

How urban ecology can provide a greener alternative to the concrete jungles of the future

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Central Park in New York City. Credit: Pixabay

Hollywood's dystopian movies would have you believe our future looks like the dark Los Angeles of *Blade Runner* or the grey concrete jungles of *Metropolis*. But the work of University of Melbourne urban ecologists paints possibilities more like Hobbiton in *Lord of the Rings* or Theed on

the idyllic planet of Naboo in Star Wars.

Associate Professor Mark McDonnell believes urban ecology is the discipline of the future, bringing geography, ecology, landscape architecture and urban planning together to create cities where people and biodiversity can thrive together.

"Global urbanisation and global climate change are the two biggest threats to humanity in the future," says Associate Professor McDonnell, who established the Australian Research Centre for Urban Ecology in 1998.

A rapidly growing body of knowledge shows people benefit enormously from nature in cities, from the shade and natural air-conditioning of trees, to the psychological boost that natural views give workers, to the role of gardens in managing stormwater.

Densely populated Australian megacities will be part of the future as the continent's population grows to an estimated 50-odd million people by the end of the century. With nine out of 10 Australians living in cities, the nation is already one of the world's more urbanised countries.

"Twenty-five million people live in Mexico City; over 1200 people per square kilometre," says Associate Professor McDonnell. "There is clearly no limit at the moment to the density that people will tolerate. What we have to do is be smarter. Megacities are coming. We need to plan for them."

He is concerned Australia may be headed down the path of some industrialised cities overseas, where accommodating more people and industries has come at the expense of the parks and gardens that are vital for the wellbeing of both humans and wildlife.

"All these old industrial cities, like Pittsburgh and Philadelphia, are rotting from the inside out. People don't want to live there anymore. People want to live in green cities. People love Amsterdam; people love the German cities. They're designed for people. Rents are high and people are still moving in," he says.

"The first and foremost feature of these cities is they're planned."

Associate Professor McDonnell praises the projects and leadership of the City of Melbourne, including their Urban Forest Strategy and its involvement with the practical Growing Green Guide.



Credit: University of Melbourne

"The City of Melbourne should be really proud of what they've done. Local governments around Victoria are following Melbourne, which is great."

Building the business case for urban ecology

Where you might see parkland, gardens and beautiful urban vistas, Associate Professor Nick Williams' expert eye sees '[green infrastructure](#)', providing valuable services that help make our cities more liveable.

Associate Professor Williams, project leader at the Clean Air and Urban Landscapes Hub and the Green Infrastructure Research Group in the School of Ecosystem and Forest Sciences at the University of Melbourne, says there are cold, hard, rational economic reasons for investing in green infrastructure, the living parts of cities.

"It can reduce the cost of the way we build our cities," he says. "For example, if we put green infrastructure in we can have potentially less storm water infrastructure or pay less for air-conditioning our city.

"Some of our research has found that a green roof ten centimetres deep can reduce the annual stormwater runoff by up to 75 per cent. That's a huge amount of stormwater that isn't going down the drain, stopping the degradation of our streams and rivers. It can save the literally billions of dollars needed to upgrade stormwater infrastructure."

Similarly, Associate Professor Williams says that areas with greater proportions of green space can have surface temperatures up to 10 degrees cooler than comparable paved, concrete or asphalt spaces.

He is concerned that the trend to denser populations in inner cities is leading to a net loss of greenery.

"We need to realise that when we change the form of the city, we're affecting the provision of ecosystem services and if we don't get that right, it will affect the lives of the people living in those cities."

He puts it bluntly: "If we remove all greenery and replace all the soil with impervious surface, such as concrete, we'll have more flooding. It will be hotter. And these things will kill people."



Credit: University of Melbourne

Emerald necklaces, pocket parkland and bio-friendly buildings

To help identify where vegetation is most needed, Dr Amy Hahs maps the patterns of small and large parks, gardens and urban greenery alongside other features of our cities and suburbs, such as housing, roads and information about the people who use them.

Dr Hahs, a GIS ecologist at the Australian Research Centre for Urban Ecology and the School of BioSciences, University of Melbourne, describes parks in cities as magnets that attract people and wildlife.

"If you build a park in a disadvantaged community there's a danger that you'll eventually displace that community as people become interested in living nearby and property prices go up," Dr Hahs says.

"In the 1800s and early 1900s there was a strong push to understand the importance of those really large parks, such as Central Park in New York, or 'emerald necklace' strings of parks like those in Boston.

"In inner Melbourne we have large spaces, like Treasury Gardens and Fitzroy Gardens, but I don't think they're planned for the areas we're expanding into. We're missing an opportunity there to create cities that can have the benefits of open spaces in more local proximity."

Dr Hahs is interested in finding the right balance between the living and built elements of urban areas as our cities grow to megacities.

"Taller buildings will change light levels, rainfall reaching the ground in windy conditions, wind patterns and air movements," she says.

Space constraints of Singapore, she says, are leading to innovative architecture, with tall buildings that use contours and plazas to allow air movement at ground level for cooling, controlling wind speeds and promoting good growing conditions for greenery.

"Tall buildings can be okay, but we have to stop thinking of them as tall rectangular blocks. It's an exciting space to think about. It provides an opportunity to get additional value out of our construction efforts and make biodiversity an integral part of our urban experience."

Associate Professor Williams predicts future cities will also lose the grey expanse of roads and car parks as these give way to green infrastructure.

"I'd argue there's a lot of space being used by technologies that may become outdated in 50 years," he says. "The better our public transport is, the less road space we need, the less amount of car parking we need. Can we use some of that space, currently under asphalt, for green infrastructure, like wider footpaths, pocket parks or rain gardens? That's low-hanging fruit. We don't have to knock down any buildings to do this."

Making it happen

Local government planning is where the rubber hits the road—or perhaps the seed hits the soil—for urban ecology.

The City of Melbourne is partnering with the University of Melbourne so that parks and gardens can serve as 'living laboratories', providing real-time data on biodiversity in the city and the benefits provided to its residents and visitors.

"We've got a rich brains trust we can draw on to help the changes we're making to our city on a daily basis," says Yvonne Lynch, team leader urban forest and ecology at the City of Melbourne.

"We don't have much time for theories anymore," Ms Lynch explains. "We need to be doing and testing. Our work with universities is critical. And we're getting a really good understanding of what good adaptation is

and how we can build resilience for ourselves."

Already, the city is repurposing poorly used inner-city roads as new parkland. And Melbourne has gained international attention and won awards for its Urban Landscapes Adaptation Program. But it's not finished.

"Melbourne's ratio of green space has been shrinking while the population has been growing. But two decades ago Singapore had 36 per cent green coverage," she says. "Now it's increased to close to 50 per cent while doubling the population."

With solid evidence and growing experience, and plans and policies for more greenery in the city, the sky is literally the limit.

Provided by University of Melbourne

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