



# UN HABITAT

FOR A BETTER URBAN FUTURE



## GLOBAL REPORT ON HUMAN SETTLEMENTS 2009

### FACT SHEET

#### NATURAL & HUMAN-MADE DISASTERS

- Cities are highly vulnerable to the effects of human-made and natural disasters. This is due to interrelated factors such as location and rapid growth of major urban centres in coastal locales; the human modification of the built and natural environments; expansion of settlements into hazard-prone zones; and the failure of authorities to regulate building standards and land-use planning strategies.
- Since 1975, there has been a fourfold increase in the number of recorded natural disasters, the highest of which was 801 disasters in 2000. Between 1996 and 2005, disasters accounted for over US\$667 billion in material loss. Worldwide, the greatest increase in natural disasters has been in Africa, where a three-fold increase in natural disasters has been experienced in the last decade alone.
- Location is a major determinant of the type and frequency of natural hazards in cities: 8 of the world's 10 most populous cities are on earthquake fault-lines, while 90 per cent of these cities are in region vulnerable to destructive storms.
- The low-elevation coastal zone – being that area along the coast that is less than 10 metres above sea level – is highly vulnerable to natural hazards: sea-level rise, extreme weather phenomena such as tropical cyclones, flooding and others associated with climate change. This zone accounts for 2 per cent of the world's land area, but contains 10 per cent of its total population and 13 per cent of its urban population.
- Because they are favourably located, coastal zones are densely populated and have large concentrations of economic activity: Coasts account for 53 per cent of the world's gross domestic product.

#### DEVELOPED & TRANSITIONAL COUNTRIES

- Floods, wind storms, earthquakes and volcanoes are the most common forms of natural disasters affecting developed countries.
- Developed countries account for less than 10 per cent of the world human loss due to natural disasters.
- 10 per cent of the total urban population live in the low-elevation coastal zone, with 86 per cent of the entire population of the zone being urban.

#### WESTERN EUROPE

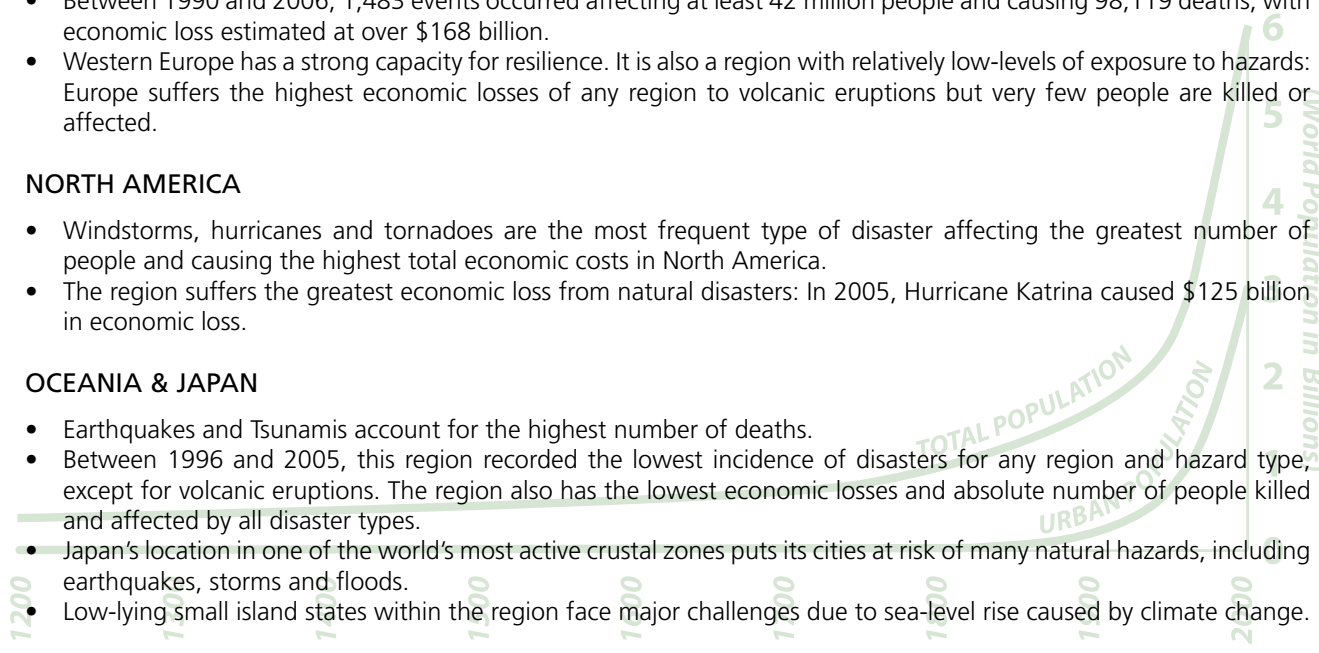
- Floods constitute the most frequent form of natural disasters.
- Between 1990 and 2006, 1,483 events occurred affecting at least 42 million people and causing 98,119 deaths, with economic loss estimated at over \$168 billion.
- Western Europe has a strong capacity for resilience. It is also a region with relatively low-levels of exposure to hazards: Europe suffers the highest economic losses of any region to volcanic eruptions but very few people are killed or affected.

#### NORTH AMERICA

- Windstorms, hurricanes and tornadoes are the most frequent type of disaster affecting the greatest number of people and causing the highest total economic costs in North America.
- The region suffers the greatest economic loss from natural disasters: In 2005, Hurricane Katrina caused \$125 billion in economic loss.

#### OCEANIA & JAPAN

- Earthquakes and Tsunamis account for the highest number of deaths.
- Between 1996 and 2005, this region recorded the lowest incidence of disasters for any region and hazard type, except for volcanic eruptions. The region also has the lowest economic losses and absolute number of people killed and affected by all disaster types.
- Japan's location in one of the world's most active crustal zones puts its cities at risk of many natural hazards, including earthquakes, storms and floods.
- Low-lying small island states within the region face major challenges due to sea-level rise caused by climate change.



### PLANNING SUSTAINABLE CITIES

## TRANSITIONAL COUNTRIES

- Some of the countries in East and Central Europe have difficult topographies and are located in areas that place them at risk to natural and human-induced disasters. Many countries are landlocked, sit on or are surrounded by steep mountains that are frequently disturbed by seismic activity, heavy rains, avalanches, landslides and earthquakes.

## DEVELOPING COUNTRIES

- Developing countries have experienced the fastest rate of increase in the incidence of natural and human-made disasters over the last three decades. Cities in developing countries suffer disproportionately from the impacts of natural disasters. This is a function of the inability of authorities to manage pre- and post-disaster situations. The result is that natural disasters tend to claim more lives than in developed countries.
- 98 per cent of the 211 million people affected by natural disasters between 1991 and 2000 resided in developing countries.
- One factor accounting for the magnified impact of natural disasters in developing countries is underdevelopment: this makes it impossible for citizens to adhere to building regulations and also for authorities to enforce them.
- 14 per cent of the urban population of developing countries live in low-elevation coastal zones, while 54 per cent of these zones are urban. The high-level of urbanization in this low-elevation zones vis-à-vis the entire developing world (44 per cent) presents major challenges, given the low capacity and weak infrastructure to deal with rising sea levels.

## LATIN AMERICA & THE CARIBBEAN

- Earthquakes, hurricanes, tropical storms and floods are the main natural hazards in this region. During the three decades leading up to the 21st century, there were 32 disasters in the region, accounting for about 7,500 deaths per year, on average. The economic loss arising from these disasters varies between \$700 million and \$3.3 billion.
- The Caribbean is more exposed to risk of disasters than South America, measured in terms of occurrence per thousand square kilometres. The Caribbean is 10.1 against 0.3 for South America.
- Cumulative losses resulting from natural disasters, from 1970 to 1999, represented 4 per cent of the gross domestic product (GDP) of South America and 43 per cent for the Caribbean. This suggests that, in economic terms, smaller countries are more vulnerable to natural disasters.
- In Latin America and the Caribbean, 8 per cent of the population live in the low-elevation coastal zones. Bahamas, Surinam, Guyana and Belize rank among the top 10 in the world that have the highest proportion of their urban population living in the coastal zone.
- In most of the Caribbean, 50 per cent of the population live within 2km of the coast. This, with the urbanization patterns and processes in low-income areas, have, in part, contributed to making the Caribbean highly vulnerable to rises in sea levels and extreme weather conditions.

## ASIA

- More than any other region of the world, Asia has the greatest number of disasters associated with avalanches, or landslides, earthquakes or tsunamis, floods, windstorms and industrial accidents. The number of people affected is also high, as is economic loss.
- Flooding is the most frequent natural hazard affecting the largest number of people and causing the greatest economic losses.
- Between 1996 and 2005, a total 472 floods resulted in 42,570 deaths, affected 1.3 billion people and cause economic loss of \$129 billion.
- Tsunamis and earthquakes caused the greatest mortality, with the 2004 Indian Ocean Tsunami accounting for some 230,000 deaths in which the province of Aceh lost capital stock worth 97 per cent of its GDP.

## MIDDLE EAST & NORTH AFRICA

- These regions suffer from desertification, drought, flash floods, earthquakes and landslides: Algeria and Morocco (North Africa) are subject to earthquakes: Yemen (Middle East) experiences floods.
- The desert exposes the areas to droughts and extreme water shortages: the projected water availability per person for the next two decades is 500 cubic metres; the current world average per capita is 7,000 cubic metres.

## **SUB-SAHARAN AFRICA**

- Flooding is the most common form of natural disaster in Africa and results in the highest mortality.
- Earthquakes, floods and storms cause the greatest economic loss, and drought affects the most people.
- Economic loss to disasters is low for Africa, compared to other world regions but is high as a proportion of GDP.
- From 1996 to 2005, more people were killed or affected by volcanic eruptions in Africa than in any other region, despite the low incidence of volcanic eruption events.
- The high loss-to-event ratio indicates low resilience; this was the case with the 2002 volcanic eruption of Mount Nyiragongo, which destroyed 40 per cent of the buildings and displaced 250,000 residents of the city of Goma, in the Democratic Republic of Congo.
- In Sub-Saharan Africa, 9 per cent of the urban population live within the low-elevation coastal zone. However, the level of urbanization in this zone is 68 per cent, making it the most urbanized ecosystem within the region.
- Coastal cities are by far the most developed and are likely to be adversely affected by rising sea levels. Such cities include Abidjan (Cote d'Ivoire), Accra (Ghana), Cape Town (South Africa), Dakar (Senegal), Lagos (Nigeria), Libreville (Gabon), Mombasa (Kenya) and Port Louis (Mauritius).

## **PLANNING IMPLICATION OF VULNERABILITY TO NATURAL & HUMAN DISASTERS**

- Cities are now facing mounting and often interrelated environment challenges, due to increasing extreme weather events associated with climate change. Urban planning must respond to these with innovative solutions. Some of these include more appropriate land-use planning; more appropriate building-codes and disaster-resistant construction; protection of critical infrastructure; more effective post-disaster rehabilitation; and implementation of effective climate change mitigation and adaptation measures.
- Land-use planning can be a valuable tool for mainstreaming disaster risk reduction into urban development processes. Land-use planning provides a framework within which interventions to partner local actors for risk mapping and community resilience building can be undertaken.

## **BUILDING CODES & DISASTER-RESISTANT CONSTRUCTION**

- Urban planning has an integral role to play in developing building codes that ensure safety standards in components of the built environment. In order to be effective building codes proposed by urban planning should meet the criteria specified by the United Nations International Strategy for Disaster Reduction: ([www.proventionconsortium.org](http://www.proventionconsortium.org)).
- A major challenge that planning is likely to face is enforcing adherence to building codes, particularly in developing countries. Failure to comply with codes is a major cause of vulnerability in building. Often, perverse incentives make it more attractive for administrators, architects, builders, contractors and even homeowners to circumvent construction standards.

## **PROTECTING CRITICAL INFRASTRUCTURE**

- Urban planning can play a major role in protecting critical infrastructure and services such as electricity, water and sanitation, telecommunications, transport systems and health services. However, protecting critical infrastructure and services against all conceivable sources of harm is prohibitively expensive, especially so for countries and cities with weak and small economies.

## **PLANNING & POST-DISASTER REHABILITATION**

- Urban Planning can contribute to post-disaster rehabilitation of human settlements since municipal authorities and local governments are best placed to coordinate relief and reconstruction efforts. In addition, urban planning can ensure that programmes and projects undertaken after disasters attend to the long-term development objectives and needs of the affected areas, and ensure an effective transition to sustainable development.
- Urban planning could contribute to the implementation of some measure to mitigate the effects of climate change through rising sea levels, and to help reduce greenhouse gas emissions in cities. However, adapting now to future climate change is difficult because of the uncertainty in forecasting and a tendency for conservative estimates of future change.

## TEN MOST POPULOUS CITIES & ASSOCIATED DISASTER RISK (2005)

City	Population (million)	Disaster risk					
		Earthquake	Volcano	Storms	Tornado	Flood	Storm surge
Tokyo	35.2	X		X	X	X	X
Mexico City	19.4	X	X	X			
New York	18.7	X		X			X
São Paulo	18.3			X		X	
Mumbai	18.2	X		X		X	X
Delhi	15.0	X		X		X	
Shanghai	14.5	X		X		X	X
Kolkata	14.3	X		X	X	X	X
Jakarta	13.2	X				X	
Buenos Aires	12.6			X		X	X

Source:Chafe, 2007, p116

## SELECTED URBAN DISASTERS 1906-2006

Year	City	Disaster	Deaths (estimated number)	Economic loss (US\$ billion, 2005)
2005	New Orleans	Hurricane	1800	125.0
2005	Mumbai	Flood	400	0.4
2003	Bam, Iran	Earthquake	26,300	1.1
2003	Paris	Heat wave	14,800	4.7
2001	Bhuj (India)	Earthquake	19,700	5.5
2000	Johannesburg	Flood	100	0.2
1999	Istanbul/Izmit	Earthquake	15,000	14.1
1995	Kobe, Japan	Earthquake	6400	128.2
1985	Mexico City	Earthquake	9500	7.3
1976	Tangshan, China	Earthquake	242,000	19.2
1970	Dhaka	Flood	1400	10.1
1923	Tokyo	Earthquake	143,000	31.8
1906	San Francisco	Earthquake	3000	10.9

Source:Chafe, 2007, p117

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