



OXFORD  
ECONOMICS



# THE ECONOMIC IMPACT OF ENVIRONMENTAL HORTICULTURE AND LANDSCAPING IN THE UK

REPORT FOR THE ENVIRONMENTAL  
HORTICULTURAL GROUP

NOVEMBER 2024



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# EXECUTIVE SUMMARY

**The environmental horticulture and landscaping industry<sup>1</sup> encompasses a wide range of activities**—including companies that cultivate ornamental plants, manufacturers of garden equipment, wholesalers and retailers such as garden centres, and specialists in landscape and arboriculture who maintain home gardens and expansive parks. Beyond these activities, environmental horticulture also boosts tourism by drawing visitors to the UK's renowned parks and gardens. Indeed, such is the increasing recognition of the benefits delivered by the plants and green spaces that the industry manages, the industry is increasingly referred to and recognised as environmental horticulture and landscaping.

**The Environmental Horticultural Group (EHG) commissioned Oxford Economics to assess the environmental horticulture and landscaping industry's contributions to the UK economy.** This comprehensive study not only quantifies the substantial impact of the environmental horticulture industry's *direct* impact from on-site operations, but also the *indirect* impact stimulated by the environmental horticulture industry through its supply chain spending, and the *induced* impact supported through wage-funded consumption by the environmental horticulture industry's employees and those working in its supply chains. These impacts are quantified in terms of gross value added contributions to GDP, the number of jobs supported, and government tax revenues raised. In addition to its economic contributions, this report also highlights the environmental horticulture industry's wider benefits, including social benefits such as health and wellbeing, and environmental benefits such as biodiversity and ecosystem services.

**The environmental horticulture and landscaping industry (excluding garden tourism) itself directly employed 378,000 people in the UK in 2023**, which is broadly equivalent to the entire population of Cardiff.<sup>2</sup> These workers were employed across a range of industries, occupations, and skill levels, but the largest broad groupings were in the ornamental landscaping (235,000) and retailing (77,000) segments. **The environmental**



722,000

Total jobs supported by the environmental horticulture and landscaping industry in 2023

<sup>1</sup> Referred to as the environmental horticulture and landscaping industry hereafter.

<sup>2</sup> ONS, Estimates of the population for the UK, 2022.





£38.0bn

Environmental horticulture  
and landscaping  
industry's total GDP  
contribution in 2023

**horticulture and landscaping industry (excluding garden tourism) is also estimated to have directly contributed £14.4 billion to UK GDP in 2023**—for context, this is greater than the direct GVA contributions of the manufacturing of aerospace sector in the same year.<sup>3</sup> The environmental horticulture industry also generated £2.6 billion in direct revenues for HM Government in 2023—which is equivalent to the salaries of 80,000 nursing professionals in the same year.

In addition to the economic contributions of the environmental horticulture and landscaping industry's core segments, garden tourism has estimated to have directly contributed an additional £1.8 billion in UK GDP in the same year. This activity also directly employed 39,000 people and generated £400 million in tax for the UK government. **Altogether, the environmental horticulture and landscaping industry (including garden tourism) has estimated to have directly contributed £16.3 billion to UK GDP, employed with 417,000 jobs, and £3 billion in tax for the UK government.**

The environmental horticulture and landscaping industry stimulates significant activity in the wider UK economy indirectly through its spending with UK-based suppliers on inputs such as machinery and professional services. The industry also induces further activity through wage-funded consumption by its employees and those working its supply chains, which stimulates activity in the UK consumer economy. Including all three channels of impact—direct, indirect, and induced—we estimate that **the environmental horticulture industry (excluding garden tourism) made a £31.5 billion contribution to UK GDP and sustained the employment of 605,000 people in 2023.**

In addition to economic activity by the environmental horticulture industry's main segments, **garden tourism is estimated to have supported a further £6.6 billion total contribution to UK GDP in 2023**, and in doing so sustained another 117,000 jobs and raised around £1.6 billion in tax revenues for the Exchequer. This included spending associated with both international and domestic tourists visiting gardens across all UK nations and regions.

Across all channels of impact, the environmental horticulture industry (including garden tourism) is **estimated to have contributed an estimated £38.0 billion contribution to UK GDP in 2023**, equivalent to £1 in every £71 of the UK's GDP. The environmental horticulture industry is also estimated to have **supported around 722,000 jobs and £8.5 billion in government tax revenues** in the same year.

<sup>3</sup> Aerospace and related machinery refers to ONS SIC 30.3 (Air and spacecraft and related machinery). More information can be found here: <https://www.ons.gov.uk/methodology/classificationsandstandards/ukstandardindustrialclassificationofeconomicactivities/uksic2007>

**Fig. 1: Summary of direct and total impacts of the UK environmental horticulture industry, 2023**

SECTOR	GDP impact (£m)		Employment (Jobs)		Tax revenues (£m)	
	Direct	Total	Direct	Total	Direct	Total
Garden Goods	700	1,900	13,000	29,000	130	450
Ornamental Plants	1,000	2,000	16,000	32,000	120	380
Landscape Services	8,500	17,900	235,000	355,000	1,260	3,660
Retail	3,000	5,700	77,000	112,000	610	1,310
Wholesale	700	1,400	14,000	24,000	220	410
Tree planting & management	600	2,600	22,000	52,000	210	730
<b>Total (excl. tourism)</b>	<b>14,400</b>	<b>31,500</b>	<b>378,000</b>	<b>605,000</b>	<b>2,560</b>	<b>6,900</b>
Garden Tourism	1,800	6,600	39,000	117,000	400	1,600
<b>Total</b>	<b>16,300</b>	<b>38,000</b>	<b>417,000</b>	<b>722,000</b>	<b>2,960</b>	<b>8,500</b>

In addition to its economic impacts, **the horticulture industry also creates wider social and environmental benefits**. Horticulture, gardens, green spaces and gardening generate a broad range of benefits to individuals and wider society. These include significant physical and mental health benefits including the alleviation of symptoms of chronic conditions, as well as benefits in the form of social integration. It is estimated that the removal of harmful pollutants by urban vegetation generated £800.5 million in avoided negative health impacts in Great Britain in 2021 (ONS, 2023). Further, the Office for National Statistics (ONS) (2023) estimated that the total annual value of noise reduction from urban trees and vegetation in the UK in 2020 was £16.6 million, in avoided loss of quality adjusted life years from sleep disturbance and annoyance.

There is also strong evidence for a range of environmental benefits, including supporting biodiversity, as well as the provision of ecosystem services such as clean air and supporting pollinators. There are specific positive impacts of horticulture to vulnerable groups, including elderly people, and by mitigating some of the most significant environmental and social challenges experiences in urban areas. Notably, the ONS (2023) have estimated that the annual value of avoided costs from urban cooling provided by green and place spaces in UK urban environments was £233 million in 2021.



**£233m**

Estimated avoided costs from urban cooling provided by green and blue spaces in 2021 (ONS, 2023).



**£800m**

Estimated avoided negative health impacts from the removal of harmful pollutants by urban vegetation in 2021 (ONS, 2023).

# THE ECONOMIC IMPACT OF ENVIRONMENTAL HORTICULTURE AND LANDSCAPING IN THE UK



£38.0bn

Environmental horticulture and landscaping industry's contribution to UK GDP in 2023, or £1 in every £71 of the UK's GDP.



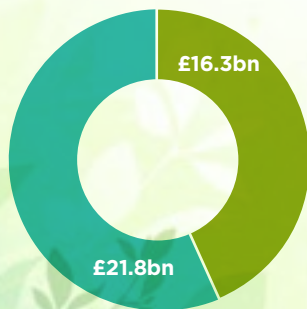
£8.5bn

Tax revenues supported by the environmental horticulture and landscaping industry.

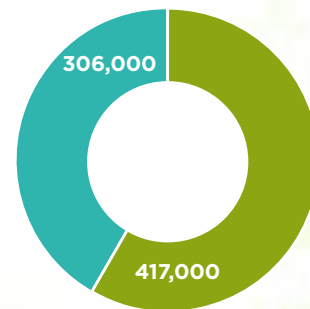


722,000

Total jobs supported by the environmental horticulture and landscaping industry in 2023.



■ Direct impact  
■ Supply chain and wage-funded consumption impact



£1.9 billion



GDP contribution of garden goods manufacturing to UK GDP in 2023, supporting over **29,000 jobs** across the UK

£5.7 billion



GDP contribution of garden goods and equipment retail to UK GDP in 2023, supporting over **112,000 jobs** across the UK

£2.0 billion



GDP contribution of ornamental plants production to UK GDP in 2023, supporting almost **32,000 jobs** across the UK

£1.4 billion



GDP contribution of garden goods and equipment wholesale to UK GDP in 2023, supporting almost **24,000 jobs** across the UK

£18.0 billion



GDP contribution of landscaping services to UK GDP in 2023, supporting over **355,000 jobs** across the UK

£2.6 billion



GDP contribution of tree planting and management to UK GDP in 2023, supporting over **52,000 jobs** across the UK





# **SECTION 1:** **INTRODUCTION**



**The environmental horticulture industry involves a wide range of activities that support a substantial amount of GDP, jobs, and government tax revenue in the UK.**

Gardening and maintaining plants and green space is an important leisure activity for many, with increasing evidence relating to the benefits to mental and physical health. This drives billions of pounds' worth of household spending on horticultural goods, garden equipment, and plants, which in turn supports significant economic activity among the domestic industries that supply these goods and services, their supply chains, and consumer-facing businesses that serve horticulture workers.

**The quality and variety of UK parks, gardens, and landscapes also attract millions of visitors every year.**

This tourism spending support further economic activity, jobs, and tax revenues.

Horticulture also has broader social and environmental benefits for society. This includes improvements to individuals physical and mental health, as well as supporting biodiversity and a range of other environmental benefits.

**Against this backdrop, the Environmental Horticultural Group (EHG) commissioned Oxford Economics to conduct a comprehensive study to assess the environmental horticulture industry's contributions to the UK economy.**

This report presents updated results to a previous study conducted by Oxford Economics in 2018 and subsequently updated in 2021.<sup>4</sup> The full definition of the environmental horticulture industry is detailed in **Box 1** (right).

The structure of the report is as follows:

- **Chapter 2** provides an overview of UK households' demand for garden goods and services and our estimates of the scale and structure of the environmental horticulture industries;
- **Chapter 3** presents our modelling of the environmental horticulture industry's "multiplier impacts" throughout the UK economy;
- **Chapter 4** outlines the ways in which the environmental horticulture industry drives domestic and international tourism;
- **Chapter 5** provides an overview of evidence about the wider social and environmental benefits of horticulture; and
- **Chapter 6** summarises our assessment.

**BOX 1: INDUSTRY DEFINITIONS**

To assess the total economic impact of the environmental horticulture industry, we measured the individual contributions of the following segments:

- 1 Supply of garden goods.** This includes businesses that produce gardening goods and equipment, garden decorations and furniture, fertilisers and agro-chemicals, as well as structures such as garden fences, huts, and greenhouses.
- 2 Ornamental plant production.** This describes creators, cultivators, and sellers of potted and bedding plants and trees, bulbs, cut flowers, and real Christmas trees. It excludes the growing of any plants for commercial food production or consumption.
- 3 Landscape services.** This covers the building and maintenance of landscapes, grounds, gardens, and parks—whether on behalf of private households, businesses, or government. It also includes landscape architects and designers, and those arranging and constructing green spaces during building activity.
- 4 Retailing of garden products, plants, and cut flowers.** This encompasses the activities of specialised plant and greenery sellers, and garden centres. It also includes the horticulture-related spending that takes place within supermarkets, DIY stores, and other retail channels and through online retailing; as well as the non-horticultural spend that takes place within garden centres.
- 5 Wholesale of garden products and flowers.** This describes the dealers and logistics suppliers that transport garden products from their makers to the retailers who sell to households and businesses.
- 6 Tree planting and management.** This includes the planting and conserving of woodlands, parks, street trees, and timber tracts, as well as forest and tree evaluation/management and environmental consulting. It does not include logging and the production of wood for manufacturing purposes.
- 7 Garden tourism.** This describes the value of both international and domestic visitors to UK parks and gardens and the role of these green spaces in supporting wider tourism spending. This includes parks & gardens visitors' ancillary spending on travel, accommodation and food and drink in the UK.

<sup>4</sup> Oxford Economics, [The economic impact of environmental horticulture and landscaping in the UK](#), October 2018.

## AN OVERVIEW OF ECONOMIC IMPACT ANALYSIS

The economic benefits of the environmental horticulture industry (as defined in Box 1) are calculated using a standard economic impact assessment framework. This approach is used to quantify the industries' impacts across three "core" channels, which can be understood as follows:

- **Direct impact**—the environmental horticulture industry's own activities, such as the GDP it generates, its direct employment, and tax contributions;
- **Indirect impact**—the activity and employment stimulated across the environmental horticulture industry's supply chain, through its procurement of goods and services; and
- **Induced impact**—the wider economic benefits that arise when workers employed within the environmental horticulture industry (and its supply chains) spend their earnings in the UK's consumer facing economy.

Three main metrics are used to measure the environmental horticulture industry's full economic footprint:

- **GDP**—the most common measure used to describe the size of an economy.

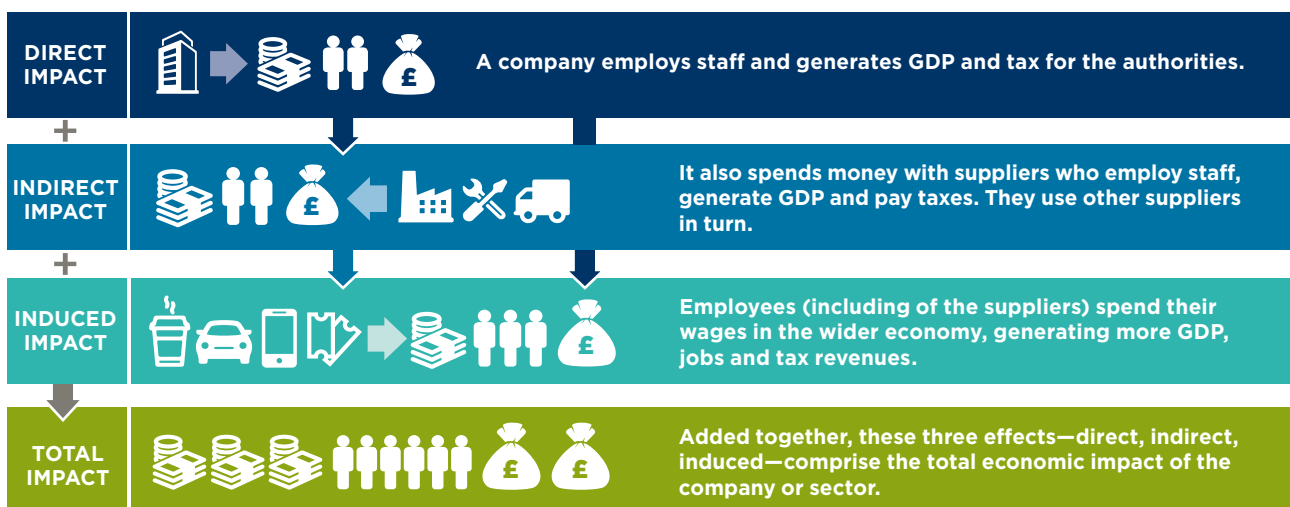
More specifically, we measure the environmental horticulture's gross value added (GVA) contribution to national GDP. GVA is the sum of compensation of employees and earnings before interest, taxes, depreciation, and amortisation (EBITDA). It is also equal to revenue minus the cost of bought in goods and services used up to produce that revenue.

- **Employment**—the number of people employed, measured on a headcount basis; and,
- **Tax revenue**—the estimated fiscal contribution resulting from transactions and employment sustained by the environmental horticulture industry.

The modelling is conducted using an input-output (I-O) based model of the UK economy, and country-level modules describing the economies of its constituent nations. This model was constructed by Oxford Economics, using macroeconomic, employment, and tax data published by the Office for National Statistics (ONS) and HMRC.

The figure below sets out how the channels of a standard economic impact study relate to one another.

### How the channels of economic impact add up



The background of the page is a close-up photograph of green leaves, likely from a plant like a succulent or a similar species, covered in small, clear water droplets. The lighting is soft, highlighting the texture of the leaves and the glistening of the water. The overall color palette is dominated by various shades of green, from deep forest greens to lighter, almost yellowish-green highlights where the water droplets catch the light.

# **SECTION 2:** **DIRECT IMPACT**



## 2.1 HOUSEHOLDS' ENVIRONMENTAL HORTICULTURE SPEND

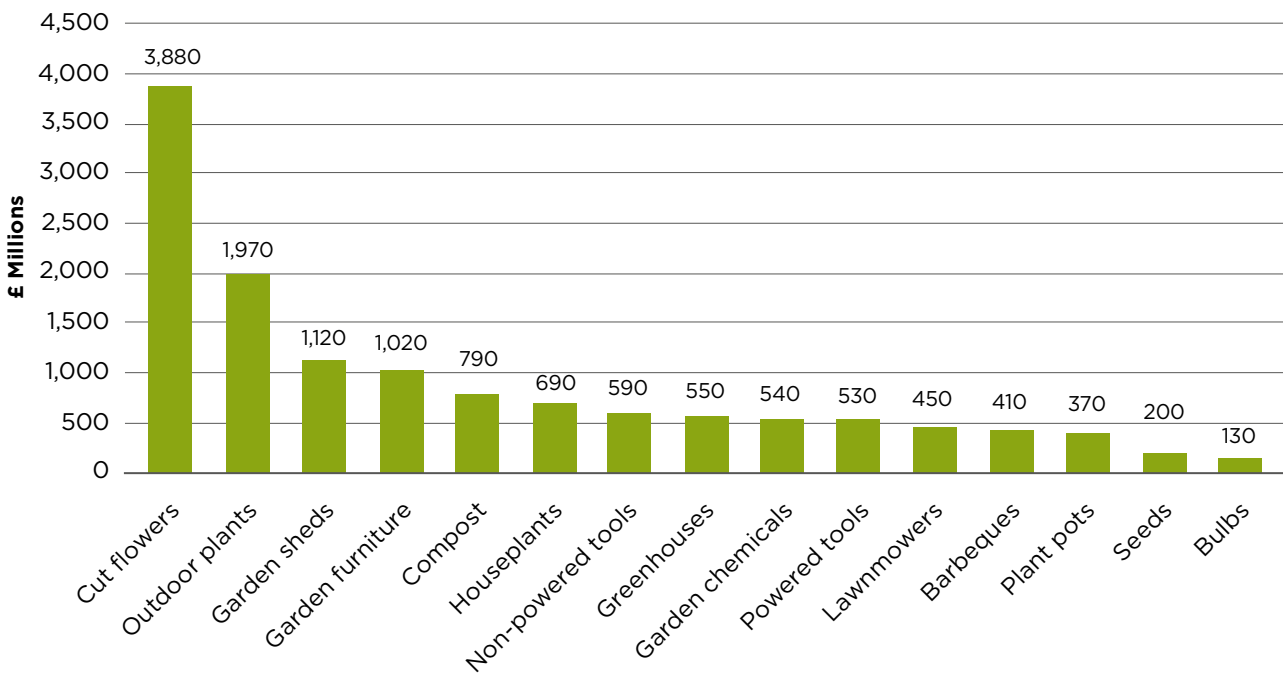
**The spending of private households on their gardens is a major driver of environmental horticulture in the UK.** By purchasing flowers and plants, fertilisers and pesticides, garden tools and furniture, greenhouses and sheds, households generate demand for all aspects of the environmental horticulture industry. These include manufacturers and retailers of garden goods, plant growers, and landscaping service providers.

**We estimate that UK households spent around £13.2 billion on garden goods in 2023.** This spending—made up of routine purchases of supplies and equipment for gardening, such as houseplants, as well as “bigger ticket” items

such as sheds and greenhouses—is equivalent to £1 in every £100 of household spending.

**Beyond these purchases of garden goods, households also spent around £5.8 billion on the services of professional gardeners and landscapers in 2023.** These services range from routine maintenance and upkeep to larger scale works such as extensive redesign and landscaping. While routine maintenance is a far more common activity, its relatively lower cost means that it accounted for just over one-third (36%) of the total spend. Landscaping projects made up the remaining two-thirds (64%) given their costlier nature.<sup>5</sup>

**Fig 2: Household spending on environmental horticultural goods, by product, 2023**



Source: ONS, Mintel, HTA, Oxford Economics

<sup>5</sup> Based on HTA analysis of YouGov survey data for the landscaping services market (2023).

## 2.2 DIRECT IMPACT BY SEGMENT

**UK-based environmental horticulture and landscaping businesses influence the economy in many ways.** By undertaking core environmental horticulture-related activities, the sectors listed in Box 1 have a direct impact on the UK economy. Quantifying this impact requires leveraging various data sources to measure the direct employment engaged in these sectors, the GDP contributions that arise from their activities, and the tax revenues generated for the UK government. This section of the report describes the direct economic contribution that was made by each segment of the environmental horticulture industry in the UK in 2023.

**In aggregate, the environmental horticulture and landscaping industry contributed an estimated £14.4 billion to UK GDP in 2023.<sup>6</sup>** The provision of landscape services contributed 59% of this

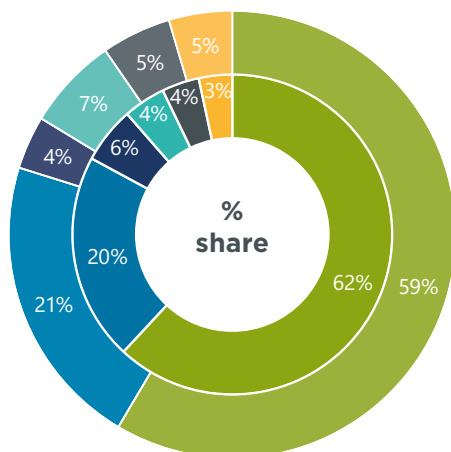
direct GDP impact, followed by 20% generated through the retail sale of garden goods and other non-garden goods within garden centres. The UK's environmental horticulture industry also supported the employment of 378,000 people in 2023, again dominated by landscapers and retailers.

**The environmental horticulture industry also generated almost £2.6 billion in tax revenues for the UK Exchequer in 2023.** This sum is broken out into the industry's various segments, as illustrated in Fig. 4. Landscaping makes up nearly half of the industry's direct tax contribution, followed by retailing.

The rest of this chapter details the direct impacts of each of the environmental horticulture industry's segments.

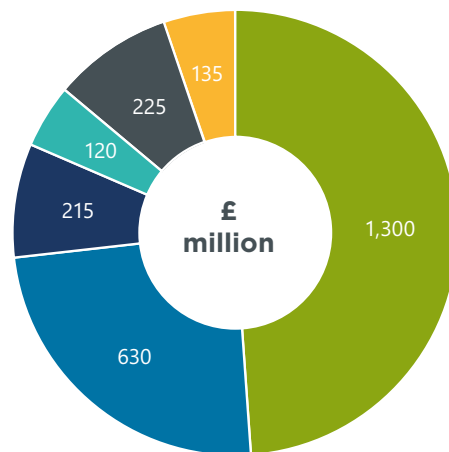
**Fig. 3: Direct GDP and employment contributions of the environmental horticulture industry, by segment (excluding tourism), 2023**

Outer circle: Direct GDP Inner circle: Employment



Source: ONS, Mintel, Oxford Economics

**Fig. 4: Direct tax contributions of the environmental horticulture industries, by tax type, 2023**



Source: HTA, Oxford Economics

■ Landscaping 
 ■ Retailing 
 ■ Tree planting and management 
 ■ Ornamental plant production 
 ■ Wholesale 
 ■ Garden goods manufacture

<sup>6</sup> These figures exclude garden tourism impacts presented in Chapter 5.

### 2.3 MANUFACTURE OF GARDEN GOODS AND EQUIPMENT

The spending of private households on their gardens creates considerable demand for garden goods and equipment producers. The manufacturing of such a broad range of lawn and garden supplies involves businesses from across the industrial spectrum, from makers of ceramic containers and pots to garden clothing manufacturers, from chemicals firms that synthesise fertilisers to metalworkers who forge hand tools for gardening.

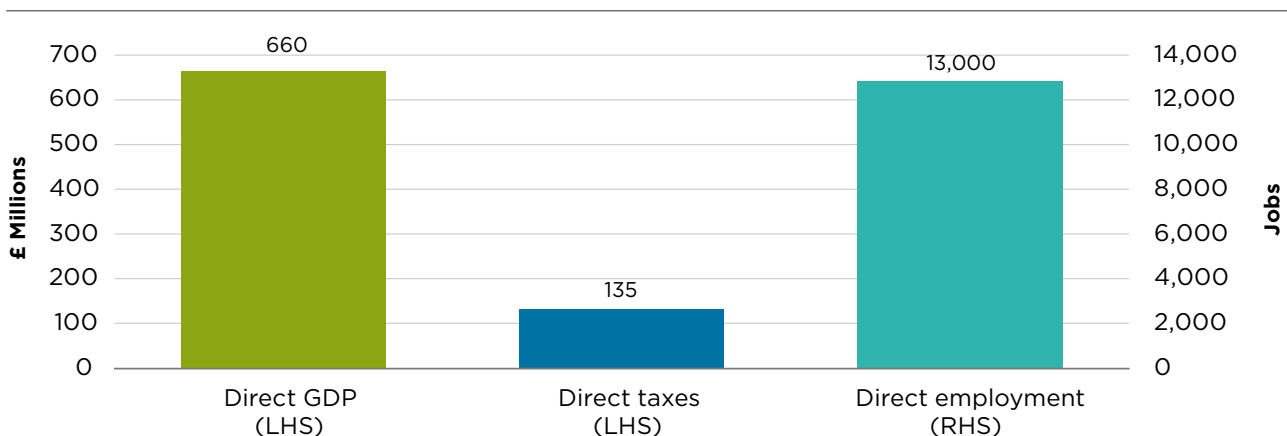
**We estimated the size of this activity drawing from detailed official statistics on industrial production by product.** These data provided us with the volume and value of garden-related items produced by UK manufacturers in 2022, which were then forecasted to 2023 using ONS GDP growth by sector at a slightly more aggregated level. We also sought to isolate the “environmental horticulture-specific” proportion of such production, by excluding the shares of production that are ultimately consumed for agricultural purposes (e.g., insecticides are used in agriculture as well as environmental horticulture).

**We calculate that UK manufacturers of garden goods and equipment sold £2.0 billion worth of environmental horticulture-related products in 2023.<sup>7</sup>** From these sales, the environmental horticulture industry directly generated approximately £660 million worth of GDP, which is equivalent to the difference between these manufacturers’ total output and the cost of external goods and services required to generate this output. This activity also sustained around 13,000 jobs in 2023.

**UK manufacturers of garden goods and equipment were also responsible for a direct tax contribution of £135 million in 2023.**

These tax revenues emerge from the activities of these garden goods suppliers through the profits they generate, the purchases they make from other businesses, the wage payments made to their employees, and business rates payable on their premises.

**Fig. 5: Direct contribution of garden goods and equipment manufacturers, 2023**



Source: HTA, Oxford Economics

Note: Left hand side (LHS) and Right hand side (RHS)

<sup>7</sup> This is factory-gate value. Products in PRODCOM dataset are valued at the price at which they are sold by the manufacturer.



## 2.4 ORNAMENTAL PLANT PRODUCTION

**The growing of plants (excluding for commercial food production), trees and flowers in nurseries is an essential component of the value generated by the UK environmental horticulture industry.**

Ornamental plants, or plants grown for aesthetic purposes and/or ecosystem service provision in gardens, green spaces, and landscape design projects, include houseplants, cut flowers, and specimen exhibition as well as plants produced for planting outside. Ornamental plant producers across the UK cultivate flowers and plants that are meant to be appreciated for their colour, shape, texture, and fragrance, and/or for practical functions such as sustainable urban drainage systems, urban greening projects. Excluded from the definition is plant production for commercial food manufacturing, or essential oils extraction.

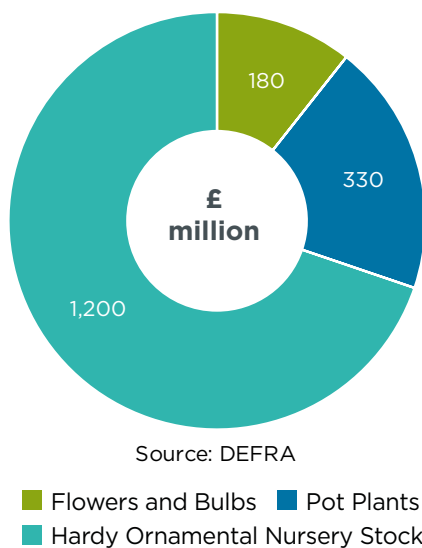
**UK ornamental plants producers grew and sold around £1.7 billion worth of products during 2023.**

Fig. 6 breaks down this amount across the groupings provided by the Department for the Environment, Food & Rural Affairs (DEFRA) shows that the bulk this sum was hardy ornamental nursery stock (HONS). The UK also imported ornamental plants worth £1.5 billion in 2023, with 42% of this figure being cut flowers.

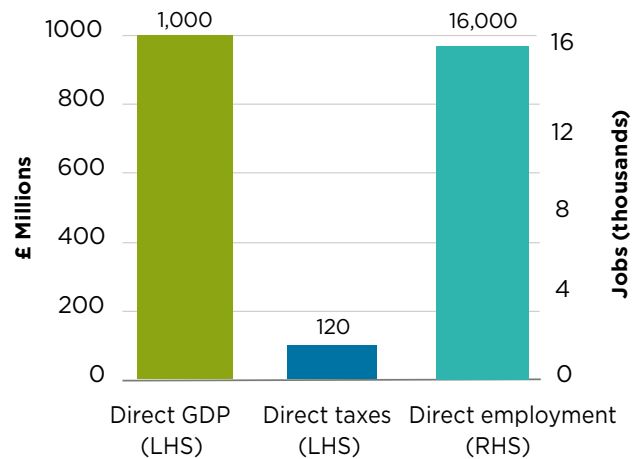
**From these sales, the environmental horticulture industry generated jobs and economic activity across the UK.**

In 2023, we estimate the production of ornamental plants generated around 16,000 jobs, a direct contribution to UK GDP of some £1.0 billion, and £120 million in tax revenues.

**Fig. 6: Estimated value of ornamental plant production in the UK, 2023**



**Fig. 7: Direct GDP, employment, and tax contributions of ornamental plant production, 2023**



Source: Oxford Economics

## 2.5 LANDSCAPE SERVICES

**The landscape services sector covers the design, building, planting, and maintaining of the UK’s green spaces.** The sector includes specialised landscape service firms, as well as landscaping activities carried out as part of broader facilities support contracts, or by groundsmen and greenkeepers employed by firms in other industries and public sector bodies.<sup>8</sup> These landscape services take place across a wide range of environments, from public parks and green spaces to the grounds of schools, hospitals, and offices.

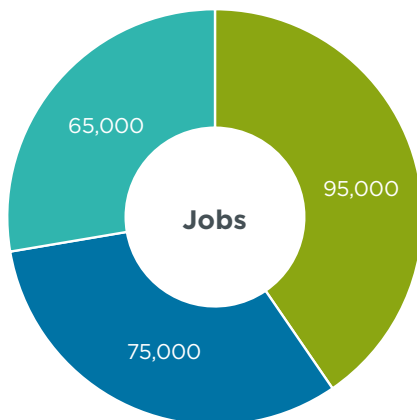
**We estimate that some 235,000 workers helped to deliver landscape services across the UK in 2023.** This figure includes the official scope of the sector as represented in national statistics (around 95,000 workers employed at registered landscaping firms), as well as those working

within landscape services firms but in non-landscaping occupations—such as administrators and managers. A further 75,000 people also worked in the landscape services sector in 2023, but who are “unregistered” in official business statistics, predominantly reflecting self-employed workers or sole traders.<sup>9</sup> Lastly, we estimate that another 65,000 people worked in landscape-focussed roles within other industries (“wider landscaping activities”) during 2023.

**Landscaping activities carried out by these workers directly supported an estimated £8.5 billion contribution to UK GDP in 2023.**<sup>10</sup>

Landscaping activities also contribute significantly to government revenues, through a variety of different tax streams. Taxes on the profits, purchases, premises, and labour amounted to a direct tax contribution of £1.3 billion in 2023.

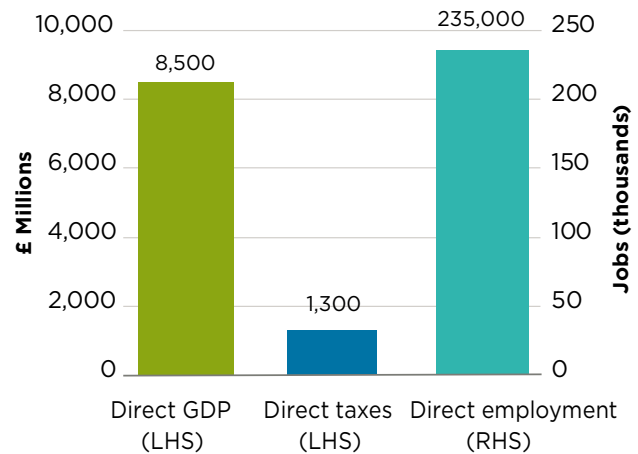
**Fig. 8: Landscape services direct employment in the UK, by employment type, 2023**



Source: BRES, APS, DBT, Oxford Economics

■ Registered ■ Unregistered ■ Wider landscaping activities

**Fig. 9: Direct GDP, employment, and tax contributions of landscape services, 2023**



Source: Oxford Economics

<sup>8</sup> The sector excludes non-commercial landscape gardening efforts.

<sup>9</sup> This figure is based on the ONS’ Annual Population Survey (APS), which is a household survey rather than one of businesses. The employment we describe as “unregistered” predominantly describes self-employment and workers within sole proprietorships. Unregistered does not imply that this activity is illicit; rather, that it occurs at a scale that falls below the relevant VAT/PAYE thresholds that require an official business registration.

<sup>10</sup> This figure assumes that the value added by landscape workers in other sectors is broadly equivalent to the average worker within the landscape services industry.

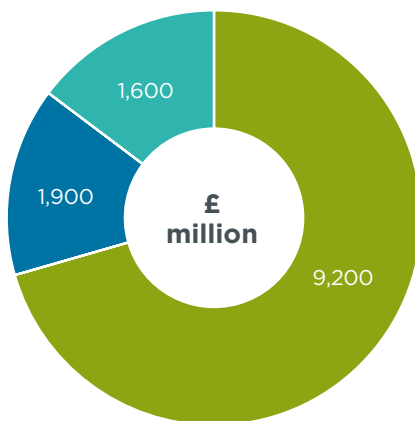
## 2.6 RETAIL SALE OF GARDEN GOODS AND EQUIPMENT

**Consumer purchases of garden supplies and equipment sustain a large economic footprint across the UK.** Using ONS statistics on retail turnover by type of store, as well as data from EHG members, we estimated how this spending was split between garden centres and non-specialised general retailers, such as DIY superstores, supermarkets and mail orders. In addition, an important proportion of garden centres' turnover is attributable to the sale of non-garden goods (e.g., catering income, garden books and magazines, and pet supplies)—these are included as part of the economic impact of garden centres.<sup>11</sup>

**Our estimates suggest that the retail sale of garden goods and equipment directly added around £3.0 billion to UK GDP in 2023.** Garden centres accounted for 42% of this total, with the remainder created by general retailers.

**The sale of garden goods and equipment (as well as non-garden sales by specialist garden centres) directly supported 77,000 jobs in 2023,** evenly split between garden centres and general retailers. We also estimate that around £610 million worth of taxes accrued to the Exchequer, because of this retail activity during that same year.

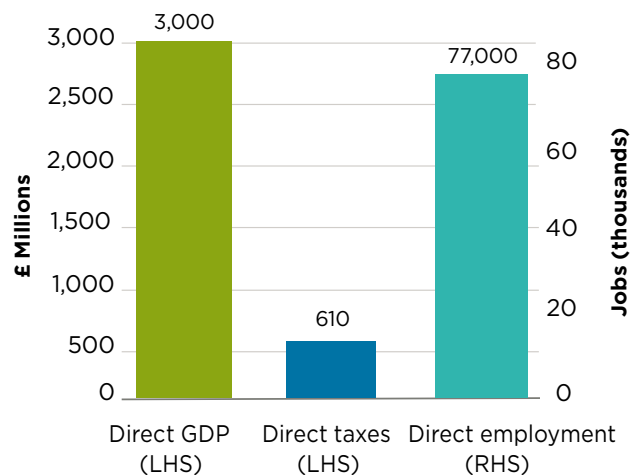
**Fig. 10: Net retail turnover attributable to horticulture, 2023**



Source: ONS, Mintel, HTA, Oxford Economics

- Non-specialised general retailers
- Garden goods sold at garden centres
- Non-garden goods sold at garden centres

**Fig. 11: Direct GDP, employment, and tax contributions of horticulture-related retail activities, 2023**



Source: Oxford Economics

<sup>11</sup> This “non-garden” revenue can be thought of as dependent upon the garden centre’s horticultural operations. For example, the sales of a café within a garden centre would likely not take place without people visiting the retailer primarily for garden supplies.



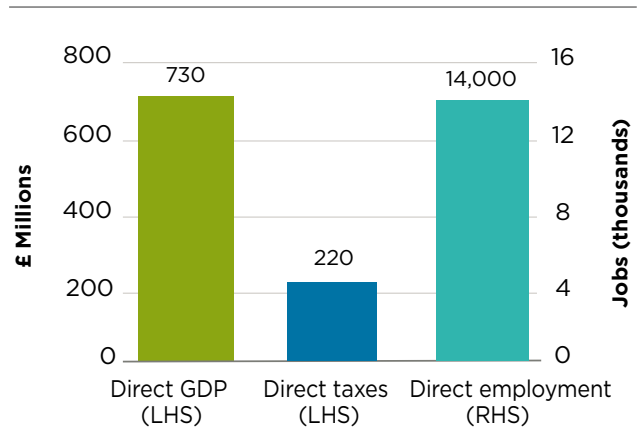
## 2.7 WHOLESALE OF GARDEN GOODS AND EQUIPMENT

**For consumers to access environmental horticultural supplies across the country, a considerable logistical effort is required to deliver these goods to retailers.** Wholesalers and logistics providers ensure plants are carefully handled, stored, and transported from nurseries and greenhouses to garden centres and supermarkets, contributing considerable economic value in the process.

Specialist wholesalers of plants and flowers contributed an estimated £370 million to UK GDP during 2023, while employing around 11,000 people. Non-specialist wholesalers that also transport garden goods and equipment contribute further economic value. When including the horticulture-related portion of this non-specialised industry, we estimate that the direct GDP impact of wholesale of environmental

horticultural products reached £730 million in 2023. This activity directly generated 14,000 jobs during that year and gave rise to about £220 million in taxes.

**Fig. 12: Direct GDP, employment, and tax contributions of horticulture-related wholesale activities, 2023**



Source: Oxford Economics

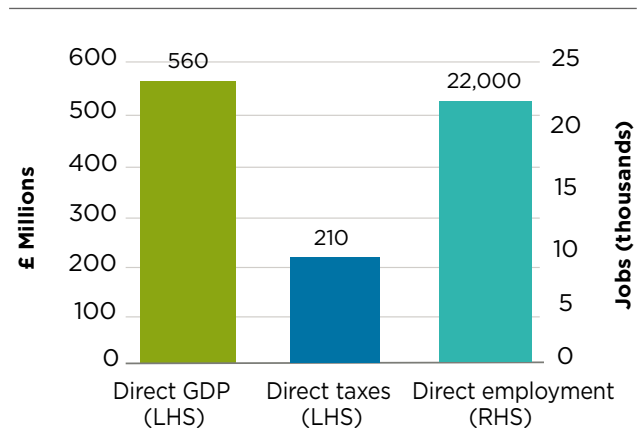
## 2.8 TREE PLANTING AND MANAGEMENT

**Tree planting and management describes a varied collection of tree- and forest-related activities.** In this study, tree planting and management includes the planting, thinning, and management of forests, parks, and street trees, carrying out inventories and evaluations, conservation, pest control, and the facilitation of woodland recreation and tourism. Our definition therefore does not include logging, the production of timber for use in manufacturing or for burning as fuel, and forestry activities focussed on the gathering of wild produce such as mushrooms, berries, and nuts. Note that this sub-industry is complex to define; more details on the approach taken is detailed in the methodology.

**Nearly 22,000 people worked in tree planting and management in 2023 in the UK**--of which over 11,000 engaged in the planting, growing, and management of trees (silviculture) and a further 11,000 worked in other support areas such as evaluation and inventories, fire protection, and public administration.

**This activity directly generated approximately £560 million in contributions to UK GDP in 2023,** with silviculture accounting for just over half of this. Around £210 million in tax revenues emerged from this activity in the same year, predominantly because of labour taxes paid on the salaries of arborists and forestry workers.

**Fig. 13: Direct GDP, employment, and tax contributions of tree planting and management, 2023**



Source: Oxford Economics

A close-up photograph of a green leaf, showing the intricate network of veins. The leaf is the central focus, with its veins radiating from the base. The background is dark, making the green of the leaf stand out. The text is overlaid on the upper left portion of the leaf.

# **SECTION 3:** **INDIRECT AND INDUCED IMPACTS**

**The total economic contribution of the environmental horticulture industry is made up of three channels.** The first channel entails the direct operations of businesses within the horticulture industry in the UK, as described in Chapter 3. The second channel occurs through *indirect* activity stimulated by the industry’s supply chain spending, while the third channel occurs through *induced* activity stimulated by employees working in the industry and its supply chains spending some of their wages in the consumer economy. This chapter discusses these multiplier effects in turn.

### 3.1 INDIRECT IMPACT

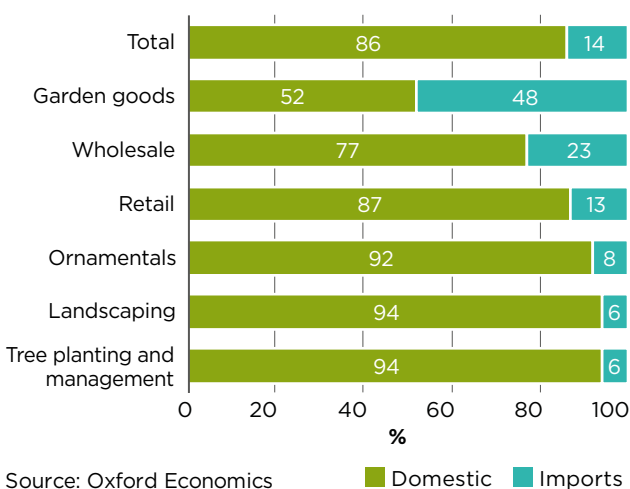
To produce goods and provide services, companies in the environmental horticulture and landscaping industry purchase inputs from a variety of domestic suppliers. In 2023, the environmental horticulture industry spent an estimated £10 billion on operational inputs of goods and services such as agriculture products, rental and leasing services and advertising and market. Imports made up 14% of this total.<sup>12</sup>

**The £8.7 billion spent with other domestic industries constitutes the first round of the environmental horticulture sector’s indirect impact.** This spending supports GDP and jobs, not only with businesses that supply the environmental horticulture industry directly,

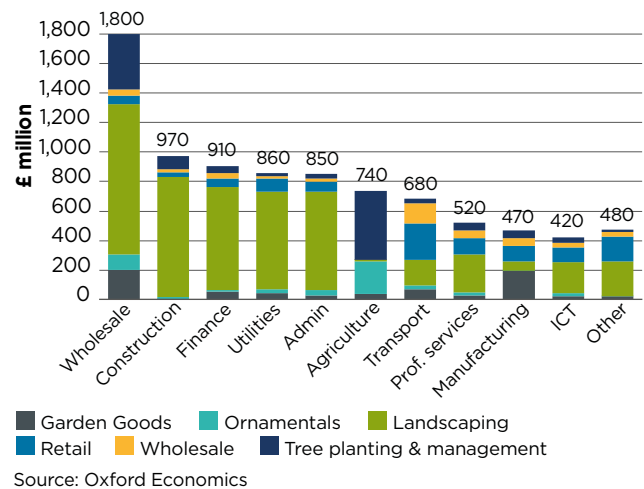
but also with suppliers’ own suppliers, and so on, along the entire length of the domestic supply chain. In this way, the environmental horticulture sector’s economic footprint extends across many other industries throughout the UK. Fig. 15 provides our estimated breakdown of the sector’s domestic spending with its “Tier 1” suppliers.

The UK industries benefitting most from the ornamental and landscaping industry’s procurement spending were wholesale, construction, finance & insurance, utilities, administrative services, and agriculture. Throughout these, the largest contributing segment in terms of procurement spend was landscaping.

**Fig. 14: Geographic source of procurement by the environmental horticulture industry, 2023<sup>13</sup>**



**Fig. 15: Domestic procurement of the environmental horticulture industry, by sector, 2023**



<sup>12</sup> This analysis excludes the expenditures that elements of the sector make with one another, to avoid the double counting of any activity. The economic significance of these transactions is captured in each subsector’s direct impact.

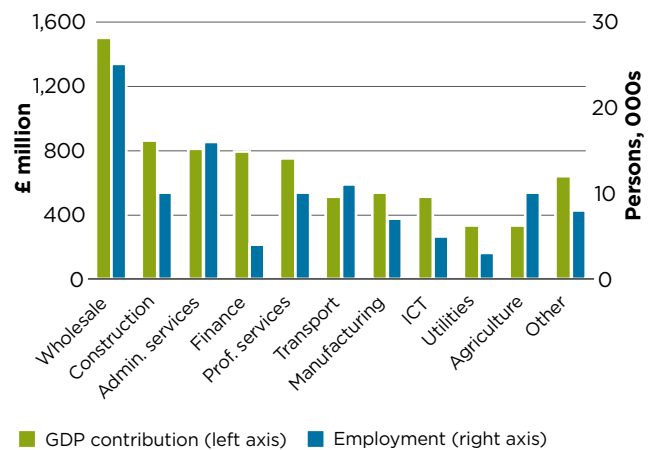
<sup>13</sup> In this chart, the retail sector’s procurement activity describes its operational inputs, but excludes goods that are bought and sold for resale in the same condition (i.e., its retail stock). Retail sector procurement would encompass its rent and utilities payments, purchases of furniture and fixtures, logistics, professional services, finance and insurance, ICT costs, etc.

**In 2023, the environmental horticulture industry supported a £7.9 billion contribution to UK GDP through its procurement spending.**

The sector's expenditure also sustained some 111,000 jobs along its supply chain, as illustrated in Fig. 16. Firms in landscaping activities made up the largest portion of this indirect impact, with their £4.4 billion contribution accounting for over half (56%) of the total.

**This indirect activity also supported substantial revenues for the Exchequer.** In 2023, environmental horticulture indirectly enabled almost £1.8 billion in indirect taxes for the UK government, including £1.2 billion in labour taxes, £260 million in corporation tax, and £380 million in other taxes on products and production.

**Fig. 16: Sectoral distribution of the indirect impact of the environmental horticulture industry, 2023**



Source: ONS, DEFRA, HMRC, HTA, Oxford Economics

### 3.2 INDUCED IMPACT

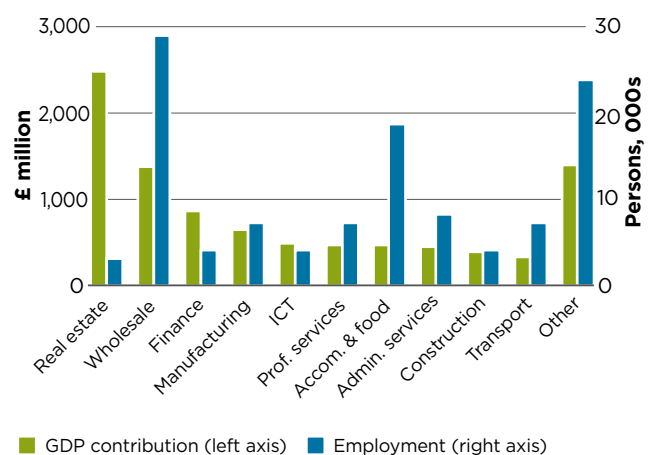
**The environmental horticulture industry paid some £7.5 billion in employee compensation to their 378,000 workers in 2023.** These employees, as well as staff at firms along the sector's supply chains, spend a portion of their wages in the UK consumer economy—for example, at retail and leisure outlets.

**Through this induced channel, the environmental horticulture industry supported a £9.2 billion contribution to UK GDP in 2023.** This accrued to many sectors of the consumer economy, with the largest GDP impact felt by the real estate (£2.4 billion), and wholesale & retail industries (£1.3 billion).

**The environmental horticulture industry also sustained some 116,000 jobs in 2023 through the induced channel.** The largest proportion of these were at firms in the wholesale & retail (28,000 jobs), and accommodation & food industries (18,000 jobs). Through this induced channel, the environmental horticulture sector

also enabled a £2.6 billion contribution to the Exchequer in 2023, mostly driven by VAT charged on consumer goods and services, and other product taxes on suppliers (£1.6 billion).

**Fig. 17: Sectoral distribution of the induced impact of the environmental horticulture industry, 2023**



Source: ONS, HMRC, Oxford Economics



# SECTION 4: TOURISM IMPACT

**Gardens and parks are an important part of the UK’s cultural attractions and play a prominent role in driving UK tourism.**

The country’s nations and regions are filled with lots of beautiful green spaces that attract millions of visitors from all over the world every year. For example, the Royal Horticultural Society (RHS) Chelsea Flower Show attracts tens of thousands of visitors to the grounds of the Royal Hospital Chelsea in London every year, and it takes approximately 8,000 people to put together.<sup>14</sup> The UK is renowned for being the “gardening capital of the world”, and its gardens help attract international and domestic visitors, who spend billions of pounds in the country year.

**This highlights the role of the environmental horticulture industry in bringing not only environmental, social, and cultural benefits to the UK, but also the important economic impacts.**

Trips that involve visits to parks or gardens support vast economic contributions, and such attractions rely on the environmental horticulture industry for their viability and charm. For example, domestic producers grow many of the plants and trees at these parks, and UK-based landscapers and groundskeepers maintain their grounds, often utilising made-in-the-UK garden equipment.

To quantify the extent of tourism activity that is attributable specifically to parks and gardens, we followed an approach originally developed by VisitBritain. This method appraises the proportion of UK tourism activity that is *motivated* by various visitor attractions by leveraging survey evidence from ONS and VisitBritain on the activities undertaken during visitors’ trips, and how important they were in motivating the visit.<sup>15</sup>

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<sup>14</sup> Gardens Illustrated, [Chelsea Flower Show in numbers](#), May 2022.

<sup>15</sup> This survey evidence is only available for domestic visitors. For international visitors, total spending on a given inbound trip is allocated equally across all activities undertaken by the visitor. Spending that takes place on trips that are undertaken for business reasons, for study, or to visit friends and relatives, are then “discounted” by 25-75%, to acknowledge the fact that these purposes were the main drivers of the visit.

## 4.1 TOURISM SPEND ATTRIBUTABLE TO GREEN SPACES

**We estimate that £4.2 billion of international and domestic tourism spending was attributable to UK parks or gardens in 2023.** International visitors accounted for over three-quarters (77%) of this total spend, and their £3.2 billion annual expenditure is “additional” to the UK economy—amounting to exports of tourism services to overseas residents. The remaining £960 million was accounted for by domestic visits, including holidays that involved overnight stays, as well as day trips.

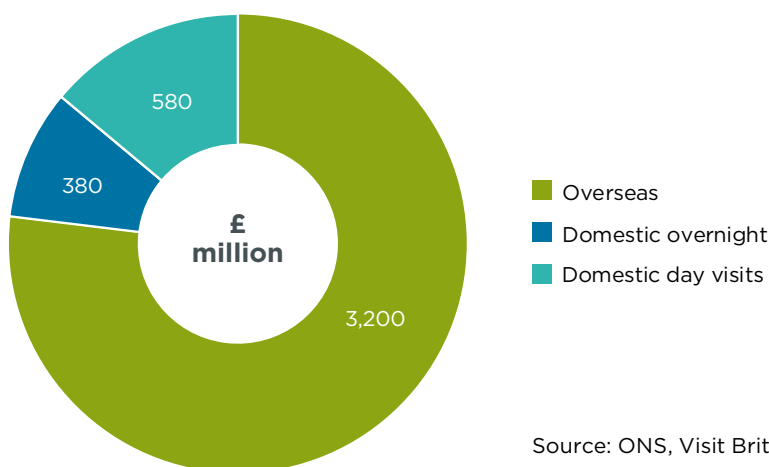
**Historically, parks and gardens have been a prominent reason for international visits to the UK.** In 2016 (the last year when the question was asked), the ONS found that around one-third (32%) of all inbound visits to the UK involved at least one visit to a park or public garden, making it the most common activity for international tourists according to the 2016 International Passenger Survey. Unfortunately, this statistic has not been updated since, so for the purpose of this study, we calculated the propensity to visit green spaces by demographic group using this data (by nationality, age, gender, purpose of visit, and visit length). We then applied these propensities

to the current demographic composition of UK international visitors and their spending in 2023. This assumes the propensity to visit parks by demographic has remained unchanged, with any variations reflecting changes in the profile of visitors to the UK and their spending.

**Following this approach, we estimate that £3.2 billion of international tourism spending was attributable to UK parks or gardens in 2023.** It should be noted that this spending did not just take place at parks and gardens, but it encompassed all purchases of goods and services by visitors during their trips, including on accommodation, food & beverage, merchandising, transportation, as well as other cultural and recreational spending. This spending therefore can be interpreted as the total tourism spending in the UK that is attributable to those visiting parks and gardens.

**When it comes to domestic tourists, our modelling suggests that in 2023, the UK saw around £960 million worth of domestic tourism spending that was attributable to parks and gardens.** This included holidays that involved overnight stays, as well as day trips.

**Fig. 18: Estimated tourism spending attributable to visits to UK parks and gardens, 2023**



Source: ONS, Visit Britain, Oxford Economics

## 4.2 ECONOMIC IMPACT OF HORTICULTURE-ATTRIBUTABLE TOURISM

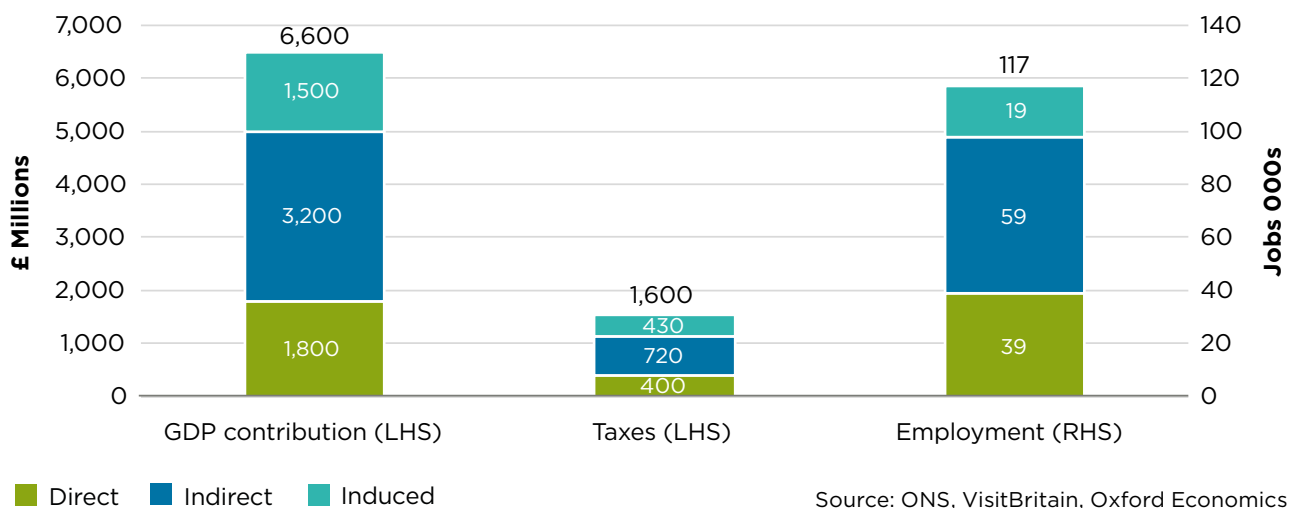
The **£4.2 billion of international and domestic tourism spending attributable to parks or gardens accrued to the UK's tourism industries**, including the accommodation sector, food services, transportation, retailers, sports, and the creative & cultural industries. The ONS' Tourism Satellite Accounts (TSAs) was used to give insights on how much spending flows to each industry.

**We estimate that in 2023, visitor spending attributable to parks and gardens supported**

**some £6.6 billion in GDP in 2023.** This scale of economic activity was enabled by some 117,000 workers and gave rise to around £1.6 billion in tax revenues for the Exchequer.

Considering just the UK's tourism industry, **visitor spending attributable to parks and gardens made a £1.8 billion direct contribution to GDP by the UK's tourism industries.** This impact was associated with 39,000 jobs and around £400 million in tax revenues in 2023.

Fig. 19: Total economic impact of horticulture-attributable tourism, 2023<sup>16</sup>




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We estimate that in 2023, visitor spending attributable to parks and gardens supported some £6.6 billion in GDP.

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<sup>16</sup> Figures may not sum due to rounding.





# **SECTION 5:** **SOCIAL AND** **ENVIRONMENTAL** **BENEFITS OF** **HORTICULTURE**

This section of the study presents evidence on the wellbeing, social, and environmental benefits of horticulture. Evidence was gathered through a rapid literature review on the health, wellbeing, social inclusion, environmental, and ecosystem services benefits of gardens, gardening, green spaces, and horticulture. A range of articles were selected from the literature, with research methods including meta-analysis and original research, and with a geographic scope ranging from global studies to research focussing on the UK, Europe, and the US. The literature includes research conducted by a range of UK organisations that are active in producing original research in the field, including DEFRA, RHS, the University of Reading and the University of Sheffield.

The literature review identifies a **wide range of evidence pointing to the significant positive benefits that horticulture affords society and the natural world**. This study separates these benefits into two broad categories: first, those pertaining to health and wellbeing, and second, those pertaining to the environment.

## 5.1 HEALTH AND WELLBEING

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As defined by the WHO (1948), health is “a state of complete physical, mental and social wellbeing and not merely the absence of disease or infirmity”. In line with Soga et al (2017), we interpret “health” in a broad sense to include physical and psychological wellbeing. On this basis, we consider three categories of health and wellbeing in this study: (1) Physical health; (2) Mental health and wellbeing; and (3) Social inclusion and wellbeing. Relevant literature to each category is outlined in further detail below.

### 5.1.1 PHYSICAL HEALTH

The literature establishes that **gardening and gardens hold a positive relationship with various physical health outcomes**. Soga et al (2017) in their meta-analysis of 22 research papers examining the effects of gardening on health, found that participating in gardening activities has a significant positive impact on a wide range of health outcomes. This positive association was observed for a breadth of physical health outcomes, including reductions in Body Mass Index (BMI) and increases in physical activity levels and cognitive function. Notably, the studies assessed in the meta-analysis found that improvements in patients’ health, including cognitive function, persisted three months

after their participation in horticulture therapy, suggesting that the positive impact of gardening on health continues over time. Soga et al (2017) outlined several possible causal pathways through which gardening promotes health. The first and most direct pathway identified was the added health benefits of direct experience with nature. A further pathway was that gardening was likely to encourage people to undertake physical exercise, which could, in turn, contribute to improvements in health.

The positive association between gardening and gardens and health and wellbeing was similarly established by Howarth et al (2020), through a meta-analysis of 77 studies to guide healthcare strategists’ decisions on how to **use gardens and gardening as a non-medical prescription**. Howarth et al (2020) found that gardening could help improve physiological outcomes associated with long-term physical health conditions, such as blood glucose levels, cortisol levels, heart rate variability, blood lipids, and salivary stress cortisol.

Focussing on the benefits of green spaces, research has also established that the quantity, size, and percentage of vegetation cover of green space has positive impacts on health outcomes.

Van den Berg et al (2015) conducted a systematic review of 40 research papers addressing the relationship between quantity and quality of green spaces in the living environment and health outcomes. Van den Berg et al (2015) concluded that there was strong evidence for significant positive associations between the quantity of green space and reductions in all-cause mortality, and moderate evidence for an association with perceived general health. Reyes-Riveros et al (2021) built upon the research of Van den Berg et al (2015), and performed a systematic bibliographic review of 153 papers examining the association between green spaces and human health and wellbeing. Their findings showed that the number of green spaces, and their percentage of vegetation cover and size, improved health and wellbeing in all aspects assessed, with the most significant positive association observed in mental health. Further, recent studies have examined associations of green space with the health-outcomes of participants in the longitudinal UK Biobank study, a national prospective cohort of adults in the UK with linked ONS mortality records (Roscoe et al, 2022; Wan et al 2022; Yu et al, 2023). The researchers found inverse relationships between green spaces and mortality, including all-cause, non-injury cardiovascular mortality and chronic respiratory disease mortality.

A positive association between health and urban horticulture is also established in the literature. It is estimated that the removal of harmful pollutants by urban vegetation generated £800.5 million in avoided negative health impacts in Great Britain in 2021 (ONS, 2023). Cruz-Piedrahita et al (2020) conducted a systematic review of the literature, focussing on the impacts of urban horticulture on public health, the environment, and health behaviours in the Global North.<sup>17</sup> Cruz-Piedrahita et al (2020) concluded that urban horticulture could help to improve public health in cities of the Global North, with positive health outcomes including an increase in physical activity and in fruit and vegetable consumption. This positive relationship with increased physical activity has also been established with respect to gardening and access to gardens. Chalmin-Pui et al (2021) found a significant positive association between more frequent gardening and physical activity levels of UK gardeners, while de Bell et al (2020) found that access to a private garden in the UK was associated with a higher likelihood of meeting physical activity guidelines.

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<sup>17</sup> Urban horticulture is the agriculture of plants for food consumption, materials production, or decoration, developed inside city boundaries.



### 5.1.2 MENTAL HEALTH AND WELLBEING

A key focus of the literature analysing the relationship between horticulture and health and wellbeing is on the significant positive association with mental health and broader wellbeing outcomes. In Soga et al (2017), “wellbeing” was interpreted simply as “the state of being comfortable, happy, or prosperous”. In addition to the researchers’ findings related to physical health outcomes, they concluded that **gardening is positively associated with a broad range of mental health outcomes**, including reductions in depression and anxiety symptoms, stress, and mood disturbance, in addition to increases in general quality of life. In fact, Soga et al’s (2017) subgroup analysis indicated that mental wellbeing variables were more likely to be sharply enhanced by gardening than health variables. In Howarth et al’s (2020) meta-analysis, 36% of the studies assessed focused on the impact of gardening on mental health. The researchers found that gardening interventions had a positive impact on mental health and wellbeing, including reducing depression and anxiety. Clatworthy et al (2013) found the same positive association in their study, where they evaluated the evidence for gardening-based mental health interventions. When the researchers considered the papers that met their specified inclusion criteria, all the selected material reported positive effects of gardening as a mental health intervention, including reduced symptoms of depression and anxiety.

The positive impact from gardening on mental health and wellbeing is also established in original research, in addition to the previously detailed systematic reviews. Wood et al (2020) assessed the impacts of a session of allotment gardening on mental wellbeing, measuring self-esteem, mood, and general health in over 100 UK gardeners before and after an allotment session. They found a statistically significant improvement in self-esteem and mood as a result of one allotment session. Moreover, the researchers revealed that allotment gardeners had statistically significantly better self-esteem and mood and experienced less depression than non-gardeners. Wakefield et al (2007) reached similar conclusions through their investigation of the health impacts of community gardening in Toronto, Canada, finding that community gardens were perceived by gardeners to provide numerous health benefits, including improved mental health. This positive association was also



found by Scott et al (2020), who studied the relationships between home and community gardening and older adults' self-reported psychosocial and physical wellbeing in Australia. Scott et al (2020) found that older adults who took part in gardening-related activities reported psychological benefits, and that the more time spent doing these activities, the more the benefits accrued.

Moreover, research on the impacts of green spaces and horticulture find a significant positive impact on mental wellbeing. Van den Berg et al (2015), in their systematic review, found strong evidence for the significant positive association between the quantity of green space and perceived mental health. Wendelboe-Nelson et al (2019) utilised a scoping review approach to map literature on green spaces and their associations with mental health and wellbeing. Of the 273 studies identified by the researchers, 70% reported a positive association between some aspect of green space exposure and health and wellbeing. The researchers concluded that different types of green spaces, in a range of contexts and environments, had a positive effect on mental health and wellbeing. With respect to horticulture, Scott et al (2022) conducted a systematic review focussing on the impacts of horticulture-based activities for people living with dementia in community settings. They found that involvement in horticulture-based activities led to positive impacts on mental wellbeing and quality of life. Further, Chalmin-Pui et al (2021) analysed the impacts of a horticultural intervention in North England, UK, where ornamental plants were introduced to previously bare gardens. The researchers found that the intervention was associated with significant reductions in residents' perceived stress, which was reflected in improved diurnal cortisol patterns.<sup>18</sup>

### 5.1.3 SOCIAL INCLUSION AND WELLBEING

Beyond physical and mental wellbeing, social wellbeing is also found in the literature to be positively affected by gardens and gardening. Looking at the systematic reviews detailed in sections 1.2.1 and 1.2.2 above, Howarth et al (2020) identified a **link between gardening and a reduction in social isolation**, finding that gardening enabled greater social interaction with others and thus improved overall mental wellbeing, while reducing depression and anxiety. Similarly, Soga et al (2017) found that gardening was associated with an increased sense of community.

This positive relationship between gardens and gardening and social inclusion is also established in original research conducted in the Netherlands and Australia. Veen et al (2016) analysed seven community gardens in the Netherlands, with varying organisational designs and objectives, and investigated the extent to which these influenced the enhancement of social cohesion. Notably, they found that community gardens contributed to the development of social cohesion, even if people were not particularly driven by social motivations. In Australia, Kingsley et al (2019) presented findings from semi-structured interviews with participants from community gardens, and suggested that engagement in community gardens enhanced social and natural connectedness in urban settings. This engagement was also shown to improve health and wellbeing and address the socio-ecological determinants of health. Scott et al's (2020) study on the relationships between gardening and older adults in Australia's self-reported wellbeing had a notable focus on social connectedness. They found that increased social connectedness appeared to be a benefit of gardening group membership, as indicated by the significantly

<sup>18</sup> The physiological stress response in humans is regulated by the hypothalamic-pituitary-adrenal (HPA) axis and its synthesis of cortisol (Chalmin-Pui et al, 2021).

higher mean on their “Social benefits” scale for members compared with non-members.<sup>19</sup> The social benefits of gardening as marked by this scale included meeting new people, making and maintaining friendships, and having a shared interest to connect with other people.

Horticulture-based activities and urban horticulture are also assessed by the literature as providing benefits to social inclusion. Sempik et al (2014) conducted a study where they collected scores on social interaction, communication, motivation, and task engagement, as part of an assessment during a programme of social and therapeutic horticulture in the UK.<sup>20</sup> The sample assessed was comprised of a varied group of participants, which included vulnerable people, principally those with a learning disability or a mental health problem. The key finding from the study was that scores for social interaction were significantly higher after 90 days of participation, with this effect appearing to be most evident in participants with a learning disability. Sempik et al (2014) concluded that social and therapeutic horticulture promoted social inclusion among vulnerable and isolated groups. Scott et al (2022) reached a similar conclusion through their systematic review, concluding that participation in horticulture-based activities promoted social participation. With respect to urban horticulture, Cruz-Pedrahit (2020) identified social isolation as an issue of increasing concern in urban life, and found that urban horticulture was related to an increase in social cohesion.

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Howarth et al (2020) identified a link between gardening and a reduction in social isolation

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<sup>19</sup> The scale was generated by combining participant’s answers to three questions relating to social benefits, measured on a five-point Likert-type scale.

<sup>20</sup> Therapeutic horticulture describes a process, either active or passive, of purposefully using plants and gardens in therapeutic and rehabilitative activities designed to positively affect a set of defined health outcomes for individuals (Scott et al, 2020).

## 5.2 ENVIRONMENTAL IMPACTS

Academic literature suggests that gardens, green spaces, and horticulture play a significant role in promoting environmental benefits. In this study we focus on two categories of environmental benefits: firstly, the support of biodiversity; and secondly, the provision of related ecosystem services.

### 5.2.1 BIODIVERSITY

The literature establishes that gardens are a principal component of green infrastructure and an important source of biodiversity. Gardens and green spaces include a variety of cultivated and wild plants, including both native and non-native species (Salisbury et al, 2015; 2017). Delahay et al (2023) conducted a review that summarised evidence from 408 studies of garden biodiversity published in the scientific literature. The researchers found that of the studies that compared the biodiversity of gardens to other habitats, several showed similar or higher plant species richness than nearby native habitats. An early assessment on the importance of green spaces and gardens in the UK's urban environments to biodiversity was conducted by Gaston et al in 2005. They performed a detailed audit of UK gardens, based on the Biodiversity in Urban Gardens in Sheffield (BUGS) project, to illustrate how green spaces in UK urban environments—including large numbers of ponds, nest-boxes, compost heaps, and trees—supported biodiversity and the provision of related ecosystem services. Thompson et al (2003) also utilised findings from the BUGS project, analysing species biodiversity in UK gardens. The researchers found that **biodiversity in gardens was very high when compared to derelict land**. The authors hence credited the variety of plants available to gardeners and identified that it was the active management of land that allowed plants to survive in low populations.

The literature also includes a range of studies focussing on the importance of gardens in supporting particular species. For example, Plummer et al (2023) used garden monitoring to illustrate how gardens play a significant role in providing habitats for butterflies, including increased visitations of species exceeding those in other habitats, and increases in species thought of as less common garden visitors. The researchers found that interventions such as increasing the number and diversity of flowering plants, as well as including shrubby areas, had a positive impact on butterfly species. With regard to invertebrates, RHS have conducted a series of experiments in the UK quantifying and comparing biodiversity benefits associated with different plant species in gardens and other green spaces (Salisbury et al 2015; 2017; 2020). The researchers found that gardens support a broad range of invertebrate species, with higher levels of plant matter availability associated with greater species abundance.

Another particular interest in the literature is the impact of gardens on pollinators. Osborne et al (2008) found that gardens provided valuable nesting habitats for bumblebees in the UK. The researchers found that **the density of bumblebee nests in gardens were comparable to those of fence lines, slightly greater than in hedgerows and significantly greater than in other habitats such as woodland and grassland**. Baldock et al (2015) also identified the important role of gardens in supporting pollinators—particularly bees. The researchers highlighted the role that urban green areas can play in providing favourable habitats, refuges, and corridors for pollinators. Tew et al (2021) quantified the nectar supply of urban areas, farm land and nature reserve landscapes across 36 UK sites. The researchers found that residential gardens are the key land use underpinning nectar sugar production within urban landscapes and concluded that retaining gardens within urban landscapes is a priority in urban pollinator conservation.



### 5.2.2 ECOSYSTEM SERVICES

A focus of research on the environmental benefits of horticulture is the support that it gives to the provision of ecosystem services. Ecosystem services are the benefits people obtain from ecosystems. These include provisioning services such as food and water; regulating services such as regulation of floods, drought, land degradation, and disease; supporting services such as soil formation and nutrient cycling; and cultural services such as recreational, spiritual, religious, and other nonmaterial benefits (Millenium Ecosystem Assessment, 2003). Notably, the ONS (2023) have estimated that the asset value of urban cooling provided by green and blue spaces in UK urban environments was £27.4 billion in 2021. Further, ONS (2023) have stated that allotments and growing spaces enable small scale food production in urban areas, yielding an estimated 116 million kilogrammes of produce in Great Britain in 2021.

The support provided by horticulture to the provision of ecosystem services is inherently connected to the previously mentioned research on the biodiversity benefits of horticulture and gardens. However, in addition to this literature, there are papers that have a more explicit focus on the impacts of horticulture and gardens on ecosystem services. For example, Evans et al (2020) conducted a systematic review of 157 peer-reviewed journal articles to synthesise the benefits and disbenefits of implementing various forms of urban agriculture and green infrastructure for the delivery of ecosystem services in urban areas. The researchers concluded that **parks, community gardens, and green spaces supported diverse ecosystem provisions**, each delivering more than 16 different ecosystem services across all four service categories. The most prevalent services provided by parks and green spaces were climate and air quality regulation, as well as recreation and mental and physical health, while the most prevalent service provided by community gardens was maintenance of genetic diversity. With respect to horticulture, the systematic review

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Researchers concluded that parks, community gardens, and green spaces supported diverse ecosystem provisions

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conducted by Cruz-Pedrahita et al (2020) found that urban horticulture could improve soil porosity and micro-diversity and regenerate urban soils, thus enhancing green spaces and increasing biodiversity in cities.

Case studies conducted across Europe, North America, and the UK have also found evidence of the supportive role that gardens play in ecosystem service provision. Speak et al (2015) analysed the ecosystem services provided by allotments gardens in Manchester, UK, and Poznań, Poland, by conducting surveys that included land cover characterisation and an assessment of plant species. The researchers found that allotment gardens provided a broad range of ecosystem services in urban areas—including pollination, food provision, and biodiversity—and noted that many of the ecosystem services provided were of high importance in cities. Case studies have also been conducted in the UK investigating the ecosystem service provision of green hedges, green facades and green roofs (Blanusa et al, 2019; Kemp et al, 2018; Thomsit-Ireland et al, 2020). The researchers found that these green spaces support the provision of a range of ecosystem services, including pollution capture, cooling and water management through increased rainfall retention. Clarke & Jenerette (2015) investigated the ecosystem services production in community gardens across Los Angeles in the US by conducting surveys across regional, garden, and plot scales. Quantitative results from the study indicated that community gardens provided valued ecosystem services in food insecure regions and contributed to biologically diverse urban ecosystems. These conclusions are reinforced by the findings of Camps-Calvet et al (2016), who adopted an ecosystem services framework to assess the contributions of urban gardens to their users in Barcelona, Spain, and identified the provision of 20 ecosystem services, ranging from food production to social cohesion. Notably, the researchers found that

the main beneficiaries of ecosystem services from urban gardens were older, low-middle income, and migrant people. In an indoor context, Gubb et al (2022) find that houseplants reduce concentrations of nitrogen dioxide, which is associated with negative outcomes for human health. These impacts were found to be strongest in confined indoor spaces that were poorly ventilated and/or located in highly polluted areas.

Looking more specifically at ecosystem services related to soil formation and the impact of cultivation techniques, Bretzel et al (2018) conducted a study that focused on an allotment area in Italy, which since 1995 has been run as a municipal vegetable garden by the residents. The study analysed the soil and compared the data with those collected five years previously, to verify the possible changes in soil properties and fertility. The researchers found that the allotment holders positively influenced the soil quality through the cultivation techniques.

A specific focus in the literature is on the carbon sequestration services provided by gardens and green spaces. Davies et al (2011) examined the quantities and spatial patterns of above-ground carbon stored in a typical British city, Leicester, by surveying vegetation across the entire urban area. Davies et al (2011) estimated that approximately 230,000 tonnes of carbon is stored within the above-ground vegetation of Leicester, equating to 3.16kgCm<sup>-2</sup> of urban area. The researchers concluded that current national estimates of this ecosystem service undervalue Leicester's contribution by an order of magnitude. Edmundson et al (2014) investigated the effect of land-cover on soil organic carbon (SOC) stocks in domestic gardens and non-domestic greenspaces in Leicester. The researchers found that domestic gardens held greater SOC concentrations than non-domestic greenspaces and that urban green space SOC storage exceeded that of regional agricultural soils.

# **SECTION 6:** **CONCLUSION**



**The environmental horticulture and landscaping industry’s wide range of activities support a significant amount of GDP, jobs, and government tax revenue in the UK.** Through the environmental horticulture and landscaping industry’s own activities—plus activity it stimulated through its supply chain spending with UK-based businesses and wage-financed consumption of people employed in the sector and among its suppliers—the nation’s environmental horticulture and landscaping industry (excluding garden tourism) supported a £31.5 billion GVA contribution to UK GDP in 2023 across the economy, equivalent to £1 in every £85 of the UK’s GDP. Through these channels of activity, the environmental horticulture industry sustained the employment of 605,000 people and £6.9 billion in tax revenues across the UK economy in that same year.

**On top its core impact, environmental horticulture also boosts the UK’s attractiveness as a tourism destination.** Green spaces across the country attract international and domestic visitors with their scenic beauty, enabling tourists to spend money within the UK’s tourism industries and thereby contributing further to the economy. We estimate that tourism activity attributable to parks and gardens boosted UK GDP by a further £6.6 billion in 2023, while sustaining another 117,000 jobs and raising £1.6 billion in tax.

Altogether, the industry supported a £38.0 billion GVA contribution to UK GDP in 2023 across the economy, equivalent to £1 in every £71 of the UK’s GDP. Through these channels of activity, the environmental horticulture industry sustained the employment of 722,000 people and £8.5 billion in tax revenues across the UK economy in that same year.

**A significant share of the environmental horticulture and landscaping industry’s total impact was generated through its direct operations.** Its activities directly generated an estimated £ billion gross value added contribution to UK GDP, employed around 417,000 jobs, and £3 billion in tax for the UK government.

**Horticulture also generates a broader range of social and environmental benefits.** Through a review of key literature, we identified a broad range of benefits provided by gardens, gardening, green spaces and horticulture to health and wellbeing and the environment. This ranges from the alleviation of symptoms of chronic physical and mental health conditions, to the integral role played by gardens and green spaces in supporting the provision of ecosystem services. The literature review also provides insights into the positive impacts of horticulture for particularly vulnerable groups, such as the elderly, and in lessening the specific environmental and social challenges of urban spaces.

**Fig. 20: Summary of direct and total impacts of the UK environmental horticulture industry, 2023**

SECTOR	GDP IMPACT (£m)		EMPLOYMENT (Jobs)		TAX REVENUES (£m)	
	Direct	Total	Direct	Total	Direct	Total
Garden Goods	700	1,900	13,000	29,000	130	450
Ornamental Plants	1,000	2,000	16,000	32,000	120	380
Landscape Services	8,500	17,900	235,000	355,000	1,260	3,660
Retail	3,000	5,700	77,000	112,000	610	1,310
Wholesale	700	1,400	14,000	24,000	220	410
Tree planting & management	600	2,600	22,000	52,000	210	730
<b>Total (excl. tourism)</b>	<b>14,400</b>	<b>31,500</b>	<b>378,000</b>	<b>605,000</b>	<b>2,560</b>	<b>6,900</b>
Garden Tourism	1,800	6,600	39,000	117,000	400	1,600
<b>Total</b>	<b>16,300</b>	<b>38,000</b>	<b>417,000</b>	<b>722,000</b>	<b>2,960</b>	<b>8,500</b>

# APPENDICES



# APPENDIX 1: DETAILED RESULTS

**Fig. 21: Environmental horticulture’s core economic impact, by channel of impact and segment, 2023**

SECTOR	Direct	Indirect	Induced	Total
<b>GDP IMPACT (£m)</b>				
Garden Goods	700	600	600	1,900
Ornamental Plants	1,000	500	500	2,000
Landscape Services	8,500	4,400	5,000	17,900
Retail	3,000	900	1,800	5,700
Wholesale	700	300	400	1,400
Tree planting & management	600	1,100	900	2,600
<b>Total (excl. tourism)</b>	<b>14,400</b>	<b>7,900</b>	<b>9,200</b>	<b>31,500</b>
Garden Tourism	1,800	3,200	1,500	6,600
<b>Total</b>	<b>16,300</b>	<b>11,100</b>	<b>10,700</b>	<b>38,000</b>
<b>EMPLOYMENT (Jobs)</b>				
Garden Goods	12,800	8,900	7,600	29,300
Ornamental Plants	16,200	9,500	6,300	32,000
Landscape Services	235,400	57,200	62,900	355,500
Retail	77,100	12,900	22,300	112,300
Wholesale	14,400	4,200	5,400	24,000
Tree planting & management	21,600	18,700	11,200	51,600
<b>Total (excl. tourism)</b>	<b>378,000</b>	<b>111,000</b>	<b>116,000</b>	<b>605,000</b>
Garden Tourism	38,900	59,100	19,300	117,400
<b>Total</b>	<b>417,000</b>	<b>171,000</b>	<b>135,000</b>	<b>722,000</b>
<b>TAX REVENUES (£m)</b>				
Garden Goods	130	140	170	450
Ornamental Plants	120	120	140	380
Landscape Services	1,300	1,000	1,400	3,700
Retail	610	210	490	1,310
Wholesale	220	70	120	410
Tree planting & management	210	270	250	730
<b>Total (excl. tourism)</b>	<b>2,600</b>	<b>1,800</b>	<b>2,600</b>	<b>6,900</b>
Garden Tourism	400	700	400	1,600
<b>Total</b>	<b>3,000</b>	<b>2,500</b>	<b>3,000</b>	<b>8,500</b>

**Fig. 22: Environmental horticulture's economic impact, excluding tourism, by nation, 2023<sup>21</sup>**

NATIONAL IMPACT SUMMARIES	GDP IMPACT (£m)		EMPLOYMENT (Jobs)	
	Direct	Total	Direct	Total
England	12,200	25,900	311,000	490,000
Wales	540	1,800	16,400	37,000
Scotland	1,300	2,600	41,900	59,700
Northern Ireland	440	1,400	8,700	22,400
<b>United Kingdom</b>	<b>14,400</b>	<b>32,000</b>	<b>378,000</b>	<b>610,000</b>

**Fig. 23: Environmental horticulture's GDP impact, excluding tourism, by nation and segment, 2023**

NATIONAL GDP IMPACT	ORNAMENTAL PLANTS		LANDSCAPE SERVICES		GARDEN GOODS	
	Direct	Total	Direct	Total	Direct	Total
England	770	1,700	7,200	14,700	520	1,500
Wales	70	170	310	960	40	130
Scotland	30	130	840	1,600	80	170
Northern Ireland	100	180	180	720	20	90
<b>United Kingdom</b>	<b>1,000</b>	<b>2,200</b>	<b>8,500</b>	<b>17,900</b>	<b>660</b>	<b>1,900</b>

NATIONAL GDP IMPACT	RETAIL		WHOLESALE		TREE PLANTING AND MANAGEMENT	
	Direct	Total	Direct	Total	Direct	Total
England	2,700	4,800	600	1,200	450	2,000
Wales	80	250	20	60	30	180
Scotland	200	400	30	80	70	230
Northern Ireland	90	230	40	80	10	130
<b>United Kingdom</b>	<b>3,000</b>	<b>5,700</b>	<b>730</b>	<b>1,400</b>	<b>560</b>	<b>2,600</b>

Note: May not sum due to rounding.

<sup>21</sup> Tourism activity cannot be broken down along national lines using the same methodology that is employed for other segments of the environmental horticulture industry.

**Fig. 24: Environmental horticulture's employment impact, excluding tourism, by nation and segment, 2023**

REGIONAL EMPLOYMENT IMPACT (Jobs)	ORNAMENTAL PLANTS		LANDSCAPE SERVICES		GARDEN GOODS	
	Direct	Total	Direct	Total	Direct	Total
England	12,100	25,800	194,000	287,600	11,100	23,900
Wales	1,500	3,700	10,300	20,300	500	1,900
Scotland	800	2,400	27,400	36,700	900	2,100
Northern Ireland	1,800	3,000	3,600	10,900	300	1,300
<b>United Kingdom</b>	<b>16,200</b>	<b>34,900</b>	<b>235,400</b>	<b>355,500</b>	<b>12,800</b>	<b>29,300</b>

REGIONAL EMPLOYMENT IMPACT (Jobs)	RETAIL		WHOLESALE		TREE PLANTING AND MANAGEMENT	
	Direct	Total	Direct	Total	Direct	Total
England	66,800	94,900	12,500	20,000	13,900	36,000
Wales	2,700	5,500	400	1,100	1,000	4,500
Scotland	5,900	8,400	500	1,200	6,400	8,900
Northern Ireland	1,700	3,600	900	1,400	300	2,100
<b>United Kingdom</b>	<b>77,100</b>	<b>112,300</b>	<b>14,400</b>	<b>23,800</b>	<b>21,600</b>	<b>51,400</b>

Note: May not sum due to rounding.

## APPENDIX 2: METHODOLOGY

To conduct the analysis, we used an update UK Input-Output (IO) table sourced from the ONS. This is effectively a cross-section of the economy, outlining the transactions between different industrial sectors (who purchases what from whom). It forms the basis of our economic impact assessment model. The updated IO table reflects structural changes in the economy. We include the latest National Accounts data, also sourced from the ONS, so to reflect the structure and industrial relationships of the UK's economy in 2023.

### HOUSEHOLDS' ENVIRONMENTAL HORTICULTURE SPEND

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To understand the magnitude and structure of households' demand for garden goods and products, we drew upon a range of sources. YouGov's detailed product-by-product sales figures form the core of this analysis. These figures—sense checked by HTA—were used to measure the magnitude of horticulture spending across detailed product groups. This differs from the source used in the previous project

(Kantar-TGI) hence there are some minor differences in definition. Namely, 'houseplants' and 'indoor plants' are included in 'other garden plants/trees', which is an addition to the previous data source, and 'fertilisers/weeds' has been re-defined as 'garden chemicals'. Due to the data not including cut flowers, these are added using an estimate from Mintel.

### MANUFACTURE OF GARDEN GOODS AND EQUIPMENT

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To estimate the direct impact of garden goods and equipment production, we used PRODCOM data accessed via ONS and Eurostat. This is a dataset that records detailed production statistics across 3,900 different types of manufactured products. We identified a list of environmental horticultural products from these data and used them as the starting point for our analysis.

For products that could be used for either horticultural or agricultural purposes, we adjusted total production to isolate environmental horticultural demand. This adjustment drew upon data from the ONS' input-output tables. These record the extent to which different goods and services are consumed by various sectors of the economy and allowed us to estimate the share of demand for (e.g.) agro-chemicals used by households and landscape services firms,

as opposed to the agriculture sector and food manufacturers.

We estimated GDP contributions using the ONS' Annual Business Survey (ABS). This provides details on the turnover and gross value-added (GVA, that is broadly equivalent to GDP) for many industries across the UK economy, including a detailed list of manufacturing subsectors. The ABS uses the same industrial classification as the PRODCOM database, albeit at a greater level of aggregation. Import propensities were added, sourced from HRMC's Overseas Trade Statistics. We estimated garden goods' direct GDP impact using the ratio of GDP to turnover from the broader manufacturing subsector within which this production takes place. The employment impact of this production is estimated in the same fashion, using ABS data on manufacturing employment.



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## ORNAMENTAL PLANT PRODUCTION

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The production value of ornamental plants was sourced from DEFRA's Horticulture Statistics bulletin. We estimated the GDP impact of this production using a ratio drawn from HTA's survey

of ornamental plant producers. We estimated employment using Annual Population Survey (APS) figures for the plant propagation sector.

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## LANDSCAPE SERVICES

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The direct impact of landscape services first used ABS data on the landscape services industry. This provided estimates of the turnover, GDP, and employment that arises through the sector's activities. However, household-based employment surveys reveal that there is much more employment within this sector than is suggested by the ABS.

As such, we incorporated the estimated "unregistered" employment using data from the APS. This encompasses self-employed and own-account workers, whose activities are not at a scale that necessitates VAT/PAYE registration, and thus do not appear in official business register-based statistics.

We estimated turnover per person among this workforce using a factor drawn from BEIS' Business Population Estimates (BPEs). This provided turnover estimates for unregistered

workers within the broader sector, "Services to buildings and landscape". We calculated the ratio of turnover per worker among unregistered and registered workers in this broader sector. This ratio was then applied to turnover per worker as provided in the ABS data, to estimate the average turnover that is accrued by unregistered landscape service workers.

Data from the APS disaggregated by both industry and occupation also revealed that gardeners, groundsman, and greenkeepers are employed within many other sectors of the economy. Some are horticultural professionals within other facilities service firms that provide landscape services as part of broader service contracts. Others are employed within sports, education, health, and public sectors, amongst others. We characterised this employment collectively as "wider landscape activities".

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## RETAIL SALE OF GARDEN GOODS AND EQUIPMENT

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To understand the impact of garden goods and equipment retailing, we combined household spending estimates with ABS figures for turnover among specialist garden centres and pet stores. We adjusted for the increment of this turnover accounted for by specialist pet stores, using the relative proportions of horticultural and pet-related consumer spending from the ONS' Family Spending Survey. We also made use of the Horticultural Trades Association's (HTA) estimates of aggregate garden centre turnover, drawn from industry surveys.

Once we estimated how much of households' environmental horticultural spend flowed to garden centres, we assigned the rest to non-specialist retailers (i.e. supermarkets). We then used ABS data on general retailers' output and productivity to quantify how many employees this spending supported; and how much GDP was generated as a result. We then estimated the employment and GDP of garden centres using ratios from the ABS. We used data from the ONS' Business Register and Employment Survey (BRES)—as supposed to the ABS data previously used, which was not available—to estimate employment.

For both general and specialist retailers, ABS figures allow for the estimation of retail margins as a proportion of overall turnover. These margins amount to the gross output of a retailer, and are distinct from total turnover, since turnover also encompasses the value of goods the retailer has sold. By excluding the value of the goods themselves, we ensure that we do not double-count; retailers accrue only that revenue that is attributable to their retail services (i.e., their margin), and manufacturers accrue the revenue that is attributable to the value of the goods.

Data on the number of real Christmas trees purchased was sourced from an IPSOS survey, while the average price of real Christmas trees came from HTA's Garden Retail Monitor system. While included in the specialist garden centres turnover data provided by HTA, turnover estimates for non-specialist stores did not include the value of Christmas tree sales. To account for this this, we assumed that 50% of Christmas tree sales was generated by non-specialist stores.

## WHOLESALE OF GARDEN GOODS AND EQUIPMENT

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Our estimates for wholesaling began with ABS figures for GDP and employment in the "wholesale of flowers and plants" industry. This describes the direct economic contribution of specialist wholesalers of flowers, plants, and bulbs.

To estimate the impact that the trade of environmental horticulture products supports among non-specialist wholesalers, we began with our estimates of domestic production of garden

goods. We then included the value of imported garden goods (via trade data from HRMC and Eurostat), to arrive at an estimate of the total supply of environmental horticulture products to the UK market. To this value, we applied average wholesale margins for non-specialist wholesalers, as indicated by the ABS. These margins form the wholesalers' output and allow us to derive the GDP and employment contributions sustained by this activity.

## TREE PLANTING AND MANAGEMENT

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Our estimates for tree planting and management drew on ABS data for the sectors "Silviculture and other forestry activities" and "Support services to forestry". We adjusted this latter sector to exclude the estimated proportion of support services that are focussed on logging activity. This adjustment factor drew upon a detailed breakdown of forestry sector employment from the ONS BRES, contrary to the previous project which drew from analysis by CJC Consulting looking at Scotland's logging activities.

We also incorporated APS-based estimates of employment within forestry and arboriculture occupations that fall outside of the forestry sector itself. An important sector of the Environmental horticulture and Landscaping industry is arboriculture. Elements of this industry are likely captured within this sector, and other sectors of our model such as landscaping services. However, the absence of definitive SIC codes for arboriculture is a barrier to obtaining definitive values for this sector.

## TOURISM

Our methodology for environmental horticulture’s tourism impact utilises the latest available information to estimate the visitor spending which is attributable to the UK’s horticultural attractions and sites.

The starting point is the Visit Britain domestic overnight and day tourism visit and spend data. We then reduce this to the total value of tourist spending on trips which include a visit to a park or a garden. Next, we factor in the number of other activities undertaken by tourists during their trips—note, this information is not available for 2023, so it is retained from the previous study—along with the importance of the park and garden visit to their trip. For this, we used the latest data from Visit Britain to estimate the share of visitors going to parks and gardens as the main, or an important, reason for their trip. Combining this information, we our estimate for the visitor spend which is attributable to horticultural attractions and sites.

For international passengers, we used information from the we used International Passenger Survey (IPS) data on the inbound tourists to the UK. Because the latest (2023) survey no longer asks visitors about the activities they undertake on

their visit (incl. visiting parks and gardens) we took the activity profile from the last available year (2016) and applied to the 2023 visitors based on age, country of origin, gender, duration, purpose of visit, and spending during visit. The total spending of tourists who undertook only visits to parks and gardens is undiscounted, while the spending of tourists who also undertook other activities is divided by the number of activities undertaken (i.e., for an inbound tourist that visited parks and gardens as well as three other activities, only 25% of their spending was included in the calculation).

International visitors’ spending was then discounted again, according to their stated ‘trip purpose’ in the IPS, using the following discount factors:

<b>1</b>	Holiday: .....	100%
<b>2</b>	VFR: .....	50%
<b>3</b>	Business: .....	25%
<b>4</b>	Study: .....	25%
<b>5</b>	Miscellaneous (including multiple reasons): .....	25%
<b>6</b>	Transit: .....	25%

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