
Book Review

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Creating Regenerative Cities

by Herbert Girardet

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Professor Herbert Girardet's pedigree as a leading environmental figure stretches back five decades. In the early 1970s he was a contributing editor of legendary alternative science and technology magazine *Undercurrents*. Since the 1980s he has produced and contributed to numerous documentaries including the BBC *Fragile Earth* series and *Earthise*. He is a co-founder of The World Future Council, former chair of the Schumacher Society, a member of the Club of Rome and is recipient of a United Nations 500 award. His 13 books include *Earthise* (1992), *The Gaia Atlas of Cities* (1992), *Creating Sustainable Cities* (1999), *Cities, People, Planet* (2004), *Shaping our Future* (2005).

Girardet is regularly at the forefront of solution oriented approaches to dealing with systemic environmental, economic and social challenges. With a background in anthropology, Girardet's work has moved beyond the traditions of social anthropology and its focus on inter human relationships to tackle the relationship between humans and the environments on which they depend and he may now, perhaps, be best described as a cultural ecologist.

Following *A Renewable World* (2009), his new book, *Creating Regenerative Cities* is a significant redefinition of the role of cities in the planet's future. Accompanied by clear schematics and photographic examples, this concise solution-oriented manual presents a unique combination of best practices and policies for urban regeneration along with the fundamental shift needed in the way we think about our cities. It emphasises the importance of implementing urban systems theory and advocates moving beyond the term Sustainable Cities to the development of Regenerative Cities.

Between 1900 and 2012 the global population increased 4.5 fold, from 1.7 billion to 7 billion, with the global urban population increasing 16 fold to account for half of the global population. By 2030, the global population will continue to increase, some 60% or 4.9 billion of us will live in urban areas. Cities are living *superorganisms* and technical systems constituting the most complex structures ever devised by humankind. They are the buzzing hubs of human reproduction and creativity and the stage for intense human interaction with the Earth's living systems. They grow and transform over decades and

centuries, reflecting the cultural choices adopted by each successive generation. Humanity is building an urban future, yet urbanisation in its current forms, is threatening the very future of humanity and the natural world.

Urbanists today, claims Girardet, live in a pre-Galilean age where cities are seen as the centre of the universe with global ecosystems somehow revolving around them. But cities are only appendages of living systems and the world's climate, soils, rivers, lakes and oceans are their life support systems.

Left to its own devices, nature's economy does not know scarcity and is defined by a never-ending *circular system* of give and take, whereas cities are *linear* throughput systems. They deplete nature's reserves and increasingly turn the Earth's renewable systems such as soils, forest-systems, coral-reefs into non-renewable systems.

In the rich countries, the patterns of affluent urban and rural consumption now appear to be very similar, though rural living is often less resource efficient, where people use more energy in transport, and in heating or cooling detached houses. Girardet challenges the optimism offered by such books as Edward Glaeser's 2010, *The Triumph of the City*.

Studies from China and India have shown that people moving from a village to a city will, typically, increase their resource consumption fourfold. In developing countries, traditional rural living has relied on locally available renewable resources. Country people moving to the city will inevitably adopt consumer lifestyles dependent on mineral resources, as well as long-distance food and timber supplies. Urban growth in developing countries is a major factor in humanity's ever growing global environmental impacts. As hundreds of millions of Asians, Africans and Middle Easterners become urban consumers, in some instances escaping grinding poverty, the consequences for the future of these regions and the world as a whole are huge. The book asks for our attention to be redirected from urban regeneration towards regenerative cities.

Large modern cities are dependent systems and *The Triumph of the City* could instead be a tragedy in the making. Built on 3 to 4% of land surface, cities' ecological footprints extend to much of the globe's productive areas using the bulk of the world's resources and are prime contributors to pollution, environmental damage, biodiversity loss and climate change. The understanding people in cities have is detached from the environment on which they depend. Beyond the vague idea of landfill somewhere, there is little awareness of where urban solid, liquid and gaseous wastes end up.

A dramatic example is the vast off-shore sewage plumes around coastal cities such as Rio De Janeiro, where a grey-brown lagoon of thousands of hectares of waste smothers the life out of any vegetation. The one-way traffic of plant nutrients – from farmland, via cities, into the sea – is causing havoc to life in coastal waters across the planet. Regenerative cities must clean up urban sewage and return plant nutrients back to the farmland that feeds the cities.

In the first chapters of the book Girardet defines three stages in historical urban development, the past *Agropolis*, the current *Petropolis* and the future *Ecopolis*.

'*Agropolis*' was defined by 19th century geographer Heinrich von Thünen describing the 'embeddedness' of towns and cities in their local landscapes. Cities are in a relatively isolated situation, with very limited access to transport systems and are surrounded by a series of rings of cultivation, beginning with market gardens on the edge of the town through to the city peri-urban forest supplying the needs of heavy firewood and building timber. And then further out, to various rings of increasingly less intensive cultivation – producing grain, root vegetables and other food and fodder crops. And finally, maybe

half a mile or even further away, there is the rough grazing for cows, horses, sheep and goats. The model is much in evidence in contemporary prints of medieval cities and their surrounding countryside but is still much in evidence in more remote areas in the world and even in places such as Shanghai where the peri-urban farmland is actually administered by the city authorities themselves, in order to secure local supply of vegetables, fruit and pond fish.

Today, however, we live in ‘*Petropolis*’, the *autophilic* city, not the *biophilic* or the *ecophilic* city. It exists only because the industrial revolution has provided the technological basis of the urban revolution. The systemic problem of global urbanisation relies on daily injections of oil, gas and coal that accumulated in the Earth’s crust over hundreds of millions of years. As a giant heat engine, the vast interconnected systems of the *Petropolis*, are designed for turning energy into ‘work’ or motion, and subject to *entropy* as the ancient energy used to run power stations, pumping engines, transport systems, factory conveyor belts, cranes and internet server farms can be used only once, and ends up as low grade heat and waste gases. The order which is established in the form of a city, causes disorder elsewhere in nature. Thus concentrating human activities in high-energy cities increases the level of entropy – disorder, waste and pollution – for the planet as a whole.

The challenge of the ‘*Ecopolis*’ is to find ways of converting cities into environmentally regenerative systems, offering new, green business and job opportunities, but without burdening financially challenged city administrations. We need to create spatial structures that satisfy the needs and aspirations of city people, whilst also assuring their long-term ecological and economic resilience.

Regenerative cities are created from the inside out: first of all people need green, pleasant spaces for life, work and play, free from pollution and waste accumulation; they need to benefit from efficient, renewable energy systems, bringing urban energy economies ‘back home’; but they also need to ensure that their daily practices contribute to the continuous regeneration of ecosystems beyond city boundaries on whose wellbeing they ultimately depend.

Ecopolis is ‘*biophilic*’ in that its local environment is enhanced by green spaces for its people to enjoy and to benefit from. But it also embraces the wider notion of ‘*ecophilia*’ in that it ensures a symbiotic, life enhancing relationship to the world’s ecosystems.

Conceptualising *Ecopolis*, then, requires us to extend the concept of urban ecology: from focusing primarily on the interactions of living organisms within cities, and the benefits of vegetation and green spaces for human populations, to also encompass the wider global living environment from which cities draw resources. Urban ecology should help us define a mutually beneficial, regenerative relationship between urban populations and the world’s ecosystems.

Ecopolis incorporates some elements of *Agropolis*, the traditional town which emerged out of its local countryside. But unlike *Petropolis*, its contemporary successor, *Ecopolis* is powered primarily with modern renewable energy from its own territory and its hinterland.

Cities everywhere are discovering that they have a quantifiable *metabolism*: energy and materials – carbon, nitrogen, phosphorus, metals, water, industrial products – enter the city from the biosphere and the global economy, and percolate through urban systems before returning to the biosphere in a degraded form.

Across the world, different cities are at very different stages of development, facing different challenges. In Europe, North America and Australia, urban growth is very limited and the primary task is to undertake 'ecological retrofits' of urban systems. In rapidly urbanising countries in Asia, Africa and South America, urban development needs to be 'smart from the start': defined by high standards of resource efficiency, with renewable energy as a key component.

In poor cities the 'brown agenda' is the primary issue, and environmental problems are seen primarily as local, immediate and health-threatening. In middle-income cities they are additionally regarded as regional, and threatening to people's health, as well as to the wider environment. In affluent cities these impacts are increasingly seen as global and inter-generational.

The last two Parts of the book draw on 20 case studies, mainly from Girardet's first hand involvement. They show the multifaceted approaches that must constitute modern regenerative cities. As a consultant to major governmental and non-governmental initiatives, Girardet thinks and acts big. In his position as 'Thinker in Residence' in Adelaide, in 2003 he was tasked with creating a plan for the greening of the city. His proposals were transformational and Adelaide now has many of the attributes of a Regenerative City.

Conceived in the mid-19th century as a pioneering garden city, set in 760 hectares of parkland populated by tens of thousands of eucalyptus trees, post WWII saw Adelaide grow into a low-density automobile fuelled petropolis of 1.3 million inhabitants, with its values defined by commuting, consumerism and a throw away culture. From virtual zero waste recycling the city is now a world leader composting 180,000 tonnes of urban organic waste. Along with thousands of new green jobs, it has a programme of eco-home building, produces 30% of its electricity from wind turbines and solar PV panels with photovoltaic roofs on 140,000 (of 600,000) houses, and on most public buildings. Solar hot water systems are mandated for new buildings and there is a 60% carbon emissions reduction by municipal buildings. It has an ambitious zero-waste strategy, and it has planted three million trees for CO₂ absorption, soil stabilisation and biodiversity. 20,000 hectares of land near Adelaide are used for vegetable and fruit crops and it has the world's first bus running on solar energy.

Other case studies include: The Catskills watershed, which supplies 90% of New York City's water, the largest naturally filtered water supply in the USA, covering over 400,000 hectares; Cuba's innovative urban agriculture and forestry practices following the breakdown of its trading relationship with the Soviet Union in the 1990s, which have been turned into an opportunity to create a successful food supply chain within and around Havana; Copenhagen is remarkable for its historic development, radical redesign and ambitions to become the world's first carbon neutral capital city; Curitiba in Brazil, with its large public displays showing how the recycling of timber and forest products has dramatically reduced the need to cut down trees.

Regenerative urban development is about a fairer, restorative relationship between cities, the natural world and future life to build vibrant new local Green Economies. *Creating Regenerative Cities* argues that we can no longer ignore the economic and social conditions and *externalities* that affect the long-term viability of both cities and life on earth. These challenges must be addressed with a new sense of urgency using suitable policy measures, technical means and with active public participation.