Change Adaptation. A Special Report of Working Groups I and II of the IPCC. Cambridge University Press. Cambridge and New York: 25-64.

Leser, H. (1995): Diercke-Wörterbuch Allgemeine Geographie. Taschenbuch 8. Auflage. Westermann.

Martens, J. (2014): Brüchiger Kompromiss über globale Entwicklungsziele. In: Global Policy Forum. Post-2015 Briefing 5. New York and Bonn.

Matuschke, I. (2009): Rapid Urbanization and Food Security: Using Food Density Maps to identify future Food Security Hotspots. Discussion paper for the Conference of the International Association of Agricultural Economists, Beijing, 16.–22.08.2009.

Mcgranahan, G., D. Balk and B. Anderson (2007): The Rising Tide: Assessing the risks of climate change and human settlements in low elevation coastal zones. Environment and Urbanization. 19(1): 17–37.

Meyer, W. (2004): Indikatorenentwicklung. Eine praxisorientierte Einführung (2. Auflage). CEval-Arbeitspapiere 10. Centrum für Evaluation. Saarbrücken.

Moser, C. and D. Satterthwaite (2008): Towards pro-poor adaptation to climate change in the urban centres of low- and middle-income countries. Climate Change and Cities Discussion Paper. 3. IIED. London.

Muller, N. (2014): Small signs of progress in Bangladesh's textile sector. Deutsche Welle. As of 24.03.2014. http://dw.de/p/1BTiP (Called up on 04.08.2014).

OECD-FAO (2014): Agricultural Outlook 2014–2023. Organisation for Economic Co-operation and Development. Paris.

Proietti, I., C. Frazzoli and A. Mantovani (2014): Identification and management of toxicological hazards of street foods in developing countries. Food and chemical toxicology. 63: 143–152.

Ruel, M. T. and J. L. Garrett (2004): Features of urban food and nutrition security and considerations for successful urban programming. eJade. 1(2): 242–271.

Satterthwaite, D., S. Huq, M. Pelling, H. Reid and P. Romero-Lankao (2007): Adapting to climate change in urban areas: The possibilities and constraints in low- and middle-income nations. IIED Human Settlements Discussion Paper Series. 1.

Saunders, D. (2011): Arrival City: Über alle Grenzen hinweg ziehen Millionen Menschen vom Land in die Städte. Von ihnen hängt unsere Zukunft ab. Blessing. Munich.

Schauber, A. (2010): Städte im Klimawandel – Herausforderungen für die Zivilgesellschaft. VENRO Symposium 2010.

Schneider, A., M. A. Friedl and D. Potere (2009): A new map of global urban extent from MODIS data. Environmental Research Letters 4. Article 044003.

Schneider, A., M. A. Friedl and D. Potere (2010): Monitoring urban areas globally using MODIS 500m data: New methods and datasets based on urban ecoregions. Remote Sensing of Environment 114: 1733-1746.

Shah, F. (2011): Methodology Report: Calculating Multi Hazard City Risk. World Bank. Washington DC. http://documents.worldbank.org/curated/en/2011/09/17671828 (Called up on 04.08.2014).

Steyn, N. P. and D. Labadarios (2011): Street foods and fast foods: how much do South Africans of different ethnic groups consume? Ethnicity & disease. 21: 462–466.

Storch, H. and N. K. Downes (2011): A scenario-based approach to assess Ho Chi Minh City's urban development strategies against the impact of climate change. Cities. 28(6): 517–526.

Süddeutsche Zeitung (2014): Hilfsfonds fehlen noch mehr als 30 Millionen US-Dollar. As of 24.03.2014. http://www.sueddeutsche.de/panorama/fabrikeinsturz-in-bangladesch-hilfsfonds-fehlen-noch-mehr-als-millionen-us-dollar-1.1920898 (Called up on 04.08.2014).

Swinburn, B. A., I. Caterson, J. C. Seidell, and W. P. T. James (2004): Diet, nutrition and the prevention of excess weight gain and obesity. Public health nutrition.

7: 123–146.

UN (1948): The Universal Declaration of Human Rights. UNO-Resolution 217 A (III) of 10.12.1948.

UN (1966): International Covenant on Economic, Social and Cultural Rights, International Covenant on Civil and Political Rights. UNO-Resolution A/RES/2200(XXI)[A-C] of 16.12.1966.

UN DESA (2012): World Urbanization Prospects: The 2011 Revision. New York.

UN DESA (2014): World Urbanization Prospects: The 2014 Revision. Highlights. New York.

UNDP (2013): Data from the 2013 Human Development Report: Online database. http://hdr.undp.org/en/data (Called up on 04.08.2014).

UN DPI (2014): UN General Assembly's Open Working Group proposes sustainable development goals. Press release of 22.07.2014. http://sustainabledevelopment.un.org/content/documents/4538pressowg13.pdf (Called up on 05.08.2014).

UNFPA (2007): State of World Population 2007. Unleashing the Potential of Urban Growth. New York.

UN-HABITAT (2013): Global Activities Report 2013, Our Presence and Partnerships. http://unhabitat.org/un-habitat-global-activities-report-2013-our-presence-and-partnerships/ (Called up on 05.08.2014).

UN-HABITAT (2014): The State of African Cities 2014. Nairobi.

UNICEF (2012): The State of the World's Children 2012. Children in an Urban World. New York.

UNISDR (2012): Making Cities Resilient. Report 2012. Second Edition. Geneva.

UNISDR (2014): UN Resilient Cities Campaign. http://www.unisdr.org/campaign/resilientcities/ (Called up on 14.08.2014).

Ward, P. J., M. A. Marfai, F. Yulianto, D. R. Hizbaron and J. C. Aerts (2011): Coastal inundation and damage exposure estimation: a case study of Jakarta. Natural Hazards. 56(2): 899-916.

Welle, T., J. Birkmann, J. Rhyner, M. Witting and J. Wolfertz (2012): WorldRiskIndex 2012: Concept, updating and results. In: Bündnis Entwicklung Hilft: WorldRiskReport 2012: 11-27.

Welle, T., J. Birkmann, J. Rhyner, M. Witting and J. Wolfertz (2013): WorldRiskIndex 2013. In: Bündnis Entwicklung Hilft WorldRiskReport 2013: 45-57.

World Bank (2011): Guide to Climate Change Adaptation in Cities. Washington. http://siteresources.worldbank.org/INTURBANDEVELOPMENT/Resources/336387-1318995974398/GuideClimChangeAdaptCities.pdf (Called up on 13.08.2014)

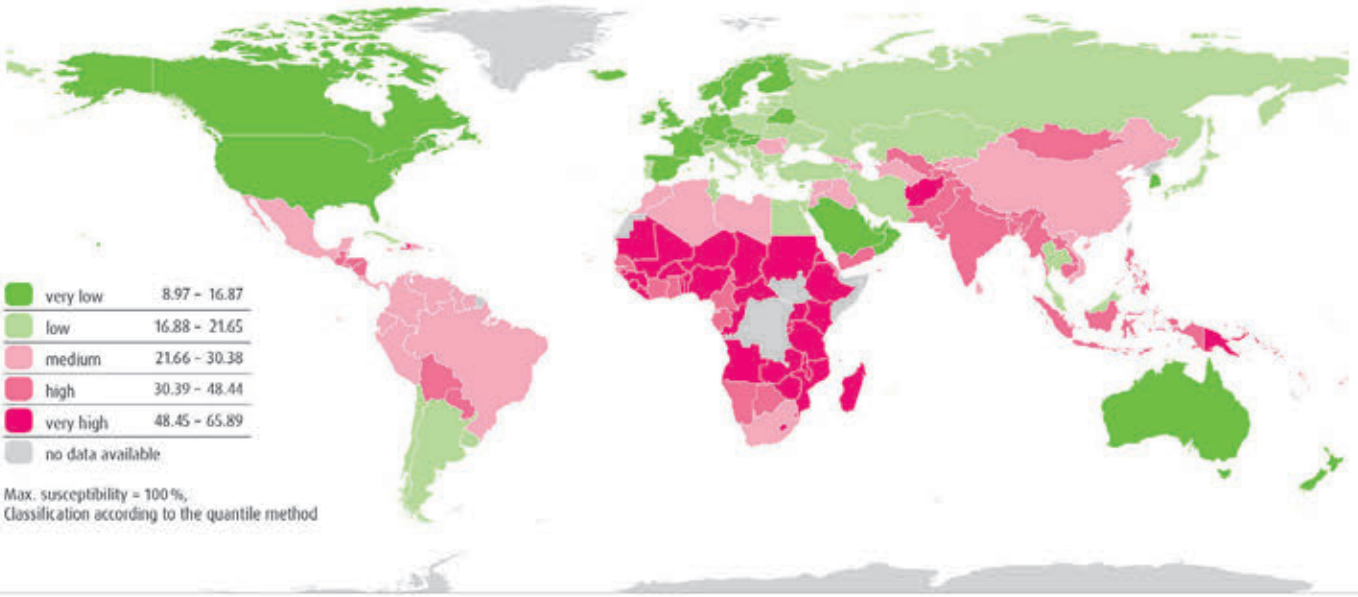
World Bank (2014): World Bank Development Indicators Data Bank. http://data.worldbank.org/indicator (Called up on 13.08.2014)

World Bank and IMF (2013): Global Monitoring Report: Global Monitoring Report 2013: Rural-Urban Dynamics and the Millennium Development Goals. Washington, DC.

Zingel, W.-P., M. Keck, B. Etzold and H.-G. Bohle (2011): Urban Food Security and Health Status of the Poor in Dhaka, Bangladesh. In: Krämer, A., M. M. H. Khan and F. Kraas (Eds.) (2011): Health in megacities and urban areas. Physica-Verlag. Heidelberg: 301–319.

Susceptibility

dependent on public infrastructure, nutrition, income and the general economic framework

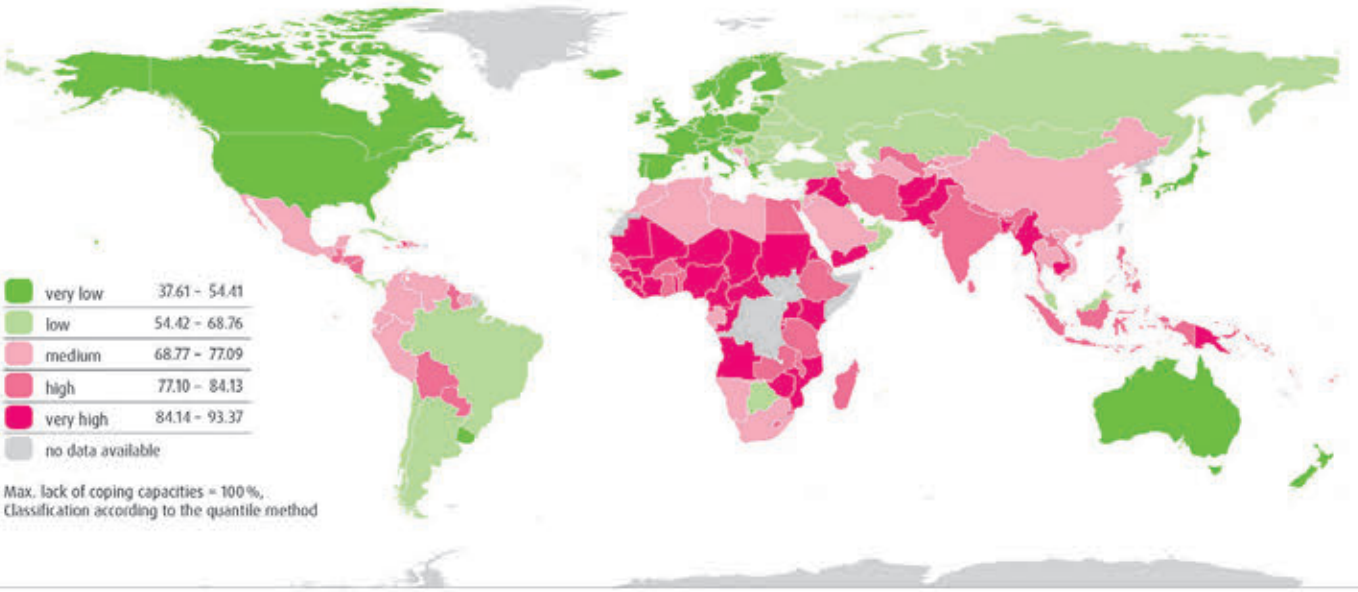


Max. susceptibility = 100 %,
Classification according to the quantile method

Map B1
Map B2

Lack of coping capacities

dependent on governance, medical care and material security

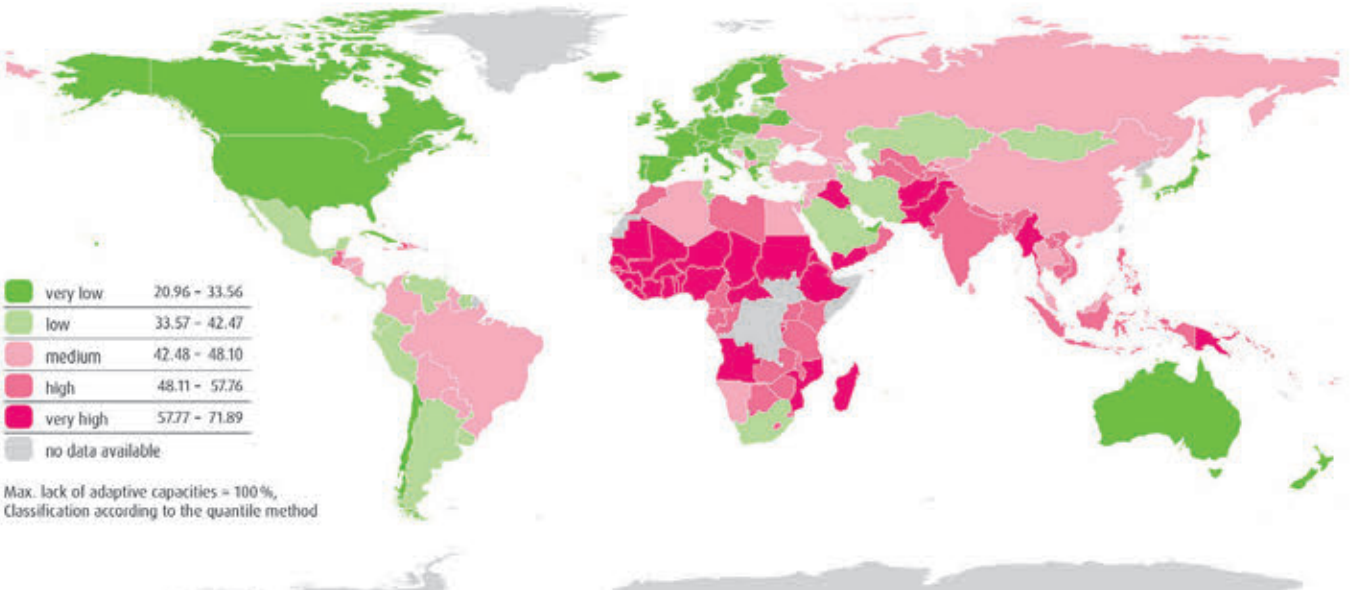


Max. lack of coping capacities = 100 %,
Classification according to the quantile method

Map B3

Lack of adaptive capacities

related to future natural events and climate change

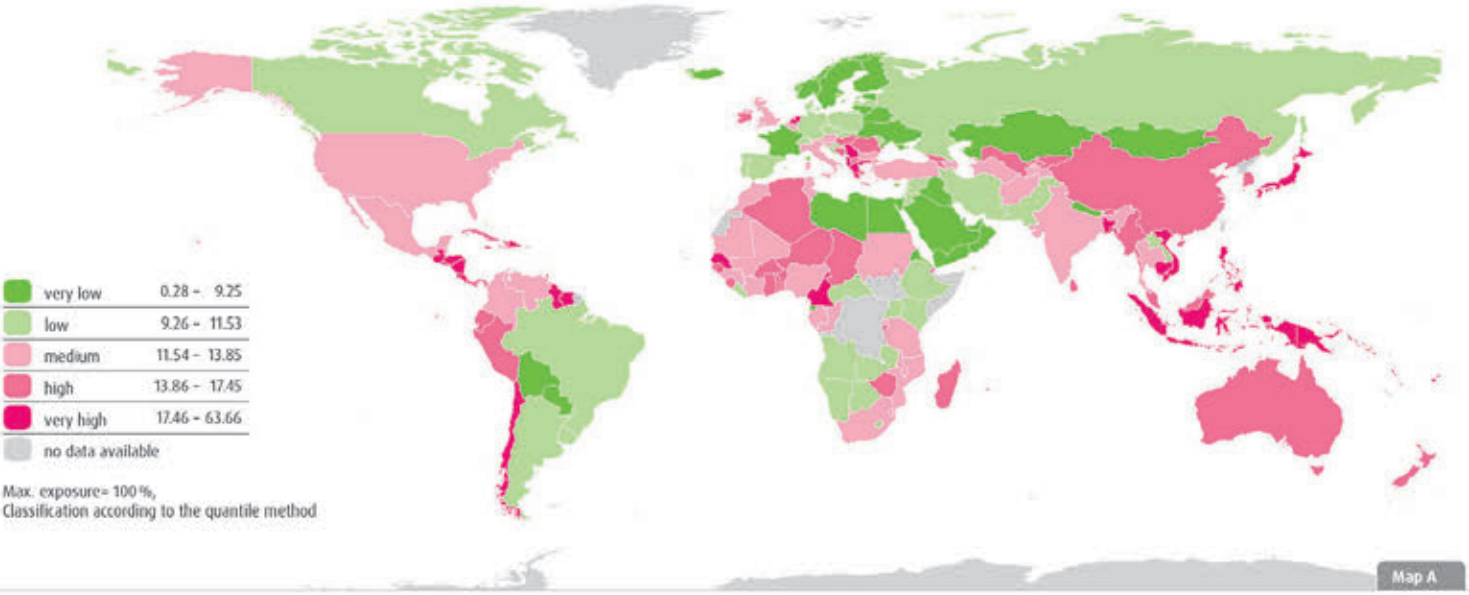


Max. lack of adaptive capacities = 100 %,
Classification according to the quantile method

Data: Source UNU-EHS, based on the PREVIEW Global Risk Data Platform, CRiSIS, CIESIN and global databases, detailed information at www.WorldRiskReport.org

Exposure

Exposure of the population to the natural hazards earthquakes, storms, floods, droughts and sea level rise.



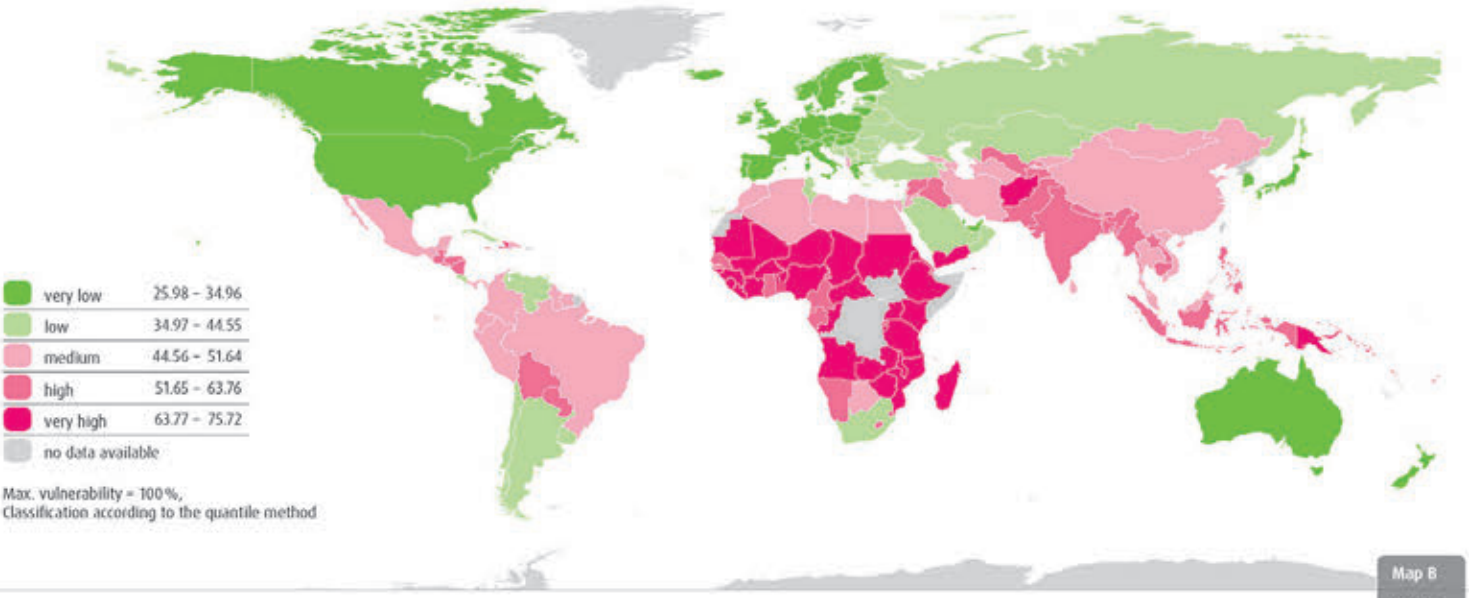
very low	0.28 – 9.25
low	9.26 – 11.53
medium	11.54 – 13.85
high	13.86 – 17.45
very high	17.46 – 63.66
no data available	

Max. exposure= 100 %,
Classification according to the quantile method

Map A

Vulnerability

Vulnerability of society as the sum of susceptibility, lack of coping capacities and lack of adaptive capacities



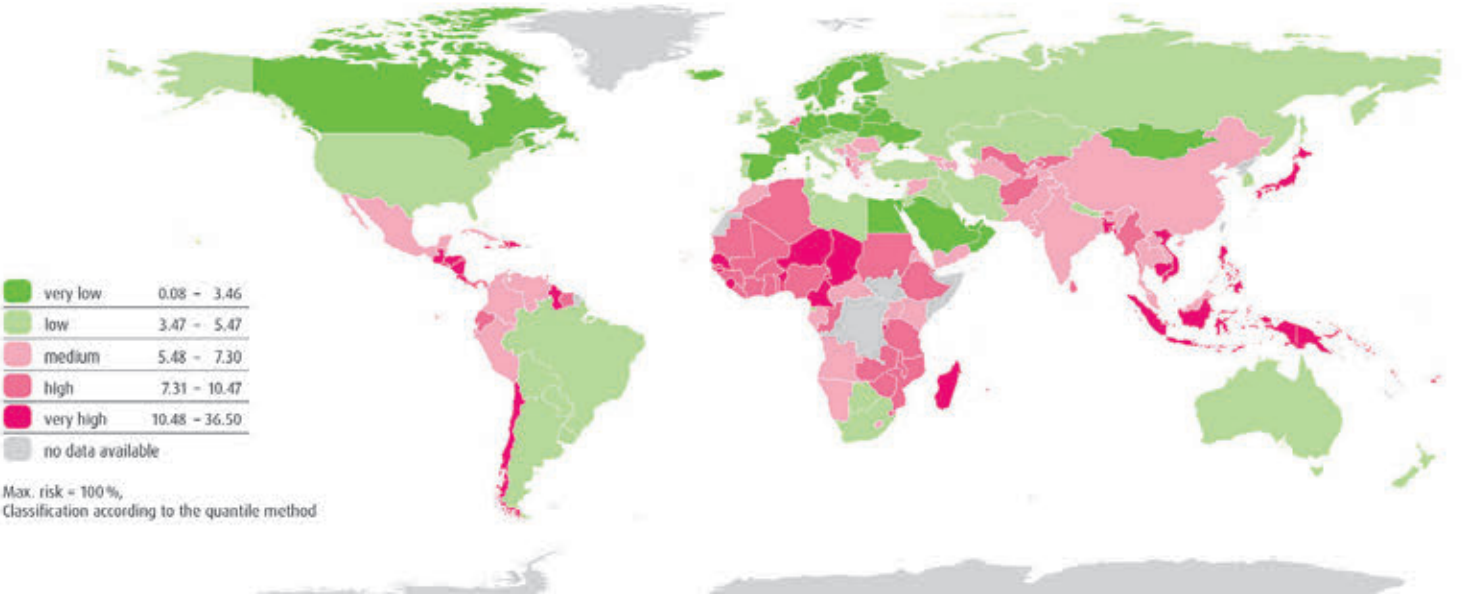
very low	25.98 – 34.96
low	34.97 – 44.55
medium	44.56 – 51.64
high	51.65 – 63.76
very high	63.77 – 75.72
no data available	

Max. vulnerability = 100 %,
Classification according to the quantile method

Map B
Map C

WorldRiskIndex

WorldRiskIndex as the result of exposure and vulnerability



very low	0.08 – 3.46
low	3.47 – 5.47
medium	5.48 – 7.30
high	7.31 – 10.47
very high	10.48 – 36.50
no data available	

Max. risk = 100 %,
Classification according to the quantile method

Data: Source UNU-EHS, based on the PREVIEW Global Risk Data Platform, CRISIS, CIESIN and global databases; detailed information at www.WorldRiskReport.org

Publisher of the WorldRiskReport 2014:
Bündnis Entwicklung Hilft (Alliance Development Works),
and
United Nations University – Institute for
Environment and Human Security (UNU-EHS)

Concept and implementation:
Peter Mucke, Bündnis Entwicklung Hilft, Project Leader
Lars Jeschonnek, MediaCompany

Scientific advisors:
PD Dr. Jörn Birkmann, UNU-EHS

Authors:
Dr. Matthias Garschagen, UNU-EHS
Peter Mucke, Bündnis Entwicklung Hilft
Dr. Almuth Schauber, Misereor
Dr. Thomas Seibert, medico international
Dr. Torsten Welle, PD Dr. Jörn Birkmann, Prof. Dr. Jakob Rhyner,
all UNU-EHS

Guest authors:
Dr. Stefan Kohler, Charité – Universitätsmedizin Berlin
Thomas Loster, Dirk Reinhard, Münchener Rück Stiftung
Dr. Ira Matuschke, Institute for Advanced Sustainability Studies

In collaboration with:
Tina Braun, Stefanie Knapp, Marie-Kathrin Siemer,
all Bündnis Entwicklung Hilft
Werner Lamottke, Beat Wehrle, terre des hommes
Oliver Neuschäfer, Christoffel-Blindenmission
Tanja Pazdzierny, Kindernothilfe
Heinz Peters, Welthungerhilfe

Editors:
Lars Jeschonnek, MediaCompany, Editor in Chief
Marion Aberle, Welthungerhilfe
Janine Kandel, UNU-EHS
Wolf-Christian Ramm, terre des hommes
Barbara Wiegard, Misereor

Graphic design and information graphics:
Naldo Gruden, MediaCompany

Translation:
Mike Gardner

ISBN 978-3-9814495-4-9

**The WorldRiskReport has been published annually since 2011 by
Bündnis Entwicklung Hilft
Responsible: Peter Mucke**

Photo credits:
Cover picture: Arial photo of slums. Mexico City, Mexico ©Pablo Lopez Luz/www.pablolopezluz.com
Pages 4/5: Manila, Philippines ©Christof Krackhardt/Brot für die Welt
Pages 10/11: Slums next to the railroad between the old airport and the station. Dhaka, Bangladesh ©Karin Desmarowitz/Brot für die Welt
Page 13: In the joinery of the Diakonie construction yard Katastrophenhilfe. Bainet, Haiti ©Thomas Lohnes/Brot für die Welt
Page 19: Flooding in the streets. Manila (Philippines) ©Christof Krackhardt/Brot für die Welt
Page 23: Floods causing a threat. Mumbai, India ©T. Loster/ Münchener Rück Stiftung
Page 25: Girls making metal spirals. Dhaka, Bangladesch ©Christof Krackhardt/Brot für die Welt
Page 28: Participants in the soccer championship. Rio de Janeiro, Brazil ©Florian Kopp/Brot für die Welt
Page 32: Refugees from the Totota IDP Camp preparing their return to the old villages in
Lofa County. Liberia ©Günter Vahlkampf/Brot für die Welt
Page 34: A place to sleep for children living and working on the streets. Nairobi, Kenya ©Roland Brockmann/Kindernothilfe
Pages 38/39: Allotment gardens on the site of a decommissioned sewage plant. Monrovia, Liberia. ©Jens Grossmann/Welthungerhilfe
Pages 52/53: The "Kick into a better life" program of the SERUA organization. Rio de Janeiro, Brazil ©Florian Kopp/Brot für die Welt
Page 56: Dhaka, Bangladesh ©Karin Desmarowitz/Brot für die Welt

Printers:
Druckerei Conrad GmbH, Berlin
Printed on 100% recycled paper.

Online:
Detailed scientific explanations, in-depth information and tables can be found at www.WorldRiskReport.org and are downloadable.

Publisher

Bündnis Entwicklung Hilft
Alliance Development Works

Chausseestraße 128/129
10115 Berlin, Germany
Phone +49 30 – 278 77 390
Fax +49 30 – 278 77 399
kontakt@entwicklung-hilft.de
www.entwicklung-hilft.de

United Nations University – Institute for Environment and Human Security (UNU-EHS)

Platz der Vereinten Nationen 1
UN Campus
53113 Bonn, Germany
Phone +49 228 – 815 0261
Fax +49 228 – 815 0299
www.ehs.unu.edu

Sieben Organisationen – ein Bündnis

Brot für die Welt · cbm · kinder not hilfe · medico international · MISEREOR IHR HILFSWERK · terre des hommes Hilfe für Kinder in Not · welt hunger hilfe

ISBN 978-3-9814495-4-9