The environmental impact of cities

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ABSTRACT  Cities are growing inexorably, causing many to think that inevitably their environmental impact will worsen. In this paper, three approaches to understanding the environmental impact of cities are analyzed, namely population impact, Ecological Footprint and sustainability assessment. Although the population impact model provides some perspective on local impact, and the Ecological Footprint model on global impact, only the sustainability assessment approach allows us to see the positive benefits of urban growth and provides policy options that can help cities reduce their local and global impact while improving their liveability and opportunity, which continue to drive their growth. This approach is then applied in the city of Sydney.

KEYWORDS  cities / Ecological Footprint / environmental impact / population impact / sustainability assessment

I. INTRODUCTION

The continued rapid growth of cities raises a number of persistent questions. Are they becoming so big that their negative impacts outweigh the opportunities that they provide? Is urbanization damaging the planet or helping save it? How do we assess the growth of population in a city? Can the concept of sustainability provide a better way of understanding the local and global environmental impact of cities? Is there a future for cities?

These questions will be addressed using three approaches: population impact, Ecological Footprint and sustainability assessment.

II. POPULATION IMPACT

From the 1960s, as global ecological problems started to be revealed and discussed, there was a focus primarily on the sheer numbers of people and their potentially negative impact on the earth. Ehrlich and colleagues stated:

“In an agricultural or technological society [as distinguished from a hunter-gatherer society], each human individual, in the course of obtaining the requisites of existence, has a net negative impact on his environment.”(1)
Every extra person was seen as having an impact, and a simple formula was developed to understand it.\textsuperscript{(2)}

\[ I = P \times F \]

(where \( P \) = population and \( F \) = per capita impact)

or its expanded version:

\[ I = P \times A \times T \]

(where \( P \) = population, \( A \) = affluence or consumption per person, \( T \) = technological impact per unit of consumption)

Global environmental impact is seen in such a model to increase automatically in response to the combination of increasing population and increasing per capita consumption, as technology has rarely kept up with the growth in the other two factors. For example, in most developed cities, fleet fuel efficiency has not improved since the 1960s, while per capita car travel has increased along with population growth, and in many cities at an even faster rate.

In cities where the population has been growing faster than in rural areas, the impact of this population and its standard of living has been seen as entirely negative for the environment and also for people. Ehrlich and colleagues suggested:

“The deterioration of the environment, both physically and aesthetically, is most apparent in our cities. There seems to be abundant evidence that traditional cultural patterns break down in cities, and also that the high numbers of contacts with individuals not part of one’s circle of regular social acquaintances may lead to mental disturbance.”\textsuperscript{(3)}

This approach had enormous appeal, as the deteriorating global and social environment suddenly had a simple explanation – too many people. Evidence from the 1960s (largely anecdotal) showing that high density underlies all our urban problems was used to demonstrate the negative impact of cities on the environment and on the people living in them. Cities were seen as unnatural and unsuitable for humans, and a range of authors have supported this anti-urban, anti-density model.\textsuperscript{(4)} Up until now, the model has been used especially by anti-development groups wishing to “save” their suburbs from redevelopment, and sometimes in anti-immigration debates, but mostly by those with an apocalyptic view of the future of cities. However, these perspectives may not provide a complete understanding of the impact of cities, and various questions are raised about such a model, including:

- Does the population impact approach contribute to an understanding of local and global impacts from cities?
- Are rural or low-density land uses always environmentally friendly?
- Are social problems exacerbated in cities, especially in higher-density urban environments?
- Can population issues be dealt with in cities?
- Is city population growth actually saving some rural areas?
a. Does the population impact approach contribute to an understanding of local and global impacts from cities?

The population impact approach does help us to understand some local impacts of cities. Population perspectives involve biological realities, and thus help us to see that cities are fundamentally biological systems that depend on their bioregions, and that they each have a metabolic process involving energy, water and materials going through a city and ending up as waste. By concentrating people and production, cities concentrate demands for fresh water and other natural resources – and inevitably concentrate waste generation. As populations grow, this can, and often does, have strong local ecological impacts.\(^{(5)}\)

Commentators who emphasize population in their analysis of cities are generally making a plea to consider the ecological base of a city. Cities, from this perspective, are seen as an ecological system just a short step away from collapse.\(^{(6)}\) However, there are many aspects of cities that are not explained by this simple biological model. It does not explain why people are attracted to cities, or how economies of scale and density can actually lead to better urban services that manage natural resources and wastes or public transport (as outlined below).

The population impact model of cities also fails to explain the global impact of cities. It does not explain why a city like Sholapur in India, with one million people but with very low average consumption and little resource-intensive production, has far less global impact than similar-sized cities like Portland in the USA or Perth in Australia, although it has considerable local ecological impact. Sholapur does not have the waste controls of Perth and Portland, and these cities have also moderated their local ecological impact by importing most of the goods they consume so that the ecological impact of their production is not apparent. Other models are needed to explain this, which go beyond just the number of people gathered in one place.

b. Are rural or low-density land uses always environmentally friendly?

Some who support the population impact paradigm see cities as unnatural and rural areas as natural. Suburbs, according to this view, are more natural as they are less dense and thus have a lower ecological impact. In reality, there is little left on our planet that is not modified in some way by human contact. Hunter-gatherer societies have probably the least impact on the earth but can still substantially modify it – Australian aborigines, for example, radically altered their continent through the use of fire.\(^{(7)}\) Most landscapes today need to be managed. Most agricultural land use is low density but has been very damaging in many places. However hunter-gatherer and agricultural land use can also be adapted to ensure regional ecosystems are functional and biodiversity is supported. This is the situation in many areas of the developed and less-developed world, where rural communities have created a balance between their activities and the ecosystems that support them.

The same approach can be applied to cities. Cities can be adapted to live largely within the means of their bioregions.\(^{(8)}\) Low-density suburban land uses can be even more damaging than high-density uses due to the extent of the land loss and car dependence that they imply.\(^{(9)}\) Many


important and ecologically relevant services require economies of scale and density – public transport, waste recycling and water treatment, for example, all work better in larger and denser cities.

According to a 1996 report by UNEP and the UN Centre for Human Settlements:

“Anti-city polemic obscures the real causes of social or ecological ills. It fails to point to those responsible for resource overuse and environmental degradation, and fails to perceive the great advantages (or potential advantages) that cities offer for greatly reducing resource use and wastes.”(10)

c. Are social problems exacerbated in cities, especially in higher-density urban environments?

The attraction of cities, which continues to be at the heart of their growth, lies in the opportunities that they create through networks of people. Often, these opportunities require economies of scale and density, especially for the knowledge economy jobs and services that are features of twenty-first century global cities.(11)

Studies of the relationship between concentrations of people and social and health problems have never pointed to a clearly negative connection, although the history of town planning in Anglo-Saxon traditions is based on the assumption that such a connection exists.(12) On the other hand, social scientists such as Freedman and Baldassare have shown that density is not a primary variable in the creation of social problems, but intensifies human experience of all kinds.(13) Human beings are adaptable to urban environments and rapidly create social support systems if given the opportunity. The combination of poverty and high density without social support frameworks is not, however, without problems. The optimum population size of cities for reaching various social goals has not yet been determined.(14) The top four “alpha” cities of the global economy – London, Paris, Tokyo and New York – still appeal to their residents and visitors despite being large and dense.

d. Can population issues be dealt with in cities?

Global population is becoming less of an issue as birth rates decline rapidly, especially where social programmes for the education of women are in place. Cities in fact are major catalysts for birth rate reductions in situations where there is rural in-migration.(15) However, the growth of cities in many places remains a significant political issue, as the numbers of new people are seen to be stretching resources and causing major problems. Yet attempts to control such population growth have been largely unsuccessful in both democratic planning systems and in totalitarian regimes. (For example, both Moscow and Beijing have failed to curb population growth despite clear policies with that objective in mind.)

More extreme measures, such as the military intervention of Pol Pot, are perhaps the only way to stem the flow into cities (and these are not without some supporters), although the benefits remain highly questionable. All disasters (both natural and human), when they are over, are the catalyst for rapid population growth. In population terms, Pol Pot failed despite killing one-third of Cambodia’s population.
In those cases where population decline has set into cities because of economic decline, such as in Liverpool or inner-city Detroit, there is no obvious reduction in any environmental or social problems. In fact, a city with population decline usually simply becomes incapable of making the necessary investments to ensure it can deal with such issues. The reduction of population in cities is not obviously linked to the solution of urban problems or those of the planet.

e. Is city population growth actually saving some rural areas?

Where bioregional environmental deterioration of landscapes, water, soil and biodiversity are the result of poor rural land use practises, then reducing population pressures in those areas by means of urban migration can be of global benefit. While not all cities are growing, the global trend shows that cities are growing on average 2.3 per cent per year and rural areas at 0.1 per cent per year, with many rural areas in decline. Thus from a population impact perspective, rural areas should be improving in terms of their sustainability. The evidence in Australia, however, is that often, those areas with declining populations have more environmental and social issues. Even if rural areas were improving as their populations declined, would it therefore be true that cities deteriorate as they grow?

Cities take up little more than 1.5 per cent of the earth’s surface (200,000 square kilometres, or the size of Senegal). The idea of spreading the population of such cities into small systems of intensive rural production has been suggested by some, although the arithmetic shows that a complete destruction of the most productive agricultural land would soon occur. Three billion people with a few hectares each would mean the obliteration of most of the best agricultural land in the world. How the urban functions of cities would work in such sprawl is unimaginable, especially transport, which would have to become totally car dependent. Such ruralization of cities would vastly increase global environmental impacts, and some of the worst environmental impacts from cities are associated with the large sprawling hobby farms and rural retreats around cities, which have not been good for either the rural area or the city.

In a global sense, cities (when they concentrate people rather than spreading them thinly across the landscape) can be seen to be helping with the population impact issue. The demographic transition (or reduction in birth rates) appears to be accelerated whenever social programmes involving gender equality, universal access to quality education, and sexual and reproductive health services are available; but birth rates also seem to be lowered with urbanization. In many cities like Hong Kong, birth rates are now well below replacement levels. In global terms, population growth is actually slowed by the growth of cities. Cities could indeed be helping to save the planet.

f. Conclusion to the discussion of the population impact model

The population impact model is largely unhelpful for understanding cities. It does alert us to our biological base but it can be used to generate many rather ludicrous policy implications, from human culling to...
ruralization of cities. Such ideas are dangerous. It is important to try to seek a more expansive way of understanding cities. Population impact is largely a debilitating concept, as it implies that the primary task of urban policy is to be anti-people. There is little room to suggest how a city can modify or manage its population growth, or even to see it as a positive force on the impact of humans on the planet.

Population impact is therefore not only difficult but of dubious value if the goal is to reduce urban global or local impact. On a global level, the population impact model has some justification, but this is not easily applied to cities. The primary issue around the growth of cities is ensuring that such growth is used to solve problems, not to entrench them. Global and regional environmental problems are real and are significantly contributed to by cities, but stopping urban population growth (even if this were possible) is not a solution to such problems, and might even make them worse by distracting from the need to restructure and change how people live in cities.

III. ECOLOGICAL FOOTPRINT

A more sophisticated analysis of the impact of cities has been developed by Rees into a methodology that can calculate a city's Ecological Footprint. This is based on an ecological understanding of how a city extracts food, water, energy and land from a bioregion (and beyond) and requires ecosystem services to absorb its wastes. The total resource use of a city is figured relative to its population, and the resulting calculation allows a per capita footprint of land to be compared to that of other cities. These comparisons are useful for obtaining a sense of how much a city should be trying to reduce its full ecological impact, both global and local. However, several questions remain about this model:

- Can the Ecological Footprint approach contribute to an understanding of the difference between local and global impact?
- What can Ecological Footprint analysis show?
- Is Ecological Footprint a policy-relevant concept?

a. Can the Ecological Footprint approach contribute to an understanding of the difference between local and global impact?

Hardoy, Mitlin and Satterthwaite have shown that large sections of the urban population in low- and middle-income nations have virtually no impact on the global environment. They use almost no non-renewable resources and few renewable resources, generate almost no waste or greenhouse gases, and use no products whose production has high ecological impacts or generates hazardous wastes. Many people in these nations make a living recycling, and thus contribute to reducing resource flows, and have very little local impact. They may live in settlements that offend the sensibilities of wealthy people and sometimes they have serious environmental health problems. But this is not the same as having an environmental impact – either global or local.

However, this is not the case with wealthy Western cities, where the global impact of local production grows each year. Hardoy, Mitlin and Satterthwaite have shown that large sections of the urban population in low- and middle-income nations have virtually no impact on the global environment. They use almost no non-renewable resources and few renewable resources, generate almost no waste or greenhouse gases, and use no products whose production has high ecological impacts or generates hazardous wastes. Many people in these nations make a living recycling, and thus contribute to reducing resource flows, and have very little local impact. They may live in settlements that offend the sensibilities of wealthy people and sometimes they have serious environmental health problems. But this is not the same as having an environmental impact – either global or local.
Satterthwaite developed the Trump Index, illustrating that in terms of the contribution to global impact, one Donald Trump is equivalent to several million low-income households in some parts of the world.\(^{(24)}\)

These matters are easily understood when an Ecological Footprint analysis is conducted on a city.

**b. What can Ecological Footprint analysis show?**

The Ecological Footprint calculation converts all resource consumption into a landprint. The calculation is largely artificial in that it relates energy consumption to the amount of land that would be needed to grow the equivalent in fuel crops. However, an indication of the relative amount of the earth consumed by a city is a useful input into policy development as a broad perspective on global impact. Increasingly, it is being used as an indicator of impact, although it has been critiqued by McManus and Haughton who state:

\[\ldots\text{the approach in effect decontextualizes place and the diversity and wonderment of nature, by suggesting that the problems, even if not solutions, are essentially reducible to a common metric.}\]\(^{(25)}\)

Because the indicator of ecological impact is a composite number, it cannot easily be used to suggest what can be done to reduce this impact. Its component parts (use of energy, water and land) may all need to be reduced, but what are the important priority areas, how do they interact and what policies will lead to reductions?

One of the important linkages that is not often drawn is between Ecological Footprint, urban density and transport energy. In previous work, I have set out how urban land use intensity is related to transport.\(^{(26)}\) Recent data have extended these relationships, as set out in Figures 1 and 2 showing the data for 84 cities across all continents and regions. The relationship between transport and density appears to be quite obvious in theory, as the closer people live together then the shorter the distances to travel and the more viable public transport becomes. Figure 3 graphs the link between urban activity intensity (the density of people and jobs per hectare) and transport energy per capita in the 58 developed cities in the sample. The relationship between urban activity intensity and car use can be similarly figured (Figure 4).

Some commentators have criticized the use of per capita car use and per capita land use as confounding the statistics because population is in both denominators.\(^{(27)}\) However, if the population factor is removed, then it is possible to look at whether land area (the direct footprint of a city) relates to transport (Figure 5).

There is a clear increase in car use (and hence transport energy) as a city sprawls. In other words, if a city has a policy to reduce the land it consumes, then it will reduce its car use. This is a policy-relevant relationship. In terms of the Ecological Footprint model (which has both a transport energy component and a land component), the transport priorities of a city shape its land use. Similarly, efficiencies in land use patterns can increase the efficiency of water use and waste management because dense land use is less water intensive and economies of scale and density make recycling easier.\(^{(28)}\) Although such linkages can be made, they rarely are when Ecological Footprint analyses are done. Ecological Footprint analysis does not easily lead to this kind of policy insight; rather, it frames

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Private passenger transport energy per person in 84 cities, 1995

Car fuel use (MJ per person)

FIGURE 1


N.B. Transport energy is measured in Mega Joules (MJ); one litre of gasoline equals 30 MJ.
FIGURE 2

Urban density in persons per hectare of urbanized land in 84 cities, 1995

FIGURE 3
Activity intensity versus private passenger transport energy use per capita, 1995

N.B. Density can be expressed as just population per hectare or as population and jobs per hectare; the same patterns are seen.


FIGURE 4
Activity intensity versus private car travel in 58 higher-income cities, 1995

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policy almost entirely in terms of the reduction of population or consumption.

An example can be given regarding the growth of Chinese cities, which many commentators say is a threat to global sustainability. However, by looking at Figure 1, it is possible to see that because of their densities (all greater than 100 persons per hectare), most Chinese cities consume around two GJ of transport energy per person. On the other hand, Atlanta consumes 103 GJ per person and has a density of six persons per hectare. Thus the 200 million Chinese who have moved into cities in the past 10 years are equivalent to just over one Atlanta with its 4 million people. In terms of global sustainability, it is clear that Atlanta should be stopping its sprawl and building up its density.

c. Is Ecological Footprint a policy-relevant concept?

The Ecological Footprint model is used largely as a symbolic parameter representing the problem of resource consumption. Analysis from this perspective can help a city frame a variety of policies to begin reducing global ecological impact. However, it does little else. It is still mostly a negative measure of the impact of cities rather than a more positive measure of what cities should do. McManus and Houghton state "... it may narrow our understanding of sustainable development even as it seeks to raise awareness of environmental issues."(31)

In policy debates, the issues of how to deal with resource consumption are reduced to a range of policies for transport, housing, water, energy, waste, biodiversity and, in particular, planning policies about density. Ecological Footprint analysis establishes a baseline and a sense of global responsibility (both important steps), but does not suggest how we can go further in policy debates to actually reduce the footprint.

30. This is rapidly becoming one of the key indicators of global city competitiveness. See Hargroves, K and M H Smith (2005) (editors), The Natural Advantage of Nations, Earthscan Books, London.

FIGURE 5
Urbanized land area versus car vehicle kilometres per capita in a sample of world cities, 1990

d. Conclusion to the Ecological Footprint discussion

Ecological Footprint analysis does highlight the problem of urban systems and their environmental impacts based on resource consumption. This is an important concept. However, it doesn’t suggest policy-level responses and hence runs the risk of being discredited if it is used too much. Policy is largely about what cities need to do – not what they should try to stop doing. Unless there are policies that can help cities to reduce their Ecological Footprint, then this awareness can become simply a tool for anti-urbanism, as with the population impact model. Although it addresses the need to tackle the over-consumption of resources, the Ecological Footprint approach does not go in a direction that can tap the opportunities created by the growth of cities. This requires a much more pro-urban assessment process.

IV. SUSTAINABILITY ASSESSMENT

Environmental assessment developed out of the need in the 1970s for project assessment, and it has hardly ever been applied to the incremental processes associated with city development. These more policy-relevant aspects of government have begun to be assessed more rigorously by strategic environmental assessment and, more recently, by sustainability assessment.\(^{(32)}\)

The objective of sustainability assessment is to achieve a simultaneous consideration of social, economic and environmental issues and to achieve a “net benefit” outcome in each area, with minimal trade-offs. Sustainability assessment allows urban development to be assessed based on a range of criteria that address all the impact issues, but it is not inherently anti-people or anti-urban. It is an integrative tool that brings together environmental and human issues. It has a much more positive agenda than the other models discussed – it encourages a much more pro-urban process and has the potential to drive an integrated policy agenda.

The sustainability model grew from the need to resolve the tension between ecologists, who saw most development as essentially negative, and those working for social justice (especially in low- and middle-income countries), who saw development as crucial to meeting human needs. The sustainable development approach was created as a new kind of development that would allow present and future generations to benefit economically, socially and environmentally.

Applying the objective of sustainability at the level of cities has been a somewhat less obvious approach than at the national level, although wherever it has taken place obvious policy outcomes become quite clear from this framing of the issues.\(^{(33)}\) For cities, I have defined sustainability as “... reducing Ecological Footprint (energy, water, land materials, waste) while simultaneously improving quality of life (health, housing, employment, community ... ) within the capacity constraints of the city.”\(^{(34)}\) This definition is now being used in Australian settlements.\(^{(35)}\) The definition is positive about cities and their opportunities, while at the same time promoting an agenda to reduce the impact of cities.

Sustainability assessment can allow for a range of criteria to be used from the social, economic and environmental areas, while simultaneously seeking to find synergies between these factors. Urban growth


33. See reference 23; also see reference 9; and McManus, P (2005), Vortex Cities to Sustainable Cities, UNSW Press, Sydney.

34. See reference 9.

35. NSW Government (2005), City of Cities: A Plan for Sydney’s Future, Department of Planning, Sydney; also WA Government (2003), Network City: A Community Plan for Perth and Peel, Department of Planning and Infrastructure, Perth; see reference 17; and House of Representatives (2005), Sustainable Cities, Parliament of Australia, Canberra.
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can thus be taken as an opportunity to create solutions to the environmental impact of cities, with the recognition that cities can also provide a more positive opportunity for human development. Integrated policy approaches can be created with attention to sustainability, and many cities around the world are now using sustainability as the basis of their strategic planning.\(^{(36)}\)

A range of criteria has emerged for making more sustainable cities, and those in Box 1 have been adopted in the development of the city of Sydney. Questions that arise concerning sustainability assessment include:

- Can sustainability assessment help cities reduce their negative global and local impact?
- Can sustainability assessment point to a positive role for city growth?
- How can sustainability assessment provide an alternative to more limited environmental impact assessment and create genuine net benefit outcomes?
- How can sustainability assessment be applied to the restructuring of present urban areas so that they are more sustainable?

### a. Can sustainability assessment help cities to reduce their negative global and local impact?

Sustainability assessment enables us to understand and act upon both the local and global impact of cities. By applying the sustainability criteria (Box 1), a city can address both sets of issues: the “natural resources” criterion promotes attention to global and local resource issues at every step of development, while the “environment” criterion calls for the same approach to include all the global and local impacts. The other criteria enable the questions of “liveability” to be addressed at the same time – and the synergies between them to be found.

By having an integrated set of goals guiding development, it is possible to reverse the historic trend whereby inevitably, Ecological Footprint has been growing along with improvements in quality of life. The first signs of this decoupling can now be detected – Australian urban data, for example, are showing that it is the wealthy and educated who are using less energy and water, recycling more, eating less junk food and living in places where they can use public transport and walk more.\(^{(37)}\) This is an indication of a “learning society” approach to sustainability, where the importance of ideas is stressed and the framing of issues becomes critical to change. A Sydney case study (Box 2) illustrates how this “policy learning” approach helped make a difference.

### b. Can sustainability assessment bring a positive role to city growth?

Sustainability assessment does not shrink from addressing the ecological problems raised by the population impact or Ecological Footprint models. However, the difference is that the fundamental role of cities – to enable human liveability and opportunity to be improved – is facilitated in simultaneous and synergistic ways. It can help with both global and local issues in a way that allows decisions to be made responsibly and with a net benefit legacy (Box 3).

Sustainability assessment of city development enables us to be serious


OVERALL GOAL: To reduce the city’s Ecological Footprint (water, energy, land, materials, waste…) and enhance the environment while simultaneously improving quality of life (health, housing, employment, community…) within the capacity constraints of the city and bioregion.

CRITERION 1: NATURAL RESOURCES – To live within natural resource limits and minimize Ecological Footprint
- Water: Manage total water cycle to keep water extraction levels within sustainable yields.
- Land: Minimize urban footprint and disruption.
- Energy/greenhouse: Use energy efficiently and reduce greenhouse gases.
- Materials: Use appropriate materials and recycle waste.
- Waste: Minimize, reduce and recycle waste.

CRITERION 2: ENVIRONMENTAL PROTECTION – To protect and enhance biodiversity, coasts, air, water and agricultural land
- Biodiversity and ecosystem function: Preserve core biodiversity values and enhance natural ecosystem of the bioregion with corridors and natural areas retained.
- Coastal protection: Protect and enhance the character of the coast and access to it, and ensure coastal hazards are recognized and avoided.
- Air quality: Improve air quality.
- Water quality: Maintain and improve waterway health.
- Agricultural land: Ensure important agricultural land is conserved.

CRITERION 3: PLACES OF HIGH QUALITY – To provide high-quality places to live and play
- Parks: Preserve open space corridors and ensure local parks are provided.
- Heritage: Protect and enhance regionally significant cultural landscapes and places, including places of relevance to indigenous people.
- Sense of place: Protect and enhance the character and identity of the area.
- Scenic places: Protect and enhance scenic areas.
- Community facilities: Provide land for community facilities in a way that coordinates state and local government efforts.
- Amenity and design quality: Ensure amenity of streets and buildings, and design that provides high-quality urban spaces with minimal traffic conflicts.
- Walkability: Provide easy accessibility for walking and cycling in local areas.

CRITERION 4: HOUSING DIVERSITY – To provide a range of housing choices to ensure that the whole population can be housed, and which can be adapted over time
- Housing types: Ensure there is a range of housing types available for the full demographic spectrum of the city.
- Housing choice: Provide housing choice for households on a range of income across the region.
- Housing quality: Manage the quality of housing to ensure it is sustainable and liveable.
- Housing adaptability: Ensure that land and housing are available that can be adapted to an ageing population.
- Housing quantity: Manage the quantity of housing to allow demand to be met.

Continued
CRITERION 5: JOBS–ECONOMY – To provide employment opportunities through increasing the city’s role in the global economy and in regionally based jobs

- **Offices**: Provide quality office space in centres and along corridors serviced by quality public transport.
- **Infrastructure**: Provide all necessary employment-related infrastructure, especially communications networks.
- **Land**: Ensure employment-related land is provided in appropriately-zoned areas.
- **Cluster links**: Facilitate interactions between R&D and employment centres in relevant clusters.
- **Training**: Ensure skills are available in appropriate regions for employment support and job creation.

CRITERION 6: ACCESS – To provide sustainable accessibility between homes, jobs, services and recreation

- **Public transport infrastructure**: Ensure all knowledge-intensive centres and corridors have quality public transport at their core.
- **Road network**: Maintain and extend the road network where appropriate.
- **Local access**: Facilitate short trips by sustainable modes for local accessibility.
- **Density and mix**: Create appropriate zonings and opportunities for density and mix of uses in centres and corridors to reduce car dependence and create efficient land use.
- **Freight access**: Ensure there is quality access for freight especially between manufacturing areas, ports and airports.
- **Travel demand management**: Use TravelSmart and other demand management tools to make transport of people and freight more effective.

CRITERION 7: QUALITY AND EQUITY IN SERVICES – To ensure that high-quality health, education, security, community development and other government services are provided equitably across the region

- **Quality services**: Require the provision of high-quality services in health, education, security and community development.
- **Equitable services**: Ensure that services are provided equitably across the GMR.

CRITERION 8: GOVERNANCE – To establish effective, fair and efficient planning and decision making

- **Planning governance**: Ensure that appropriate institutional support with local government is available for the implementation and review of plans in new land release areas, complex redevelopment areas and centres/corridors/regions across the GMR.
- **Funding mechanisms**: Create funding opportunities for each of the planning functions required to deliver the metropolitan strategy.
- **Transparent and engaging processes**: Ensure each planning step is transparent and, where complex issues are involved, create community engagement processes.

In my role as a sustainability commissioner for Sydney (2004–06), I was asked to assist in the development of a new strategic plan for the city by creating a set of sustainability criteria (see Box 1) and applying these at each stage of the plan’s development. The final strategy was released in late 2005* and has a strong sustainability base to it. But the first application of the sustainability criteria was in 2004, when the government wanted to assess the release of some new land on the urban fringe that was to provide homes for 200,000 households. The eight criteria from Box 1 were applied and analyzed in terms of the development’s ability to meet global best practice standards for each criterion. The criteria were set out on a scale of 1 to 4 (poor to best practice) and displayed as a sustainability spidergram.

As the spidergram indicates, the development was strong on such criteria as natural resources, environment and governance (it involves 100 per cent water recycling and a strong governance structure based around a levy that is used to build infrastructure), but it was not very good for jobs/economy and access – no provision for a link to the city’s rail network featured in the plan. When the new land release strategy went out for public comment, my assessment went with it. Considerable discussion ensued, including a newspaper series entitled “Campaign for Sydney” that highlighted the need for better rail links to these new areas. A “policy learning” process was created inside government as a reaction to the sustainability assessment, because the people involved in “access” did not want to be exposed as the weak part of the strategy. Politicians became involved and a whole new approach was generated, leading to a bold and transforming rail project for the area as shown in the Figure below.
about long-term issues of local and global impact but, simultaneously, it allows us to be positive about cities. Together, this can enable us to create a future for the next generation of urban dwellers.

c. How can sustainability assessment provide an alternative to more limited environmental impact assessment and create genuine net benefit outcomes?

The new techniques of sustainability assessment are still being worked out, as implied above, but the first signs that this is becoming a new professional area are emerging. The new BASIX approach developed in Sydney sets out a core goal of 40 per cent less water consumption and 25 per cent less greenhouse gas emissions in every new building. This web-based approach is being extended to a range of other factors that will enable every small step of urban development to have reduced global and local impact.


Sustainability assessment approaches the future by asking of any development that it produce “net benefit” in all three areas of environment, social and economic performance. This means that there should not be a trade-off between the three areas, as has so often been the case. It also means that the whole rationale of impact assessment is turned on its head; instead of simply seeking to reduce negative impact, it promotes development that is positive in its outcomes. This approach can and should be applied to cities. Thus cities, as they develop, will begin to contribute positively to human and natural systems.

The goal of policy makers in this arena shifts from an attempt to minimize the negative to one of seeking the positive. It means that instead of just undertaking environmental impact assessment, developments will need to demonstrate net conservation benefit; instead of just considering social impacts, developments will need to show social net benefit; real economic cost-benefit analysis must also be done. The result needs to be a legacy of “enduring value”.

d. How can sustainability assessment be applied to the restructuring of present urban areas so that they are more sustainable?

It has been suggested that issues such as climate change, the peaking of global oil production and the rapid growth in wealth disparities are the

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40. Although this is probably impossible in reality unless offsets are used, as in Gibson, R et al. (2004), Sustainability Assessment, Earthscan, London.

precursors to an apocalyptic end to cities.\(^{(42)}\) In order to adapt, a full range of policy approaches that take these issues seriously will be required, but without just sending out alarm signals that will turn people and politicians away. A positive sustainability agenda is needed to show that our cities can be restructured and, at the same time, better opportunities created for people.

Sustainability assessment can be applied to every major urban area, whether rich or poor. Talukder\(^{(43)}\) has applied the approach to the governance of megacities in Asia and has suggested that there are 10 principles that can transform the deep-seated problems that have confronted so many of these cities (Box 4). I have shown above how a sustainability assessment approach can begin to restructure car-dependent cities to withstand the impact of declining world oil supplies, as well as addressing the myriad global and local impacts of such cities.\(^{(44)}\) In both examples, there is a positive approach to the future of cities that does not accept that inevitably they will collapse or create more impact.

The main point about sustainability assessment of cities is that it is about positive urban policies that can deal simultaneously with the concerns raised by those with a population impact agenda or an Ecological Footprint agenda, while enhancing the historic role of cities as the cradle of human opportunity.\(^{(45)}\)

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**BOX 4**

**Metropolitan regional governance principles for megacities**

- A geographical area of responsibility that covers the extended metropolitan region.
- A strategic planning function that can provide a vision of how the city can address its land use problems sustainably.
- A statutory planning function that can control development to ensure “common good” outcomes that are consistent with the strategic plan.
- A development facilitation function that can provide investment coordination, partnerships for infrastructure and a local validation structure.
- An Urban Re-Development Authority (URDA) to guide and monitor further development in the core built-up areas of the city.
- A transparent local process that can help define the “common good” sustainability outcomes of development with all stakeholders.
- A coordination mechanism to ensure planning and development are integrated.
- A way of raising the finance for the above process, including from land development.
- A strong link to the national government system to enable good political support.
- New professional skills in sustainability and local participation.

e. Conclusion to the discussion on sustainability assessment

The problem with the population impact and Ecological Footprint approaches is not that they treat the environment as unimportant – on the contrary. But these approaches are largely policy free, as they do not include a positive human element.

Any policy based on the population impact model would have to have as its main intention to lower the number of people in the world. Most people would not explicitly support such a policy, yet a perception of an excess of people could be exploited by xenophobes to promote racism or even genocide. This becomes even more obvious in cities, where anti-population politics can easily become associated with a resistance to change, which can drive away investment, and become socially regressive.

The marginalizing of deeper environmental issues such as resource use (especially oil depletion) and the sidelining of attachment to an area, will occur if the focus is just on the size of the population. Rather than assisting with the environmental impact of cities, an anti-population perspective can harm the environment through inadequate city policies.

With the Ecological Footprint approach, the situation is better in terms of understanding global impacts but it is just as weak in terms of supporting positive policies that enable cities to solve their local and global problems.

A sustainability assessment approach to cities takes environmental impact seriously, and gives it mainstream consideration while simultaneously asserting the value of social and economic progress. Thus the positive aspects of cities can be merged into a net benefit approach, where the enduring value of environmental improvement, social gain and economic enhancement can be seen as a joint legacy for the future. When the people of a city are perceived as essentially a negative element, it is not possible to formulate such an integrated set of policies.

REFERENCES


Berg, P et al. (1990), *A Green City Programme for San Francisco Bay and Beyond*, Planet Drum, San Francisco.


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