Disasters and the Urban Environment

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Urban growth

• The current world population of 7.6 billion expected to reach 8.6 billion in 2030, 9.8 billion in 2050 and 11.2 billion in 2100

• World urban population (4.2 billion in 2018) expected to increase by 2.5 billion by 2050

• 90% of the expected urban growth will be in Asia and Africa

• Over this period:
  – Global rural population expected to decline from 3.4 billion to 3.1 billion.
Do more people live in urban or rural areas?, 1950

Share of the population which live in urban versus rural areas. Here, "majority urban" indicates more than 50 percent of the population live in urban centres; "majority rural" indicates less than 50 percent. Urban populations are defined based on the definition of urban areas by national statistical offices. This is based on estimates to 2016, combined with UN projections to 2050.

Source: Our World in Data based on UN World Urbanization Prospects (2018) & Historical Sources (see Sources tab)

Do more people live in urban or rural areas?, 2050

Share of the population which live in urban versus rural areas. Here, "majority urban" indicates more than 50 percent of the population live in urban centres; "majority rural" indicates less than 50 percent. Urban populations are defined based on the definition of urban areas by national statistical offices. This is based on estimates to 2016, combined with UN projections to 2050.

Source: Our World in Data based on UN World Urbanization Prospects (2018) & Historical Sources (see Sources tab)
Worldwide urbanisation

- Over half the world’s population now live in urban areas, of which a third live in informal settlements

- The major increase has been in low- & middle-income nations

Data from World Disasters Report 2010
Urbanisation in different regions

• Greatest in Asia
  – driven by expanding economies

• Less dramatic in Africa

Data from World Disasters Report 2010
<table>
<thead>
<tr>
<th>Urban area</th>
<th>Country</th>
<th>Population</th>
<th>Area (km²)</th>
<th>Density (/km²)</th>
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</thead>
<tbody>
<tr>
<td>Tokyo–Yokohama</td>
<td>Japan</td>
<td>37,750,000</td>
<td>8,547</td>
<td>4,400</td>
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<tr>
<td>Jakarta (Greater Jakarta)</td>
<td>Indonesia</td>
<td>31,320,000</td>
<td>3,225</td>
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<td>Delhi (NCR)</td>
<td>India</td>
<td>25,735,000</td>
<td>2,163</td>
<td>11,900</td>
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<td>South Korea</td>
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<td>Philippines</td>
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<td>London (Metropolitan)</td>
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<td>273</td>
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</table>
Population density by city, 2014

Population density for the world's largest 100 cities (based on total population). Population density is measured as the number of people per square kilometre (km²).

- Dhaka: 44,000 persons/km²
- Mumbai: 32,300 persons/km²
- Delhi: 11,600 persons/km²
- Chennai: 9,700 persons/km²
- Sao Paulo: 7,100 persons/km²
- London: 5,800 persons/km²
- Paris: 3,900 persons/km²
- Los Angeles: 2,400 persons/km²
- New York: 1,800 persons/km²
- Chicago: 1,300 persons/km²

Source: UN Habitat Global Urban Observatory (2014)
Some definitions

• City/town
  – Large populated area, the difference depends on local usage
    • In the UK a city is frequently a town with an Anglican cathedral

• City may refer to the urban area or the metropolitan area

• Urban area
  – the physical expanse of cities, the area of continuous urban development.

• Metropolitan area
  – economic definition
    • a densely populated urban core + its less-populated, economically connected, surrounding territories, sharing industry, infrastructure, & housing (may be quite rural)
Dublin City boundary vs Economic Core Area vs Functional Urban Region (commuting hinterland)

Figure 1: Dublin Economic Core Area.

Figure 2: Dublin Functional Urban Region.

St David’s, Pembrokeshire.
(Population 1,841)
Disasters and the rural environment

Until recently emphasis on the rural environment.

• More people lived & worked there

• Most of those with least resilience to disasters lived there

• Many of the major disasters (e.g. famines) occurred there

• Refugee camps were (& are) often located there

Photos: Tim Healing
Refugee/IDP camps

• Such camps - effectively urban environments (regardless of location)

• Can be very large indeed

1. Zaatari camp (Jordan) 78,908 Syrian refugees
2. Dadaab (Kenya) 235,269 refugees in a 5-camp complex

NB. 80% of Internally Displaced Persons (IDPs) now live outside rural camps and increasingly in urban areas*

*’Violence in the City’ International Rescue Committee, (IRC) 2017

>24 million displaced by natural disasters
Urban and rural areas & disasters

• Cannot consider urban & rural areas separately - most disasters impact both

• Many links between both areas relevant to disasters
  – in rural areas disrupt supplies of food, fuel etc. to urban centres
  – in urban areas disrupt supplies of goods & services to farmers & rural populations
Why consider urban areas?

• Over half the world’s population now live in urban areas, of which a third are living in informal settlements.

Sphere (2018) notes that urban areas typically differ from other contexts in terms of:

• Density:
  – a higher density of people, houses, infrastructure, laws and cultures in a relatively small area

• Diversity:
  – Social, ethnic, political, linguistic, religious and economically diverse groups live in close proximity

• Dynamics:
  – Urban environments are fluid and changing with high mobility and rapidly shifting power relationships
Why consider urban areas?

• More market pressures

• Low-income groups struggle to find:
  – jobs
  – affordable accommodation
  – health services

• Problems & opportunities for disaster risk reduction & humanitarian assistance
Urban areas are inherently fragile

- Proper functioning of infrastructure is vital for social stability

- Food, water, power, sewage, transport etc
  - Greater London (population 8,674,000*) daily requires about:
    - 13,785 metric tonnes of food
    - 1,301,100,000 litres of water (most of which goes out as sewage)
      - (150 l/person/day)
      - (130,110,000 at the Sphere minimum of 15 l/person/day)

  Produces about 20,000 tonnes of garbage/day

*Daytime population 8.9 million
Population of City of London
Night 12,000
Day 400,000
Urban populations and poverty

• Very large increase in urban poverty, mostly in low- & middle-income nations, in recent decades
  – poor-quality & overcrowded housing
  – lack of basic infrastructure & services

• UN HABITAT:
  – decrease from 39% to 30 % of urban population living in slums in developing countries between 2000 & 2014
  – Despite this ca. 1 billion urban dwellers still live in poor-quality, overcrowded housing in slums/informal settlements

Photos: Tim Healing
Housing in deprived communities

• Value/importance far exceeds monetary value

• A dwelling (however poorly built) is:
  – Home – family & social life, privacy, safety
  – May be place of work
  – Means by which people access income & services
    • Location in relation to income-earning opportunities & services often more important than size, quality or legality.
    • “….. why so many informal settlements are on flood plains or steep slopes at risk of landslides - the only land sites within a city close to centres of employment that low-income groups can occupy”*

*(World Disasters Report 2010).*
Loss of housing exacerbates poverty

- Damage to/destruction of housing very serious in low- and middle-income countries
- Usually little/no compensation when house is damaged/destroyed
- No insurance
- Rehousing may mean relocation & loss of:
  - local contacts
  - familiar social structures
  - easy access to earning opportunities
Disaster Risk
(applies both to rural and urban communities)

• A function of two variables:
  – the probability of an event occurring (likelihood)
  – the effects of that event (impact)

• Likelihood
  – determined by factors such as:
    • type of hazard
    • location of community
    • geology

• Impact
  – affected by the ability of communities to absorb & cope with the event
    including factors such as:
    • the state of public health in the country
    • infrastructure
    • construction methods
    • location
Hazards facing urban and rural populations include:

- extreme weather
- floods
- earthquakes
- disease (communicable & non-communicable)
- fires
- industrial/technological accidents
- crime

The nature of urbanised areas magnifies many of these hazards
Why more disaster risk in urban areas?

1. Many urban dwellers forced to live in high-risk areas

2. Many limited in their capacity to reduce risk:
   • inadequate incomes
   • need to live close to work/earning possibilities
   • high land prices
   • limited political influence
   • corruption

3. Urban authorities often lack:
   • knowledge
   • financial capacity
   • willingness to reduce risks & vulnerabilities

These have implications for development & for disaster risk reduction
Risk to Urban Populations

• High-income nations:
  – Urban populations - some protection due to a web of institutions, infrastructure, services & regulations (e.g. building regulations)

• Low - and middle-income nations:
  – Many people in urban centres lack such protection
Disasters in high & low income nations

- High income nations:
  - low loss of life
  - large economic loss

- Low & middle income nations
  - large loss of life
  - lower economic loss
    - can be catastrophic due to poverty and lack of a “safety net”

[Figure from World Disasters Report 2010]
Earthquakes in Chile & Haiti 2010

Serious earthquakes in two places:

1. Chile
   - OECD member
   - 8.8 magnitude earthquake & tsunami
   - widespread property damage
   - 525 killed

2. Haiti
   - poorest country in region
   - 7.0 magnitude earthquake
   - >200,000 deaths
   - >1 million homeless
Urban poverty and disaster risk

• Often closely linked

• Urban poverty can dramatically increase premature deaths & serious injuries due to dangerous, overcrowded housing lacking infrastructure & services

• Many factors
  – Poor building construction
  – Poor access

  – Poor/absent waste disposal
  – Poor or absent drainage
  – Contaminated water supplies

  – Unsafe and unreliable power supplies

  – Poor/absent health care
  – Increased risk of communicable disease
  – Inadequate emergency services

  – Crime and violence
Poor building construction

• Bangladesh garment factory (Savar building)
  – >4,000 people
  – 1,134 killed
  – ca. 2,500 injured

• Especially important in earthquake areas
  – Buildings in Port au Prince
  – Buildings (especially schools) Sichuan earthquake
Poor access

• Narrow roads
• Close packed buildings
• Poor access for emergency services
  – Worsened by dense traffic (e.g. Nairobi airport fire - 2013)
Limited access to water

- No piped water – standpipes / bowsers
  - May be some distance from dwellings
  - May not always be available
- Wells
- Rainwater recovery

Photos: Tim Healing
Contaminated water supplies

- Lack of water purification systems
- Damaged water distribution systems
- Damaged drainage systems
- Poor/absent sewage disposal

Photos: Tim Healing
Poor drainage

• Poor / absent drainage - heavy rain does not run off but causes landslips, flooding etc.

• Liquid waste from households not removed

• Septic tanks not emptied or not structurally sound

• Soakaways too close to drinking water supplies

Photo: Tim Healing
Poor or absent waste disposal

• Waste directly pollutes water supplies

• Contaminants leach into water supplies

• Rubbish tips are breeding grounds for insect & rodent pests & disease vectors
Unsafe or unreliable power supplies

• Lack of power, unreliable or expensive power lead to:
  – Use of candles/lamps – fire risk, poor light
  – Cooking on cheaper fuels (wood/charcoal/paraffin) –
    • Fire risk
    • Smoke from fires causes respiratory and eye disease
  – Use of bottled gas from unregulated sources – explosion risk
  – Unofficial tapping of electricity/gas/fuel supplies

Photos: Tim Healing
Inadequate emergency services

• **Ambulances**
  – Often just vans without equipment
  – Staff lack training

• **Police**
  – May be poorly trained
  – May be corrupt
  – Crime/violence may be rampant

• **Fire fighting**
  – Buildings are close – fire spreads fast
  – Fire engines may be old & poorly maintained
  – Poor staff training
  – Access difficult
  – Lack of water
Risks to health

• Exposure to sources of disease
  – Contaminated food & water
  – Exposure due to vector breeding
  – Respiratory disease

• Poor immunisation levels

• Poor, limited or absent health care services

• Poor diagnostic services

• Health care too expensive

Photos: Tim Healing
Main diseases affecting the people of two deprived urban communities in Sierra Leone

**George Brook - Freetown**
- Malaria
- ARI
- Watery and bloody diarrhoea
- Malnutrition and dehydration in children
- Worm infestations (GI tract)
- Typhoid fever

**Blama (country town)**
- Malaria,
- ARI
- Watery and bloody diarrhoea
- Malnutrition and dehydration in children
- Worm infestations (GI tract)
- Schistosomiasis
- Typhoid fever
- Lassa fever

Data for first 9 months of 2009 from Government Health Centre
Cholera outbreak in Sierra Leone, 2006

- Cholera is endemic in Sierra Leone
- Increase of cases of “watery diarrhoea” in early September 2006
- Mostly in Freetown but some cases elsewhere
- 1 isolate tentatively identified as *V.cholerae* Ogawa

Photo: Tim Healing
Response

- Cholera task force set up by MoHS (Members from ministries, police, military, water companies, UN, NGOs)
- MoHS responsible for collection and analysis of surveillance data
- Aid agencies (particularly ACF, MSF, ICRC) worked with MoHS to provide response on the ground
- WHO Country Office provided advice & Regional Office offering external lab facilities and supplies
Contamination of water points by material from latrines

(ACF data)

Figures shows that 77% of the latrines are located less than 30 m from a water supply facility that exposes this latter to permanent faecal contamination, especially during rainy season where water table is near the surface.
Safety of water in East Freetown

(ACF data)

Other figures highlight that 63% of the water used for drinking purposes are highly contaminated with faecal coliforms.

Besides, some figures show that only 5% of the estimated population have access to safe drinking water by the time of the survey.
Disinfection of 393 wells & 640 latrines by ACF
Cholera in Sierra Leone - summary

Outbreaks of cholera in Sierra Leone reflect

1. The endemic nature of the disease in the country
2. The poor state of the infrastructure
3. The poor state of the health services
4. The severe poverty faced by the majority of the population
5. A lack of public health awareness in the population
Climate change

• Has the potential to increase risks to urban inhabitants, especially the urban poor
  – by damaging and degrading systems and infrastructure
  – by increasing risks of disease

• Cities in low lying areas & close to the sea are particularly at risk
Climate change and the urban environment

Urban systems

• Damage to roads and buildings

• Stress on water & sewage systems
  – Damage
  – Increased demand
  – Salination
    groundwater depletion

• Disruption to transport systems

• Erosion

• Land instability
Climate change and the urban environment

Residents

• Increased illness
  – Waterborne
  – Vectors

• Disruption of essential services
  – Healthcare
  – Power
  – Water
  – Sewage disposal
  – Waste disposal

• Loss of livelihood

• Damage to & loss of buildings

• Food & water shortages
Climate change and urban risks

• The urban poor are on the front line.
  – particularly vulnerable to climate change & natural hazards due to
    • where they live within cities
    • lack of reliable basic services

• City governments - drivers for addressing risks through ensuring basic services

• City officials should build resilience by mainstreaming risk reduction into urban management

• Significant financial support is required
Rural and urban resilience

Comparing rural & metropolitan America:

• Resilience in urban areas is primarily driven by economic capital

• Community capital is the most important driver in rural areas

• Within rural areas there is considerable spatial variability in the components of disaster resilience.

• This suggests that attempts to enhance resilience cannot be approached using a one-size-fits-most strategy

Making cities resilient

• Organization and coordination
  – understand and reduce disaster risk
  – participation of citizen groups and civil society
  – build local alliances
  – all departments must understand their role in disaster risk reduction and preparedness.

• Budget for disaster risk reduction
  – incentives for all parts of society to invest risk reduction

• Maintain up-to-date data on hazards & vulnerabilities

• Risk assessments
  – Use as basis for urban development plans & decisions
  – Ensure this information and plans for resilience are available to the public and discussed with them
Making cities resilient

• Invest in & maintain critical infrastructure that reduces risk (e.g. flood drainage)

• Assess safety of schools & health facilities
  – upgrade as necessary.

• Realistic, risk-compliant building regulations and land-use planning principles.
  – Identify safe land for low-income citizens & upgrade informal settlements

• Education programmes & training on disaster risk reduction
  – in schools and local communities.
Making cities resilient

• Protect ecosystems and natural buffers to mitigate hazards

• Early warning systems and emergency management capacities
  – hold regular public preparedness drills.

• Post-disaster, ensure that needs of survivors are placed at the centre of reconstruction
Education programmes

• Of great value in:
  – Building resilience
  – Emergency Preparedness
  – Disaster response

• Ensure that the message will be properly delivered & will be understood & acted on
  – Work with communities to develop messages – local ownership is vital
  – Train locals to assist
  – Disseminate messages
  – Assess impact & modify if required

• Only of value if facilities exist to apply the training
Appropriate technologies & novel solutions

• Improved resilience need not be very expensive

• Use of appropriate technologies, often very cheap, can greatly improve life quality, reduce poverty and improve health

• New solutions to supply problems are being developed
Initiatives to improve responses by agencies working in the urban environment

• Global Alliance for Urban Crises
  – brings together different actors who can help to improve crisis preparedness & response in an increasingly urban world

• Urban Competency Framework
  – the competencies and accompanying behaviours that underpin effective humanitarian action in urban crises

• Sphere
Some useful publications