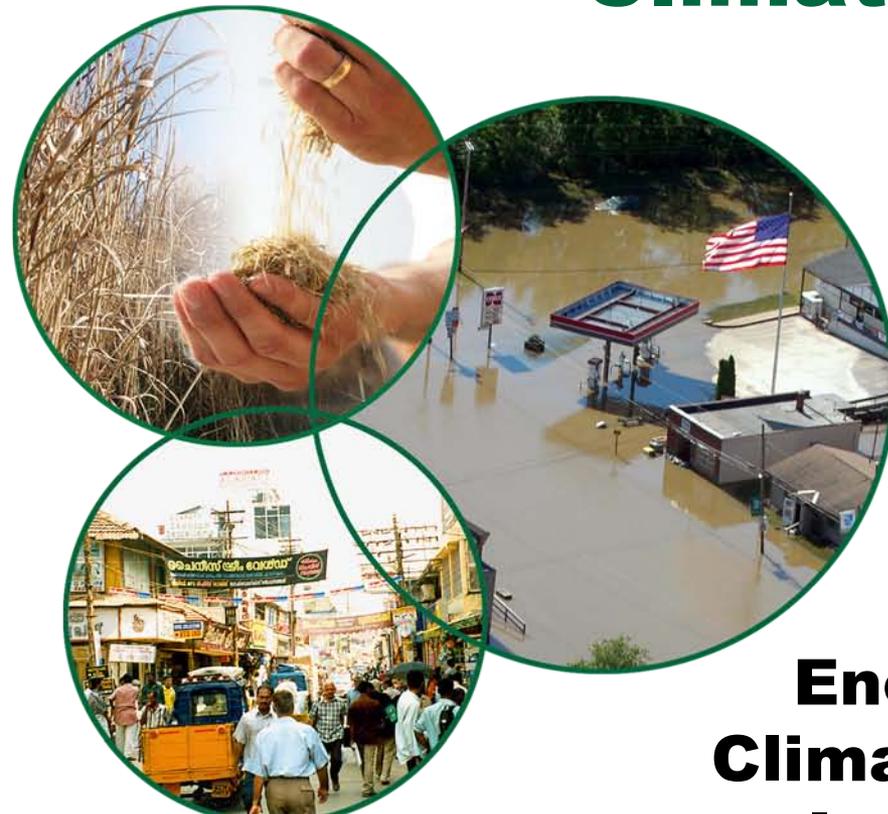


Urban Vulnerabilities, Impacts, and Adaptation Potentials in Responding to Climate Change

Thomas J. Wilbanks
Oak Ridge National Laboratory

**Energy Modeling Forum:
Climate Change Impacts and
Integrated Assessment**

27 July 2009



The Context for Our Three Days Together:

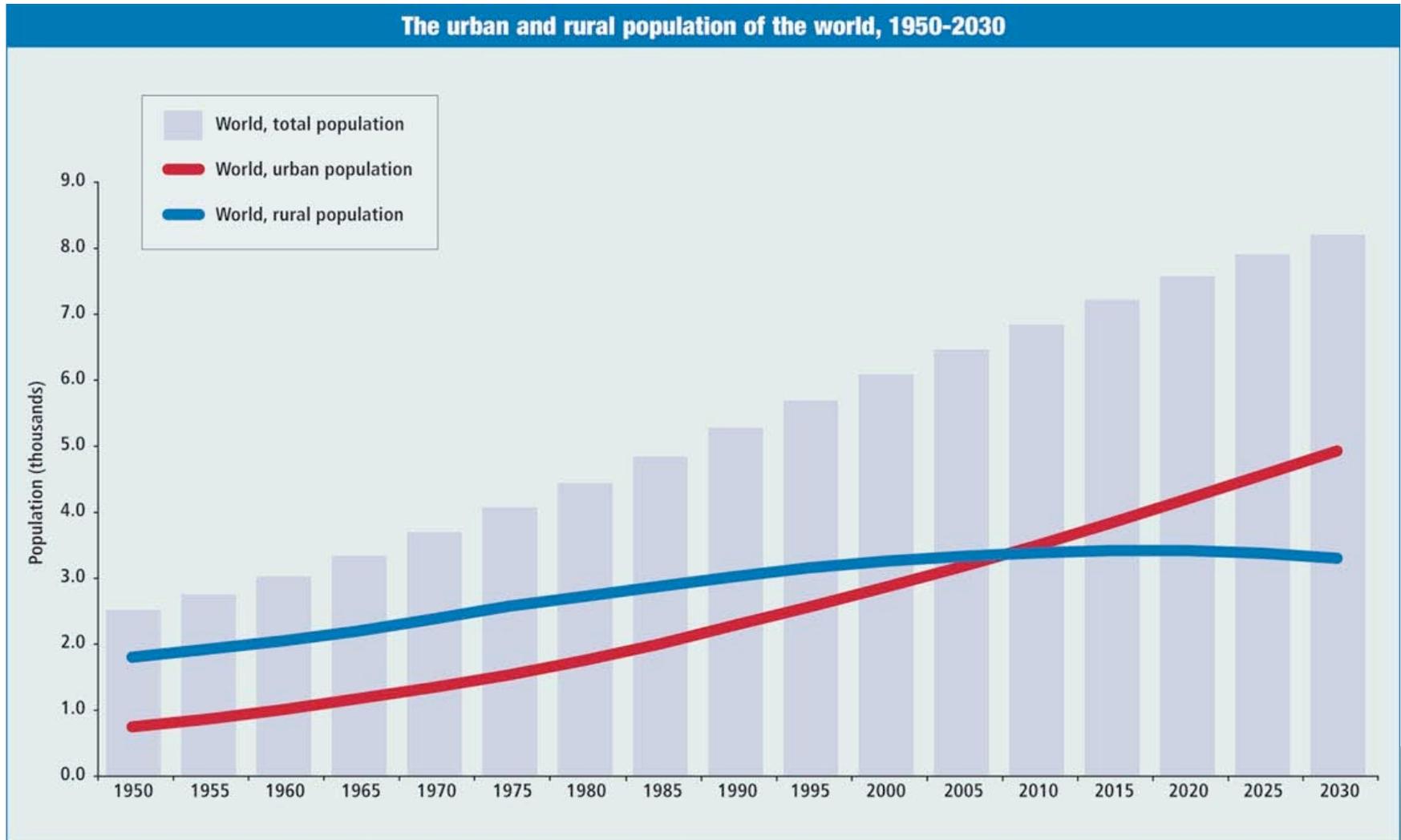
- **An introduction to why the interest in what climate change might mean for urban areas is growing**
- **A brief summary of the emerging body of attention to climate change vulnerabilities, impacts, and adaptation potentials in human settlements/cities/urban areas**

Why Are Human Settlements a Topic of Particular Interest (I):

- **Where most of the earth's population live**
 - **Urban population growing rapidly**
 - **In 2008, for the first time more than half of the world's population is living in cities and towns**
 - **Most of the growth in urban areas in developing countries: UN: world urban population from 1.9 billion in 2000 to nearly 4 billion in 2030; Africa and Asia urban proportion growing from 39% in 2000 to 54/55% in 2030**



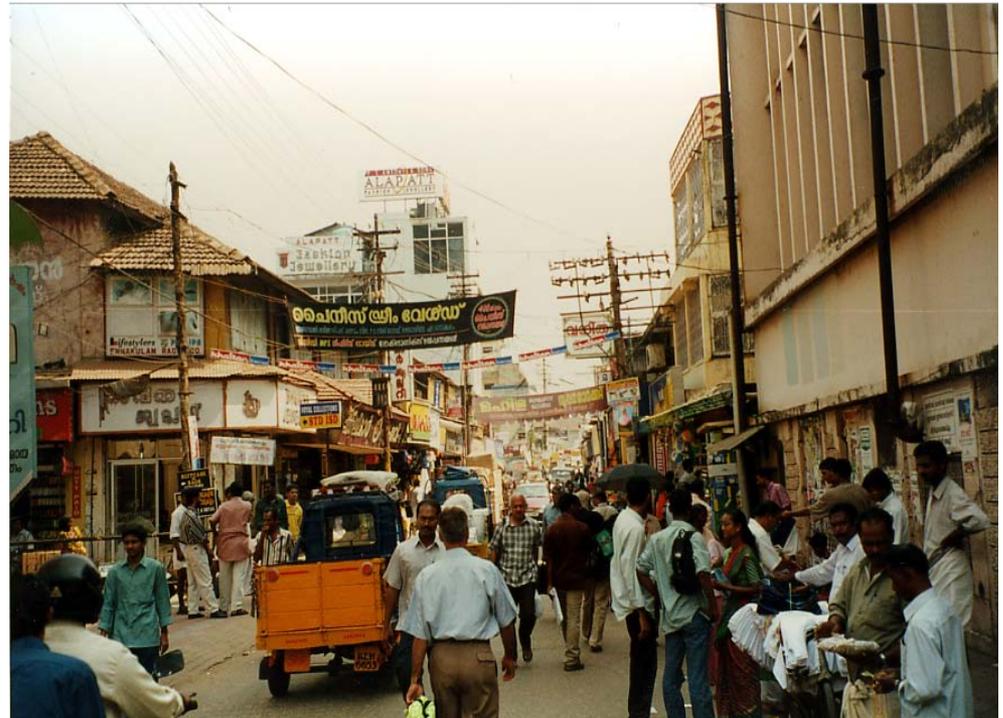
Why Are Human Settlements a Topic of Particular Interest (II):



Urban & rural population of the world, 1950-2030. Source: UN Population Division

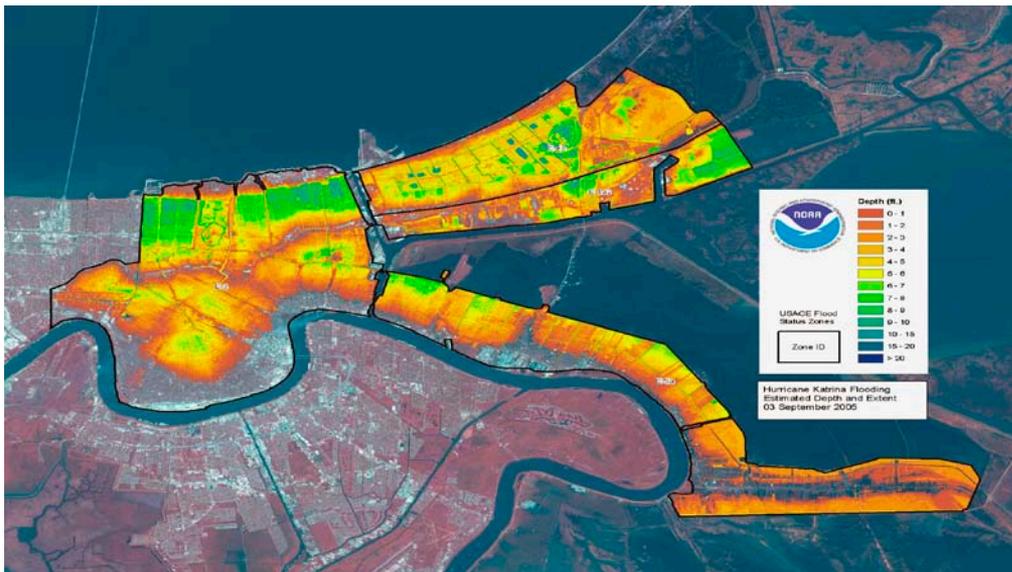
Why Are Human Settlements a Topic of Particular Interest (III):

- **Population concentrations present special risks of human system catastrophes from major climate events**
- **Often are the location of a large share of a nation's most disadvantaged citizens**



Why Are Human Settlements a Topic of Particular Interest (IV)?

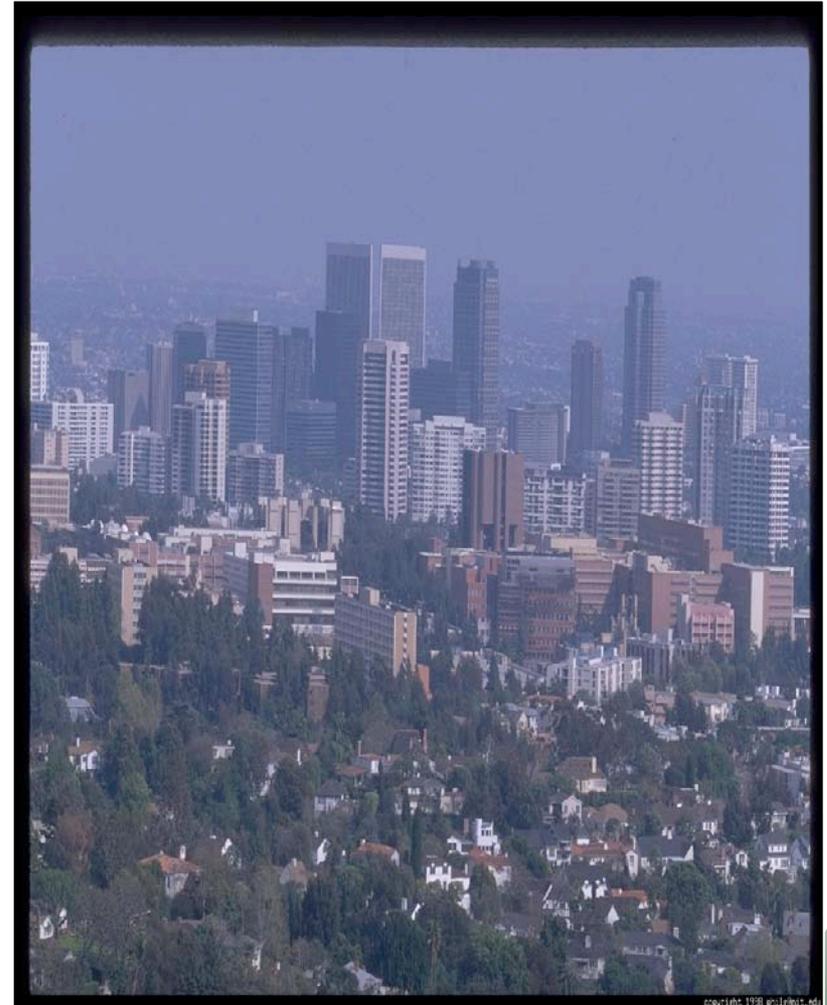
- Often located in areas vulnerable to climate change impacts
 - Coastal areas and river valleys
 - Areas where regional climate-related resources face increasing competition with population and economic growth
 - Areas where the economic base is rooted in climate-sensitive sectors



Flood depths in New Orleans on September 3, 2005, five days after flooding from Hurricane Katrina, in feet (0.3 meter) (Source: www.katrina.noaa.gov/maps/maps.htm).

Why Are Human Settlements a Topic of Particular Interest (V)?

- A focus of many driving forces for climate change responses at regional and national scales
 - Financial centers
 - Industrial centers
 - Media centers
 - Innovation centers
 - Democratic decision-making: one person/one vote

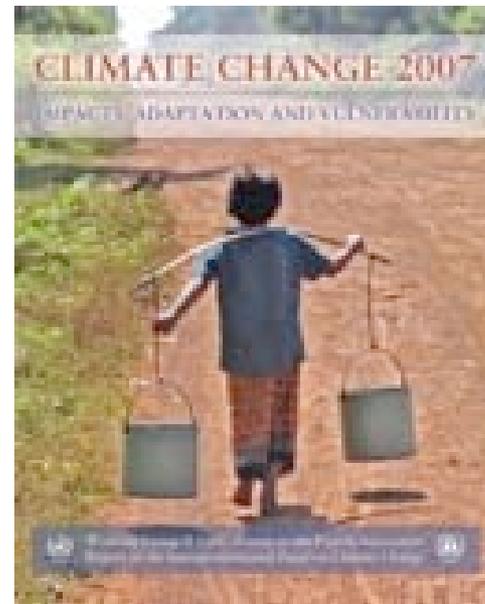
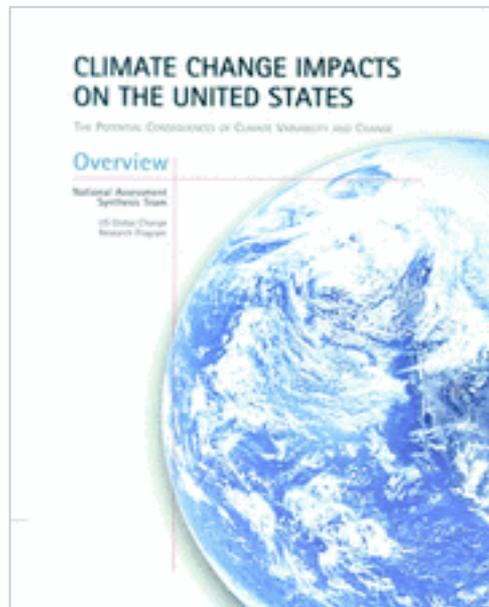


How Do Human Settlements or Urban Areas Fit into a Taxonomy of Vulnerability/Impact/Adaptation Concerns?

- **Not exactly a sector**
- **Not exactly a human system**
- **More than an arbitrary cut across a scale continuum from very small to very large**
 - **A mesoscale between neighborhood and region**
 - **Associated with a degree of self-organization**
 - **Able to mobilize collective decision-making**
- **Often the most coherent focus for place-based integration of a wide range of driving forces, sectoral, and socioeconomic factors**

So What's Going On with Urban IAV Issue Identification and Integrated Analysis and Assessment (I)?

- A glimpse of how we got to where we are
- Some recent summaries of the knowledge base
- An illustrative list of relevant activities underway right now



So What's Going on with Urban IAV Issue Identification and Integrated Analysis and Assessment (II)?

- **A glimpse of how we got to where we are**
 - **Starting points – global: IPCC – attention in FAR (1990, 1992), chapter in SAR (1995), chapter in TAR (2001), part of a chapter in AR4 (all chapters co-led by US authors)**
 - **Starting points – US: first National Assessment:**
 - Scoped a “sectoral” component on cities and other settlements at initial meeting in Aspen, July 1997
 - Included a major breakout session on “urban services” at second meeting in DC, November 1997
 - No sectoral chapter commissioned, but one “regional” chapter focused on an urban area: Metro East Coast
 - Spinoffs from NACC, including an AGCI session in 1999 on “integrating human and natural systems to understand climate change” at an urban scale and a subsequent major urban impact assessment for Boston (CLIMB), 1999-2004

So What's Going on with Urban IAV Issue identification and Integrated Analysis and Assessment (III)?

- **A glimpse of how we got to where we are**
 - **Since then:**
 - Continuing attention by IPCC
 - A number of important urban impact assessments, such as London
 - Some growth of institutional focus, such as IIED
 - The Urbanization and Global Environmental Change project of IHDP
 - The beginnings of a spillover toward impacts from attention to urban roles in climate change mitigation: ICLEI's Cities for Climate Protection Program, carbon cycle studies (Field and Raupach, 2004; the Urban and Regional Carbon Management Initiative of the Global Carbon Project, since 2005)
 - Occasional reminders of urban impact vulnerabilities, such as Hurricane Katrina and urban heat waves (Europe 2003, US 2005, 2006)

So What's Going on with Urban IAV Issue Identification and Integrated Analysis and Assessment (IV)?

- **Some recent summaries of the knowledge base**

- **Examples of reports**

- World Bank report on *Climate Resilient Cities*, 2009
- IIED book on *Adapting Cities to Climate Change*, 2009
- Journal: *Environment & Urbanization*: e.g., April 2007 issue on “Reducing Risks to Cities from Disasters and Climate Change”
- *Id21*, “Climate Change and Cities”, January 2008
- US Climate Change Science Program Synthesis and Assessment Report 4.6, 2008: Chapter 3 on “Human Settlements”
- US Global Change Research Program report on *Global Climate Change Impacts in the United States*, 2009: settlements a major part of a “Society” sectoral impact summary

So What's Going on with Urban IAV Issue identification and Integrated Analysis and Assessment (V)?

- **Some recent summaries of the knowledge base**
 - **Some of the things that they say**
 - **Far too few good case studies of urban vulnerabilities and possible responses**
 - Generalizing from too small a sample
 - Missing case studies of many important types of cases
 - **Very little ability to talk about climate change impacts and adaptations based on evidence**
 - Attribution of impacts from climate change just emerging
 - Climate change adaptation still in the planning stages (if that....)
 - **Some particular areas of concern**
 - Large urban concentrations in vulnerable areas, such as Asian mega-deltas
 - Implications of extreme weather events and water scarcity
 - Interactions with other aspects of sustainable development paths, such as poverty and infrastructure needs

So What's Going on with Urban IAV Issue identification and Integrated Analysis and Assessment (VI)?

- **An illustrative list of relevant activities under way right now**
 - **NSF Urban LTER Sites: Phoenix and Baltimore, with ULTRA in development**
 - **Rockefeller Foundation's Asian Cities Climate Change Resilience Network**
 - **ADB urban climate change programs**
 - **START – Cities at Risk: Developing Adaptive Capacity for Climate Change in Asia's Coastal Megacities**
 - **UN Habitat Report on *Cities and Climate Change*: 2011 issue of the UN Global Report on Human Settlements**
 - **Urban climate change adaptation plan development:**
 - Case studies: New York City
 - Tools: *Climate Change: A Guidebook for Local, Regional, and State Governments* (King County, WA; ICLEI; University of Washington)
 - Programs: US Conference of Mayors Climate Protection Agreement