# Sustain no city: An ecological conceptualization of urban development

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# Sustainability implications of the ecological conceptualisation of urban development

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## Introduction

Sustainability has become a critical goal in development initiatives and is a predominant theme in development discourse today. Urban development too has come under sustainability considerations. The discourse about sustainable development involves the theorisation of cities in ecological frameworks; what Gandy (2004) calls 'organicist metaphors' after Vidler (2000). This paper applies discourse analysis method to review the mainstream ecological terms that are currently in use in urban development expressions. It finds out that the use of the terms largely imply that urban development is a living phenomenon with the city being particularly seen as an organism. But on all occasions, the logic of life and death is always ignored or avoided by the proponents of these usages. Concerning the theory of urban metabolism for example, White (1994), relying on Douglas (1983), has limited the organism aspect to the living stage only and has dismissed the usefulness of the metabolic analogy if extended to full life cycle.

On the contrary, this paper argues that the ecological metaphor of the city should be followed to the logical end. In which case, if cities are living beings, we must expect that they should die at some point. The current strategies that aim at indeterminable sustainability of the city are therefore illogical in the normal functioning of nature. The paper therefore commits the proponents of sustainable cities to impact a timescale of sustainability in their strategies. Otherwise sustaining cities indefinitely contradicts the phenomenon of sustainability itself.

## Sustainable urban development

In 1992 the world adopted Agenda 21 as a global ecological management programme at the Rio Conference in Brazil (United Nations 1997). Agenda 21 is about sustainable development. As a meta-programme, it only gave guidelines from which countries, regions and sectors could take cue on how to achieve sustainable development, in a cascading hierarchical manner. In this regard, all sectors, regions and countries have been awash with strategies and activities for achieving the sustainable development goals. Not left behind in these efforts are urban developments particularly cities where several Local Agenda 21's have been operationalised. The fact that a follow-up conference—also dubbed Rio+10, see for example Swatuk (2002), Gardner (2002)—was held in Johannesburg in 2002 underscores the global commitment to sustainable development. To date, the pursuit for sustainable development is becoming more frantic owing to the threats of climatic change for which urban development is seen as one major culprit.

Sustainable development is a general term that is sometimes given to different interpretations. But the core of it is that it seeks to operationalise development within the functional limits of the environment. The term sustainable development can be broken down into two components: sustainable—the aspect that refers to the environment intended to convey the message that the environment should continue its normal natural cyclic functions without disruption or overburdening; and development entailing socio-

economic change. So we have the physical and the social components that must reconcile; if they do not sustainable development is ruled out. For example, if the physical functions of the environment are disrupted or overburdened, there is no guarantee that the functions would continue into the future. Central to the concept of sustainable development therefore is the issue of equity. If the continuity of the functions of the earth or the physical environment is compromised then the future generation is deprived of their share of life. The equity is inter-generational in the physical/natural sense and also intra-generational in the social sense.

As people and organizations grapple with strategies for the goal of sustainable development, a clear ontological strategy has emerged on the understanding of sustainable development within the urban scenario. This involves the theorizing of urban phenomenon in ecological terms. The ecological conceptualization of cities is a strategy aiming to promote the understanding of environmental implications of urban development. The strategy conceives urban entities as living organisms that: require food, water, air, energy and dispel gaseous, liquid and solid wastes; and that grow and can die. These conceptions are evident under the following topics:

i) The concept of urban growth
ii) The concept of urban political ecology
iii) The concept of ecological footprints of cities
iv) The concept of urban metabolism

This paper mainly looks at the sustainability implications of conceptualising urban development in these ecological frameworks. The metaphorical use of the city as an organism has been discredited (Marcuse 2005) but only in terms of its political implications, not in the ecological perspective.

**The concept of urban growth**

We often refer to the increase in size of urban areas as ‘urban growth’ without realizing the underlying implication that we perceive the urban phenomenon as a living thing; only living things grow, strictly speaking. We rarely realize this because probably the term growth here can be linguistically identified as a dead metaphor. A dead metaphor is a word that was once used as a metaphor but the usage became so popular it lost its metaphorical value and attained ordinary meaning. This means that we metaphorically see urban areas as living things that can grow and die. It is inevitable, although in most cases undesirable, that living things must die.

In the urban studies parlance, we use the term growth rate to refer to the interval increase in the size of urban areas. Interestingly, the measure is anthropometric and only refers to the increase in size in terms of human populations. The physical or spatial increase in size of urban areas is referred to as urban sprawl and does not define the growth rate. But both growth and sprawl define urban development which is yet another biological term applied to the urban phenomenon. Development refers to age dependent transformation in an organisms’ natural history. The fact that world cities have undergone and undergo certain transformations in their temporal projection is incontrovertible.

Also related to the concept of growth is urban decay; which refers to the degeneration of certain portions of an urban area that were once thriving but have since deteriorated or continue to deteriorate due to age among other factors. Much of our efforts on urban regeneration, renewal or upgrading are expended on trying to forestall or eliminate decay in the name of sustainable development. The title of Michael Keating's book: *The City that Refused to Die: Glasgow the Politics of Urban Regeneration* illustrates this point (see Keating 1988). Decay itself is a natural consequence, biologically speaking. When an organism grows, it thrives in assimilating certain nutrients and when it decays it releases these nutrients back to nature for use by other organisms. In growth, other organisms are deprived and in decay other organisms thrive.

Decay takes place both when an organism is living and when dead. This has been true for our living and dead cities. For a living organism it is normal for some parts to decay while others grow. This may be due to natural consequence or as a consequence of extraneous damage. Our cities experience all these sorts of decays. Examples of extraneous damage would include destruction by fire or other manmade or natural disasters.

With reference to decay, White (1994:67) has introduced another ecological term 'Urban Pathology'. He notes that 'urban systems sometimes produce a pathological condition, in that the built form and/or the inhabitants experience decline, which may be fatal'. The term 'urban blight' is another clinical/biological metaphor often used to describe this condition.

It is interesting to note that there have been attempts to disassociate the concept of sustainable development from growth. In 1990, the world Conservation Strategy observed that sustainable development had been criticized as ambiguous because the term had been used interchangeably with 'sustainable growth' that was a contradiction since nothing can grow indefinitely (Hill and Bowen 1997). From this realization, a re-conceptualisation of sustainable development was done. The implication of this was that the successive definitions of sustainable development are founded on the basis of indefinite sustainability. This does not help the case of sustainable development. According to this paper, the indefinite sustainability of a particular city is a breach of the law of nature.

**The concept of urban political ecology**

The term ecology refers to the study of the relationship between an organism with its living environment. In this sense, the term urban ecology could have two meanings: the literal one, that urban areas are living environments for certain organisms including human beings, and; the metaphorical one, that urban areas are organisms within the living environment of nature.

Page (2003) has managed to isolate a number of distinct meanings in the use of the concept of political ecology. First is the structuralist tradition that concerns itself with empirical studies of specific environmental problems in developing countries such as deforestation and land degradation. Second is the Marxist political ecology that involves

the extension of the concept of historical materialism to the environmental realm and its application to environmental problems associated with capitalist production systems (see for example Benton 1998 and Heynen 2006).

The other typology concerns the use of the term to refer to the political wing of pure ecologists. This is the case when structuralist ecologists become political in the articulation of their knowledge. Urban structuralist ecologists mainly see urban development in terms of a living environment for human and other populations and its impacts in the surroundings; see for example Pickett and Cadenasso (2006). There is also the metaphorical application that sees social institutions and how they relate as organisms that should be understood in the context of ecology. The last case is most relevant to this discussion where urban institutions are seen as living organisms with the human spirit and ability. In this sense, Waste (1989) has ecologised the urban policy environment. According to him, American cities share a policymaking environment or policy ecology comprising ten key elements including age, locale, and growth factors among others (Waste 1989).

**The concept of ecological footprint of cities**

Ecological footprint is a term proposed by the economist William Rees to evaluate the spatial extent of the environmental impact of a city; see for example Rees (1992). Since then, it has become a principle of popular application in urban ecology and economics. For example, it has been applied as a practical and technical methodological instrument for the assessment of environmental impact of cities. Warren-Rhodes and Koenig (2001) have done this for Hong Kong. It can also be used as a tool of urban planning as suggested by: Wackernagel et al. (2006) in the budgeting and balancing the accounts of natural capital for cities; and McManus and Haughton (2006) in informing urban planning and policy development.

In more practical terms ecological footprint of cities can be defined as the size of land required to feed cities, to supply cities with timber and for growing vegetation to reabsorb their carbon dioxide emissions (Girardet 1992). According to Girardet (1992) cities may have giant or nimble footprints. Cities with giant footprints are wasteful in the use of resources: feeding on imported foods, using timber products without caring about their forest origins and emitting vast amounts of carbon dioxide that require great chunks of vegetation that they have not helped to put in place. For that matter, a city has a nimble footprint when it does not engage in destructive consumption of food and timber and, limits and reabsorbs its carbon dioxide emissions. Cities with nimble footprints are therefore desirable.

It suffices for purposes of this discussion to note that in the concept of ecological footprint of cities, cities are, metaphorically speaking, thought of not as stationary creatures but legged beings or human beings with pedestrian abilities to walk to other lands to get food and timber for use at home and also to other lands to breathe off the foul product of their energy consumption. These human beings have to walk to other lands for food and timber because their own land is dedicated to space for non-agricultural activities (built environment) and have to go to breath off in other lands because they do

not grow any/enough vegetation at home to clean their breaths. In order to make cities sustainable, nimble footprints are commendable.

**The concept of urban metabolism**

The concept of urban metabolism was introduced Wolman (1965) in reference to the total flow of materials into and out of the urban system. It was subsequently applied to human ecology research in the case of Hong Kong; see Boyden et al. (1981).Under the concept of urban metabolism, cities are seen as consumers of a variety of materials including food, fuels, stone, metals, vegetation etcetera, that it processes and transforms into unprecedented/unnatural amounts and kinds of products and by-products. Proponents of urban metabolism believe that it enhances the accurate assessment of the cities 'regular demand for food, water, raw materials, and fuels, and the potential impact of their use and processing on the atmosphere' (Girardet 1992:20). In terms of the metabolism processes, cities can be described as organisms or mechanisms (Girardet 1999). It is this organic-mechanic hybridity that makes urban political ecologists think of cities as cyborg creatures, see for example Swyngedouw (1999 and 2006) and Gandy (2004 and 2005). As organisms, cities metabolise raw materials into energy and waste (Girardet 1992).

Girardet (1992) has categorized cities into:

i) Biocidic cities with linear metabolism
ii) Biogenic cities with circular metabolism

Cities with linear metabolism are cities that function as straight line processors of materials perpetually turning raw materials into wastes without any options of recycling nutrients or materials. Cities with circular metabolism on the other hand function by recycling wastes and materials. The concept of metabolism therefore generally works towards a recommendation of circular metabolism as an option for sustainable development.

White (1994), like Warren-Rhodes and Koenig (2001b), has noted that the metabolism analogy helps the 'urban ecologist' to understand the complex systems and problems of cities as they grow. But he is quick to point out that: 'despite the mental stimulus provided by these biological metaphors, cities differ from biological organisms in at least one important respect—organisms have a known cycle of life, death, and decay' (White 1994: 43). This is the main point being disputed in this paper. The point of this paper is that it would be more useful if the analogy run to the logical end so that cities could have known or estimate cycle of 'life death and decay'.

In the recent past, the metaphor of urban metabolism has been extended to embrace the concept of fat cities or 'obecity' (Marvin and Medd 2006). Sahely et al. (2003) on the other hand see urban metabolism as a tool for measuring urban sustainability as already recommended by Girardet (1992).

**The cyclic principle of nature**

Continuity in nature is based on the cyclic flows of its components. It is actually the cyclic character of nature that makes sustainability perceptible. In nature we have nutrient cycles including carbon and nitrogen cycles. We also have the hydrological cycle. Living

things, plant and animals, are largely made up of three elements: carbon, oxygen and hydrogen in various combinations. Carbon is derived from carbon dioxide in the air, hydrogen fro water and oxygen from both sources. The combination starts with photosynthesis in plants to form carbohydrates. When living things die, they quickly decompose into the original elements or compounds. Nature has made it a law that whenever something dies, the nutrients are quickly recovered for use by other organisms through decomposition. Nature is strictly against tying up of the basic elements or compounds of life for too long since this would interfere with the tempo of the cyclic processes. So life on earth is all about composition, decomposition and re-composition. At times these organisms have failed to decompose owing to unfavourable circumstances for the decomposition process and they fossilysed instead. These fosssilised tissues are what can be recovered as fossil fuels. These are then decomposed through burning in cars, cookers, machines and power plants.

The most important cycles to life are the carbon and water cycles. Carbon is captured by plants from carbon dioxide in the atmosphere, composed into carbohydrates in combination with water from the soil. The carbohydrates are then burnt by the plant itself for its own metabolism or stored in the plant as addition to plant tissue. Animals eat plants and metabolise the stored carbohydrates and also store some for themselves as animal tissue. Metabolism is the reverse of photosynthesis and results into the original elements/ compounds plus energy/heat. Burning of plant or animal remains also results into the same products as metabolism i.e. carbon dioxide and energy among others.

Water cycle, technically known as the hydrological cycle, involves the transformation of water into gaseous, liquid or solid states. Also it involves movement of water from the ocean reservoirs where in its liquid form the water is heated up by the sun’s energy. This makes it change into gaseous form that is transported in the atmosphere by wind to the land. The water then condenses and precipitates on the land in the form of rain (liquid) or snow (semi-liquid) or hail (solid). Once fallen back on the land, water begins its faithful journey back home to the oceans. As it journeys back, it passes through lands and soils thereby giving opportunity of life to plants that absorb it by the roots for purposes of photosynthesis. As the water journeys back, it also becomes available for use by animals that need it for their own biochemical processes. Sometimes water remains trapped on land without flowing back to the sea. This water may remain trapped in underground aquifers or in icecaps for a long time.

Urban development is a threat to nature because it largely interferes with the natural balance and functioning of these cycles. Because of their high energy requirements, cities burn up a lot of remains of plants and animals thereby pumping unnatural amounts of carbon dioxide in the air. Because of concentrations of populations, cities also divert a lot of water from the natural hydrological cycle thereby interfering with the hydrological balance and other natural processes that require the water. But this is not all for cities and water. The burning of the remains of plants and animals as fuels produce greenhouse gases that are responsible for global warming. This may distabilise the balance in the state cycle of water by causing a meltdown of the ice caps to inundate low lying areas, among other disasters. Sustainable urban development advocates are prescribing

reduction in the burning of carbon based fuels to reduce the amount of carbon dioxide and resultant gaseous pollutants. But this is not sufficient to achieve sustainability.

**Conclusion: Sustain no city**

The prescription on reduction in use of fossil fuels ignores other nutrients or materials that the city is keeping that should be released to the others. The most interesting aspect of conceptualizing the city as an organism is that it should also die and decompose to release the nutrients for use by other living organisms whether fellow cities or plants and animals. In its 'organic tissues', the city is tying up tons and tons of limestone (cement), silica (sand and glass), iron, hard stone (in the form of ballast), aluminium etcetera..

As has been noted, nature did not intend that any living organism should live for ever as our current perception of sustainability would imply. This is why all living things must naturally die by being eaten up alive or dead in order to release back the nutrients for the benefit of other organisms or the natural processes. This forms part of intra-generational and intergenerational equity in access to nutrients by living organism. We may borrow a leaf from the Bible although this discussion remains secular. According to Genesis 5, men used to live close to one millennium. This happened until God found it 'not sustainable' and fixed the maximum age at 120 years.

Sustaining cities in the manner prescribed by current sustainable development advocacy means cities will live perpetually, thereby keeping the nutrients to themselves. This will mean denying other living organisms' access to these nutrients thereby killing off millions of other living organisms or causing them never to be procreated and causing extinction of a vast many. Is this sustainable? The acts of conservationist who aim at regenerating urban areas through redevelopment actually contradict the principle of sustainability. Regeneration means something has to die for another to come up—it means one generation must die for another generation to take over. This is the principle of intergenerational equity.

Therefore, let the rot take root in these old districts. Let the vandals and the gleaners thrive. Let the rats and the cockroaches in. Let grass grow on the pavements and figs crack the concrete. For these are the agents of sustainability. This is the cyclical, the true process of regeneration; the path to sustainability.

This argument may look simplistic but, at the bottom-line, it is asking the question: sustainability for how long? It is reminding the urban ecologists to define the time frame for sustainability in the sense that they have currently conceived it. What is the sell-by date of a city? Because every being, whether natural or manmade must have a lifespan. When we create cities, we must also know when to lay off for this is the time cities will stop having negative impacts in their surroundings.

It is high time they realized the pursuit of perpetual sustainability goal is illogical and untenable naturally or environmentally. Sustaining cities is therefore not equivalent to sustainable development.

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