SUSTAINABLE CITIES: A MINIMUM AGENDA

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Summary

This essay reviews diverse views of cities as human artifacts dependent upon as well as modifying their natural surroundings. In developmental terms some view cities as cradles of civilization; while other see them as behavioral sinks, sites of exploitation, and destructive of nature. If Goethe thought “city air makes men [sic] free”, his era was not yet aware of the health effects of air pollution. Having reviewed such definitions of urban

human ecology and views of urbanism, the author passes on to a series of initiatives that have attempted to address sustainable human development in an urban context. This inevitably leads to consideration of the Third World City and developmental approaches toward urban governance and urban social movements. "Eco cities" do not often extend beyond show piece city centers and the occasional suburb for the rich. More relevant and urgent is to ask about "Healthy cities" and "Disaster resilient" cities. Human health problems and vulnerability to extreme natural events such as floods, coastal storms, earthquakes, and landslides, as well as exposure to catastrophic environmental disasters like Chernobyl and Bhopal accidents loom large among the challenges of urban growth in the context of the socio-economic polarity being produced by globalization. Some believe that such tragic events are not accidents at all, and are a product of unmanageably complex and tightly coupled systems. The popular reaction to such failures of urban management is the rise of eco-politics within a "Risk society." In developing a "minimum agenda" for sustainable development in cities, the author finds that environmental goals are probably not achievable except in tandem with the social goals of justice and democratic participation.

1. Introduction

1.1 Defining "Sustainability"

Since this notion was first coined in its contemporary form by the World Commission on Environment and Development (the Brundtland Commission) in 1987 and fully launched on the world stage in 1992 by the Earth Summit in Rio literally scores of definitions have appeared (WCED, 1987; Redclift, 1987; Adams, 1990; Elliot, 1994). To add to the confusion, in the form of an adjective the word "sustainable" has been widely coupled with all sorts of nouns, sometimes producing oxymorons like "sustainable growth."

In the context of a contribution on cities in *Encyclopedia of Life Support Systems*, it might be thought to be easier to avoid the controversy that attaches to the task of defining the words "sustainable" and "sustainability". One might begin with a definition of a "sustainable city" as *a human settlement that does not over time destroy its life support systems*.

All human settlements depend on their surrounding (and often distant) territories and natural processes for the energy, food, and water, among many other goods, that allow their daily vital activities. These are the city's life support systems. As organisms (or super-organisms), cities metabolize these "inputs", the waste products of which (waste heat, solid and liquid waste) must go somewhere. Thus cities also depend on the receptivity of other places for the deposit of such waste products (Newcombe, Kalma, and Aston, 1978; Girardet, 1992: 26-28). Table 1 shows the approximate through-put of material for a typical U.S. city of one million inhabitants (source: Miller, 1998: 89, Fig. 3-16).

Daily inputs		**Daily outputs**	
Water	625,000 tons	Sewage	500,000 tons
Fuel	9,500 tons	Air pollutants	950 tons
Food	2,000 tons	Refuse	9,500 tons

Table 1: Typical Daily Inputs and Outputs of matter and energy for a U.S. city of 1 million people

This all seems quite straight forward. However, in the era of the global metropolis and the mega city, such a definition runs into complexities. First, the "zones" from within which a city draws its vital inputs are no longer as simple as they were one hundred years ago, when geographers drew concentric circles around cities from which, as one moved farther and farther from the city center, came dairy products, fruit and vegetables, grain, and firewood and charcoal. An urban region such as greater Los Angeles with a population of 16 million in its metropolitan area, draws water from the Colorado River and Northern California, hundreds of miles away, feasts on electricity generated from as far away as British Columbia and provided by increasingly complex private distribution networks. LA's food comes from nearly every part of the world, and its waste is shipped by rail into the Mojave desert or pumped into the Pacific Ocean. The chemical by-products of some of its industries cross the continent to be reused, while others add to the cocktail of pollutants in LA's infamous air (Wisner, 1999). Something similar could be said of any world city or regional metropole with a population of more than a few million. What is exemplified here is the issue of spatial scale, a city's reach, footprint, and backwash effects.

A second problem arises when one tries to draw the line at "strictly ecological" life support systems. A city lives by flows of money and information as well. Its "metabolism" requires these flows as much as it does the daily flux of petroleum, electricity, fresh water, and food. As will be pointed out later, it is often political and economic problems that account for the inability of a city to "manage growth" or even to provide basic services like removal of rubbish (Paoletto, 1999: 304-308; Mellor, 1999: 54-55; Davis, 1993a&b; Eibenschutz and Puente, 1992; Wisner, 1988: 87-119). Thus there is at the very least a close linkage between environmental or ecological life support systems and economic ones.

A third thorny issue concerns the notion of "carrying capacity". In thinking about "sustainable cities" it is often naively assumed that the problem is to solve a simple equation: how many people can be supported by the natural resources within a certain distance of that city? What this approach overlooks is how relative consumption levels and cultural expectations about quality of life must weight population numbers. This complexity is nicely captured by the notion of the "ecological footprint". Studies in the Frazer River Valley, or greater Vancouver, suggest that the average person living there requires 12 acres of land, some of it quite remote from the city, to satisfy her consumption of food, paper, energy, etc. (Wackernagel and Rees, 1996).

At the risk of adding yet another layer of complexity, one can also see Caribbean, Aegean, Pacific and other tourist destinations as part of the (post)industrial urban footprint. When conditions in a city such as Los Angeles, Tokyo, New York, London, or Paris become intolerable and threaten the mental health of the middle class resident, the safety valve takes the form of a holiday in a tropical paradise. The literature on eco-tourism is skeptical about the benefits accruing to local populations in these destinations and queries their ecological health as increased tourist numbers place pressures for development.

What these foregoing complexities and difficulties with the definition of "sustainability" show is that a complex notion of human ecology must be used. Cities must be seen as a set of social relations and subjective human experiences and not merely as techno-biological systems (Soederstroem, 1993: 334, citing Boyden, 1984). In considering the sustainability of cities from the point of view of "life support systems", there is a temptation to reduce urbanism to the flux of matter and energy. The author just cited above urges against "the blinkers set by an ecology centered on the question of environment and confined to a technocratic perspective... " (Soederstroem, 1993: 333). She continues by suggesting that the concept of *ecosophia* helps one avoid excess of reductionism since it is, in Guattari's words (1989: 12), "an ethico-political articulation ... between the three ecological registers, the one of environment, the one of social relations and the one of human subjectivity."

1.2. Sustainable Cities: Green? Healthy? Eco?

Besides the unruly and ambiguous circus of proposed definitions for basic terms like "sustainable", there are other quite different terms sometimes used including "green cities", "eco-cities", and "healthy cities". Since some of the examples will be cited later on use this kind of language, a preliminary discussion is useful.

Although existing usage is varied and not systematic, the author thinks of these descriptions and ideal types on a continuum from less to more profound structural, social, and economic transformation. "Green" cities, as they exist today, are simply those that are adopting, or trying to adopt, some relatively minor reforms in their energy and material budgets (e.g. recycling programs, energy efficiency in government buildings, some emphasis on improving public transport) or attempting to provide more landscaped and open space. These reforms require few in the economic and social relations within that city or in the urban fabric itself.

"Healthy cities", a program promoted by the World Health Organization, may incorporate some of the above, but is also focused on public-private partnerships that enhance the quality of life of groups of people who have previously been marginalized. Again, these are reforms requiring little except the redirection of philanthropic contributions. It may result in some empowerment of social groups who demand deeper reforms, but the status quo is seldom shaken.

"Sustainable cities" are the result of a minimum package of structural (spatial/ territorial), economic, and social changes required actually to ensure the continuing urban metabolism, the daily inflow and outflow of vital energy and material. These changes do, indeed, challenge current patterns of economic and political power. However, these political and economic changes are neither unrealistic nor utopian because the political and economic elite realize that social peace and economic efficiency also require these changes. Cases exist where strict control over sprawl have been enforced, limits on water withdrawals put in place, money redirected into mass transport, serious efforts made to encourage urban agriculture, encourage small businesses and youth employment, etc.

Finally, "eco-cities" remain an ideal. They would be cities of a size, structure, and function that coexist perfectly with their surroundings and promise sustainable

livelihoods, healthful living, and cultural enrichment for their inhabitants. Since order anywhere is established and maintained at the cost of disorder somewhere else (the Second Law of Thermodynamics), it is hard to see the "true" eco-city as anything but a thought experiment. Yet there have been interesting attempts to build them. For example, Arcosanti, the vision of Paulo Solari, is slowly accreting itself like a form of coral or lichen to the sides of a deep ravine in Arizona between Phoenix and Flagstaff. More common are the literary visions and sometimes detailed plans found in works that began with Thomas More's *Utopia*.

2. The Human Ecology of Human Settlements

2.1. Time and Space: Constructing a Second Nature

Evidence of human clustering in continuous settlements dates back to nine thousand years ago. The author presumes that people came to live together as the neolithic invention of agriculture made it possible to group together for protection and conviviality. Processing raw materials, food storage and redistribution against extremes of weather, and eventually trade with other people reinforced the importance and desirability of proto-urban life. Within a few thousand years of these origins of clustered settlement, ancient cities of several thousand people had evolved including Uruk, Ur, and Lagash in Mesopotamia and Mohenjo-Daro in the Indus Valley (Ponting, 1991: 295).

Avoiding romantic notions, however, the hydrologic works, military needs, and monumental structures of these Near Eastern and other early Latin American and African cities served to control labor as well, and imposed requisitions of food from surrounding farmers.

As these cities grew, they more often than not suffered dramatic, even catastrophic declines due to climate change, war, or the long term consequences of ecological mismanagement. The salting up of soil due to continuous irrigation led to the decline of ancient cities of Sumeria and Mesopotamia (Girardet, 1992: 40).

Rome, like many "world cities" today, had lifelines along which it imported grain that stretched far across the Mediterranean and as far as the Black Sea. Rome reached the point when its armies were stretched too thin to protect the increasingly long lines of supply needed to feed its metropolitan population (Mumford, 1961).

With all their ecological problems, even large cities were never larger than a few hundred thousand persons until only a few centuries ago. At its peak Rome had possibly 400,000 inhabitants. By 1300 AD Europe had only nine cities larger than 25,000 persons. The center of the Islamic empire in the western Mediterranean, Cordoba, reached 100,000 before declining (Ponting, 1991: 298-299).

Throughout the Middle Ages and into pre-modern times major cities continued frequently to burn to the ground or to be emptied out from time to time by plague. Bulk transport and energy supply technologies did not allow them to grow beyond a certain point, nor was there good reason until the rise of industry.

2.2. The Modern City

With the rapid industrialization of the 18th and 19th centuries in Europe, and somewhat later in North America and in enclaves elsewhere, urban growth accelerated. Early in the history of the city, water and sanitation had been explicitly addressed by regulations and engineering works such as the aqueducts and baths of classical Rome. However, with the rise of the industrial city and increase in scale, water and sanitation became major issues in city management, especially after the discovery of the water-based transmission of cholera by Dr. John Snow in London in 1851 (Learmonth, 1988). Food supply, and later food inspection and standards, became another concern of the municipal state. Bulk transport of coal, foodstuffs, and building materials by canal barges and steam locomotives was the single most important innovation that drove centralized location of industry and rapidly denser urban growth. The emergence of kerosene for lighting, coal gas lights and electrification, all between 1880 and 1910, allowed increase in urban density.

Petroleum-based urban transportation was the second most important force that shaped modern urban form and density. The classic "ecological" model of urban land uses proposed by the Chicago school of urban sociologists in the 1920s already included a suburban belt around the industrial production zone and workers' housing, and a core central business district (Burgess, 1925). This urban form had begun to take shape a half century earlier as horse-drawn trams shuttled commuters between downtown Berlin, London, New York, and Boston and their suburbs (Ponting, 1991: 304-305).

The automobile was instrumental in allowing suburban development far from older urban centers. As Hough (1995: 16)) states:

> "The availability of cheap energy has been an overriding determinant of urban form. The energy flow through a city, with its factories, automobiles, heating and cooling systems and high power consumption, is about a hundred times greater than the energy flow through a natural ecosystem."

New residential zones far from the old city center were later to take on a life of their own as "edge cities" and helped to fuel the fiscal crises of the old cities that spawned them (Garreau, 1988).

Increasing world trade and competition in older industries like steel, ship building, and auto production, has given rise to massive shifts of industrial and financial capital, and with these movements have come millions of dislocated workers (Sassen, 1994). There have been large flows of international migrants since at least the middle of the last century — some fifty million Europeans left for North and South America between 1840 and 1900 — and today large cross-border movements continue. The result is that old city centers and nearby, older suburbs in cities such as Los Angeles are populated by a near-majority of people of Hispanic origin — some proportion of whom are illegal immigrants — while the newer "edge cities" are made up of lower-to-upper middle class whites.

I mention these recent social and demographic changes because it is to some extent the

entrophic effects of massive over consumption by the affluent in cities that account for deterioration of the rural environments far away. For example, production of cheap beef, cotton, coffee, bananas, soft fruit such as strawberries and winter vegetables in Mexico and Central America for the U.S. market has undermined rural sustainability (due to deforestation, erosion, pesticide contamination) in the service of U.S. urban "sustainability". Thus, deteriorating rural conditions in places such as Michoacan and Chiapas, Mexico, Guatemala, and El Salvador "push" migrants toward the US border. Globalization of markets has caused new flows of environmental refugees from zones degraded by export monocropping and a new spatial and social distribution of risk (Handmer and Wisner, 1999; Burbach, Nunez, and Kargarlitsky, 1996).

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Biographical Sketch

Ben Wisner worked for three decades in Africa on questions concerning rural energy, water and sanitation, and food security. Since 1996 he has coordinated research for the United Nations University on urban social vulnerability. He was vice-chair of the Earthquakes and Megacities Initiative from 1997-2002, and is vice-chair of the Commission on Risk and Hazards of the International Geographical Union (IGU) and of the IGU's Task Force on Megacities. He served as senior technical editor for UNDP's report, Reducing Disaster Risk: A Challenge for Development (Geneva: UNDP, 2004). He is lead author of At Risk (London: Routledge, 2nd ed. 2004), a major textbook on vulnerability to natural hazards. He has focused attention on the importance of municipal government and civil society cooperation as coordinator of a United Nations University research program on megacities Manila, Tokyo, Mumbai, Mexico City, Los Angeles, and Johannesburg.