

Cities under pressure

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Professor Richard Dawson, Newcastle University. Photo taken by SUDS - Sustainable Urban Drainage System - on Helix, Newcastle University's living laboratory. Credit: Newcastle University

Cities to swelter as planners face unenviable trade-off between tackling climate change and quality of life, new research has shown.

The study, led by experts at Newcastle University, UK, has shown the challenge we face to reduce [greenhouse gas emissions](#), increase cities' resilience to extreme weather and also give people quality space to live

in.

Publishing the research in the journal *Cities*, the team have for the first time analysed the trade-offs between different sustainability objectives. These include minimising climate risks such as [heat waves](#) and flooding, reducing emissions from transport, constraining urban sprawl, making best use of our brownfield sites, ensuring adequate living space, and protecting [green space](#) which is important for our health and wellbeing.

Focussing on London—an example of a large rapidly growing [city](#) that is also at the forefront of tackling climate change—the team show the 'best case' scenario would be to increase development in a small number of central locations, such as East Barnet, Wood Green and Ealing.

Avoiding development along the Thames, this optimum plan would reduce [flood risk](#), minimise transport emissions and reduce [urban sprawl](#)

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But, says author Dr. Dan Caparros-Midwood, the trade-off will be more people exposed to extreme temperatures.

"Many of the lowest heat hazard areas coincide with the flood zone on the banks of the River Thames due to the cooling effect of blue infrastructure," explains Dr. Caparros-Midwood, who carried out the work as part of his Ph.D. at Newcastle University and is now a Senior GIS Specialist at Wood.

"But moving development away from the river while also protecting our green spaces and reducing sprawl really only leaves two options; either shrinking our homes or developing in higher heat risk areas.

"And while our study looked at London, this could apply to most cities in the world."

Building resilience in our cities

By 2050 it is estimated that two-thirds of the world's population will live in cities, highlighting the urgent need for urban development to be sustainable.

"Urban areas must radically transform if they are to reduce their greenhouse gas emissions and consumption of resources whilst also increasing their resilience to climate change and [extreme weather](#)," explains Professor Stuart Barr, co-author and part of the Geospatial Engineering group at Newcastle University.

Project lead Professor Richard Dawson, of the School of Engineering at Newcastle University, said the findings reinforced the scale of the challenge.

"We are already starting to see the impact of hotter summers and flooding on our cities," he says.

"Balancing trade-offs between these objectives is complex as it spans sectors such as energy, buildings, transport, and water.

"What our study shows in stark detail is this cannot be done using our current approach to planning and engineering our cities—difficult choices will have to be made."

Even in Europe, says Professor Dawson, only a quarter of cities have a comprehensive climate strategy. And yet, with the right impetus, we have the potential to accelerate and upscale action in our cities to tackle [climate change](#).

"We have to be more creative about how we design and build our buildings and infrastructure," he says.

"This will include weaving green infrastructure into urban spaces; facilitating lifestyle choices such as walking and cycling that reduce [energy demand](#), pollution and greenhouse gas emissions; and integrating new technologies that can shift carbon-intensive energy patterns by optimizing transport efficiency, vehicle sharing and reducing congestion.

"For the moment though, there are difficult, and often irreconcilable, trade-offs to be made in urban areas and we need to be making them now."

More information: Caparros-Midwood D, Dawson R, and Barr S (2019). Low Carbon, Low Risk, Low Density: Resolving choices about sustainable development in cities. *Cities*, 89, 252-267.

Provided by Newcastle University

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