

There are two planetary emergencies upon us: climate change and biodiversity loss. Both need urgent attention. Green spaces can help tackle both, as well as promoting greater wellbeing. As is clear from the pressures of the COVID-19 pandemic, green spaces are important to people. Numerous recent surveys such as that of the [CPRE \(May 2020\)](#) attest to this.

## Green plants and climate-change mitigation

Green plants have a major impact on the climate. During daylight hours they absorb carbon dioxide from the atmosphere through photosynthesis. Throughout the 24-hour day they respire and produce carbon dioxide but in far smaller amounts than they take up through photosynthesis. The carbon dioxide they absorb is converted into plant material. In this way plants become carbon sinks.

The proportion of photosynthesising material to overall biomass of the plant can be significant. An old tree, for example, may have a smaller proportion of leaves to woody tissue. The carbon stays locked in the woody tissue unless the tree is burned. The decomposition of a dead tree will release carbon, but at a much slower rate, whilst also promoting biodiversity. This absorption of carbon by green plants comes under the category of climate-change mitigation.

## Green plants and climate-change adaptation

Plants also have a major role in climate-change adaptation. This term refers to how we accommodate to a rise in temperature and other impacts of a changing climate: for example, significant changes in weather patterns such as storms and resulting flooding. Plants have a cooling effect by losing water through their leaves (transpiration) and by offering shade. This can benefit not just individuals but whole buildings. Used in this way, plants can reduce the need for air conditioning and the energy consumption that this would normally require. They can temper the heat-island effect of concrete and other building materials.

## Natural Capital

Natural capital refers to the world's natural resources including its geology, soils, air, water and living organisms. We depend on these resources to live. The resulting goods and services are referred to as ecosystem services.

Plants make a major contribution to ecosystem services and as such to resilience. They can lessen the impact of flooding by preventing an otherwise unhindered flow of water through, for

example, a concrete gully. Cities have traditionally relied on controlling stormwater by draining it through channels, but this can cause a range of problems downstream and degrade aquatic habitats. When grey water (shower, bath, kitchen, and washing machine water from rinse cycles) and sewage are mixed in this process, the energy needed for treatment of the water increases. Plants, by contrast, will take up some of the water and release it more slowly, though care is needed to ensure that the most appropriate plants are planted in the right places. Green roofs, if well designed, can absorb rainfall and slowly release it whilst also insulating the roof. These nature-based solutions enhance our resilience to climatic extremes while protecting biodiversity.

## Biodiversity

Biodiversity is the term used for the range and quantity of species needed to maintain a balanced environment. As already noted, nature is critical to our survival: photosynthesising plants provide us with oxygen and help regulate our weather patterns. Human activity has altered 75% of the earth's land area, squeezing wildlife and nature into ever-smaller patches of the planet.

Around one million animal and plant species are threatened with extinction – many within decades – according [2019 Global Assessment Report](#) (IPBES). The report called for transformative changes to restore and protect nature. It found that the health of the ecosystems on which we and all other species depend is deteriorating more rapidly than ever, affecting the very foundations of our economies, livelihoods, food security, health and quality of life worldwide.

The loss of biodiversity has led the Department for Environment Food and Rural Affairs (DEFRA) to launch an initiative called [Biodiversity Net Gain](#), which calls for any development to result in a net gain for biodiversity, although this may involve compensatory mitigation efforts in places other than the development in question.

## Health

We need green spaces both to support good mental health via visual ambience and to improve air quality. Research over the years, ([see here](#)) has shown that when viewing green landscapes, there can be reductions in stress and anxiety, measurable in positive changes to blood pressure, pulse rate and other physiological factors, For example, a [pilot study](#) in Scotland has found that using a woodland-based cardiac rehabilitation programme combined with regular cardiac rehabilitation can boost recovery.

Hospital patients able to look out on green space have been shown to suffer less pain and to recover more rapidly. As a result, their need for medium to strong pain-killing drugs can be reduced by 25% ([Health & Wellbeing Greener Planning Greener UK](#)). Elements which are thought to contribute to this effect include ‘soundscapes’ such as the noise-buffering achieved in green spaces, and sounds such as the flow of water or bird song. Other elements include improved air quality, the triggers of scent and colour to emotion and the sense of awe that can be experienced when absorbed in nature, as for example when simply watching a butterfly. This latter effect is also known as attention restoration theory ([Kaplan](#)). It suggests that mental fatigue and concentration can be improved by time spent looking at nature.

### **Designing green spaces: what you can do**

Those who have influence over the design of an area of green space, whether in the City or elsewhere, might consider a number of factors, though not all will be applicable in each case:

- Some formal/informal seating to enable those entering a garden to enjoy the peace, the colour, the scents and the sense of awe. Informal seating could be just the side of a raised bed.
- Avoid using pesticides.
- If using a hedge as a border, fairly dense foliage with textured leaves is more likely to help reduce air pollution. A hedge can also provide a good habitat for insects and birds, thereby improving biodiversity, and can reduce disturbance from external noise.
- A mixture of shade and sun provides a range of habitats.
- Make water available for birds and insects – as easy as a bowl with pebbles, and water which almost covers the pebbles. A small water feature can also provide soundscapes from the sound of water flowing.
- No matter the size of your garden or window box, you can do your bit for pollinators, for example by planting at least two kinds of bee-friendly flowers for every flowering season. Bee-friendly flowers are rich in pollen and nectar, which bees can then easily access throughout the year. All bees--bumblebees, honeybees and solitary bees--will benefit from this. The best habitats for bees are those that offer plenty of flowers to feed on during the entire active phase of the bees’ lifecycle (from March until October).
- You may like to introduce a bee box to help with nesting sites for wild bees. At present in the City there are too many honeybee colonies and not enough forage. As a result, the honeybee colonies are likely to out-compete the wild pollinators, potentially reducing biodiversity in the area.
- Make best use of space: reduce any hardstanding and close-cut grass areas, instead using more of the space for planting. Replace hardstanding with gravel to support better drainage.
- Ensure there is food for birds, whether bought-in seeds or fruit and berries.

- On the [Pollinating London Together](#) website there are suggestions for plants that could provide pollinators with forage throughout the year. The shrubs in this list have been chosen primarily for their ability to allow access to nectar and pollen, but also because they are suited to urban areas and do not need a lot of care and attention.
- Avoid highly cultivated bedding plants, such as pansies, as they often provide little forage.
- Choose plants that are well suited to the conditions and that do not require excessive watering.

Fact checked by:

