

Increasing the environmental resilience of UK gardens



Inspiring everyone to grow

RHS National Gardening Survey 2020

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RHS Registered Charity No: 222879 / SC038262

Boosting the potential of UK gardens to combat environmental challenges

Summary of the findings from the nationwide RHS-commissioned survey on UK domestic gardens, December 2020

The towns and cities we live in are coming under mounting environmental pressure. Declining air quality, heightened noise and flood risks, increasingly high summertime temperatures and a decrease in wildlife are just a few of these growing problems. As a result, scientists at the UK's gardening charity, the Royal Horticultural Society, have intensified their research over the last decade to find solutions to these problems.

This research has increased our understanding of the environmental benefits (services) offered by plants, domestic gardens and small urban green spaces, particularly in highlighting their vital role in mitigating climate change and how we can manage them more sustainably.¹⁻⁴

It comes against the backdrop of the huge potential gardens could offer – the majority of UK residents (nearly 90%) are classed as living in urban or suburban areas, and most have access to domestic green space either in the form of a private or community garden.⁵ Every garden could do something to help; and in many cases, much, much more.



“The majority of UK residents have access to domestic green space. Every garden could do something to help; and in many cases, much, much more.”

Thanks to RHS-led (and wider) scientific research we already know that:

- ◆ Using less paving and growing more greenery in domestic front gardens reduces the risk of localised flash flooding⁶
- ◆ Growing greenery to form shrubberies and hedges will reduce noise and particulate pollution behind those ‘screens’²
- ◆ Covering houses with plants (e.g. a climber / wall shrubs / a green wall) will reduce summertime air temperatures within buildings and improves insulation in wintertime without causing damp issues⁷
- ◆ Choosing plants with hairy leaves, large and dense canopies and high transpiration rates will improve cooling by plant species and reduce rainfall runoff^{8, 9}
- ◆ Growing and increasing the diversity of plants in your garden helps provide multiple environmental benefits, including those mentioned above³

With millions more people taking up gardening over the course of the pandemic,¹⁰ the RHS now aims to maximise the power of UK gardens to help combat some of the biggest environmental problems facing us today, including mitigating climate change. Consequently, the RHS carried out a survey to find out:

1. The extent of the environmental pressures experienced by people around the UK and how much people want to take action to help;
2. The general awareness people have about the role of plants in mitigating these problems and what action they have already taken;
3. How the RHS can increase the positive impact of UK gardens by reducing the barriers to growing more plants.

The RHS survey was carried out by YouGov with a total sample size of 2,056 adults. The survey was carried out online 3–4 December 2020. The figures are weighted and are representative of all UK adults (aged 18+).



Highlights from the survey findings

Perceptions of the UK public

- ◆ Good awareness and concern about the global environmental issues
- ◆ The local environmental issues most often perceived as ‘threats’ in daily life are summer heatwaves and a decline in air quality, particularly in the South and South East of England. Additionally, nearly 4 in 10 (37%) of respondents nationally report being moderately or severely affected by noise where they live. There were some regional differences, including increased flooding being perceived more in the regions that suffered more flooding events in the recent past, such as Yorkshire and Humber and West Midlands



Awareness and actions of the UK public

- ◆ Good awareness of the role of plants in capturing carbon dioxide (CO₂) with 59% of respondents reporting this, and in supporting wildlife (47%); also of the importance of plant diversity (36%)
- ◆ Less awareness of the role of plants in mitigating flooding (<20%), compared to using them to reduce noise (40%) or improve air quality (30%)
- ◆ A smaller proportion of front gardens are now fully paved over compared to 2015. This is in part due to the ‘COVID effect’ of having more appreciation of nature and time at home to plant and grow; but the RHS and other organisations with an interest in nature have helped raise awareness of the added environmental benefits
- ◆ Encouragingly, our gardens proved to be a good place to start with simple improvements such as enhancing what we grow in them. Woody perennial plants offer the most potential to help the environment – 61% of gardens already have at least one tree and 38% a hedge
- ◆ Growing food – this was a feature of more than a quarter of gardens
- ◆ Significant numbers of people are engaging with sustainable practices, for example 44% collect rainwater in drier areas (South and East of England), 41% nationwide limit their use of pesticides and fertilisers, and 32% reduce the use of plastic in their gardens.

70%

care about
environmental issues

61%

of gardens already
have at least one tree

59%

are aware of the role
of plants in capturing
CO₂

56%

of Londoners are
moderately or severely
affected by heatwaves

47%

are aware of the
role of plants in
supporting wildlife

44%

collect rainfall in drier
areas



Removing barriers for the public

◆ A lack of space, gardening knowledge / expertise and time were the key barriers. Only 20–30% of respondents report this, signifying a potential to:

- focus help and information in the areas where barriers exist
- encourage people who are already relaxed about these barriers to do more

◆ Ownership of a garden came up as an issue, with people in rented spaces being limited in what environmental activities they were allowed or able to engage in. Supporting them to do something within these confines by offering advice and inspiration would reduce this barrier.

Results in detail

In line with the Office of National Statistics 2011 census data, 88% of our survey respondents were classed as urban/suburban. Across the UK, 87% reported to have access to a domestic garden (ranging from 97% in Wales to 71% in London), whether rented or privately owned.



What do people perceive as environmental problems?

The majority of respondents (70% on average, 74% female / 66% male) stated that they care / care very much about the environmental issues and ‘do their bit’ / as much as possible to help. This was true for respondents of all ages and social grades. Responses from each of the UK nations were also similar (70+%).

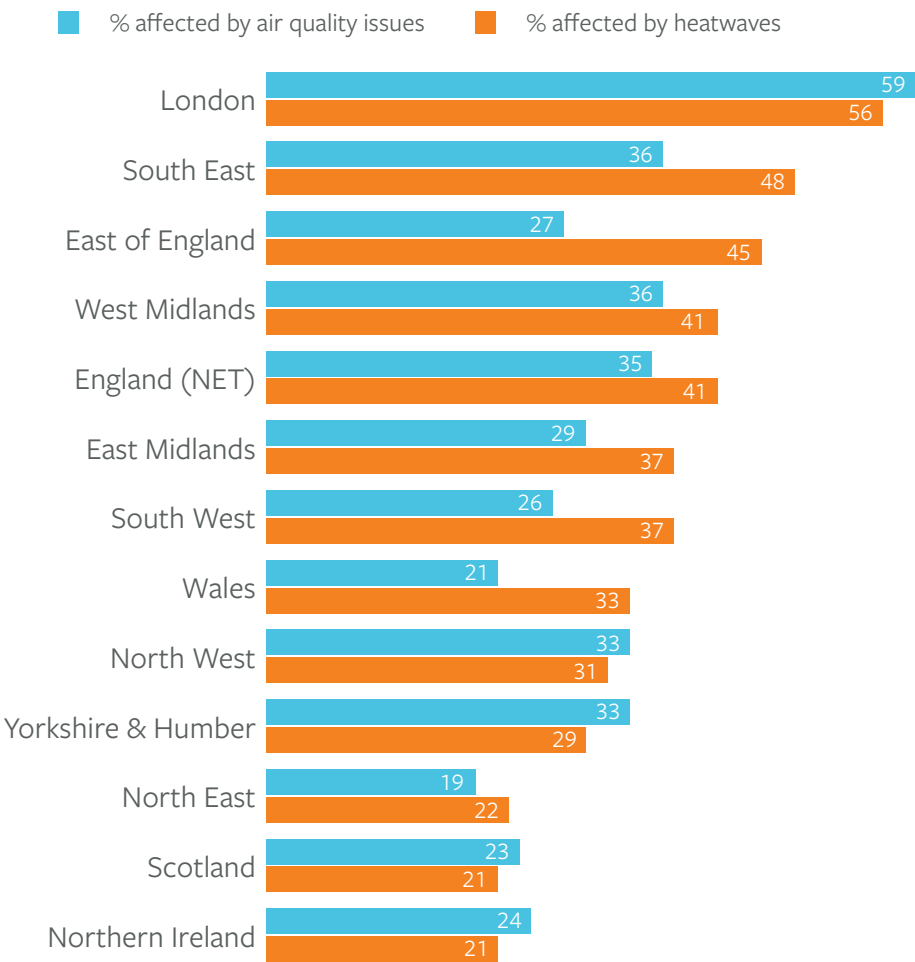
In terms of the respondents’ exposure to, and perception of, environmental issues, **summer heatwaves** and **poor air quality** were those most noted by respondents (Figure 1). Unsurprisingly there were regional differences, with Londoners saying they were most affected by heatwaves (56% moderately or severely affected), followed by 48% in the South East of England, and 45% in the East of England. This compared with around 20% in the naturally cooler climates of North East England, Scotland and Northern Ireland.

Air quality issues were perceived as the biggest issue by Londoners (59%), followed by West Midlands residents (36%). Just over 1 in 5 residents of Scotland and Wales report being affected by poor air quality issues (Figure 1).

Flash flooding was seen as a threat by significantly more residents in Yorkshire and Humber and the West Midlands (1 in 5), compared to other regions nationally.

“The local environmental issues most often perceived as ‘threats’ in daily life are summer heatwaves and poor air quality.”

Figure 1. Survey responses to the question ‘Have you ever personally been affected by air pollution / heatwaves?’ – percentage of respondents who report being ‘severely’ or ‘moderately’ affected.



74%

of women and

66%

of men **care** or **care**
very much about
environmental
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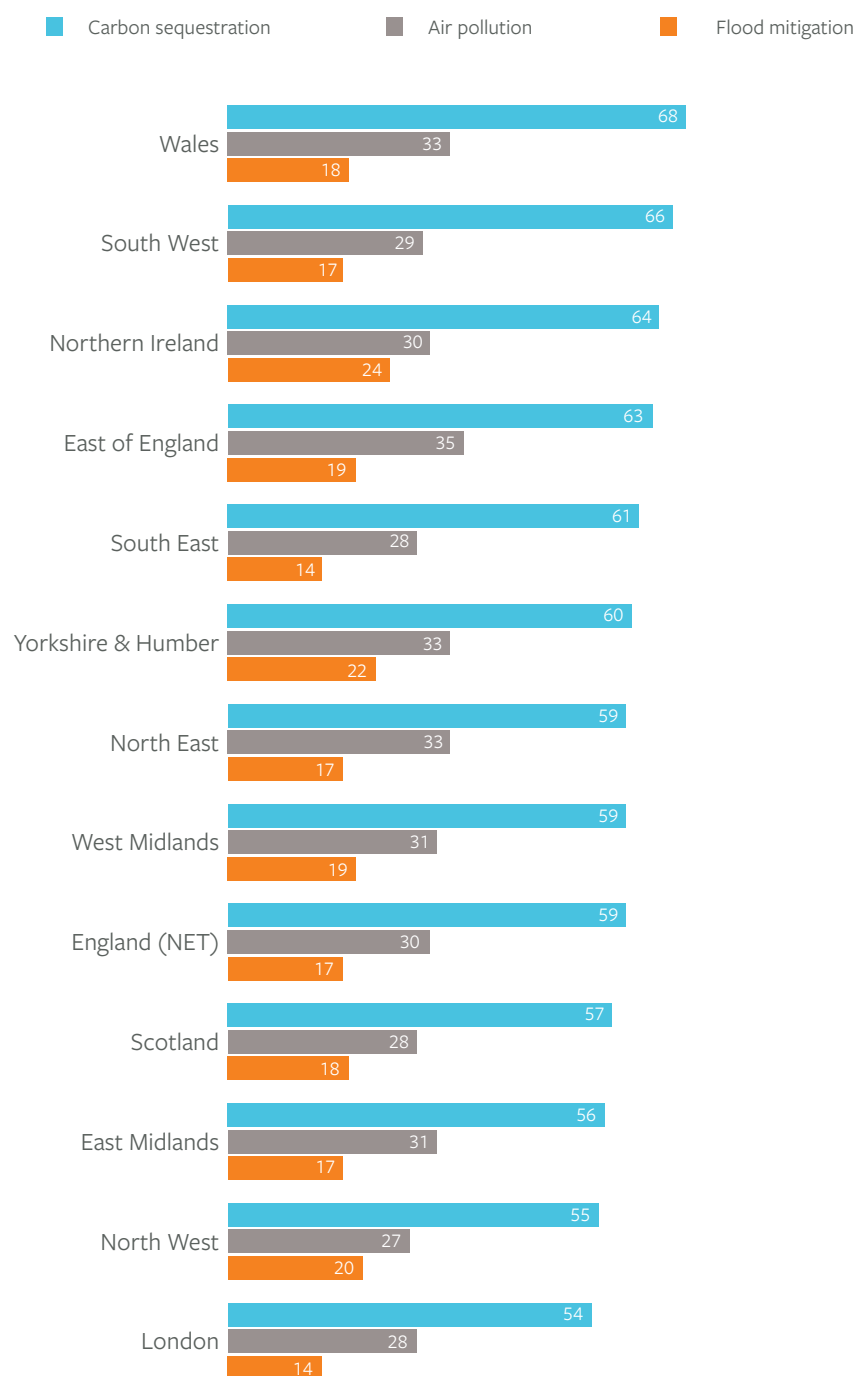
Results (cont.)



Are people aware of the role of garden plants in reducing environmental problems?

The greatest awareness of how plants help with environmental issues is around the capacity of trees to **capture and store CO₂**. Hedges are best known for their role in supporting wildlife, but many were aware of their potential for capturing CO₂. Nearly 60% of respondents nationwide ranked the CO₂-storing capacity of trees and hedges as one of the top benefits from growing these in their gardens (Figure 2), followed by around 50% saying that **helping wildlife** is the biggest benefit of a garden. The role of hedges as **noise barriers** was recognised by 40% of respondents, but only 30% perceived hedges as **air pollution barriers** (Figure 2). There is least awareness about **using plants to mitigate flooding**, with fewer than 1 in 5 respondents citing this (ranging from 14% in London to nearly 25% in Northern Ireland) (Figure 2).

Figure 2. Percentage of respondents supporting the statements ‘Trees/hedges capture carbon and significantly reduce CO₂ levels in the atmosphere’; ‘Hedges act as significant barriers to roadside air pollution’; ‘Hedges can help reduce flooding risks for your house and street’.



Nearly

60%

rank their **capacity to store CO₂** as the one of the top benefits of growing trees and hedges, while around

50%

say **helping wildlife** is the biggest benefit of a garden.

Results (cont.)



Green coverage within front gardens

Compared to a similar nationwide survey of front gardens in 2015 (RHS Mori Poll of 1,492 people in the UK aged 16+ with front gardens, March 6–22 2015),¹¹ there was a positive development – a reduction in the amount of fully paved-over front gardens (Figure 3). This suggests that some garden owners have been planting pockets of greenery (e.g. plants in containers, climbers or a hedge) in previously bare gardens. And this shift can be seen in the 1–24% and 25–49% categories, which are measures of the percentage of a front garden covered by plants. There was even a slight increase in the percentage of 75–99% planted/green front gardens, which, we hypothesise, might be linked to new houses where fronts may not yet be developed.

The South West of England, along with Wales and Scotland, has fewest fully paved-over front gardens, which mirrors the results that show they have the greenest gardens (Figure 4).

This apparent decrease in the proportion of front gardens without any vegetation in the period 2015–2020, and a complementary presence of gardens with substantial greening, is a positive development. It will help lower local flood risks, creating better conditions for water percolation into the ground where soil was retained, increased water loss by evapo-transpiration by plants, and temporary storage of rainwater in the leafy canopies. With more diverse planting, and the presence of features such as hedges, the benefits could expand to include noise reduction, air quality improvement, summertime cooling and corridors for wildlife.²

“This suggests that some garden owners have been planting pockets of greenery (e.g. plants in containers, climbers or a hedge) in previously bare gardens.”

Figure 3. Percentage of UK front gardens with various extents of green cover (from ‘all paved’ to ‘100% green’), in 2020 compared with 2015.

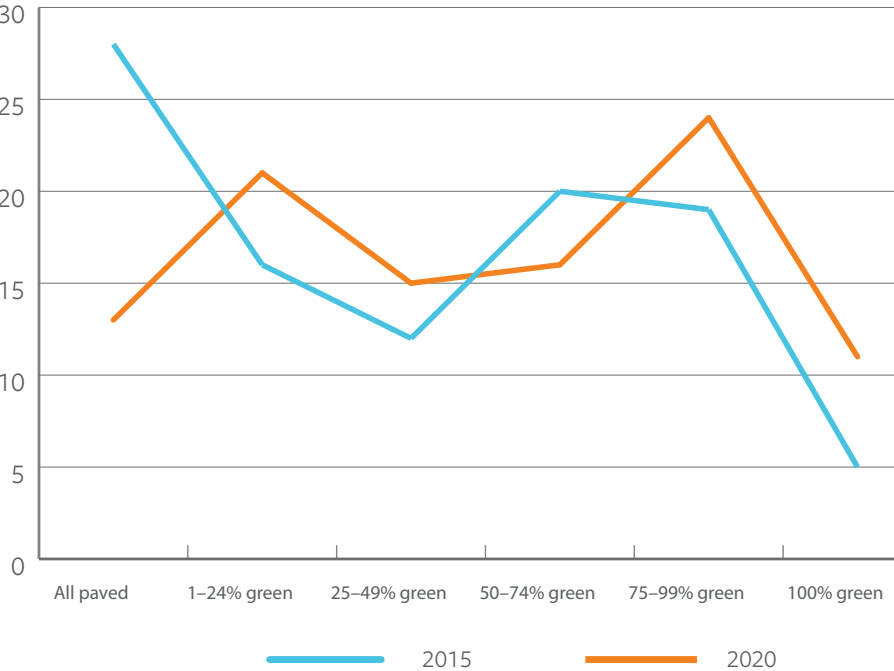
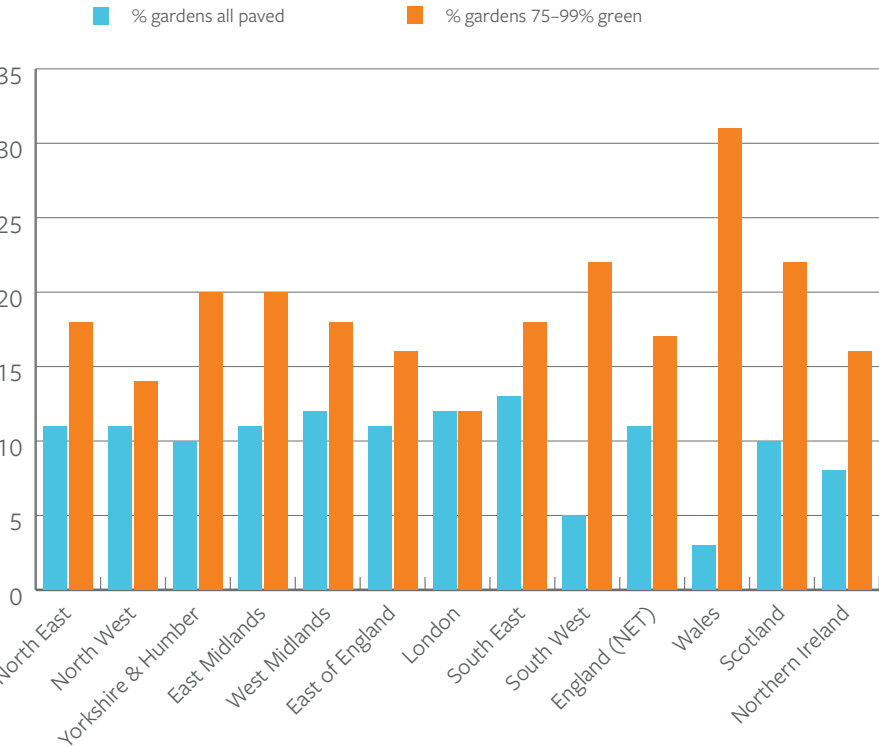


Figure 4. Proportion of respondents who report either no greenery present in their front gardens, or 75–99% of their garden being vegetated, by UK region/nation.



Key environmental benefits provided by urban vegetation, including hedges:

- Reducing flood risks
- Sequestering particulate and gaseous airborne pollutants as well as soil-borne chemical pollutants
- Reducing noise
- Providing habitat, shelter and corridors for wildlife
- Providing shade and transpirational air cooling

Results (cont.)



“These results could be linked to wider trends in gardening such as greater sustainability through growing food at home.”

Habits and gardening practices

From the survey, it's clear that many people grow plants that provide good environmental benefits and actively engage in sustainable practices such as composting to 'do their bit'. The results also indicate where more could be done.

Trees and hedges

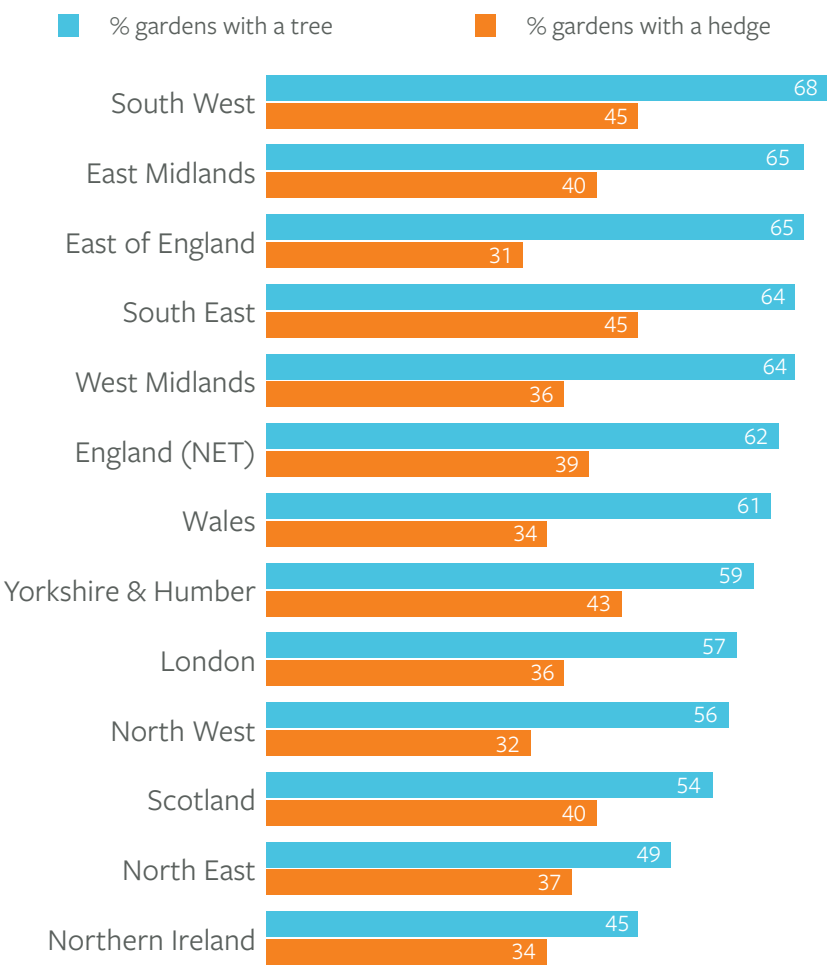
Owing to the range of benefits that trees provide, it is very encouraging to see that over 60% of respondents nationally say they have at least one tree in their garden. In the East of England, Midlands and South West they report 2 in 3 gardens having a tree (Figure 5). Likewise, hedges remain a feature in many gardens (nearly 4 in 10 gardens nationally have them, but this goes up to half of all gardens in the South East and South West, and down to 1 in 3 in North West and East of England, Northern Ireland and Wales) (Figure 5).

This is encouraging as both trees and hedges are perennials (i.e. long living) and so will provide multiple benefits for the long term such as localised cooling, supporting biodiversity, flood risk reduction and carbon locking.²

Grow Your Own

A quarter of all respondents who have a garden report they grow their own fruit and / or vegetables (up to 30% in the South and East of England and Scotland, and down to 18% in London). These results are likely to reflect the specific circumstances of 2020 with the pandemic and lockdowns increasing people's reliance on domestic green spaces for leisure, but it could also be linked to the wider changing trends in gardening such as being more sustainable by growing food at home.

Figure 5. Proportion of respondents who report having a tree or a hedge in their garden, by UK region.



25%

of all those who have a garden **grow their own fruit and veg** rising to

30%

in Scotland and the South and East of England.

Results (cont.)

Gardening practices (cont.)

Collecting rainwater

Equally, the use of the sustainable gardening technique of collecting rainwater varies across the UK. Unsurprisingly, drier areas (East and South East of England) lead the way with 44% of respondents with a garden saying they have a water butt. However, even in the naturally wetter South West and East Midlands, figures were similar. Conversely, only 8% of Northern Irish respondents and only 17% of Londoners claim to collect rainwater (despite 2 out of 3 London respondents having a back garden).

Composting garden waste

The tendency to have a compost heap is quite similar across the UK regions / nations, with just under 30% of those with gardens reporting they have one.

Supporting wildlife

Nearly 1 in 3 adults with a garden report that they plant with wildlife in mind. This is still about half the amount who recognise the benefits of gardens in supporting wildlife, suggesting an opportunity to bridge the gap between knowing the benefit and taking action.

Other sustainable practices

More than a third of respondents actively limit their use of plastics, and up to 40% limit their use of pesticides and fertilisers in their gardens.

The use of less sustainable practices such as plastic turf was not prevalent – nationally only 6% of respondents report this, with less than 4% in the East of England.



Removing barriers to change

Figure 6. Qualitative answers by word frequency (n=144). The question was ‘What would help you plant more?’ *



In the survey, similar barriers were consistently mentioned nationwide. Some are simpler to solve than others: it's easier to improve people's horticultural expertise than to increase the size of their gardens.

- ◆ Lack of space and horticultural expertise were the biggest barriers to growing more plants, both being reported by more than 1 in 4 respondents quite equally across all UK nations / regions. Having more space would remove the barrier for more than 30% of respondents
- ◆ The cost and the time required to garden were the next biggest barriers, reported by approx. 1 in 5 respondents. A small proportion of respondents (7%) said the cost of plants and materials was also a barrier that needs to be lowered (Figure 6)
- ◆ Garden ownership: the free-text responses highlighted that garden ownership is an issue when considering growing more plants. Respondents living in rented properties are often constrained as to what and where they are allowed to plant (Figure 6)

* analysed using NVivo software (QSR International, Melbourne, Australia)

Where next?



“There’s still so much more that plants could do to protect us against environmental issues such as climate change.”

‘Super plants’?

The survey highlights so many positives taking place in UK gardens. It reports an encouraging reduction in the proportion of front gardens that contain no plants at all in the last five years. It also shows that more gardens than not have either a tree or a hedge – this is important because woody plants provide the best range of environmental services because of their large size and the fact that they live a long time. And food and wildlife areas are now present in more gardens than not.

There’s still so much more that plants could do for us if we grow them. By further increasing the diversity of the planting in our gardens, and by growing plants (species and cultivars) that are known to provide excellent environmental benefits (often referred to as services), gardens can strengthen their role in protecting us against environmental issues such as climate change.

By raising awareness of the environmental benefits of plants – including their role as flood, noise and air pollution barriers and natural ‘coolers’ – we can bridge the gap between people’s general awareness of these issues and the practical steps we can take in our own gardens.

Our research has highlighted that plant characteristics such as large and dense canopies and the presence of rough and hairy leaves improve storage of rainfall within foliage, and increases the capture of airborne particulate pollutants. Examples include yew (*Taxus baccata*), *Cotoneaster franchetii* and western red cedar (*Thuja plicata*). Additionally, high evapo-transpiration rates in plants are linked with better cooling as well as reduction of rainfall runoff, so consider planting *Forsythia* × *intermedia*, hawthorn (*Crataegus monogyna*) and privet (*Ligustrum* species).



It's important to remember that plants provide multiple benefits. Even those that do not excel in one particular 'service' may provide other 'services' well.

What does this mean for your garden?

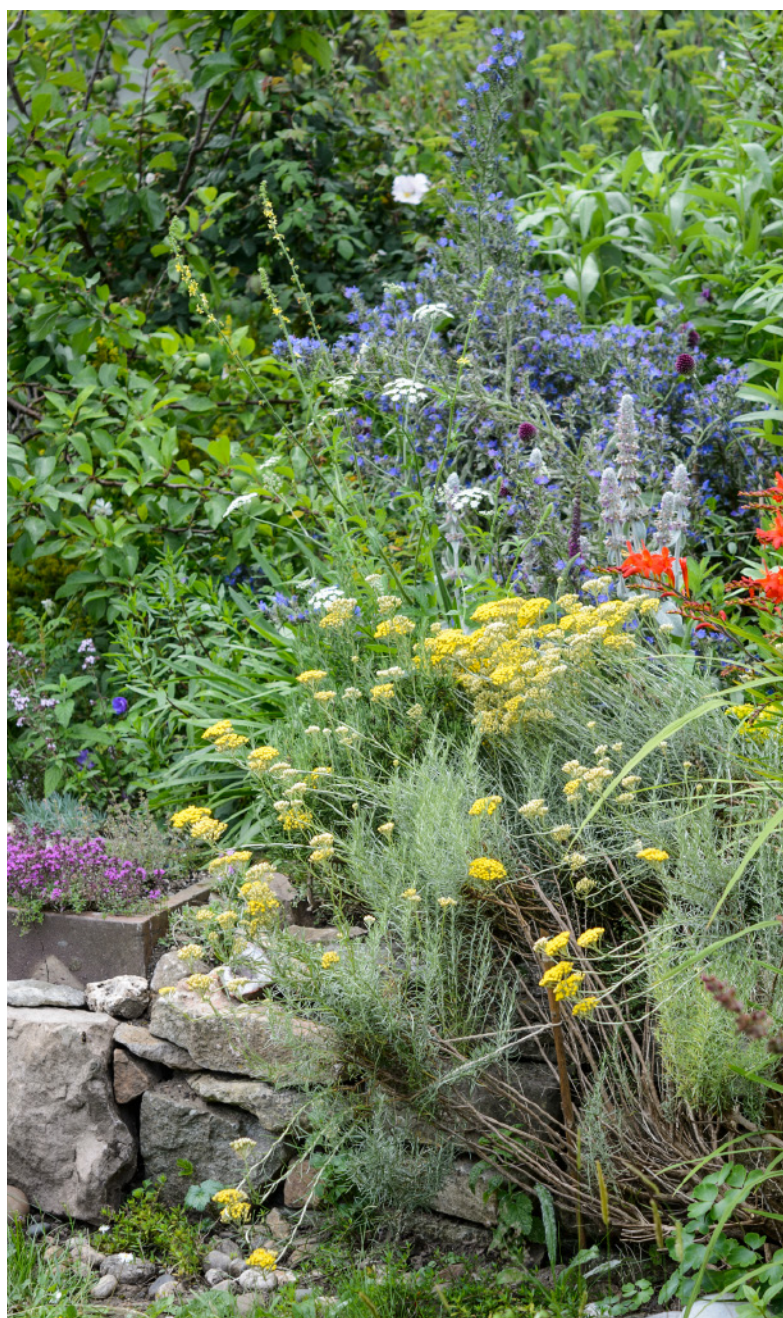
RHS research indicates that the way to make gardens more environmentally resilient and extend the range of benefits they provide us with is to populate them with plants which are best suited for the location, complement each other (e.g. in terms of nutrient and water use) and maximise the number of layers on whatever ground footprint is available.

1 Grow as many plants as possible. Not just by covering as much of your garden as possible with planting, but also increase the range of plants you grow.

2 Plant perennials (including herbaceous, trees, shrubs and hedges), as these will remain in the ground for many years, providing environmental benefits throughout their long lives.

3 Grow as big as you can. Not every garden can accommodate a large tree, but trees, hedges and shrubs will provide the most benefits, purely by virtue of their size. Bigger plants will also often provide multiple benefits at the same time. If you rent, this might not be possible, but if landlords are made aware of the benefits, they may be more receptive.

4 Consider targeting particular environmental issues when you choose your plants. If you live in an area where summer heatwaves make you uncomfortable, for example, plant to shade and cool the air through evapo-transpiration – this could include trees and climbers on the walls of your house. For pollution, a hedge in the front garden between you and the road can help.





“Grow as many plants as possible, and consider targeting environmental issues when you choose your plants.”

5 Take time to enjoy your garden. It’s something that UK gardeners learnt in lockdowns, but the rewards can continue for life if you can make time – it’s also known to be an excellent way of helping our wellbeing, so is part of being kind to ourselves.

6 Improve your gardening expertise. As well as helping you to enjoy growing new things, by seeking support you reap more rewards more easily and become more time efficient – removing two barriers in one. The RHS offers a tailored gardening advice service to all members, as well as straightforward plant and gardening ‘how to’ pages on its website for all.

7 Right plant, right place. It’s an old garden adage, but it means growing the plants that will thrive in the natural conditions in your garden. If you have a naturally dry garden in summer, drought-tolerant species are the perfect choice. This means you will have more success, and the plants won’t need so many environmentally costly inputs such as water and fertilisers.

8 Don’t underestimate the value of collecting rain in water butts, composting and growing your own food. Sustainable practices such as these all help reduce our negative impact on the environment, allowing the plants to provide the positive impacts.

RHS Hilltop — The Home of Gardening Science

In summer 2021, the RHS is opening the world's first dedicated centre for gardening science. RHS Hilltop will enable 70 RHS scientists and PhD students to increase and accelerate their work; it will include a large exhibition space and events calendar that will showcase the fascinating world of gardening science to millions of visitors and school children. Surrounding the building will be four acres of new gardens or 'living laboratories' – the World Food Garden, the Wildlife Garden and the Wellbeing Garden, all of which will contain ideas reflecting new RHS science for people to incorporate at home and in their communities.

Gardeners play a vital role in the effort to adapt to and mitigate major environmental challenges like climate change. Anyone can be a gardener and make a difference and you can find everything you need from the RHS. See www.rhs.org.uk for details.

For press queries about Hilltop or this survey, call 0207 821 3080 or email pressoffice@rhs.org.uk



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Published 9 March 2021. Compiled by Dr Tijana Blanuša, RHS Principal Horticultural Scientist; Leigh Hunt, RHS Principal Advisor; Ed Horne, RHS Head of Communications. To find out more, contact science@rhs.org.uk or RHS Gardening Advice, RHS Garden Wisley, Woking, Surrey GU23 6QB. For press enquiries, see above. Photos © 1 wajan / Adobe Stock 2 Luke MacGregor (*Primula vialii*) 3 RHS / Julian Weigall 4 RHS / Tim Sandall 5 RHS / Mark Waugh 6 Thaut images / Adobe Stock 7 Tijana Blanuša 8 RHS / Neil Hepworth 9 RHS / Jason Ingram 10 RHS / Julian Weigall 11 RHS / Joanna Kossak 12 IRINA / Adobe Stock 13–19 RHS / Jason Ingram 20 RHS / Joanna Kossak 21 Paul Debois. Layout and design: Richard Sanford (RHS).