Understanding and Facilitating Sustainability in Urban Ecosystems

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Can cities be sustainable?

• Defining sustainability
  – Three pillars
• Urban as inclusive
• Urban as changing
• Heterotrophy
• Trajectory – not state.
The map shows the total urban population of countries in 1950 (inner circle) and 2010 (outer circle). The visible area of the outer circle shows the total increase in urban population during this period. Intensity of color shows the proportion of each nation's population living in cities: the most urbanized countries have the darkest colors.

Sustainability: A Social Construction

• Stakeholders
• Civic process
• Role of scientific knowledge
• Risk of ideology
  – Greenwashing
  – Ecocities
• Example of plan.
City Council adopts Baltimore Sustainability Plan

In March 2009, the Baltimore City Council adopted the Baltimore Sustainability Plan, a broad, community-responsive sustainability agenda that provides a new lens by which to weigh decisions affecting the future of Baltimore...

so what is sustainability?

Sustainability: meeting the current environmental, social, and economic needs of our community without compromising the ability of future generations to meet these needs.

Basically, “sustainability” means both to improve the quality of life today and to pass on a world that is as good as, if not better than, we found it for our children. Sustainability is sometimes illustrated as a three-legged stool, comprised of social equity (people), economic health (prosperity), and environmental stewardship (planet). Collectively, these “legs” are the foundation for our quality of life. In order for a community to thrive today and tomorrow, all three pillars of this platform need to be strong.
Plan Components

• Cleanliness
• Pollution prevention
• Resource conservation
• Greening
• Transportation
• Education and awareness
• Green economy.
Melbourne Principles (ICLEI)

• Provide long-term vision for cities
• Achieve long-term economic and social security
• Recognize intrinsic value of nature
• Minimize ecological footprint
• Model cities on ecosystems
• Recognize and build sense of place
• Empower people and foster participation
• Expand and enable partnerships
• Promote sustainable production and consumption
• Enable good governance
Resilience as Mechanism

- System dynamics
- Undergirds sustainability
- Adaptive cycle
- Adaptive capacity.
Adaptive Processes

• Socio-cultural
• Biogeophysical
  – Ecosystem phenomena
• Ecosystem services
Underlying Determinants of Adaptive Capacity

Social Adaptive Processes
- Range of available technologies.
- Available resources & their allocation.
- Structure of decision making institutions.
- Human capital.
- Social capital, including property regimes.
- Access to risk spreading.
- Ability to manage and vet information.
- Public perception of stress & local manifestation.

Biophysical Adaptive Processes
- Genetic variation & evolution.
- Organismal plasticity.
- Species & functional group richness.
- Regulatory population feedbacks.
- Resource stocks & retention.
- Key biological ecosystem structures.
- Metacommunity & patch dynamics.
- Reduction of biotic sink patches.
- Scaled connectivity.
- Compartmentalization of disturbance.
Baltimore Example

Mercantile → Industrial → Sanitary
Central Business District

Transitional zone: recent immigrants, deteriorating housing, factories, abandonment

Working class zone: single family tenements

Residential zone: single family homes with yards and garages

Commuter zone: suburbs

Burgess Model
City Modes

• What are cities for?
• City-Suburban-Exurban systems.
The Sanitary City

• Lynch (1960): City as Machine
• Melosi (2000): The Sanitary City
• Gandy (2003): Concrete and Clay
• Modernism
Features of Sanitary City

- Engineering solutions
- Segregation of hazards
- Removal of waste
- Management/planning silos
- Management by experts
- Public resources
- Government control
- Demographic transition benefits.
Sanitary City: A Mode in Crisis

• Assumptions violated
• Assumptions irrelevant.
Transformations among Modes
How to Facilitate This One?

Sanitary

Sustainable
Nature of the Sustainable City

• Sustainability: A goal
• Socially constructed
• Normative
• Three components
  – Economy
  – Ecology
  – Society
From Ecology to Equity

Ecosystem Structures/Functions

Relevance to humans

Ecosystem Dis/Services

Resonance with values

Dis/Amenities

Socio-cultural and spatial heterogeneity

Environmental In/Equity
Features of the Sustainable City

- Polycentric governance
- Integrated management
- Exploitation of bio-ecosystem services
- Rethink waste-resource dichotomy.
Sustainable Solutions

• Ecological and engineered
• Hazards addressed
• Wastes reduced
• Integrated management
• Management involves stakeholders
• Public-private partnerships
• Transitions not deterministic.
BES III Evolution

• Sanitary City to Sustainable City
Growing the Partnership

• National: Research Collaboration Network on Urban Sustainability
• Regional: Baltimore Regional Academy of Sustainability Science
• City: Extend and link agency conversations
• Sharing expertise
• Sharing tools
• Collaborative development of projects
• Leverage limited human, social, and financial capital.
Urban Meta-mosaic

Process Landscapes:
- Biogeochemical flux
- Organismal flux
- Demographic flux
- Information flux

Choice Landscapes:
- Policy
- Design
- Lifestyle
- Location

Outcome Landscapes:
- Biodiversity
- Justice
- Safety and vulnerability
- Zoning
- Inheritance & legacy
Tradeoffs

- Services
- Amenities
- Values
- Costs
- Engineering/ecology
Seeyalaterbye, Hon!