

Do greener cities mean healthier people?

How do we measure the effect and role of urban green-areas on our lives? The groundbreaking work of a cross-disciplinary project is answering that question and helping to direct the planning of 'livable' cities.

Australia is one of the most urbanised countries in the world, with more than 90% of the population living in cities and towns. By 2030, more than 60% of the world's population is expected to have made a similar transition, moving from a predominantly rural or agricultural lifestyle to an urban one. Our connection with the land lives on, however, in our backyard gardens, parks and sporting grounds, street trees and nature strips – 'greenspace' in urban planning parlance. But just how important is greenspace to our lives in rapidly expanding urban areas?

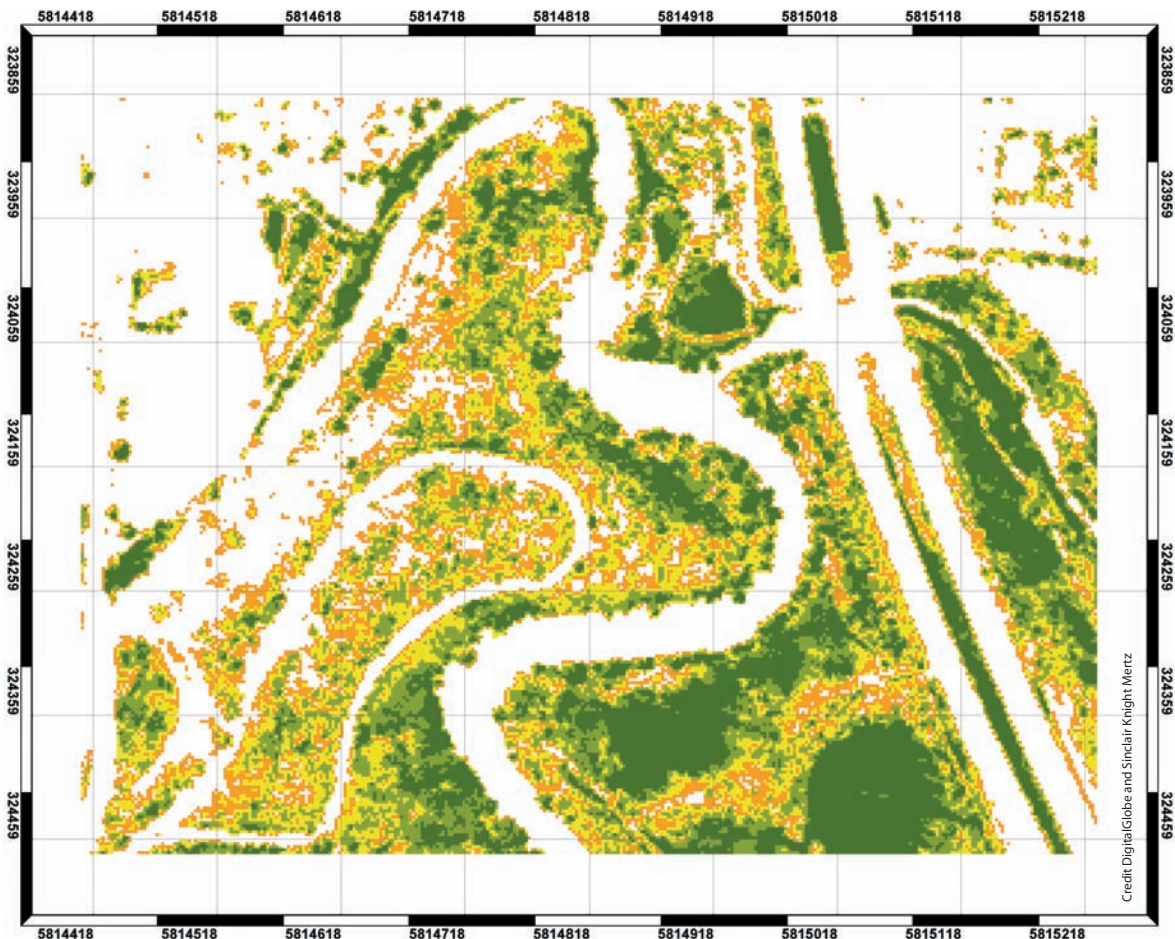
In this Year of the Built Environment,

CSIRO Sustainable Ecosystems landscape ecologist, Mr Guy Barnett, is leading a project called *Greener Cities, Healthier People* that demonstrates a new approach to understanding and addressing the issue of livable, sustainable cities. The approach, known as Social and Economic Integration (SEI), is a CSIRO Emerging Science Areas initiative, which aims to incorporate social and economic considerations in the design, conduct and delivery of research.

SEI brings interdisciplinary teams of social and biophysical researchers together, to apply their collective and specialist knowledge in a 'whole system' approach

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to complex problems. The teams look at human behaviour and decision-making, the welfare of communities and society, economic contexts, and the related interdependencies and linkages between these areas.



One of the project's satellite images of an area of Melbourne which has parks and urban zones. Greenspace is colour-classified based on vegetation vigour (orange to dark green which corresponds to dead or dry vegetation, such as bark, leaf litter and native grasses) through to trees and well-irrigated vegetation such as lawns. Total areas of each type of greenspace can be calculated from these images.

Progress

‘By studying whole systems rather than their component parts, we’re more likely to deliver lasting and durable solutions,’ explains Barnett.

‘If we fail to address the fundamental drivers of a problem, many of which are social and economic, we’ll only get part of the story, and limit our ability to understand our world and the way it works.’

Greener cities, healthier people?

Urban development is placing enormous pressure on the planning and management of smart and sustainable urban regions. Studies have shown that greenspace provides a range of environmental, economic and quality of life benefits, for individuals and local communities. Therefore, the retention of and provision for greenspace will be essential to the overall livability of the urban environment.

The environmental benefits from greenspace include: filtering air pollution, protecting biodiversity, reducing stormwater run-off, and cooling heat islands (high heat areas) within cities. Economic benefits arise by making areas attractive to new employers or through better real estate prices.

Perhaps the most significant gain, however, is made through the effect of

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about the risks to human health and quality of life associated with their deterioration or loss. If such areas do have a positive impact on human health, could they act as a preventative health-care mechanism for an ageing population, and help contain the rising costs of health care in this country? Could we design or revitalise urban greenspace for positive health outcomes?

Barnett’s team – an interdisciplinary group of CSIRO scientists with expertise in community and cognitive psychology, remote sensing, spatial analysis, plant and landscape ecology, and ecological economics – are nearing completion of a one-year scoping study investigating these and other greenspace issues. The study explores the current knowledge about greenspace and its impact on mental, physical and community health, assesses the quantity of greenspace and access to it – through a

links, there seemed little understanding of the causal processes.

‘The majority of studies were done on a fine scale, exploring the psychological aspects of greenspace and health from an individual’s perspective, often in relation to a single park or a view from a window,’ Barnett says.

‘There were few landscape-scale studies, considering multiple types of greenspace, especially at the population level. There was also little consistency among studies in the way greenspace and health were measured, making it difficult to draw comparisons and generate robust conclusions from the literature.’

The biggest unknown, however, was the complex interactions between people and greenspace. There appears to be little understanding of how people use greenspace, and what they require from it. For example, is a view of a single tree enough to provide a health benefit, or do people need greater complexity of greenspace?

‘To really understand the role and value of greenspace in cities, you have to bring people into it, to understand how they use and value it,’ Barnett says.

‘As soon as you do that, you can’t take anything other than an SEI approach.’



CSIRO Social and Economic Integration/Kaylene Biggs



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Greenspace is any area of urban vegetation that may contribute in a direct or indirect way to the physical and mental health of humans in urban environments. It includes parks and open spaces, street trees, public and private gardens, and native and exotic plant species.

greenspace on the physical, spiritual and mental wellbeing of individuals and the community as a whole. Overseas studies suggest that urban greenspace can reduce fatigue and stress, improve concentration, enhance worker productivity, boost immunity, promote healing and recovery after an illness or accident, encourage exercise and provide a haven for peace and tranquillity.

If these suggested benefits are correct, the implications for urban planning and design are significant. Much of our greenspace is earmarked for urban development and consolidation, but we know little

Melbourne case study – and establishes a framework for future research.

‘By focusing on “urban health” we are interested in more than just human or environmental health, but rather the nature of the linkages and the quality of the interactions between the community, environment and economic elements where urban people live,’ Barnett says.

Investigating the links

The team reviewed the literature for research identifying links between greenspace and health. While they found some

Exploring Melbourne

To test some assumptions about greenspace and health, and define the methodology for future studies in Australian and other cities, the team conducted a small exploratory case-study in Melbourne.

They used satellite imagery that could detect greenspace at the scale of an individual tree, and various digital map data for the city and surrounds, to identify the amount and types of greenspace. Then, using data from the Victorian burden-of-disease studies and the Social Health Atlas of Australia, they investigated the patterns



The Yarra Local Government area in Melbourne – A more regional greenspace image .

between health and greenspace, while controlling for socio-economic variables.

The results of the case-study showed that there was no simple link between health and greenspace. This may be due to the broad geographic scale of the health data – local government area and statistical local area – which made comparison with the fine resolution socio-economic and greenspace data difficult. Greenspace was also relatively evenly distributed across the Melbourne case study, suggesting that comparisons between cities with widely different distributions of greenspace will be important.

The team also showed that remote sensing was a fast, efficient, cost-effective and accurate way of measuring greenspace, compared to traditional map-based methods. The technique improved the estimation of greenspace by up to three-fold, by not only capturing the public greenspace, such as parks and open space, but also private greenspace, such as backyards. This shows that private greenspace forms a significant component of the total urban greenspace, the contribution of which has been largely unrecognised and undervalued.

‘The case-study successfully demonstrated that new technologies could be applied to health and socio-economic data,

providing novel insights across disciplinary boundaries,’ Barnett says.

‘Accurate and rapid measures of urban greenspace, using remote sensing, can now be made, limited only by the spatial resolution of publicly available health data.’

To overcome this spatial resolution problem, future work will consider how individuals use and relate to urban greenspace.

‘Through our case-study and review of the literature, we’ve come up with a range of questions dealing with people’s values and perceptions of greenspace, and its benefits for health, which we’d like to tease-out in more detail using qualitative methods, such as a survey,’ Barnett says.

‘We want to discover whether people believe that their proximity to greenspace has an impact on their health and quality of life. Do differences in the distribution and allocation of greenspace matter? Do people have to ‘use’ greenspace to place value on it? And are the benefits of greenspace greater in disadvantaged socio-economic groups?’

Unravelling this complex web of social, economic and environmental interactions poses a significant challenge for integrated and interdisciplinary research.

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Potential impacts of research

The team is now working on a business plan to take the research concept to the next stage. Through discussions with a range of stakeholders, including university researchers, urban planners and managers, and various health organisations, they aim to develop a research partnership that can build on the diverse nature of the team already assembled. This will ensure a rigorous and comprehensive study of all aspects of greenspace and human health.

The research has the potential for significant scientific, economic and social impacts. If a positive relationship between greenspace and health does exist, for example, decision-makers may be able to improve health by manipulating greenspace. For example, the research may offer developers some basic design principles that could be applied to maximise the beneficial impact of greenspace on new residents. Alternatively, older suburbs may be ‘retro-fitted’ to improve their health benefits. This could have a significant impact on preventative health and the economic drain of an ageing society.

‘SEI allows us to move away from focusing solely on the negative effects of urbanisation on greenspace,’ Barnett says.

‘Through more detailed inquiry into the human-environment relationship, we aim to identify the positive effects of urban greenspace, so that we can design and manage our cities as they continue to grow in size and complexity, for positive health outcomes.’

The project also provides a link between remote sensing and social science, by developing a spatial understanding of the social and economic context within which greenspace is located. By addressing the social and economic drivers of greenspace decline too, a stronger case for their continued preservation can be presented.

● Wendy Pyper

More Information

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