

Urban Patterns for a Green Economy

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The city is one of the highest pinnacles of human creation. Concentrating so many people in dense, interactive, shared spaces has historically provided distinct advantages, that is, *agglomeration advantages*. Through agglomeration, cities have the power to innovate, generate wealth, enhance quality of life and accommodate more people within a smaller footprint at lower per-capita resource use and emissions than any other settlement pattern.

Or so they could. Increasingly, cities are forfeiting many of the benefits that agglomeration has to offer. Two meta-studies of urban land expansion have shown that over the last two decades most cities in the world have become less dense rather than more,^{1,2} and are wasting their potential in ways that generate sprawl, congestion and segregation. These patterns are making cities less pleasant and equitable places in which to live, and are threatening the earth's carrying capacity. They are most acute in fast-growing cities, particularly those with the lowest institutional capacities, weakest environmental protections and longest infrastructure backlogs. For such cities to continue to grow – much less improve the quality of life that they offer – they must do so at lower rates of resource use and emissions and reduced environmental impact.

More than half the global population now lives in towns and cities. By the year 2050, UN-Habitat research projects that that figure will rise to two-thirds. This rapid, large-scale concentration of humanity in the world's cities represents new challenges for ingenuity, and numerous opportunities to improve the way in which human habitats are shaped. Most of this population growth will be in the cities of developing countries, which are expected to grow by an additional 1.3 billion people by 2030, compared to 100 million in the cities of the developed world over the same period.³ Most urbanization is likely to occur in cities relatively unprepared to accommodate these numbers, with potential negative repercussions for quality of life, economic development and the natural environment.

Although the percentage of the urban population living in slums worldwide has decreased, the absolute number of people living in slums continues to grow.⁴ If these growing cities are to be socially sustainable, new approaches will be required to integrate the poor so that the urbanization process improves inter-generational equity rather than entrenching socio-spatial fragmentation. Privatized models of service delivery that discriminate between consumers based on their ability to pay threaten to worsen inequalities,⁵ and require carefully considered parameters to ensure that the poor are not disadvantaged.

According to a World Bank study, urban population growth is likely to result in the significant loss of non-urban land as built environments expand into their surroundings. Cities in developing countries are expected to triple their land area between 2005 and 2030, with each new city dweller converting an average of 160 metres² of non-urban land to urban land.⁶ Despite slower population growth, cities in industrialized countries are likely to see a 2.5 times growth in city land areas over the same period due to a more rapid decline in average densities when compared to their developing country counterparts.⁷ As built environments become less dense and stocks of built up land accumulate, the amount of reproductive and ecologically buffering land available for ecosystems and food production is diminished, reducing the ability of city-regions to support themselves.⁸ The configuration of human settlements is clearly essential for sustainable development.

While international trade has made it possible for cities to meet their demands for food, water and energy with imports from faraway lands, it is becoming increasingly apparent that the appetite of the world's growing and increasingly affluent population is coming up against

limitations in the planet's ability to support human life on this scale. It is estimated that our addiction to oil will result in a peak in oil extraction within the next decade, leading to dramatic increases in the costs of fuel, mobility, food and other imports. Greater demand for potable water, combined with changing rainfall patterns, the depletion of aquifers and pollution of groundwater, is likely to see increasing competition for scarce fresh water resources, raising the possibility of conflict in the near future.

The ability of ecosystems to continue providing biotic resources like wood, fish and food, and to absorb manmade wastes - commonly referred to as the earth's "bio-capacity" - is also diminishing. Comparing global ecological footprints to the earth's available capacity shows that, at current rates of resource use, we are exceeding bio-capacity by 30 per cent,⁹ and approximately 60 per cent of the ecosystems we depend on for goods and services are being degraded or used in an unsustainable manner.¹⁰ We are living off the planet's natural capital instead of the interest from this capital, and there are already signs of the devastating effect this will have on our societies and economies in depleting fish stocks, loss of fertile soil, shrinking forests and increasingly unpredictable weather patterns.¹¹

The global population is reaching a size where cities need to start thinking beyond their immediate interests to consider their role as nodes of human consumption and waste production in a finite planet that is struggling to keep pace with humanity's demands. If cities are to survive, they must acknowledge the warning signs of ecosystem degradation and build their economies in a manner that respects and rehabilitates the ecosystems on which life depends. If cities are to prosper, they must embrace the challenge of providing shelter and uninterrupted access to water, food and energy and improve quality of life for all of their citizens.

The way in which city spaces, buildings and infrastructural systems are planned, designed and operated influences the extent to which they encroach on natural ecosystems, and locks them into certain modes of consumption from which they struggle to deviate. Urban activities have direct and indirect consequences for the natural environment in the short, medium and long term, and their scale of influence typically extends far beyond the boundaries of what is typically considered to constitute "the city". Managing the indirect, distant and sometimes obscured impacts of city decision making in an increasingly globalized world requires appropriate governance mechanisms that improve cities' accountability for the resources they rely on.

As nexuses of knowledge, infrastructure and governance, cities represent a key opportunity to stimulate larger scale change toward green economies. In a world where cities are increasingly competing against each other economically, where weather patterns are unpredictable and low resource prices can no longer be assumed, cities need to proactively shape their economies and operations in preparation for an uncertain future. To manage risk in a democratic manner, a balance will need to be struck between deliberative decision making processes and centralized master planning. This can be done by empowering planning professionals to respond quickly and effectively to evolving developments without compromising longer term shared visions of a better city¹².

UN-Habitat and the authors analyzed 32 case studies of green urban interventions undertaken around the world. Through them they identified four modalities through which cities may regain their sustainability advantages in pursuit of a green economy: working with nature, leveraging density, optimizing infrastructure and clustering for competitiveness. Developing green economies at the city scale requires supportive city planning and strategic infrastructure investments that allow for optimal use of resources whilst improving living standards for all.

Instead of the uncontrolled expansion of cities into car-dependent suburbs, carefully planned densification supported by public and non-motorised transport networks can allow for a higher quality of life whilst consuming less fossil fuel and protecting valuable ecosystems. Waste management systems that facilitate the re-use of solid and liquid wastes within the city can reduce demand for raw materials and landfill space whilst creating jobs and developing local economies. Improved efficiencies in water and electricity usage can conserve resources whilst saving money, allowing for more to be spent on education and upliftment of the poor to reduce inequality. The growth of a green economy must start in cities, with a focus on spatial planning and strategic investments that make the most sustainable use of natural assets for the benefit of all. If cities are to continue to benefit from agglomeration advantages in the face of planetary crises, it is the responsibility of all city stakeholders to work together to pursue these goals as a matter of urgency.

Key Questions

Will developing at higher rates of resource efficiency achieve 'decoupling' of growth from environmental degradation or is it more likely to cause a 'rebound effect' of increased consumption?

How might cities in the developing world expand their infrastructure in an era of relatively higher energy prices?

How might cities in the developed world retrofit their obsolete, inefficient infrastructure despite the ongoing financial crisis?

What kinds of obstacles are preventing cities from completing their metabolic loops and mining their waste for energy and materials?

¹Angel, S. et al. (2011). *Making Room for a Planet of Cities*. Lincoln Institute of Land Policy, Cambridge.

²Seto, K. et al. (2011). *A Meta-Analysis of Global Urban Land Expansion*. PLoS ONE.

³Boston Consulting Group (2010). *Winning in Emerging Market Cities: A Guide to the World's Largest Growth Opportunity*. BCG, USA. p. 5.

⁴UN-HABITAT. (2011). *State of the World Cities Report 2010/2011, Bridging the rural divide*. Nairobi: UN-HABITAT.

⁵Graham, S. and Marvin, S. (2001). *Splintering urbanism: Networked infrastructures, technological mobilities and the urban condition*. United Kingdom: Routledge.

⁶Angel, S., Sheppard, S. and Civco, D. (2005). *The Dynamics of Global Urban Expansion*. Transport and Urban Development Department, Washington D.C.: World Bank

⁷Angel, S., Sheppard, S. and Civco, D. (2005). *The Dynamics of Global Urban Expansion*. Transport and Urban Development Department, Washington D.C.: World Bank.

⁸Bringezu, S. (2002). *Construction ecology and metabolism – rematerialisation and dematerialisation*. In Kibert, C., Sendzimir, J. and Guy, G. (eds.). *Construction ecology: nature as the basis for green buildings*. London: Routledge, pp. 196-219.

⁹WWF, Zoological Society of London and Global Footprint Network (2008). *Living Planet Report 2008*. WWF: Switzerland.

¹⁰Reid, W. V., Mooney, H.A., Cropper, A., Capistrano, D., Carpenter, S.R., Chopra, K., Dasgupta, P., Dietz, T., Duraipah, A.K., Hassan, R., Kaspersen, R., Leemans, R., May, R.M., McMichael, A.J., Pingali, P., Samper, C., Scholes, R., Watson, R.T., Zakri, A.H., Shidong, Z., Ash, N.J., Bennett, E., Kumar, P., Lee, M.J., Raudsepp-Hearne, C., Simons, H., Thonell, J. and Zurek, M.B. (2005). *Millennium ecosystem assessment synthesis report*. United States: Island Press.

¹¹SERI Global and Friends of the Earth Europe (2009). *Overconsumption? Our use of the World's Natural Resources*. Vienna/Brussels: SERI Global.

¹²Amin, A. (2011). *Urban planning in an uncertain world*. In Bridge, G. and Watson, S. (eds.). *The New Blackwell Companion to the City*. London: Blackwell Publishing Ltd.