



Why Cities are Inherently Unsustainable

(And why they are a key to sustainability)

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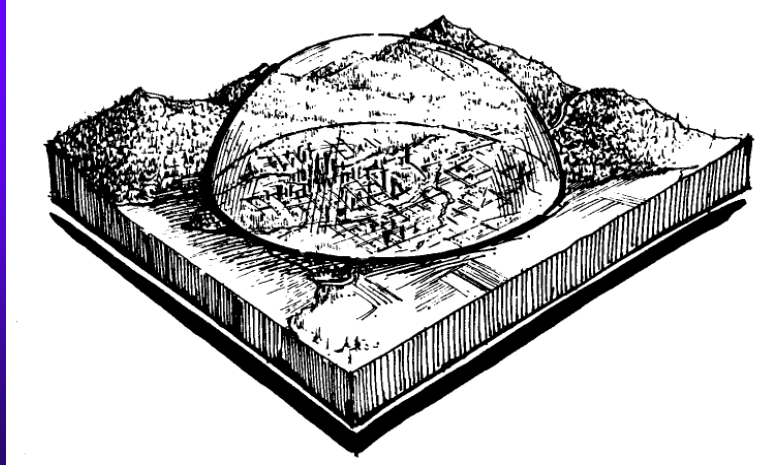


Cities as Biophysical Parasites

- ◆ “Great cities are planned and grow without any regard for the fact that they are parasites on the countryside which must somehow supply food, water, air, and degrade huge quantities of wastes.”
(Odum 1971)
- ◆ For all the recent advances in technology and resource productivity, ‘great cities’ remain ever more materially dependent on a vast (and increasingly global) hinterland. They can produce the ‘wealth of nations’ only by first consuming the products and services of the ecosphere.



The city is an incomplete (human) ecosystem
(Enclosed in a bell-jar, a city would simultaneously starve and suffocate.)



The Human Ecological Footprint

The 'ecological footprint' of a specified population is *the area of land and water ecosystems required to produce the resources that the population consumes, and to assimilate the wastes that the population produces, wherever on Earth the relevant land/water may be located.*

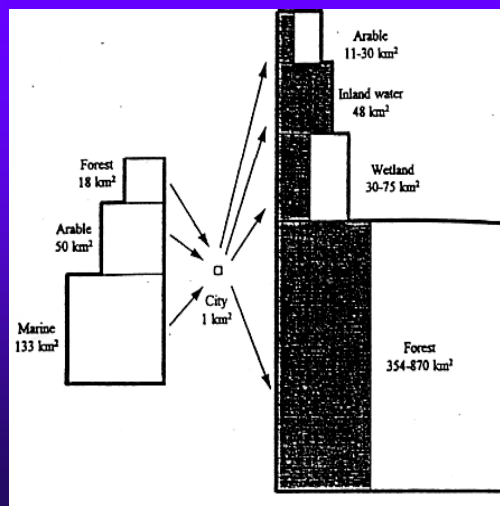


The Average Consumer's Eco-Footprint

- ◆ The average ecological footprints of residents of high-income countries range between four and ten hectares (10 to 25 acres). Therefore...
- ◆ The ecological footprints of high income cities are typically hundreds of times larger than their political or geographic areas.



The Eco-Footprint of the 29 Largest Cities in Baltic Europe



- ◆ Blocks on the left represent ecosystem area appropriated for resources.
- ◆ Blocks on the right is ecosystem area appropriated exclusively for waste assimilation.



Is “Sustainable City” an Oxymoron?

- ◆ No city, as currently conceived, can be sustainable on its own:
 - How secure are cities in an era of accelerating global change and increasing geopolitical instability?
 - The future sustainability and security of cities may depend on increasing regional self-reliance.
 - Certainly rethinking the city-as-(eco)system would require consolidating and including the supportive hinterland (the city’s ecological footprint).



Cities and Material Throughput

- ◆ The construction, operation, and maintenance of buildings accounts for 40% of the materials used by the world economy and for about 33% of energy consumption (Worldwatch Institute 1995).
- ◆ Buildings in the US account for between 15 % and 45 % of the total environmental burden in each of eight major categories of impact used for life cycle assessment (Levin *et al.* 1995).
- ◆ Most of the rest of energy/material use is to satisfy private consumption, mostly in the world’s rich cities.
- ◆ Overall, approximately 65% of the world’s economic production/consumption and pollution is associated with cities in rich countries.



The Key: Exploiting the Urban Sustainability Multiplier

Cities enable...

- ◆ Reduced *per capita* demand for occupied land.
- ◆ A high proportion of, condominiums, apartment buildings and other multiple-family dwelling units which reduces per capita consumption of building materials and service infrastructure.
- ◆ Lower costs *per capita* of providing piped water, sewer systems, and most other types of infrastructure and amenities.
- ◆ A greater range of options for recycling, reuse, re-manufacturing, and a concentration of the skills needed to make these things happen.
- ◆ Greater possibilities for electricity co-generation and the use of waste process heat from industry or power plants to reduce the *per capita* use of fossil fuels.
- ◆ More opportunity to implement the principles of low through-put 'industrial ecology' (i.e., the creation of closed-circuit industrial parks).
- ◆ Great potential for reducing (mostly fossil) energy consumption by motor vehicles through walking, cycling, and public transit.



Consistent with present scientific understanding, a biophysically sustainable GVRD would therefore have policies that...

- ◆ minimize energy and material use, and waste production, associated with all capital projects, public and private;
- ◆ facilitate the reduction of the ecological footprints of its residents to no more than 2 hectares *per capita*.

(Overall target: 80-90% *per capita* reduction in energy/material throughput by 2040)



The Ultimate Goal?

- ◆ The central idea of urban ecosystem planning is to reintegrate the geography of living and employment, of production and consumption, of city and hinterland.
- ◆ Such a transformed “homeplace,... rather than being merely the site of consumption, might, through its very design, produce some of its own food and energy, as well as become the locus of work for its residents” (Van der Ryn and Calthorpe 1986).
- ◆ Following this logic, urban regions would gradually become less a burden on, and more a contributor to, the life-support functions of the ecosphere.

NB: All these point fly in the face of conventional trade theory and globalization trends.