Urban trees improve air quality

Planting trees in urban areas could cut particulate pollution in cities by as much as a quarter, according to a new study. Small air particles, especially those less than 10µm in diameter (PM$_{10}$) pose a long-term threat to human health. These can originate from human activities, including exhaust fumes or smoke, or from natural causes, such as dust. The study shows that trees are particularly good at capturing PM$_{10}$ on their leaf surfaces.

Scientists investigated the potential of trees to remove PM$_{10}$ in Glasgow in Scotland, and also in the West Midlands area in England, which includes the cities of Birmingham, Wolverhampton and Coventry. The researchers used an established statistical model to calculate how further tree planting in these urban areas would affect PM$_{10}$ levels.

The model generated a number of scenarios which showed that PM$_{10}$ from human activity could be reduced by between seven and 26 per cent. The greatest reductions could be achieved by increasing tree cover in the West Midlands. If tree cover was increased from 3.7 per cent to 16.5 per cent, PM$_{10}$ levels could be cut by 19 per cent. Increasing tree cover to the theoretical maximum level of 54 per cent (achievable only by planting trees on available green space) would result in a 26 per cent drop in PM$_{10}$ levels and result in the removal of 200 ton (203.21 metric tonnes) of PM$_{10}$ per year. In Glasgow, a six per cent reduction in PM$_{10}$ could be achieved by increasing tree cover from 3.6 per cent to eight per cent.

In the West Midlands, trees currently remove seven per cent of the particulate pollution arising from human activity, or 39 ton (39.63 metric tonnes) of PM$_{10}$ removed from the atmosphere. This is equivalent to a four per cent reduction in PM$_{10}$ levels. The study estimates that trees currently remove 4.9 ton (4.99 metric tonnes) of PM$_{10}$ from the air in Glasgow.

Tree planting appears to be an effective strategy to remove PM$_{10}$ from urban air. If a quarter of the urban land available was planted with trees, then average PM$_{10}$ could be cut by between two and ten per cent. Tree species with the greatest overall leaf surface area, such as larch, pine and ash, are the best PM$_{10}$ scavengers, and planting them individually rather than in large groups offers the biggest improvements in air quality. The downside is that some tree species emit volatile organic compounds (VOCs) which contribute to ozone formation. In addition, the PM$_{10}$ that trees collect is not removed completely but can accumulate in the soil, which over the long term may lead to contaminated soils.


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