Beyond Cities: Is an Urban Planet even Possible?

Jeremy Dawkins

The fate of the planet seems to hang on how well mass urbanisation is planned and managed over the next few decades. An ISOCARP Urban Planning and Advisory Team, meeting in Singapore in July 2010, developed a fresh analysis of rapid urbanisation and proposed radically new approaches to achieving sustainable urban regions (ISOCARP, 2010). This article outlines the team's findings, including the likely patterns of land use in the sustainable urban regions of the future, and presents the team's ten 'practical solutions' – realistic but meaningful first steps which can be implemented immediately, everywhere.

The team was commissioned by the Philips Center for Health and Well-Being, whose generous support is gratefully acknowledged. The members of the team were Jeremy Dawkins (Team Leader), Martin Dubbeling (UPAT Raporteur), Antonia Cornaro, Nadya Nilina, Francisco Pérez, Dr Awais Piracha and Luc Vrolijks. Tragically, Luc suffered a fatal stroke on 1 August 2011, depriving us of a highly valued friend and colleague, Yvette of a generous and loving partner, and the world of gifted architect, planner and urban designer. We express our condolences to his family and friends and to all of the ISOCARP community who knew him.

The report is available at www.isocarp.org/fileadmin/user_upload/network/ISOCARP_UPAT_final_20110114.pdf.

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An 'urban' life – a life of personal, social and economic opportunity – is ultimately the right of everyone[1]. But does it require continued rapid *urban*isation? If so, can the world survive a doubling of the urban population in the next half century?

Rapid urbanisation still means the further widening of social inequalities, the wholesale loss of fertile land, massive increases in the consumption of fossil fuels and accelerating depletion of natural capital[2]. To envisage a doubling of the urban population – from three billion out of a global population of six billion today to six billion out of a global population of nine billion some time after the middle of the century– is to contemplate irreversible climate change and the collapse of humanity's life-support systems.

Fortunately, we are at a point when 'rural' no longer means toiling subsistence, and when an interactive 'urban' life can be enjoyed anywhere. So personal fulfilment no longer literally entails a 'civic', 'civilised', *city* life – the people of the world now have many opportunities even in relatively remote locations, and continued urbanisation is no longer necessary to fulfil the reasonable aspirations of the non-urban half of the world's people.

Thus, one way to avoid global collapse would be to halt or even reverse urbanisation by equalising access to educational, cultural, technological and economic resources across all urban and rural areas. For much of the second half of the twentieth century, something like this was the stated aim of the Chinese government. However, few would think that such an aim would be remotely feasible: China's current experience is more likely to indicate a future of vast, continuous, urbanising regions wherever populations and economies are growing rapidly (Buijs, 2010; Mars and Hornsby, 2008).

The alternative response to rapid urbanisation is to transform both the processes of urbanisation and the kinds of urban areas that result. This raises new questions. Can rapidly urbanising regions create (rather than destroy) natural capital? Can they generate (rather than deplete) energy? Can they increase (rather than reduce) fairness and equality of opportunity? If so, what radically new forms of planning and governance would be needed to achieve these outcomes?

The Urban Planning Advisory Team (UPAT) which met in Singapore from 23 to 31 July, 2010, had the exciting opportunity to sketch answers to these fundamental and challenging questions. ISOCARP's generous partner in the project was the Philips Center for Health and Well-Being, which has established a Liveable Cities Think Tank to identify the pathway to liveable cities. The UPAT process and its outcome are fully described in the report *Liveable cities in a rapidly urbanizing world* (ISOCARP, 2010), available at http://www.isocarp.org/fileadmin/user_upload/network/ISOCARP_UPAT_final_20110114.pdf.

This article outlines the findings of the Singapore UPAT in four sections:

1. A new paradigm for planners: the 'non-city rapidly urbanising region'
2. Harnessing the creativity of rapidly urbanising regions
3. Possible outcomes: Radically new land use patterns and densities
4. Possible outcomes: What are some practical first steps?

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A New Paradigm for Planners: The Non-City Rapidly Urbanising Region

Rapid urbanisation is eating the future

Rapid urbanisation, particularly in Asia, Africa and Latin America, is creating entirely new kinds of urban environments, generally with the following characteristics:

• Vast, dense, diverse, uneven and fragmented nodes and corridors of industrial complexes, commercial clusters, urban services and housing estates, associated with ports and highways, poorly connected by retro-fitted arterial roads and railways...
• ...driven spontaneously by export opportunities, rapidly increasing domestic consumption and the aspirations of the rural population...
• ...resulting in economic growth and rapidly rising standards of living, accompanied by loss of habitat and natural resources, rapid consumption of natural capital, pollution, congestion, inequalities, inefficiencies, corruption and exploitation.

The quality of life in these new urban regions could, at one end of the spectrum, condemn ordinary people to deprivation and exclusion, or, at the other end, foster fulfilment of human potential – depending on how these regions are planned, managed and governed. The challenge is to imagine how these new urbanising regions can provide people with the most humane and sustainable environments for urban living.

If urbanisation continues in anything like the present patterns, we will need the resources of four or five planets by mid century. To make this project meaningful, we must assume that drastic changes will have been forced on the world through the collapse of ecosystems, and that strong global action will have taken place. Our (heroic) assumptions include the following.

• Strong global action to establish a high price on carbon.
• Strong global action to price natural capital at its real value. (Perhaps the best work in this regard has been done by the Economics of Ecosystems and Biodiversity Study (TEEB)[3] (TEEB 2009, 2010, 2011).)
• Therefore we assume that rapidly urbanising regions are powered by low-carbon energy and that 'free' environmental goods and services are accurately valued and managed conservatively as capital assets.
• We assume that urban development has become 'light-weight', in that the extremely resource-demanding construction of the present is replaced with durable but light-weight and adaptable structures using recycled materials to the maximum, and that heavy industry moves from carbon (heat) processes to hydrogen (electrical/ chemical) processes, both transformations having been driven by real values being attributed to natural capital.[4]
• We assume that there are high levels of social mobility, openness and transparency in a fully digital world.
• We must also assume that strong and enlightened leadership provides holistic, long-term strategies and science-based policies for urbanising regions (see section *The regional commission: working around dysfunctional boundaries and layers of governments* below).

These assumptions become the *preconditions* for liveable, sustainable urban environments.

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Rapid urbanisation does not result in 'cities'

Urban growth in its traditional form is unlikely to play a significant role in accommodating the next three billion people in urban environments. These people will be living in the 'city', but not in planned, incremental extensions of existing cities nor in newly-planned cities. Rapid urbanisation, spreading around growth zones, ports, airports, mining districts and transport corridors, will be urban but 'non-city': fast, extensive, less structured, more dynamic, more spontaneous and in some ways more innovative than more familiar forms of urban growth.

Where this leaves traditional forms of planning was one of the critical questions addressed in this project. We concluded that contemporary planning approaches and the use of familiar models of urban form (for example, the metropolitan region with core, sectors, corridors and subregions) cannot be applied to these 'non-city' rapidly urbanising regions. *Attempts to apply these models are likely to fail in both diagnosis and prescription.* More importantly, such attempts are likely to fail to capitalise on the potential of these regions to generate new models, new approaches and new solutions.

Figure 1: The UPAT team at work
From left to right: Martin Dubbeling, Awais Piracha, Nadya Nilina, Luc Vrolijks, Francisco Pérez, Antonia Cornaro and Jeremy Dawkins

In short, many of the models and techniques developed for the management of traditional cities and for traditional forms of urban governance are largely irrelevant in guiding rapid mass urbanisation. City planning, developed in different times and circumstances, cannot claim to be able to deliver the kinds of transformations described below. If misapplied, it may fail or, worse, actually impede the rapid, spontaneous and creative initiatives required.

Some of the characteristics of the new urban regions can already be seen in the older example of rapid post-war urbanisation around Tokyo – for instance multiple nodes and corridors of development, generated by expanding industrial complexes and/or by lines and nodes of communication, generally retrofitted with highways and rapid transit – and even in ex-urban development in the US. The full form of this kind of urbanisation, however, is seen in the examples of Shenzhen in China and the Eastern Seaboard in Thailand. It is this form of urbanisation which is most likely to take place over vast areas in China and India and parts of SE Asia, Africa and Latin America.

These new urbanising regions may be a form of 'city' and are likely to be referred to as cities. In fact they are not 'cities' in anything like the classical sense of the word. Whereas the traditional image of the city, in all cultures, reflects some form of monarchical power – a single centre of wealth and authority, a centre of advantage and accessibility at the crossroads – the rapidly urbanising regions do not form into patterns resembling contained cities with concentric structures and with networks radiating from a centre. It could therefore be a serious impediment to the effective management of these regions if the planners and administrators imagine that they are building 'cities': 'non-cities' call for a clever form of 'non-planning' from the politicians, urban managers and planners.

Rapidly urbanising regions need to be seen as a new paradigm in the production of the human habitat. If planners adhere to a traditional model of the structured city, they may fail to appreciate – and fail to address, and/or take advantage of – the following attributes of this new phenomenon.

- Rapidly urbanising regions extend dynamically, and even unpredictably, across large areas, ignoring all levels of governmental boundaries, and stretching for 100 or 200 km or more. In the case of the Beijing-Shanghai corridor, the dense rapidly urbanising region extends some 1500 km (Mars and Hornsby 2008).
- Rapidly urbanising regions are discontinuous, leapfrogging over constraints and responding to dispersed opportunities in the landscape including, for instance, pre-existing settlements, major infrastructure such as ports, emerging industries and natural resources. They are flexible and dynamic, and can be more resilient than traditional cities (Webster, 2004).
- Rapid urbanisation creates a kaleidoscopic mosaic of fragments and corridors, with the same growth patterns and 'daily urban systems' tending to be reproduced at all scales, from the crossroads and the village to subregions and regions.
- Rapidly urbanising regions are poorly connected, making many journeys long, uncomfortable and/or expensive.
- Rapidly urbanising regions are segregated: land uses are typically separated into estates and districts at both the local and regional scales, and people are typically separated into sectors by income and occupation; neighbourhoods and quarters are typically separated by transport corridors and other forms of infrastructure.
- Rapidly urbanising regions are wasteful and inefficient in the use of resources and excessively damaging to the environment – responding to short term and local interests rather than strategic and regional priorities.

- Rapidly urbanising regions are seldom governed as a whole, and when they are there is little or no opportunity for citizen participation at the local level.
- All of these characteristics are the result of large movements of people and rapid economic growth overlying existing natural, social and administrative landscapes.

We concluded that the dynamism of these rapidly urbanising regions may be able to produce a human environment which is not only liveable and sustainable but which will provide models for the transformations also required in the mature cities of fully urbanised countries. There is, however, a very big IF attached to this possibility: it requires new concepts and new planning tools, it requires strong global action on energy, climate change and biodiversity, and it will only happen if the rapidly urbanising region is governed by enlightened regional leaders with an open-ended mandate (see section *The regional commission: working around dysfunctional boundaries and layers of governments* below). Assuming all this, what could these regions be like, in a generation or two?

To begin to answer this question, the UPAT team investigated non-city rapid urbanisation at three scales, from regional to local. While merely schematic, the following three kinds of rectangular territories enable us to investigate and describe the nature and planning of these new kinds of places.

'10x100': the 10 km by 100 km 'slice' or transect

This is a large area of 1000 square kilometres (1000 km²), and therefore indicative of the scale at which rapid urbanisation takes place, with towns, industrial areas, ports and transport corridors expanding from one end to the other. It reflects the often linear nature of rapid urbanisation. It may ultimately accommodate 10 million people. (By way of comparison, Singapore with its islands has an area of about 700 km², with a population of 5.2 million.) This is the scale at which natural resources, major transport corridors, transit systems and major infrastructure such as ports and airports are planned.

'10x10': the 10 km by 10 km subregion

This area of 100 km² could in classical terms be seen as a city of one million people. As in Singapore, public housing, public transport, traffic management, water management, major commercial and recreational precincts are largely planned and implemented at this scale.

## '1x1': the one-square-kilometre urban living area

This is the scale of communities and urban life in all its shapes and forms. Each 1x1 urban living area will be different, but most will have dwellings for a population of around 20 000 to 40 000 people, together with natural areas, open space, water bodies, small scale agriculture, industry, storage, offices, shops, schools, health services, transport interchanges and civic and cultural facilities.

These three scales, admittedly abstractions and simplifications, enable the focus to move from the whole region to the subregion to the

neighbourhood (while also recognising that many of the challenges may well be at the intermediate scales). One thousand 1x1 urban areas do not add up to an urban region, just as the region cannot be divided into ten 10x10 subregions; across the 1x1 urban living areas, land uses come in many sizes and may be distributed very unevenly. Nevertheless:

• The rebuilding of natural capital, the optimisation of local energy potential and the social fairness of the urban environment all have to be implemented and safeguarded at the regional scale or larger;
• Natural resources, land use and infrastructure should be integrated at the subregional scale; and
• There should be a fine grain of diverse land uses and transport modes within a walking catchment of a few square kilometres.

The hypothetical 10x100 rapidly urbanising region (1000 km^2) is notionally made up of …

…ten 10x10 subregions (100 km^2), each with …
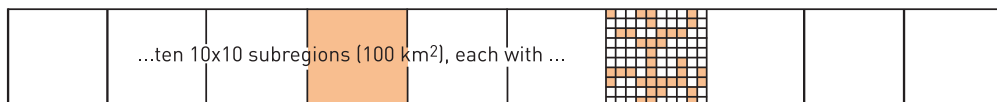
…one hundred 1x1 squares, 35 of them being *urban living areas.*

Figure 2: The three scales adopted for the investigation of rapidly urbanising regions

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Harnessing the Creativity of Rapidly Urbanising Regions

Overlapping mosaics

Planners are, of course, familiar with maps and plans, including those showing intended land use patterns, or urban designs, or blueprints, or structure plans, or regulatory land use allocations. A very different kind of spatial language is required in rapidly urbanising regions, closer to natural patterns and processes, often having fuzzy boundaries and anticipating unpredictable patterns of growth and change. The image is one of patchworks or mosaics – a fluid jigsaw puzzle that reflects the natural world and the complexities of the human habitat.

The first layers of spatial representation seek to understand the overlapping mosaics of natural resources and opportunities which will strongly influence urbanisation, including:

- The distribution of ecological communities and habitats, including critical areas and corridors;
- The landscape which sustains ecological diversity and delivers access to resources, recreation and nature;
- The hydrological component of the landscape, crucially important for managing local water sources and building resilience;
- The potential for renewable energy sources (wind, water, ocean, solar, agricultural and aquacultural, biomass, geothermal, heat storage, energy storage, kinetic potential, etc);
- The suitability of the topography and soils for different agricultural, built and natural purposes;
- Climate and environmental risks;

- The cultural landscape, including cities, towns, villages, historic areas, places of cultural significance and meaning, landmarks, visual landscapes, natural heritage areas, etc;
- The potential arterial routes and catchments for all modes of the transport network.

Some of these layers are fixed, some fluid; some are sharp and some fuzzy; some are non-negotiable while many are amenable to planning, design and mutual optimisation. As mapping and analysis moves to strategic planning and design, layers are continually added for the large-scale components of the 10x100 region, including ports, airports, commercial centres, regional hospitals and educational campuses, heavy industry, agriculture, aquaculture, mining, forests and natural areas, regional parks, transport corridors, energy resources, etc.

Some of these uses require land to be irrevocably committed while for others the land allocation can be contingent and responsive to how development unfolds. In every case, the regional strategy must be explicit yet at the same time capable of being implemented in many ways – the strategy is nothing like a master plan. Likewise, decisions on elements of the regional structure should be made *as soon as necessary, and as late as possible,* to be informed by the best information and the latest patterns of development. In addition, land allocation should be based on smart combinations and multiple uses, for instance locating a highway so that it serves as a flood protection barrier, and creating recreational areas on new offshore islands that protect the coast from erosion and storm surge.

If the 10x100 region is notionally made up of one thousand 1-km^2 square segments, it is apparent that these segments are highly varied, with many being mono-functional, making up airports, ports, road and rail infrastructure, heavy industry, forest, natural

areas, water bodies, farms, regional parks and the like. Others will be a complex combination of, for instance, commercial centres, health facilities, educational campuses and sports grounds. Many of the 1x1 *urban living areas* – about 350 of the thousand segments – will be areas where most of the population live, work, shop, study, play sport, etc.

Over time, governed entirely by opportunity, demand and circumstance, the details of the urban living areas will be sketched in and progressively planned in detail. Within any single neighbourhood, there should be many opportunities:

- For a choice of lifestyle, employment, expression
- For growth, development, prosperity
- For living and working in healthy buildings and enjoying space, light, fresh air
- For child care, education, health and community services, parks, nature
- For variety—quiet, active, dense, loose, high, low, upper and lower social groups
- For influencing community decisions
- For belonging, contact with the earth, a connected social environment.

The 1x1 urban living areas will be fine grained, often with land uses tiered at the different levels of thin, tall buildings, and allowing people of diverse occupations and incomes to live and work in the same neighbourhoods, to shop in the same centres and to send their children to the same schools. Again, land planning should be based on smart combinations and multiple uses, for instance green roofs to cool down buildings, to retain rain water, and to provide opportunities for local parks and food gardens; street trees that provide shade, produce food and retain rain water; and a park on top of a highway, filtering the air, reducing noise and providing amenity for residents.

Food production must become a visible layer within the city. Producing food is partly a

professional activity, partly something that inhabitants do; it takes place in different shapes and forms, from high-tech hydroponic glasshouses on the roofs and facades of office buildings to collective gardens to provide high quality slow-food, and has many social and environmental benefits. Notwithstanding, agriculture cannot compete for private urban land. It can be a significant activity in the public landscape framework, and it can be an interim use on infrastructure reservations and other land banks. Its more complete integration with the urban environment requires a high level of control, in which a public authority is able to allocate land on the basis of more than monetary consideration. Many 'smart combinations' are possible, including crops on industrial buildings (providing insulation to the building and using CO_2, grey water and compost produced in the building), urban landscape that is not only attractive but also productive, and other technologically advanced approaches.

In the rapidly urbanising regions, the landscape is under tremendous pressure. Natural resources rapidly disappear, farms become housing projects, trees vanish, watersheds become polluted, streams are reduced to drains, and the green pattern gets more and more fragmented. All experiences indicate that 'once it is gone, it is gone', and it is very difficult to remake landscape in a dense urban area. This means that early protection and landscape development based on a landscape ecology approach are needed to maintain and nurture a landscape framework that enables and supports a liveable city. One example is the city of Almere, made on reclaimed polder land in the Netherlands. The first activity undertaken was to plant and develop a main framework of 'forest-strips' to provide all inhabitants easy access to nature. Over 30 years, this resource has grown into one of the key assets of the city. While the scale is completely different, a similar strategy can be successful at the 10x100 level: early identification of a

landscape ecological framework – protecting and enhancing it – and providing access for the people.

Overlapping networks

Threading through and connecting these overlapping mosaics will be many networks, including wildlife corridors, green wedges, parkways, waterways, roads, railways, light rail, cycle paths and infrastructure corridors. In a traditional metropolitan strategy, these elements are the bones or skeleton of the region and tend to be fixed once the initial planning has been completed. In theory the same approach is applied to non-city rapidly urbanising regions, but in practice the planning of these networks tends to follow rather than lead development, and is then too static to accommodate the dynamic changes that take place under conditions of rapid urbanisation. The result can be highly inefficient, and expensive or impossible to correct.

Just as a new kind of spatial language, of patchworks or mosaics, is required for land use patterns, so a new spatial language is needed for layers of loose networks laid over the regional mosaics, representing green corridors, parkways, drainage, railways, roads, transit, pipes, wires, etc. The equivalent of the land use *mosaic* is the network *fishnet*. Layers of 'fishnets', of all sizes and complexities, represent loose grid systems. Compared to a typical planned grid, they have more connections, they have redundancy, and they are adaptive. This approach responds to the uncertainties of rapidly urbanising regions – uncertainties which it is desirable not to try to prevent, since this is also the source of the region's innovations and resilience.

The design of networks early in the process of urbanisation is intended to reflect the main structures and protect connections for later development. It is this which gives the networks the character of fishnets: stretched in some places, dense in others, linear, square, multidirectional, but always connected. The design of the 'fishnets' is based on likely development scenarios, natural conditions, the protection of streams and waterways and a host of other considerations. A 'fishnet' has to be robust in its main shape, but allow nodes to develop in quite different ways, allowing for a network that can absorb a large degree of uncertainty. A fishnet is a finer network than is ultimately required. While some of the links in the network will be strengthened and 'promoted', many links will never be implemented: the course of dynamic development will determine which is which.

As in the case of major elements of the regional mosaics, some of the links in a 'fishnet' (of roads or green corridors, for instance) will need to be irrevocably committed while others can remain indicative or strategic, their final form responding to the way in which development unfolds. The fishnet is another instance of the principle that the best regional planning is strategically certain, and tactically flexible.

People move to cities for opportunities, including greater mobility. The transport systems of non-city rapidly urbanising regions, including footpaths and cycle paths as well as cars and transit, will continue to offer the population very high levels of mobility (powered entirely by non-carbon/renewable energy)[5]. Transport requires hierarchy – from local to international – with a seamless integration of all modes, each doing what it does best. The rapidly urbanising region needs to avoid dependence on cars, even though in the early stages of urbanisation large roads are cheaper and easier to build than mass transit. These regions, therefore, need to deliver fast, frequent and comfortable public transport services as early as possible, integrated with all other modes from the outset. It is essential that land use patterns and densities be designed and programmed to achieve this outcome.

The regional commission: working around dysfunctional boundaries and layers of governments

Administrative boundaries in city regions can seriously impede desirable policy making – for instance when a city's growth occurs beyond its boundaries; when the distribution of the population and the location of major destinations are determined by the exercise of local powers irrespective of (or in opposition to) natural resources, trade areas and transport services; when competing transport agencies refuse to work to regional objectives; when responsibilities for watersheds and catchments are randomly divided; or when revenues and responsibilities are vertically and spatially distorted.

All of these impediments to effective urban management are much greater in non-city rapidly urbanising regions, where there will be layers of local, rural, municipal and regional governments and special-purpose agencies and districts already in place. Do rapidly urbanising regions need a new form of government? Should a new regional government replace all the existing governments, sweeping aside all these boundaries, as is often advocated?

We concluded that it is best to leave most or all of these government structures in place. Firstly, there is the practical reality that structural reform on such a scale creates enormous problems of conflict, re-integration and adjustment, lasting for years, even decades. Secondly, and even more importantly, notwithstanding parochialism and narrow mandates, existing government structures have expertise, local knowledge and essential functions to perform, and will be needed to implement regional strategic plans and policies.

The imaginative alternative to restructuring is the superimposition of a regional leadership body – an expert commission, or a council of elders – which has the necessary authority to guide the region, but of a different kind. It is not endowed with legal powers and resources, since any such powers and resources would have unavoidably been removed from existing agencies. Instead, it has high public standing, as a small, stable group of wise and experienced men and women, operating transparently, and guided by community engagement and excellent science.

This 'regional commission' has an open mandate (unconstrained by statutory functions and funding) and is thus better able to exercise persuasive moral authority than any normal government body. It exercises and strengthens this moral authority in articulating a credible, compelling, public vision for the urban region, in maintaining a strategic focus on the long term interests of the whole region, and in providing agencies and the public with a constant flow of independent data, assessments and forecasts.

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Possible Outcomes: Radically New Land Use Patterns and Densities

A further challenge was to quantify the allocation of land across a future, sustainable urban region. This is not easy or simple to do (and is seldom done), for several reasons. Firstly, there is no master plan and no prescriptive land use regulation beyond strong regional policies relating to 'mosaics' and 'fishnets', so patterns of land use will fluctuate markedly over time in response to opportunities, constraints and demand. Secondly, even well-managed rapid urbanisation retains its spontaneity, so the filling in of the 'mosaics' and 'fishnets' is piecemeal and opportunistic, resulting in diverse patterns from place to place. In short, land use allocations such as those listed below cannot be seen as either 'plans' or predictions for any given time or place.

Nevertheless, it is essential to attempt to describe a desirable future pattern of land use allocation. Without such an attempt to quantify intended outcomes there are no guidelines, no benchmarks against which to measure outcomes, and no aspirations. The following tables should be understood in that spirit.

The **10x100 region** (the transect) might have the following characteristics. As noted above, the figures are not prescriptions or predictions. They are indicative of the broad shape of the possible/desirable/sustainable future non-city rapidly urbanising region.

Area	1000 km^2
Population	10 million people
Population density	10 000 people/ km^2 = 100 people/regional ha
Dwelling density	40 dwellings/regional ha

The 1000 km^2 area is allocated as follows:

Nature, farming, broadacre open space	25%	250 km^2
Large scale commerce and exchange	10%	100 km^2
Large scale industry and production	10%	100 km^2
Large transport infrastructure	15%	150 km^2
Water and waste processing	5%	50 km^2
1x1 urban living areas	35%	350 km^2

Notes on areas used for indicating densities

I   A density expressed as 'people per *regional hectare*' (abbreviated as people/*regional ha*) is the population divided by the entire area of the region in hectares.

II   In the tables below, density expressed as 'people per *urban living area hectare*' (people/*urban living ha*) is the population divided by the area of the 1x1 urban living area, which generally excludes areas allocated to regional infrastructure and other major elements.

III   In the tables below, density expressed as 'people per *site hectare*' (people/*site ha*) is the population divided by the area of the actual residential site(s) while excluding the rest of the land in the urban living area (non-residential uses, streets, parks, etc).

If the 10x100 transect is thought of as being made up of one thousand 1-km^2 squares, around one in three is allocated to nature, farming, broadacre open space and water, another one in three is allocated to large-scale commerce, industry and transport, and only about one in three is an urban living area. As indicated in the above table, the 1x1 urban living areas notionally comprise 35% of the area of the region. While there will be a great deal of variation between the 1x1 urban living areas, the typical or average 1x1 urban living area might have the following characteristics.

Area	1 km^2 = 100 ha = 1 000 000 m^2
Population	30 000 people
Population density	300 people/urban living area ha, 600 people/site ha
Dwelling density	120 dwellings/urban living area ha

The 1 km^2 area is allocated as follows:

Nature, water, agriculture, etc	15 ha footprint	15%
Parks and active recreation	10 ha footprint	10%
Roads and transport infrastructure	25 ha footprint	20%
Housing for 30 000 (12 000 dwellings)	1 000 000 m^2 floorspace }	
Employment areas (10 000 jobs)	200 000 m^2 floorspace }	45%
Civic, educations, retail and services	300 000 m^2 floorspace }	
Landscaping around housing, etc	10 ha footprint	10%

This table shows that, in the 1x1 urban living areas, a notional 1.5 million square metres of floorspace (for housing, employment and retail and other services) is built on 55% of the land (the 45% of the land occupied by building footprints and 10% used for on-site access and landscaping). Thus floorspace of 1.5 million square metres occupies 55 ha or 0.55 million square metres of land, giving an average ratio of floorspace to site of about 3:1. A floorspace ratio of 3:1 is relatively high and is definitely urban rather than suburban, but it is not excessive, is entirely feasible, and can be achieved at high levels of resource and energy efficiency.

Having followed the patterns of land use through to the local level, it is now time to return to the overall regional scale. When land was allocated at the regional scale, in the first table above, the 1x1 urban living areas were treated as a single land use, occupying 35% of the whole area. It has now been seen that the 1x1 urban living areas include more of the non-residential uses such as parks, agriculture and commerce, and transport infrastructure such as local roads, already listed for the region. If these local land uses are reallocated at the regional scale, the overall characteristics of the region are as follows.

Nature, water, agriculture, local parks	33%
Large scale commerce and exchange	10%
Large scale production and storage	10%
Urban buildings and associated landscaping	20%
Transport infrastructure including local roads	22%
Water and waste processing	5%

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While such an urban land use pattern is radically different to the current norm, we concluded that land use allocations of this kind are not only feasible (under the heroic assumptions initially adopted) but also absolutely essential if continued rapid urbanisation is not to precipitate irreversible climate change, the collapse of life support systems and disastrous social and global conflict. To put that in another way: if the above radically new patterns of urban land use are *not* feasible, nor is an 'urban planet'.

Possible Outcomes: What Are Some Practical First Steps?

The Urban Planning and Advisory Team was challenged to develop simple, practical and original solutions that improve the quality of people's lives in sustainable cities in South East Asia. These solutions were to be readily implementable and capable of being translated into reality within a few years and replicated in communities worldwide.

The team regarded this as an exciting and very challenging assignment: to first identify the 'big picture' long-term transformations which are required of cities and urbanising regions, and then to imagine the first practical steps towards those goals. The 'practical solutions' would need to be relatively simple and capable of immediate implementation everywhere, yet at the same time be both original and real drivers towards the urban environments of the future.

The team developed ten such practical solutions. Each has a name, such as 'Regional leaders', 'Landscape first' and 'Map the energy', as listed in the table. The ten practical solutions are not ranked or prioritised,

and indeed they are not necessarily the top ten actions that should be taken: the team developed them because they are important, original and feasible, while recognising that many other important actions need to be taken at the same time.

Each of the ten practical solutions relates to a specific principle, listed in the first column of the table. A single sentence explains each principle, and then a note describes how each principle applies to rapidly urbanising regions.

The first four practical solutions, on the green background, relate primarily to the scale of the '10x100' region. The next six practical solutions, on the yellow background, relate primarily to the '10x10' subregion and the '1x1' urban areas. All ten practical solutions may be most likely to emerge in the dynamic and innovative conditions of rapidly urbanising regions. They are equally applicable to mature cities, rapidly expanding cities and even shrinking cities, since these and similar 'practical solutions' are likely to be essential ingredients in responses to the great global challenges.

Fundamental principle	'Practical solution'
Strong regional governance **Stable, credible, passionate regional leadership is essential to take responsibility for the urbanising region and the long term.** Regional leadership must have sufficient legitimacy and credibility to transcend fragmented layers of government, short term and parochial priorities, competing interests and a lack of strategic responsibility for a rapidly urbanising region	**'Regional leaders'** **Without attempting to remove or restructure layers of governments, the highest level of government appoints a small leadership council or regional commission comprising wise, expert and highly respected people who have the moral authority, and scientific resources, to define strategic regional priorities, to plan patterns of development and to persuade and educate the decision makers and the public.**
Natural capital **It is imperative that in future the natural systems of a region are understood, conserved and recovered as urbanisation proceeds.** Maximising biodiversity in a rapidly urbanising region requires a landscape framework to be designed based on excellent science, before indiscriminate development takes over	**'Landscape first'** **Define the regional landscape framework and plant it prior to urbanisation, to protect and recover biodiversity.**
Local energy **Urban areas should maximise the local generation of low-carbon energy, through the efficient use of local energy resources.** All rapidly urbanising regions have a unique endowment of potential energy resources distributed unevenly across the region, which can be fully employed only if researched, mapped and protected ahead of development.	**'Map the energy'** **First map the potential wind, wave, hydro, solar, biomass, geothermal and other energy resources, to prevent their sterilisation and to ensure that urbanisation makes the most of these resources.**
Urban agriculture **Food production, and agriculture generally, should be integrated throughout the urban environment.** Minimizing the separation between food production and urban living reduces energy use, improves urban metabolism, enriches daily life and improves well-being	**'Productive landscapes'** **Use food plants for urban landscapes, public gardens, street trees and interim uses of land banks.**
Strategically certain, tactically flexible **Liveable cities need strong strategies for the large scale patterns and networks, with greater creativity, flexibility and responsiveness at the smaller scale.** The planning of rapidly urbanising regions is often typified by weak strategic regional frameworks but detailed local plans and rules, which are often used to simplify or standardise local development, usually by segregating land uses which might have negative impacts.	**'Mix to the max'** **Planning controls should be based not on land use but on effects or performance, to encourage innovation and to allow every kind of low-impact use to become part of a rich urban living ecology.**

The more urban, the more innovation

Cities generate innovation, through the intensity of interaction, the rate of change, and the market for creativity and art.

Rapidly urbanising regions need to support the arts and enrich the cultural landscape, in order to create environments which attract and foster creativity and build stronger communities.

'Budget for the arts'

A significant share of the urban budget allocated to the arts will enable artists to be engaged on all major project teams, and enable off-beat spaces to be made available for artists' studios and for other cultural production.

Mobility at all scales

From local high-quality pedestrian spaces to international bullet trains, liveable cities provide high mobility without compromising equity or environmental quality.

In the 1x1 urban living areas of rapidly urbanising regions, the quality of the pedestrian environment should come first, with all other modes, including private cars, performing their optimal role and interconnecting effortlessly.

'Node for all modes'

All modes connect seamlessly in a purpose-built interchange integrated into the heart of 1x1 urban living areas. *See the diagram Node for all modes.*

Actively engaged citizens

Liveable cities foster health and community connectedness by providing multiple destinations and opportunities within walking and cycling distance of where people live, work and play.

To counter the tendency in rapidly urbanising regions for important urban functions to be segregated and even inaccessible, the many destinations of 'daily life' should be co-located, and where possible integrated, in places of high accessibility

'Urban playground'

Plan the new retail centres to fully integrate commercial activities with public areas, social spaces, entertainment, sports and active recreation.
See the diagram Urban playground

Equity and social mix

Liveable cities improve life chances, health status and well-being by minimizing social division, exclusion and income inequality.

Wilkinson and Pickett provide compelling scientific evidence that 'equality is better for everyone' (2010). Whatever the level of inequality in income and opportunity in society, well-planned social mix in rapidly urbanising regions can improve levels of trust and well-being.

'People to people'

Intervene in many ways to ensure that each 1x1 urban living area has the broadest mix of employment types, income levels and cultural backgrounds, so that the area reasonably reflects the demographics of the whole region.

Corporate citizenship

Large corporations can play an increasingly creative role – through their products, their operations and their partnerships with governments and communities – to help make cities liveable.

In rapidly urbanising regions, corporations can be instrumental in driving innovation and raising standards, through their own developments and through direct relationships established with a local community for mutual benefit.

'Business to cities'

Corporations and large agencies each form a close relationship with a community by 'adopting' a 1x1 urban living area to better understand rapid urbanisation, to gain insight into daily life, to test innovations and to assist the local community.

Conclusion: Urban Planet in the Balance

The 'cities' issue is receiving historically high levels of attention. Urban planning stories are in the news – stories covering many dimensions of urban issues at all scales, from local to global. Planners are working with communities to find creative, integrated, strategic, sustainable responses to all of these issues.

It is hard not to conclude, however, that the fate of the planet will be largely determined by the scale and type of urbanisation which takes place in those parts of the world where the growth and movement of populations is greatest. Here, in East Asia, in the Indian sub-continent, in Africa and parts of Latin America in particular, rapid urbanisation is creating a new paradigm for which there is not yet a recognised planning, urban management and governance response.
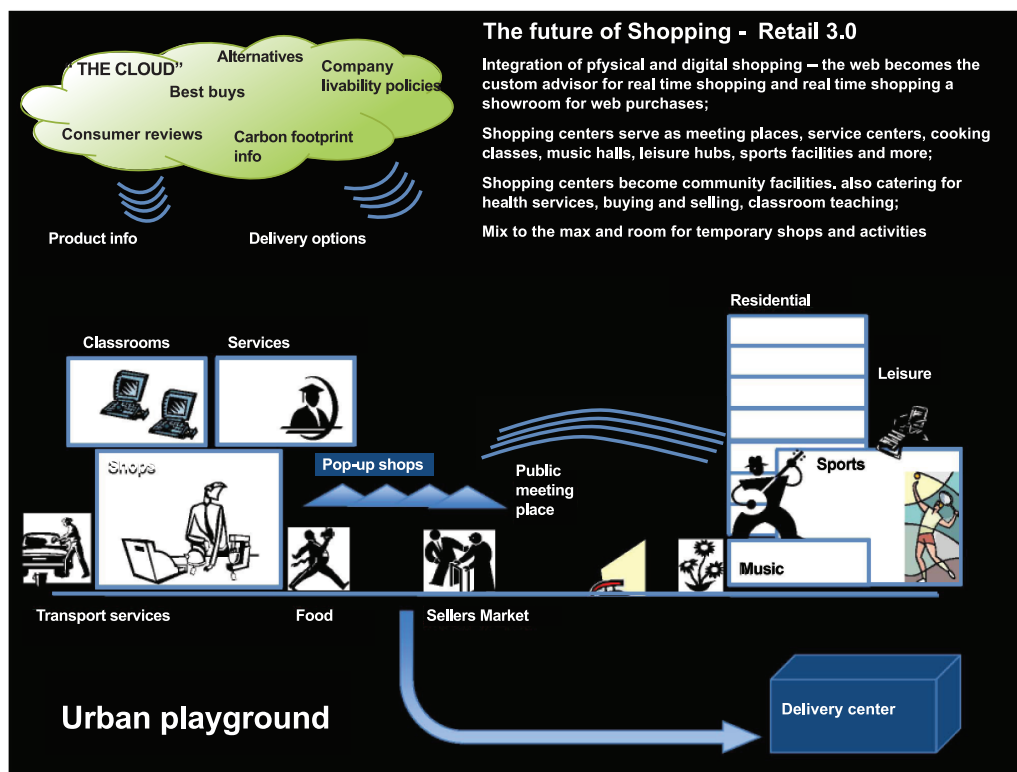
To have any significant impact at a global scale, any response will need to be radically different to the planning, urban management and governance practices of the past. The scale of the change can be seen from the desirable/necessary patterns of land use identified in the section *Possible Outcomes: Radically New Land Use Patterns and Densities*, above. Consider a part of a country (or, as is often the case, a region which is parts of several adjoining countries), where there are vast areas of rural lands, forest, mountains, and the like, within which is a 'non-city' rapidly urbanising region of 1000 km^2, growing towards a population of 10 million people. The Singapore UPAT found that within the *urban area*, within that urban region of 1000 km^2 – within what used

Jeremy Dawkins
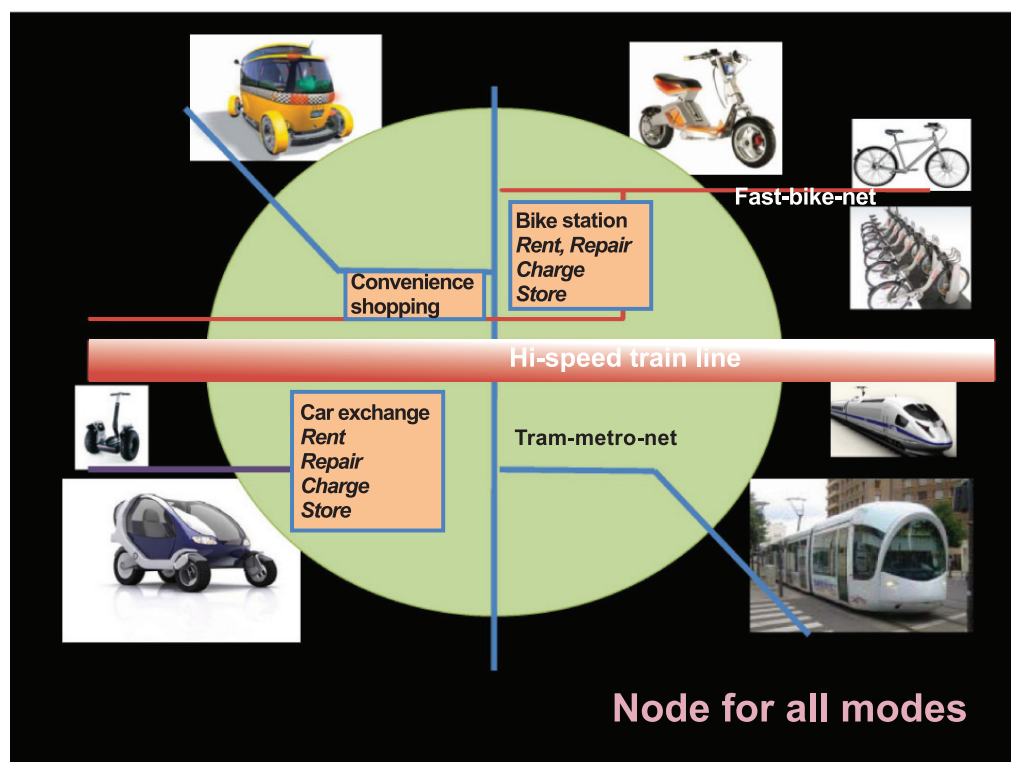
to be called the city – agriculture, conservation areas, regional parks and wet areas occupy fully 30% of the land and large scale commerce, industry and infrastructure occupy another 35%, while what we think of as 'urban' occupies only the remaining 35% of the land.

To achieve that unlikely outcome, the Singapore UPAT found that the management of a rapidly urbanising region would require, amongst other things, an adaptive strategic land use planning approach we called 'mosaics', an adaptive strategic network planning approach we called 'fishnets', and a radical governance approach we called 'regional commission'. Even then, any success would depend on strong global measures to (amongst other things) price carbon and value natural capital.

To make all this real, we were challenged to imagine ten 'practical solutions' which were steps towards these outcomes yet capable of being implemented immediately, everywhere. Our ten 'practical solutions' are presented in the section *Possible Outcomes: What Are Some Practical First Steps?*, above. We hope they will be considered systematically in many situations. For instance, to take just the first five of our proposals: the power of moral authority can often achieve much more than legal and financial resources, and should be tested wherever possible ('Regional leaders'); many projects could reverse the typical priorities whereby the green, conservation, landscape framework takes up the residual land and is implemented at the end ('Landscape first'); many planning projects could begin with an inventory of potential energy resources (Map the energy'); there are many opportunities

The future of Shopping - Retail 3.0

Integration of pfysical and digital shopping — the web becomes the custom advisor for real time shopping and real time shopping a showroom for web purchases;

Shopping centers serve as meeting places, service centers, cooking classes, music halls, leisure hubs, sports facilities and more;

Shopping centers become community facilities, also catering for health services, buying and selling, classroom teaching;

Mix to the max and room for temporary shops and activities

(usually missed) to introduce food production and agriculture into even dense urban environments, something Singapore is actively pursuing (Productive landscapes); and a much richer and creative mix of uses, activities and people can be achieved when the usual pattern of loose strategy but tight local controls is reversed ('Mix to the max').

We gained a great deal from the intense UPAT experience. We intend to investigate these matters further, and in the meantime we will seek to apply the findings in our work. To all who have read this article, we say: comments, criticism and ideas will be warmly welcomed.

jeremy.dawkins@uts.edu.au

Endnotes

1. By 'right of everyone' I simply mean that to live an urban life is a reasonable aspiration for all people to achieve, without trying to invoke the more complex (or fashionable) idea of Lefebvre's 'right to the city' as a 'demand…[for] a transformed and renewed access to urban life', or Harvey's (2008) 'right to the city' as 'a right to change ourselves by changing the city', or – to cite one example of how the term is being embraced – San Francisco's 'right to the city' campaign on behalf of tenants and the homeless.

2. Natural capital is a metaphor for the stock of environmental goods and services and the natural systems on which life – and human development – depends (Hawken et al., 1999).

3. Established in 2007 by UNEP with financial support from the European Commission, Germany, the United Kingdom, Netherlands, Norway, Sweden and Japan, and led by banker Pavan Suhkdev, the Economics of Ecosystems and Biodiversity Study (TEEB) analysed the global economic benefit of biological diversity, the costs of the loss of biodiversity and the failure to take protective measures versus the costs of effective conservation. The TEEB series of reports are available at www.teebweb.org. In February 2011 TEEB launched the Bank of Natural Capital, a website designed to communicate the TEEB Study findings to citizens. Visit it here: http://bankofnaturalcapital.com.

4. Coyle (1997) examines the trends in the use of fewer resources. She points out that, despite real incomes in most industrialised countries increasing twenty times from the beginning of the twentieth century, such was the reduction in the use of materials that the weight of all that was produced was much the same at the end of the century as it was at the beginning. On the other hand, this greater efficiency may be overwhelmed by increases in consumption. Take the single example of the metal copper. 'We need more copper in the next 20 years [600 million tons] than was mined in the last 110 years [585 million tons],' Ivanhoe Mines Ltd Chairman Robert Friedland said today at the Diggers and Dealers conference in Kalgoorlie, Western Australia (quoted from www.bloomberg. com/news/2010-08-04; see also www.businessday.com.au). And that is not counting the demand for copper to make electric cars. 'Cars are going to be electric,' said Mr Friedland, 'and 80% of the weight of a lithium battery is copper – 200-300 kg per car, wanted by half a billion people in the next decade or two.'

5. Many planners anticipate – apparently with some pleasure – that sustainability entails deprivation, and specifically a return to human-powered transport supplemented by pre-car forms of public transport. Sustainability does mean the end of the fossil-fueled car and the end of the private vehicle as the main mode for the journey to work, but for most, an urban life will offer increased physical mobility, not less.

Jeremy Dawkins

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