The Cambridge Forum for Sustainability and the Environment

Risk, Resilience and Response: Cities

8th March 2016: Catalysing Change

Quick Summary

The presentations examined: defining resilience and effective responses to hazards; the use of big data in managing transport systems; and the use of satellite data to model and compare development. The discussion explored issues concerning private versus public data sources and what is needed to make a resilient city.

Witness Perspectives

Dr Prathivadi B. Anand used case studies to demonstrate the challenges of defining resilience. **A city's resilience is dependent on time horizons, the conditions it is subject to and the system (physical, institutional, social, etc.) under stress.** For example, in December 2015, Chennai suffered record rainfall which was in contrast to the more common hazard of drought. Problems with communication network protocols and infrastructure led to slow early response. This was evidence of fragility and vulnerability: two concepts related to resilience. There can also be competing/complementing types of resilience, such as that of institutions and social networks. After a catastrophe, or when new information is available, resilience can be reassessed. This data can be used to analyse consequences, create stress tests and question delays in creating a response to risks. During the discussion, Dr Anand clarified that **resilience is not a threshold but a subjective continuum.**

Professor Michael Batty suggested that cities are intrinsically resilient as they are built by a resilient humanity. Like Dr Anand, he also highlighted the changing nature of resilience, which is dependent on its time and spatial conditions. **Big data is an emerging tool**, and Professor Batty discussed the streaming of real time data for London's public transport. By creating a synthetic baseline, disruptions and their effect on the behaviour of commuters can be measured in comparison to the norm. For example, during the 2012 Olympics people adapted to the increased thoroughfare by changing their normal routes. Despite limitations (such as incomplete data), **we can use big data to build a more comprehensive picture of travel.**

Witness Themes:

- **Definitions of resilience** (and cities) are contingent on time, space and circumstance.
- **Big data** can be used to inform policies to increase resilience

Sergio Freire sought to illustrate the connection between resilient cities, policy and data. First he considered **the fundamental definition of a city: how many are there, where are they located, and what are their sizes, shapes, outlines and names?** Using Landsat imagery combined with other sources of population and building data his team has mapped four periods between 1975 and 2014 to capture time slices of the earth's development. This provides valuable information on the changing makeup of urban areas and activities and the ability to compare development across the globe.

Wicked Problems and Discussion Points

- **How do we create a hierarchy of resilience?** Do we take a human rights perspective and start with the sanctity of life? Should the needs for a resilient city be decided by people rather than governments?
- **How do you decide what data you need to assess a resilient city?** Each city faces its own challenge, so the nature of resilience and the method of assessment are continually changing.
- **How do you decide which data you need?** Which comes first: theory or data? Big data may be incidental to the problem and we need more experience of it. Traditional datasets, such as GDP per capita, do not measure inequality or social cohesion.
- **Are private caches of data acceptable?** Large companies have huge data resources compared with some public projects. Can we assume such players are benign and their agenda aligns with goals such as inclusivity? How can government and civil society catch up?
- **Is nuance lost in big data?** Particularly in relation to environmental risk and individual.
- **Levels of trust in institutions are important**: A lack of trust can lead to public disengagement.