

'Build parks to climate proof our cities'

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Scientists looking at the effect global warming will have on our major cities say a modest increase in the number of urban parks and street trees could offset decades of predicted temperature rises.

The University of Manchester study has calculated that a mere 10% increase in the amount of green space in built-up centres would reduce urban surface temperatures by as much as 4°C.

This 4°C drop in temperature, which is equivalent to the average predicted rise through global warming by the 2080s, is caused by the cooling effect of water as it evaporates into the air from leaves and vegetation through a process called transpiration.

"Green space collects and retains water much better than the built environment," explained Dr Roland Ennos, a biomechanics expert in Manchester's Faculty of Life Sciences and a lead researcher in the team.

"As this water evaporates from the leaves of plants and trees it cools the surrounding air in a similar way to the cooling effect of perspiration as it evaporates from our skin."

Taking Greater Manchester as their model, the team used Geographic Information System (GIS) mapping to build up a picture of the conurbation's land use. The team then worked out the impact that increasing the amount of green space would have on the urban climate as well as on water retention.

"Urban areas can be up to 12°C warmer than more rural surroundings due to the heat given off by buildings, roads and traffic, as well as reduced evaporative cooling, in what is commonly referred to as an 'urban heat island'," said Dr Ennos, who worked on the project with Professor John Handley and Dr Susannah Gill in the School of Environment and Development.

"We discovered that a modest increase of 10% green space reduced surface temperatures in the urban environment by 4°C, which would overcome temperature rises caused by global warming over the next 75 years, effectively 'climate proofing' our cities.

"Such a reduction has important implications for human comfort and health within urban areas and opportunities need to be taken to increase green space cover wherever structural changes are occurring within urban areas, as well as planting street trees or developing green roofs."

The research, published in *Built Environment* also examined the effect increased green space would have on the amount of rainwater urban areas capture and retain; towns and cities lose a large proportion of rainwater through what is termed 'run-off' where precipitation quickly leaves the surface and drains away into streams and rivers, eventually returning to the sea.

"By the 2080s, our summers will be hotter and drier but winters are predicted to become wetter," said Dr Ennos. "An extreme wet winter's day by the 2080s will deliver almost 50% more rain than is currently experienced.

"Based on an existing model, we have calculated that these more powerful storms would increase the amount of run-off from urban areas by more than 80%. Unfortunately, increasing the amount of green space only has a limited effect in reducing run-off and so flash flooding will

become an increasing problem in our cities.

"Conversely, the warmer, drier summer months will reduce the amount of water available to plants and, during the longer droughts, this will reduce transpiration with its associated cooling effect.

"In order for the cooling effect of green spaces to work when it is most needed, cities would need to develop ways to store additional water, which could then be used to irrigate the green spaces during drier months."

Source: University of Manchester

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