Urban Ecology – Sustainability and such
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I. Social-ecological systems in urban ecology
   1. HUMANS – Dominant players in urban ecosystems. So, to study the ecology of cities we must carefully examine social-ecological systems.
   2. Social identity can be based on age, gender, class, etc. and social structure determines the allocation of resources including economic, social and cultural resources (wealth, power, knowledge, status and territory).
      Historical perspective:
      a. The emergence of the first cities (e.g. Mesopotamia) and associated political and administrative systems that came as a consequence of increased resources and improved agricultural practices.
      b. Some resilience consequences however – decision-makers are disassociated from production.
      c. Sedentarization also occurs with immovable facilities. Societies are less nomadic.
      d. But then came globalization! Though citizenship is still important.
      e. Another feature of social-ecological systems in cities is the ability for “problem-solving” and specialization of goods and services.
   3. Households are a key unit for examining urban ecology relationships (instead of just HPD) and increase faster than human population growth in cities.
      a. Characteristics of households (e.g. size, culture, power, wealth) determine biophysical and social ecosystems.
      b. For example, the “ecology of prestige” can determine green cover in neighborhoods through household decisions to adhere to a group or community identity.
   4. Urban resilience – cities have the ability to deal with challenges through their institutions but environmental disruptions (typhoons, floods, fires etc.) tend to impact the poor disproportionately. Thus we need to consider social trade-offs and costs of decisions to all in an urban society.
   5. Resilience vs. sustainability – resilience deals with the consequences of disruptions to equilibrium whereas sustainability efforts aim to achieve a long lasting equilibrium itself.

II. Urban sustainability, ecological footprint and urban metabolism
   1. Sustainability meets the needs of the present generation without sacrificing the needs of future generations. 3 conceptual keys to urban sustainability:
      a. In essence sustainability aims for “intergenerational equity”.
      b. Social justice – equitable distribution of resources across social structure (e.g. class).
      c. Trans-frontier responsibility – recognition that pollution and resource use which extends across city borders must be accounted for.
   2. Urban sustainability efforts must meet economic (local profit), social (quality of life), natural (natural capital), physical (carrying capacity) and political (equitable power – democracy) dimensions.
   3. The urban environmental transition identifies the different needs and goals of cities at separate developmental stages – post-industrial cities have green agendas (e.g. emissions reductions) vs. developing cities which have brown
agendas (e.g. water supply, sanitation) – i.e. ecological debt may not be a huge concern if present generation cannot eat.

4. But even some post-industrial cities do not have sustainable dev. goals.
5. Ecological footprint – standard accounting tool for measuring the impact of a city’s use of land.
   a. Hong Kong uses “2.6 earths” and significantly exceeds its biocapacity.
   b. Marc Reisner’s Cadillac Desert is one of the pioneering historical accounts detailing how the Western U.S. appropriated most (76%) of the region’s water to build cities (e.g. L.A.). Recently, an analysis suggested a “feasible” target of 60% freshwater use of the watershed.

6. Urban metabolism – cities take in materials and then emit waste in a linear fashion that differs from natural systems (which tend to be cyclic).
   a. Hong Kong was one of the first cities to have been studied from an urban metabolism perspective (see below figure).

7. Urban land teleconnections – a conceptual framework that focuses on the connections between urban, rural and periurban locations rather than the places themselves (e.g. mobile phone prod. and mining in the Congo, land consequences of hydropower, population increase and land, CO2 uptake).

8. Eco-cities – urban planning measures which aim for sustainability and prioritize the minimization of waste and consumption. For example, emphasis is often on efficient public transportation networks, compact growth (rather than expansive) and local food and goods production.