The social dimensions of vulnerability and resilience for low-income urban residents

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Changing Cities, Changing Climate

SOURCE: IPCC (2014). Working Group 2 Chapter 8
Changing Cities, Changing Climate

- changes in temperature (means and extremes)
- drought and water scarcity
- sea level rise and coastal flooding
- inland flooding and hydrological hazards
- changes in the social and environmental determinants of health

(Not) addressing the root causes of climate change

Total Annual Anthropogenic GHG Emissions by Groups of Gases 1970–2010

[Source: IPCC Fifth Assessment Report (2014), Working Group 3, Figure SPM1]
Impacts of climate change (in cities)

Global mean change from pre-industrial temperatures (°C)

- Peak emissions 2015
  - Water: More water available in moist tropics and high latitudes. Decreasing water availability and more drought in mid-latitudes and semi-arid low latitudes.
  - Ecosystems: More amphibian extinction, increasing risk of extinction.
  - Food: Crop productivity decrease for some cereals.
  - Coast: More damage from floods and storms.
  - Health: Increasing burden from malnutrition, diarrhoea, cardiorespiratory disease and infections.
  - Singular events: Local retreat of sea ice in Greenland and West Antarctic.

- Peak emissions 2025
  - Water: 1.0-2.0 billion
  - Ecosystems: About 20-30% species at high risk of extinction.
  - Food: Decreases for some cereals.
  - Coast: Additional people at risk of coastal flooding each year.
  - Health: Morbidity and mortality from heatwaves, floods and droughts.
  - Singular events: Long-term commitment to several metres of sea-level rise due to ice sheet loss.

- Peak emissions 2035
  - Water: 1.1-2.2 billion
  - Ecosystems: Most coral bleached, widespread coral mortality.
  - Food: Decrease in some regions.
  - Coast: About 30% loss of coastal wetlands.
  - Health: Substantial burden on health services.
  - Singular events: Ecosystem changes due to weakening of the meridional overturning circulation.

- Peak emissions 2065
  - Water: Additional people with increased water stress.
  - Ecosystems: Major extinctions around the globe.
  - Food: All cereals decrease.
  - Coast: 2-15 million.
  - Health: Leading to reconfiguration of societal, economic and institutional of low-lying areas.

- Peak emissions 2080
  - Water: Peak temp.
  - Ecosystems: Peak temp.
  - Food: Peak temp.
  - Coast: Peak temp.
  - Health: Peak temp.
  - Singular events: Peak temp.

- Peak emissions 2100
  - Water: Peak temp.
  - Ecosystems: Peak temp.
  - Food: Peak temp.
  - Coast: Peak temp.
  - Health: Peak temp.
  - Singular events: Peak temp.

Climate Change In Cities
Impacts on Urban Areas

Infrastructure systems: water and energy supply; sanitation and drainage; transport and communication

Services: health care; emergency services

Built environment

Ecosystem services

Effects vary depending on extent of “infrastructure deficit”
Climate Change In Cities
Impacts on People

“For each of the direct and indirect impacts of climate change, there are groups of urban dwellers that face higher risks”

Age

Health Status

Gender

Residents of low-income/informal settlements
Vulnerability to climate change: exposure, sensitivity and adaptive capacity

Bacon Poblacion, Sorsogon, Philippines
Vulnerability to climate change: exposure, sensitivity and adaptive capacity
Vulnerability to climate change:
exposure, sensitivity and adaptive capacity

Quarry Road,
EThekwini Municipality,
South Africa
Vulnerability to climate change: exposure, sensitivity and adaptive capacity

Old Fadama, Accra, Ghana
Urban population with piped water
% of population with water piped into premises (2010)
“Many of New York City’s most vulnerable people had been housed in its most vulnerable places: public housing projects along the water, in areas like the Rockaways, Coney Island, Red Hook and Alphabet City... New York started building housing projects on the waterfront because that’s where its poorest citizens happened to live. It continued because that’s where space was most readily available. Finally, it built them there because that’s where its projects already were.” (Mahler 2012)
Identifying vulnerable cities (and countries)

UNFCC commits developed countries “to assist developing countries that are particularly vulnerable to the adverse affects of climate change in meeting costs of adaptation to those adverse effects” but what is “particularly vulnerable”?

- No agreed measure of vulnerability (or adaptation)
- ‘Exposure’ does not take social/economic characteristics into account
- LDCs or low HDI do not take biogeographical characteristics into account
- Technical and political challenge
Identifying vulnerable cities (and countries)

i) Cities in geographically sensitive locations (exposure to hazards: high temperature, precipitation, sea-level rise, extreme events)

ii) Cities with physical and social sensitivity (location, population composition and density, city size, infrastructure quality, land use, governance)

iii) Cities with lower levels of adaptive capacity (ability and capacity of stakeholders and in institutions to cope and change)

iv) Both in situ and long-distance impacts of climate change
Identifying vulnerable (urban) people

Often treated simply as a matter of geographical location (“where is affected?”) – but can be expanded to address “who is affected?” and “why them?”

Urbanization may increase or decrease exposure:

- Access to land and shelter
- Population density (in “safe” or “dangerous” places
- Efficacy of infrastructure
- Access to services
- Response to extreme events
- The role of migration
Who lives or works in the locations most exposed to hazards related to the direct or indirect impacts of climate change?

Who lives or works in locations lacking the infrastructure that reduces risk?

Whose homes and neighborhoods face greatest risks when impacts occur?
Vulnerability to climate change
Social dimensions (sensitivity and adaptive capacity)

Who lacks knowledge, capacity and opportunities to take immediate short-term measures to limit impacts?

Who is least able to cope with impacts?

Who is least able to adapt to avoid impacts?

Vulnerability to climate change
Gender and Vulnerability

- Greater reliance on home-based economic activities
- Greater reliance on natural resources
- Vulnerability from relocation
- Child-rearing and domestic responsibilities (access to food, water, sanitation)
- Underlying economic disadvantages and dependency
### Vulnerability to climate change

#### Social dimensions: gender

<table>
<thead>
<tr>
<th>Aspect of vulnerability</th>
<th>Contribution to urban vulnerability</th>
<th>Contribution to climate vulnerability</th>
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</thead>
<tbody>
<tr>
<td>Gendered division of labour and ‘poverty of time’</td>
<td>Women have prime responsibility for ‘reproductive’ labour; lack of time to engage in ‘productive’ labour</td>
<td>Limited financial assets to build resilience and to cope with disaster events</td>
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<tr>
<td>Gender-ascribed social responsibilities</td>
<td>Women have prime responsibility for ‘reproductive’ labour; lack of time to engage in ‘productive’ labour</td>
<td>Additional domestic responsibilities when access to food, water and sanitation are disrupted; additional time required to care for young, sick and elderly</td>
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<tr>
<td>Cultural expectations of gender norms</td>
<td>Constraints on women’s mobility and involvement in certain activities</td>
<td>Higher mortality from disaster events due to lack of skills and knowledge</td>
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<tr>
<td>Unequal entitlements to land and property</td>
<td>Limited access to productive resources</td>
<td>Limited ability to invest in more resilient land or shelter</td>
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<td>Higher representation of women in informal sector</td>
<td>Lower wages and lack of financial security</td>
<td>Damage to homes and neighbourhoods affects women’s incomes more severely as income-earning activities are often undertaken at home</td>
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<tr>
<td>Safety and security in public spaces</td>
<td>Limited freedom to use public space</td>
<td>Particular problem in temporary accommodation / relocation sites; high rates of sexual abuse and violence</td>
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<td>Limited engagement of women in planning processes</td>
<td>Urban plans fail to meet particular needs of women and children</td>
<td>Climate adaptation plans fail to meet needs of women and children; reduced aversion to risk (?)</td>
</tr>
</tbody>
</table>
Vulnerability to climate change
Age and Vulnerability

• Particular vulnerability of children: less developed immune and cognitive systems

• Particular vulnerability of elderly: heat stress and cardio-respiratory illnesses
Social Dimensions of Vulnerability
Some questions for discussion

- What would be some of the best ways to measure exposure, sensitivity, and adaptive capacity among low-income urban residents?

- Which people would you categorise as most vulnerable in the cities where you work?

- What are some of the main differences in the social dimensions of vulnerability between low-income and high-income urban centers?