

# An ecological worldview perspective on urban sustainability

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**Abstract:** *Many commentators suggests that in order to effect meaningful transformation of global development pathways, it is necessary to change the worldview that underlies the current development paradigm to a view that sees the world as a complex living system, i.e. an ecological worldview. This paper briefly outlines the key characteristics of this alternative, ecological worldview as it is emerging from the interactions between a wide range of knowledge sources, in order to develop a theoretical basis for a different approach to sustainability. It concludes by suggesting a notional point of departure to how this ecological worldview interpretation of sustainability would influence the understanding of and approaches to urban sustainability.*

**Keywords:** *Urban sustainability; ecological; worldview; resilience; systems*

## 1. INTRODUCTION

The terms sustainability and sustainable development continue to signify different things to different people. However, most of these different interpretations originate in the realisation that while there is a necessity to achieve human wellbeing and quality of life for the majority of the world's population, this cannot be achieved if in the process the continued functional integrity of the ecosystem services, and especially the necessary life support systems provided by Nature, are placed in jeopardy. From this point of departure sustainability would be the condition or state of the planetary social-ecological system that would allow the continued existence of *Homo sapiens*. Sustainable development is therefore an attempt by humans to continue improving the quality of life for most people on the planet, while preventing the human species from becoming extinct as a result of its own inability to live within planetary ecosystem limits or adapt to changing conditions. Because of endlessly changing external (biophysical) and internal (societal) conditions, this is not a fixed state, but one of dynamic balance where humans will have to continuously adapt to these changing conditions. The messages coming through from the 2005 Millennium Ecosystem Assessment, as well as the IPCC 4<sup>th</sup> Assessment Report and preparatory work for the IPCC 15<sup>th</sup> Conference of Parties in Copenhagen (e.g. Richardson et al., 2009) presents clear evidence though that "the global human enterprise is rapidly becoming less sustainable and not more" (Adams, 2006:3). Evidently the numerous conferences, agendas, action plans, guidelines, and assessment tools that up to now formed the backbone of the international response to the environmental polycrisis, are not successful in bringing about the large scale transformations required to facilitate a shift towards a more sustainable world.

Critics of the current sustainability project cite numerous reasons for its transformational failure - weak political will, conflict between the growth imperative and the notion of limits on consumption, failure to communicate the reality and urgency of the problem, individual self-interest, the inertia of the global economic system, etc. This paper proposes that the failure of the sustainability project lies in its uncritical acceptance of the currently dominant worldview based on a deterministic, mechanistic understanding of nature (Capra, 1997:5; Rees, 1999:24-26), and suggests like numerous other commentators (e.g. Schumacher, 1974; Naess, 1995 a & b; Sachs, 1995; Devereux, 1996; Capra, 1997 and 2002; Bossel, 1998; AtKisson, 1999; Hawken *et al.*, 1999; Kumar, 2002, Raskin *et al.*, 2002; Adams, 2006) that in order to effect meaningful transformation of global development pathways, it is necessary to change the worldview that underlies the current development paradigm to reflect an understanding of the world as a complex living system. Such a worldview shift, these authors suggest, appears to be happening already and the notion of sustainability can be seen as both a driver and a result of this shift. This new worldview has been referred to as evolutionary (Prigogine and Stengers, 1985:298), 'reflective/living systems' (Elgin

and Le Drew, 1997), holographic (Wilber, 2001:113) or ecological (Goldsmith, 1988 and Capra, 1997). Capra (1997) suggests that the new (ecological) worldview draws on an understanding of nature and its processes and relationships, and that implied in the term 'ecological' is an understanding that we are dealing with living systems and all that comes with such systems, including connections, flows, relationships, interdependence, evolution and consciousness. This inclusivity makes 'ecological' the most appropriate term to use to describe the emerging worldview.

The paper briefly outlines the key characteristics of this alternative, ecological worldview as it is emerging from the interactions between a wide range of knowledge sources, in order to develop a theoretical basis for a different approach for sustainability. It concludes by reflecting on how this ecological worldview interpretation of sustainability would influence the understanding of and approaches to urban sustainability if it is accepted that the problem of cities and their sustainability is about both the continued existence of cities and the quality of life of their citizens, as well as the role of cities as part of the global social-ecological system.

## **2. METHODOLOGY**

The main source of data for the study from which this paper is drawn (Du Plessis, 2009) was a range of texts that span different disciplines, discourses and knowledge sources, and included representative and seminal texts as well as texts that challenge mainstream perspectives. A first reading of key sources defining the emerging ecological worldview (e.g. Capra, 1983, 1997; Berry, 1990, 1999; Rees, 1999; Wilber, 2000b; Sterling, 2003; Lazlo, 2004, 2006) identified certain themes. These themes were then used to identify additional literature and knowledge sources and further structure the reading. A second reading drew on 21st century science, particularly theoretical physics and complexity science, ecology and other life sciences, and neuroscience. These provided a current scientific understanding of how the world works and practices for generating knowledge. A third reading drew on Eastern and Western philosophical traditions, providing a reasoned understanding of how the world works, how one should engage with such a world and what would constitute knowledge. The fourth and final reading drew on spiritual traditions, especially ancient traditions found in indigenous knowledge systems. This provided an understanding of how the world works and how one should engage with this world that is based on an experiential understanding that has stood the test of time, in some cases (such as Australian aboriginal traditions) for at least 40 000 years. Each of these layers added to and reinforced an emerging picture of the world that, through an iterative process of reflection, was concretised in a coherent description of the worldview that made this picture explicit and added to the purely descriptive narrative of what the world looks like and how it functions, also reflections on the meaning and implications of this world and the processes that create it, and finally the practices that would lead to effective and efficient action. The discussion below presents a very brief summary of the main findings and their implications for how sustainability is to be understood and pursued.

## **3. THE ECOLOGICAL WORLDVIEW**

These different perspectives provide a surprisingly coherent and consistent description of the world. They describe a world that is fundamentally connected at the most basic level of existence, with all of observable reality being called into existence (manifested) from a universal energy-information field in response to patterns of movement or disturbances elsewhere within this field (the universal flux). Thus everything that is manifest owes its existence to its relationship with everything else in the field and material objects are not distinct entities, but part of their world in such a way that "their properties can only be understood in terms of their interaction with the rest of the world" (Capra, 1983:231). In this world, phenomena, subjects and objects do not exist independently but come into being through four types of relationship:

- *Unifying relationships.* These are the relationships between the animate and the inanimate, and the organic and the inorganic, at the most fundamental level of existence, as events unfolding from the quantum energy-information field that unifies all aspects and dimensions of the cosmos.

- *Generative relationships.* These are found between organisms and other organisms, as well as organisms and their abiotic environment where the relationship defines the form, function and identity of the organism – and, in the case of humans, the social identity of the person.
- *Linking relationships* such as systems, networks or hierarchies. In these relationships entities are related through linkages or connections which provide pathways for flows such as energy, matter, information and influence between entities. The picture of the world provided by linking relationships is one where a number of interrelated, interdependent and interacting entities combine to form a collective entity – a system.
- *Transactional relationships.* These occur when components of a system interact in such a way that a dynamic set of processes are set in motion, which in turn shapes the structure and functioning of the system.

Being constantly created through the interactions engendered by these relationships, the world is dynamic, ever-changing, and therefore impermanent. Even seemingly permanent phenomena are undergoing constant fluctuations and change at both a micro and macro scale of existence. As these small-scale changes reach certain critical thresholds (or bifurcation points), they introduce changes in the organisation of the system (or phenomenon) at larger scales. Eventually the changes brought about by impermanence at smaller scales will cascade up the scales and transform the identity of phenomena at even the largest scales until a point is reached where the identity of the phenomenon has changed irrevocably (e.g. the man has turned to dust, the star has become a black hole). These changes come about because of interactions in open systems between objects and subjects over time leading to essentially unpredictable irreversible processes. Thus, because of the inherent complexity and non-linear dynamics found in the systems that constitute the world, the world is not only impermanent and ever-changing, but also largely uncertain and unpredictable. In addition, our knowledge of the world is uncertain, constantly changing and relative to the viewpoint of the observer. Thus, accurate prediction and certainty are elusive goals at best. In such a world it is necessary to be able to respond and adapt to perturbations and fluctuations

The ecological worldview furthermore sees humans and nature as fundamentally interconnected in a global social-ecological system<sup>1</sup> and as co-creative partners in the processes of development and evolution. A critical insight provided by this view is the realisation that humans owe their existence to their relationship with nature, and that their future as individuals and as a species relies on the continued ability of nature to provide a supportive environment to humans. Maintaining the wholeness of the world is therefore vital to the continued wellbeing of both the human individual and human society, as the relationship between self (the individual) and non-self (everything with which the individual is in relationship) is seen as essentially non-dual – i.e. the non-self is an extension of the self and not separate from it. Thus nature is not something separate from humans or human society, but part of the extended self – as are other humans. The wellbeing of the individual can therefore not be separated from the wellbeing of the whole. In addition, if humans are seen as intrinsically part of nature, it can be argued that effective and efficient action should follow the laws of nature, cooperate with and participate in the processes of nature and learn from nature, and that the outcome of actions should contribute to the wellbeing, nourishment and regeneration of the rest of the world. The understanding of the world as constantly changing, inherently unpredictable and ultimately impermanent furthermore requires that actions should be guided by iterative, collaborative and, above all, reflective processes that take into consideration the impact of actions on all system levels and abide by principles of precaution, adaptation and non-attachment.

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<sup>1</sup> Social-ecological system is a term used to refer to a tightly coupled dynamic relationship in which humans, their social structures and their biophysical environment interact with each other as parts of one interdependent system.

#### **4. DEFINING SUSTAINABILITY FROM WITHIN AN ECOLOGICAL WORLDVIEW**

Currently dominant interpretations of sustainability (such as that presented by the key United Nations documents or organisations like the World Business Council for Sustainable Development) are based on a fundamental split between humans and nature, with environmental sustainability mainly seen as a constraint on human social, economic and technological development (e.g. by presenting source and sink limits) that is to be addressed through trade-offs and increased efficiency. In this interpretation, environmental sustainability is also only one of three equally important ‘pillars’ of sustainability – the other pillars being social sustainability and economic sustainability. From this perspective, sustainable development is then seen as the development processes that would maximise (or optimise) the achievement of goals across all three aspects of sustainability. These goals (presented as conditions for sustainability) are agreed on through politically negotiated processes that build on specific social and economic ideologies (and hegemonies), as well as the interpretations of quality of life and the value of the natural environment derived from these viewpoints. This results in an interpretation of sustainability that focuses mainly on quality of life, measured according to a culture-specific idealised notion of the perfect society. In this interpretation, the biophysical environment is important only in terms of its use-value to the human enterprise or threats posed to human wellbeing, and protecting the integrity of its functions is subject to cost-benefit analysis. The main flaw in this interpretation is that it is based on how humans would like the world to work and ignores to a large extent the messiness of real life complex systems and their “wicked problems” (as defined by Rittel and Webber, 1973).

The ecological worldview offers an alternative interpretation of sustainability and sustainable development that is based on the idea of an interdependent and interconnected living world in which humans are an integral part of nature and part of the processes of co-creation and co-evolution that shape the world. In this view, environmental sustainability is seen as foundational to any other sustainability considerations, just as a life-supporting and life-enhancing biophysical context is essential to quality of life, however this may be defined. In other words, it is the foundation upon which the pillars of social, economic, technical or institutional sustainability are constructed, not just another pillar. Ecological sustainability is therefore a survival imperative, whereas social and economic sustainability (and the definitions thereof) are ethical issues, the resolution of which can support or destroy ecological sustainability. Seeing the world as constantly changing, inherently unpredictable and ultimately impermanent also introduces a different understanding of what it is that is to be sustained and what is the timeframes for sustainability (i.e. sustainable for how long?). What should be sustained is the functional integrity of social-ecological systems and their ability to provide not just life-supporting but also life-enhancing conditions. As to the timeframe, the obvious answer is that the objective is to sustain this functional integrity for as long as we want human life on Planet Earth. Within this worldview three key themes direct the interpretation of sustainability – relationship, change, and reflection. Each of these themes introduces a set of values that would guide the actions and decisions necessary to achieve societal transformation towards sustainability.

##### **4.1. Sustainability as a function of relationship**

The concepts of sustainability and sustainable development arose from a growing understanding of the increasingly dysfunctional and dissonant nature of the relationship between humans and their biophysical environment (i.e. nature) as result of a worldview that encourages fragmentation and reductionism and privileges the self. It is suggested that the focus of the sustainability project is on understanding and improving this human-nature relationship, and that sustainability lies in the nature of the relationships society fosters through its social, economic and technological systems, and not in the characteristics of individual components or processes of these systems.

The objective of sustainability from this perspective would be to cultivate relationships that sustain the ability of the global social-ecological system to provide not just life-supporting but also life-enhancing conditions for the global community of life. To achieve this, it would be necessary to maintain the wholeness of both local and global systems (i.e. their critical structures, functional integrity, overall

health and well-being, and capacity for regeneration and evolution) and this can only be achieved through changes in the nature of the relationships, and therefore of the interactions, between people, groups of people, and people and their biophysical environment. Firstly, it is argued that there should be no distinction between how a person should treat other people and how a society should treat the natural and social systems with which it is in relationship. Both people and nature should be treated with respect and in a spirit of fellowship and mutuality, and it is therefore important to maintain the integrity and harmony of these relationships, and ensure that interactions are of mutual benefit or at least respectful. Secondly, the ecological worldview calls for responsibility, with humans having a duty of care that requires them to be considerate of and look after the well-being of the social-ecological systems of which they are part, as well as having to take responsibility for the consequences of their actions. Thus the sustainability agenda should focus not only on the wellbeing of humans, but also on the well-being of the entire social-ecological system, serving also nature's agenda. To achieve this, it would be necessary to align human efforts with those of nature, resulting in cities that are embedded in and contributing to natural processes of creation, evolution and regeneration.

#### **4.2. Sustainability as interplay between change and persistence**

Previous interpretations of sustainability envisioned a change from a current 'unsustainable' state to a future 'sustainable' state that can be achieved by following certain recipes and rules. The human development enterprise would then focus on maintaining this imagined optimal state. However, as is pointed out by a number of critics (e.g. Cowan in Waldrop, 1992:356; Bossel, 1998:62; Gallopin *et al.*, 2001:12; Yorque *et al.*, 2002:436; Moffat and Kohler, 2008:263), such an optimal state cannot be seen as a steady state that allows no further change. This would be an untenable position in a world that is an ever-changing, impermanent and inherently unpredictable system of processes. In such a world the objective of sustainability could not be to reverse change or resist it once an optimal state has been achieved, but would rather be to accept change as inevitable and adapt to and evolve with the changes. This requires a letting go of outdated, unproductive or wrong strategies, accumulated resources, and existing conditions and attitudes.

However, certain levels of change can tip local and global social-ecological systems into a different stability regime where conditions may not be favourable for human life. There is therefore a need as well for keeping these systems within certain stability regimes. Sustainability would thus also lie in maintaining the resilience of these systems – i.e. their ability to absorb change without tipping into a different stability regime. This is especially important when dealing with changes in the biosphere, as life depends on a very specific and narrow set of biogeochemical parameters. Outside these parameters, though, the notion of some set of ideal 'sustainability' conditions that should be sustained is meaningless, and against the basic developmental processes of life which feed on change and novelty. However, as Walker and Salt (2006:37 & 118) point out, it may be necessary to induce such a tipping into a new stability regime where the current conditions are not conducive to the wellbeing of the social-ecological system, for example when the system is threatened by dysfunctional political regimes or economic ideologies.

A key concern of sustainability is therefore about learning how to respond and adapt to, and evolve with, change and surprise, while avoiding changes that would move global and local social-ecological systems into stability regimes that would threaten the life-supporting and life-enhancing capacity of these systems. What is important in this interplay of allowing and adapting to change, and ensuring the persistence of conditions that would keep the system within a preferred stability regime, is the need for reflection in order to learn from both failures and successes, and achieve sufficient understanding of the workings of global and local social-ecological systems to be able to learn from, work with and anticipate the dynamics in these systems.

### **4.3. Sustainability as reflective process**

The understanding of the world as ever-changing, as well as the notion of knowledge being relative and relational, coupled with the imperative to act according to a specific value system that fosters harmonious and mutually supportive relationships, means that sustainability has to become a reflective process, instead of the prescriptive goal set it was in previous interpretations.

Reflection has to happen at several levels. The first is at the level of the individual and group conscience, where reflection is about how intended actions respond to the values that underlie sustainability within the ecological worldview and whether these actions are in accordance with the laws of nature. The second level of reflection is about our understanding of the possible consequences of an intended action, not just at the scale or level of the system where the action is intended, but also the consequences of such actions at lower and higher scales or levels, and the appropriateness of the proposed action to its context. However, it is important that such precautionary reflection is an ongoing process, leading to the third level of reflection, which is to remain aware, as we act, of what is happening, and to respond and adapt to changing circumstances, new knowledge and surprise. This, in turn, feeds into the fourth level of reflection which requires reflecting about what was learnt during the entire cycle of decision, implementation and outcomes, and how this learning can be fed back into future actions.

Decision-making for sustainability is therefore a reflective process that guides decisions about proposed actions, not by measuring these actions against pre-determined and negotiated criteria and indicators, but by questioning whether the proposed actions uphold the values of the ecological worldview and what the possible consequences of an intended action would be across system scales and levels. Sustainability initiatives are not goal-driven, but rather reflective responses that allow systems to adapt to changing circumstances, new knowledge and surprise, and learn from experience in order to maintain adaptive capacity and resilience.

## **5. REFLECTION: URBAN SUSTAINABILITY FROM AN ECOLOGICAL WORLDVIEW PERSPECTIVE**

So what would an ecological worldview perspective mean for how urban sustainability is understood and approached if urban sustainability concerns the continued existence of the city, the quality of life of its citizens, as well as the role of the city in maintaining the integrity of the global social-ecological system?

The ecological worldview sees these three concerns as follows:

- The continued existence of the city is determined by the integrity and resilience of the various systems at different levels and scales that combine to form the urban social-ecological system (SES)
- The quality of life of the citizens in the city is determined by the quality of the relationships of which they form part, and by the extent to which these relationships uphold the values and praxiology provided by the ecological worldview.
- At a larger scale, the role of the city is to maintain the wholeness of the global SES by fostering respectful and mutually beneficial relationships at local and global scales that contribute to the wellbeing of the entire system.

Actions and decisions that would contribute to urban sustainability would follow the laws of nature and work with nature (as defined by *inter alia* Todd and Todd, 1993; Robert, 1995 and Benyus, 2002); contribute to the regeneration and overall wellbeing of the city SES; be based on flexible, collaborative and adaptive practices; and be informed by reflective processes of precaution, learning and adaptation that ask how do we most effectively participate in the functioning, regeneration, evolution and overall wellbeing of the urban SES? Urban sustainability is therefore not necessarily about how to make 'correct' choices of technology or social and economic ideologies, or find solutions to a range of pre-determined

and often perennial problems (e.g. poverty, pollution, crime, or waste), but about understanding the social and biophysical dynamics that give rise to desirable and undesirable phenomena so as to adapt to changes and participate most effectively in the natural evolution of the city, while keeping the urban and global SESs from crossing critical thresholds.

There is a growing body of work that attempts to operationalize this new understanding of and approaches to urban sustainability. Some of it, such as ecological/regenerative design and engineering, are already established fields, while others, such as the study of urban resilience, are fairly new. Grounding these approaches in an interpretation of urban sustainability that is aligned with the complex reality of social-ecological systems, as is provided by the ecological worldview, offers an argument for privileging these approaches above those favoured by the currently dominant, but ultimately ineffective interpretation of sustainability based on a reductionist and mechanistic understanding of the world that separates environment, society and economy into competing domains.

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