

New Forms of Green for Mega-Cities: Peri- and Inter-urban Agricultural Space

Professor Helen Armstrong,

Professor Emeritus of Landscape Architecture

Queensland University of Technology

h.armstrong@qut.edu.au

Abstract: The crisis of unbridled development in the form of continuous linear coastal conurbations in Australia has resulted in alarming losses of productive rural land, sadly in areas of relatively fertile soils and reliable water supplies. Urban crises, however, can also provide opportunities, currently explored in the Netherlands as 'reflexive modernization', where there is interest in the instrumentality of design and its enabling function. Netherlands designers' confronting representations of the 'endgame' of unrestrained housing developments prompted government-sponsored design competitions, resulting in visionary designs for urbanism, landscape and infrastructure. This paper argues that an important component has been left out of new infrastructure-rich, enabling cities, namely new forms of rural/urban space. New typologies for peri-/inter-urban rural land require new landscape vocabularies with key drivers being state-of-the-art technology and mapping techniques. Economic dilemmas, including current farmers' need for retirement incomes, require new land-tenure models and innovative forms of agriculture that synthesize agriculture, nature conservation, infrastructure and communities. Equally new forms of LGA planning are needed. The challenge is how to transcend design as a consumer item and instead employ design as an inventive enabling agent. The paper will explore these new design and planning approaches and describe research on peri-urban rural land in SEQ.

Keywords: *new forms of green, peri-urban rural land, enabling design.*

Introduction

What role does landscape play in Mega-cities of 21st century? When Deyan Sudjic wrote his seminal book of 1993, *The Hundred-Mile City*, describing the forces that shaped cities in the late 20th century (particularly Western Cities), landscape design was a consumer item, in the main furnishing expensively detailed parks and gardens.

By 1999, Sudjic's writings included the mega-cities on the Pacific Rim, particularly those rapidly emerging in Asia, and he suggested that these Pacific Rim cities are at the edge of a new urban invention (Sudjic,1999). What role is landscape design playing in this context? Again, in the main, landscape design is a consumer item for the massive high-rise housing developments or water-front playgrounds in both Australian and Asian cities or creating 'soft location factors' for tourism (Hoddenstedt,2003).

New urban inventions are evident in Australian cities in some sustainable new developments on former industrial land in the inner city, enabling population densities which can support public infrastructure. Despite this, the urban/rural edge is being consumed by the least appropriate form of development; namely low density green-field master-planned communities of 'Mc Mansions'(SMH, 2003) and rural residential subdivisions, both alienating good quality agricultural land in environmentally unwise ways.



McMansions in Western Sydney

This paper argues that Australian cities could lead the way in 'new urban inventions' by both holding and creating significant areas of green land within and between large urban conurbations. Such lands are important for sustainable regional planning and the well-being of urban dwellers. The paper proposes that there are opportunities for new forms of 'green' that both hold existing rural peri-urban land while also developing new landscapes within cities that integrate landscape, infrastructure, and architecture as forms of productive land.

The paper begins by describing the crisis related to productive lands in and around 21st century cities and the particular role that landscape design can play. It briefly describes new strategic tools being developed to hold the productive land on the edge of cities and goes on to suggest that as well, new landscapes are needed within the urban fabric. The paper argues that landscape design approaches need to shift from those predominantly servicing consumerism to ones which can enable new forms of productive and sustainable lands within cities. This involves engaging with the challenging possibilities for new landscapes generated by the new design tools explored in such inventive ways by architects and engineers.

The paper concludes with a brief discussion about the different roles of urban agriculture, including community empowerment and new partnerships with sustainable and best-practice agribusiness to create economically sustainable forms of urban green space.

Holding the Urban/Rural Edge

The growing crisis in peri-urban landscapes has been the focus of much attention in the Netherlands, parts of Europe and United States (Armstrong & Allison,2003, Musacchio et al, 2003, Oliver & Jenkins,2003). The crisis was raised in the 1990s when the Netherlands architect, Rem Koolhaas, pointed out that in the Ranstad area of the Netherlands, there was a risk that the entire landscape would be covered by low-rise residential and commercial development where the only 'open space' would be the motorway.

Public concern about the growth of low-rise, car-dependent urbanism was such that young Dutch architects felt that rather than addressing the design of the built environment there was a pressing need for completely new designs for the countryside and a redefinition of the relationship between city and country (Grafe &Speaks,2000). Publications such as *Aftersprawl* (de Geyter,2002) prompted Bart Lootsma to suggest that landscape architects had to join in the debate about urban growth.



Peri-urban productive land in SE Queensland

In Australia, the urban crisis is associated with continuous linear coastal development with occasional breaks of nature conservation and recreation areas, but with a damaging loss of rural lands. Sadly, this is occurring in areas of fertile soils and reliable water supplies, a serious loss for a relatively infertile, dry country. The particular plight of peri-urban rural lands in Australia has been highlighted in Victorian work on 'Future Agricultural Landscapes' (Barr,2003) and in discussions about the importance of the rural lands in Greater Sydney (Sinclair et al, 2003). The crisis has prompted some strategic responses, in particular the Green Wedges Policy introduced in the Melbourne 2030 Strategic Plan (Delahunty,2003). In South East Queensland (SEQ), the Department of Primary Industries and Fisheries is preparing a 'Toolkit' to assist farmers to hold their rural enterprises against the increasing pressure for suburban development. The 'Toolkit' explores innovative forms of land tenure, new local government planning controls, and incentives to encourage new farmers (Armstrong et al,2004).

There is, however, a specific role for landscape design and planning, namely developing new forms of productive green space. Building on the work on landscape urbanism, initially promoted by Corner's essays in *Recovering Landscape* (1999), there are

opportunities to design for new partnerships between communities, new economics, infrastructure and new design technologies.

Recently, the committee for the 2003 German Landscape Architectural Prize, asked how can landscapes be designed to connect environmentally-friendly agriculture with regional marketing, including newly emerging wilderness so that green space can be an attractive, ecologically valuable *'urbanized cultural landscape'* (Dettmar,2003:39).

The Enabling Role of Design

The demise of rural landscapes in the Netherlands is now also of concern in parts of Germany where the discourse is focussed on the *'perforated city'*, described as *'a settlement carpet with lots of holes in it'* in which landscape, in its generally understood sense, has become an endangered species (Schröder,2003:80).

Despite this, the urban theorists, Beck and Lootsma, see that the crisis of urban development can provide opportunities as much as it causes problems. Beck calls this *'reflexive modernisation'* where through reflection and self-confrontation new answers to urban problems can be found (Beck,1994:5, Lootsma,1999:251).

Lootsma discusses this in *Recovering Landscape* in 1999 and again in *Topos 40* in 2002. He brings out how such concepts have been explored in the Netherlands by design and urban planning offices where Dutch designers and planners *'have turned Beck's notion of self-confrontation into a [design] method'* (Lootsma,1999:252). This method involves designers continually confronting communities and policy planners with the extreme consequences of their respective desires; the intention being that showing the so-called *'endgame'* can act as a catalyst for discussion and negotiation by the wider public.

Designers such as Winy Maas of MVRDV, Rem Koolhaas of OMA, and Adrian Geuze of West 8 have produced controversial proposals in order to trigger off wider discussions about urban development issues. As a result, the Dutch government has funded design and planning competitions, publications, exhibitions etc to explore new ideas for dealing with the situation. Lootsma (1999:257) points out *'This has led to a situation in which the Dutch debate about urbanism, landscape and planning... is less about philosophy, theory, and aesthetics and more about how the visionary and pragmatic may be combined in creative and paradoxical ways.'*

New ways of approaching design have already made significant contributions to finding answers to 21st century cities. For the last ten years, there has been a major focus on new hybrid urban forms that conflate landscape, infrastructure and architecture. Post-industrial cities have undergone massive urban change where large former industrial tracts have become new high density housing, linked with new road and/or rail infrastructure and new areas of parkland open space. In the process of exploring new urban forms, there has been a renewed interest in *'the instrumentality of design and its enabling function'* (Wall,1999:233).

When Wall(1999:233), an important urban theorist, describes the new urban landscape, he likens it to a *'dynamic agricultural field, assuming different functions, geometries, distribution arrangements, and appearances as changing circumstances demand.'* This can equally apply to peri-urban land. Rather than continuing to lose peri-urban agricultural land, new agricultural land penetrating the city could reclaim land in a similarly dynamic way, however with new partnerships and relationships with infrastructure.

Currently, local government planning results in zoning and rigid categorization of landscape types. This acts against new hybrid forms, including the innovative tenures and new collaborations for flexible governance explored in the 'Protecting Rural Lands Toolkit' (Armstrong et al,2004). Open space zoning only allows for recreational open space and nature conservation. Nature conservation has achieved some buffers between urban development, but they are increasingly small in scale, meanwhile rural land faces a constant battle with rural residential zoning (Sinclair et al,2003).

In this context, landscape design continues to be seen as *'passive ameliorant'* instead of acting as *'an active accelerant, staging and setting up new conditions'* for innovative futures associated with the rural lands within and between urban conurbations (Wall,1999:233).

New Forms of Green for the Contemporary Metropolis

As a number of urbanists (DeKlerk,1999,Lootsma,1999,2002,Sudjic,1999) have pointed out, contemporary cities are now characterised by polycentric weblike sprawls where infrastructure and material flows are more significant than the static political and spatial boundaries. In these urban conurbations, the emphasis is now on processes that facilitate networks across regional and global space. The new cities are *'spreading rhizome(s), dispersed and diffuse, but at the same time infinitely enabling'* (Wall,1999:234). However an important component has been left out of these new infrastructure-rich and enabling cities, namely new forms of rural/urban space that synthesise agriculture, nature conservation, infrastructure and communities.

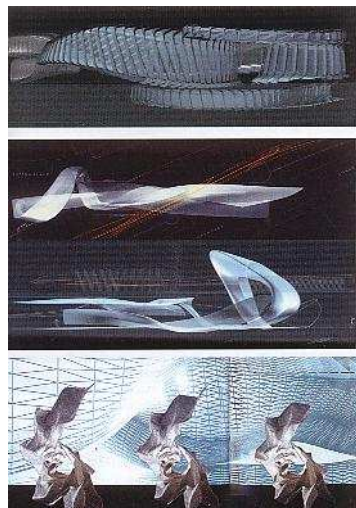
If the physical and programmatic functions of new urban form are resulting in designs that are rebuilding and intensifying the city, how then do we similarly reconfigure a new urban/rural space? What shape can the new forms of green space take? Can landscape designers apply similar principles and strategies suggested for cities, for example, *'thickening', 'folding', 'non-programmatic use', and 'impermanence'* (Wall, 1999:244)?

New Scapes: Territories of Complexity

Paola Gregory, in her publication *'New Scapes: Territories of Complexity'* (2003), provides numerous examples of how computer algorithms can enable designers to generate answers to complex programs. Architects and engineers have seized this opportunity, generating innovative environmentally-sensitive buildings. They see new

ways of designing and inhabiting space through complex systems of connections and interchanges which are constantly open, flexible and modifiable (Gregory,2003:5). They particularly see how valuable new computer tools are in enabling simulation of complexity.

Central to these investigations is the notion of landscape. Designers working with the Information Technology (IT) paradigm see that in the electronic and post-industrial era, people can '*re-settle their account with nature*' where compensation can occur through integrating nature and structures within new high density built areas (Gregory,2003:6). In these urban forms, we are no longer dealing with protected ecosystems forming counterpoints to urbanisation. Instead new parts of the city can be created that exist beside a '*powerful presence of nature*'(2003:6). Rather than zoning and compartmentalisation to plan cities, 'New scapes' suggest multi-functionality and integration as the necessities for the information city.



Ecoscapes from Paola Gregory (2003) *New Scapes*, Birkhauser

Lootsma (2002), however, is wary of the way architects and urban designers describe this concept of landscape. He suggests the ecosystem analogy is more about design processes than the resulting urban form. Concepts of nature in the new paradigm are complex, drawing from fractals, topological geometries and other formalisms associated with contemporary science, where nature is an analogy rather than a reality. Sawyer in his discussion about the 'Topological Twist in Landscape Architecture' (2000) has explored similar issues.

Despite or because of this, landscape designers should engage with the 'Newscapes' and the particular way Information Technology (IT) can play key roles in new designs. There are four major roles. First, IT can supply the mathematical models to investigate scientific complexity of landscape and nature. Second, IT can supply mechanisms to achieve the construction/realisation of projects developed in an 'all digital' context.

Third, IT can provide reactive systems capable of simulating behaviour in nature. Finally, the Information Age provides a different model of city and landscape which is mixed in uses, laminar in its flows, and where nature and artifice can be structurally interwoven into production, leisure, and residential activities (Gregory,2003:7).

In the IT context, landscapes have become a paradigm of complexity. Charles Jencks has explored some of this metaphorically in his *Garden of Cosmic Speculations* (2003), but there are opportunities to apply the concepts at a larger scale in designs for new forms of green space within and on the edge of cities. This means engaging with '*disorder, chaos, and contradiction*' where deductive-analytic logic is being replaced with a way of thinking that is '*associative, flexible, and continually oscillating*' (Gregory,2003:12).

The new IT technologies have produced a radical change in the design process. Relinquishing form as the prime driver, there is a new poetics of interrelation. In this context, landscape and architectural relations go beyond historico-environmental themes, beyond planning cities using natural elements, and beyond simulating shapes of the earth with architectural works.

The new information 'scapes' are not merely derived from a technology developed through the use of the computer, they indicate a new way of designing and inhabiting space. Architectural designs reflecting the new paradigm are more open, fluid, ambiguous, stratified and unstable, hence the analogy with landscape. Landscape designers are familiar with these states but it is only in the field of landscape urbanism, that we see broad scale design engagement with this new IT-driven paradigm (Mostafavi & Najle,2003).

In terms of urban green space, it is the instability of figure-ground relationships and the search for hybrids that express tensions and forces that can provide the opportunity for new forms linking landscape, architecture, and infrastructure. New productive landscapes could certainly invade Ben van Berkel & Caroline Bos of UN-Studio's projects where design methods are capable of generating dynamic and interactive organisations that allow for any scale of project and multiple possibilities for realisation (Gregory, 2003:21).

During the 1980s, a number of architects, such as Koolhaas and Tschumi, explored a design language which shattered the logic of causality replacing it with an aleatoric logic of chance, always allowing possible unusual connections. Landscapes emerged not from the organisation of spaces and volumes but from collections of fragments in fluid fields of change, a dynamic web of interconnections realised through layers and links (actual and virtual). This approach has been able to go much further with the latest IT tools where folding, warping of surfaces and morphing from one form into another represent the 'space-in-between'. This space is the symbol of every potentiality but what shape does it take?

The Fold

The fold is one of the ways for space to reflect the 'in-between'. New technologies such as vectoral geometries can help complex concepts of space-time take form. Vectors are able to show continuous deformation where Euclidean geometry is replaced by topology - the science of spatial transformations. As Gregory (2003:35) states the design form reflects diagrams of relationships, sometimes as maps – coextensive horizontal layering – which retain the multiple series of traces of the figurative process. In this form the figure-ground relationship is dissolved.

Design forms such as folds, continuous torsions, curves, deformations, and distortions, are born of the digital world. One sees wrinkled surfaces and juxtapositions of facets that dig, cut and distort forms, often absorbed into the ground from which endogenous structures emerge. In some cases this is a soft integration with imperceptible borders between natural and artificial, ground and covering (Gregory,2003:35). For large scale landscape design, these present exciting opportunities.

Eco-scapes

New designs are often based on cyclical models of information flows typical of living systems. However, they also include human subjectivity. Drawing from 'Deep Ecology' and the parallels of integrated electronic systems and living systems, new design methods search for animate forms – 'ecoscapes'- that are '*self-organising and self-producing morphogenetic processes*' (Gregory,203:49). These new forms create the basis for a new intermediate nature between the genetic code of biology and the digital code of technology.

There is the potential for new landscapes to morph and fuse with infrastructure and architecture. They can become fluid, variable and endless, but also self-regulating. Gregory(2003:49) describes them as '*capable of reacting to external stimuli, changing, mutating, renovating,*' and yet sustaining an '*internal coherence*'. James Wines of the SITE group has explored the ecological paradigm as forms which connect building, landscape, information flows, and the environmental context. Reiser and Umemoto developed a method defined as urban '*infrastructuralism*'. They developed a design for a new urban form as an organisational continuity between architecture, transportation, and communication networks, which can include the '*temporality of incompleteness*' (Gregory,2003:54). The structure combined buildings, infrastructure, and parks as a dynamic system capable of acting like a '*spatial sponge*'. This is well worth exploring in terms of new forms of urban agricultural space.

The Cyborg

The synergy between Information Technology and biological science has redefined the artefact as a system combining biosphere, socio-sphere, and techno-sphere. Built environment designs for people are not static but are now dynamic. They are cyborgs, often light and translucent, soft and organic, as architecture, they become '*living passages*' in which metabolic and ecological mechanisms interweave the constructed

form with a fourth dimension, (Gregory,2003:66). The fourth dimension is familiar to landscape architects who commonly see it as 'time' and 'organic growth'.

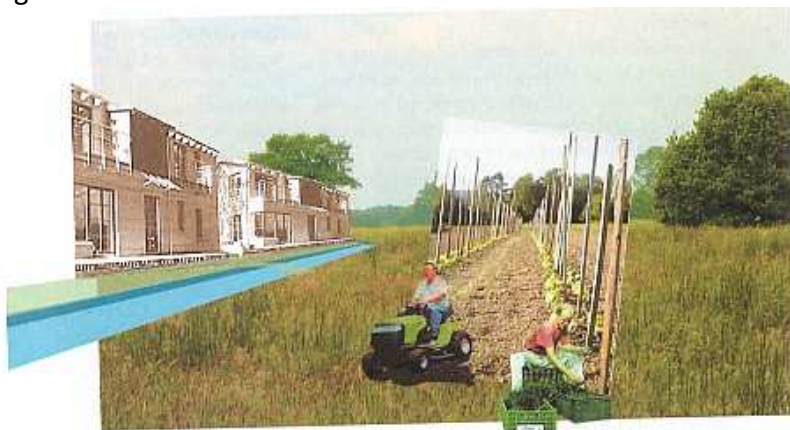
With these new tools and the pioneering work of some architects, it is possible to explore new forms of productive green space as cyborgian ecoscapes. But why engage with these ideas? It is worth reminding ourselves of Christopher Alexander's *Pattern Language* (1977) and his 'agricultural fingers' still remain important components of our cities. An effective way to hold these green fingers is to push back into the city and reclaim the land that has been so recently lost using IT tools to create new landscapes as a form of urban agriculture.

Urban Agriculture.

Urban agriculture can have a number of roles in 21st century cities, including community based city farms, new living working urban agricultural ventures, and new environmentally sensitive agribusiness.

City farms have a long history as forms of community empowerment. Central Detroit, USA, devastated by the demise of the car industry, has a flourishing urban agriculture developed over the last twenty years as community farms. This is one model for post-industrial redevelopment.

A different model of urban agriculture has been proposed for Hamburg in Germany. In an as yet unrealised proposal, urban agriculture associated with leisure facilities that are close to housing has aroused sufficient interest in the profession to receive a Landscape Award in 2003 (Schroder,2003:82). This is the Hamburg-Fischbek Mississippi project by cet-o/kunst+Herbert, landscape architects. The designers suggest that the landscape carries identity '*not just in terms of space and gestalt but through a particular social idea*' (Aufmkolk,2003:98). They explore urban density with different forms of agricultural landscapes, linking land titles to the urban agriculture project on the urban edge.



Hamburg-Fischbek Mississippi project by cet-o/kunst+Herbert, landscape architects

This paper is proposing a third model. If the paradigm of landscape design is shifted from passive ameliorant to active accelerant, there is an opportunity for landscape design to play a new role in cities. There are possibilities for new forms of green space that is high-tech and productive, pushing forward new technologies for urban water management and other aspects of sustainable practice. The forms that these new landscapes can take can be as exploratory and innovative as the new architectural forms.

Post industrial cities provided *Terrain Vagues* pregnant with possibilities for new engagements with the city. In the 1990s, designers were urged to respect the large urban 'void's (Armstrong,1999). Despite this, most former industrial land in Australian cities has been redeveloped as predictable designs for medium to high density housing. The loss of former industrial urban voids suggests that potential land for urban agriculture will be predominantly associated with linear urban infrastructure, however once designers engage with this issue, a range of exciting possibilities can emerge.

Conclusion

This paper has argued that peri-urban agriculture land should be a vital part of mega-cities of 21st century. There are numerous crises associated with the globalisation of food production, 'Mad Cow' disease and Bird Flu being recent examples. Added to this, concerns about global terrorism and the concept of cities feeding themselves are extra dimensions to sustainability.

There is need for broad landscapes between growing conurbations that reflect working rural lands as well as nature reserves. The paper has argued that there are two ways of approaching this, one to hold the existing rural lands through innovative planning tools and the other is to push back into the city with new forms of 'green' enabled by new computer tools and involving new partnerships.

It is important that landscape architecture becomes an active voice in the urban discourse, arguing for a broad range of diverse landscapes in and around cities. It is also important that landscape design engage with the constantly evolving IT paradigms so that the values of landscape can be one of the many vectors considered. Landscape in the IT world needs to go beyond analogies of nature and instead be realised as significant contributions to the wellbeing of cities of the future.

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