

# Cities as Sustainable Ecosystems: Stories of Change and for Change

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## EXECUTIVE SUMMARY

The time is fast approaching when more than half the human population will be living in cities and most future population growth is predicted to occur in cities. Currently, many cities are growing spatially and destroying important ecosystems, and most have far-reaching negative impacts on natural ecosystems and other communities well outside their immediate boundaries. Thus, transforming our cities is a key element in moving towards sustainability. This paper will discuss a framework for Cities As Sustainable Ecosystems (CASE) along with current research, which focuses on developing a story-based sustainability assessment tool for cities. Through interviews of people involved in urban sustainability initiatives, 'stories' of the most significant changes are collected to provide a picture of change in the city system and as a basis for exploring the dynamics of social change.

## Introduction

This paper aims to present the work completed to date on developing a sustainability assessment tool based on a Cities as Sustainable Ecosystems (CASE) framework and the use of stories. CASE employs a systems approach and outlines characteristics of a sustainable city or human settlement, including sustainable patterns of human culture, institutions, infrastructure and integration with more-than-human world within the bioregion (Jennings 2003; UNEP-IETC (Jennings & Newman) 2004). Stories may be a more effective way of capturing this systems view than indicators or indicators alone. Furthermore, they may provide a catalyst for change through the positive visions they present and the discussion they can provoke. It is important to determine the quality of changes that are occurring: are they moving us towards CASE and using higher level leverage points, or are they moving us further away from CASE or only making superficial lower level changes.

## Cities as Sustainable Ecosystems

Cities as Sustainable Ecosystems is a way of looking at cities that has been put forward by the United Nations Environment Programme to address urban unsustainability, by applying the patterns of sustainable ecosystems (*CASE Toronto Summary Report: International Workshop on Cities as Sustainable Ecosystems 2002; Cities as Sustainable Ecosystems Seminar Proceedings 2002*). An International Charette that was held in Melbourne in 2002 and attended by over 40 experts from around the world, produced the Melbourne Principles, a series of ten principles for sustainable cities (Table 1.1).

At the second Earth Summit in Johannesburg, 2002, local governments made a declaration which included support for the Melbourne Principles:

*Ten years after the 1992 Rio Earth Summit, Implementation of Agenda 21, the Rio conventions, and the Habitat Agenda is proceeding so slowly that the horrors of global poverty and environmental disruption are becoming ever more overwhelming. We demand, therefore, a profound shift in the current development model to one based on true equity and deep reverence for the processes of nature. We commit ourselves to the Earth Charter and the Melbourne Principles... (The Johannesburg Call: 30 August 2002).*

Resting on the foundations of social, economic and political equity, along with the recognition of the intrinsic value of nature, CASE seeks to reduce the ecological footprint of cities, and to employ the characteristics of ecosystems as a model for the design of sustainable cities, such as mimicking the cycles apparent in ecosystems. Drawing together wisdom from natural ecosystems and complex systems theory, indigenous cultures, human history, and more recent contributions to the sustainable cities debate, this paper will outline the foundations of CASE. Applying Bossel's (1998) systems approach, sustainable social-ecological systems can be described as systems with the following characteristics or properties:

1. Ethical
2. Psychologically-fulfilling
3. Co-existing
4. Nutrient cycling
5. Zero-waste
6. Self-regulating
7. Resilient and flexible
8. Self-renewing

Table 1.1 The Melbourne Principles for Sustainable Cities

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***A Vision for the Creation of Sustainable Cities***

***To create environmentally healthy, vibrant and sustainable cities where people respect one another and nature, to the benefit of all.***

*The principles provide a simple set of statements on how a sustainable city would function.*

1. *Provide a long-term vision of cities based on sustainability; intergenerational, social, economic and political equity; and their individuality;*
  2. *Achieve long-term economic and social security;*
  3. *Recognise the intrinsic value of biodiversity and natural ecosystems, and protect and restore them;*
  4. *Enable communities to minimise their ecological footprint;*
  5. *Build on the characteristics of ecosystems in the development and nurturing of healthy and sustainable cities;*
  6. *Recognise and build on the distinctive characteristics of cities, including their human and cultural values, history and natural systems;*
  7. *Empower people and foster participation;*
  8. *Expand and enable cooperative networks to work towards a common, sustainable future;*
  9. *Promote sustainable production and consumption, through appropriate use of environmentally sound technologies and effective demand management;*
  10. *Enable continual improvement, based on accountability, transparency and good governance.*
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*(The Melbourne Principles for Sustainable Cities. 2002.)*

The CASE framework is elaborated further in the UNEP-IETC Monograph (2004) on *Cities as Sustainable Ecosystems* and is being refined further in Isabella Jennings' PhD research.

Cities can be seen as systems composed of more-than-human elements such as natural ecosystems/wild places, local and introduced plants and animals; humans along with human infrastructure; institutions and culture. Culture includes the core beliefs and values, ways of thinking along with rituals, customs and practices that support these. The nature of the human-created components of the system and the way people live their lives reflects largely the influence of the dominant culture. CASE is less about identifying details of what a sustainable city would look like and more about applying patterns of sustenance evident in systems that have flourished over thousands of years, including 'natural' ecosystems, social-ecological systems (eg. traditional societies) and cities/towns that have sustained themselves for long periods of time.

Applying these patterns, Cities as Sustainable Ecosystems would have the following elements:

*Culture (worldview, ethics, values and practices) that has the following characteristics:*

- life-affirming and caring
- sense of place and place attachment – people have a sense of connection to place and a responsiveness to the nuances of place (local/bioregional)
- sense of community
- cooperative
- inclusive and respectful of diversity
- participatory
- systemic thinking
- mindful
- creative
- committed to learning and listening

*Institutions which reflect and support the above qualities including*

- Polycentric institutions and participatory governance (adaptive management)
- Lifelong learning for active citizenship and individual wellbeing (ecoliteracy, cultural literacy, arts/creativity, conflict resolution);
- Bioregional/local economies of sustenance - conserver lifestyles and meaningful livelihoods;
- Spirituality/religions that encourage life-affirming practices;
- Arts and rituals that are integrated into everyday life

*Physical landscapes which retain or mimic/restore sustainable patterns from sustainable ecosystems, notably*

- Visibility - making natural processes and interactions, including human interactions, more visible to restore feedback loops;
- Living Landscapes - connected networks of static and dynamic reserves in the city and its bioregion, and biodiversity integrated into the urban fabric;
- Renewable energy-based;
- Small-scale ongoing renewal processes (eg. neighbourhood urban renewal)

However, it is one thing to propose a vision of a sustainable community, it is another to suggest ways to move closer towards this vision, onto a sustainable path. Looking at social change from a systems perspective, it is useful to consider leverage points, those places in the system where interventions can occur and precipitate relatively larger changes. Donella Meadows (1999, 18) compiled a list of leverage points for a system, with the highest leverage points being:

3. *The goals of the system;*
2. *The mindset or paradigm out of which the system – its goals, structure, rules, delays, parameters – arises;*
1. *The power to transcend paradigms (highest leverage point)*

A major question is then: Could sustainability assessment itself have some role to play in promoting these changes?

### **Assessing Change for Sustainability**

Much of the focus of sustainability assessment has been on the use of quantitative indicators to monitor changes towards sustainability. Efforts have also been directed at developing indices, which combine a collection of indicators or summarise a situation such as the Wellbeing of Nations Index (Prescott-Allen 2001), the Compass of Sustainability (<http://www.atkisson.com/what/brochures/CompassPittsburgh.pdf>), and the Ecological Footprint (Wackernagel and Rees 1996). Numerous cities have had their ecological footprints calculated such as Toronto, London, Santa Monica, and Tokyo.

Many cities have developed indicator sets inhouse or through community processes. These approaches have allowed comparisons of progress towards sustainability to be made between countries and cities, and to track changes over time. Some cities have chosen indicators that are imaginative to capture public attention and inspire change. However, there are limitations to standard indicator approaches, including that they:

- Fragment the overall picture
- May not be readily accessible to the layperson
- May involve expensive data collection

With the use of indicators choices have to be made about what to measure, how to measure it and how to weight it. This process is complex, involving many assumptions. The final picture is a set of 'bits' or a number made up from these fragments and the assumptions are often hidden. The effectiveness of the indicator approach to motivate change is also questionable.

Another approach that has emerged in the last few years is the use of stories to assess sustainability. Peter Newman (n.d.) argues:

*The main approach I have found to be of value for this reconciling the 'interpretive approach' of the humanities into sustainability assessment is to highlight and prioritise stories as well as the statistics of the 'descriptive approach'. Stories are an emerging technique in social sciences for integrating issues and enabling their values and political scope to be mainstreamed.*

([www.sustainability.dpc.wa.gov.au/pdfs/Papers/VISION%20AND%20SUST.pdf](http://www.sustainability.dpc.wa.gov.au/pdfs/Papers/VISION%20AND%20SUST.pdf))

Collecting stories of change is the basis for the recently-developed Most Significant Change technique. It provides the benefits of a whole-picture view of the changes occurring from project work.

## **Most Significant Change Technique**

The Most Significant Change (MSC) methodology (Dart & Davies 2005) has emerged as a complementary or alternative assessment tool to standard indicator approaches to assess the effectiveness of community development projects. Stories of significant change are gathered from clients, field workers, and beneficiaries. At each level in the project hierarchy, the stories are tabled, organised into domains and then a dialogue occurs about which story from each domain describes the most significant change:

*The underlying mechanism is a form of continuous values inquiry whereby designated groups of stakeholders search for significant program outcomes and then deliberate on the value of these outcomes.*

(Dart & Davies 2003, 142)

The selected stories and the criteria for their selection are passed onto the next level.

Dart and Davies (p.140) point out that “Storytelling is an ancient and cross-cultural sense-making process familiar to all peoples.” They regard the collection of stories as an integral part of MSC as they encourage the participation of non-evaluation experts, are likely to be remembered as a complex whole, and they can support dialogue based on concrete outcomes instead of abstract indicators. Dart and Davies (2003, 141) argue:

*Stories about the impact of interventions can infiltrate the collective memory of an organization, helping program staff to gain and retain a more deeply shared understanding of what is being achieved. This creates a common base to enter into dialogue about what is desirable in terms of expected and unexpected outcomes.*

This participatory process illuminates different values and perspectives that can in itself lead to changes in people’s attitudes, knowledge and possibly values.

## **Sustainability Assessment for Cities**

Questions arise then about whether sustainability assessment could be enhanced by a methodology similar to the MSC to be a more effective tool for change. The use of stories to assess change towards sustainability may provide a more holistic picture of changes occurring in the system than a set of indicators, as the relationships between parts of the system are illuminated. Additionally, stories have greater potential to capture public imagination and therefore act as catalysts for change. Stories may help to illuminate critical high-level leverage points that lead to widespread system change.

A sustainability assessment approach is being developed using the CASE framework and collecting stories of significant change. Numerous questions arise:

- What projects should be selected?
- Who should be interviewed?
- What questions should be asked?
- How should the stories be evaluated/rated? Who should be involved in this process?
- How can the different stories be integrated to provide an overall picture for the city?
- What quantitative indicators could complement the stories?

Projects could be selected from the main parts of a city system – culture, institutions, infrastructure/non-human nature and any examples that might cover some or all of these.

So far the focus has been on Perth. The range of Perth-based sustainability initiatives studied so far, include:

- Harvest Lakes - a recent government-driven housing development which incorporates sustainable design principles and community-building initiatives;
- First Fremantle Cooperative – co-housing project that was built in the 1980s;
- Living Smart – a community sustainability education initiative covering topics of simple living, water and energy conservation, recycling, garden for biodiversity and food, and health; and
- the WA Collaboration – a partnership of social and environmental organisations, formed to dialogue about and promote sustainability and justice in Western Australia.

Field/project staff and active participants are being interviewed. However, the question arises whether this could skew the picture, but the stories may still be inspiring as best-case scenarios even if the extent of experience may be limited.

The following questions form the basic framework for the interviews I have been conducting with the last two being added after the first interview:

1. Please explain briefly your involvement in the project:
2. In your view, what is the most significant change(s) you have noticed/contributed to through your participation in this project:
3. Why do you regard this change(s) as important?
4. What lessons have you learnt from your involvement in the project?
5. What are some major influences on your own personal involvement in actions for sustainability?
6. What would your ideal city be like?
7. What do you believe sustains your well-being?

In rating the stories – a dialogue process could be created amongst people in each project and then a broader group to look at all of the best stories; or alternatively a community forum could be held to discuss the stories and encourage constructive dialogue. Additionally, we hope to develop a process using CASE qualities or characteristics as targets combined with the leverage point list to rate changes according to their movement towards CASE and their leverage in the system – are they high-level cultural changes or lower-level infrastructure-only changes

Finally, we need to decide how to create an overall picture to assess overall progress to sustainability. Perhaps we can say a city is more sustainable the more projects it has that exhibit higher level changes towards CASE, particularly reflexiveness which allows us to transcend paradigms and continually reflect on our practices. Other questions include: What do we use as a baseline? At what point can we say city is on a sustainable path? Perhaps a story could be constructed which paints a picture of life in the city now, providing a snapshot of the current state of the systems. Some quantitative indicators might be useful here.

## Conclusions

This thesis seeks to make a contribution to broader community dialogue on sustainability through stories of changes, which contribute to cities as sustainable ecosystems. At this stage there are more questions than answers but we argue that this is also part of the process of becoming more sustainable – asking questions about what matters and how we might do things better and developing our capacities to listen to each other and the land.

## References:

Bossel, H. (1998). *Earth at a Crossroads: Paths to a Sustainable Future*. Cambridge, Cambridge University.

*CASE Toronto Summary Report: International Workshop on Cities as Sustainable Ecosystems, March 18 - 19, 2002*. Boyd Field Centre, Toronto, Canada  
[http://www.unep.or.jp/ietc/Focus/CASE\\_Toronto/1.asp](http://www.unep.or.jp/ietc/Focus/CASE_Toronto/1.asp). (accessed 22/10/05)

*Cities as Sustainable Ecosystems Seminar Proceedings, 2002*. Environmental Technology Centre, Murdoch University, Australia.

Compass - creating indicators of sustainability for the Pittsburgh Region. Atkisson Inc. An International Consulting, Training and Sustainability Team.  
<http://www.atkisson.com/what/brochures/CompassPittsburgh.pdf>. (Accessed 19/1/06)

Dart, J. & Davies, R. 2005. *The 'Most Significant Change' (MSC) Technique: A Guide to Its Use*. [www.mande.co.uk/docs/MSCGuide.pdf](http://www.mande.co.uk/docs/MSCGuide.pdf). (Accessed 29/10/05).

Jennings, I. 2003. *Cities as Sustainable Ecosystems: Ecological Footprints and Other Indicators*. Honours thesis, Murdoch University.

The Johannesburg Call, September 2, 2002.  
[http://www.joburg.org.za/sep\\_2002/johannesburg\\_call.stm](http://www.joburg.org.za/sep_2002/johannesburg_call.stm). (Accessed 4/11/04).

Meadows, D. 1999. *Leverage Points: Places to intervene in a system*.  
[www.sustainer.org/pubs/Leverage\\_Points.pdf](http://www.sustainer.org/pubs/Leverage_Points.pdf). (Accessed 29/10/05).

*The Melbourne Principles for Sustainable Cities*. 2002. Osaka, UNEP-IETC. See  
<http://epanote2.epa.vic.gov.au/EPA%5Cpublications.nsf/PubDocsLU/MelbournePrinciples?OpenDocument>

Newman, P. n.d. Sustainability assessment and urban systems.  
[www.naf-forum.org.au/papers/Urban-Newman.pdf](http://www.naf-forum.org.au/papers/Urban-Newman.pdf). (Accessed 22/10/05).

Prescott-Allen, R. (2001). *The Wellbeing of Nations: A Country-by-Country Index of Quality of Life and the Environment*, Washington, Covelo, London, Island Press.

UNEP (Newman, P. & Jennings, I.) 2004. *Cities as Sustainable Ecosystems*. Integrative Management Series Monograph. UNEP: Osaka & Shiga. (Second edition being prepared)

Wackernagel, M. and W. Rees. 1996. *Our Ecological Footprint: Reducing Human Impact on the Earth*. Gabriola Island, BC: New Society Publishers.