



Urban vegetation could be an undervalued carbon sink

Urban vegetation could have been overlooked as valuable above-ground carbon storage, according to researchers. They estimated that 231,521 tonnes of carbon were stored in above-ground vegetation in a UK city, the majority of which (97 per cent) in trees. This was 10 times the amount estimated from national figures for the same city area.

Over half the world's population now live in towns or cities and this is predicted to increase to 70 per cent by 2050. However, although urbanisation is a major cause of land-use change, there have been few attempts to quantify the provision of ecosystem services at a city-wide scale. This is likely to be due to the longstanding perception that urban ecosystems have limited ecological value. Carbon storage within biomass and soil is being increasingly recognised for its contribution to mitigating climate change, but little has been done to assess this ecosystem service in cities.

The study analysed the levels and distribution of above-ground carbon stored in a typical British city, Leicester. It was examined in terms of four categories of vegetation: herbaceous vegetation (grasses and non-woody plants), shrubs (woody bushes and trees typically smaller than 2 metres), tall shrubs (woody bushes and trees with a height of about 2 to 5 metres) and trees that were greater than 5 metres in height. Vegetation was sampled at 347 sites distributed throughout the city across both public and private land, including 35 domestic gardens. The proportion of land covered by each type of vegetation was determined using geographic information system (GIS) data, and the amount of biomass and stored carbon was measured for herbaceous vegetation and calculated for trees and woody vegetation.

The research estimated that 231,521 tonnes of carbon is stored in above-ground vegetation within the city of Leicester - which is about 3.16 kg of carbon per m² of urban area. This is nearly ten times more than the figure derived for Leicester from national estimates, which is 25,299 tonnes of carbon. Trees contribute 97.3 per cent to the carbon store. Within the sample there were 20 trees that were over 20 metres tall and these constituted 72,970 kg of biomass. This is more than the remaining 635 trees which were under 10 metres and contributed 56,964 kg.

From its estimates, the study demonstrates the importance of urban ecosystems for the storage of carbon, a service that has previously been undervalued. However it must be remembered that above ground vegetation is not a permanent carbon sink as the plants and trees will ultimately die and release the carbon back into the environment. This means there should be initiatives in place to replant and maintain current carbon reservoirs.

If 10 per cent of public grassland in Leicester was planted and maintained with trees, an extra 28,402 tonnes of carbon could be stored. To optimise this, vegetation should be chosen and located with care to ensure a long, productive life span and should account for projected future climate. In the UK, for example, summers are expected to get hotter and drier, and vegetation which can survive this will be needed. Planting should also consider any possible negative impacts it may have, such as decreased traffic safety if trees obscure line of vision and the loss of grassland recreational space.

Source: Davies, Z.G., Edmondson, J.L., Heinemeyer, A. *et al.* (2011) Mapping an urban ecosystem service: quantifying above-ground carbon storage at a city-wide scale. *Journal of Applied Ecology* doi: 10.1111/j.1365-2664.2011.02021.x

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