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Our cities need more trees and water, not less, to stay liveable

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How can we keep urban trees and gardens alive, without wasting water? Australia's major cities routinely rank among the [world's most liveable](#). But for all our clean streets, good healthcare and educational opportunities, one of the things we have to contend with is our sweltering summer heat.



Credit: [Marc Wisniak](#)

Urban vegetation has an important role in easing these temperatures, which means that a city's public parks, remnant woodlands, residential gardens, nature strips, street trees, green roofs, green walls and rain gardens are all vital for maintaining its liveability.

As such, this greenery – collectively termed 'urban green infrastructure' – confers a wealth of environmental, economic and health benefits to city residents. By actively cooling the urban landscape, it helps reduce energy use and carbon dioxide emissions, and ultimately lessens the risk of residents suffering heat stress, heatstroke or even death.

The problem is that urban greenery needs water, and all too often the response to past droughts has been to stop watering it, to conserve water for people.

Yet irrigating urban greenery should not be viewed as a 'waste of water', but rather as an investment in the long-term environmental and social benefits we gain from green spaces. Our cities need to use the abundant water that we currently let run down the drain.

Smarter design

Thankfully, local and state governments around Australia have started to recognise this and are starting to use water-sensitive urban design, which retains stormwater run-off and provides an alternative to irrigation with drinking water. Much of our research involves developing and evaluating new water-sensitive technologies such as green roofs, rain gardens and modified kerbs and nature strips.

But the amount of urban vegetation is still declining in Australian cities. Ever-growing houses, on ever-shrinking plots, mean that the average backyard has shrunk. Population growth has driven up property prices so that residential blocks are being subdivided for units or townhouses.

Meanwhile, larger green open spaces are being sold and developed. Perth's Burswood Park Golf Course is [making way](#) for a football stadium and casino complex, while more than 9 hectares of Melbourne's historic Royal Park is [set to disappear](#) under the [East-West Link](#) toll road.

As one of the most urbanised countries in the world, Australia could benefit greatly from increasing the extent and quality of its urban green infrastructure. Doing so has repeatedly been shown to reduce the [urban heat island effect](#) – a critical issue considering climate change predictions foretelling more intense and more frequent heatwaves.

Thermal mapping observations collected in Melbourne suggest that, on average, a 10 per cent increase in urban green cover could reduce the daytime surface temperature during heatwaves in our cities by around 1°C. However, US research has shown that for a similar reduction in urban air temperatures, a much larger increase in greenery is required.

Where to start

To help planners in Australian cities make better use of urban green infrastructure to beat the heat, we have developed [a framework](#) including the following steps to:

1. Identify priority neighbourhoods based on assessments of exposure and vulnerability, using satellite thermal imagery and demographic data. This will target the areas of cities that most need cooling.
2. Maximise the effectiveness of existing greenery by integrating water-sensitive urban design. Water is vital for plants to deliver their cooling benefits: in Melbourne, irrigated grass can be up to 15°C cooler than unwatered grass during the day, while a healthy tree canopy can reduce summer midday air temperatures beneath by up to 3°C.
3. Identify priority streets for temperature reduction, based on their orientation and the height/width ratio of the street canyon. Wide streets that run east-west in areas with low buildings should be the highest priority because they are the most exposed to the sun. In contrast, narrow, north-south streets with tall buildings are the least exposed.
4. Finally, select the most appropriate type of green infrastructure for each location. For example, increasing tree canopy cover will be the most effective strategy in wide, open streets, whereas green walls will work better in narrow street canyons. Grassed parks can act as islands of cool in a hot urban landscape, and these could be strategically located upwind of vulnerable communities such as aged-care facilities.

From new parks to new policy

Australian cities are already trying to increase their green cover in innovative ways. For example, a new park was recently created in North Melbourne by removing and reducing the width of roads, while in inner Sydney, the [Goods Line](#) project is being compared to New York's celebrated [High Line park](#). Many local governments are developing urban forest strategies, with targets to increase tree canopy cover by a certain date.

These individual projects are good initiatives, but are they enough, and do they make enough use of the great benefits that urban greenery can provide?

Given the intensity of heat being experienced in our southern cities, perhaps a more joined-up approach is required. Australian cities could consider policies like the 'no net loss' of urban green cover policy used in German cities, or Seattle's [Green Factor](#) – a score-based planning code that increases the amount and quality of green infrastructure in all new developments.

Couple this with a shift in thinking, based on the retention and reuse of the abundant stormwater that runs off the hard surfaces in our cities, and we might really get somewhere. Retarding and redirecting runoff from roofs and impervious

surfaces towards green infrastructure should happen in the [peri-urban landscape](#), in [the suburbs](#) and the [inner city](#).

Making this rainfall runoff available to existing and engineered green infrastructure, particularly during hot weather, is the means to making our cities, greener, cooler and more resilient to climate change.

Perhaps then Australian cities can still be at the top of the annual ‘most liveable’ lists – even during a heatwave or in a drought.

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